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# Does “Sorting into Specialization” Explain the Differences in Time Use between Married and Cohabiting Couples? An Empirical Application for Germany

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The aim of this paper is to identify the sources of time use differences between married and cohabiting couples. We want to answer the question whether there is a “sorting into specialization” in marriage, i.e. whether cohabiting partners who intend a (traditional) division of work have a higher probability of getting married. In a non-parametric matching approach, we compare couples in the German Socio-Economic Panel who married between 1991 and 2008 with couples who remained cohabiters. Taking the potential selection into marriage into account, differences in the intra-couple division of market work, housework and child care are reduced by up to 75 percent. We therefore conclude that couples who anticipate specialization in time use (and its economic advantages) pre-select into formal marriage. However, remaining differences in time use leave sufficient scope for an additional specialization-reinforcing effect of the institution of marriage in Germany, particularly for the subsample of couples who become parents.\*

## I. Introduction

It is a well established fact that married or cohabiting men receive higher wages than unmarried ones. However, the marital wage premium is typically larger than the cohabiting wage premium.<sup>1</sup> In the German Socio-Economic Panel (SOEP), a man who got married in the preceding year receives a 13 percent higher wage than a man who stayed single, whereas moving in with a partner is reflected in a cohabiting premium of 6.7 percent in the subsequent year (BARG and BEBLO [2009]). The same data set reveals remarkable differences in the time use of married and cohabiting couples, suggesting a higher level of household specialization after marriage: for instance, the intra-household difference in paid working hours within married couples is

1. A number of empirical studies confirm a larger wage premium for marriage than for cohabitation (see e.g. STRATTION [2002], COHEN [2002], DATTA GUPTA, SMITH and STRATTION [2005], GINTHER, SUNDSTRÖM and BJÖRKlund [2006], GINTHER and ZAVODNY [2001]).

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more than double the difference within cohabiting couples (4 versus 1.7 more hours spent on employment by the male partners)<sup>2</sup>. Accordingly, married men not only spend less time on child care and household work than their spouses, but also do significantly less so than their cohabiting counterparts. The percentage of couples where the wife is full-time employed is significantly lower among married than among cohabiting couples – 31 compared to 58 percent. Empirically it seems obvious that intra-household time use decisions differ depending on the legal status of the relationship. This paper aims to identify the sources of these behavioural differences between cohabiting and married couples and to answer the question whether and to what extent these differences can be explained by a “sorting into specialization”, that is, a higher probability to marry of couples who intend to specialize.

In the presence of the economic efficiency effects of intra-family specialization, it can be argued that specialization should pay off and be observed regardless of the legal status of the relationship. From a sociological perspective, however, couples might act according to the family norms and gender roles imposed by their respective marital status. That is, husbands and wives may specialize regardless of the efficiency effects, whereas the time allocation of non-married couples may be more equalized or may solely depend on relative productivity advantages. At the same time, the desire to ‘do family’, i.e. the desire to act as ‘husband’ and ‘wife’, may play a part in deciding for cohabiting couples to get married. Therefore, a selection into marriage of couples who are willing to specialize in a traditional way may explain why the time allocation differs between married and non-married cohabiting couples. Additionally, the different legal and institutional treatments of cohabitation and marriage, such as joint income taxation, (public) health insurance regulations, the entitlement for maintenance payments during the relationship and after split up, inheritance regulations and widows’ or widowers’ pensions, which apply to married couples only, provide incentives for formally married couples to choose a division between paid and unpaid work. These economic advantages may in turn encourage cohabiting couples to get married once they plan to specialize in time use. Empirical evidence supporting a specialization-reinforcing effect of marriage has been found accordingly by studies based on the SOEP (EL LAGHA and MOREAU [2007], LUDWIG [2007]). For the United States, where married and cohabiting couples are also treated differently by law, studies confirmed a statistically significant effect of marriage on housework division as well (GUPTA [1999], ONO and YEILDING [2008], SHELTON and JOHN [1993], SOUTH and SPITZE [1994]). In contrast, studies focussing on more “liberal” countries such as Sweden and the UK found no significant time use differences between cohabiting and married couples (KALENKOSKI, RIBAR, STRATTON [2007], ONO and YEILDING [2008]).

Against this theoretical and empirical background, our research question is whether and to what extent “sorting into specialization”, i.e. a higher marriage probability of cohabiting partners who agree on and who anticipate a (traditional) division of work, contributes to explaining the observed time use differences between married and cohabiting couples? By use of a non-parametric matching approach on several outcome variables in the SOEP, we intend to find out whether marriage increases specialization measured in terms of time use differences between formerly cohabiting partners. Using a shifting 3-year panel window on marriages in the SOEP

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2. See also TABLE II.

between 1991 and 2008, cohabiting couples who married in the reference year ( $t$ ) and who were still married in  $t + 1$  are matched with likewise cohabiting couples who stayed formally unmarried from year ( $t - 1$ ) to year ( $t + 1$ ). By holding constant observable characteristics that might have an impact on both a couple’s probability of getting married and their time allocation, we take account of the possible selection of couples in marriage. We focus on couples’ first transitions from cohabitation to marriage – instead of comparing cohabiting and married couple’s time uses in a cross-sectional analysis – in order to capture the factors (in  $t - 1$ ) that determine a couple’s decision to marry and thereby test our “sorting into specialization” hypothesis.<sup>3</sup>

The empirical literature on the time allocation of married and cohabiting couples has applied various methods to answer the question whether marriage has a (causal) effect on specialization. To our knowledge the selection hypothesis has been emphasized only by HAYNES, BAXTER, HEWITT and WESTERN [2009] and EL LAGHA and MOREAU [2007]. HAYNES and colleagues [2009] investigated the daily time spent on housework of cohabiting and married women living in Australia and the UK. We go further by focusing on various intra-couple time use differences – in employment, child care and housework hours – in a country where the institutional framework provides multiple incentives, particularly for married couples, to specialize – and by refining the selection argument. Theoretically, our paper contributes to the literature by taking an interdisciplinary perspective on the selection hypothesis. We combine economic and sociological approaches and elaborate on the importance of the institutional framework of marriage in Germany. Empirically, we propose an estimate of the *extent* to which specialization differences between married and cohabiting couples can be attributed to sorting. The topic of our paper is closely related to that of EL LAGHA and MOREAU [2007], who also analyzed German couples’ time use based on the SOEP and found no evidence for a significant selection into marriage. As the authors do not explicitly investigate transitions from cohabitation into marriage and impose various sample restrictions (including only dual-earner couples with positive housework hours and excluding those with children below age two), our empirical approach seems more expedient for examining the selection hypothesis, – in terms of both the sample chosen and the parametric assumptions applied. It prepares the ground to draw conclusions on the behavior of cohabiting and newly married couples in the 1990s and 2000s in Germany.

Our results show that selection into marriage can explain a major part (up to 75 percent) of the observed time use differences between married and cohabiting couples. However, there remain statistically significant differences in the intra-couple division of market work and child care between recently married and still cohabiting couples even when controlling for selection into formal marriage. Taking into account the birth of a child at about the same time as marriage reduces the remaining specialization-reinforcing effect of the marriage remarkably. We interpret this result as partial support for the “sorting into specialization” hypothesis: couples who anticipate specialization, e.g. because they plan to have a child, evidently select into marriage. Once married, though, the work division remains, whereas cohabiting couples who become parents almost recover their pre-birth time use pattern after a number of years.

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3. As will be discussed in SECTION III, our matching approach has several advantages over the parametric methods typically applied to panel data.

The rest of the paper is structured as follows: In SECTION II we review the theoretical background for intra-family work division and time use decisions being related to marital status. We thereby draw on theories from family economics and family sociology as well as potentially specialization-enhancing institutional differences for married and cohabiting couples in Germany. The matching approach is laid out in the third section, followed by a description of our data sampling procedure in SECTION IV. Empirical results on the propensity score estimation and the matched intra-family time use differentials of married versus cohabiting couples are presented in SECTIONS V and VI. SECTION VII explores the robustness of our results by looking at time use patterns over time – what happens, once couples are married? – and the scope for a specialization-reinforcing effect of the institutional framework. SECTION VIII concludes.

## II. Theoretical Background

### II.1. *The Economic Perspective*

There are deviating theoretical views as to whether work division and specialization in time allocation within the household should differ between cohabiting and married couples. In the origins of family economics (BECKER [1973]), couples were seen to form households in order to concentrate on activities in which each of the partners has a relative advantage and in order to make use of the efficiency effects of intra-family specialization, regardless of the type of the relationship. According to this theory, the relative allocation of economic resources determines a couples' work division, independent of their marital status: the more one spouse gains on the labor market, the less time he or she will spend on housework and child care. In line with these assumptions of rational behavior, the economic exchange model argues that since men provide income for the family, women take on unpaid domestic labor in exchange (BRINES [1994]). As women's time in paid labor and their contribution to the household income has increased over time, the division of housework has become more equal and less traditional. With regard to the effect of marriage on specialization, the economic exchange theory expects only weak differences between married and cohabiting couples that disappear when controlling for young children (BAXTER [2005]). Evidence supporting this economic reasoning was found for Germany e.g. by LUDWIG [2007], who revealed that marriage increases the domestic work division between men and women, depending on their respective shares of labor earnings. Bargaining models of the family or the collective framework<sup>4</sup> also predict an intra-household work division to depend on the spouses' respective earnings. However, a differing behavior between married and cohabiting couples would only be expected due to the institutional framework [2500?] – e.g. if institutional differences ensured a better bargaining position of the weaker (i.e. lower earning) spouse who specializes in domestic-labor – only when the couple is married (see the discussion on institutional differences between marriage and cohabitation below).

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4. For an overview see e.g. VERMEULEN [2002].

## II.2. *The Sociological Perspective*

Family sociology often takes a more normative-cultural perspective and argues that partners act depending upon what they believe and have learned as being the appropriate behavior for men and women. The theory of ‘doing gender’ states that everyday interactions within couples cause the partners to perform according to their gender roles regardless of the allocation of their resources (WEST and ZIMMERMAN [1987]). With the growing importance of cohabitation as a new family type, the ‘doing gender’ approach was extended to the ‘doing family’ hypothesis which argues that within marriage, individuals act according to their roles as ‘husbands’ and ‘wives’ and that this family-role performance results in higher levels of specialization within marriage than within cohabitation (SHELTON and JOHN [1993]). Moreover, some sociologists argue that rituals such as wedding ceremonies help couples to internalize their new roles as ‘husband’ and ‘wife’ and to be confirmed in their norm-guided behavior by their social network (e.g. KALMIJN [2004]). According to this argument, the marriage celebration itself may reinforce the impact of marital norms and values on specialization within couples. Furthermore, there is the argument of “gender trumps money” (BITTMAN, ENGLAND, FOLBRE, MATHESON and SAYER [2003]) which – up to a point – contradicts the economic exchange model: based on empirical evidence from Australia and the U.S. (BRINES [1994], GREENSTEIN [2000], BITTMAN *et al.* [2003]), it states that family norms frame married couples’ work division and make wives bear the main part of domestic labor even when they earn more than their husband. For the United States, SHELTON and JOHN [1993] and SOUTH and SPITZE [1994] found the gender gap in time spent on housework to be greater in married couple households as compared to cohabitations, even when controlling for children and reduced hours of paid work for women. In both studies this result was interpreted as support for the ‘doing family’ approach. The results of a recent longitudinal study by BAXTER, HAYES and HEWITT [2010] for Australia show that young women living with their parents already spend considerably more time on housework than their male counterparts, indicating that gender-role socialization starts early in life.

## II.3. *The Institutional Setting*

More recent economic *and* sociological literature mentions an additional explanation for specialization differences between married and cohabiting couples. It is argued that institutional differences between marriage and cohabitation, such as joint taxation for married couples, promote specialization particularly within marriage (EL LAGHA and MORAU [2007], BARG and BEBLO [2009]). For the purpose of testing the impact of cultural-institutional differences, ONO and YEILDING [2008] compared the time spent on childcare of Swedish and U.S. married and cohabiting couples. They suggest the United States provide an institutional setting where rights and resources are rather unequally distributed between married and cohabiting couples, while Sweden creates an institutional context in which marriage and cohabitation are legally and culturally perceived as similar unions. In fact, the authors found married and cohabiting couples in the United States to differ strongly with regard to their division of time spent on child care, whereas the allocation of childcare among Swedish couples appeared not to depend on the couples’ marital status. Accordingly, KALENKOSKI, RIBAR and STRATTON [2007] found no childcare differences between cohabiting and married couples living in the UK – another country

where the institutional framework of cohabitation and marriage is rather similar (ODERSKY [2006]).

In Germany (like in the U.S. and many other countries) cohabitation and marriage have a different legal status. The legal framework of marriage and cohabitation is expected to enhance specialization differences between married and cohabiting couples via two different mechanisms. First, some institutional differences have a *direct* specialization-reinforcing effect: financial benefits for couples with unequal incomes or with only one spouse employed create an immediate incentive to specialize. Second, other institutional differences have an *indirect* effect since they protect the spouse that specializes on domestic labor against power and welfare losses during the relationship or after dissolution. This latter mechanism is based upon the idea that specialization in housework and child care by one partner constitutes a trust problem (see e.g. YOUM and LAUMANN [2003], BREEN and CROOKE [2005] for the sociological perspective) or hold-up problem (putting the same thing economically, see e.g. OTT [1992]). While the trust problem may be resolved by the “institutional embeddedness” of marriage (RIJT and BUSKENS [2006]), the hold-up problem can be reduced by setting up a contract, such as marriage. TABLE I lists the features of the institutional framework in Germany that are expected to affect couples’ time allocations and indicates the type of effect at work.

First of all, joint taxation of married couples combined with a tax allowance for each partner creates a greater economic incentive for married spouses to specialize in a breadwinner-housewife-type model (or vice versa) than for cohabiting ones, since the more unequal the individual incomes of the spouses, the lower the marginal tax rate of the couple and the larger the resulting tax benefit. Coverage of the not employed spouse by the public health insurance of the spouse who is employed provides a similar *direct* effect for more specialization within married than cohabiting couples. It even encourages the married partners to allocate their time in a way that one spouse does not work at all in the labor market. Moreover, married couples benefit from joint ownership of income flows (capital income, employment income).<sup>5</sup> This regulation entitles the spouse with no or less labor market income – usually the spouse who specializes on domestic labor – to half of the income of the working spouse. In order to secure the economic and emotional power of the spouse who undertakes the main part of the housework and who, therefore, has no or little labor market income, the German legal system has introduced the institution of “Schlüsselgewalt”. This law allocates the financial power within a married couple independently of the actual intra-household income distribution. Since cohabiting partners have no such power-ensuring institutional framework, they might be less willing to take the “risk” of specialization on housework and child care. The obligation of the spouse who provides the household with labor market income to financially support the spouse who focuses on domestic labor has a similar “insurance aspect” that helps overcome the trust (or hold-up) problem associated with specialization. The law for widows’ or widowers’ pensions creates rather long-term returns, as only married people are entitled to them and thus may be willing to engage in intra-household specialization in view of future compensation. Similar *indirect* effects that may support selection into marriage and encourage specialization within marriage but not within cohabitation are created by inheritance regulation and the regulations for ownership

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5. Although, the German legal system automatically entitles married couples to *joint ownership of flows* (“Zugewinnungsmeinschaft”), they can choose other legal frames for managing their ownership (see IVO [2006], p. 419).

division and maintenance payments after a split up. The financial capital of a couple built up during marriage is divided equally after a divorce and meant to compensate the spouse who accumulated no or little of their own labor market income during marriage for the time input she (or he) has invested in housework and child care and her (his) foregone earnings. In comparison, the maintenance support after divorce does not compensate for foregone earnings and foregone tenure unless a child has been cared for. If one spouse cares for a child up to 8 years old or for two to three children up to 14 years old he (or she) is entitled to receive financial support by the other spouse if not able to provide the income her- (or him-) self.<sup>6</sup> The splitting cohabiter, on the other hand, is only entitled to maintenance support if he or she has sacrificed employment for raising a mutual child under 3 years of age. In addition, there are lower dissolution costs for cohabiting couples. As a result, cohabiters may face a lower commitment level which translates into a shorter expected duration of the relationship and hence less specialization, as this is a more risky investment for a non-married partner who specializes in housekeeping. Evidence for this effect is provided by GINTHER, SUNDSTRÖM and BJÖRKLUND [2006] for Sweden. In line with the “insurance aspect” of the institutional setting, STRATTON [2002] argues that specialization is more likely to occur in stable relationships and since cohabitations are known to be of shorter duration and less stable than marriages, one might expect cohabiters to specialize less than married partners. However, causality may work the other way as well, such that specialized partners have a higher expected duration of the relationship because they have more to lose. Finally, men only automatically become legal fathers of their children if they are married to the mother. Otherwise the mother has to approve fatherhood. As a consequence, marriage may encourage a higher commitment level for the division of work and sharing of resources within the couple.

Both the economic and the sociological theories predict that married couples will specialize more than cohabiting ones. At first glance, the economic approaches seem to contradict this hypothesis, but when taking the institutional context into account, enhanced specialization after transition into marriage appears to be an economically efficient and perfectly rational choice for many couples.<sup>7</sup>

#### II.4. *Sorting into Marriage and Specialization*

However, apart from marriage having a *causal* effect on a couple’s division of time between market work, housework and child care, there may also be selective sorting into marriage, if couples who – for various reasons – are more likely to specialize also have a higher probability of getting married. Socio-economic factors – including the male partner’s earnings (BROWN [2000], SMOCK and MANNING [1997]), his full-time employment (OPPENHEIMER [2003]) and occupation (WU and POLLARD [2000]) – are empirically associated with the probability that a cohabiting couple decides to marry *and* with the gender differences in time spent on housework, child care and labor market work (SOUTH and SPITZE [1994], BAXTER 2005; BAXTER *et al.* [2010]). The same has been found for the male partner’s education (OPPENHEIMER [2003],

6. Depending on the age and health of the spouse in need, he or she can be entitled to receive financial support as well (for more detail see IVO [2006], p. 439f.).

7. Though ignoring the dynamic bargaining effects within the couple (see e.g. OTT [1992], BEBLO [2001]).

**TABLE I.** – SPECIALIZATION-ENHANCING INSTITUTIONAL DIFFERENCES BETWEEN MARRIAGE AND COHABITATION IN GERMANY

	Married couples	Cohabiting couples	Reason for more specialization in intra-couple time use when being married
Taxation	Joint taxation	Individual taxation	
Health insurance	Not-employed spouse is covered by (public) health insurance of employed spouse	Individual insurance	Direct effect through lower marginal tax or insurance rate respectively
Ownership	Joint ownership of the increase in capital value of assets	Individual ownership	
Disposition of financial resources	“Schlüsselgewalt”, i.e. legal power is allocated to both spouses	No legal power allocation	
Maintenance support during partnership	Obligation to support spouse (in particular the spouse with no/little income who undertakes the housework)	Obligation to support only if the couple has a child under 3 years of age	Indirect effect through more financial security → trust problem and hold-up problem less severe
Widow’s/widower’s pension	Entitlement	No entitlement	
Dissolution costs	Legal fees depending on the income level	No legal costs	
Division of ownership after dissolution	Division depends on joint assets	No legal regulation of division	
Maintenance support after dissolution	Support depends on joint income during marriage	Obligation for support only if the couple has a child	
Parenthood	Male spouse is legal father of children born during the marriage <sup>1</sup>	Legal fatherhood has to be approved by both cohabiting partner and mother	Indirect effect through more legal insurance for fathers

SMOCK and MANNING [1997], WU and POLLARD [2000]), the female partner’s education (WALLER and McLANAHAN [2005], KALENKOSKI *et al.* [2005]), and age (WALLER and McLANAHAN [2005]). While the man’s education and age have no or a positive effect on time spent on housework, the woman’s education level has a negative effect (SHELTON and JOHN [1993], SOUTH and SPITZE [1994], PITTMAN and BLANCHARD [1996]).

With the “sorting into specialization” hypothesis we assume particularly those couples to get married (instead of staying cohabiters) who plan to divide childcare, housework and labor market work in traditional ways; that is, who anticipate specialization. We base this hypothesis on three pieces of evidence. First, studies on the impact of attitudes and values suggest that couples’ ideas about the consequences of marriage and the common behavior of married persons determine their decision to marry or simply cohabit. E.g. BARBER and AXINN [1998] find that young women who believe that wives should care for the home and the family at the cost of their professional career are more likely to get married, but the impact of these attitudes interacts with the women’s educational aspirations. According to CLARKBERG, STOLZENBERG and WAITE [1995] people who place high values on leisure time, money, their career and sex-role liberalism are less likely to marry than to cohabit, because they are aware of the impact of marriage on these areas of life. SCHNEIDER and RÜGER [2007] detect four sets of values and attitudes explaining marital behavior in Germany: first, the belief that marriage provides legal and financial security especially needed for childrearing; second, the notion that marriage has a value of its own as an institution assuring a life-long relationship; third, a strong association of marriage with religiosity and conservative attitudes regarding gender-roles and same-sex marriage; fourth, the view that marriage is an obsolete institution that should be abandoned. While these studies show traditional gender-role attitudes and values to affect the probability of marriage, others find that the same types of beliefs have an effect on the gender gap in time spent on housework, labor market work and child care (SHELTON and JOHN [1993], BAXTER [2005], BAXTER, HAYES and HEWITT [2010]).

The second argument of our “sorting into specialization” assumption is based on the notion that marriage ceremonies have the purpose of reinforcing the role transition. We suppose that couples who anticipate specialization get married in order to reduce uncertainty about their future role-guided behavior and receive approval from their social network through the marriage ceremony.

The third and possibly strongest reason why couples who plan to specialize would marry refers to the legal differences in the (direct or indirect) promotion of specialization within marriage compared to cohabitation. To couples who anticipate unequal earnings and employment status in the future and are aware of the economic advantages of being married induced by the institutional framework, marrying is a rational and efficient strategy. The same goes for the “insurance aspect” of marriage: couples who plan a division of tasks, in particular the partner who plans to dedicate more time to domestic labor and, hence, will have to take the risk of welfare and power losses during the relationship and in case of dissolution, has a strong incentive to get married to benefit from the “insurance aspect” of regulations such as maintenance support. This economic reasoning does not contradict the sociological perspective on the importance of attitudes and norms. On the contrary, both theoretical ideas go hand in hand as the incentives provided by the institutional framework underpin the attitudes and decisions of couples who

**TABLE II. – CHARACTERISTICS OF MARRIED AND COHABITING COUPLES**

	Married		Cohabiting	
	Men	Women	Men	Women
<b>Time use per weekday</b>				
Job hours	8.66	4.64	8.42	6.71
Child care hours	0.89	3.44	0.71	2.30
Housework hours	1.40	4.50	1.81	3.32
Leisure time	1.68	1.66	1.90	1.75
Full time employment (%)	0.86	0.31	0.80	0.58
<b>Individual characteristics</b>				
Age	44.12	41.54	36.06	33.69
No occupational qualification	0.14	0.21	0.16	0.19
Occupational qualification, apprenticeship	0.64	0.62	0.64	0.62
University degree	0.22	0.17	0.20	0.19
Non-German nationality	0.15	0.14	0.06	0.04
Share of total household labour income	0.72	0.28	0.60	0.40
<b>Household characteristics</b>				
Net household income	2732	2732	2498	2498
Presence of a child in the household	0.56	0.56	0.33	0.34
Living in East Germany	0.25	0.25	0.32	0.32
Observations	62866-67805	64148- 67792	9134-9918	9208-9931

Source: Own calculations based on SOEP waves 1991 to 2008. Sample means of all women and men within the observation period with valid information on the spouse.

have traditional gender-role beliefs. For couples who may have more egalitarian views but who anticipate specialization – because they plan to have children for instance – these incentives are the main reason to get married.

From this theoretical and institutional discussion we conclude that the observed “specialization effect of marriage” may in fact be largely due to a “sorting into specialization” of couples who anticipate specialization (e.g. because they plan to have a child and divide tasks) and who, therefore, want to legitimate the gender-roles they intend to perform and/or benefit from the economic advantages including the insurance aspect of marriage.

### III. Empirical Analysis

The simplest way to assess the specialization effect of being married seems to compare the time uses of married and non-married couples. As mentioned in the introduction, descriptive analyses reveal remarkable differences in the work division of married as compared to cohabiting couples (see TABLE II). However, a causal effect could only be concluded if married couples formed a randomly selected subgroup of all couples. As illustrated in TABLE II, married and cohabiting couples differ in other socio-economic aspects as well, which are more or less related to the observed time uses. For instance, spouses in cohabiting couples show more similarity than married spouses with respect to their occupational qualifications and their contributions to the total household labor income. In terms of household characteristics, married couples dispose of more household income (also due to their greater age) and live with a child in the household more often than cohabiters. Finally, couples in East Germany are less often married than in West Germany.

In light of these observed differences and according to the sorting and specialization hypotheses, couples neither seem to sort randomly into marriage nor are they equally affected

by it. Instead, a selection bias may emerge if the likelihood of marriage is related to time use. If cohabiting couples who (plan to) specialize are more likely to marry, the *true* time use differential between married and non-married couples will be overestimated. In this way, our research question may be interpreted as a classical evaluation problem, where counterfactual outcomes are to be estimated in order to assess the causal specialization effect of marriage.

To produce a credible estimate of this counterfactual or hypothetical outcome, we apply the method of matching which identifies the causal effect of a “treatment” by comparing the time use differences of a just married couple with the time use differences that would have been realized, had that same couple stayed cohabiting (RUBIN [1974]). This yields the average treatment effect on the treated (ATT), an estimate of the average expected effect of marriage on time use differences for all marrying couples.

Let  $Y_{1i}$  denote the time use difference (e.g. hours of market work or hours of child care) of a couple one year after marriage and let  $Y_{0i}$  denote the time use of a couple which stays unmarried. Then, the ATT is given by:

$$\text{ATT} \equiv E(Y_{1i}|D_i = 1) - E(Y_{0i}|D_i = 1)$$

where  $D_i$  is an indicator variable which equals one if couple  $i$  is married and equals zero otherwise.

As the hypothetical time use difference  $E(Y_{0i}|D_i = 1)$  (i.e. of a married couple not being married) cannot be observed, we have to refer to time use differences of unmarried but otherwise similar couples. According to the Conditional Mean Independence Assumption (CMIA) (ROSENBAUM and RUBIN [1983]),  $Y_0$  is the same for treated and untreated individuals (here couples) in expectation, if we control for differences in observable characteristics  $X$ :

$$E(Y_{0i}|D_i = 1, X) = E(Y_{0i}|D_i = 0, X)$$

Hence, if we assume that selection into marriage is taken up by this set of individual characteristics, any remaining difference between treated and non-treated couples can be attributed to the effect of marriage. By conditioning on  $X$ , we can select the appropriate control group of non-treated, i.e. non-married, couples by means of propensity score matching where every couple in the treatment group (married) is matched to a comparable control couple from the non-treated group (non-married). The vector  $X$  includes all variables available that presumably affect the event of marriage while being related to intra-family time use decisions as well.

We estimate a Probit model of getting married and derive the corresponding propensity score ( $PS$ ) to identify comparable couples. The intuition behind the  $PS$  matching is that individuals (here couples) with the same probability of “treatment” can be paired for the purpose of comparison. In our setting, it describes the likelihood of getting married in the following year for every couple in the sample. In the next step, married couples are matched to unmarried ones based on their estimated probability of belonging to the treatment group, given by the distance metric  $PS = P(X)$  (ROSENBAUM and RUBIN [1983]). We apply Kernel matching, where for each married couple a weighted mix of non-married couples with the closest PSs is selected.<sup>8</sup>

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8. A detailed discussion of the advantages and disadvantages of different PS matching algorithms can be found in IMBENS [2004].

According to GEBEL [2010] and GANGL [2011], propensity score matching has several advantages over traditional regression analysis: first, the matching approach does not impose parametric assumptions on the selection model. Hence, misspecification errors that might bias the linear regression specifications are avoided. Second, the analytical strategy and the theoretical assumptions from which inferences on causal effects are made are much more transparent in the matching approach than in regression analysis. Moreover, the effect estimation is easier to interpret since it can be directly traced back to the central parameters in the counterfactual model. Third, linear regression could suffer from comparing non-comparable persons, while the ‘common support condition’ in matching, which requires the propensity score not to equal 1, makes sure that only persons with suitable control cases are taken into account. Fourth, one vivid advantage of the matching strategy is that it concentrates on the empirical effect of the treatment on the outcome Y and does not estimate the covariates’ effects on the outcome. Therefore, a clear detection of the causal effect of the treatment is possible, as the covariates are not “mixed up” in the estimation of the ATT. They are merely used to calculate the propensity score and, thus, as a practical by-product this first step of the matching approach provides insights into the determinants of the treatment (here getting married instead of staying cohabiting).

We are aware that, as a considerable disadvantage of our analytical approach, unobserved characteristics cannot be taken into account. This may seem even more unfavorable as we use panel data to which alternative methodological strategies accounting for selection and (time-constant) unobserved heterogeneity could be applied (e.g. a Heckman correction with panel fixed effects). In a sensitivity analysis we test the robustness of our findings by applying difference-in-difference matching, which also considers time-constant unobserved factors. Thereby, applying the matching approach to panel data permits us to appropriately consider the chronological order of treatment, antecedent factors and outcome variables and to estimate the impact of the treatment on outcomes at different points in time, i.e. at  $t + 1$ ,  $t + 2$ , etc. (see GANGL [2011]).

#### IV. Data Sampling

The data used for our analysis are based on eighteen waves of the German Socio-Economic Panel (SOEP). The SOEP is a yearly micro-data panel which has been conducted in annual interviews of individuals and households since 1984 in West Germany and since 1990 in East Germany.<sup>9</sup> Although not as informative as a time-use survey as regards the individual use of time, the SOEP has the advantage of containing many additional socioeconomic variables, among these, most importantly, the gross labour income of individual household members. It is best suited for our analysis as it also includes various individual characteristics that are likely to affect marriage prospects and intra-family work division at the same time. Participants in the survey provide information about their living circumstances each year, such as whether they live with a partner and their formal family status. Moreover, this information is available over a long period of time which enables us to gather a decent number of respondents who experience a marriage within the 18-year observation period.<sup>10</sup>

9. For a detailed description of the data set see WAGNER *et al.* [2007].

10. Comparisons of self-reported employment hours and time-diary measures with U.S. data have shown that, holding overall working hours constant, married men tend to underreport their employment hours whereas single and cohabiting

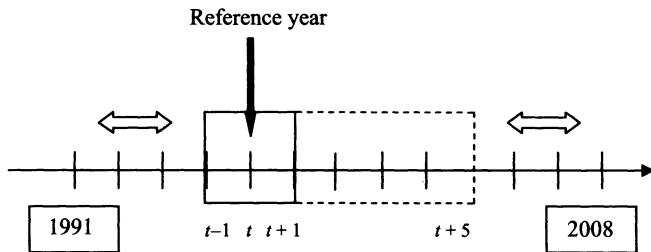


FIGURE 1. – SHIFTING PANEL WINDOW

As illustrated in FIGURE 1, we apply a shifting panel design for marriages between 1992 and 2007, within the observation period 1991 to 2008. A panel window of 3 years ensures that we consider solely respondents who are observed as part of a couple one year before marriage ( $t - 1$ ) and one year following the year of marriage ( $t + 1$ ). Respondents who report a change in their family status from unmarried to married in two subsequent years within the observation period constitute the treatment group I (“married”) of that specific sample year  $t$ . Likewise, all respondents who remain unmarried but cohabiting during the corresponding 3-year window (that is, from  $t - 1$  to  $t + 1$  around the sample year) qualify for the control group. Divorcees and widowers are not considered in either of the groups. Thus, the treatment group consists of couples who are married in  $t$  for the first time and the control group includes couples who have never married up to  $t + 1$  (but may still do so in the future). Later, we will enlarge the sample window to  $t + 5$  to perform sensitivity analyses on successive effects in work division.

In addition to the restrictions imposed by the shifting panel design, the sample is further limited to adults between the ages of 20 and 60, with valid information on their partners, and those who have finished (or abandoned) education to prevent the results from being excessively affected by education decisions and early retirement behavior.

In total, by focusing on marriages between 1992 and 2007, we make use of SOEP data of the survey years 1991 to 2008. The total number of couples marrying over the 18-year observation period and matching our sampling criteria is 668 whereas that remaining in cohabitation is 2670.<sup>11</sup>

Time use information is drawn from a set of items in the SOEP questionnaire where respondents are asked to report the average amount of time per day spent on employment, housework, errands, gardening, repairs, child care and hobbies or other leisure activities. To cope with a few respondents who report simultaneous activities cumulating to more than 24 h per day, we restrict the sum of all work activities to 18 hours per day (thereby allowing at least 6 hours of physical regeneration). We hereby treat time spent on paid employment as given

men do not (SONG [2010]). These results suggest that the difference in specialization between married and cohabiting couples may even be underestimated in our analysis. Comparing German data sets, OTTERBACH and SOUSA-POZA [2010] found that women report more accurate stylized estimates than men. However, as long as this gender bias is of same magnitude cohabiting and between married couples, our results will hardly be affected.

11. Of all 869 couples who married during the observation period and were observed in a 3-year window, only 750 reported still being married in the subsequent year and 668 had non-missing information on all relevant variables.

and, if necessary, downscale other family work activities, as these are more often performed simultaneously. The time-use data in the SOEP are based on the following questions: "What does a typical weekday look like for you? How many hours per day do you spend on the following activities? 1) job, apprenticeship, second job (including travel time to and from work), 2) errands (shopping, errands, citizen's duties), 3) housework (washing, cooking, cleaning), 4) child care, 5) education or further training, studying (also school, college), 6) repairs on and around the house, car repairs, garden work, 7) hobbies and other free-time activities."<sup>12</sup> Hours shall be reported for weekdays, Saturdays, and Sundays separately by both the husband and the wife, but annual data is available for weekdays only. For this reason, we concentrate on time uses on weekdays. We define the first category as employment hours, the second, third and sixth as housework and the fourth as child care.<sup>13</sup>

## V. Propensity Score Estimation

A Probit model is estimated for couples to assess the probability of a transition from cohabitation to marriage. According to the CMIA (that selection into marriage is taken up by this set of individual characteristics and any remaining time use difference between treated and non-treated individuals can be attributed to the effect of marriage), the models include explanatory variables on characteristics one year before marriage ( $t - 1$ ) that are assumed to have an influence on both, the propensity to marry and how time will be allocated. Due to the longitudinal perspective of our analysis, our choice of variables that might serve as conditioning characteristics for the matching of married and cohabiting respondents is limited. We are confined to variables gathered in each year over the whole period from 1991 to 2007 (time of matching,  $t - 1$ ). We distinguish three sets of variables for both spouses:

*Socio-economic characteristics* including age, education, region, nationality, (birth of) children.

*Employment and time use characteristics* including employment status, occupational status and intra-family differences in time spent on employment, housework and child care.

*Satisfaction and concern variables* include satisfaction with life in general and concerns about the own and the general economic situation.<sup>14</sup>

With a descending specification search we obtain the estimation results reported in TABLE III. Most of the estimated coefficients have the expected signs and sizes. Whether a child was born within the year of marriage or in the subsequent year is statistically significantly and positively related to the probability of getting married. Gender differences do exist with respect to the impact of age, nationality and self-employment. Only the female partner being between

12. In the years from 1991 to 1997 the wording of the time use question differed marginally: "Now some questions about your week days. How many hours per day do you spend on the following activities? 1) job, apprenticeship, second job (including travel time to and from work), 2) errands (shopping, errands, citizen's duties), 3) housework (washing, cooking, cleaning), 4) child care, 5) education and continuing education (also school, college), 6) repairs on and around the house, car repairs, garden work, 7) hobbies and other free-time activities.

13. We choose a rather broad definition of housework to encompass both typically female- and typically male-denoted activities at home. We also perform sensitivity analyses with a narrow definition including only category 3) housework (washing, cooking, cleaning).

14. We would have liked to include variables that also measure traditional attitudes and religion, but unfortunately the GSOEP does not provide this information for subsequent waves.

DOES “SORTING INTO SPECIALIZATION” EXPLAIN THE DIFFERENCES IN TIME USE BETWEEN MARRIED AND COHABITING COUPLES? AN EMPIRICAL APPLICATION FOR GERMANY

TABLE III. – PROBIT MODEL OF MARRYING IN *t*

	Coeff. estimate	Std. error
Characteristics in t-1		
Woman: Age 30 to 39	0.1651**	0.0636
(reference: 20 to 29 or 40 to 59)		
Man: Age 20 to 29	0.4120***	0.1030
(reference: 40 to 59)		
Man: Age 30 to 39	0.3988***	0.0933
Age difference	0.0306***	0.0071
Woman without occupational qualification	-0.1696*	0.0783
Difference in years of schooling (man’s – woman’s)	0.1625**	0.0591
Living in East Germany	-0.454***	0.0642
Man has German nationality	0.3513**	0.1218
Woman is fulltime employed	0.2236**	0.0769
Man is self employed	-0.4724***	0.1156
Labor income ratio (man’s gross income/both partners’ gross income)	0.6807***	0.1356
Man’s satisfaction with life (10 point scale)	0.0411*	0.0206
Woman’s satisfaction with life (10 point scale)	0.0737***	0.0203
Difference in hours child care (man’s – woman’s)	-0.0146	0.0104
Child born in year of marriage	0.9828***	0.0907
Child born in subsequent year	0.9375***	0.0912
Constant	-2.7798***	0.2800
Pseudo R <sup>2</sup>	0.1534	
<i>x</i> <sup>2</sup> (31)	512.67	
No. of observations	3338	

Note: Year of marriage included as a dummy-set of control variables. \*\*\* indicate a significance level of 1% level, \*\* of 5% and \* of 10%.

Source: Own calculations based on SOEP waves 1991 to 2007 (sample definition based on 1991 to 2008).

the age of 30 and 39 and satisfied with life in general and the male partner having German nationality is positively related to the couple’s probability of getting married. In contrast to this, male self-employment is negatively related. Finally, couples are the more likely to change from cohabitation to marriage the larger the male partner’s earnings’ contribution to the household; that is, the less symmetric the spouses’ labor income shares are.

## VI. Matching Results

Based on the estimated propensity scores, couples of the “married” treatment group are now matched to their neighbors, based on a kernel density function, within the “still cohabiting” couples control group. The results are presented in TABLE IV.

The average difference in the number of hours married spouses devote to employment is 4.2 hours whereas the unmatched differential of cohabiting spouses amounts to only 1.7 hours on average. This yields a significant unmatched specialization gap of about 2.6 hours which represents 61 percent of the married time use differential. After balancing the samples with respect to observed characteristics, the adjusted intra-family time use difference of cohabiters rises towards the level of the married (3.3 hours). The specialization differential falls by more than half to 0.9 hours but is still statistically significantly different from zero.<sup>15</sup> Interpreting this

15. Since standard errors provided by the Stata procedure psmatch2 do not take into account that the propensity score has been estimated, we use bootstrapping (with 100 replications) to conclude on statistical inference. According to ABADIE and IMBENS [2008], the bootstrap provides valid inference for kernel-based matching methods, whereas it is

**TABLE IV.** – TIME USE DIFFERENTIALS BETWEEN MARRIED AND COHABITING COUPLES

	Married (#668, whereof 3 are without common support)	Cohabiting (#2,670)	Married- Cohabiting	Married- Cohabiting
	Hours difference man-woman	Hours difference man-woman	Absolute difference in hours	Relative difference in %
<b>Difference in time use in <math>t + 1</math> on:</b>				
<i>Employment</i>				
Unmatched (Std. Error)	4.24	1.67	2.57*** (0.23)	61
Matched ATT (Std. Error)	4.23	3.30	0.92*** (0.25)	22
<i>Child care</i>				
Unmatched (Std. Error)	-3.47	-1.31	-2.16*** (-0.15)	62
Matched ATT (Std. Error)	-3.47	-2.91	-0.56*** (-0.20)	16
<i>Housework, Repairs...</i>				
Unmatched (Std. Error)	-1.65	-1.04	-0.61*** (-0.10)	37
Matched ATT (Std. Error)	-1.64	-1.38	-0.26** (-0.13)	16

Note: \*\*\* indicate a statistically significant difference at the 1% level, \*\* at the 5% level.

Source: Own calculations based on the Probit estimation results of TABLE III and Stata matching algorithm psmatch2 by LEUVEN and STANESI [2003]. SOEP waves 1991 to 2008. Standard errors obtained from bootstrapping with 100 replications, Kernel matching.

relative ATT of 22 percent means that a randomly chosen couple from the sample of married would only be left with 22 percent of its employment time use gap if not married. It would hence reveal a much more symmetric time use division.

The outcome variable child care yields the mirror image of employment. Without controlling for differences in observed covariates, married women invest two more hours in child care than cohabiting ones in comparison to their spouses. As with employment time, this observed gap between married and cohabiting couples corresponds to about 60 percent of the married time use differential. After controlling for differences in observed characteristics the matched gap of child care decreases to only 0.6 hours (or 16 percent), which is still statistically different from zero at standard levels.

The third outcome variable, housework, yields a similar result. Starting from an observed time use difference of a little bit more than half an hour between the housework gaps of married and cohabiting couples (the gap being much smaller between unmarried spouses again), the ATT reduces to a borderline significant quarter of an hour after matching.<sup>16</sup> A randomly chosen couple from the sample of married couples would thus show less asymmetric time use if not married. This result confirms that specializing spouses with fewer symmetric respectively homogenous socio-economic and attitudinal characteristics and engaged in family planning are more likely to marry. Hence, when comparing married and cohabiting couples, the major part

“not valid as the basis for inference with simple nearest-neighbor matching estimators with replacement and a fixed number of neighbors” (p. 1546).

16. With a more narrowly defined housework variable, where we consider only the core housework chores and errands and exclude repairs and gardening, the ATT is slightly smaller (-0.16) and not significantly different from zero any more (at standard levels).

of the specialization gap seems attributable to a selective sorting into marriage. With regard to intra-couple differences in time spent in the labor market and on child care, two thirds, respectively three quarters, of the specialization gap can be explained by selection into marriage. More than half of the gap in specialization on housework seems due to selection.

We may therefore conclude that the results of the matching approach largely support our sorting-into-specialization hypothesis.<sup>17</sup> This conclusion is supported by a sensitivity analysis with difference-in-difference (DID) matching. Here, the outcome variables are the differences in couples’ time use differentials between  $t - 1$  and  $t + 1$ , hence before and after marriage, which levels out the impact of time-constant unobservable individual and couple characteristics. Interestingly, DID matching yields the same qualitative results as our simple matching procedure, indicating the high power of the propensity score estimation for the selection model, even though only based on observables.<sup>18</sup>

## VII. Once Married...

Although the sorting into marriage and, hence, into specialization seems to explain a large part of the observed time use differences between married and cohabiting couples, a remaining specialization-reinforcing effect of marriage may become more evident over the course of time. As outlined above, the institutional framework in Germany does not only encourage couples who anticipate specialization to marry; they also provide strong economic incentives and an institutional insurance for couples to specialize, even if they did not plan to do so initially, once they are married. Moreover, ‘doing family’, i.e. acting according to the roles of ‘husband’ and ‘wife’, might only evolve over the years of being married. As a sensitivity analysis, in order to investigate whether a remaining effect of marriage on specialization becomes evident over the years, we compare the average treatment effects on the treated (ATT) during a five-year period after marriage (FIGURES 2 and 3).

Net of selection effects, the specialization gap between married and cohabiting couples remains statistically significantly different from zero until up to the 5<sup>th</sup> survey year.<sup>19</sup> With regard to time spent in the labor market and time devoted to child care, the ATTs seem to increase within the first few years of marriage ( $t + 1$  to  $t + 3$ ), however, these annual changes are well within the confidence intervals and hence, not statistically significant.

In contrast to this, the ATTs on specialization in housework, errands, repairs and gardening remain negative but small over the years and only partly statistically significant. Economically, the difference does not seem very relevant, as married couples exhibit only a quarter of an hour larger gap in household activities between male and female partner than cohabiting.<sup>20</sup>

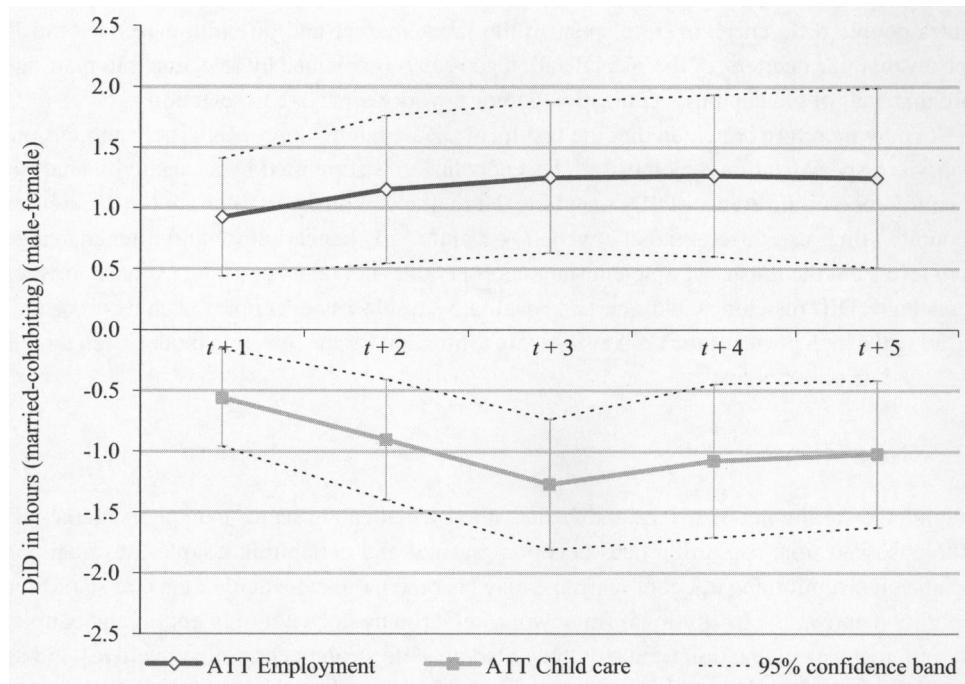
Now, to investigate where these net effects of marriage on specialization stem from, we disentangle the ATTs by presenting the intra-couples time use differences in  $t - 1$  to  $t + 5$  *before* accounting for selection (FIGURE 4) and *after* controlling for selection into the treatment by matching similar couples (FIGURE 5).

17. Robustness checks with alternative matching procedures such as nearest neighbor matching confirm these results.

18. The results are available from the authors on request.

19. Going beyond  $t + 5$  would result in the loss of too many observations.

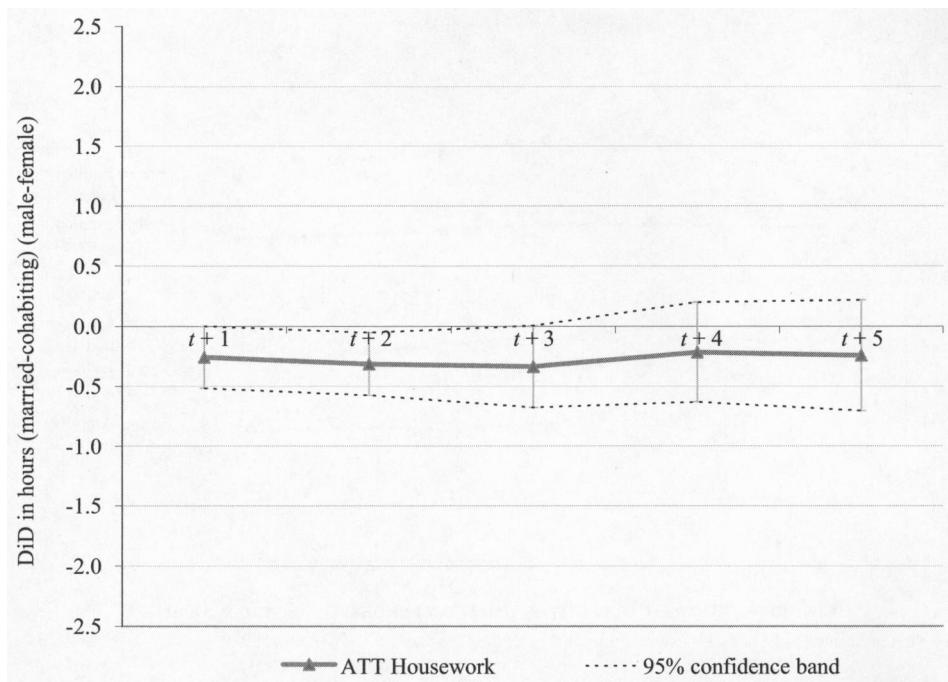
20. With the narrow definition of housework the picture looks very similar.



**FIGURE 2.** – ATTs OF INTRA-COUPLE TIME USE DIFFERENCES FOR WEEK DAY EMPLOYMENT HOURS AND WEEKDAY HOURS SPENT ON CHILD CARE OVER TIME

Source: Own calculations based on the Probit estimation results of TABLE III and Stata matching algorithm psmatch2 by LEUVEN and SIANESI [2003]. SOEP waves 1991 to 2008. Standard errors obtained from bootstrapping with 100 replications, Kernel matching.

Starting from a rather low level of two-hours difference in time spent on employment and 1.3 hours difference in time spent on child care in the survey year just before marriage takes place (in  $t - 1$ ), couples seem to specialize further once married. In the years following marriage, husbands invest up to four more hours in their jobs per day than wives. This difference is exactly reflected in the child care gap, where married women invest up to four more daily hours. However, while the employment time gap falls below three hours in  $t + 5$ , the child care gap remains at and above four hours. At the same time, the differential in housework, errands, repairs and gardening increases steadily to above two hours that married women spend more than their husbands. In contrast to this, cohabiting couples seem to exhibit a much more constant time use pattern. The employment differential remains between 1.2 to 1.6 hours over the whole observation period. The housework differential ranges between 1 and 1.5 hours. Yet, child care seems to be increasingly provided by cohabiting women rather than men over the course of time, the gap growing from 1.1 to 2.3 hours – though still far below the four hours gap exhibited by married spouses.



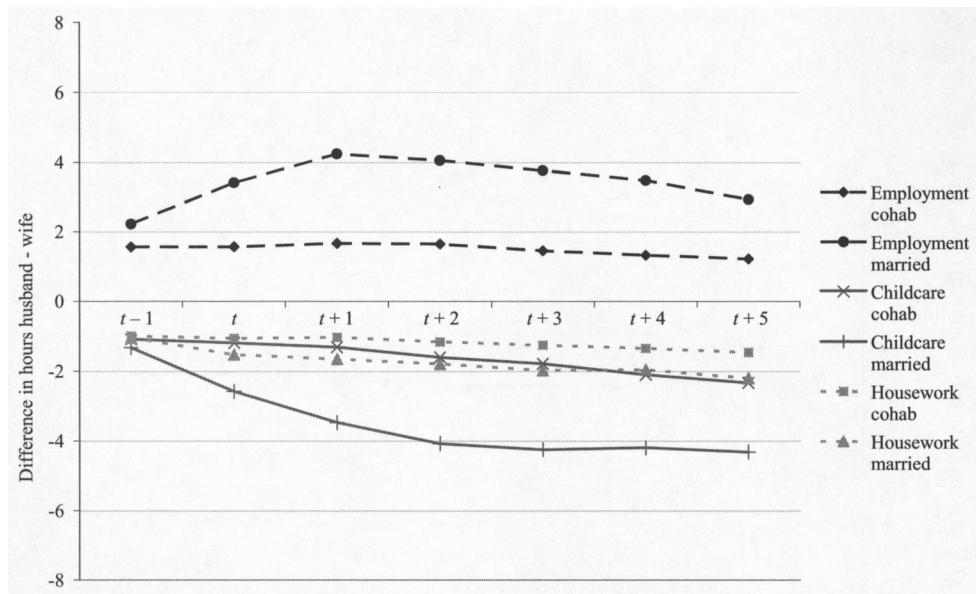
**FIGURE 3.** – ATT ON INTRA-COUPLE TIME USE DIFFERENCE FOR WEEKDAY HOURS SPENT ON HOUSE WORK, ERRANDS, REPAIRS AND GARDENING

Source: Own calculations based on the Probit estimation results of TABLE III and Stata matching algorithm psmatch2 by LEUVEN and SIANESI [2003]. SOEP waves 1991 to 2008. Standard errors obtained from bootstrapping with 100 replications, Kernel matching.

When restricting the comparison to couples who are actually included as control units in the matched sample, and using their sample weights from the matching procedure<sup>21</sup>, the picture changes (see FIGURE 5). The curves for cohabiting spouses now look more similar, in level as well as pattern, to those for married couples (which remain the same as in FIGURE 4). The differential in employment hours in particular between cohabiting women and men becomes more similar to the differential between married spouses, although it remains still more than one hour smaller. The child care and housework gaps also show a more similar pattern. Despite this convergence in time use differentials due to the selection correction, there remain notable differences between the matched samples (as already seen with the dynamics of the ATTs) which may give interpretative scope for a specialization-reinforcing effect of marriage.

It may be objected that couples often get married when (or because) they expect a child or are planning to have a child and that marriage can therefore not be analyzed independently of child birth. In addition to taking account of the event of a child birth in the propensity score estimation, we therefore investigate the robustness of our results with a subsample of couples

21. For this illustration, the weights of the nearest neighbour matching are used.

**FIGURE 4.** – INTRA-COUPLE TIME USE DIFFERENCES, UNMATCHED SAMPLES

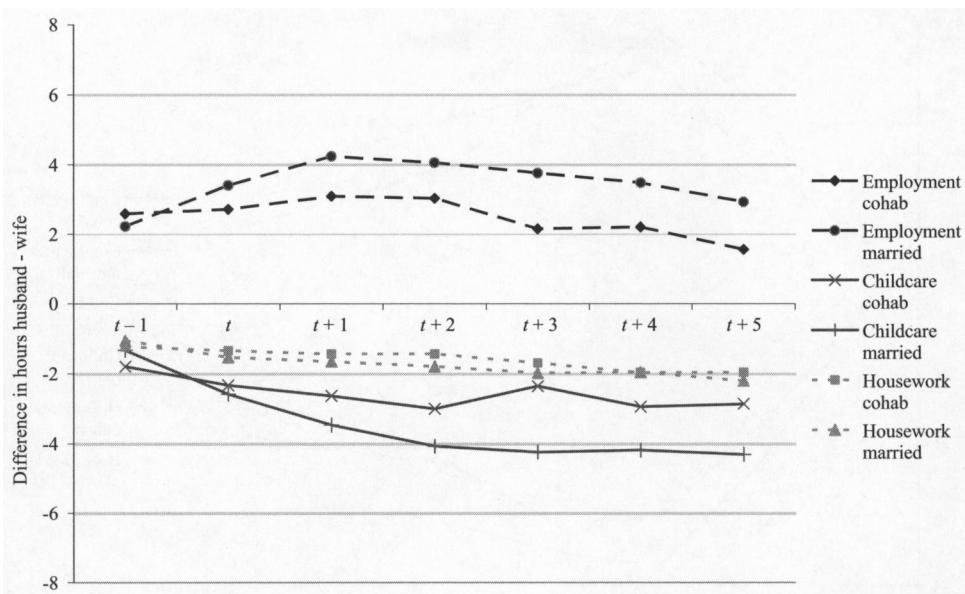
Source: Own calculations based on SOEP waves 1991 to 2008.

who have a child born in  $t$  or  $t + 1$  (that is, who are already expecting a child at the time of marriage).

Interestingly, the graphs of married and cohabiting couples' time use gaps resemble even more if we condition the comparison further to couples who experience a child birth, as illustrated in FIGURE 6. Both, the employment gap and the child care gap increase substantially after child birth and have a peak at  $t + 1$  which amounts to 7.8 job hours respectively 7.5 child care hours between married spouses and 6.8 job hours respectively 6.2 childcare hours (in  $t + 2$ ) between cohabiting spouses. However, the long-run patterns differ by family status. A few years after child birth, the employment differential of cohabiters converges back to the pre-birth level. As regards time spent on child care, the gap drops below 4 hours whereas for married couples it remains at almost 6 hours.<sup>22</sup> This finding is perfectly consistent with the differing economic incentives for married and cohabiting parents to engage in work division and supports the interpretation of a specialization-reinforcing effect of marriage.

Altogether, we interpret the persistently different time use decisions within married and cohabiting couples as an indication for a specialization-reinforcing effect of the institutional framework for marriage. A complementary interpretation may be a couple's 'doing family'

22. One may object that married couples tend to have more children than cohabiting ones and, hence, the remaining higher level of specialization of the married couples could be due to further children being born between  $t + 2$  and  $t + 5$ . For a sensitivity analysis and in order to assess the effect of additional children, we also restricted the samples to those couples who had no children before, and who experienced no further child births. With regard to the cohabiters, we further restricted the sample to those couples who remained unmarried during the whole observation period. The resulting time use patterns differ even more sharply between the two groups than illustrated in FIGURE 6 (based on very small sample sizes though). The results are available from the authors on request.



**FIGURE 5.** – INTRA-COUPLE TIME USE DIFFERENCES, MATCHED SAMPLES

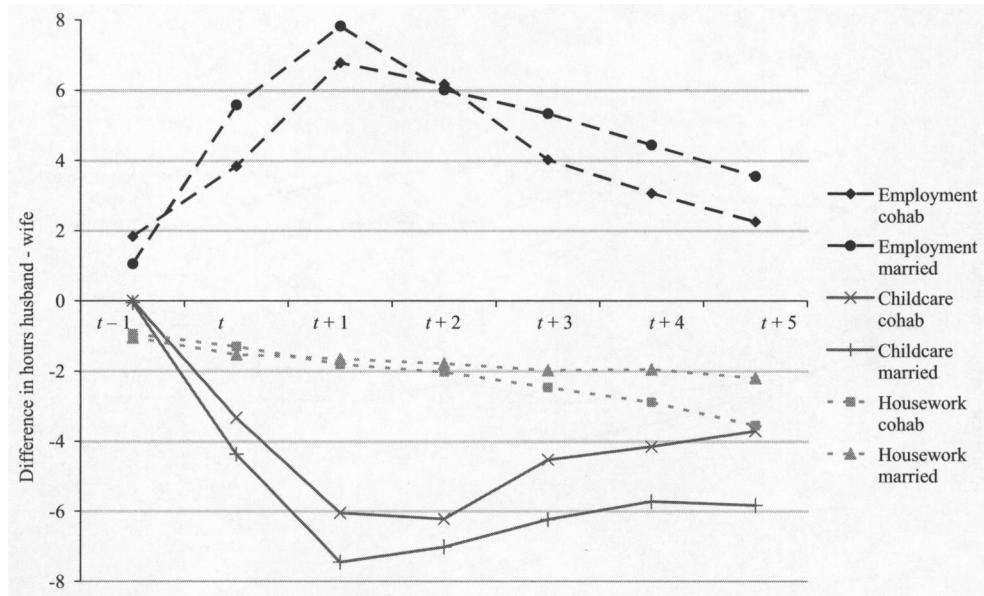
Source: Own calculations based on the Probit estimation results of TABLE III. SOEP waves 1991 to 2008.

behavior once married. However, the effect does not become significantly larger with marriage duration, except for the subsample of parents: Although the time use patterns of married and cohabiting couples are much more similar after a child has been born, married couples still exhibit larger differences, hence more specialization, particularly after the child’s infant and toddler years.

### VIII. Conclusion

This paper investigates intra-couple work divisions by emphasizing the selective sorting into marriage of couples who are willing and likely to specialize in time use and the specialization-reinforcing effects of the institutional framework of marriage versus cohabitation in Germany. To the best of our knowledge, selection into specialization within marriage has not been tested by non-parametric matching before.

Our analyses emphasize that even recently married couples in Germany reveal more intra-household specialization in time use than cohabiting couples. Different behavior is observed for all major time uses – employment, housework and child care. With PS matching, however, we can show that the average treatment effect of marriage for the married decreases by three quarters of the observed difference between married and cohabiting couples in time spent on child care and by two thirds, respectively one half, of the observed differences in employment and housework. In other words, married couples have larger time use differences mostly because they have a specific mix of characteristics, even before marriage, and because they become parents at a much higher probability. More homogenous spouses in terms of education, wage

**FIGURE 6. – INTRA-COUPLE TIME USE DIFFERENCES, CHILD BIRTH SAMPLES**

Source: Own calculations based on the Probit estimation results of TABLE III. SOEP waves 1991 to 2008.

income and time use are less likely to get married. Contrary to the findings by EL LAGHA and MOREAU [2007], our analysis reveals a substantial selection effect. Both matching and DID-matching results confirm that anticipated specialization plays an important part in the selective sorting process from cohabitation to marriage – as expected particularly in a country like Germany where institutions impose very different incentives conditional on the family status. This finding not only supports our sorting hypothesis, it also complements the diagnosis of a virtually non-existent wage differential (when accounting for selection) between married and cohabiting men as previously found in BARG and BEBLO [2009].

However, even though sorting into specialization tells most of the story, we cannot reject a remaining, reinforcing effect of marriage on employment and child care hours. Particularly when having a child, husbands' and wives' time uses tend to deviate all the more from those of cohabiting spouses, the more time has elapsed since child birth. Whereas cohabiting parents' work division converges back to the pre-birth level after a few years, married parents' time use remains more specialized.

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