Identity, Working Moms, and Childlessness: Evidence from Switzerland

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Abstract

The positive relationship between fertility and female labor force participation in the cross-country dimension represents a puzzle when viewed through the lens of the classical household model. This paper argues that differences in women's identity may be important to explain this pattern. I exploit a unique setting in Switzerland, where German- and French-speaking women are neighbors sharing the same institutional environment, but retaining different attitudes towards working mothers. While there is high tolerance of working mothers with children below school age in the French-speaking region, this is much less the case in the German-speaking region. Using a spatial regression discontinuity design, I find that labor force participation of mothers is lower and childlessness higher on the German-speaking side, particularly among more educated women, while composition, work-family policies, labor market opportunities, and the general institutional setting vary smoothly. I argue that a simple household model combined with the identity framework of Akerlof and Kranton (2000) provides a natural explanation of the observed patterns.

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1 Introduction

Fertility rates have been declining in many developed countries, alongside increasing female labor force participation (LFP). Most explanations for these trends, at least among economists, rely on increasing female wages (Feyrer et al. (2008) provide a summary). However, this decline exhibits substantial heterogeneity in the cross-country dimension. While countries such as Norway, France, and the U.S. still have almost replacement level fertility, countries like Germany and Austria are well below replacement levels at about 1.4 children per woman. The secular trends in fertility and female LFP do not come as a surprise to many economists, as Willis (1973) in his formulation of Becker's (1960) classical household model already proposed that, if the production of children is intensive in the wife's time, the substitution effect from rising wages likely dominates the income effect.[1] The cross-country patterns, however, are not easily rationalized in the classical model. Somewhere between 1980 and 2000, a robust positive correlation between fertility and female LFP has emerged (Ahn and Mira (2002), Feyrer et al. (2008)). If rising wages are responsible for both rising female LFP and declining fertility due to a strong substitution effect, this correlation should be negative in the cross-country dimension.

In this paper, I argue that differences in women's identity are an important determinant of this relationship.[2] Akerlof and Kranton's (2000) seminal paper introduced the notion of identity to economics, stressing that individuals derive value from their actions if they correspond to prescribed behavior. In the context of this paper, prescribed behavior relates to whether a mother should work when young children are present in the household. A mother's decision whether to work, and a woman's decision whether to have children, depends on the view of working mothers in society, as this view shapes their sense of what a mother should do, and thus influences their decisions as mothers and whether they want to be a mother.

I exploit a unique empirical set-up in Switzerland where German- and French-speaking women live together in the same institutional setting, but retain different views of working mothers. I demonstrate that labor market opportunities, work-family policies, and composition vary smoothly at the language border segregating the two cultural regions, due to institutional integration, while attitudes related to working mothers differ sharply. In particular, working as a mother is viewed less favorably on the German side, which I document using survey data and results from federal referenda. Using a spatial regression discontinuity approach, I find that labor force participation of mothers of children below school-age is lower and childlessness higher on the German-speaking compared to the French-speaking side. This difference is particularly large among more educated women. At the same time, the number of children, LFP of mothers of older children and LFP of childless women are similar on both sides of the border. The pattern of jointly higher fertility (due to lower childlessness) and higher female LFP (due to higher LFP of mothers) on the French-speaking side thus corresponds to the cross-country pattern,

[1] The prediction that increasing female LFP is accompanied by decreasing fertility has recently been revisited and mostly confirmed by Jones et al. (2008), who derive rigorously the possible set of theoretical assumptions consistent with a negative correlation between wages and fertility. They find that time-intensive production of children is a central piece to generate this relationship in many different formulations of the model.

[2] The terminology in the literature regarding identity and culture is somewhat vague. While some authors talk exclusively about culture, attitudes, or norms and values, others rely more on the identity concept inspired by Akerlof and Kranton (2000). In this paper, the framework generally follows the identity approach, but since my identification strategy relies on language, and is related to the cultural literature, it would be confusing to completely avoid referring to culture. In my view, a clear distinction between the two terms is hardly possible and arguably not necessary, since identity can just be seen as an attempt to describe specific components of culture.

highlighting the relevance of identity in making sense of the observed relationship.[3]

The cultural aspect of women's employment is the primary focus of a growing literature. Fernández and Fogli (2005) use an epidemiological approach and find that cultural origin matters for fertility and female labor supply of immigrants in the U.S., while Fortin (2005) and Giavazzi et al. (2012) demonstrate the importance of attitudes regarding the role of women for female LFP using cross-country survey data. How working mothers are viewed in society has received particular attention. Fortin (2005) uses the term "Mother's Guilt" to describe the psychological cost borne by mothers torn between family values and egalitarian views and finds that women who think that working mothers can establish just as warm a relationship with their children as mothers who do not work have higher labor supply. Similarly, Fernández (2007) and Fogli and Veldkamp (2011) explain the S-shaped development of female LFP in the U.S. using uncertainty on the part of women about whether or not a child's development is negatively affected by a working mother. Increasing employment of mothers is a crucial determinant of the secular trends, as Fogli and Veldkamp (2011) note. In the sociological literature the connection between a country's view of working mothers and fertility is made explicitly (Rindfuss et al. (1996), Rindfuss et al. (2003), Ruckdeschel (2009)). The general finding is that if working mothers are viewed unfavorably, fertility is lower.[4] The results at the language border thus broadly correspond to the general finding in the literature. To the best of my knowledge, however, this is the first paper where identification of the cultural determinants of fertility and female labor supply is jointly possible without relying on a potentially selected population (immigrants), and confounding differences in attitudes with differences in the institutional setting.

The literature has largely remained silent on the theoretical link between identity, female labor force participation, and fertility so far. In the second part of the paper, I augment the classical household model with the identity framework proposed by Akerlof and Kranton (2000) to spell out how the basic mechanism potentially operates. Specifically, I add an identity cost of combining work and motherhood to a simple version of the household model inspired by Willis (1973) and Jones et al. (2008). I show that this framework is able to rationalize the language border patterns, and thus the cross-country relationship, by differences in identity costs, while retaining the assumption that children are intensive in the wife's time, required to explain the secular trends and cross-sectional (within country) patterns. I also explore interactions with wages, finding that the model accommodates the language border results, where particularly large differences are found among more educated women.

The contribution of this paper to the literature is twofold. First, using the unique language border setting in Switzerland, new evidence is presented that identity is an important determinant of completed fertility and female labor force participation, thereby highlighting its relevance in terms of making sense of the positive

[3] Also see Figure A.1 in the Appendix. Among OECD countries, there is a significant negative relationship between childlessness and female labor force participation among the latest cohort for which these data are available (born about 1965). Childlessness is measured at about age 45, when most of these women have completed their fertility spells, while LFP is measured at age 25-29 in 1990, when most of these women are mothers of young children.

[4] At the cross-country level, cultural differences are amplified by institutional differences in child-care subsidies and availability, school policies, and parental leave regulations (Algan and Cahuc, 2006). Correspondingly, generous work-family policies have been shown to be associated with higher female LFP and fertility (D'Addio and d'Ercole (2005), Lauer and Weber (2003), Del Boca and Sauer (2009)). The theoretical importance of market purchased child-care in reconciling secular trends with the cross-country relationship is explored in Ahn and Mira (2002).

correlation between female LFP and fertility found in the cross-country dimension. Second, it is shown that a specific component of identity, the acceptance of working as a mother in society, is lower in the German-speaking compared to the French-speaking part, and that this difference is able to rationalize the language border patterns, which reflect the larger cross-country pattern, in a basic household model combined with the identity framework.

The rest of the paper is organized as follows. In section 2, the language border set-up is described and the language border difference in childlessness and LFP of mothers, as well as additional margins of fertility and labor market outcomes, are estimated. Section 3 presents evidence regarding differences in attitudes and presents a basic household model augmented by the identity framework. Section 4 concludes.

2 Childlessness and Labor Force Participation of Mothers at the Language Border

In this section, I document the unique cultural set-up in Switzerland and how identification of the cultural effects is derived. Then, I describe the data and methodology, and estimate language border differences in fertility and female labor force participation.

2.1 Identification

There are four official languages in Switzerland: German, French, Italian and Rhaeto-Romanic.[5] Figure 1 shows the geographical distribution of the four languages, as surveyed in the 2000 census. The German- and French-speaking Swiss are segregated geographically, resulting in a sharp language border that runs between municipalities in North-South direction.

Language and culture are closely associated, as a common language provides the means for the emergence and maintenance of norms and values within a group, and limits external influence. Speaking a language fosters a person's identity and the sense of belonging to a group (see Clots-Figueras and Masella (2013) for a recent paper on the link between language and identity). In Switzerland, media outlets such as newspapers and television, are organized by language regions. No major newspaper has a German and French variant, although some internationally renowned publications such as the "Neue Zuercher Zeitung" are read everywhere. Despite the segregation by language, linguistic co-existence, institutional integration and a lack of discrimination of members of other language groups have a long tradition in Switzerland, vividly pictured by McRae (1983) in his "Conflict and Compromise" series.

To identify the effects of culture, or norms and values, Brügger et al. (2009) develop a method they call Spatial Regression Discontinuity Design. Their idea is that comparing French- and German-speaking Swiss individuals at the language border allows for the interpretation of differences in outcomes as quasi-causal effects of culture.

[5] The languages in their written form largely correspond to the official languages in Germany, France, and Italy. However, their spoken forms manifest in various dialects, which differ (some times dramatically, e.g. the Swiss-German spoken in the canton of Valais) from the spoken languages in the surrounding countries.

Their outcome is the duration of unemployment of prime-age men, which they show is about one week higher in the French-speaking part. The method has also been used in Eugster et al. (2011), who show that the demand for social insurance is higher in the French-speaking part (measured by voting results in federal referenda), and Eugster and Parchet (2011), who show that despite the difference in demand for social insurance, municipality-level tax rates converge at the border. They argue that this is the result of municipality-level competition due to mobility pressure.

As can be seen in Figure 1, the language border cross-cuts three cantons (states): Berne, Fribourg, and Valais (in North-South direction). This aspect of the segregational patterns is crucial, as in Switzerland, the cantons have considerable legislative authority regarding schooling policy (e.g. school starting age), taxes, social assistance systems, and other institutional parameters. I exploit this feature below by running specifications limiting the sample to include only the bilingual cantons while controlling for canton fixed effects.

Besides the fact that the language border does not coincide with the main institutional borders (cantons/states), one might be worried that the pattern of segregation leads to differences in economic circumstances. After all, a common institutional setting does not guarantee that labor markets are integrated. Cattaneo and Winkelmann (2005) study economic integration of the German- and French-speaking parts of Switzerland by looking at earnings differentials. They find no evidence that labor markets are separated across the language regions. Another piece of evidence in this direction is the classification of Switzerland into greater regions along economic, political and social dimensions by the Federal Statistical Office, according to Eurostat's NUTS-2 specification. As shown in panel (a) of Figure 2, the language border cuts through two of these seven regions.[6] Additionally, the Federal Statistical Office separates Switzerland into 16 labor market regions, according to commuting dynamics (questions in the Census questionnaire). As shown in Panel (b) of Figure 2, the language border cuts through three of these regions.[7]

Labor market integration should also be reflected in hourly wages. To see whether this is the case, I use data from the Swiss Labor Force Survey, carried out yearly in spring. To avoid attrition bias (it's a panel), I limit the sample to data from the first interview with Swiss women age 25-55, sampled between 1996 and 2009.[8] Their real hourly wages are regressed on quadratics in age, experience and indicator variables for highest educational achievement, marital status, and survey year. The residuals from this Mincer regression are then plotted against distance to language border in Figure 3. There is no significant difference at the language border in the unexplained part of mean real hourly wages of women.[9]

Other important factors when looking at childlessness, according to previous studies, are school starting age, organization of pre-school institutions like kindergarten, and costs and availability of child care (for children below kindergarten age). Differences in school starting age, early schooling (kindergarten), child-care subsidies

[6] From north to south: Espace Mittelland, CH02 (comprising the French-speaking cantons of Neuchatel and Jura, the bilingual canton of Berne and the German canton of Solothurn). Region Lemanique, CH01 (comprising the French-speaking cantons Geneva and Vaud and the bilingual canton of Valais).

[7] From north to south: Biel/Bienne (region 6), Fribourg (region 4), Sion (region 3).

[8] The SLFS was started in 1991, but highest educational achievement is not comparable before and after 1996.

[9] The same exercise for men does not lead to a significant difference either (point estimate of the difference at the border: 0.028, standard error 0.049). Unfortunately, the survey interviews only one member of the household, so I cannot use the *relative* wage of the wife as a dependent variable (in the best case one would have pre-marriage wages of both spouses). Instead, I consider assortative mating by education in the census data below.

and tax-deductibility of child-care costs can be ruled out within canton (state), since these are regulated at the cantonal level.[10] Different levels of child-care provision might arise if mothers were reluctant to put their child in a facility in the other language region, or if there were unobserved constraints (cultural or institutional) on starting a child-care establishment. Otherwise, competition and mobility should equalize levels at the border.

To see how child-care supply varies at the border, I use data from the Swiss Firm Census, which is carried out roughly every three years and covers most private sector firms. The first year which contains information on child care firms is 1995.[11] I compute full-time equivalents working for day-care firms in each municipality and divide it by the number of resident women age 20-40 in 1990.[12] Figure 4 plots this ratio against distance to the language border, including predicted values and confidence intervals of the intercepts according to the specification outlined in the next section. At the border, there is no significant difference in day-care supply. Considering the evidence of higher labor force participation of mothers (at the border) in the French-speaking part, presented below, this result is consistent with sufficient mobility by mothers in terms of choosing a child-care facility location.

On the grounds of this combined evidence, this paper argues that the language border provides the unique possibility to identify the effects of differences in culture on fertility and labor supply outcomes, holding constant the main explanatory variables in the previous literature: labor market and family policies, child-care availability, wages, and taxes.

2.2 Data and Methodology

In this paper, I use census data from the 1990 and 2000 Swiss population census. These rich data sets cover all individuals living in Switzerland, with detailed household information, demographics, and labor market outcomes. The geographically smallest units available are municipalities (about 2,500), with a median size of 7.25 square kilometers. To construct the language border, and assign every municipality a distance measure to this border, I rely on map data provided by search.ch, an internet search engine. These data come in the form of a matrix, containing road distance between any two municipalities. I assign a language region to every municipality by majority language in the 2000 population census, and compute the shortest distance to a municipality in the other language region.[13]

Figure 5 plots the share of individuals indicating Swiss-German (a German dialect, panel a) or Swiss-French

[10] As far as there is no national law restricting cantonal authority. Most school-related policies are left to the cantons, although there have been some largely successful attempts to harmonize the system. Regarding child-care costs I am ignoring a subtle detail here. The total tax deduction depends on cantonal regulations and the municipality-level tax rate (in addition to federal and cantonal tax rate). But Eugster and Parchet (2011) show that mobility pressure equalizes any differences in municipality-level tax rates.

[11] The 1995 edition is the first which contains the NOGA 85.32A code, used to classify day-care firms. In the data, the number of workers are categorized by hours: working 90% or more, 50% to 90%, or less than 50% but at least 6 hours per week (100% are 40 hours per week). From this, I calculate full-time equivalents by summing up over the number of workers multiplied by interval midpoints (95%, 70%, 32.5%).

[12] Dividing by the number of children under a certain age would also be possible, but might be problematic since this paper will demonstrate that fertility is different at the border, and I want to capture ex ante expectations of women regarding child-care supply.

[13] To determine affiliation, I compute the share speaking any of the four official languages among Swiss residents age 15+, and assign the language region of the largest share (always exceeds 0.5 for municipalities assigned to German- or French-speaking region, except in parts of Grisons, which is a mountainous canton in the East). Note that language regions in Switzerland are stable over time. Using the 1970 census instead, only one municipality changes affiliation from French to German (Courgevaux, 48.7% German-speaking in 1970, 50.6% German-speaking in 2000).

(panel b) as their main language (among the 4 official languages, which also include Italian and Rhaeto-Romanic). Both shares change abruptly as one crosses the constructed border. This forms the basis of the sharp regression discontinuity design approach used in the empirical part of the paper. The assumption being that the majority language in a municipality determines the dominant culture.

The focus of this paper is on completed fertility of women and the labor supply of mothers. These two outcomes have to be measured at different points in time, as a woman's childbearing age is usually assumed to end somewhere beyond age 40, while mothers' labor supply has to be measured earlier. Due to the restriction implied by the census data being only available every 10 years, I therefore focus on one 10-year cohort of Swiss women, born 1952-1961, which are observed in 1990, when most of these women are mothers of young children, and in 2000, when most of these women have completed their fertility spells.[14] Excluded are women living in group quarters, women living on farms, and women with missing fertility information in 2000 (1.33% in the French- and 1.30% in the German-speaking part).[15]

This cohort of women is on average 33 years old in 1990 and 43 years old in 2000. This illustrates the trade-off in choosing the cohort boundaries, as mothers are slightly too old in 1990 — on average already having given birth to their second child—and just starting to be old enough in 2000 to look at completed fertility. One might worry that return to work behavior differs by parity of the child and age of the mother and that the cohort window introduces selection. I will present robustness checks below controlling for parity and age to alleviate these concerns. Completed fertility is usually measured somewhere around age 40–45 in most sources. From the Swiss birth register,[16] which contains data up to 2009, it can be shown that of the 1952-1961 cohort, 99.31% of births have occurred by the end of 2000.[17]

Being in a stable relationship is an important determinant of whether a woman has children and whether a mother participates in the labor market. To have a homogeneous group of women facing the same constraints, I therefore exclude never-married women from my sample. This introduces the possibility for sample selection if the mating process is different for German- and French-speaking women. To alleviate this concern, I compare composition of the sample at the language border, and check for differences in marriage market success indicators below.[18]

The baseline specifications I will estimate are local linear regression models including only municipalities close to the language border of the following form

$$y_{im} = \beta_0 + \beta_1 \text{german}_m + \beta_2 \text{german}_m \times \text{distance}_m + \beta_3 \text{distance}_m + \epsilon_{im}, \tag{1}$$

where y_{im} is the outcome of interest for individual i in municipality m. german_m and distance_m are language region affiliation and distance to the language border of the municipality of birth (where the respondent's mother

[14] In the 1980 census there is unfortunately no birth place information, effectively limiting me to one cohort which I observe at two points in time.

[15] Living on farms means that either the woman or her partner is working in agriculture (sector 1).

[16] BEVNAT, Federal Statistical Office, Neuchatel.

[17] Of the women born in 1961, which are the youngest in 2000, 96.41% and 97.40% of births have occurred in the French- and German-speaking regions, respectively. Note that the census was carried out in December of 2000.

[18] Additionally, I conducted the whole empirical exercise without conditioning on marital status and obtained very similar results (within less than 1 standard error from conditional results). Results available upon request.

lived when giving birth) of individual i. I use municipality of birth instead of residence for three reasons. First, there is substantive evidence that norms and values in general, but specifically those related to the role of women and the family, form during early childhood and adolescence (Vella (1994), Bisin and Verdier (2000), and references therein). Second, mobility choices might reflect a desire to be surrounded by peers sharing the same beliefs, which would lead to an upward bias in the language border difference using municipality of residence. Third, I focus on two outcomes measured at different points in time—completed fertility and labor supply when young children are present. By relying on municipality of birth, these two outcomes are measured for the same women at different points in time.

While manipulation of the running variable (distance to language border) is a minor concern in this set-up due to relying on municipality of birth to compute the measure, it is important to check that municipality characteristics and sample composition are the same. This is due to the fact that fertility and labor market outcomes vary strongly by municipality characteristics, e.g. on the urban-rural scale, and by demographics. Figure 6 plots population density and cumulative density by distance to the language border. Municipalities in the French-speaking region are coded with negative distance approaching zero at the border, while municipalities in the German-speaking region are coded with positive distance. I add estimated slopes and intercepts resulting from estimating equation 1 with population count as dependent variable (population includes only Swiss women born 1952-1961, sampled in the 2000 census), along with confidence intervals for the intercepts at the border. The estimated discontinuity is 38.4 with a standard error of 62.1. There are a couple mid-size towns close to the border. On the French-speaking side these are Neuchatel (11.6km) and Fribourg (5.5km). On the German-speaking side Biel/Bienne (5.5km) and Solothurn (16.3km). The bigger cities are further away from the border, namely Lausanne (52km), Bern (30.1km) and Basel (38.6km). The bandwidth of 30km in the empirical specifications ensures that population size on both sides of the border is about the same, and no big cities are included on either side.

I restrict all analyses to an RD sample bandwidth of 60km for the figures, and 30km for estimation. This means only women born in municipalities within 30km and 60km of the language border are included in the sample, respectively. Following the suggestions of Porter (2003) and Hahn et al. (2001), the model is estimated using local linear regression relying on a triangular weighting kernel which gives more weight to individuals born closer to the border. Robust standard errors are computed using a bootstrap procedure with 2,000 replications, clustered on the municipality level.

Identification in the RD design relies on a discontinuity in treatment, which in the present context is the dominant cultural environment, while other determinants of the outcomes have to vary smoothly at the discontinuity. Here, this mainly concerns composition (e.g. educational achievement), child-care and labor market policies, taxes and wages. These are variables I can test (or that have been tested by others) for discontinuities. Regarding unobserved differences like genetic endowment (biological infertility in this context) there is not much that can be done to assure that they vary smoothly around the cut-off, as in other RD settings. However, regarding biological infertility, the heterogeneous effects when splitting the sample by educational achievement presented below are one piece of evidence against the importance of this particular channel.

I have presented evidence above that policies, taxes and wages vary smoothly at the language border.[19] Regarding sample composition, Table 1 presents estimates of equation 1 with a set of marriage market outcomes as dependent variables. Regarding the share married, divorced, and widowed, there are no significant differences at the border. The same holds true for years since last change of marital status, either when looking at married or divorced women.[20] The number of observations is slightly higher in the 1990 census, which reflects deaths and emigration. Overall, there does not appear to be reason for concern that focusing on ever-married women is subject to selection bias.

Table 2 looks at sample composition of ever-married women, the sample used in the empirical part of the paper, using a broad set of demographic characteristics measured in 1990 and 2000 as dependent variables in equation 1. At the language border, there is a sharp difference in the main language, as expected. There are no significant differences in educational achievement, marital status, or partner's characteristics. There are differences regarding religious affiliation, though they are not highly significant. Women from German-speaking municipalities are more likely protestant, while women from French-speaking municipalities are more likely catholic. As can be seen from the large standard errors, there is significant variation. I present robustness checks below where I control for religious affiliation on the individual and municipality level. The number of observations is now slightly higher in 2000 compared to 1990, resulting from women of this cohort marrying after 1990, i.e. after they have reached age 29-38, offset by deaths and emigration as discussed above.

Table 3 looks at municipality characteristics in 1970, 9-18 years after the 1952-1961 cohort was born, and 2000, the point in time completed fertility is observed. Since these characteristics will be used as control variables in robustness checks, I exclude women in panel A and compute population, population density, and labor market structure for Swiss men above age 15. As can be seen, population and labor market characteristics look very similar on both sides of the language border. Panel B presents additional characteristics for the total population. Since giving birth to a child requires a male partner, it is important to have smoothness in the gender ratio. There is no significant difference at the border in this ratio. Whether municipalities are mostly urban or rural is captured by the share of land occupied by settlement and farming, which look very similar at the border. Lastly, this table contains the estimates regarding child-care supply computed in the same way as in Figure 4. There is no significant difference in full-time equivalents working in child-care in 1995 per 100 women age 20-40 at the border.

2.3 Results

In the previous sections, the emphasis was on smoothness in the environment around and composition of one cohort of Swiss women, born 1952-1961. These women were born kilometers apart, but exposed to a different cultural environment at home and in school. In this section, I look at their fertility outcomes at the end of

[19] Regarding policies and taxes, this statement holds within canton (state). I will estimate all of the main specifications for all cantons combined, and using only the bilingual cantons, including cantonal fixed effects.

[20] Unfortunately, this measure is not available in the 1990 census, and there is no measure directly capturing age at first marriage or duration (stability) of marriage in either census. However, the rate of re-marriage is relatively low (20% of women were non-single upon marriage in 2000), and the average age at re-marriage was about 38 in 2000 (both numbers from ESPOP, Federal Statistical Office, Neuchatel). If there were significant differences in age at first marriage or duration of marriage, one would expect them to show up in the years since last change of marital status.

their childbearing years, and at their participation in the labor market at the time they were mothers of young children. At both stages, I exclude never-married women at the respective point in time to ensure comparable constraints. Figure 7 plots childlessness at age 39-48 of this cohort against distance from their place of birth to the language border. Ceteris paribus, women born in German-speaking municipalities are about 3.7 percentage points more likely to remain childless than their peers born in French-speaking municipalities. As will be shown below, there is no statistically significant difference at the border in terms of the number of children mothers give birth to. In terms of completed fertility, German-speaking women have about 0.14 less children than their French-speaking peers.

This difference is robust to bandwidth variation, as shown in Table 4. Column (1) is estimated using the preferred bandwidth of 30km driving distance from the municipality of birth of the individual to the closest municipality in the other language region, leading to the 3.7 pctp difference at the border as plotted in Figure 7, statistically significant at the usual levels. Columns (2)-(4) contain estimates using different bandwidths of 15km, 60km and the optimal bandwidth of Imbens and Kalyanaraman (2012), respectively. The estimated border difference is robust to bandwidth variation, while precision gets markedly lower for the smallest bandwidth.[21]

Table 5 checks robustness with respect to the inclusion of control variables, using the 30km bandwidth in all specifications. Column (1) is the same as in Table 4. Columns (2) to (4) add control variables from Tables 2 and 3 on the individual and municipality level. The estimated border difference is slightly smaller and more precisely estimated. In column (6), partner's characteristics (from Table 2) are added as additional control variables. This excludes women who are not living (anymore) in a household with a male partner. Again, the estimated border difference does not change much and remains statistically significant.

As discussed above, many policy decisions are made on the cantonal (state) level. To gain confidence that the border difference in childlessness is not driven by differences in local school policy or work incentives (taxes), I carry out the same robustness checks using only the sample of women born in the bilingual cantons of Berne, Fribourg, and Valais. Figure 8 plots childlessness for this sample. Tables 6 and 7 contain the empirical estimates. For the baseline bandwidth of 30km, the discontinuity estimate for the bilingual cantons is 3.4 percentage points and highly statistically significant. Varying the bandwidth and using the optimal bandwidth proposed by Imbens and Kalyanaraman (2012) does not change the estimated discontinuity much. In the smallest bandwidth, precision is markedly lower due to the small sample size. Including control variables also does not change the results significantly: the estimated discontinuity stays around 3 percentage points. Overall, the estimated discontinuity in childlessness at the language border lies between 3 and 4 percentage points, robust to many different specifications.

One dimension which I have neglected so far is mobility. The fertility outcomes are measured for women born close to the border, but they could move anywhere in Switzerland before age 39-48 in 2000. This potentially raises concerns regarding smoothness of the institutional set-up, since German-speaking women move to different

[21] I also estimated the border discontinuity following the suggestions of Angrist and Pischke (2008) in allowing for a more flexible parametric specification for the effect of distance. Specifically, I included a quadratic function for distance (different on both sides of the border) in the 30km bandwidth set-up, and a quartic in the 60km set-up, without kernel weights. The estimated discontinuity in those models is 0.0465 with a standard error of 0.0081 and 0.0878 with a standard error of 0.0167, respectively (both clustered at the municipality of birth).

parts of the country compared to their French-speaking peers born across the language border, and institutional differences increase to some degree in distance from the border. There are two pieces of evidence that mitigate these concerns. First, one particular feature of Switzerland is low geographical mobility. Of this sample of women, in 2000, 21 percent live in the same municipality in which they were born. Furthermore, median distance from municipality of birth to municipality of residence is only 17km. Second, splitting the sample into women that stayed within 30km of the border, and women that moved outside this window yields border differences of 3.4 (with a standard error of 1.1) and 3.5 (1.2) percentage points, respectively.[22] Additionally, in panel a of Figure A.2 in the appendix, childlessness is plotted by municipality of residence. The border discontinuity estimate in that specification is 0.0324 with a standard error of 0.0124, in line with (selective) mobility playing a minor role at the language border. Thus it does not appear to be the case that an interplay of mobility and differences in institutional environment drive the language border results. This highlights the importance of vertical transmission of norms and values as suggested by Bisin and Verdier (2000) in particular, and of cultural determinants of fertility outcomes in general.

In 1990, these same women are mostly mothers of young children. Figure 9 and Table 8 present border discontinuities regarding their propensity to work.[23] When they are mothers of young children, women born in German-speaking municipalities are about 8 percentage points less likely to be in the labor force than their French-speaking peers.[24] Bandwidth variation, limiting the sample to bilingual cantons (including canton fixed effects), and/or including control variables does not lead to important differences. Doing the same comparison for mothers where the youngest child is age 5–9, or women without a child in the household, there is no significant difference in LFP at the language border (see panels a and b of Figure A.4 in the Appendix).[25]

Thus in terms of (extensive margin) labor supply, the only difference between German- and French-speaking women is observable when they are mothers of children below school age. This is interesting in the sense that one alternative explanation for cross-country differences in female labor supply concerns the speed of adoption of a "modern" identity Fortin (2009). While traditionally most women were withdrawing from the labor force completely after getting married, modern women never left the labor force or returned to work when their kids reached school age. As there is no difference in LFP at the language border except among mothers of young children, it does not appear to be the case that a differential speed in adopting the modern identity is driving the language border patterns. Instead, cultural differences linked only to mothers seem to be the main drivers. This forms the basis for the simple explanatory approach relying only on differences in the acceptance of working mothers outlined below.

The difference in LFP, especially its magnitude, is not as clean as the difference in childlessness, however. Since there is a significant difference in extensive margin fertility at the language border, the sample of mothers

[22] Both are slightly lower than the estimates for the whole sample, which is possible here because of kernel weighting, i.e. observations do not have the same weights in both split-sample models.

[23] Of the mothers, we observe about 40% when their youngest child is below age 5. Is is important to note that all of these results are robust to inclusion of year of birth dummies, age of youngest child in the household, and/or varying the cohort window.

[24] About 3 percent of those in the labor force report to be unemployed.

[25] The results are almost the same when using only the sample of women born in bilingual cantons, and highly statistically significant whether the bandwidth is varied or control variables are included. Also, in panel b of Figure A.2 in the appendix, labor force participation of mothers is plotted by municipality of residence, leading to a border estimate of -0.1011 with a standard error of 0.0252. Thus, as was found to be the case for childlessness, LFP of mothers appears not to be driven by mobility decisions.

is not necessarily the same in terms of observed and unobserved characteristics, which might raise concerns that the difference in labor force participation of mothers is driven by selection. But this effect is likely small even in the most extreme case, since childlessness is still relatively low on both sides of the border in terms of the population of women. According to a back-of-the-envelope calculation assuming all the "surplus" childless women in the German-speaking part were working at the time they would hypothetically be mothers of young children, labor force participation of mothers would be about 5.4 percentage points lower at the border among mothers born in the German-speaking part.[26]

From the results presented so far, I conclude that there is a significant difference in childlessness and labor force participation of mothers at the language border in Switzerland, which does not coincide with differences in wages, taxes, child-care availability, or composition (e.g. educational achievement). Women born in German-speaking municipalities are significantly more likely to remain childless, and significantly less likely to work at the time there are below-school-age children in the household, compared to their peers born in French-speaking municipalities.

2.4 Heterogeneity

One important dimension with regards to fertility and labor supply is human capital. It is a consistent pattern that women with higher educational achievement are found have lower fertility and higher labor supply. Willis (1973) speculated that higher human capital might decrease fertility due to the combination of increased opportunity costs and child "production" being time intensive in the wife's time. At the language border, according to Figure 3, German- and French-speaking women can expect to earn the same wage. From a pure economic point of view, one would therefore expect the language border difference to be identical for women with different potential wages.[27]

This is not the case, however, as can be seen in Table 9 and Figure 10. The language border difference in childlessness is only marginally significant for women who completed mandatory education, and strongly increasing with higher educational achievement.[28] At the same time, when these women are mothers of young children, they are equally likely to work if they only completed mandatory education. Among mothers with post secondary (mostly apprenticeships) or tertiary education, those born in German-speaking municipalities are increasingly less likely to work, compared to their French peers. These differences do not appear to be the result of selection, as there is no evidence for differential educational achievement at the language border (Table

[26] Using the baseline estimates (30km bandwidth) at the border, 90.9 percent of the French-speaking women are mothers, compared to 87.2 percent among German-speaking women. Combining this with the estimates of Table 8, 35.2% of women are working mothers on the French compared to 26.6% on the German side. Attributing the percentage point difference in the share mothers (3.7) to working mothers thus leads to 30.3% working mothers on the German side. Then, LFP of mothers on the German side would be 33.3%, compared to 38.7% on the French side, a 5.4 percentage point difference.

[27] Highest educational achievement is strongly linked to *observed* wages. In the 2000 Labor Force Survey, median hourly wages of Swiss women age 25-55 were CHF 25.7 for women with mandatory education, 31.9 for post secondary education, and 39.7 for tertiary education. In terms of US dollars, with an exchange rate of 0.6 USD for 1 CHF (March 1st 2000, oanda.com), these are equivalent to USD 15.4, 19.1, and 23.8.

[28] Note that the educational system in Switzerland resembles the German dual system. In most cantons (states), mandatory education consists of 9 years of primary school, followed by either 4 years of university preparation, or an apprenticeship accompanied by education in a professional school (hence the word "dual"). Both university preparation and an apprenticeship are classified as post secondary education in the ISCED. After passing university preparation exams or obtaining a comparable degree at a professional school (in addition to apprenticeship related education), individuals are eligible to enrolling at any Swiss university (general or professional) to obtain a BA/MA/PhD, which are classified as tertiary education.

2). Similarly, differential assortative mating does not appear to be reason for concern, as adding all the control variables used in the robustness checks above, which include partner's education, does not change the picture significantly.[29]

The pattern that differences in childlessness and LFP of mothers are larger among more highly educated women is also visible when comparing France and Germany (see Figure A.6 in the Appendix). But comparisons of these two countries are difficult as the educational system is different and levels of educational achievement (and therefore composition) differ. At the language border, this result has more weight, since the system is the same, and there does not appear to be differential selection into educational tracks.

The patterns of fertility and mothers' labor force participation at the language border are puzzling in the light of previous research, and not easily explained away by taste. Below, I present a new approach to resolve these difficulties, potentially shedding light on what drives the significant cross-country variation we observe in these two important statistics.

2.5 Additional outcomes

There might be some concern that higher childlessness among German-speaking women is driven by giving birth later in life. This could result from different career planning horizons, or differences in the mating process. Additional fertility outcomes of the cohort of Swiss women born 1952-1961 are given in Panel A of Table 10 (corresponding to Figure A.3 in the appendix). As can be seen, there are no significant differences at the language border in terms of age at first birth and age at birth of last child. This should alleviate concerns that differences in childlessness are driven by delayed childbirth of German-speaking women.

Furthermore, on both sides of the language border, (ever-married) women of this cohort have on average about 2.1-2.2 children, highlighting the fact that the cultural difference in fertility mainly occurs along the extensive margin. This is in line with the conclusion of the German Federal Statistical Office in their 2008 report on fertility,[30] where they state that declining fertility among recent cohorts (born after 1949) in Germany is mainly due to increasing childlessness.[31]

As shown above, women born in the German-speaking part of Switzerland are more likely to stay at home when they are mothers of young children than women born in the French-speaking part. An interesting follow-up question is whether this difference in lifetime labor force participation leads to observable differences in labor market outcomes later in life. Panel B of Table 10 looks at labor force participation, weekly hours of work, and the share reporting to be in a managerial position in their firm in the 2000 census, splitting the sample into mothers and childless women.

According to these results, labor force participation does not differ significantly at the border either among

[29] Adding all the control variables as in column (6) of Table 5, the border difference in childlessness is 0.035 (s.e. 0.017), 0.026 (s.e. 0.012), and 0.105 (s.e. 0.041) for women with low, medium, and high education, respectively. For mothers' LFP the border differences with all controls are 0.014 (s.e. 0.041), -0.084 (s.e. 0.028), and -0.224 (s.e. 0.082) for women with low, medium, and high education, respectively.

[30] "Mikrozensus 2008 - Neue Daten zur Kinderlosigkeit in Deutschland", Statistisches Bundesamt, Wiesbaden. Publication available at https://www.destatis.de/DE/PresseService/Presse/Pressekonferenzen/2009/Kinderlosigkeit/Kinderlosigkeit_Ueb.html. Retrieved in September 2013.

[31] They report a relatively stable distribution of the number of children per woman for cohorts born after 1949. About 30% of these mothers have 1 child, 45% have 2 children, and 20% have 3 or more children.

mothers or childless women. In terms of weekly hours of work, the German border level is about 1.4 hours lower than on the French side among mothers, and there is no difference among childless women. The share managers is slightly lower among German-speaking mothers, while there is again no difference among childless women. Thus mothers in the German-speaking part work less on the intensive margin and at lower positions in their firms later in life compared to their French-speaking peers. This result is in line with French-speaking mothers returning to work more quickly after giving birth, and thus being less exposed to losses in human capital.

However, note that since culture has been shown to be an important determinant not only of the labor supply of mothers, but also of extensive margin fertility, these results have to be interpreted with caution, as there is a selection problem. Specifically, it has been shown that women with higher education are more likely to stay childless in the German-speaking part, which likely leads to negative selection (in terms of human capital) of German-speaking mothers. Thus the worse labor market outcomes of German-speaking mothers represent the combined effect of selection into motherhood and lower lifetime labor force participation. In the combined sample of women, the difference in hours is -0.775 with a standard error of 0.477 (p=0.104). The difference in the share managers is -0.011 percentage points, with a standard error of 0.006 (p=0.087). Thus the total effect of cultural differences on labor market outcomes at ages 39-48 is weakly negative but only marginally statistically significant.

3 An identity approach

In this section, I lay out the basic idea behind the identity approach. I demonstrate that working mothers are viewed less favorably in the German-speaking compared to the French-speaking region. I combine a simple version of the household model inspired by Willis (1973) and Jones et al. (2008) with an identity framework to to spell out how the basic mechanism could operate and explore interactions with wages. In light of the education gradient in the language border differences discussed above, it seems relevant to explore whether the model can accommodate these additional patterns. Throughout, I focus on the extensive margin choices in fertility and labor supply, motivated by the empirical results.[32]

3.1 Identity and working as a mother

There is a growing literature in economics investigating cultural explanations of fertility and labor supply patterns (Fortin (2005), Fortin (2009), Fernández and Fogli (2005), among others). Using different approaches, these studies find significant impacts of culture on women's choices. One such cultural component is "mother's guilt" (Fortin (2005), Fernández (2007), Fogli and Veldkamp (2011)), i.e. mothers feeling guilty if they work instead of caring for their children, linked to the acceptance of working mothers in society. Feelings of guilt result from behavior not corresponding to one's own ideal of what a mother *should* do (Akerlof and Kranton,

[32] The justification for focusing on extensive margin fertility might also be given by the following reasoning. In the language of Fortin (2009), rising labor market opportunities increasingly present women with a fundamental choice—whether to pursue a career, i.e. maintain labor market attachment in becoming a working mother or childless, or a housewife focused on home production. If working as a mother is not desired by women and/or accepted by society, the main response can be expected at the extensive margin, since few careers permit a 5-year break, the time it usually takes until a child reaches school age.

2000)—taking care of children full-time. Extensive survey evidence documents the prevalence of the belief that children are harmed if their mothers work, and that the mother-child relationship suffers (Fortin (2005), Fogli and Veldkamp (2011)). This belief is argued to be the result of two factors. First, in early childhood, breastfeeding may be important for the physical development of the child. Second, development of the child's cognitive and social skills could depend crucially on the mother-child relationship, and not be substitutable with relationships to other care-takers.[33]

Whether working as a mother is considered acceptable is different from norms and values related to the optimal division of household tasks, like the traditional role model, which holds that the man is the breadwinner, and the wife the homemaker. In the traditional role model, women should restrict their labor supply in general, to be able to take care of household tasks and support their husband and children. Attitudes regarding working mothers, and the mother-child relationship, on the other hand, only affect women who are mothers of young children, and do not relate to labor supply of women when their children attend school, or when there are no children in the household. Being raised in a culture where the prevalent belief is that mothers should stay at home has theoretically interesting consequences, since women may anticipate this restriction and adjust their fertility accordingly. The prevalence of the belief that mothers should stay at home while the child is below school age is the main channel through which this paper attempts to reconcile the cultural patterns in the labor force participation of mothers and extensive margin fertility of women. This is not the first approach considering this channel. The effect of mother's guilt on desired fertility is investigated in Ruckdeschel (2009), comparing France and West-Germany using data from the UN Generations and Gender Programme. She finds a negative effect of agreement with the statement "pre-school child suffers with working mother", on the desire to have children, controlling for demographics and a measure of support for the traditional role model ("taking care of the household is as fulfilling as paid work").

In 2002 the International Social Survey Programme (ISSP) asked women in Switzerland whether they think that mothers should work when they have a child. Table 11 shows their answers, differentiated by language region according to canton of residence. In German-speaking cantons, almost no one thinks that women should work full-time when they have a child under school age, compared to 6.9 percent in French-speaking cantons. The difference is even larger when asked about part-time employment. Whereas 71.3 percent of Swiss-French think women should do at least some work while having a child under school age, only 48.1 percent of Swiss-Germans do so. The remaining respondents answered that women should stay at home, with a highly statistically significant difference of 28.9 percentage points. When the youngest kid is at school, the differences become much smaller. This strong difference in how the Swiss-French and the Swiss-Germans think about labor supply of mothers shows how culturally distant these two groups of women are in terms of their norms and values.[34] That

[33] Note that this paper does not take a stand on whether mother's guilt is justified. Fogli and Veldkamp (2011) cite evidence that a child's human capital is only marginally lower if the mother works. In this paper, I look at consequences of the belief that the child suffers, not whether this belief is justified.

[34] Looking at the results for male respondents, the difference in the shares answering "Stay at home with child under school age" is 0.227 (std.err. 0.059) and "Stay at home with youngest kid at school" is -0.005 (std.err. 0.052). The difference between attitudes of men and women therefore seems to be small. There might be concerns regarding cognitive dissonance. If French-speaking mothers are working for some unobserved reason they might attempt to rationalize their action ex post. I split the sample to investigate this possibility. The difference in the shares answering "Stay at home with child under school age" among childless women is 0.314 (s.e. 0.094), among mothers who reported to have worked while they had a kid under school age it is 0.191 (s.e. 0.063) and among

caring mothers should stay at home and fully invest their time in children is reflected in the broader German culture. Working mothers are labeled "Raven Mothers" (Rabenmuetter), and face social pressure if they return to work too early (Ruckdeschel, 2009).

Additional survey evidence is found in the European Values Survey, carried out in Switzerland in 2008. Women were asked whether they agree with the statement "A working mother can establish just as warm and secure a relationship with her children as a mother who does not work" and the statement "A pre-school child is likely to suffer if his or her mother works". Women from German-speaking regions were significantly less likely to agree with the first statement, and more likely to agree with the second, compared to their peers from the French-speaking region.[35] Regarding other attitudes stressed to be important for female LFP and fertility in the literature, there does not appear to be a significant difference between German- and French-speaking Swiss women. Agreement with the statement "If jobs are scarce, give men priority", 18.5% and 23.1% agreed in the French- and German-speaking region, respectively (a difference of 0.05, p-value 0.23). Regarding the statement "Being a housewife is as fulfilling as working for pay", 57.8% of women in the French-speaking region agreed, vs. 61.4% in the German-speaking region (a difference of 0.04, p-value 0.44). The first question captures egalitarian values, while the second captures support for the traditional household model (Fortin, 2005). These findings correspond to the empirical results at the language border, where the only significant difference in LFP is observed among mothers of young children.[36]

Thus there is strong evidence from aggregate survey data that labor supply of mothers is more accepted in the French-speaking parts of the country, compared to the German-speaking parts, corresponding to the difference between France and Germany (Ruckdeschel, 2009). But do these cultural attitudes change abruptly at the language border or is there convergence? Due to the direct democratic system in Switzerland, how people vote in referenda on policy questions like extension of unemployment insurance or immigration policy is routinely recorded. One particularly interesting vote in the context of this paper took place in 2004 and concerned the introduction of maternity insurance. It passed (at the third attempt) and thus mandatory maternity insurace was introduced at the federal level paying 80% of the last pre-birth wage for a leave of 14 weeks after giving birth. Figure 11 shows the share yes-votes in municipalities, by distance to the language border. The jump at the language border is sharp, and there does not appear to be any convergence toward the border, showing that support for maternity insurance is much stronger in the French-speaking municipalities compared to their German-speaking neighbors right across the border.

The yearbook of Swiss politics[37] states that the two main issues in the political debate concerned regulatory

mothers that stayed at home it is 0.319 (s.e. 0.101). Although the difference becomes smaller among mothers that worked, it does not appear that ex post rationalization is driving the results.

[35] Agreement with the statement could be indicated on a scale from 1 (strongly agree) to 4 (strongly disagree). Mean answers among women in the German- and French-speaking parts of the country to the first question were 2.085 and 1.823, respectively, with a difference of 0.262 (s.e. 0.065). Note that a lower mean indicates higher support for the statement. Mean answers to the second question were 2.290 and 2.442, respectively, with a difference of -0.152 (s.e. 0.063). Number of observations: 146 in the French-speaking and 525 in the German-speaking part. Survey weights used in all calculations.

[36] Feyrer et al. (2008) argue that the positive correlation between female LFP and fertility in the cross-country dimension is the result of social norms regarding the division of household work. They show that in high LFP-fertility countries men do a larger share of household work compared to low LFP-fertility countries. I replicated their measure for the division of household work using the same data set (ISSP 2002) and compared the share done by men between the two language regions. Among all women (with partners) the difference in the share household work done by their partners is (German minus French) -0.005 ($t = -0.19$, $n = 257$). Among women with children below age 6 the difference is -0.017 ($t = -0.32$, $n = 47$).

[37] http://www.anneepolitique.ch/aps_open/APS2004_1_7_c.html, retrieved in July 2013.

arguments, i.e. the question whether it is the government's job to look after mothers and children (opponents coined the term "government kids"), and the general view of the family, i.e. the acceptance of working women. Eugster et al. (2011) argue that the border difference observed in this referendum is in line with a higher demand for social insurance in regions where Latin-derived languages are dominant. The large difference at the German-French language border might therefore reflect both a difference in norms regarding working mothers and a difference in the demand for social insurance. There is no way to separate the two, but since there is no visible difference in the trends on either side, it seems plausible that both cultural components differ sharply at the border. While it is not possible due to a lack of much more detailed survey data to provide conclusive proof that the only difference in attitudes is in whether mothers should work when there are young children in the household, the results of the empirical section speak a clear language. There is a large and robust difference in LFP of mothers at the border, despite no observable differences in wages or work-family policies. Furthermore, once the youngest child reaches school age, the difference disappears, and is also not found among women without children in the household.

In the next section, I combine identity costs resulting from working as a mother with a prototype household model to see how rational agents' choices react to this cost. Throughout, the assumption will be that this cost is inherited and womens' choices do not have a feedback effect on the cost. In that respect, I follow the literature stressing the importance of vertical transmission of norms and values (Bisin and Verdier (2000), Vella (1994), Fernandez (2007)). To some extent, this is also true in the learning model introduced by Fogli and Veldkamp (2011). In that model, women inherit their parents' beliefs about the harm done to children by working mothers and update them by observing the outcomes of their neighbors of the previous generation.

3.2 Theoretical Framework

Economists have long thought about fertility decisions of women. The main theoretical device in this endeavor has been a model of joint optimization within the household, pioneered by Becker (1960) and refined by Willis (1973).[38] I combine a simple version of this household model with identity parameters, as suggested in Akerlof and Kranton (2000).

Consider a household consisting of a wife and husband maximizing joint utility from children and the consumption of a composite good: $u(C,S) = \alpha C + \log(S)$, where C denotes investment in children,[39] α denotes fertility preferences, and S is a composite consumption good. This choice of functional form for the household's preferences is inspired by Becker and Barro (1986). The husband supplies earnings E, while the wife allocates her total available time T to work (L) and investment in children ($T - L$). The household budget constraint is given by $S = wL + E$, while children (in the terminology of Becker (1960) the combination of number and quality of children) are "produced" according to $C = T - L$. This simple parametrization captures the main features of Willis' (1973) version of the Becker model in that "production" of children (quantity times quality) is intensive in the wife's time. I will expand below on how my results apply in a more general model.

[38] Gobbi (2013) uses a similar model to study long run dynamics of childlessness.

[39] As in Willis (1973), I abstract from the distinction between number and quality of children, as the main emphasis of the model will be on extensive margin choices.

As documented above, there is evidence that German-speaking women consider working as a mother to be harmful for the child to a greater degree than French-speaking women. Using the terminology in Akerlof and Kranton (2000), German-speaking women have a different sense about what it means to be a "good" mother, and how they define their identity as women and mothers. Their identity concept stipulates that a good mother stays at home when the child is below school age, since she is the only person capable of taking good care of her child.[40] This directly translates into feelings of guilt should she decide to work as a mother (or be forced to). On the other hand, a German-speaking mother who chooses to stay at home feels good about this choice since it conforms to her sense of what a mother *should* do. Akerlof and Kranton (2000) propose operationalizing identity as a utility cost if a choice does not correspond to the prescribed behavior of a social category.[41] In the present context, I differentiate between two social categories: mothers and childless women.[42] Labor supply of mothers is constrained, while childless women are free to work as much as they want.

Identity enters the model as a utility parameter, a utility cost associated with working as a mother. Specifically, I assume that working mothers suffer identity costs I, while childless women or mothers who choose not to work are not subject to this cost.[43] The household maximization problem is then

$$\begin{aligned} \max_{\{C,S,L\}} \; & \alpha C + \log(S) - I\mathbf{1}\left[L > 0 \cap L < T\right] \\ \text{s.t.} \; & C = T - L \\ & S = wL + E \\ & 0 \leq L \leq T \end{aligned}$$

Solution of the model proceeds by setting up the Lagrangean and deriving Kuhn-Tucker optimality conditions. For interior solutions of L, the first order conditions yield

$$L^* = \frac{w - \alpha E}{w\alpha}$$

If $L^* \leq 0$, the wife does not work and the household thus fully invests in children. I call this the "stay-home

[40] In the formulation of the model, I am more precise: The German-speaking women have a higher identity cost than their French-speaking peers. I do not assume that the French-speaking have zero cost.

[41] As Akerlof and Kranton (2000) note, a woman's identity is constantly threatened by the observed choices that her peers make. If, for example, a stay-home mother meets a mother who works, her sense of identity is diminished, since after all her choice may not have been the correct one. This inner conflict is resolved by punishing peers who violate the rules associated with good behavior. I lump "self-cost" and peer component together into one parameter, since analyzing different equilibria is not the goal of this paper.

[42] One margin which I am ignoring here is AK's social categories of women and men. One could argue that the category woman is associated with the following rule: women should have children. In that case, childlessness would also be subject to identity costs. Another distinction that I abstract from is that women might adopt "career" identities (working mom or childless) vs. "housewive" identities Fortin (2009). Since the only difference in female LFP at the language border is observed among mothers, is does not appear to be the case that there are differential adoption rates in terms of these margins.

[43] This parametrization ignores the possibility that, if working as a mother is not viewed favorably in society, firms could be less willing to provide part-time options for mothers. Generally speaking, the firm side of the employment relationship could be responsible for costs associated with combining work and family. This channel does not contradict that cultural factors are responsible for the language border difference—it would just be the boss' attitudes instead of the woman's that are the driving force. However, regarding availability of suitable hours jobs, this does not appear to be the case. In the 1992-1995 Labor Force Surveys, mothers of children below age 5 working full-time were asked whether they would prefer to work part-time. In the French-speaking region, 9% said yes, vs. 5% in the German-speaking region. Among mothers working part-time, 47% and 28% said they would prefer to work full-time in the French- and German-speaking region, respectively. From these results, it appears French-speaking mothers feel more constrained in the choice of hours than German-speaking mothers. Similarly, mothers not in the labor force were asked whether they would accept an "interesting" job offer. 18% of mothers said "yes" in the French-speaking part, vs. 8% in the German-speaking part. The other possible answers were "given certain conditions" (30% vs. 32%), and "no" (52% vs. 60%).

mom" arrangement. If $L^* = T$, there are no children and the household is focused on consumption, which I call the "childless" arrangement. If $0 < L^* < T$, the household chooses a combination of children and labor supply by the wife. I call this the "working mom" arrangement. In this allocation, total utility is decreased by I, due to non-conforming behavior to society's prescriptions of what a mothers is supposed to do (stay at home). Due to identity costs entering utility only in the interior solution of the model, a case differentiation is necessary, comparing utility in the interior solution, to utility in the corner solutions.

In terms of social categories and household arrangements, agents in this model thus face the following alternatives.

Social category	Household arrangement	Utility
Mother	Stay-home mom (H)	$u_H^* = \alpha T$
	Working mom (W)	$u_W^* = \alpha\left(T - L^*\right) + \log\left(wL^* + E\right) - I$
Childless woman	Childlessness (C)	$u_C^* = \log(wT + E)$

Note that due to the specific functional forms chosen, changes in the wage have clear-cut effects on labor supply in this model. Specifically, increasing wages lead to higher labor supply of mothers, or a switch to childlessness with all time spent working. This is consistent with the wage and labor supply patterns of women observed in recent history: As the gender wage gap decreased due to rising female wages, women in rich countries increased their labor supply across the board. This feature is also consistent with Willis' (1973) proposition that substitution effects dominate when wages increase.

Comparative Statics In the following I will show how changes in I affect optimal choices. The formal aspects of the model are relegated to Appendix B. To be able to talk in a meaningful way about childlessness and labor force participation, assume there is heterogeneity in fertility preferences α and wages w. Then there are sets in (α, w)-space at which households are indifferent between any two of the three household arrangements. Let $\bar{\alpha}_{HW}(w, I)$ denote the implicit function describing the indifference curve between arrangements H and W, i.e. all w where $u_W^*(\bar{\alpha}_{HW}(w, I), w) = u_H^*(\bar{\alpha}_{HW}(w, I), w)$. Correspondingly, let $\bar{\alpha}_{HC}(w)$ and $\bar{\alpha}_{WC}(w, I)$ denote the indifference curves between H and C, and W and C, respectively. An interior allocation of the model, where any arrangement is chosen by at least one household looks as depicted in Figure 12. $\tilde{\alpha}$ and $\tilde{w}$ denote the lowest possible α and w for which arrangement W is attractive (these depend on I). As substitution effects dominate income effects due to increasing wages, arrangements where the wife supplies labor to the market (C and W) become strictly more attractive as wages increase.

Identity costs determine the locations and slopes of the indifference curves. If identity costs increase, being a stay-home mom or childless become more attractive. Consider Figure 13, which looks at the effect of increasing identity costs. As can be seen, both indifference curves related to W rotate and shift inwards, leading households close to these curves to switch to H or C. This is the first result of the model directly capturing the language border patterns. If German-speaking women are subject to higher identity costs of combining work and motherhood, more women opt for childlessness and becoming stay-at-home moms instead of working moms, compared to French-speaking women where identity costs are lower. This mechanism thus generates a positive

between-group correlation in fertility and female LFP, while retaining the basic mechanism of a dominating substitution effect due to increasing wages required to rationalize the secular trends (increasing female LFP and decreasing fertility) and within-group cross-sectional pattern (higher wage women have higher LFP and lower fertility).

In the following, I discuss how identity effects interact with wages. This is interesting as it could be seen as a test of the model. While the direct effects on fertility and labor supply are modeled after the language border patterns as an explanatory approach, there is no direct mechanism in the model to capture interaction effects. Still, relative total utility in the three arrangements changes with the wage, so a constant identity cost affects different parts of the wage distribution in different ways. Consider childlessness conditional on w, which is a function of $\bar{\alpha}_{WC}(w, I)$. I show in Appendix B that higher identity costs unambiguously increase childlessness (for $w > \tilde{w}$), and that this effect is increasing in the wage. For higher wage women, childlessness is more attractive than for lower wage women. When the utility cost of being a working mom increases, these women show a higher propensity to opt out and choose childlessness in the model.

Regarding the labor force participation (LFP) of mothers, there are two effects due to higher identity costs. First, due to the shift in $\bar{\alpha}_{HW}$, working mothers opt out of the labor force and become stay-home moms. Second, there is a selection effect due to the shift in $\bar{\alpha}_{WC}$. This effect leads working moms not to have children at all. Thus both effects decrease LFP of mothers. Whether the combined effect is increasing or decreasing with wages depends on parameters. To see this note that the first effect operating on $\bar{\alpha}_{HW}$ always becomes larger in the wage (shown in the appendix), while the second effect goes to zero as LFP approaches one. In the appendix, I show that for plausible values of the parameters, the effect of higher identity costs on LFP of mothers is always increasing initially (where LFP is low), but might be hump-shaped.

This section has presented a simple model of household fertility choices augmented by an identity parameter as suggested by Akerlof and Kranton (2000). In this simple model, identity costs lead to higher childlessness and lower labor force participation of mothers. Moreover, childlessness is more strongly affected by identity costs the higher the wage. The model is compatible with a stronger effect of identity costs on LFP of mothers the higher the wage, which results in the model if the direct effect of identity costs on the labor supply of mothers, along the margin where working mothers opt out and stay at home, is increasing more strongly in the wage than the indirect effect leading to childlessness. If the converse holds, the model predicts a hump-shaped relationship between wages and the absolute value of the change in LFP due to identity costs.

Generalization The model above simplifies the household decision problem considered by Becker (1960) and Willis (1973) in two respects. First, preferences and production have simple functional forms. Second, "production" of children only depends on the wife's time and does not allow for goods inputs, and the composite good (which includes leisure) only depends on household income, and not the wife's time. In the following, I discuss how the central result that identity costs lead to higher childlessness, and that this effect is increasing in the wage, generalizes to a more complete model. I maintain some crucial assumptions. First, identity costs are a fixed cost linearly entering utility in the interior solution where $C > 0$ and $L > 0 \cap L < T$. Second, "production"

of children requires the wife's time, and it is not possible for the household to completely "outsource" child production (thus $C > 0$ is only possible if $L < T$). Third, there are two heterogeneity parameters: α which captures fertility preferences, and w, which captures the wife's wage, and there is an indifference curve separating the two household arrangements "working mom" and "childlessness" in (α, w)-space, given by

$$\bar{\alpha}_{WC}(w, I): \; u_W^* \left(\bar{\alpha}_{WC}(w, I), w\right) - I = u_C^* \left(\bar{\alpha}_{WC}(w, I), w\right). \tag{2}$$

Additionally, I need some structure on the utility function to be able to pin down how this indifference curve is affected by changes in I. I assume the utility function has the CES structure according to

$$u^*(\alpha, w) = \left(\alpha \left(C^*\right)^{\rho} + (1-\alpha)\left(S^*\right)^{\rho}\right)^{\frac{1}{\rho}},$$

with $\rho \in (-\infty, 1]$ and $\alpha \in [0, 1]$.

The household in the complete model simultaneously chooses C^*, S^*, and how to produce these optimally using goods inputs and the wife's time (see Willis (1973) for the complete statement of the general model). By the Implicit Function Theorem, the derivative of $\bar{\alpha}$ with respect to I is given by (using equality of u_w^* and $\underline{u_C^*}$ at $\bar{\alpha}(w, I)$)

$$\frac{\partial \bar{\alpha}_{WC}(w, I)}{\partial I} = \frac{1}{\frac{\partial u_W^*}{\partial \alpha} - \frac{\partial u_C^*}{\partial \alpha}} = \frac{1}{\frac{1}{\rho}\left(u_W^*\right)^{1-\rho}\left(C_W^{*\rho} + \left(S_C^{*\rho} - S_W^{*\rho}\right)\right)}, \tag{3}$$

where C_W^*, S_W^*, and S_C^* denote optimal values of C and S in the W and C arrangement, respectively ($C_C^* = 0$). Due to the Envelope Theorem, the derivatives in the denominator of 3 depend only on the optimized value of the utility function (and thus C^* and S^*), and not on how production occurs. The denominator of equation 3 is positive if but not only if $\rho \geq 0$, since composite good consumption when childless is always larger than composite good consumption in the interior optimum, due to specialization. Thus identity costs tend to increase childlessness if children and composite consumption are sufficiently substitutable in the household's utility function. This shows the first crucial requirement of my results above. At least in the region of (α, w)-space where households tend to derive equal utility from specialization in consumption (childlessness) and combining wife's work with family, preferences need to exhibit sufficient substitutability regarding the two inputs for the result to carry over to the more general specification.

Differentiating equation 3 with respect to the wage yields

$$\begin{aligned}\frac{\partial \bar{\alpha}_{WC}(w)}{\partial I \partial w} = &- \left(\frac{\partial \bar{\alpha}_{WC}(w)}{\partial I}\right)^{-2} \left[\frac{1-\rho}{\rho} u_W^{*-\rho} \frac{\partial u_W^*}{\partial w}\left(C_W^{*\rho} + \left(S_C^{*\rho} - S_W^{*\rho}\right)\right)\right. \\ &\left. + \frac{u_W^{*1-\rho}}{w}\left(\frac{\partial C_W^*}{\partial w}\frac{w}{C_W^*} C_W^{*\rho} + \frac{\partial S_C^*}{\partial w}\frac{w}{S_C^*} S_C^{*\rho} - \frac{\partial S_W^*}{\partial w}\frac{w}{S_W^*} S_W^{*\rho}\right)\right],\end{aligned}$$

where the first term in square brackets is positive if $\rho \geq 0$ and involves the shadow price of the wife's time

$(\partial u_W^*/\partial w)$[44]. As can be seen, this expression tends to be small if ρ is large (close to 1). The second expression in square brackets depends on the household's elasticities of demand for children and consumption with respect to the wife's wage. If the substitution effect due to a higher wage dominates the income effect, then $\partial C_W^*/\partial w < 0$, and $\partial S_W^*/\partial w > 0$ ($\partial S_c^*/\partial w > 0$ since there is no substitution effect). Thus the second expression in square brackets may be negative and if it dominates the first expression, the total effect may be positive. Whether this is the case depends on ρ and the household's production functions. Willis (1973) argued that a model where the production of children is intensive in the wife's time and thus the substitution effect likely dominates is consistent with evidence that higher wage (or more educated) women tend to work more and have fewer children, but spend more money per child.[45] Jones et al. (2008) revisit this prediction, find that it still holds on a broad level, and derive the possible set of assumptions in the household model consistent with this pattern.

Thus identity costs may increase childlessness more among higher wage (or more educated) women if preferences exhibit sufficient substitutability, and if the production of children is intensive in the wife's time, so that the substitution effect dominates the income effect.

Interpretation A simple household model augmented by an identity parameter rationalizes the patterns of higher childlessness and lower labor force participation of mothers on the German-speaking side of the border, compared to the French-speaking side, as a consequence of differences in women's identity concept. Furthermore, the model accommodates the heterogeneity results where particularly large differences were found among women with the highest educational achievement if the substitution effect from a higher wage dominates the income effect. This is in line with Willis' (1973) proposition that the production of children is intensive in the wife's time, needed to rationalize the secular trends of increasing female LFP and decreasing fertility. The first feature represents an explanatory approach to get at the specific identity component responsible for the reduced form results, based on observable differences in attitudes. The second feature—the results regarding heterogeneity– could be interpreted as a test of the model, since identity costs do not interact with wages by construction. Rather, this is a feature that arises from the preference specification required to generate the secular trends. If wages (or human capital) increase, the outside option (childlessness) becomes relatively more attractive, so that a constant psychological cost gives a stronger incentive to opt out as wages increase.

In this analysis, I have ignored the intensive margin of fertility. This is mainly because that is where one expects the main response, and because the empirical patterns do not offer clear guidance for how the intensive margin is affected. The absence of a difference in the number of children among mothers could be the result of two effects. First, there is a selection effect on the extensive margin, as women with lower fertility preferences are more likely to opt out and choose childlessness. This leads to higher fertility preferences among the group of mothers where identity costs are higher and would be expected to lead to more children per woman. Second, identity costs of combining work and motherhood and the associated longer breaks from labor market careers

[44] Using the first order conditions of the problem and the Envelope Theorem, $\partial u_W^*/\partial w$ is equal to the shadow price of the wife's time.

[45] If production of children is intensive in the wife's time substituting time from child care to market work leads to a decrease in "child services" (quantity times quality) in Willis' version of the Becker model. He does not distinguish quality and quantity in this respect, but argues that the net negative effect may be composed of a negative effect on quantity compensated by a (smaller) positive effect on quality.

represent higher opportunity costs *per child*. This would be expected to decrease fertility among those women who choose to become mothers. These effects go in opposite directions, and thus a zero effect at the language border is not surprising. If one had a good instrument for extensive margin fertility, it would be possible to isolate the second effect and extend the model in that direction. An additional outcome in the literature is the spacing of births (Newman, 1983), which is also potentially affected by identity costs, but similarly subject to the selection problem. Due to the empirical difficulties in isolating the selection and identity effects, these issues are left for future research.

4 Conclusion

In this paper, I presented novel empirical evidence that identity matters for fertility and female labor supply, using a unique set-up in Switzerland. At the language border in Switzerland, German-speaking mothers are significantly less likely to work, and women significantly more likely to be childless, compared to their French-speaking peers. It has been shown that these differences are robust to a wide array of robustness tests, and there is no evidence that they are driven by endogenous mobility. As I have documented, there is strong evidence that work-family policies, and labor market opportunities in general, are similar on the German- and French-speaking side of the border. This hints at an important role for identity in generating the cross-country pattern.

It has been shown that one particularly salient difference between German- and French-speaking Swiss is lower acceptance of working mothers in the German-speaking part. In the German culture, there is a widespread belief that children are harmed if their mothers return to work too soon. I added this cultural aspect as an identity cost to a simple version of the classical household model, along the lines of Akerlof and Kranton (2000). In the model, it has been shown that the negative association between childlessness and labor force participation of mothers can be rationalized by different levels in identity costs on both sides of the border. Furthermore, the model predicts the effect to be particularly strong among women with higher human capital, which is in line with the empirical results, where the largest differences in childlessness and LFP of mothers were found among women with tertiary education.

Overall, the results of this paper represent new evidence that identity matters for the cross-country patterns of fertility and labor supply of mothers, and that a possible solution to the puzzle regarding reconciliation of cross-country patterns and secular trends are differences in norms and values regarding working mothers. In the 2008–2010 edition of the European Values Survey, 45.9% of respondents in European OECD countries agreed that a child suffers with a working mother. Thus this belief is prevalent in many countries and not limited to the German-speaking world.[46] Clearly, more evidence is needed to substantiate this mechanism and show that it matters in a broader context, but this is left to future research.

[46] In West Germany, 63% agreed (or strongly agreed). In Austria, 64%. On the other hand, the percentage agreeing in France is 39%, in Sweden 20%.

Appendix

A Additional tables and figures

This appendix contains figures focusing on municipality of residence, other fertility outcomes, labor force participation of mothers of other children and women where no child under age 15 is present in the household, outcomes using the sample of women born in bilingual cantons, and figures of childlessness and labor force participation of mothers in Germany and France.

B Details on the model

This appendix collects technical results regarding the household model outlined in the main text. The properties of the allocation depicted in Figure 12 are derived and comparative statics results relating to changes in I are presented.

B.1 General properties and distribution of household choices

Assume household fertility preferences α and female wages w follow a joint uniform distribution $\alpha \sim [0, \alpha_b]$, $w \sim [0, w_b]$. Also, assume all parameters are positive: $E > 0$, $I > 0$, $T > 0$. Household utility in the three arrangements "Stay-home mom" (H), "Working mom" (W), and "Childless" (C) is given by

$$\begin{aligned} u_H^*(\alpha) =& \alpha T + \log(E) \\ u_W^*(\alpha, w, I) =& \alpha\left(T - L^*\right) + \log\left(wL^* + E\right) - I \\ u_C^*(w) =& \log(wT + E), \end{aligned}$$

where L^* denotes optimal labor supply, given by $L^* = (w - \alpha E)/(\alpha w)$. This set-up admits an indifference curve $\bar{\alpha}_{HC}(w)$ separating the (α, w)-space into households that prefer "Stay-home mom" (H) and households that prefer "Childless" (C), ignoring the possibility to choose arrangement "Working mom" (W) for the moment. This indifference curve is given by

$$\bar{\alpha}_{HC}(w) = \frac{1}{T} \log \frac{wT + E}{E}$$

Note that $\bar{\alpha}_{HC}(0) = 0$ and $\partial \bar{\alpha}_{HC}(w)/\partial w = 1/(wT + E) > 0$. Arrangement W is increasing in w, as $\partial u_W^*/\partial w = \alpha L^*/w > 0$ ($L^* = 0$ is never optimal due to the fixed utility cost I). For $w < \tilde{w}$ (derived below), W is not attractive due to the fixed utility cost I. Thus $\bar{\alpha}_{HC}(w)$ characterizes household choices for $w \leq \tilde{w}$. For $w > \tilde{w}$, households may prefer W over C if $\alpha \leq \bar{\alpha}_{HC}(w)$, and prefer W over H if $\alpha \geq \bar{\alpha}_{HC}(w)$. Since $\partial u_W^*/\partial \alpha = T - L^* > 0, < T$, while $\partial u_H^*/\partial \alpha = T$ and $\partial u_C^*/\partial \alpha = 0$, there are indifference curves $\bar{\alpha}_{HW}(w) \geq \bar{\alpha}_{HC}(w)$ and $\bar{\alpha}_{WC}(w) \leq \bar{\alpha}_{HC}(w)$ characterizing optimal household choices for $w > \tilde{w}$. Specifically,

households optimally choose H if $\alpha > \bar{\alpha}_{HW}(w)$, W if $\bar{\alpha}_{WC}(w) < \alpha < \bar{\alpha}_{HW}(w)$, and C if $\alpha < \bar{\alpha}_{WC}(w)$. $\bar{\alpha}_{HW}(w)$ and $\bar{\alpha}_{WC}(w)$ are defined implicitly by

$$u_H^*\left(\bar{\alpha}_{HW}(w)\right) = u_W^*\left(\bar{\alpha}_{HW}(w), w, I\right) \tag{4}$$

$$u_C^*\left(w\right) = u_W^*\left(\bar{\alpha}_{WC}(w), w, I\right) \tag{5}$$

It can be shown that $\bar{\alpha}_{HW}(w)$ is the solution to

$$x - \log x = 1 + I, \text{ where } x = \frac{E}{w}\bar{\alpha}_{HW}(w), \tag{6}$$

subject to $x \leq 1$ (so that $L^* \geq 0$) and $x \geq E\log(wT/E+1)/(wT)$ (so that $\bar{\alpha}_{HW}(w) \geq \bar{\alpha}_{HC}(w)$, which also ensures $L^* \leq T$). $\bar{\alpha}_{HW}(w)$ is unique on the permissible domain. The lowest w for which $\bar{\alpha}_{HW}(w)$ exists (loosely speaking: where at least 1 household is indifferent between H and W) is given by $\tilde{w}$, which (uniquely) solves[47]

$$\frac{E}{\tilde{w}T}\log\left(\frac{\tilde{w}T}{E}+1\right) - \log\left(\frac{E}{\tilde{w}T}\right) - \log\left[\log\left(\frac{\tilde{w}T}{E}+1\right)\right] = 1 + I. \tag{7}$$

Thus $\bar{\alpha}_{HW}(w)$ is defined on $[\tilde{w}, w_b]$. Similarly, it can be shown that $\bar{\alpha}_{WC}(w)$ is the solution to

$$x - \log x = 1 + I, \text{ where } x = \frac{wT+E}{w}\bar{\alpha}_{WC}(w),$$

subject to $x \geq 1$ (so that $L^* \leq T$) and $x \leq (wT+E)\log(wT/E+1)/(wT)$ (so that $\bar{\alpha}_{WC}(w) \leq \bar{\alpha}_{HC}(w)$, which also ensures $L^* \geq 0$). This solution again is unique on the permissible domain and the lowest w for which $\bar{\alpha}_{WC}(w)$ exists is given by equation 7. Thus it holds that $\bar{\alpha}_{HC}(\tilde{w}) = \bar{\alpha}_{HW}(\tilde{w}) = \bar{\alpha}_{WC}(\tilde{w})$. Regarding the slopes of these indifference curves, we get

$$\partial\bar{\alpha}_{HC}(w)/\partial w = 1/(wT+E) \tag{8}$$

$$\partial\bar{\alpha}_{HW}(w)/\partial w = \bar{\alpha}_{HW}(w)/w \tag{9}$$

$$\partial\bar{\alpha}_{WC}(w)/\partial w = \bar{\alpha}_{WC}(w)E/(w(wT+E)). \tag{10}$$

Using $S_W^* = wL^* + E = w/\alpha$ and $S_C^* = wT + E$, we get (10)<(9)<(8). The resulting allocation is depicted in Figure 12.

Note that due to imposing bounds on the distributions of α and w, an "interior" allocation, where each arrangement is chosen by a positive mass of households, requires $\tilde{w} < w_b$ and $\log(\tilde{w}T/E+1)/T < \alpha_b$. Thus I cannot be too large relative to w_bT/E, which are max total earnings of the wife when childless relative to earnings of the husband.

[47] Obtained by plugging the lower bound on x into equation 6.

B.2 Comparative Statics

Here, I investigate how indifference curves shift due to changes in I. I will make a few simplifying assumptions. Since the interest is in changes due to effects on working mothers, which are only found to the right of $\tilde{w}$, I restrict comparative statics to $w > \tilde{w}$ (which can be arbitrarily close to the lower bound on w, depending on parameters). It has to be kept in mind though that $\tilde{w}$ depends on I, but the effects have the same direction as farther to the right of this cut-off, with constrained magnitude. If focus on two statistics: childlessness and labor force participation of mothers. To keep these statistics simple and abstract from boundary considerations, I assume that the household endowed with (α_b, w_b) chooses H in the initial allocation. A sufficient condition for this is $E \geq w_b/\alpha_b$.[48]

Childlessness Denote the share of childless households conditional on w by θ, which is given by (assuming $\alpha \sim U[0, \alpha_b]$)

$$\theta(w) = \frac{\bar{\alpha}_{WC}(w)}{\alpha_b}.$$

Totally differentiating equation 5 yields

$$\frac{\partial \bar{\alpha}_{WC}(w)}{\partial I} = \frac{1}{T - L^*_{WC}} > 0, \tag{11}$$

where L^*_{HW} denotes optimal labor supply along $\bar{\alpha}_{HW}(w)$, and L^*_{WC} denotes optimal labor supply along $\bar{\alpha}_{WC}(w)$. Thus $\partial\theta(w)/\partial I = \alpha_b^{-1}(T - L^*_{WC})^{-1} > 0$. This is the first result stated in the main text: If identity costs of working as a mother increase, childlessness will increase. How does this effect vary with the wage? Differentiating 11 with respect to the wage yields

$$\frac{\partial(\partial \bar{\alpha}_{WC}/\partial I)}{\partial w} = (T - L^*_{WC})^{-2} \frac{\partial L^*_{WC}}{\partial w} \tag{12}$$

where

$$\frac{\partial L^*_{WC}}{\partial w} = \frac{E}{w} \frac{T - L^*_{WC}}{wT + E} > 0.$$

Since labor supply is increasing along the indifference curve between "Childlessness" and "Working mom", the effect of increasing identity costs is increasing in the wage. This results from the fact that the difference in total utility is decreasing along the indifference curve, since higher wages dominate increasing fertility preferences and lead to higher labor supply. In other words, the outside option becomes attractive to a larger mass of households along this indifference curve.

[48] To see this, let $I = 0$ (which makes this marginal household choosing W over H most likely). Then, the solution to equation 6 is $x = 1$, which implies $\bar{\alpha}_{HW}(w) = w/E$. So $\bar{\alpha}_{HW}(w_b) \leq \alpha_b$ if $E \geq w_b/\alpha_b$.

Labor force participation of mothers Denote the share of mothers that choose to work conditional on w by γ, which is given by

$$\gamma(w) = \frac{[\bar{\alpha}_{HW}(w) - \bar{\alpha}_{WC}(w)]}{\alpha_b - \bar{\alpha}_{WC}(w)}.$$

To see how LFP is affected by identity costs, we need to know how the indifference curve between "Working mom" and "Stay-home mom" changes with I. Totally differentiating equation 4 with respect to I yields

$$\frac{\partial \bar{\alpha}_{HW}(w)}{\partial I} = -\frac{1}{L^*_{HW}} < 0. \tag{13}$$

Thus higher identity costs rotate the $\bar{\alpha}_{HW}(w)$ curve downwards ($\partial L^*_{HW}/\partial w < 0$), since labor supply is decreasing along this indifference curve (higher fertility preferences are dominating the effect of higher wages). Differentiating γ with respect to I using 11 and 13 yields

$$\begin{aligned}\frac{\partial \gamma(w)}{\partial I} &= (\alpha_b - \bar{\alpha}_{WC})^{-1} \left(\frac{\partial \bar{\alpha}_{HW}}{\partial I} - \frac{\partial \bar{\alpha}_{WC}}{\partial I} (1-\gamma) \right) \\ &= -(\alpha_b - \bar{\alpha}_{WC})^{-1} \left(\frac{1}{L^*_{HW}} + \frac{1-\gamma}{T - L^*_{WC}} \right) < 0\end{aligned}$$

Thus LFP is decreasing in I, since both the effect of a downward shift in $\bar{\alpha}_{HW}$ (working moms opting to stay at home) and an upward shift in $\bar{\alpha}_{WC}$ (working moms opting to be childless) decrease LFP. How this effect changes with w depends on interaction effects, since the first effect is increasing in the wage, but the second effect tends to zero as γ approaches 1. Intuitively, if the outflow of working mothers to childlessness due to increasing identity costs is large relative to the outflow to stay-home moms, the effect of higher identity costs on LFP of mothers can get smaller with higher wages. It can be shown that $\partial\gamma/\partial I \partial w$ at $\gamma = 0$ is always negative (and thus $\partial\gamma/\partial I$ increasing in the wage in absolute terms) if $wT/E <\approx 2.5$ (a sufficient but not necessary condition).[49] This would imply that for the lowest wage woman for whom W is just becoming a possibly optimal solution (the w at which $\gamma = 0$), earnings when childless have to be lower than about 2.5 times her husband's earnings. This seems to be a plausible restriction on parameters. In that case, the effect of higher identity costs on LFP of mothers is always getting larger in absolute terms initially, but potentially getting smaller for the highest wages. Either a situation where this effect is only increasing in w or hump-shaped in w is thus compatible with the model, depending on parameters.

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[49] To see this, take $\partial\gamma/\partial I \partial w$, set $\gamma = 0$ and $\bar{\alpha}_{HW} = \bar{\alpha}_{WC} = \tilde{\alpha}$. Then, set $\alpha_b = \tilde{\alpha}$, the lowest possible value for an interior allocation (the sign of $\partial\gamma/\partial I \partial w$ depends positively on α_b). Then, the sign of $\partial\gamma/\partial I \partial w$ corresponds to the sign of $2\log(1 + wT/E) - wT/E$, which is greater than zero for $wT/E \in (0, 2.5129)$.

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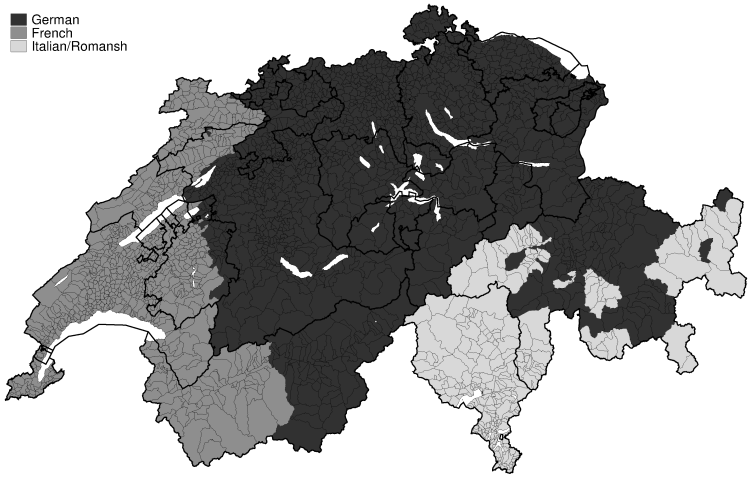
Figure 1: Language regions in Switzerland

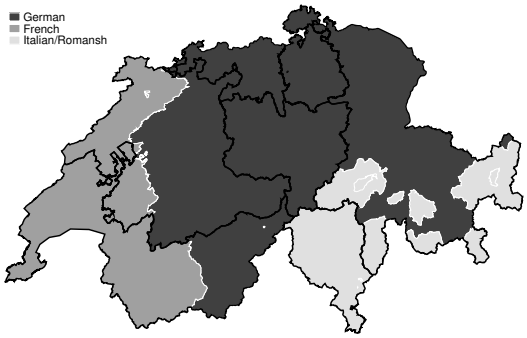


Notes: Map plots municipalities of Switzerland by majority language among its Swiss residents surveyed in the 2000 Swiss population census. Heavy black lines delineate cantonal (state) borders. Note that language region affiliation of municipalities is stable over time. Using the 1970 census instead, only one municipality changes affiliation from French to German.

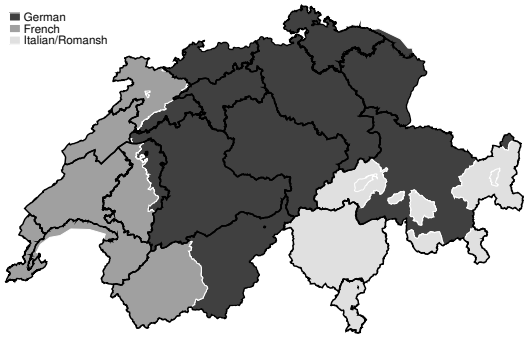
Source: data from 2000 Swiss Population Census, Federal Statistical Office (FSO), Neuchatel. Map data (GIS shape files) from swissBOUNDARIES3D, Federal Office of Topography swisstopo, Wabern.

Figure 2: Economic integration

(a) Greater regions (NUTS2)



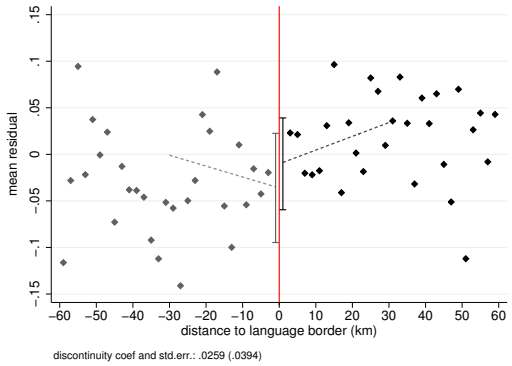
(b) Labor market regions



Notes: Maps plot language regions (by municipality) as in Figure 1. Panel (a): black borders delineate the 7 greater regions (NUTS2). Panel (b): black borders delineate the 16 labor market regions.

Source: data from 2000 Swiss population census, Federal Statistical Office, Neuchatel. NUTS2 and labor market region classifications as of 2000: Federal Statistical Office, Neuchatel.

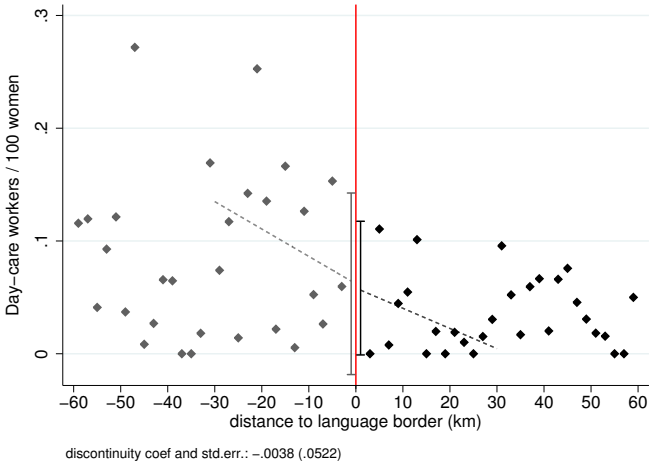
Figure 3: Residuals from Mincer wage regression



Notes: Negative distance=French-speaking, positive=German-speaking municipalities. Figure plots mean residuals from regression of log real hourly wage on quadratics in age and experience, and indicator variables for highest educational achievement, marital status and survey year for Swiss women age 25-55, sampled in the Labor Force Survey 1996-2009 (first interview only, i.e. no panel structure). See notes to Figure 7 for details regarding RD method. Note that the labor force survey does not contain data on place of birth, so for this figure, I have to rely on place of residence. Only data from years 1996-2009 are used as highest educational achievement before and after 1996 is not comparable. Number of observations: 10,484. Cross-section weights are used.

Source: Swiss Labor Force Survey, Federal Statistical Office, Neuchatel.

Figure 4: Day-care supply

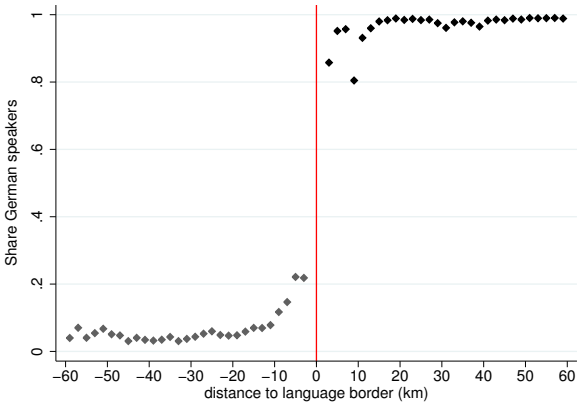


Notes: Negative distance=French-speaking, positive=German-speaking municipalities. Figure plots ratio of full-time equivalents working in day-care (as of 1995) and number of women age 20-40 (residents in 1990). Each dot represents the average of this municipality-level ratio within a 2km distance "bin". See notes to Figure 7 for details regarding RD method.

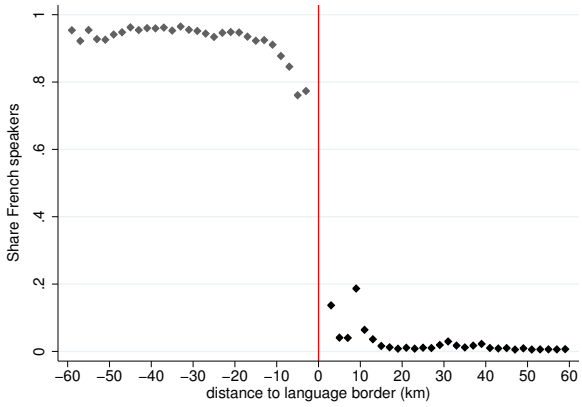
Source: own calculations, 1990 population census and 1995 firm census, Federal Statistical Office. Distance data: search.ch map data.

Figure 5: Language shares, by distance to French-German language border

(a) Share German speakers



(b) Share French speakers

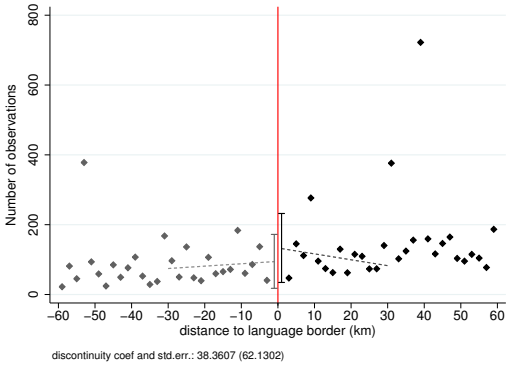


Notes: Negative distance=French-speaking, positive=German-speaking municipalities. Plotted is the share speaking Swiss-German or Swiss-French as their *main* language (questionnaire asked for the "language in which you think and which you master best (only indicate one)". Population is defined as all residents holding Swiss nationality and speaking one of the four official Swiss languages (German, French, Italian, Rhaeto-Romanic). One data point in the figure therefore represents the population living in municipalities within a 2km range distance to the language border, since the distance measure and assignment to language region are on the municipality level (majority language by 2000 census). Distance is driving distance to nearest municipality in other language region.

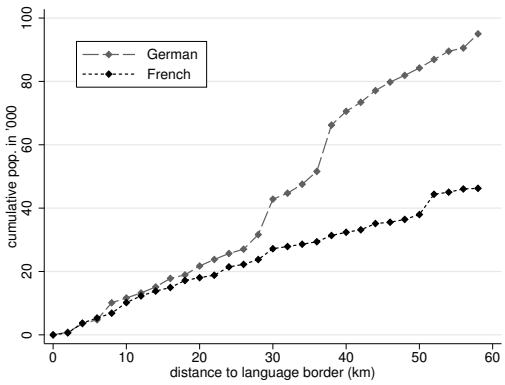
Source: Data from 2000 Swiss population census, Federal Statistical Office, Neuchatel.

Figure 6: Population distribution, by distance to border

(a) Population density

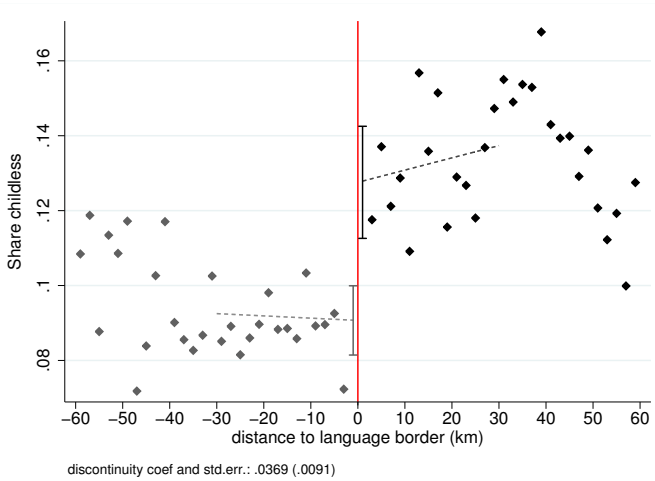


(b) Cumulative density



Notes: Left panel: negative distance=French-speaking, positive=German-speaking municipality of birth. Both panels: distance to language border is distance in driving km to the closest municipality in the other language region, where municipality is the mother's municipality of residence when the individual was born. Language region affiliation by majority language among all residents in 2000. Sample includes Swiss women born in Switzerland between 1952 and 1961, sampled in the 2000 population census. Panel a includes predicted values from estimating equation 1 with population count by municipality as dependent variable (population includes only Swiss women born 1952-1961, sampled in the 2000 census (see sample description in the text)), along with confidence intervals for the intercepts at the border computed with bootstrapped standard errors (2000 replications).

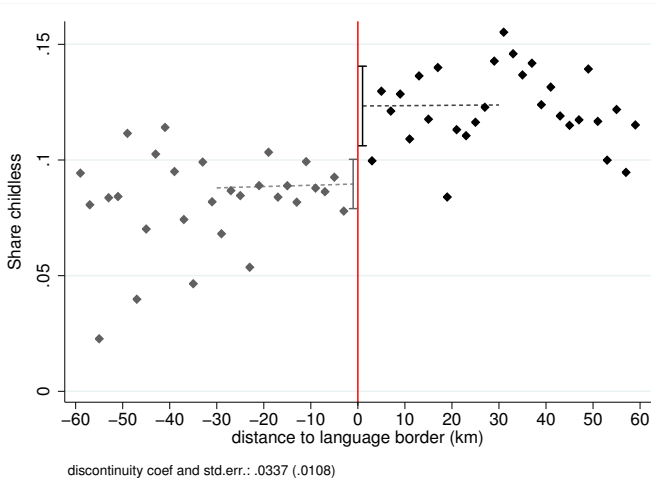
Figure 7: Childlessness at the language border



Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Municipality of birth is the mother's municipality of residence when the individual was born. Language region affiliation by majority language among all residents in 2000. Distance to language border is distance in driving km to the closest municipality in the other language region.
Sample includes Swiss women born in Switzerland age 39-48 (in 2000). Women working in agriculture (or with partners working in agriculture) are excluded. Scatter-plot consists of 2km bin averages. Note that population density varies over distance. Municipalities close to the border are smaller, so the variance is naturally higher. Included are local linear regression estimates (individual level) on both sides separately using a triangular kernel with 30km bandwidth and bootstrapped (500 replications) confidence intervals. The same procedure generates the discontinuity coefficient and standard error, but jointly estimating both sides with the same kernel (triangular) and bandwidth (30km).

Source: own calculations, 2000 population census, Federal Statistical Office. Distance data: search.ch map data.

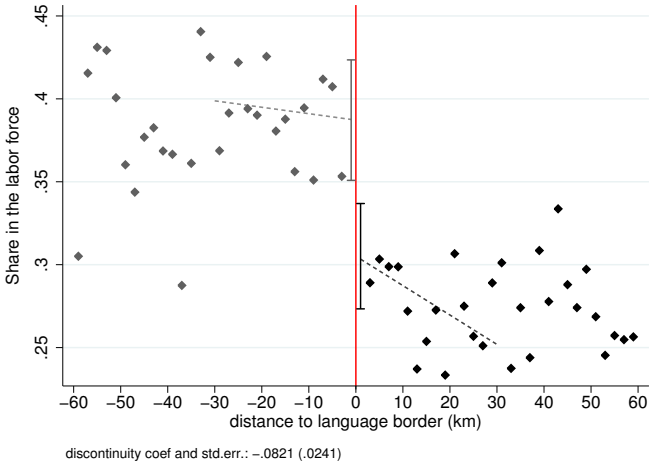
Figure 8: Childlessness at the language border: bilingual cantons only



Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Women born in bilingual cantons (Berne, Fribourg, Valais) only. See notes to Figure 7 for details.

Source: own calculations, 2000 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure 9: Labor force participation of mothers of young children

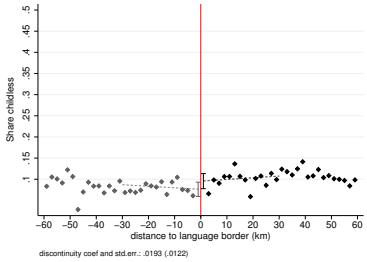


Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Sample includes Swiss women born 1952-1961, sampled in the 1990 census, with children under age 5 present in the household. See notes to Figure 7 for details regarding RD technicalities.

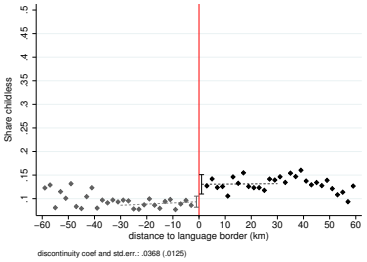
Source: own calculations, 1990 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure 10: Childlessness by education

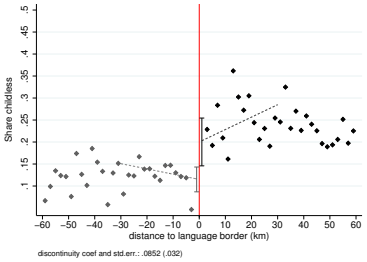
(a) Mandatory education only



(b) Post secondary education



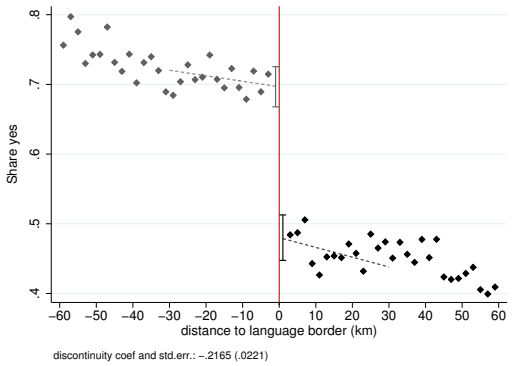
(c) Tertiary education



Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Mandatory education in Switzerland consists of 9 years of primary and secondary education. Exact rules vary by canton. Post secondary education are mostly 3-4 year apprenticeships, but include also teaching seminars or (usually 6 years) high schools that award a university entrance qualifying degree. Tertiary education includes university, advanced teaching seminars or degrees in applied sciences for professionals. See notes to Figure 7 for details regarding RD technicalities.

Source: own calculations, 2000 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure 11: Swiss popular referendum on the introduction of maternity insurance (2004)



Notes: Negative distance=French-speaking, positive=German-speaking municipalities. Depicted is the share yes-votes among all valid votes in a federal referendum on the introduction of mandatory maternity insurance held in 2004 (municipality level). The initiative demanded mandatory leave of 14 weeks for mothers, with a replacement rate of 80% of the pre-birth wage (with a cap of CHF 172 per day), for self-employed and employed women, financed by employer contributions. See notes to Figure 7 for details regarding construction of the figure. Weighting observations by population size has no significant effect on the estimate of the discontinuity.

Source: data from Federal Statistical Office, Neuchatel.

Figure 12: Optimal household arrangements

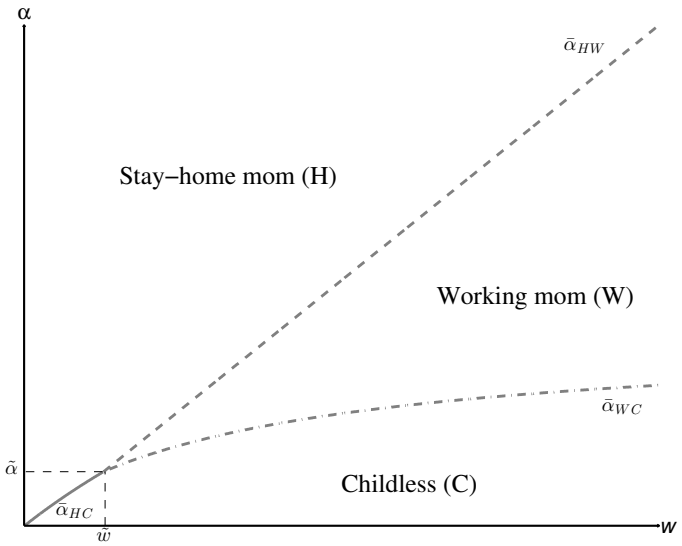


Figure 13: The effect of higher identity costs

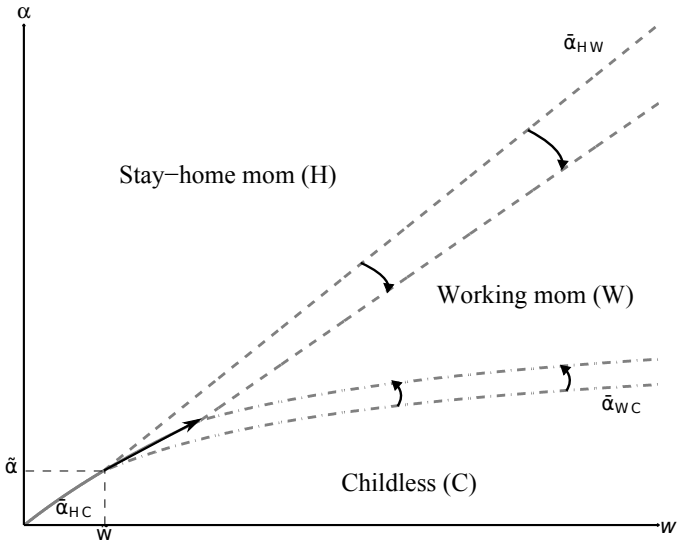


Table 1: Marriage market outcomes at the language border, Swiss women born 1952-1961

Census year	1990		2000	
	Intercept (French side)	German difference	Intercept (French side)	German difference
	(1)	(2)	(3)	(4)
Share married	0.7221	−0.0169	0.7442	−0.0194
	(0.0144)	(0.0235)	(0.0147)	(0.0193)
Share divorced	0.0748	−0.0064	0.1209	0.0059
	(0.0084)	(0.0099)	(0.0124)	(0.0151)
Share widowed	0.0068	−0.0026	0.0167	−0.0001
	(0.0012)	(0.0017)	(0.0024)	(0.0031)
Years since last change of marital status (married)			17.0261	−0.6525
			(0.2565)	(0.5124)
Years since last change of marital status (divorced)			7.7008	0.0536
			(0.3578)	(0.4131)
Observations	25,263	32,852	23,771	31,631
Municipalities	273	287	273	287

Notes: Table entries are estimates of β_0 (Columns 1 and 3) and β_1 (Columns 2 and 4) of equation 1, i.e. estimates of the intercept approaching the border from the French-speaking side and the border discontinuity. Estimation by local linear regression with triangular kernel (30km bandwidth), bootstrapped standard errors in parentheses, clustered on municipality of birth (2,000 replications). Statistical significance (two-sided test against zero based on normal approximation) of German border difference (β_1): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sample includes Swiss women born 1952-1961 within 30km of the language border. Excluded women living in group quarters or on farms, and women with missing fertility information in 2000.

Table 2: Composition at the language border, ever-married Swiss women born 1952-1961

Census year	1990		2000	
	Intercept (French side)	German difference	Intercept (French side)	German difference
	(1)	(2)	(3)	(4)
Age and language				
Age	33.6544	−0.0906	43.5155	−0.1253
	(0.0636)	(0.0853)	(0.0667)	(0.0889)
German speaking	0.2026	0.6077	0.1862	0.6281
	(0.0490)	(0.0859)***	(0.0407)	(0.0779)***
French speaking	0.7910	−0.6084	0.8057	−0.6267
	(0.0498)	(0.0844)***	(0.0407)	(0.0769)***
Education				
Mandatory education only	0.2612	0.0013	0.2744	−0.0144
	(0.0223)	(0.0458)	(0.0246)	(0.0444)
Upper secondary education	0.6266	0.0125	0.5629	0.0432
	(0.0172)	(0.0349)	(0.0129)	(0.0326)
Tertiary education	0.0850	−0.0177	0.1281	−0.0343
	(0.0170)	(0.0200)	(0.0198)	(0.0237)
Partner's characteristics				
Partner present	0.8982	0.0156	0.8245	0.0060
	(0.0101)	(0.0124)	(0.0131)	(0.0171)
Age	36.6917	−0.1429	46.0388	−0.1661
	(0.1440)	(0.2003)	(0.1316)	(0.2444)
Mandatory education only	0.1066	−0.0092	0.0855	0.0047
	(0.0080)	(0.0127)	(0.0091)	(0.0128)
Upper secondary education	0.4990	0.0481	0.4400	0.0156
	(0.0300)	(0.0380)	(0.0273)	(0.0349)
Tertiary education	0.2711	−0.0247	0.2758	−0.0128
	(0.0259)	(0.0339)	(0.0231)	(0.0310)
Religion				
Protestants	0.2471	0.2421	0.2344	0.2362
	(0.1053)	(0.1285)*	(0.0948)	(0.1168)**
Catholics	0.6678	−0.2427	0.6439	−0.2517
	(0.1168)	(0.1466)*	(0.1112)	(0.1402)*
No religion	0.0508	−0.0012	0.0768	0.0157
	(0.0111)	(0.0170)	(0.0145)	(0.0240)
Other religion	0.0342	0.0018	0.0448	−0.0002
	(0.0062)	(0.0102)	(0.0080)	(0.0108)
Observations	20,373	25,859	20,894	27,501
Municipalities	273	287	273	287

Notes: Table entries are estimates of β_0 (Columns 1 and 3) and β_1 (Columns 2 and 4) of equation 1, i.e. estimates of the intercept approaching the border from the French-speaking side and the border discontinuity. Estimation by local linear regression with triangular kernel (30km bandwidth), bootstrapped standard errors in parentheses, clustered on municipality of birth (2,000 replications). Statistical significance (two-sided test against zero based on normal approximation) of German border difference (β_1): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sample includes Swiss women born 1952-1961 within 30km of the language border. Excluded are never-married women, women living in group quarters or on farms, and women with missing fertility information in 2000.

Table 3: Municipality characteristics at the language border

Census year	1970		2000	
	Intercept (French side)	German difference	Intercept (French side)	German difference
	(1)	(2)	(3)	(4)
Panel A. Swiss men age 15+				
Log population	5.1246	0.2609	5.3612	0.2444
	(0.2040)	(0.2978)	(0.2198)	(0.3078)
Population density	2.2845	−0.0850	2.8579	−0.2747
	(0.7669)	(0.9501)	(0.7640)	(1.0091)
Employment-population ratio	0.8537	0.0033	0.7375	0.0245
	(0.0065)	(0.0097)	(0.0100)	(0.0138)*
Share unemployed	0.0011	−0.0008	0.0141	−0.0028
	(0.0005)	(0.0005)	(0.0023)	(0.0028)
Share working in agriculture	0.2802	0.0621	0.1462	0.0379
	(0.0333)	(0.0518)	(0.0228)	(0.0389)
Share working in manufacturing	0.5040	−0.0610	0.3643	−0.0268
	(0.0279)	(0.0433)	(0.0172)	(0.0265)
Share working in services	0.2158	−0.0011	0.4895	−0.0110
	(0.0160)	(0.0228)	(0.0207)	(0.0324)
Panel B. Other characteristics				
Share male	0.5212	0.0064	0.5060	0.0004
	(0.0050)	(0.0075)	(0.0033)	(0.0062)
Share foreigners	0.0867	−0.0265	0.1102	−0.0284
	(0.0146)	(0.0188)	(0.0140)	(0.0183)
Share settlement area			0.1217	0.0014
			(0.0178)	(0.0333)
Share farming area			0.4659	0.0700
			(0.0304)	(0.0437)
Day-care supply in 1995†			0.0620	−0.0038
			(0.0414)	(0.0522)
Observations	273	287	273	287

Notes: Table entries are estimates of $\beta 0$ (Columns 1 and 3) and $\beta 1$ (Columns 2 and 4) of equation 1 for different dependent variables, i.e. estimates of the intercept approaching the border from the French-speaking side and the border discontinuity. Estimation by local linear regression with triangular kernel (30km bandwidth), additionally weighted by population (Swiss men age 15+), bootstrapped standard errors in parentheses (2,000 replications). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
† Day-care supply is full-time equivalents working in day-care firms (Firm census 1995, which is the earliest firm census for which day-care classification is available) per 100 resident women age 20-40 (per 1990 census). Population density is Swiss men age 15+ per 100 hectare (municipality area as of 1997). Settlement and farming areas as of 1997 (Arealstatistik, Federal Statistical Office, Neuchatel). Share male and share foreigners for total resident population (not just Swiss nationality), excluding group quarters.

Table 4: Border difference in childlessness

Dependent variable: never gave birth (1 = childless, 0 = not childless)				
	(1)	(2)	(3)	(4)
Bandwidth	30km	15km	60km	40.6km†
Intercept (French side)	0.0907	0.0801	0.0885	0.0911
	(0.0049)	(0.0099)	(0.0040)	(0.0046)
German border difference	0.0369	0.0451	0.0390	0.0307
	(0.0091)***	(0.0177)**	(0.0066)***	(0.0081)***
Observations	48,395	23,870	122,243	85,237
Municipalities	560	250	1,137	779

Notes: Table entries are estimates of β_0 (Columns 1 and 3) and β_1 (Columns 2 and 4) of equation 1, i.e. estimates of the intercept approaching the border from the French-speaking side and the border discontinuity. Estimation by local linear regression with triangular kernel for different bandwidths, bootstrapped standard errors in parentheses, clustered on municipality of birth (2,000 replications). Statistical significance (two-sided test against the null hypothesis based on normal approximation) of German border difference (β_1): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Sample includes Swiss women born 1952-1961 within 30km of the language border. Excluded are never-married women, women living in group quarters or on farms, and women with missing fertility information in 2000.
† Optimal bandwidth as suggested by Imbens and Kalyanaraman (2012).

Table 5: Border difference in childlessness with controls

Dependent variable: never gave birth to a child (1 = childless, 0 = not childless)					
	(1)	(2)	(3)	(4)	(5)
German border difference	0.0369	0.0351	0.0326	0.0359	0.0360
	(0.0091)***	(0.0076)***	(0.0076)***	(0.0089)***	(0.0096)***
Observations	48,395	48,395	48,395	48,395	40,448
Municipalities	560	560	560	560	559
Individual controls	No	Yes	Yes	Yes	Yes
Canton fixed effects	No	No	Yes	Yes	Yes
Municipality controls	No	No	No	Yes	Yes
Partner controls	No	No	No	No	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, see notes to Table 4 for details. Individual controls are indicator variables for religious affiliation (catholic/protestant/other/none), age (in 2 year increments), highest educational achievement, and marital status. Municipality controls are from Table 3 (1970 version). Partner controls are partner's age, and indicator variables for highest educational achievement and employment status. Last column only includes women living with a partner (in 2000).

Table 6: Border difference in childlessness: bilingual cantons only

Dependent variable: never gave birth (1 = childless, 0 = not childless)				
	(1)	(2)	(3)	(4)
Bandwidth	30km	15km	60km	23.7km†
Intercept (French side)	0.0896	0.0861	0.0907	0.0876
	(0.0056)	(0.0108)	(0.0039)	(0.0069)
German border difference	0.0337	0.0260	0.0328	0.0344
	(0.0108)***	(0.0174)	(0.0072)***	(0.0124)***
Observations	30,262	16,647	60,784	22,782
Municipalities	349	182	594	277

Notes: Sample only includes women born in bilingual cantons (Berne, Fribourg, and Valais). See notes to Table 4 for details. Statistical significance (two-sided test against the null hypothesis based on normal approximation) of German border difference (β_1): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
† Optimal bandwidth as suggested by Imbens and Kalyanaraman (2012).

Table 7: Border difference in childlessness with controls: bilingual cantons only

Dependent variable: never gave birth to a child (1 = childless, 0 = not childless)					
	(1)	(2)	(3)	(4)	(5)
German border difference	0.0337	0.0290	0.0299	0.0317	0.0341
	(0.0108)***	(0.0087)***	(0.0088)***	(0.0093)***	(0.0107)***
Observations	30,262	30,262	30,262	30,262	25,359
Municipalities	349	349	349	349	349
Individual controls	No	Yes	Yes	Yes	Yes
Canton fixed effects	No	No	Yes	Yes	Yes
Municipality controls	No	No	No	Yes	Yes
Partner controls	No	No	No	No	Yes

Notes: Sample only includes women born in bilingual cantons (Berne, Fribourg, and Valais). See notes to Tables 4 and 5 for details. Statistical significance (two-sided test against the null hypothesis based on normal approximation) of German border difference (β_1): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Border difference in labor force participation of mothers

Dependent variable: labor force participation (1 = in LF, 0 = not in LF) Sample: Mothers only, youngest child under age 5 (in 1990)	(1)	(2)	(3)	(4)
Panel A. Varying the bandwidth				
Bandwidth	30km	15km	60km	40.5km†
Intercept (French side)	0.3872	0.4114	0.3905	0.3862
	(0.0187)	(0.0290)	(0.0108)	(0.0146)
German border difference	−0.0821	−0.0981	−0.1045	−0.0960
	(0.0241)***	(0.0384)**	(0.0159)***	(0.0203)***
Observations	18,924	9,502	48,029	33,330
Municipalities (clusters)	557	247	1,121	768
Panel B. Adding controls (30km bandwidth)				
German border difference	−0.0786	−0.0812	−0.0853	−0.0805
	(0.0185)***	(0.0204)***	(0.0205)***	(0.0211)***
Individual controls	Yes	Yes	Yes	Yes
Canton fixed effects	No	Yes	Yes	Yes
Municipality controls	No	No	Yes	Yes
Partner controls	No	No	No	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Sample includes Swiss mothers born 1952-1961, sampled in the 1990 census. Only mothers with youngest child under age 5 are included. See notes to Tables 4 and 5 for details regarding RD estimation and control variables.
† Optimal bandwidth as suggested by Imbens and Kalyanaraman (2012).

Table 9: Childlessness and labor force participation of mothers by education

Highest completed education	All	Mandatory only	Post secondary	Tertiary
Panel A. Childlessness in 2000				
Intercept (French side)	0.0907	0.0762	0.0936	0.1150
	(0.0049)	(0.0084)	(0.0062)	(0.0147)
German border difference	0.0369	0.0193	0.0368	0.0852
	(0.0091)***	(0.0122)	(0.0125)***	(0.0320)***
Observations	48,395	12,600	29,219	4,906
Municipalities	560	551	559	464
Panel B. LFP of mothers of children under age 5 in 1990				
Intercept (French side)	0.3872	0.2270	0.3807	0.6675
	(0.0187)	(0.0242)	(0.0189)	(0.0498)
German border difference	−0.0821	0.0197	−0.0800	−0.2124
	(0.0241)***	(0.0366)	(0.0243)***	(0.0630)***
Observations	18,924	3,504	13,368	1,689
Municipalities	557	486	552	321

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. See notes to Tables 4 and 8 for details. Mandatory education consists of 9 years of primary school (in most cantons (states)), followed by either 4 years of university preparation, or an apprenticeship accompanied by education in a professional school (hence the word "dual education system"). Both university preparation and an apprenticeship are classified as post secondary education in the ISCED. After passing university preparation exams or obtaining a comparable degree at a professional school (in addition to apprenticeship-related education), individuals are eligible to enrolling at any Swiss university (general or professional) to obtain a BA/MA/PhD, which are classified as tertiary education.

Table 10: Other fertility and labor market outcomes in 2000

Sample	Mothers		Childless women	
	Intercept (French side)	German difference	Intercept (French side)	German difference
	(1)	(2)	(3)	(4)
Panel A. Fertility outcomes (in 2000)				
Age at birth of first child	26.1465	0.3629		
	(0.1588)	(0.3119)		
Age at birth of last child	30.1197	−0.0670		
	(0.1346)	(0.2546)		
Number of children (excl. childless)	2.1879	−0.0468		
	(0.0185)	(0.0322)		
Panel B. Labor market outcomes (in 2000)				
Labor force participation	0.7599	−0.0046	0.8941	−0.0049
	(0.0096)	(0.0151)	(0.0188)	(0.0233)
Weekly hours of work	26.1012	−1.4159	35.0421	0.4053
	(0.2973)	(0.5296)***	(1.2556)	(1.4730)
Share managers	0.0269	−0.0138	0.0439	0.0026
	(0.0054)	(0.0067)**	(0.0139)	(0.0166)

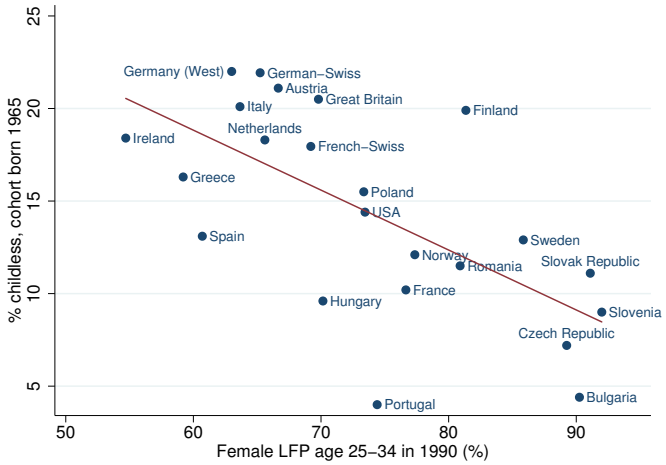
Notes: Table entries are RD estimates (30km bandwidth) of intercept and German border difference, see notes to Table 4 for details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Hours of work regressions only include observations with positive hours. Share managers is computed from "position in main job"-variable, only including observations with "employee position" and "superior position" (about 80% of working mothers and 75% of working childless women; other possible answers were self-employed (9%/11%), employed in own company (2%/2%) and employed in family enterprise (4%/2%); about 9%/5% did not indicate their position).

Table 11: ISSP 2002 questions on mother's guilt

Do you think that women should work...	a. ...w/ child under school age?			b. ...youngest kid at school?		
	French	German	Diff.	French	German	Diff.
Work full-time	0.069	0.012	−0.057	0.124	0.055	−0.069
	(0.028)	(0.007)	(0.029)**	(0.035)	(0.016)	(0.038)*
Work part-time	0.713	0.481	−0.232	0.789	0.762	−0.027
	(0.047)	(0.031)	(0.057)***	(0.041)	(0.026)	(0.049)
Stay at home	0.218	0.507	0.289	0.087	0.183	0.096
	(0.043)	(0.031)	(0.053)***	(0.026)	(0.023)	(0.034)***

Notes: Reported are shares of respondents (women only) selecting the particular category. Standard errors in parentheses. Survey weights are used. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ No. of observations: 413 for the first and 417 for the second question. Separation into language region by majority language of the canton of residence.
Source: ISSP 2002

Figure A.1: Childlessness and LFP of mothers in OECD countries



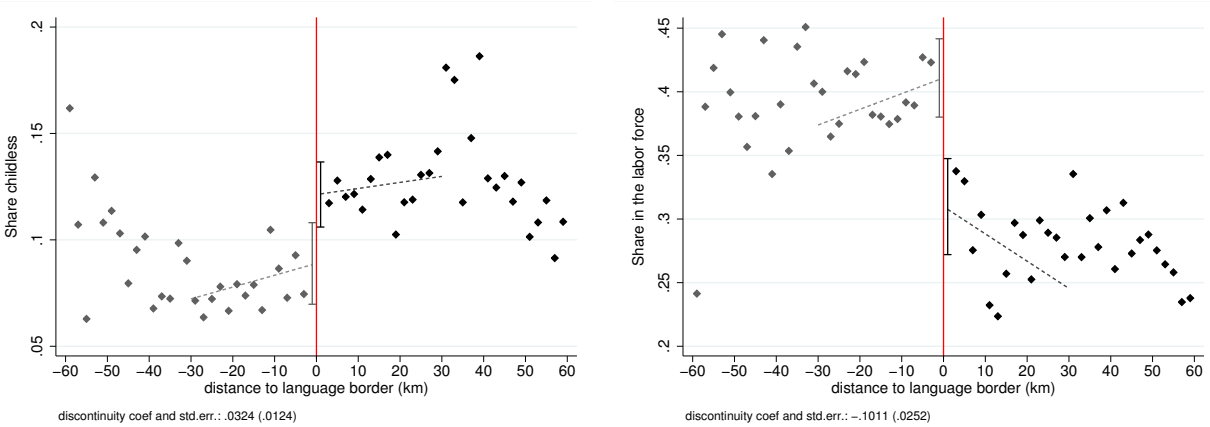
Notes: Figure plots % childless of women born 1965 at age 45 against female labor force participation rate among women aged 25-29 in 1990. Slope of regresion line: -0.32, $t = -3.49$. Dropping the countries of the former Soviet Union yields a slope of -0.36, $t = -2.07$. Exceptions in childlessness are France (1960 cohort), Italy (1964 cohort), and Finland (1964 cohort) due to missing data for 1965 cohort. Exception in LFP is Greece (1992).

Source: Childlessness data from OECD (2012), OECD Family Database, OECD, Paris. LFP data from International Labour Office (ILO). 2013. ILOSTAT Database (Geneva). Germany: German Microcensus, Federal Statistical Office, Wiesbaden, Germany.

Figure A.2: Childlessness and LFP of mothers by municipality of residence

(a) Childlessness (2000)

(b) LFP, child under age 5 in the household (1990)

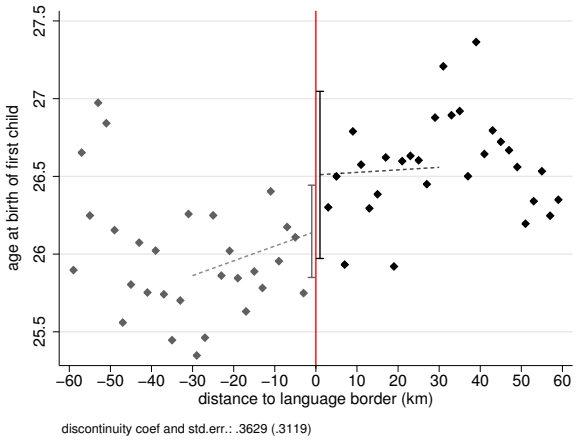


Notes: Negative distance=French-speaking, positive=German-speaking municipality of residence. Sample includes Swiss women born 1952-1961, sampled in the 1990 census, with children under age 5 present in the household. See notes to Figure 7 for details regarding RD technicalities.

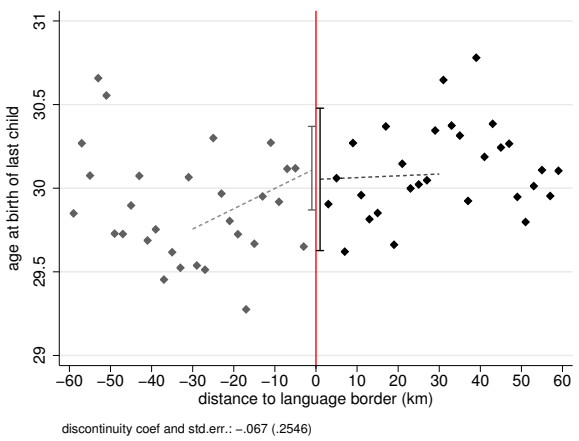
Source: own calculations, 1990 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure A.3: Other fertility outcomes

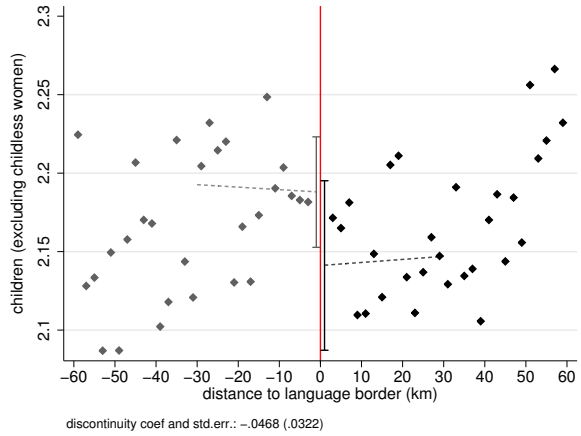
(a) Age at first birth



(b) Age at last birth



(c) Number of children

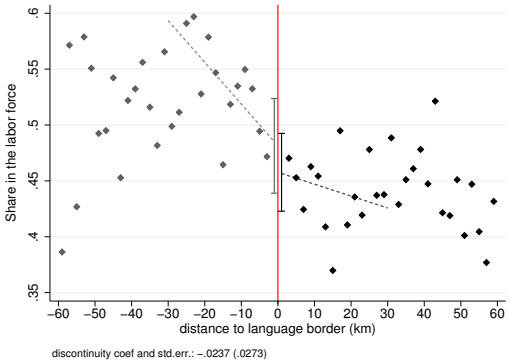


Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Sample includes Swiss women born 1952-1961, sampled in the 2000 census. See notes to Figure 7 for details regarding RD technicalities.

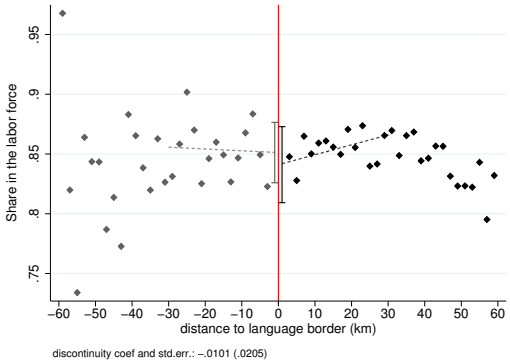
Source: own calculations, 1990 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure A.4: Labor force participation of mothers of older children and childless women

(a) Youngest child age 5–9



(b) No child under age 15 in the household

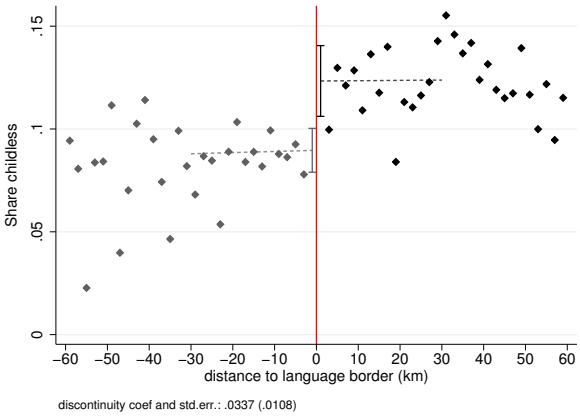


Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Sample includes Swiss women born 1952-1961, sampled in the 1990 census. See notes to Figure 7 for details regarding RD technicalities.

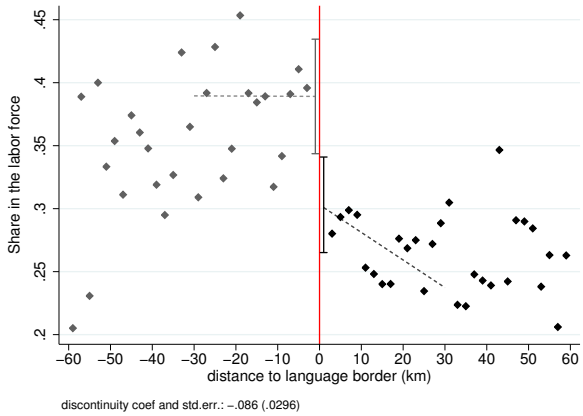
Source: own calculations, 1990 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure A.5: Childlessness and LFP of mothers, bilingual cantons only

(a) Childlessness (2000)



(b) LFP, child under age 5 in the household (1990)

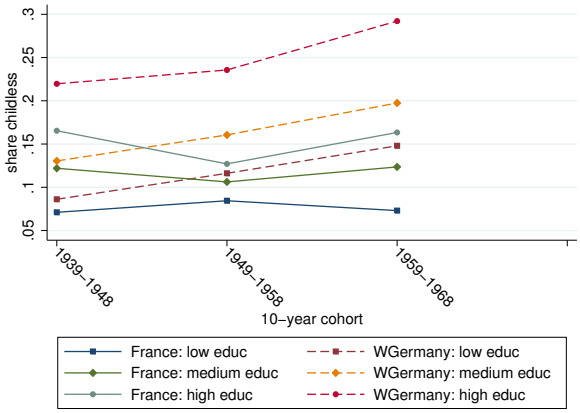


Notes: Negative distance=French-speaking, positive=German-speaking municipality of birth. Sample includes Swiss women born 1952-1961 in Berne, Fribourg or Valais. In the 2000 census, share of German- and French-speaking residents: Berne 84% German, 7.6% French; Fribourg 29% German, 64% French; Valais 28% German, 63% French. See notes to Figures 7 and 9 for details regarding RD technicalities and sample selection.

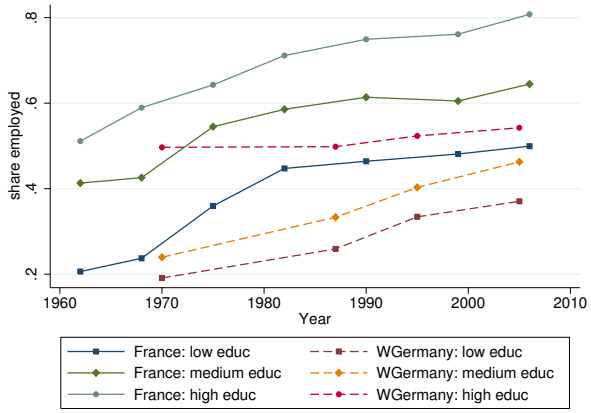
Source: own calculations, 1990 and 2000 population census, Federal Statistical Office. Distance data: search.ch map data.

Figure A.6: Childlessness and LFP in France and Germany

(a) Childlessness



(b) LFP



Source: Childlessness rates from German micro-census, Toulemon and Mazuy (2001), and UN Generations and Gender Programme 2004 wave. LFP: IPUMS (France) and German micro-census.