

ORIGINAL ARTICLE

Open Access

Relative labor supply in intermarriage

Olga Nottmeyer

Correspondence: nottmeyer@iza.org
Institute for the Study of Labor,
Schaumburg-Lippe-Str. 5-9, 53113
Bonn, Germany

Abstract

Spouse's relative labor supply and the degree of specialization in intermarriage might differ from that in immigrant and native marriage for several reasons. Intermarried couples may specialize less due to smaller comparative advantages resulting from positive assortative mating by education, and due to different bargaining positions within the household. The empirical analysis relies on panel data using a two limit Random Effects Tobit framework to identify determinants of a gender-neutral specialization index. Results indicate that for immigrants intermarriage is indeed related to less specialization, as is similar education levels of spouses, while children and being Muslim or Islamic are associated with greater specialization. For natives, on the other hand, the likelihood to specialize increases with intermarriage. This might result from differences in bargaining strength or be due to adaptation to immigrants' gender roles.

JEL classification: J11, J12.

Keywords: Migration; Integration; Intermarriage; Specialization; Division of labor

Introduction

Marriages between immigrants and natives, here termed “intermarriage”, are often viewed as indicator of social proximity and possibly a driving factor of individual economic success. Being intermarried seems to signal greater commitment and better integration in the hosting country, as, on average, intermarried immigrants tend to have better education, are more likely to work in high-qualified jobs and earn more than singles and immigrants who live with other immigrants¹.

Structural characteristics of the marriage market, such as availability of potential partners within the own ethnic group, interference of third parties, personal characteristics such as age at immigration, years elapsed in the country and education are among the most important factors determining intermarriages (see Kalmijn 1998).

Besides determinants of intermarriage and intermarriage patterns, research has increasingly focused on intermarriages' potential effects on economic outcomes such as immigrants' wages in the U.S., Australia, and France, and on employment and self-employment rates, e.g. of U.S. immigrants². However, little is known about what happens within the household and in particular how intermarried couples differ from immigrant and native couples with respect to the division of labor.

Some studies, starting with Baker and Benjamin (1997) and followed by Blau et al. (2003) and Basilio et al. (2009), look at labor market behavior of immigrant families upon arrival. They find mixed evidence for the “family investment hypothesis” which states that immigrant wives tend to take on “dead end” jobs upon arrival in order to finance

their husbands' human capital investment. While this is supported by findings from Canada (Baker and Benjamin 1997), immigrant couples in the U.S. seem to equally invest in human capital accumulation upon arrival and findings by Blau et al. (2003) do not support this hypothesis. Equally, such behavior is not found for immigrant couples in Germany (Basilio et al. 2009)³.

This investment strategy affects the degree of labor market participation within immigrant partnerships and is therefore related to the question addressed in this paper: The difference in relative labor supply and the degree of specialization of intermarried couples in comparison to immigrant and native couples, and its relation to differences in bargaining power.

Diverging degrees of specialization could arise from smaller comparative advantages in intermarriage due to positive assortative mating by education and differences in partners' perceived bargaining position. The former implies that spouses have similar education levels, which leads to more similar productivity levels and therefore similar wages. As a consequence, opportunity costs are similar and both partners have similar incentives to work in the labor market.

In this context, potential earnings and wages are two possible measures for bargaining power as, for instance, Lundberg and Pollak (1996) discuss in detail. Another potential measure of power is the perceived influence on financial decisions. Friedberg and Webb (2006) use self-reported information about who has the "final say" in financial questions, and Beegle et al. (2001) look at ownership of household assets to measure bargaining power. This paper uses similar variables, namely "distribution of income" and "final say on financial decisions", to relate intermarriage to self-perceived bargaining power. Given the interdependencies between perceived power, wages and hours worked, it is however difficult to determine the direction of causality, so the aim of this paper is not to identify causality but rather to highlight some interesting correlations.

The empirical analysis builds on data from the German Socio-Economic Panel (SOEP), which offer the possibility to incorporate unobserved, time-invariant factors (due to its panel structure) and various individual's and couple's characteristics (an advantage of the richness of personal aspects covered)⁴. It is assumed that the degree of specialization is the outcome of an underlying optimization problem where each couple maximizes its combined utility function. Complete specialization - in the sense that one partner is the main bread-winner and the other partner focuses exclusively on home production - is thus one optimal solution of this problem. As a consequence, a two-limit Random Effects Tobit model is used to account for these corner solutions in the couple's maximization problem.

To control for possible endogeneity between intermarriage and relative labor supply, the functional form assumptions of the Tobit model are successively relaxed, leading to an instrumental variable (IV) estimation. In that IV regression an ethnicity-gender ratio is used as identifying restriction - similar to those proposed in previous studies on intermarriage, e.g. by Meng and Gregory (2005). Even though its use as instrument is not indisputable it serves well as a first indicator for how intermarriage relates to specialization.

The analysis considers cohabiting (heterosexual) couples and proposes a gender-neutral specialization index to measure to what extent one partner contributes to the mass of couple's working hours. This approach is motivated by work by Stratton (2005) and

Bonke et al. (2008) who use a similar design to study differences in the degree of specialization in household tasks between married and cohabiting couples - and between couples in the U.S. and Denmark respectively.

The decision of how much to work relative to the partner depends, among other factors, on the expected gains from specialization and the bargaining strength of each spouse. If expected gains are low and the risk of divorce is high, less specialization is optimal. Plus, if bargaining strength is high more labor supply is expected.

Empirical findings indicate that intermarriage is, indeed, related to less specialization: Especially mixed couples of immigrant men and native women are less specialized than immigrant couples. (For immigrant women this relation also holds but is somewhat weaker). Furthermore, intermarried immigrant men are less likely to be the sole decision maker in the household, while in immigrant households financial decisions are mostly made by the husband. This indicates more bargaining power of the native partner, especially the native wife, probably due to better and more similar education, better outside options and thus different threat points, that is different, presumably better prospects in case of divorce⁵.

In contrast, natives in intermarriage seem to specialize more than native couples, possibly indicating that natives view female labor force participation differently than immigrants, and that intermarried natives adapt to their partners' views in order to mitigate conflict potential within the partnership. Hence, native couples may have more egalitarian views which may lead to less specialization compared to couples with more traditional role models.

In the next section the determinants and economic implications of intermarriage are discussed. In addition, an outline of the theory behind intra-household division of labor is given. Section 2 then explains the construction of the specialization index, followed by a summary of definitions and the data description in Section 3. In Section 4 the empirical results are presented and discussed including a subsection that contains some robustness checks based on measures of bargaining power. The paper concludes with a summary of results and an outlook for further research.

1. Background

1.1. Determinants of intermarriage and its economic implications

Previous research on intermarriage primarily focused on patterns and determinants of intermarriage, that is factors that increase the likelihood to marry outside the own ethnic group and, in particular, to marry partners from the native population. This strand of literature predominately evolved in traditional immigration countries such as the U.S. and Australia, but is also increasingly prominent in Germany and other European countries like France, Sweden and the Netherlands.

Accordingly, structural constraints in the marriage market such as gender ratio and the availability of partners within the own ethnic community are among the most important factors driving marriage choice (Angrist 2002). In addition, interference of third parties (mainly parents), religious beliefs, and socio-economic status, next to cultural norms and linguistic proximity determine the decision of whom to marry. These factors, at least partly, explain why some immigrant groups show a greater tendency toward intermarriage than others.

Kalmijn (2012) argues that immigrants whose educational level deviates substantially from that of their own ethnic group, both at the lower and upper tail of the educational distribution, are more likely to marry outside their ethnic group. In addition, there are differences in the perception of certain ethnic groups within the native population. Therefore, immigrants belonging to a (perceived) well educated ethnic group will intermarry more often than immigrants from (perceived) less educated groups – independent of their actual educational attainment level. Finally, well educated minority groups often have different preferences, norms and values, and therefore different attitudes towards intermarriage and gender roles. This later point shows in the differences in the “Big Five” personality traits, for example (see Tables 1 and 2).

However, individual characteristics and personal preferences must not be neglected: Immigrants are more likely to intermarry if they immigrated at young ages, spent considerable time in the hosting country, exhibit good language skills, and, most importantly, are highly educated (Furtado 2006; Furtado and Theodoropoulos 2011; Chiswick and Houseworth 2008).

If partner choice would be completely random there would be no difference in education levels between intermarried, immigrant or native couples. However, since partner choice is not random it is not surprising to find differences in intermarried couples with respect to education and other characteristics, of course. According to Becker (1974), people generally match based on similar bundles of resources. However, partners do not need to be identical in each characteristic but can compensate for differences in one by offering greater similarities in others.

Even though everybody would probably prefer “double matches”, that is to marry somebody with the same ethnic background and the same level of education, some may settle for a partner with a different ethnic background as long as they match, at least, on education⁶. Hence, positive assortative mating by education might be especially important in intermarriage and partners with heterogeneous ethnic backgrounds tend to be more similar with respect to education than couples with the same ethnic background (see Chiswick and Houseworth 2008); (Furtado 2006); Furtado and Theodoropoulos 2011).

Moreover, educational institutions usually serve as social platforms to meet potential future spouses. And, as discussed in detail by Furtado (2006) and (Furtado and Theodoropoulos 2011), better educated immigrants are assumed to be less likely to live in ethnic enclaves and to better adapt to unfamiliar environments.

Studies on economic implications from intermarriage find mostly positive effects from native partners, at least for immigrants: So intermarriage has positive effects on immigrants’ earnings in Australia and France (Meng and Gregory 2005), and (Meng and Meurs 2006)⁷, and on employment status and self-employment probabilities for U.S. immigrants (Furtado and Theodoropoulos 2009a and 2009b; Georgarakos and Tatsiramos 2009). In contrast, Kantarevic (2004) finds no significant effect of intermarriage on immigrants’ earnings in the U.S. once he controls for possible endogeneity. Until now, little is known about such relations for immigrants in Germany.

The purpose of this paper is, however, not to explain what determines intermarriage formation or how it affects wages or employment status but to shed some light on internal constellations, in particular the degree of couple’s specialization.

1.2. Couple's specialization

The degree of specialization depends, among others, on expected gains and associated costs from the division of labor within the household. According to Becker (1981) – and discussed for instance by Bonke et al. (2008) – specialization and the division of labor are the “fundamental principles of economics and allow for production at lowest possible costs”. These principles create an advantage of multi-person over single-person households and can result in household specialization to the extent that one partner focuses mainly on labor market work while the other specializes completely in home production. The degree of specialization and the division of tasks depends on relative advantages and opportunity costs. Greater gains from specialization are expected for couples with greater differences in skills and abilities Becker (1981, 1985) so that greater differences in education will lead to more specialization. In contrast, higher earnings and greater labor force participation of married women reduce the gains from marriage (and raise the attractiveness of divorce) so that the sexual division of labor within the household becomes less advantageous (Becker 1985). Who specializes in which tasks therefore depends mainly on resource endowment and labor market opportunities.

Following the arguments given in the context of collective labor supply models, couples utility can be written as the weighted sum of spouses' individual utilities subject to their time and budget constraints, incorporating home production. Lundberg and Pollak (1996) give a very comprehensive overview of the development of cooperative bargaining models, starting from common preference models that assume families to maximize one single utility function independent of who receives and controls the resources, covering models of marriage and divorce that allow agents to compare their expected utility inside and outside of marriage, and moving on to cooperative bargaining models that consider two or more agents who determine their consumption based on distinct preferences. These models show that (Nash) bargaining solutions depend on a threat point, that is the maximum utility level available outside of marriage, which is determined by the ownership after divorce, for instance.

Couples maximize their joint utility function, subject to the fact that total income consists of both partners' labor earnings times their labor market hours (that is total time available minus leisure time and hours spent on household work), plus non-earned income Van Klaveren et al. (2011). Total household production is also a weighted sum of husband's and wife's time spent on household work.

The weighting factor in the utility function represents each partner's bargaining power, and captures, for instance, relative resource endowment, time availability, outside options and egalitarian views. Members with the most “power” will tend to do less housework and engage more in labor market work (Bonke et al. 2008). In this context, “power” is related to comparative advantages and better outside options (Hersch and Stratton 1994). The weighting factor in the household production function may alter from 1 in order to account for different productivity levels in household production between husbands and wives. It is assumed that the observed labor supply of each spouse is the optimal solution of this maximization problem given each partner's bargaining strength.

According to Van Klaveren et al. (2011) bargaining power depends mainly on labor market earnings, the number of children living in the household, the age of the

partners, and net weekly non-labor income. However, measuring actual bargaining power is difficult.

Van Klaveren et al. (2011) therefore rely mainly on functional form assumptions to solve the measurement issue. Previous research has used wages (e.g. Chiappori et al. 2002) or annual earnings (e.g. Fuwa 2004) to determine bargaining power. Accordingly, those with higher expected wages/earnings, and therefore higher opportunity costs, are expected to contribute more time to labor market work. Using wages or earnings is however not unquestionable. While Pollak (2005) suggests using wages rather than earnings because they may vary with hours worked, this still requires to observe wages for both partners and to concentrate on dual earner households. This restriction might impose sample selection and exclude more traditionally focused households. Stratton and Gupta (2008) therefore propose to look at relative education instead when analyzing the effect of bargaining on leisure time. Education is a determinant of earnings but the investment decision is made early in life. Hence, education is pre-defined and impacts the distribution of power already at the beginning of a relationship, before the division of tasks. In addition, it can be observed for everybody and is hence not subjective to selection like earning may be.

Other studies, such as by Luehrmann and Maurer (2007) or Beegle et al. (2001) use self-reported information to detect bargaining strength. Beegle et al. (2001) consider the ownership of assets/share of household assets as indicator of economic power while Friedberg and Webb (2006) use information about who has the final say in household decisions to reveal whose preferences are reflected. (A similar variable is used in this study as robustness check to depict different decision patterns in intermarriage, in immigrant and in native marriages.)

Other determinants of the degree of specialization are time constraints and marriage market conditions. Accordingly, the least time constrained party will do the house work while the more time constraint partner will specialize in labor market work (Bonke et al. 2008). Conditions in marriage markets like sex ratios determine female labor force participation, e.g. in the U.S. (Grossbard and Amuedo-Dorantes 2007), and divorce laws affect the costs of separation and hence spouses' threat points within marriage. If divorce bounds are tight there is little scope for bargaining so that institutions may impact the division of tasks between men and women by affecting threat points within the partnership. The optimal degree of specialization therefore depends on the stability of marital environment and the availability of alternative marital partners, as (Lundberg and Pollak 1996) point out.

Culture, ideology, and social norms, as well as preferences and the importance of individual beliefs about, for instance, gender roles ("doing gender") play an important role in the division of labor as well (Bittmann et al. 2003). As (Stratton and Gupta 2008) show, costs associated with deviating from social norms and benefits associated with behaving according to individual beliefs are crucial. Lundberg and Pollak (1996) argue that history and culture might generate a "self-evident way to play" (p. 151) so that complete gender specialization in the provision of household goods corresponds to conventional gender assignments of responsibilities. In other words, social recognition and sanctioning gender roles may assign responsibilities of certain activities to husbands and wives.

In line with this, couples with more egalitarian views – mainly younger, more liberated people – divide tasks more equally (Fuwa 2004), while couples with more traditional role

models are expected to specialize more. Shelton and John (1996) refer to a study by Huber and Spitz from 1983 that finds that better educated women have more egalitarian sex role attitudes and therefore do less housework – while better educated men do more housework. Moreover, they find differences in the division of household labor for different ethnic and racial groups in the U.S. such as African-Americans, Hispanics, Japanese and South Korean men as well as Soviet women. This indicates that traditions and home culture may play a role in the division of labor as well and that more traditional societies may specialize more⁸.

Finally, the optimal degree of specialization is related to the expected duration of the partnership. As Bonke et al. (2008) explain, the longer the expected period of specialization the lower the present value of costs of changing tasks when the relationship ends, and the greater the degree of specialization (p. 1033). As a consequence, the degree of specialization is a function of the expected duration of marriage with more enduring relationships inducing a higher degree of specialization Stratton (2005). Consequently, partners should specialize more if the risk of divorce is low and partners expect the relationship to last long⁹.

1.3. Working hypotheses

Relating these arguments to intermarriage implies that intermarried couples may be less specialized than immigrant couples for the following reasons:

- (1) Intermarried spouses tend to have similar education due to enhanced assortative mating by education. Accordingly, intermarried immigrants seem to compensate for differences in ethnicity with greater similarity in education (see Chiswick and Houseworth 2008). This leads to similar productivity levels of partners in intermarriage and hence smaller comparative advantages of one partner over the other. It reduces incentives to specialize and results in less division of labor. In contrast, immigrant and native couples are, by definition, ethnically homogeneous and hence may place less emphasis on similar education. Consequently, a higher comparative advantage of one partner is expected leading to greater specialization within those partnerships as compared to intermarriages.
- (2) Bargaining power in intermarriage might be shifted to the native partner due to better labor market – and hence outside – options. The native partner is more familiar with the host country's customs, norms, and peculiarities, has a better knowledge of the local labor market, faces less discrimination based on ethnicity, and exhibits better host country specific skills requested by native employers. Adding to that, (in Germany) the native spouse might “dominate” the immigrant partner if the immigrant's permission of residence depends solely on the marital status and the immigrant is threatened with expulsion in case of divorce. Residential status of non-German nationals from non-EU member states who come to Germany exclusively based on marriage with German nationals, depends to a great extent on the duration of that marital union. Intermarried bi-national couples need to spend a considerable time “living their marriage” before the immigrant spouse receives an autonomous right of residence (*eigenstaendiges Aufenthaltsrecht*). Hence, especially within the first years after immigration, divorce could lead to

deportation of the immigrant partner, which might affect spouses' threat points in case of divorce, the distribution of bargaining power within the marriage, and therefore relative labor supply patterns¹⁰.

(3) Marriages of very religious immigrants, in particular Muslims, often do not give a "de facto" possibility to divorce. Consequently, a higher degree of specialization is expected for immigrant and particularly Muslim couples¹¹.

(4) Finally, intermarried couples may be exposed to more conflict potential because of their different cultural background (see Stoecker-Zafari 2007), and intermarriage might be associated with an increase in severe distress (see Bratter and Eschbach (2005)). Hence, intermarriages may be expected to end earlier than ethnically homogeneous marriages which will lead to less specialization – as discussed by Lundberg and Rose (1998), the shorter the expected duration of marriage and the higher the risk of divorce the lower the degree of specialization¹².

In relation to native couples differences are more ambiguous: Native couples may represent either more traditional or more modern concepts of division of labor. On the one hand, because they are homogeneous with respect to ethnicity, spouses might differ more in educational attainment than intermarried couples and thus specialize more. On the other hand, natives might have more egalitarian views with respect to female labor force participation, and hence specialize less. Moreover, getting divorced and re-marry might be more common and less socially sanctioned among (German) natives which may affect threat points within the partnership. The degree of specialization in intermarriages can thus differ from or resemble that of native couples.

2. Measure of the degree of specialization

The variable of interest is the degree of specialization in labor market work measured by the index S_{it} . A similar index has been used previously by Stratton (2005) and Bonke et al. (2008) to measure the degree of intra-household specialization, and has been adopted here to apply their idea to labor market work. S_{it} is defined as:

$$S_{it} = \left(\frac{\max(h_{it}, h_{-it})}{h_{it} + h_{-it}} - \frac{1}{2} \right) \cdot 2$$

This index is gender neutral and captures whether one partner supplies the bulk of working hours in period t or whether working hours are equally distributed between spouses. It is normalized between zero and one, with $S_{it} = 0$ referring to the situation when both partners spend the same amount of hours on labor market work - that is when the average number of working hours per weekday of individual i , h_{it} , equals h_{-it} , the average number of working hours per weekday of its i 's partner $-i$. Complete specialization in labor market work of one spouse is reached when either h_{it} or h_{-it} equals 0. In that case $S_{it} = 1$ ¹³.

An increase in S_{it} clearly indicates more specialization, whereas a decrease in S_{it} unambiguously indicates more similarity in terms of supplied labor hours. In the majority of observations, husbands provide at least as many hours of labor market work as their

wives. Therefore, results can be interpreted in the sense that $S_{it} = 1$ refers to cases when the husband is the single bread-winner in the household, that is to more traditional gender roles.

The German Socio-Economic Panel (SOEP) gives information about hours spent on labor market work, household work, child care, repairs and other activities including hobbies. The structure of how this information is gathered changes slightly over time. For instance, in the first wave interviewers ask about time allocation during the workweek, that is Monday to Saturday, and on Sundays. Later the distinction is made between Monday to Friday, Saturday, and Sunday - but only for alternating years. For the years in between, only weekly hours (Monday to Friday) are surveyed¹⁴. These changes result in slightly different answer schemes and do not allow for direct comparison of working hours in one year with working hours in the subsequent year. To circumvent this problem the index is constructed such that it does not rely on the absolute but the relative amount of working hours: It is assumed that both partners make the same multiplicative adjustment ε to the different question schemes. Then, in every alternating year, the reported value is $h_{jt} = h_{jt}(1 + \varepsilon)$ instead of h_{jt} , for $j \in \{i, -i\}$. Using the proposed specialization ratio eliminates such errors because:

$$\frac{h_{it}(1 + \varepsilon)}{h_{it}(1 + \varepsilon) + h_{-it}(1 + \varepsilon)} = \frac{h_{it}}{h_{it} + h_{-it}}$$

So to sum up, this specialization index S_{it} has three major advantages: (a) it is gender-neutral, (b) it can be easily interpreted in the sense that an increase in S_{it} reflects an increase in specialization and more traditional gender roles, and (c) it does not depend on the design of the questionnaires.

3. Data

3.1. Definitions

Similar to Becker (1974), “marriage” is defined as “sharing the same household”. The underlying sample is hence restricted to people who report a partner living in the same household. In the final sample about 86 percent of those partnerships refer to formal marriage (“married, living together”). Marriage is therefore used interchangeably of partnership or cohabitation, and partners are addressed as spouses, husbands and wives even though they might not be formally married¹⁵.

A partnership between an immigrant and a native is called “intermarriage” and is used in the sense of “marriage into the native society”. Marital constellations between two immigrants/two natives are called “immigrant/native marriages”. Note that spouses in immigrant marriages can come from the different countries of origin as long as both exhibit a “migration background” – having a migration background refers to being born outside of Germany, having non-German citizenship, being born to parents who do not hold German citizenship or to parents who were not born in Germany.

First generation immigrants are defined as people not born in Germany. Those who are born in Germany but (a) do not hold German citizenship, or (b) have at least one parent who is not German-born or of non-German nationality are called second generation immigrants. Both first and second generation immigrants are considered in this analysis, assuming that members of the second generation are not fully assimilated and still differ in their behavior, at least partly, from natives. Marriage between first and

second generation immigrants is therefore treated as immigrant marriage, while marriages between natives and second generation immigrants are considered intermarriages.

People are included in the sample only when a current partner is observed and when they report non-missing working hours. One person can be observed with different partners and it is assumed that former marriages do not influence future marriages¹⁶.

3.2. Sample construction

The focus of this study lies on the working age population, hence people aged 20 to 65. People are included independent of their working status, so that the analysis includes full and part time employed, occasionally employed, unemployed and people who are still enrolled in school¹⁷.

Due to different questioning schemes in alternating years (see Section 2), only every second year is considered. Furthermore, language information and information about the nationality of the best friend is available only for 1997, 1999, 2001, 2003 and 2005. Hence, these are the years considered in this study¹⁸.

2005 data have the additional advantage of containing information about the so-called “Big Five” personality traits that give insight to one’s self-perception with respect to (i) openness, (ii) agreeableness, (iii) conscientiousness, (iv) neuroticism/emotional stability, and (v) extraversion. These traits model the basic structure of people’s personality and capture different modes of behavior and experience. They are used in the fields of psychology and sociology to analyze personality structures and are based on information about individual communicative ability, agreeableness, originality, and imaginativeness; work attitudes, attitudes towards worry and towards stress; self-restraint, cordiality, and artistic and aesthetic experiences, all measured on a self-report basis¹⁹. A factor analysis of these responses is conducted and the data are grouped into an aggregate value for each of the five traits.

In 2005 information is also available on how income is distributed between spouses and who has the final say in financial decisions. This information is used in robustness testing to support the argument that bargaining power is differently distributed in intermarriage than in other marital unions.

3.3. Statistics

Tables 1 and 2 show selected characteristics of men and women in either intermarriage, immigrant or native partnerships. The numbers refer to two-year observations available between 1997 and 2005. They compare immigrant men and women in intermarriage with those in immigrant marriages, and native men and women in intermarriage with those in native marriages.

Roughly 18 percent of the observations are immigrants, 82 percent are natives. Immigrants living in Germany predominately immigrated during the “guest worker” recruitment period of the 1950s to 1970s, the family reunification after the recruitment stop in 1973, as asylum seekers, or as “ethnic Germans” after the fall of the Iron Curtain²⁰. Most immigrant men (in the sample) originate from Turkey, Italy, Poland, Greece, and states of former Yugoslavia, while immigrant women mainly came from Turkey, Italy, Poland, Russia, and Greece²¹.

Table 1 Selected characteristics of men

Selected characteristics	Immigrant		Native	
	Intermarriage	Immigrant marriage	Intermarriage	Native marriage
Number of Obs. ¹	3,831 (18.1%)		17, 283 (80.9%)	
Working hours per weekday:				
0	11.4%	11.4%	10.3%	9.3%
8-10	63.2%	73.2	61.3%	61.7%
11-12	17.4%	8.9%	18.9%	19.8%
Marriage pattern	869 (22.7%)	2,962 (77.3%)	819 (4.7%)	16, 464 (95.3)
Labor hours	8.5	8.1	8.7	8.8
Partner's labor hours	5.4	3.9	4.7	5.4
Household hours	1.4	1.3	1.4	1.4
Partner's household hours	3.9	4.8	3.9	4.0
Years of education	12.1	10.5	12.6	12.7
Difference in education	0.0	0.3	0.3	0.3
Age at marriage	29.2	25.4	30.9	28.4
Duration of marriage	13.2	17.6	13.7	17.3
Years since immigration	26.2	19.7	/	/
Age at immigration	16.7	23.1	/	/
Language ² (German):				
Speaking	1.4	2.3	/	/
Writing	2.0	2.8	/	/
Identity ³ :	2.8	3.1	/	/
with Germany				
with Home Country	2.5	2.5	/	/
Big Five ⁴ :				
Openness	positive***			
Emotional stability				
Extraversion	positive***			
Agreeableness	negative***			
Conscientiousness				
Risk proclivity ⁵ :	5.2	4.3	5.2	5.1
Origin of best friend:				
East or West Germany	73.0%	32.4%	90.7%	99.1%
Other country	27.0%	67.6%	9.3%	0.9%
Distribution of income:				
Each manages money separately	19.7%	3.9%	17.6%	16.1%
I manage, partner receives portion	4.8%	10.9%	8.4%	3.8%
Partner manages, I receive portion	6.1%	9.4%	4.6%	6.7%
All money shared	59.7%	72.9%	61.2%	63.9%
Part shared, part kept separate	9.6%	2.9%	8.2%	9.6%

Table 1 Selected characteristics of men (Continued)

Final say financial decisions:				
Myself	9.0%	16.6%	10.8%	7.1%
Partner	11.3%	6.2%	5.9%	6.1%
Both	79.7%	77.2%	83.3%	83.8%

Source: German Socio-Economic Panel (SOEP), unbalanced panel, years 1997, 1999, 2001, 2003, 2005.

¹Those numbers refer to observations not to individuals, unweighted sample, years 1995 to 2005.

²Self-reported value measured on a scale from 1 (= very good) to 5 (= very poor).

³Self-reported value measured on a scale from 1 (= strong) to 5 (= poor).

⁴Values are conducted from a factor analysis; positive/negative***: significant differences between those intermarried and those who are not.

⁵Self-reported value measured on a scale from 1 (= highly risk averse) to 10 (= highly risk loving).

The share of intermarriage out of the total observed partnerships is relatively low (only about 5 percent among natives). Among immigrants this share is considerably higher, namely about 22 percent²².

Intermarried native men most often live with women from Poland, Italy, Austria, states formerly belonging to Yugoslavia, Russia, France, the Philippines and Romania, while intermarried native women are often married to men from Italy, Turkey, Spain, Greece, former Yugoslavia or Poland²³. So these men come mainly from countries with more paternalistic family structures and different gender roles compared to Germans which might explain some of the later results.

The majority (63 to 73 percent) of immigrant men work on average 8 to 10 hours per weekday. About 9 percent in immigrant marriages and 17 percent in intermarriages work slightly more, namely 11 to 12 hours. Among native men, the share of those working 8 to 10 hours is slightly smaller (only about 61 percent). However, a greater share (about 19 percent) works 11 to 12 hours. Among native women between 27 and 29 percent report not to work. For immigrant women this share is noticeably bigger, particularly among those in immigrant partnerships (with almost 45 percent). In contrast, among the intermarried the share of women reporting zero hours of work is only 34 percent which is noticeably closer to the shares of natives. About 25 percent of women in immigrant marriage work 8 to 10 hours. Among native and immigrant women in intermarriage this share is considerably higher, namely 28 to almost 35 percent. Thus, women in intermarriages tend to work more than those in ethnically homogeneous partnerships.

On average, native men in intermarriage do not differ much from men in native marriages with regards to the presented characteristics. Accordingly, for natives the gap in education between spouses is the same in native partnerships and intermarriages. There are no statistically significant differences in natives' answers to the big five and risk proclivity questions. However, intermarriages do not last as long as marriages between natives and native men in intermarriage are more likely to report having the final say on financial decisions than men in native relationships. This suggests more traditional gender roles in marriages between native men and immigrant women than within native couples.

There are also no statistically relevant differences between intermarried native women and those in native marriages in most characteristics. However, while average years of schooling in intermarriages and native marriages are almost identical, the difference in education is not: While native women who live with native men have about half a year less of education than the native partner, in intermarriage the educational

Table 2 Selected characteristics of women

Selected characteristics	Immigrant		Native	
	Intermarriage	Immigrant marriage	Intermarriage	Native marriage
Number of Obs. ¹	3,976 (18.2%)		17,833 (81.8%)	
Working hours per weekday:				
0	34.3%	44.7%	29.8%	27.3%
8-10	28.6%	25.3%	34.5%	32.5%
11-12	4.1%	1.7%	4.8%	5.3%
Marriage Pattern	870 (21.9%)	3,106 (78.1%)	893 (5.0%)	16,490 (95.0%)
Labor hours	4.5	3.7	5.2	5.2
Partner's labor hours	8.7	8.1	8.6	8.9
Household hours	4.0	4.9	4.0	4.0
Partner's household hours	1.4	1.2	1.4	1.4
Years of education	12.3	10.2	12.2	12.3
Age at marriage	27.9	22.4	27.8	25.9
Duration of marriage	13.6	18.0	13.3	17.4
Years since immigration	21.9	17.9	/	/
Age at immigration	20.2	22.4	/	/
Language ² (German):	1.5	2.3	/	/
Speaking				
Writing	1.9	2.8	/	/
Identity ³ :				
with Germany	2.7	3.1	/	/
with Home Country	2.5	2.5	/	/
Big Five ⁴ :				
Openness	positive***			
Emotional stability				
Extraversion	positive***			
Agreeableness	negative***			
Conscientiousness				
Risk proclivity ⁵ :	4.1	3.0	4.1	4.2
Origin of best friend:				
East or West Germany	701%	32.4%	91.3%	98.9%
Other country	29.9%	67.6%	8.7%	1.1%
Distribution of income:				
Each manages money separately	17.6%	4.1%	20.5%	16.0%
I manage, partner receives portion	3.9%	9.2%	6.8%	6.1%
Partner manages, I receive portion	7.9%	11.7%	5.5%	4.1%
All money shared	62.5%	72.0%	59.2%	64.2%
Part shared, part kept separate	8.2%	3.0%	8.1%	9.6%

Table 2 Selected characteristics of women (Continued)

Final say in financial decisions:				
Myself	6.0%	6.7%	9.3%	5.5%
Partner	11.5%	16.7%	9.3%	6.9%
Both	82.5%	76.6%	81.3%	87.7%

Source: German Socio-Economic Panel (SOEP), unbalanced panel, years 1997, 1999, 2001, 2003, 2005.

¹Those numbers refer to observations not to individuals, unweighted sample, years 1995 to 2005.

²Self-reported value measured on a scale from 1 (= very good) to 5 (= very poor).

³Self-reported value measured on a scale from 1 (= strong) to 5 (= poor).

⁴Values are conducted from a factor analysis; positive/negative***: significant differences between those intermarried and those who are not.

⁵Self-reported value measured on a scale from 1 (= highly risk averse) to 10 (= highly risk loving).

gap between spouses is completely negligible. As for men, intermarriages tend to end earlier than native partnerships and answers to the personality traits and risk attitudes do not differ significantly. Finally, a higher percentage of native women reports that each spouse manages his/her income separately in intermarriage than in natives partnerships. In other words, native women are more likely to have the final say on financial decisions if they are intermarried.

For immigrants, differences by marriage type are considerably stronger: Immigrant men in intermarriage work more hours per weekday than other immigrants. They devote about the same amount of hours to household tasks in intermarriage as in immigrant marriage, whereas native wives spend more time working in the labor market and less time with household work than immigrant wives. Furthermore, intermarried immigrant men have significantly more education than those in immigrant partnerships, and the difference in education between spouses is noticeably smaller and even insignificant in intermarriage. Moreover, those who live with natives have spent more years in the hosting country, immigrated at younger ages, report better linguistic abilities - both with respect to speaking and writing skills - and feel more attached to Germany. On top of that, they are more risk loving than immigrant men in marriages with other immigrants and more likely to report a best German friend. They are, according to their self-assessment, more open and have higher values of extraversion than men in immigrant marriages – even though men in immigrant marriages view themselves as more agreeable. A noticeably higher percentage of immigrant men reports that each spouse manages his/her own money separately when they are intermarried. And, most strikingly, only 9 percent of immigrant men in intermarriage report to have the last word in financial decisions, in contrast to over 16 percent of men in immigrant marriages.

Similar patterns evolve for immigrant women: Those intermarried provide more hours of labor market work but spend less time on household tasks than women in immigrant partnerships. Immigrant wives with native husbands have considerably more years of education, although differences in education between partners are as big in intermarriages as in immigrant partnerships. Intermarried immigrant women have spent more time in Germany, immigrated at younger ages, report better linguistic proficiency and a greater identification with Germany. They are less risk averse than women in immigrant marriages, are more often friends with Germans and view themselves as more open and outgoing. Over 17 percent of immigrant women in intermarriage report that each spouse manages his/her own money separately, which contrasts to only 4 percent among women in immigrant marriages. Adding to that,

almost 17 percent of women in immigrant partnerships report that the partner makes the final decisions on financial aspects, but only about 11 percent of intermarried immigrant women make the same claim.

The descriptive findings imply that positive assortative matching by education is most severe in marriages between immigrant men and native women, and that bargaining strength of women is stronger in intermarriages than in immigrant marriages. Both are in line with the hypotheses stated earlier.

4. Estimation results

4.1. Two-limit random effects Tobit

The specialization index S_{it} is limited between zero and one. This is not an issue of data observability but part of its construction. It is therefore suitable to use a two-limit Random Effects Tobit regression to model corner solutions. S_{it} is the observable outcome that equals 0 and 1 with positive probability, and is continuous between those two limits. The structural equation in this model is a latent variable with $S_{it}^* = \beta X_{it} + u_{it}$, with $u_{it} \sim N(0, \sigma)$. The observed outcome S_{it} , that is the degree of specialization in the household, is the solution of a maximization problem solved by each individual. The explanatory variables used to determine the outcome of this maximization problem are: own education, educational difference between spouses, age, age difference between spouses, duration of marriage and of intermarriage, number of children younger than 16 living in the household, religious beliefs (“being Muslim/Islamic”), and German and home countries’ language skills²⁴.

Tables 3 and 4 show the estimated marginal effects on the probability that the specialization index S_{it} is smaller than 1, that is on the probability that the couple is

Table 3 Impact of intermarriage on specialization - for immigrant men

Dep. Var.:	RE Tobit ¹	Tobit ¹	Logit ^{1, 2}	LPM ³	IV ⁴
Specialization index	(1)	(2)	(3)	(4)	(5)
Intermarriage	0.129***	0.130***	0.144***	0.144***	1.745***
Education	0.006	0.011**	0.027***	0.044***	0.026**
More educ ⁵ × difference in educ	-0.023***	-0.026***	-0.039***	-0.050***	-0.031**
Age	-0.009***	-0.009***	-0.004*	0.002	-0.009
Older × difference in age	0.007*	0.008**	0.006	0.002	0.022**
Duration of marriage	0.005**	0.006**	0.004	-0.000	0.024**
Duration of intermarriage	-0.005*	-0.006**	-0.007*	-0.007**	-0.081***
Children younger than 16	-0.128***	-0.146***	-0.090***	-0.049**	0.018
Being Muslim/Islamic	-0.123***	-0.213***	-0.202***	-0.172***	-0.166***
Good German language skills	-0.030***	-0.026**	-0.029**	-0.013	0.045
Good skills in language of home country	-0.012	-0.028**	-0.014	0.007	-0.027
Estimation coefficient of the IV on intermarriage variable in first stage:					-0.742***

Source: German Socio-Economic Panel (SOEP), unbalanced panel, years 1997, 1999, 2001, 2003, 2005. Male immigrants aged 20 to 65; Comparison of those in intermarriage with those in immigrant marriages. Clustered standard errors; * p ≤ 0:05, ** p ≤ 0:01, *** p ≤ 0:001.

¹Entries refer to marginal effects on the probability that both spouses work.

²Modified Dep. Var.: = 1 if both spouses work, = 0 if only one partner works.

³Entries refer to estimation coefficients using the same modified dep. Var. as in the logit regression.

⁴IV = $\frac{\text{number of opposite sex in the same ethnic group and the federal state}}{\text{total number of opposite sex in the federal state}}$.

⁵Implying that this person has more years of schooling than his/her partner.

Table 4 Impact of intermarriage on specialization - for immigrant women

Dep. Var.:	RE Tobit ¹	Tobit ¹	Logit ^{1, 2}	LPM ³	IV ⁴
Specialization index	(1)	(2)	(3)	(4)	(4)
Intermarriage	0.084*	0.059	0.088*	0.094*	0.662*
Education	0.005	0.008*	0.020***	0.037***	0.034***
More educ ⁵ × difference in educ	0.007	0.004	-0.007	-0.018*	-0.016
Age	-0.007***	-0.005**	-0.000	0.006**	-0.001
Older × difference in age	0.005	0.008	0.003	-0.003	0.002
Duration of marriage	0.004**	0.005**	0.002	-0.001	0.008
Duration of intermarriage	-0.007**	-0.008**	-0.009**	-0.010***	-0.034**
Children younger than 16	-0.150***	-0.151***	-0.103***	-0.063**	-0.042
Being Muslim/Islamic	-0.079***	-0.150***	-0.141***	-0.109***	-0.076**
Good German language skills	-0.066***	-0.079***	-0.065**	0.048***	0.043***
Good skills in language of home country	-0.008	-0.026**	-0.010	0.012	0.007
Estimation coefficient of the IV on intermarriage variable in first stage:					-0.997***

Source: German Socio-Economic Panel (SOEP), unbalanced panel, years 1997, 1999, 2001, 2003, 2005. Female immigrants aged 20 to 65; Comparison of those in intermarriage with those in immigrant marriages. Clustered standard errors; * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

¹Entries refer to marginal effects on the probability that both spouses work.

²Modified Dep. Var.: = 1 if both spouses work, = 0 if only one partner works.

³Entries refer to estimation coefficients using the same modified dep. Var. as in the logit regression

⁴IV = $\frac{\text{number of opposite sex in the same ethnic group and the federal state}}{\text{total number of opposite sex in the federal state}}$

⁵Implying that this person has more years of schooling than his/her partner.

not completely specialized. A positive coefficient, like for intermarriage signals, less specialization and more equal provision of labor market hours.

First, the results for immigrants are discussed – comparing intermarried immigrants and those in immigrant marriages - second, natives in intermarriages and in native marriages are compared. Differentiation by gender is important since bargaining positions might differ in partnerships of immigrant men and native women as opposed to native men with immigrant women. In the first case the bargaining position of the (native) wife might be stronger than in ethnically homogeneous marriage, while in the second case the bargaining position of the (immigrant) wife might be similar or weaker.

4.1.1. Comparing immigrants in intermarriage with immigrant marriages

For the relevant years, 1,130 immigrant men in either intermarriage or immigrant partnerships are observed. For them the corresponding marginal effect on the probability that the index is smaller than one is positive (0.13***) and highly statistically significant (Table 3, column 1). Since an index value of one refers to complete specialization of one spouse (mostly the husband) the probability to live in a household where both partners work ($S_{it} < 1$) increases noticeably with intermarriage. Even though own years of schooling are insignificant for determining the division of labor, the probability to specialize rises with each additional year of schooling that the immigrant man achieved more than his wife²⁵. In addition, the probability to specialize increases with immigrant's age but not with the age gap between spouses. The probability to live in a partnership with two working partners increases in the duration of marriage (marginal effect of 0.005**). However, the magnitude is very small and there is no change in the degree of specialization within intermarriage – in that case the two effects offset each other. Among the most prominent factors determining the division of labor in the household

are children, as indicated by a highly significant increase in the probability to specialize if children under the age of 16 are present in the household (negative marginal effect of $-0,13^{***}$). The same holds for Muslim immigrants (-0.12^{***}) so that the chance to live in a fully specialized household rises noticeably if the immigrant reports to exhibit Islamic beliefs or to be Muslim.

Estimates of language abilities which are measured on a scale from “very good skills” (=1) to “very poor abilities” (=5) indicate that those who report to have better German speaking proficiency (which corresponds to a smaller value of that variable) are more likely to live in dual-worker households. Speaking the home country language seems not significant for determining the division of labor for immigrant men²⁶.

The specialization index is gender neutral in the sense that it does not allow for unambiguous determination of who specializes in labor market work – the husband or the wife. To support the argument that an increase in S_{it} refers to more traditional gender roles, the same regressions are run for immigrant men who contribute at least as many labor work hours as their wives – indicating traditional gender roles. In this case, an increase in the index can unambiguously be interpreted as following more traditional gender roles in the sense that the husband is the single bread-winner and the wife concentrates exclusively on household tasks. Since the vast majority of cases (about 80 percent) refer to this category it is not surprising to find that this restriction does not change estimation results qualitatively - in contrast, the negative relationship between intermarriage and specialization becomes even more pronounced²⁷.

The data set contains information for 1,188 immigrant women living in partnerships during the relevant years. For these women the likelihood to live in a fully specialized partnership also decreases in intermarriage (Table 4, column 1). Hence, those who live with a native husband are more likely to live in a household where both spouses work than those who live with another immigrant. However, the relationship is smaller than for immigrant men and only significant at the 10 percent level. While educational attainment is insignificant, older immigrant women tend to live in more specialized relationships than younger ones – supporting the assumption that younger generations adopt more egalitarian views with regard to female labor force participation²⁸. There seem to be no effects from additional years being intermarried, whereas duration of marriage per se slightly increases the likelihood that both spouses work. Again, children living in the household as well as being Muslim or Islamic increases the probability of fully specialization drastically. Speaking the German language decreases this likelihood.

Further regressions include years since migration (and years since migration squared), belonging to the second generation of immigrants, coming from EU member states and having Turkish roots. Table 5 presents only the corresponding marginal effect estimates and the intermarriage coefficient as selected outcomes and shows that all of these additional regressors are interesting per se but leave the impact of intermarriage principally untouched (except for marginal effects turning insignificant for immigrant women when controlling for Turkish origin).

The impact of “years since migration” can be related to the “family investment hypothesis” outlined previously (see Baker and Benjamin (1997), Blau et al. (2003), and Basilio et al. (2009) for further information) starting that the degree of specialization should increase over time if this hypothesis holds: Baker and Benjamin (1997) argue that immigrant women are willing to take on “dead end” jobs upon arrival to support

Table 5 Additional RE Tobit regression for immigrants - selected outcomes

Dep. Var.:	RE Tobit ¹	
	Men (1)	Women (2)
Specialization index		
Intermarriage- leaving out educational differences	0.212***	0.087**
Intermarriage	0.182***	0.032
years since immigration	0.000	0.009**
Intermarriage	0.141***	-0.083*
Dummy of 2nd generation	-0.076*	0.037
Intermarriage	0.105**	0.079*
Dummy for EU member state	0.077**	0.046**
Intermarriage	0.111***	0.068
Dummy for Turkish origin	-0.200***	-0.154***

Source: German Socio-Economic Panel (SOEP).

Immigrants aged 20 to 65; Unbalanced panel, years 1997, 1999, 2001, 2003, 2005.

Comparison of those in intermarriage with those in immigrant marriages.

Clustered standard errors; * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

¹Entries refer to marginal effects on the probability that both spouses work.

their husbands' human capital accumulation (this would refer to $S_{it} < 1$). As time goes by and as husbands integrate better into the host country's labor market, immigrant wives would give up their jobs and concentrate more on home production, implying more specialization over time ($S_{it} \rightarrow 1$). However, for immigrant women, the effect goes in the other direction as the degree of specialization decreases with years since immigration. This means that the family investment hypothesis is not supported by these data and that results are more in line with Blau et al. (2003) and Basilio et al. (2009) who find no support for this hypothesis either in the U.S. and in Germany.

The dummy variable for belonging to the "second generation" picks up arguments given in the dynamic model of cultural learning by Fernandez (2013), for instance. Accordingly, immigrant women learn about female labor force participation over time. This would imply that second generation immigrant women would have higher participation rates and hence live in less specialized partnerships ($S_{it} \rightarrow 0$). However, this variable is not significant for immigrant women, so that these data do not support this idea.

Coming from an EU member state decreases the degree of specialization for both immigrant men and women while being Turkish is associated with living in more specialized partnerships for both. This implies that lower risk of expulsion in case of divorce and different cultural background may play a crucial role in the determination of specialization as well.

4.1.2. Comparing natives in intermarriage with native marriages

Between 1997 and 2005 a total of 5,874 native men are observed. In contrast to immigrants, intermarriage is associated with more(!) specialization for native men (Table 6, column 1). Accordingly, the probability to completely specialize increases for intermarried native men – compared to men in native marriages. More years of education, on the other hand, lead to less specialization, while an increase in the educational gap between partners again increases the incentive to divide tasks and thus the probability to specialize. As for immigrants, duration of marriage has no noticeable effect, while children seem to be crucial and explain most of couple's division of labor.

Table 6 Impact of intermarriage on specialization - natives

Dep. Var.: Specialization index	RE Tobit ¹	
	Men (1)	Women(2)
Intermarriage	-0.085**	-0.075**
Education	0.018***	0.019***
More educ ⁵ × difference in educ	-0.022***	-0.004
Age	-0.010***	-0.012***
Older × difference in age	0.006	0.007**
Duration of marriage	0.001	0.001*
Duration of intermarriage	-0.001	0.002
Children younger than 16	-0.152***	-0.152***

Source: German Socio-Economic Panel (SOEP).

Natives aged 20 to 65; Unbalanced panel, years 1997, 1999, 2001, 2003, 2005.

Comparison of those in intermarriage with those in native marriages.

Clustered standard errors; * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

¹Entries refer to marginal effects on the probability that both spouses work.

⁵Implying that this person has more years of schooling than his/her partner.

Finally, the underlying data include observations for 6,047 married native women. Like for native men, intermarriage increases(!) the probability to specialize compared to being married to native men (Table 6, column 2). As before, the probability to completely specialize is lower for better-educated women, although exhibiting more education than the spouse does not alter the division of labor. Similar to immigrant women, older native women tend to live in more specialized partnerships, whereas being older than the husband increases the probability that both partners work. (This effect could be explained by arguing that in traditional families the husband is usually older than the wife. If the wife is older than the husband, this already expresses more modern perspectives which are reflected also in more modern views on female labor market participation and a more equal share of labor.) Again, duration of marriage seems to play only a minor role for relative labor supply, whereas children determine most of the couple's distribution of labor supply.

4.1.3. Summary – random effects Tobit

Summing up results from the two-limit Random Effects Tobit regressions: Intermarried immigrant men live in less specialized partnerships than men in immigrant partnerships. This might be due to (a) greater assortative mating by education and hence less comparative advantages in the marriage, and (b) a better bargaining position of native wives compared to immigrant wives. Specialization also seems less frequent in intermarriages for immigrant women. However, assortative mating is not so pronounced and the bargaining position of immigrant wives might not be much different in the two types of partnerships.

In contrast, natives specialize more when intermarried than in native marriages. Although this seems to contradict expectations at first sight, it could be explained by (a) native women being often married to immigrant men who come from countries with more traditional gender roles such as Turkey and Italy. They might thus be willing to compromise on classical gender roles and accept a more traditional allocation of labor in order to mitigate conflict potential in the partnership; (b) native men might specialize more when intermarried because of a weaker bargaining position of immigrant wives compared to native wives.

4.2. Alteration of estimation method

One of the main shortcomings of the Random Effects models is that it does not allow the unobserved individual factors to correlate with the explanatory variables. This is somewhat dissatisfying as intermarriage choice and the division of labor within the household may both be affected by unobserved factors such as ambitions, openness to new cultures and egalitarian views. As discussed in the data section, intermarried and non-intermarried immigrants differ, for example, in their replies to the big five questions. So it can be expected that they also exhibit different characteristics that might determine both partner choice and relative labor supply. Omitting such factors will then bias estimation results.

To address this endogeneity issue by using an instrumental variable approach, it is necessary to show that altering the functional form of the estimation model does not affect the empirical results. At first, instead of the Random Effects Tobit a simple Tobit is estimated on the whole data set (including observations from all years), using clustered standard errors to correct for dependences within individuals. As shown in the second columns of Tables 3 and 4 this does not change results dramatically.

In a next step, a new binary variable is generated which equals 1 in case that both partners work, and 0 in case of complete specialization. Columns 3 show the estimated marginal effects from a corresponding Logit regression that uses this modified specialization index as dependent variable – the entries report marginal effects on the probability to live in a dual-worker partnership (index equals 1). Again, results are fairly stable and close to the Tobit results.

As argued by Angrist and Pischke (2008), functional form assumptions underlying the Logit regression can sometimes be ignored and a simple Linear Probability Model (LPM) will lead to the same results. This argument is supported by findings presented in columns 4 showing that the Logit marginal effects are almost identical to the OLS estimates.

In a final step an IV estimation is proposed to account for the endogeneity problem. The applied instrument (an ethnicity-gender ratio) is similar to that introduced by Meng and Gregory (2005) which into account that the probability to intermarry depends to a great amount on the availability of potential partners and hence the opportunity structure of the marriage market. The instrument used here is the ratio between the number of members of the opposite sex within the own ethnic groups in a certain region (in this case the federal state) and the total number of members of the opposite sex in that area²⁹. The smaller the ratio the less likely it is to meet a potential partner from the same ethnic group and the more likely it is to marry someone from outside the own ethnic community, in particular from the native population. As a consequence, a negative effect of that ratio on the probability to intermarry is expected.

As shown in the last row of columns 5, this negative relationship is indeed found, as the corresponding estimation coefficients of the first stage regressions of the 2SLS estimations are negative and highly significant. Furthermore, the coefficients of the intermarriage indicators in the second stage are still significant at the same level and increased noticeably in size. The downward bias of the OLS estimate might hence result from omitting important factors that affect both intermarriage choice and the degree of specialization. If, for instance, ambitions increase the probability to find a native partner but also increase the likelihood to be the main bread-winner in the family, the OLS will

underestimate the effect of intermarriage on the probability to specialize if no adequate measure for ambitions is available. Assuming that the ratio is indeed exogenous, this finding indicates that intermarriage fosters – or is at least highly correlated to – more equal supply for labor³⁰.

Unfortunately, using this instrument to explain intermarriage behavior of natives is difficult. There are hardly any theories explaining the driving factors for intermarriage for natives, so that there is not justification why an ethnicity-gender ratio like this should determine intermarriage choice among natives³¹. Trying to answer this question is beyond the scope of this paper but seems crucial for fully understanding the processes that determine intermarriage choice as a two-sided decision. But for now, since intermarried and non-intermarried natives do not differ in their answers to the big five questions, for instance, omitted variable biases might not be as important for them as it is for immigrants.

4.3. Robustness checks

One of the arguments made earlier about why intermarried couples might behave differently than ethnically homogeneous couples is that bargaining power may be distributed differently – presumably more in favor of the native partner. A first indicator of this assumption was given in the descriptive section when two variables were discussed that measure who has the decision power over income and who has the final say in financial decisions. Similar variables have been introduced by Luehrmann and Maurer (2007), Friedberg and Webb (2006) and Beegle et al. (2001) and they will be used now to proxy bargaining strength. It is expected that intermarried immigrants are more likely to live in partnerships where financial decisions are made collectively.

To make this correlation apparent, simple multinomial Logit regressions are run using self-reported decision information (that is “distribution of income” and “final say on financial decision”) as dependent variables and age and education as regressors (Table 7). This is a very simple specification which does not account for various problems related to, for instance, endogeneity or measurement errors. But for now the purpose is merely to visualize some correlations leaving aside causal relations.

Estimation results refer to marginal effects on the probability that a particular outcome is achieved. They indicate that there are no differences for natives and immigrant women while for immigrant men intermarriage is highly correlated with joint decision making.

5. Conclusion

Marriages between members of different ethnic groups are among the crucial factors driving social and economic harmonization. In that context, intermarriages serve as indicator of social proximity and are often associated with individual economic success of immigrants. However, little is known about the dynamics evolving within the couple, in particular regarding the division of labor between spouses. This paper aims to fill that gap (at least partly) by analyzing relative labor supply of intermarried couples in comparison to immigrant and native couples.

The leading arguments that might explain differences in labor supply behavior, especially less specialization in intermarriage, are based on two observations: First,

Table 7 Correlation between Intermarriage and Decision Power

Dep. Var.: Distribution of income (=1 if "me", =2 if "partner", =3 if "shared")	Multinomial Logit			
	Immigrant		Native	
	Men	Women	Men	Women
Marginal effect on prob (outcome = "mainly me")				
<i>Intermarriage</i>	-0.085**	-0.034	0.029**	0.002
Education	-0.008**	-0.015***	-0.005***	-0.013***
Age	-0.001	0.001	-0.001***	0.000
Marginal effect on prob (outcome = "mainly partner")				
<i>Intermarriage</i>	-0.009	-0.002	-0.001	0.003
Education	-0.017***	-0.015***	-0.015***	-0.008***
Age	0.001	-0.000	0.001**	-0.000
Marginal effect on prob (outcome = "shared")				
<i>Intermarriage</i>	0.094**	0.036	-0.028	-0.006
Education	0.026***	0.030***	0.020***	0.022***
Age	0.000	-0.000	0.000	-0.000
Dep. Var.: Final say on financial decision (=1 if "me", =2 if "partner", =3 if "both")	Multinomial Logit			
	Immigrant		Native	
	Men	Women	Men	Women
Marginal effect on prob (outcome = "partner")				
<i>Intermarriage</i>	-0.100**	0.002	0.025	0.021
Education	-0.002	-0.007**	-0.007***	-0.007***
Age	-0.003**	-0.002**	-0.002***	-0.001***
Marginal effect on prob (outcome = "partner")				
<i>Intermarriage</i>	0.058**	-0.024	-0.003	0.019
Education	-0.012***	-0.013***	-0.011***	-0.011***
Age	-0.001	-0.001	0.000	-0.001
Marginal effect on prob (outcome = "both")				
<i>Intermarriage</i>	0.041	0.022	-0.022	-0.040*
Education	0.014**	0.019***	0.018***	0.018***
Age	0.004**	0.003**	0.002***	0.002***

Source: German Socio-Economic Panel (SOEP).

People aged 20 to 65; year 2005 (financial decision), years 2004 and 2005 (agreement on income).

Entries refer to marginal effects on the probability that the variable takes on the particular outcome.

Clustered standard errors; * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

positive assortative matching by education, that is greater educational similarity of partners, is more pronounced in intermarriages than in other marital constellations, possibly leading to less comparative advantages and therefore fewer incentives to specialize. Second, bargaining positions of spouses in intermarriages differ from that in immigrant or native marriages, probably due to different outside options, different threat points and other factors determining bargaining strength.

Results from a two-limit Random Effects Tobit model are in line with these hypotheses and regression estimates indicate that intermarried immigrants live in less specialized partnerships than those in immigrant marriages. This result also holds when accounting for possible endogeneity of intermarriage in an instrumental variable approach. In contrast, natives in intermarriage are more specialized than those in native marriages

possibly indicating less bargaining power of the immigrant wives and adaption behavior of native women in intermarriages.

This analysis is only a first step on the way to a better understanding of what makes intermarried couples different and what drives their decisions. For further research it is of particular importance to find out what determines the decision to intermarry for natives if, for instance, immigrants are economically disadvantaged and intermarriages prone to more conflicts than ethnically homogeneous marriages. Moreover, differences in bargaining strength of spouses in different types of marriage should also be studied in greater detail.

With increasing globalization and higher mobility of people, it is crucial for multi-national and multi-cultural societies to better understand processes that encourage social proximity and acceptance of different cultural backgrounds. Intermarriages are in that context essential as they can build bridges and encourage social interaction.

Endnotes

¹See e.g. Chiswick and Houseworth (2008), Furtado (2006), Furtado and Theodoropoulos (2009b), and Meng and Gregory (2005) for more research on those topics.

²For the United States see Kantarevic (2004), for Australia Meng and Gregory (2005), and for France Meng and Meurs (2006). Dribe and Lundh (2008) and Gevrek (2009) address similar questions regarding immigrants in Sweden and the Netherlands, whereas Furtado and Theodoropoulos (2009a; 2009b), and Georgarakos and Tatsiramos (2009) consider employment and self-employment rates of U.S. immigrants.

³According to Blau et al. (2003) and Basilio et al. (2009) both immigrant husbands and wives work less upon arrival than comparable natives but tend to invest in their own human capital rather than specialize.

⁴For further information about this data source see for example Wagner et al. (2007).

⁵This relates to arguments given in models of collective labor supply where bargaining strength depends on partners' threat points and their outside options. For more information about collective labor supply models, its assumptions, tests, and implications see for instance: Van Klaveren et al. (2011); Blundell et al. (2007); Attanasio and Lechene (2002); Chiappori et al. (2002); Lundberg and Pollak (1996); or Chiappori (1988).

⁶Positive assortative mating, that is positive correlations between values of traits of husbands and wives, also applies to IQ, height, attractiveness, skin color, and ethnic origin. According to Becker (1985), there is no positive assortative mating by earnings. However, this finding is discussed controversially in the literature.

⁷The instrumental variable approach used by Meng and Gregory (2005) and Meng and Meurs (2006) to account for selection into intermarriage serves as the model for the instrument used in this paper.

⁸Fernandez (2013) looks at the role of culture in the process of learning about female labor force participation. She develops a dynamic model of culture in which (changing) beliefs about the long-run effects of female labor force participation versus work at home evolve into an intergenerational learning process. Relating this to immigrant women from countries with more traditional gender roles, this would imply that they

“learn” about the positive aspects of female labor force participation over time so that their labor supply would increase with the time spent in the hosting country. The data used in this paper indeed support this idea as the degree of specialization decreases with the years spent in Germany for immigrant women. In addition, some ethnic groups, like Turkish women, tend to specialize more while immigrants from EU member states generally specialize less (Table 5).

⁹Related to this argument, Lundberg (2002) shows that if family members cannot commit to household settings, in particular to the division of income in later years in order to compensate the home worker for foregone earnings, then an inefficient degree of specialization is chosen and too little of the household public good (e.g. childcare) is provided.

¹⁰Testing this hypothesis Explicitly is beyond the scope of this paper. What can and will be tested though with the available data are differences in the self-assessed power over financial decisions between intermarried and ethnically homogeneous couples. In addition, regressions including years since migration and coming from EU member states indicate that both factors have significant implications for the degree of specialization, leading to more equal division of labor market work (Table 5).

¹¹Immigrants coming from countries with very traditional gender roles, like Turkey, can be expected to specialize more. Regressions including dummies for Turkish background show highly significant effects indicating more specialization among Turkish immigrants (Table 5).

¹²See also Kalmijn et al. (2005), who study the relationship between intermarriage and the risk of divorce in the Netherlands.

¹³In case both partners provide zero working hours the ratio is set to missing.

¹⁴Furthermore, in 1984, the first year of the panel, zero working hours are not reported.

¹⁵It is assumed that cohabiting couples do not differ in their specialization behavior – even though I acknowledge that Stratton (2005) finds differences in intra-household specialization between cohabiting and married couples.

¹⁶This matching structure and the fact that people may have missing entries explain slight differences in the descriptive statistics (Tables 1 and 2): For instance, the number of labor hours for immigrant men in intermarriage equals 8.5, which deviates minimal from the number of partner’s labor hours for native women in intermarriage, which is 8.6. Because a person can have different partners in different years or missing entries in one year, these kind of deviations can occur.

¹⁷For unemployed reported hours of work are expected to equal zero. Observations of people who give inconsistent answers are set to missing. Consequently, people who report zero weekly working hours while being full-time, part-time or occasionally employed are not considered, as are people who report positive hours of work while being unemployed. People may work while being enrolled in school. So they are still included in the sample.

¹⁸Couples may drop in and out of the sample at different points in time. So this is not a balanced panel and standard errors are corrected for this fluctuation.

¹⁹For more information about the big five and its construction in the SOEP see Gerlitz and Schupp (2005) or Dehne and Schupp (2007).

²⁰For further information about the historic evolution of immigration to Germany see, for instance, Kalter and Granato (2007).

²¹This is not Explicitly shown in the Tables.

²²Next to preferences this pattern can be explained also by group size differences: The bigger the own ethnic group and the more potential partners are available within the own ethnic community, the less likely it becomes to marry somebody from outside that group. Members of the majority population as well as members of big minority groups are thus more likely to marry a partner with the same ethnic background than members of small ethnic groups.

²³This information is not Explicitly shown in the tables but for a detailed discussion of different marital patterns among non-German nationals see for instance Gonzalez-Ferrer (2006), Haug (2006) or Schroedter (2006).

²⁴Year dummies are also included to account for year effects. Instead of including home country fix effects, targeted regressions are run using “coming from EU member states” as additional regressor (see Table 5).

²⁵Leaving out educational differences does not alter the main implication and the significance of the intermarriage coefficient remains the same (see Table 5).

²⁶Writing abilities are not included in the regression despite their availability in the SOEP because answers to speaking and writing skills are highly correlated and would induce multicollinearity.

²⁷The estimated marginal effect of intermarriage for immigrant men increases from 0.129*** (Table 1) to 0.133*** in the restricted sample. Estimation results are not shown in detail in this paper but are available upon request.

²⁸This corresponds to arguments given by Fuwa (2004) for example.

²⁹Ideally a closer regional frame would be preferred but this is not possible with the data underlying in this study.

³⁰Using this ethnicity-gender ratio as instrument works if living in a certain area affects only the probability to intermarry but not the degree of specialization. However, people with more egalitarian views, for instance, may live in areas with a more mixed population such as bigger cities with a multi-cultural population – which increases their probably to intermarry-, and(!) prefer less specialization within a partnership at the same time. Estimation results should therefore be interpreted with caution and what is shown should be viewed as correlation rather than clear causality.

³¹Glowsky (2007) is among the few studies that looks at intermarriage decisions of native men in Germany.

Competing interests

The IZA Journal of Migration is committed to the IZA Guiding Principles of Research Integrity. The author declares that she has observed these principles.

Acknowledgements

I am grateful to the anonymous referee for comments on earlier drafts of this paper.
Responsible editor: Amelie Constant

Received: 15 April 2013 Accepted: 13 January 2014

Published: 24 Feb 2014

References

- Angrist JD (2002) How do sex ratios affect marriage and labor markets? Evidence from America's second generation. *Q J Econ* 117(3):997–1038
- Angrist JD, Pischke JS (2008) *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press, Princeton, New Jersey, USA
- Attanasio O, Lechene V (2002) Test of income pooling in household decisions. *Rev Econ Dyn* 5:720–748
- Baker M, Benjamin D (1997) The role of the family in immigrants' labor-market activity: an evaluation of alternative explanations. *Am Econ Rev* 87(4):705–727

- Basilio L, Bauer TK, Sinning M (2009) Analyzing the labor market activity of immigrant families in Germany. *Labour Econ* 16:510–520
- Becker GS (1974) A Theory of Marriage. In: Schultz TW (ed) *Economics of the Family: Marriage, Children, and Human Capital*. University of Chicago Press, Chicago, pp 299–351
- Becker GS (1981) *A Treatise on the Family*. Harvard University Press, Cambridge, Massachusetts and London, England
- Becker GS (1985) Human capital, effort, and the sexual division of labor. *J Labor Econ* 3(1):33–58. Part 2: Trends in Women's Work, Education, and Family Building
- Beegle K, Frankenberg E, Thomas D (2001) Bargaining power within couples and use of prenatal and delivery Care in Indonesia. *Stud Fam Plan* 32(2):130–146
- Bittmann M, England P, Folbre N (2003) When does gender trump money? Bargaining and time in household work. *Am J Sociol* 109(1):186–214
- Blau FD, Kahn L, Moriarty JY, Souza AP (2003) The role of the family in immigrants' labor-market activity: an evaluation of alternative explanations: comment. *Am Econ Rev* 93(1):429–447
- Blundell R, Chiappori PA, Magnac T, Meghir C (2007) Collective labour supply: heterogeneity and non-participation. *Rev Econ Stud* 74:417–445
- Bonke J, Deding M, Lausten M, Stratton LS (2008) Intra-household specialization in housework in the United States and Denmark. *Soc Sci Q* 89(4):1023–1043
- Bratter JL, Eschbach K (2005) 'What about the couple?' Interracial marriage and psychological distress. *Soc Sci Res* 35(4):1025–1047
- Chiappori PA (1988) Rational household labor supply. *Econometrica* 56(1):63–90
- Chiappori PA, Fortin B, Lacroix G (2002) Marriage market, divorce legislation, and household labor supply. *J Pol Econom* 110(1):37–72
- Chiswick BR, Houseworth CA (2008) Ethnic inter-marriage among immigrants: human capital and assortative mating. IZA DP:3740
- Dehne M, Schupp J (2007) Persönlichkeitsmerkmale im Sozio-oekonomischen Panel (SOEP)–Konzept, Umsetzung und empirische Eigenschaften. *DIW Res Notes* 26
- Dribe M, Lundh C (2008) Inter-marriage and immigrant integration in Sweden—an exploratory analysis. *Acta Sociol*
- Fernandez R (2013) Culture as learning: the evolution of female labor force participation over a century: NBER working paper No. 13373. *Am Econ Rev* 103(1):472–500
- Friedberg L, Webb A (2006) Determinants and Consequences of Bargaining Power in Households. NBER Working Paper No. 12367. NBER National Bureau of Economic Research, Cambridge, MA, USA
- Furtado D (2006) Human capital and interethnic marriage decision: IZA DP1989. *Econ Inquiry* 50(1):82–93. 2012
- Furtado D, Theodoropoulos N (2009a) I'll marry you if you get me a job: marital assimilation and immigrant employment rates. *Int J Manpow* 30(1/2):116–126
- Furtado D, Theodoropoulos N (2009b) Inter-marriage and Immigrant Employment: The Role of Networks CReAM DP 06/09: The Role of Networks CReAM DP 06/09. Centre for Research and Analysis of Migration, London, UK
- Furtado D, Theodoropoulos N (2011) Interethnic marriage: a choice between ethnic and educational similarities. *J Popul Econ Springer* 24(4):1257–1279
- Fuwa M (2004) Macro-level gender inequality and the division of household labor in 22 Countries. *Am Sociol Rev* 69(6):751–767
- Georgarakos D, Tatsiramos K (2009) Immigrant Self-Employment: Does Inter-marriage matter? In: Solomon P, Konstantinos T (ed) *Ethnic and Labor Market Outcomes: Research in Labor Economics*, 29th edition. Emerald Group Publishing Limited, Bingley, UK, pp 253–271
- Gerlitz JY, Schupp J (2005) Zur Erhebung der Big-Five-basierten Persönlichkeitsmerkmale im SOEP. *DIW Res Notes* 4:1–44
- Gevrek E (2009) Interethnic marriage and the labor market integration of immigrants. *Job Market Pap*, 1–48
- Glowsky D (2007) Why do German men marry women from less developed countries? An analysis of transnational partner search based on the German socio-economic panel: SOEP Papers on Multidisciplinary Panel Data Research 61. *Zeitschrift für Soziologie*, 36(3):282–301
- Gonzalez-Ferrer A (2006) Who do immigrants marry? Partner choice among single immigrants in Germany. *Eur Sociol Rev* 22(2):171–185
- Grossbard S, Amuedo-Dorantes C (2007) Cohort-Level Sex Ratio Effects on Women's Labor Force Participation: IZA Discussion Paper No 2722, 5, No. 3rd edition. *Review of Economics of the Household*, Springer US, pp 249–278
- Haug S (2006) Interethnische Freundschaften, interethnische Partnerschaften und soziale Integration. *Diskurs Kindheitsund Jugendforschung Heft* 1:75–91
- Hersch J, Stratton LS (1994) Housework, Wages, and the Division of Housework Time for Employed Spouses. *American Economic Review, Papers and Proceedings of the Hundred and Sixth Annual Meeting of the American Economic Association* Vol. 84, No. 2. American Economic Association, Nashville, TN (USA), pp 120–125
- Kalmijn M (1998) Inter-marriage and homogamy: causes, patterns, trends. *Annu Rev Sociol* 14:395–421
- Kalmijn M (2012) The educational gradient in inter-marriage: a comparative analysis of immigrant groups in the United States. *Soc Forces* 91(2):453–475
- Kalmijn M, De Graaf PM, Jacques P, Janssen G (2005) Inter-marriage and the risk of divorce in the Netherlands: the effects of differences in religion and in nationality, 1974–94. *Popul Stud* 59(1):71–85
- Kalter F, Granato N (2007) Educational Hurdles on the Way to Structural Assimilation in Germany. In: Heath AF, Yi Cheung S (ed) *Unequal Chances: Ethnic Minorities in Western Labour Markets* Vol. 137. *Proceedings of the British Academy* by Oxford University Press, Oxford, pp 269–317
- Kantarevic J (2004) Interethnic marriages and economic assimilation of immigrants. IZA DP 1142:1–36
- Luehrmann M, Maurer J (2007) Who wears the trousers? A semiparametric analysis of decision power in couples. *Cemmap Working Paper CWP25/07*. Institute for Fiscal Studies, London, UK
- Lundberg S (2002) Limits to Specialization: Efficiency and the Division of Labor in Modern Families. IZA Conference on "The Future of Family and Work", Bonn, German

- Lundberg S, Pollak RA (1996) Bargaining and distribution in marriage. *J Econ Perspect* 10(4):139–158
- Lundberg S, Rose E (1998) The Determinants of Specialization Within Marriage: Working Papers 0048. University of Washington, Department of Economics, Seattle (USA)
- Meng X, Gregory RG (2005) Inter-marriage and the economic assimilation of immigrants. *J Labor Econ* 23(1):135–175
- Meng X, Meurs D (2006) Inter-marriage and the economic assimilation of immigrants. *J Labor Econ* 23(1):135–175
- Pollak RA (2005) "Bargaining Power in Marriage: Earnings, Wage Rates and Household Production". *NBER Working Papers* 11239. National Bureau of Economic Research, Inc, Cambridge, MA, USA
- Schroedter Julia H (2006) Binationale Ehen in Deutschland. *Wirtschaft und Statistik* 4/2006, Statistisches Bundesamt, Wiesbaden, Germany
- Shelton BA, John D (1996) The division of household labor. *Annu Rev Sociol* 22:299–322
- Stoecker-Zafari H (2007) Lebenswirklichkeiten binationaler Paare. In: Munsch C, Gemende M, Weber-Unger Rotino S (ed) *Eva is emanzipiert, Mehmet ist ein Macho, Zuschreibung, Ausgrenzung, Lebensbewaeltigung und Handlungsansaezte im Kontext von Migration und Geschlecht*. Juventa Verlag, Weinheim, Germany
- Stratton L (2005) Specialization in Household Activities within Cohabiting versus Married Households. Mimeo
- Stratton LS, Gupta ND (2008) Institutions, Social Norms, and Bargaining Power: An Analysis of Individual Leisure Time in Couple Households. IZA Discussion Paper No 3773. IZA–Institute for the Study of Labor, Bonn, Germany
- Van Klaveren C, Van Praag B, Van den Brink HM (2011) Collective Labor Supply of Native Dutch and Immigrant Households in the Netherlands. CESifo working paper No. 2872, Household Economic Behavior, International Series on Consumer Science. Springer, New York, pp 99–119
- Wagner GG, Frick J, Schupp J (2007) The German socio-economic panel study (SOEP)–scope, evolution and enhancements. *Schmollers Jahr* 127(1):139–169

10.1186/2193-9039-3-3

Cite this article as: Nottmeyer: Relative labor supply in intermarriage. *IZA Journal of Migration* 2014, 3:3

Submit your manuscript to a SpringerOpen[®] journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com