

# The influence of partners' education on family formation

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## **Abstract**

Most of the empirical studies on education and fertility focus on characteristics of the female spouse. The role of the partner is often neglected. Yet, most children are fathered and grow up in a relationship. Hence, we assume that both partners' education has to be regarded when analysing family formation. In our paper, we use couples as the unit of analyses and look at each partner's education and the couple's educational constellation, i.e. if both partners have the same educational level or if one partner is higher educated than the other. In our empirical analysis on first births we use the German Socio-Economic Panel (GSOEP).

**Keywords:** education, educational homogamy, fertility, family formation, spouse, couple, partnership

**Word count:** 6,787

# 1. Introduction

A review of existing sociological literature on the relation between educational attainment and fertility reveals that most empirical studies focus on women. A well-known finding of these studies is that high educated women postpone childbirth and more often remain childless than less educated women (Brüderl and Klein 1991, 1993; Blossfeld and Jaenichen 1992). Only part of this pattern can be attributed to postponement of family formation while being in education. In contrast to women, studies examining family formation of men show that childlessness among men is highest for those with low levels of education (Kravdal and Rindfuss 2008, Schmitt 2005). Similar to women high educated men postpone family formation but for those having a partner and in fulltime employment educational differences mostly disappear (Kurz 2005). Therefore, analysing the relation of education and timing of family formation on the basis of individual data is problematic if the partnership context differs. Regarding the abovementioned findings, delayed first births of high educated women might be related to delayed partnership formation; the relatively low share of childless, high educated and fulltime employed men might be due to their female partner that withdraws from the labour market for childrearing. Despite numerous research on education and fertility only a few previous studies have applied a couple's perspective (e.g. Corijn, Liefbroer, and de Jong Gierveld 1996; Kreyenfeld and Konietzka 2008; Bauer and Jacob 2009).

In this paper, we extend previous research by using couples as the central unit of analyses and we analyse the relation of education and first birth in the partnership context. The influences of both partners' education are regarded simultaneously as well as possible combinations of female and male spouse's education. Previous research reporting postponement of family formation often used the age at which women give birth to their first child. By placing family formation within the appropriate context of couples, not (only) the biological age of actors matters, but the time of partnership formation marks the beginning of the process of decision on parenthood. Although finding a partner might be driven by family attitudes and the desire for children, the realization of (planned) family formation follows necessarily partnership formation. In our empirical analyses, we first look at the female spouse's age as the relevant time axis because fertility of a couple is limited by the female's fertile phase. Additionally, for a comprehensive description of first births within couples we also apply a couple's perspective by using the partnership's duration as process time and compare these results with the individualistic view. Summing up, we examine the following questions: *What is the influence of the male and female spouse's education on family formation in existing partnerships? Are there differences between different combinations of male-female education? How do couples differ when we look at family formation from the beginning of the partnership on?*

We begin with a short overview of previous research dealing with education, employment and fertility (see 2) and some results on fertile behaviour of couples. In section 3, we discuss the assumptions of a rational choice model of family formation. This can either be based on the New Home Economics, assuming that all household members maximize a joint utility function. Bargaining theories also apply rational choice, though the household members must not have same interests and therefore negotiate with each other in order to reach an agreement. Both approaches focus on expected benefits and costs (direct costs and opportunity costs) of parenthood, which can either be beneficial for individuals or for unitary households. We derive our hypotheses assuming that differently educated individuals and couples use different strategies to maximize

their benefits and minimize their costs. Our empirical analysis is based on the German Socio-Economic Panel (GSOEP), a wide-ranging representative longitudinal study of private households in Germany that includes characteristics of all members living in the household. The longitudinal structure of the data allows us to examine the life courses of individuals as well as partnership formation and duration simultaneously, and how these interact with childbirth.

## **2. Partner's education and family formation**

### **2.1 Theoretical considerations and previous empirical evidence**

Empirically as well as theoretically, there are several arguments to focus on couples instead of individuals: Most children are fathered and grow up in a relationship. For example, in 2006 in Germany 85 percent of all children up to age 18 lived in a two-parent family (Krieger and Weinmann 2008). Even if both partners did not reach a clear consensus on family formation, in most cases partners provide the social environment of parenthood. Hence, characteristics of both partners have to be taken into account when analysing family formation. Theoretically, micro-economic theory also explicitly has a household approach: Family formation is a household's decision. Both partners' education and its related labour market potential are evaluated for the capability to bear direct costs and opportunity costs in case of childbirth (Becker 1973, 1974, 1981; Leibenstein 1974; Easterlin 1975). Although the theoretical perspective concerns couples, most empirical research has focused on one partner and her or his education only.

Some recent research also included partners' education. Two approaches on partners and couples can be distinguished: (1) Some studies focus on one partner and examine whether the effect of individual educational attainment is altered when taking the partner's education into account. Putting this into empirical practice, both partners' educational attainment was included in one model ("partner perspective"). (2) Other studies use couples as unit of analyses and look at the educational constellation of the whole couple. The partners' education is put in relation to each other, i.e. if both partners have attained the same educational level (homogamous couple) or if one partner is higher educated than the other (hypo- resp. hypergamous couple). This approach is suitable to examine interaction effects of both spouses' education ("couple perspective").

Almost all studies applying a "partner perspective" come to the same conclusion: Differences between educational groups are greatly reduced when including the partner's characteristics. Kreyenfeld (2002) shows that looking only at women, vocational training has a negative effect on first births but a positive on second births. These effects become insignificant when including the partner's (vocational) education. In accordance with previous studies both Kreyenfeld and Konietzka (2008) and Brose (2008) find for women being in education significant reductions of the transition to a first child. This effect is reduced and becomes insignificant for those with a partner and if the partner's education resp. employment is added to the model. Regarding higher order birth, the effect of women's education is also reduced in the model that includes characteristics of the partner. Klein (2003) looks at fertility of men and women first separately then jointly. The relation of education changes in a couple's perspective: postponement of family formation during education becomes weaker for women with a partner but stronger for male spouses and is reduces in the

case of educational differences among men and women living in a partnership. Kurz (2005) analyses family formation of men. She finds that for those men who actually have a partner the transition rate to fatherhood does not vary significantly with their own education and employment status. Similarly, Brüderl and Diekmann (1994) report that men's educational attainment is negatively related to fertility in more recent cohorts but this effect disappears once the educational level of the wife is controlled for. Using cross-sectional data of couples, Bauer and Jacob (2009) can show that in particular the education of the female partner matters within couples. Taking into account the partner's education, differences between women with different educational attainment remain and the impact of the female spouse prevails. For Sweden, Andersson, Duvander, and Hank (2005) found that characteristics of both partners significantly influence the transition to a second or third child, but that in Germany female's education has a stronger impact than the male partner's.

A "couple perspective" is applied by Corijn, Liefbroer, and de Jong Gierveld (1996), Kreyenfeld (2002), Wirth (2007) and Bauer and Jacob (2009). In these studies educational constellations of couples are examined, i.e. homogamous, hypergamous and hypogamous couples are compared. Classical theories of family economics suggest that educational asymmetries between partners encourage parenthood. In that case opportunity costs of the partner that specializes in family tasks are relatively low and specialization gains are high. In contrast, for high educated homogamous couples, opportunity costs in case of specialisation are rather high and therefore a higher share of childlessness among these couples is expected. The results of these studies are fairly robust in support of these hypotheses: Couples with two high educated spouses are the most likely to remain childless. As the samples of analyses differ, the constellation that is most likely for children is either the 'traditional' couples with a higher educated male spouse (Wirth 2007 for couples with at least one tertiary graduate) or those with two low educated partners (Corijn, Liefbroer, and de Jong Gierveld 1996; Bauer and Jacob 2009). Consistent over all studies, hypogamous couples with a higher educated female spouse also more often remain childless than hypergamous couples. Bauer and Jacob (2009) extend these analyses by a distinction of general and vocational education. Hypergamous couples, i.e. couples with a higher educated male spouse, are not per se most likely to have children but only in the case of higher vocational training of the male spouse. On average, couples with the same general and vocational education are the most likely to have children although the variation between high and low educated homogamous couples is quite high.

## 2.2 Hypotheses

In this paper, we extend previous research in the following two respects:

(1) Most studies apply a "partner perspective", only a few the "couple perspective". Those focusing on couples either used rather crude distinctions of education (high/low) or could only draw on cross-sectional data to examine childlessness. In our study, we apply a distinction between post-secondary (including tertiary education and vocational training) and general education that proved to be fruitful in our previous analyses and examine differences among couples in the timing of first birth. We expect that the timing of family formation is more strongly related to each partner's post-secondary education and vocational constellation than to general education. Post-secondary education serves as an indicator of labour market

potential that is relevant for evaluating available resources to afford children resp. opportunity costs in case of temporarily withdrawal from the labour market after childbirth.

(2) Most previous research on timing of first birth used a time axis of either the female or the male partner (mostly age). Klein (2003) has already shown that the results substantially differ when using a couple's time axis, e.g. time since partnership formation. We will follow his suggestion and examine the influence of each partner's education and educational constellation in the course of cohabiting couples. Regarding partnership duration, we expect that differences between men and women with different educational attainment and couple's educational constellation are reduced. Therefore, using the partnership's duration as the 'time at risk', differences in mating and partnership formation between educational groups that precede childbirth are partly suppressed.

### 3. Data and estimation

Our empirical analysis is based on the German Socio-Economic Panel (GSOEP), a wide-ranging representative longitudinal study of private households in Germany that includes characteristics of all members living in the household. The longitudinal structure of the data and the household sampling allows us to examine the life courses of individuals as well as their partner's simultaneously, including their interaction for childbirth. For estimation we used all waves of the GSOEP from 1984 to 2007. We restrict our sample to partnerships that have begun during these panel years as only in these cases we have information on the parents. Furthermore, we excluded women that already had a first birth before the current partnership began and couples that had existed before the household entered the panel, as in these cases births before panel entry can only be attributed to the mother and not the father. That leaves us with 1272 couples and 639 first births between 1984 and 2007. Using person-period data format our analyses are based on 4825 couple-years. The data used in this paper was extracted using the add-on package PanelWhiz for Stata (Haisken-DeNew and Hahn 2006).<sup>1</sup>

Our central variable of interest is the birth of the first child within an existing couple. As we use couples as unit of analyses we have to interpret all effects of individual education in the partnership context, i.e. they only refer to individuals living with a partner. For modelling the timing of first birth, we use two time axis: firstly we look at the female spouse's age as the relevant time axis, because fertility of a couple is limited by the female's fertile phase (age 15 to age 45, i.e. the analysis time ranges from 0 to 30). Secondly we use the partnership's duration as process time (with a range from 0 to 20 years). The beginning of the partnership is measured by entering cohabitation, because in the SOEP data partners have to live in the same household to be interviewed.

As we are interested in effects of education, our central variable is educational attainment of both partners. We use both, general and vocational education as two different dimensions of education. Our previous research has shown that the impact of general and vocational education on fertility differs and that also the

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<sup>1</sup> PanelWhiz (<http://www.PanelWhiz.eu>) was written by Dr. John P. Haisken-DeNew ([john@PanelWhiz.eu](mailto:john@PanelWhiz.eu)). The PanelWhiz generated DO file to retrieve the data used here is available from us upon request. Any data or computational errors in this paper are our own. The following authors supplied PanelWhiz Plugins used to ensure longitudinal consistency: John P. Haisken-DeNew (2), Markus Hahn (11).

educational constellation of the couple has to be differentiated between general and vocational education (Bauer and Jacob 2009). We use a simple dichotomous distinction: General education is operationalised by having attained higher secondary schooling (*Abitur*) vs. all other lower general schooling degrees (no *Abitur*). Post-secondary (vocational) education is a dichotomous variable as well comparing those with no post-secondary education to individuals with vocational training or tertiary education. For the educational constellation we use for general and vocational constellation two times four groups each: hypergamous general education (male partner holds *Abitur*, female partner does not), hypogamous general education (female holds *Abitur*, male does not), homogamous high (both partners hold *Abitur*) and homogamous low (both partners have no *Abitur*). The four constellations of post-secondary education are defined analogously. The effects of educational constellations can be understood as interaction effects between both spouses' resources.

In our analyses, we apply event history models. This group of models is adequate for analyzing events – here first birth – if right-censored observations occur. For most of the respondents resp. couples we know if and when they had a child, whereas for those that did not have a child until the end of the observation time it is possible that a child will be born in the future as well. Event history models take this possibility into account and control not only for state change and censored episodes, but also for the waiting time until the transition occurs or for the time until the last observation takes place. Due to the availability of yearly data only, we decided to apply discrete time logit models (for details cf. Yamaguchi 1991). The analysis time variable is included in linear as well as in logistic form.<sup>2</sup> This parameterization leads to a sickle-shaped base rate. By modelling interaction effects between the different educational categories and the (linear) analysis time, we do not assume proportionality of educational effects but estimate distinct hazard rates for each population group.

## 4. Empirical results

Our empirical findings are presented as follows: First, the female partner's age is used as analysis time to examine the impact of female and male (individual's) education (Table 1). We then take into account the interaction effects between both partners' education and include educational constellations as predictors of family formation (Table 2). Finally, we replicate these models with the partnership's duration instead of wife's age as the relevant 'time at risk' and control for wife's age at the beginning of cohabitation (see Table 3 for individual und Table 4 for constellational effects). In all models, an interaction term between education and process time is included.

### 4.1 Education of both partners and the female partner's age at first birth

#### 4.1.1 Individual's education

Female education has a significant negative effect on fertility (Table 1, Model 1). Higher educated women postpone first motherhood. The chances of giving birth to a first child of women with *Abitur* who are living

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<sup>2</sup> As the logarithm of 0 is not defined, such values (for the first year of partnership duration and age 15, respectively) have been recoded to 0.1 (log=-2.30).

with a partner are only 0.21-times the chances of women without *Abitur* ( $e^{-1.55}=0.21$ ). Post-secondary education has also a negative but less strong effect. Comparing women with vocational or tertiary education to those without, they are 0.43 times less likely to become mothers early. These ‘main effects’ have to be interpreted together with the interaction effects: The interaction term shows that educational differences in family formation do not remain constant over time but decrease significantly when childless women get older. This implies that the decelerating effect of education decreases with increasing age of the women.

**Table 1. The effect of general education and vocational education on timing of first births, female partner’s age (discrete-time logit model)**

	(1)	(2)	(3)
	Transition to first birth		
<i>Abitur</i> wife <sup>+</sup>	-1.55 <sup>***</sup>		-1.44 <sup>***</sup>
<i>Abitur</i> wife * time	0.09 <sup>***</sup>		0.09 <sup>***</sup>
Vocational education wife	-0.85 <sup>**</sup>		-0.76 <sup>**</sup>
Vocational education wife * time	0.07 <sup>**</sup>		0.06 <sup>**</sup>
<i>Abitur</i> male partner		-1.14 <sup>***</sup>	-0.72 <sup>*</sup>
<i>Abitur</i> male partner * time		0.06 <sup>*</sup>	-0.04
Vocational education male partner		-1.08 <sup>***</sup>	-0.97 <sup>***</sup>
Vocational education male partner * time		0.07 <sup>**</sup>	0.06 <sup>**</sup>
Analysis time: wife’s age	-0.33 <sup>***</sup>	-0.27 <sup>***</sup>	-0.39 <sup>***</sup>
Analysis time: wife’s age (log)	2.78 <sup>***</sup>	2.19 <sup>***</sup>	2.96 <sup>***</sup>
Intercept	-4.46 <sup>***</sup>	-3.52 <sup>***</sup>	-4.02 <sup>***</sup>
N (couple-years)	4825	4825	4825
N (couples)	1272	1272	1272
N (events)	639	639	639
$\chi^2$	91.41	82.57	107.60

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Note: <sup>+</sup> For simplicity we use the term wife although we also look at cohabiting couples.

Source: GSOEP 1984-2007, own calculations.

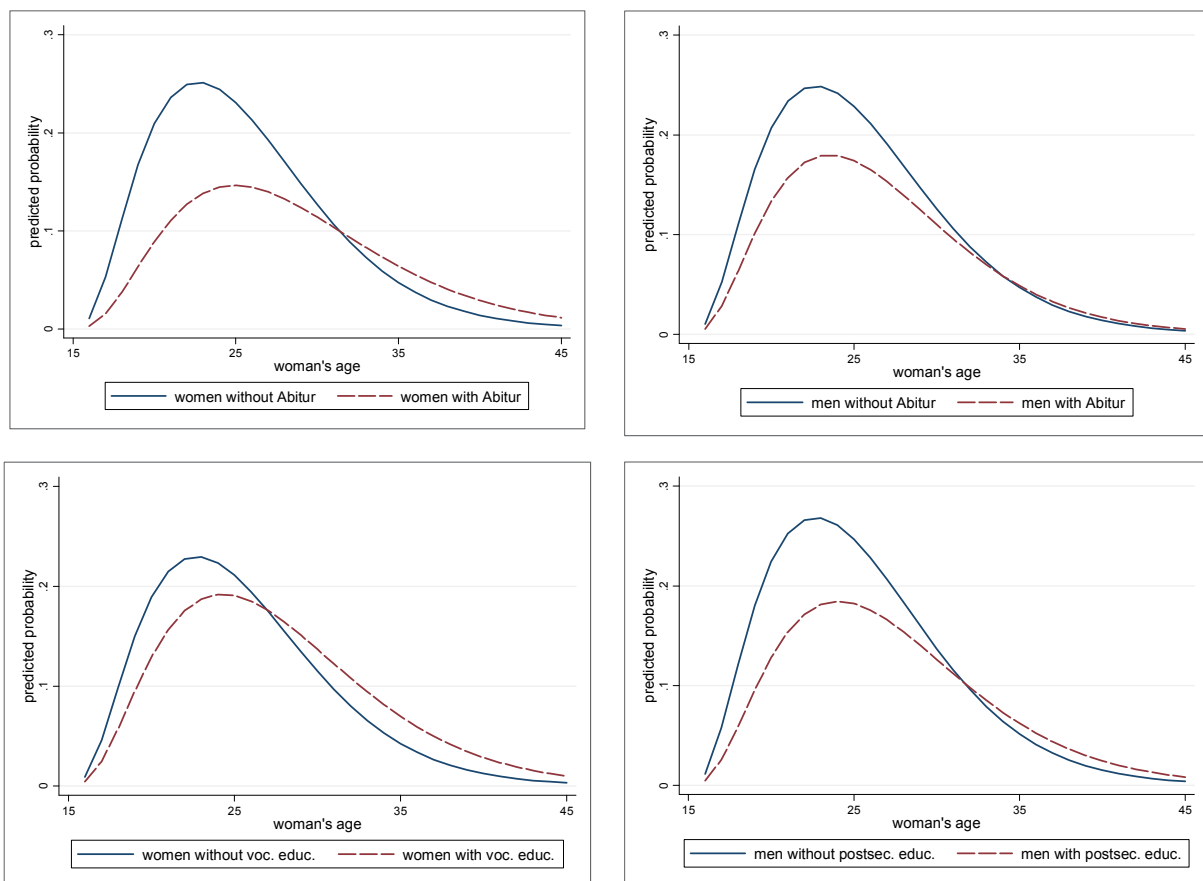
The effect of the male’s spouse general education on their partner’s fertile behaviour is lower and the accelerating interaction effect with wife’s age is less significant than the impact of female education (Model 2). The effect of post-secondary education is again negative and even stronger than the corresponding female effect. The interaction term is statistically significant, i.e. the impact of the male partner’s vocational education decreases with increasing age of the female partner.

Looking at the education of both partners simultaneously (Model 3), the female effects are only slightly altered, whereas the coefficient of male general education decreases markedly. This finding supports our first hypotheses on changes of the relation of individual education and fertility once the partner’s education is taken into account. All in all, men presumably play a ‘minor’ part in timing of first births. But especially their post-secondary education matters: We have argued that high vocational qualifications are an indicator of the labour market potential. Increasing opportunity costs lead to postponed fertility, even though usually most of

the costs are borne by women who withdraw from the labour market. If opportunity costs affect men as well, a negative effect of his labour market specific human capital is the consequence (Wirth 2007).<sup>3</sup>

In Figure 1, we illustrate these findings by plotting predicted probabilities of first birth over the female spouse's age. We vary our educational variables setting all other effects to the empirical mean. The prediction of values is based on the estimates of Model 3.

**Figure 1. The female and male partners' general and vocational education and first birth (all other effects set to mean), predicted probabilities, analysis time: female partner's age**



Source: GSOEP 1984-2007, own calculations, unweighted data.

Women without *Abitur* have the highest probability to become mothers in their early and mid-twenties, whereas women with *Abitur* are less likely to enter motherhood at that age but later in their life course. The curves by men's general education differ less although female partners of higher educated men are also less likely to enter motherhood early. Differences between different levels of the female's vocational education

<sup>3</sup> Wirth (2007) expects that wives' education should lead to rising opportunity costs for men. Higher educated women would expect more equality within the partnership, e.g. that men participate in childcare. Because education leads to a better bargaining position, higher educated women are more likely to implement equality in household and family duties. Such a hypothesis requires a couples' perspective based on educational constellations which we address in the next section.

are relatively small but we also see for those with post-secondary education a more prolonged phase of family formation until the end thirties. Women with a partner without vocational education show the highest probability of early motherhood.

#### 4.1.2 Educational constellation

In the next step of our analyses, we look at the educational constellation of the couple (Table 2). In the first model, we concentrate on general education (Table 2, Model 1), in the second we examine post-secondary constellations (Table 2, Model 2) and in the third we include both dimensions of education into our estimation (Table 2, Model 3).

**Table 2. The effect of educational constellation on timing of first births, female partner's age (discrete-time logit model)**

	(1)	(2)	(3)
	Transition to first birth		
<i>General homogamy (low level)</i>	<i>ref.</i>		<i>ref.</i>
General hypergamy	-0.40		-0.68
General hypergamy * time	0.01		0.03
General homogamy (high level)	-1.10**		-2.16***
General homogamy * time	0.05*		0.13***
General hypogamy	-1.21**		-1.38**
General hypogamy * time	0.06*		0.08*
<i>Vocational homogamy (low level)</i>		<i>ref.</i>	<i>ref.</i>
Vocational hypergamy		-0.65	-1.14**
Vocational hypergamy * time		0.04	0.07*
Vocational homogamy (high level)		-0.93**	-1.78**
Vocational homogamy * time		0.07**	0.13***
Vocational hypogamy		-0.32	-0.95*
Vocational hypogamy * time		0.03	0.08
Analysis time: wife's <sup>+</sup> age	-0.24***	-0.24***	-0.39***
Analysis time: wife's age (log)	2.24***	1.88***	2.94***
Intercept	-4.25***	-3.42***	-3.91***
N (couple-years)	4825	4825	4825
N (couples)	1272	1272	1272
N (events)	639	639	639
$\chi^2$	84.25	68.11	108.50

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Note: <sup>+</sup> For simplicity we use the term wife although we also look at cohabiting couples.

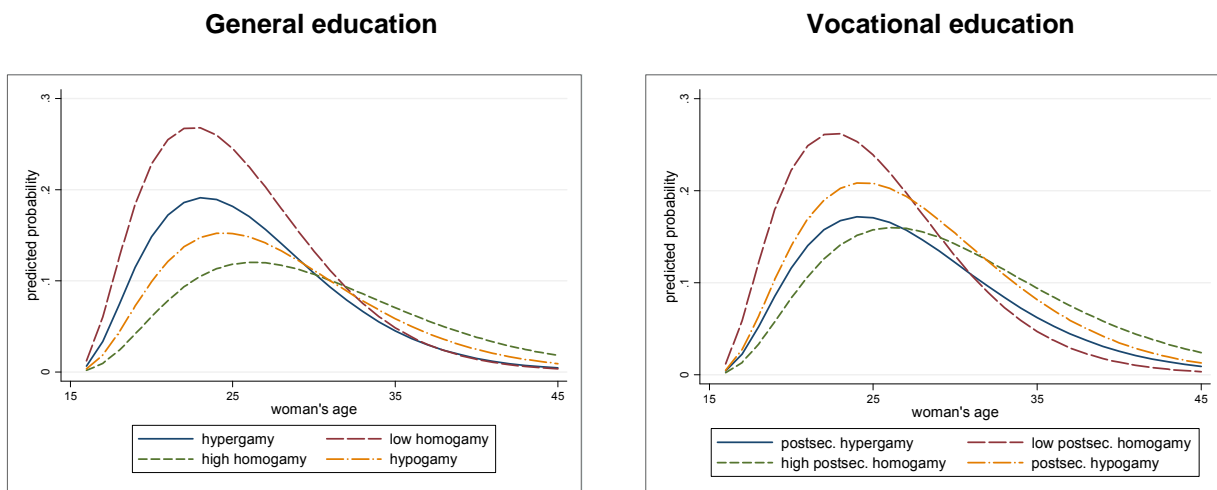
Source: GSOEP 1984-2007, own calculations.

Looking at general education, only hypo- and homogamous high educated couples differ significantly from homogamous low educated couples. Hypogamous couples with a female partner that is higher educated than the male partner are 3.4-times more likely to postpone family formation than a low educated couple is. The same can be found for homogamous high educated couples with an odds ratio of 3.0 compared to the

reference category of homogamous low educated couples. Thus, in both cases we observe a significant decrease of the effect over the women's age.

Regarding post-secondary constellation, only couples of two vocationally resp. tertiary educated partners differ significantly from couples without any post-secondary education. In this case, first births are decelerated by 2.5-times. Once one partner is without vocational education there is no difference to the reference category of low educated homogamous couples and therefore no effect of hyper- and hypogamy.

**Figure 2. Educational constellation and first birth (all other effects set to mean), predicted probabilities, analysis time: female partner's age**



Source: GSOEP 1984-2007, own calculations, unweighted data.

The probability to enter motherhood in the early twenties is the highest for women without *Abitur* that are living with a partner that also has no *Abitur* (Figure 2). In hypergamous couples, the probability of early motherhood is higher than in couples with high educated female partners, supporting a male-breadwinner hypothesis. Surprisingly, hypogamous couples enter parenthood earlier than equally homogamous high educated couples do.

Looking at post-secondary constellation, couples with two not post-secondary educated partners become parents early. All other combinations differ from these low-level homogamous couples significantly. The postponement is strongest for couples in which wife and husband both hold a degree from vocational or tertiary education. They have their first child later in the women's life course, and some of the previously adjourned fertility decision is caught up in older years. The two categories with differently educated partners, hypergamy and hypogamy, show a different picture compared to general education. The right graph depicts that the probability to give birth to a first child is always higher for hypogamous than for hypergamous couples. Here, the effect of the male partner is stronger negatively associated with the fertility decision than female post-secondary education.

## 4.2. Family formation and the partnership's duration

We now turn to the partnership's duration as relevant process time as it determines the 'exposure time' of individuals for fertility decisions. The beginning of a partnership is dated to the first year of cohabitation, as the GSOEP does not contain retrospective partnership biographies.

### 4.2.1 Individual's education

As expected in our hypothesis on partnership's duration we find that educational attainment of both partners has a less strong and less significant effect (except general education of the female spouse) once we apply a strict partnership's perspective and look at timing of first birth after the partnership has begun (Table 3). Once the partners live together in a joint household and the years since the beginning of this cohabitation are taken into account, a higher educational level has a less negative effect on the timing of first births. Taking a couples' life course perspective therefore leads to other results than educational effects on family formation against the background of individual life courses. As in the corresponding models with wife's age as exposure time, effects of general education are stronger for females than for males. Husbands' post-secondary education leads again to a stronger postponement of first parenthood than wives' post-secondary education, which now does not affect the transition rate in any significant way.

A possible explanation for diminishing effects of education on family formation is that cohabitation might be confounded with educational attainment. As it is known from previous research, partners with higher education delay marriage compared to lower educated couples (Brüderl and Diekmann 1994). It is questionable and hardly explored whether this postponement is also the case for cohabitation, but because both processes are confounded, it is reasonable to expect similar educational effects.<sup>4</sup> However, the exact mechanisms how education affects age at cohabitation is not of relevance for our argument (Brüderl and Diekmann discuss effects of human capital and of enrolment on marriage): If differently educated couples differ in their 'time at risk' because of different marital and cohabitation behaviour, educational effects on fertility should be weaker when the partnership duration is chosen as analysis time. In other words, a shorter exposure time might be a result of higher education.

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<sup>4</sup> In our sample, the average age when moving together with a man is 24.98 years for women without *Abitur* and 26.62 for women with *Abitur*. A cohabitation between two highly general educated partners starts on average at wife's age 27.22. Relationships characterized by both general and post-secondary hypogamy start about 4.5 years later than the ones with a higher educated man on both the general and vocational dimension (average age at the beginning of these partnerships is 27.47 and 23.00, respectively).

**Table 3. The effect of general and vocational education on timing of first births, partnership duration (discrete-time logit model)**

	(1)	(2)	(3)
	Transition to first birth		
Age of wife <sup>+</sup> at beginning of partnership	-0.03**	-0.03**	-0.03**
<i>Abitur</i> wife	-0.52***		-0.47**
<i>Abitur</i> wife * time	0.07		0.07
Vocational education wife	-0.05		-0.01
Vocational education wife * time	0.04		0.03
<i>Abitur</i> male partner		-0.53***	-0.34*
<i>Abitur</i> male partner * time		0.06	0.03
Vocational education male partner		-0.44**	-0.43**
Vocational education male partner * time		0.08	0.07
Partnership duration	-0.19***	-0.20***	-0.24***
Partnership duration (log)	0.12*	0.12*	0.13*
Intercept	-0.66**	-0.39	-0.37
<i>N</i> (couple years)	4825	4825	4825
<i>N</i> (couples)	1272	1272	1272
<i>N</i> (events)	639	639	639
$\chi^2$	64.33	62.33	75.36

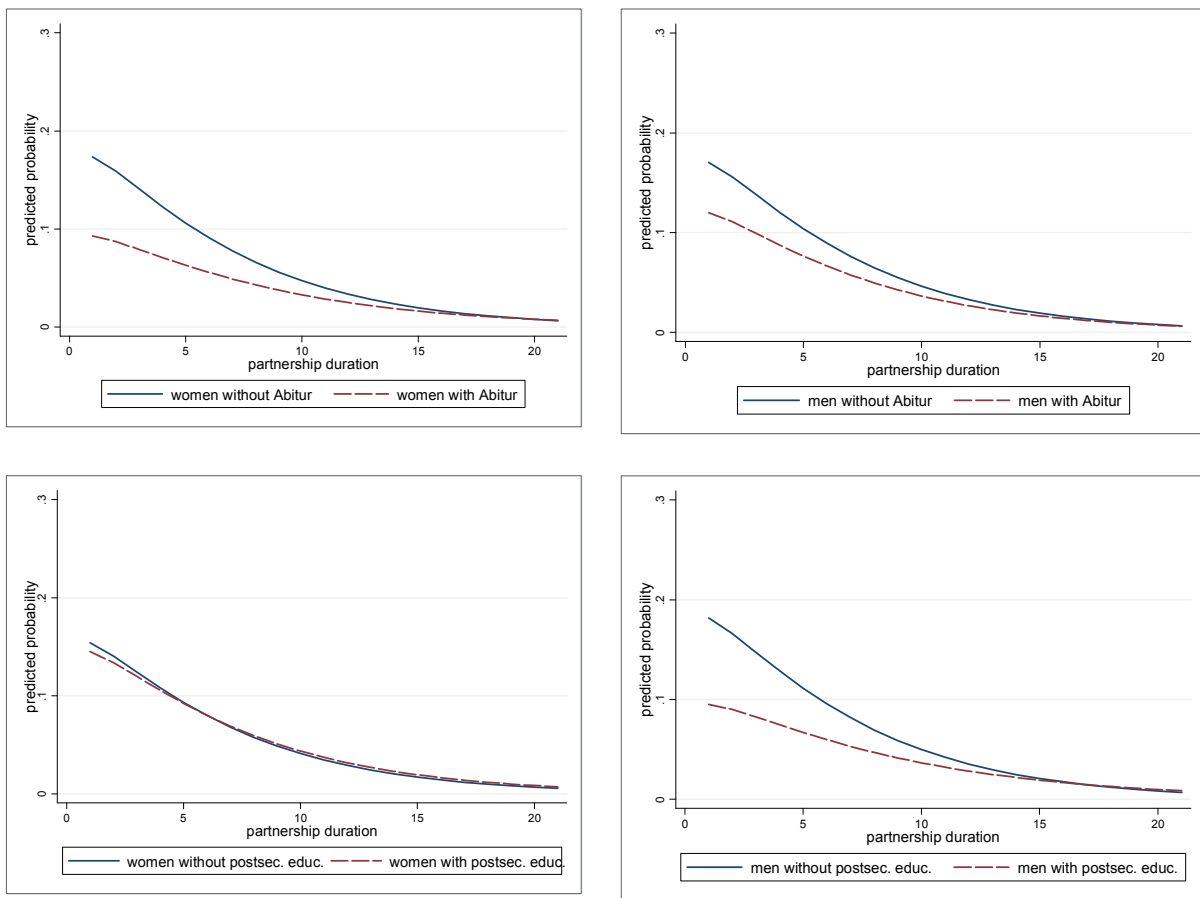
\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Note: <sup>+</sup> For simplicity we use the term wife although we also look at cohabiting couples.

Source: GSOEP 1984-2007, own calculations, unweighted data.

In our regression models, we additionally control for the age of the wife at the beginning of the partnership. The negative logit coefficient indicates that the older the wife is when starting to live together with her spouse the lower is the probability for a first child. Hence, there are no 'rush' effects with a new partner even if the remaining fertile phase is short. The coefficients of women's and men's general and vocational education are again illustrated by predicted probabilities in Figure 3. Despite of women's post-secondary education a higher educational level again reduces the probability to get a first child. As this effect is now weaker than in the models with wife's age as analysis time, the interaction effect is also less strong. The lines do not intersect. After about 15 years of cohabitation, the probability to give birth to a first child does not vary between differently educated women or women with differently educated partners any more. But a catch-up effect, leading to higher birth risks in later years, is not visible.

**Figure 3. The female and male partners' general and post-secondary education and first birth (all other effects set to mean), predicted probabilities, analysis time: partnership duration**



Source: GSOEP 1984-2007, own calculations.

#### **4.2.2 Educational constellation**

Table 4 and Figure 4 show the estimation results of educational constellations on family formation when using again the partnership duration as relevant process time. According to our theoretical considerations the effects of education (here: of constellations) should be weaker compared to the ones presented in the previous section. Indeed, the negative effect of post-secondary (high-level) homogamy in the women's age model now dilutes to a weaker and less significant level. Especially, the effects of post-secondary constellations provide no contributions to the explanation of couples' first births when the analysis time is the partnership duration (Model 2 in Table 4).

Couples with different general educational constellations have unequal probabilities to establish a family. Compared to the reference constellation (homogamous low educated couple, i.e. both partners do not have the *Abitur*), both constellations with high educated women and therefore high opportunity costs of childbearing postpone parenthood significantly. The analyses reveal negative effects for high educated partners and for hypogamy, i.e. when the female spouse is higher educated than the male.

**Table 4. The effect of educational constellation on timing of first births, partnership duration (discrete-time logit model)**

	(1)	(2)	(3)
	Transition to first birth		
Age of wife <sup>+</sup> at beginning of partnership	-0.03 <sup>**</sup>	-0.04 <sup>***</sup>	-0.03 <sup>**</sup>
General homogamy (low level)	<i>ref.</i>		<i>ref.</i>
General hypergamy	-0.30		-0.44 <sup>*</sup>
General hypergamy * time	0.03		0.04
General homogamy (high level)	-0.48 <sup>**</sup>		-0.77 <sup>***</sup>
General homogamy * time	0.04		0.12 <sup>*</sup>
General hypogamy	-0.64 <sup>***</sup>		-0.58 <sup>**</sup>
General hypogamy * time	0.09		0.09
Post-secondary homogamy (low level)		<i>ref.</i>	<i>ref.</i>
Post-secondary hypergamy		-0.35	-0.60 <sup>**</sup>
Post-secondary hypergamy * time		0.12	0.16 <sup>*</sup>
Post-secondary homogamy (high level)		-0.09	-0.47 <sup>*</sup>
Post-secondary homogamy * time		0.07	0.14 <sup>*</sup>
Post-secondary hypogamy		-0.03	-0.17
Post-secondary hypogamy * time		0.06	0.11
Partnership duration	-0.16 <sup>***</sup>	-0.20 <sup>***</sup>	-0.29 <sup>***</sup>
Partnership duration (log)	0.12 <sup>*</sup>	0.11 <sup>*</sup>	0.13 <sup>**</sup>
Intercept	-0.69 <sup>**</sup>	-0.52	-0.28
N (couple-years)	4825	4825	4825
N (couples)	1272	1272	1272
N (events)	639	639	639
$\chi^2$	67.22	53.65	79.31

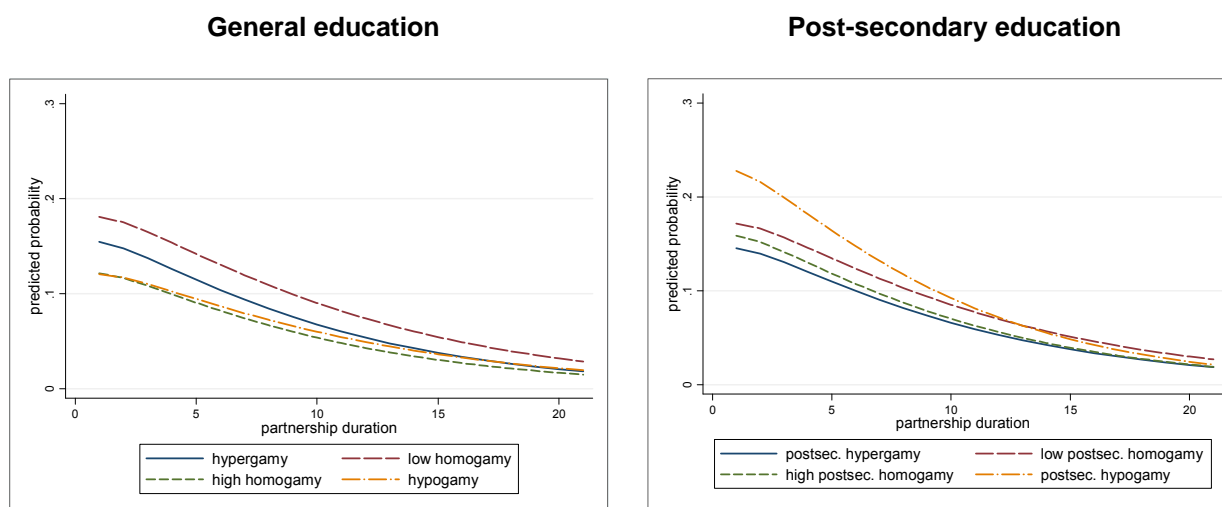
<sup>\*</sup> p < 0.05, <sup>\*\*</sup> p < 0.01, <sup>\*\*\*</sup> p < 0.001

Note: <sup>+</sup> For simplicity we use the term wife although we also look at cohabiting couples.

Source: GSOEP 1984-2007, own calculations.

The catch-up effect in later years is again positive but mostly insignificant. The plotted predicted probabilities of having a first child (Figure 4) do not or only slightly intersect. Each year living together with the partner further reduces the (already slight) difference between the constellations. After 10 to 15 years, the probabilities differ only marginally by the couples' constellations. Also the previously observed 'pent-up demand' for children in older years, accumulated by earlier postponement especially in homogamous high-level constellations, diminished. This is not surprising because the difference between the groups is already much smaller in early periods of the analysis time when the partnership duration is taken as the relevant time axis compared to women's age as 'time at risk'.

**Figure 4. Educational constellation and first birth (all other effects set to mean), predicted probabilities, analysis time: partnership duration**



Source: GSOEP 1984-2007, own calculations.

## 5. Summary and conclusion

In this paper, we focused on the impact of characteristics of both partners on family formation. Using German panel data, we observed cohabiting couples and estimated timing of first birth to disentangle male and female educational effects as well as couples' educational characteristics, i.e. educational constellations. Against our theoretical background of family economics and bargaining approaches, we expected that the women's educational attainment would have a stronger effect on the timing of first birth than the males'. Additionally, educational asymmetries should encourage parenthood as these asymmetries lead to greater gains from specialisation (breadwinner/homemaker). Furthermore, we have argued that the impact of education and combinations of general and post-secondary degrees would vary depending on the analysis time selected.

Using women's age as analysis time, we concluded that women's general education has stronger impact on (women's) timing of first birth than their partner's educational attainment. For women, both general education (whether she holds the German *Abitur*) and post-secondary education (whether she finished some form of post-secondary vocational training or graduated) postpone childbirth. When only male education is regarded, both *Abitur* and post-secondary degree also delay the transition to parenthood. These effects are reduced but remain significant even if women's education is taken into account. Though, female spouses' effects remain almost unaffected when including the men's characteristics into the model. We therefore conclude that women's educational attainment has by far more impact on the couples' fertility decision. Corijn, Liefbroer, and de Jong Gierveld (1996) speak of 'sphere of interest' to explain the stronger impact of female characteristics on fertility as women are more affected e.g. by pregnancy, (temporary) withdrawal from the labour market etc. (see Bauer and Jacob 2009). This also means that for those men that have found a

partner, neither own resources nor own preferences matter much for their female partner's timing of first births.

Scrutinizing on educational constellations, we could show that homogamous low educated couples have children early and that this group remains less often childless than any other educational constellation. In theoretical terms this is a remarkable result: Although the direct costs of children are hardest to bear for this group they are the most likely to have children. Here, the male partner's education makes the difference for the timing of first birth of low educated women. This is also supported by the other extreme: homogamy with two high educated partners. They show the strongest postponement of childbearing, although direct costs should be no problem for them but at the same time opportunity costs are maximal and gains from specialisation are minimal for these partnerships. Hyper- and hypogamous couples have medium probabilities in early years (when the wife is under 30) but tend to catch up afterwards.

In the last section of this paper, we choose partnership duration as 'time at risk'. The data support our hypothesis that differences between educational groups are reduced when using the partnership's duration as analysis time. Once a couple cohabits, individual educational features as well as those of constellations make a less comprehensive contribute to the explanation of fertility behaviour. From a sociological perspective, this result shows that individual characteristics are mediated by social context, here the partnership. The well-known effect of postponement of family formation of higher educated women is not found in the same striking way. As most previous research has used the age of the female spouse to elaborate the timing of the first birth our findings indicate that it is less the women's age but differences in timing of cohabitation between educational groups that are responsible for the well-known and often debated differences in fertility behaviour. In further research the different overlapping processes of partnership formation, partnership stability and fertility have to be examined simultaneously in more detail as all these processes are related to education. Last but not least family policies to encourage (high educated) women to have the first child earlier would fail if mating and timing of partnership formation and cohabitation remain unchanged.

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