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**The Strength of Gender Norms and Gender-Stereotypical Occupational Aspirations Among Adolescents**

Andreas Kuhn and Stefan C. Wolter



Universität Zürich  
IBW – Institut für Betriebswirtschaftslehre

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# The Strength of Gender Norms and Gender-Stereotypical Occupational Aspirations Among Adolescents

Andreas Kuhn, Swiss Federal Institute for Vocational Education and Training,  
University of Bern, and IZA\*

Stefan C. Wolter, University of Bern, Swiss Coordination Centre  
for Research in Education, CESifo, and IZA

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## Abstract

We test the hypothesis that adolescents' occupational aspirations are more gender-stereotypical if they live in regions where the norm towards gender equality is weaker. For our empirical analysis, we combine rich survey data describing a sample of 1,434 Swiss adolescents in 8th grade with communal voting results dealing with gender equality and policy. We use the voting results to measure spatial variation in the local norm towards (more) gender equality. We find that adolescents living in localities with a stronger norm towards gender equality are significantly and substantively less likely to aspire for a gender-stereotypical occupation. This correlation may reflect different underlying mechanisms, however, and a more detailed analysis in fact reveals that the association between gender norms and occupational aspirations mainly reflects the intergenerational transmission of occupations from parents to their children.

*JEL classification:* J16; J24

*Keywords:* occupational choice; occupational segregation; gender gap; gender norms; preferences; socialization; intergenerational transmission

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Corresponding author: Andreas Kuhn, Swiss Federal Institute for Vocational Education and Training, Kirch-  
lindachstrasse 79, 3052 Zollikofen, Switzerland, andreas.kuhn@ehb.swiss.

# 1 Introduction

One of the most striking features of modern labor markets is that men and women tend to work in occupations that are predominantly chosen by individuals of the same sex (e.g. Charles and Grusky, 2004). This is even more remarkable if one considers the impressive changes in women’s labor market performance (e.g. Kunze, 2017; Olivetti and Petrongolo, 2016). Most astoundingly, perhaps, women caught up with, or even overtook, men with regards to their educational attainment, i.e. the level and/or the length of their formal education, in many countries (e.g. Goldin *et al.*, 2006). Nonetheless, however, women continue to earn substantively less than men on average (e.g. Blau and Kahn, 2016). This brings to the fore efforts to understand the mechanisms that underlie the segregation of men and women into different occupations (see Cortes and Pan, 2017, for an overview).<sup>1</sup>

It is presumably against this background of highly sticky patterns of gendered occupational choice that many social scientists and policymakers alike have pushed the argument that social norms regarding the appropriate role of women and men in (and outside) the labor market as well as gender-equality norms – gender norms, for short, in what follows – is one of the primary culprits underlying occupational gender segregation (e.g. Micus-Loos *et al.*, 2016). And, indeed, recent empirical evidence shows that there is gender stereotyping in various contexts (e.g. Eriksson *et al.*, 2017; Mengel *et al.*, 2017; Wu, 2017), which is consistent with the influence of gender norms on occupational choice. The observation that gender-specific occupational preferences appear early in life (e.g. Kooreman, 2009) also points to the potential importance of gender norms in shaping these preferences. Moreover, previous empirical evidence has convincingly shown that gender norms influence individuals’ behavior and attitudes. For example, gender norms have been shown to influence women’s fertility and labor supply decisions (Fernández, 2013; Fernández and Fogli, 2009). Gender norms may also explain why, within households, men still tend to earn more than their wives (Bertrand *et al.*, 2015). Using communal voting results on gender issues to measure local gender norms, Lalive and Stutzer (2010) demonstrate that women are less satisfied with their lives if they live in a community that is characterized

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<sup>1</sup>However, occupational gender segregation does not explain all of the remaining gender gap in wages. The way occupations (and jobs) differ with respect to the flexibility of working times and hours appears to be one of the most important factors besides occupational choice (e.g. Bertrand *et al.*, 2010; Goldin, 2014).

by a stronger norm towards gender equality – even though the gender gap in wages is smaller in these regions. Again, gender norms provide a plausible explanation for this finding. Janssen *et al.* (2016) find that the wage gap varies across establishments from the same firm with the local gender norm in which the establishment is located. To the best of our knowledge, however, there is virtually no empirical evidence on the direct effect of these norms on individuals’ occupational choice – with the exception of Grossmann *et al.* (2015), who find that men, but not women, who grew up in more conservative regions are more likely to choose a STEM major at a university.

At the same time, however, recent empirical evidence suggests two important competing, and possibly intertwined, explanations for gendered occupational choices.<sup>2</sup> A first alternative explanation is based on the rapidly cumulating evidence documenting substantive gender differences in preferences and psychological traits that might influence occupational choice (Bertrand, 2011; Cortes and Pan, 2017; Croson and Gneezy, 2009). The psychological trait that has presumably received the most attention from economists is competitiveness, i.e. one’s tendency to accept competition. Most studies find significant and substantive differences in competitiveness between men and women, with men being more competitive than women (e.g. Gneezy *et al.*, 2003; Niederle and Vesterlund, 2007). It has further been shown that competitiveness is related to educational and occupational choices in different contexts (Buser *et al.*, 2014, 2017a). Other studies have documented, for example, that risk aversion affects occupational choice (Bonin *et al.*, 2007; Borghans *et al.*, 2009). Gender differences in these traits provide a plausible alternative explanatory mechanism to the influence of gender norms because (at least a part of) these differences appear very early in life (e.g. Gneezy and Rustichini, 2004) and because there is evidence suggesting that these factors affect educational and occupational choices (e.g. Antecol and Cobb-Clark, 2013; Cobb-Clark and Tan, 2011; Fouarge *et al.*, 2014). A closely related literature shows that men and women have different preferences with respect to job attributes, such as preferences over interactive or non-manual work (e.g. Janssen and Backes-Gellner, 2016; Lordan and Pischke, 2016; Usui, 2008). Differences between men and women with respect to

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<sup>2</sup>Additional explanations for the remaining gender gaps, without claiming completeness, focus on technology (e.g. Black and Spitz-Oener, 2010), access to birth control (e.g. Goldin and Katz, 2002), or social contacts (Bentolila *et al.*, 2010), as well as considerations of social approval (Mani and Mullin, 2004) or an occupation’s prestige (Kleinjans *et al.*, 2017).

such preferences may be due to differences in aptitudes and skills (Baker and Cornelson, 2016), but they could also be due to gender-specific socialization, and thus indirectly be driven by gender norms. Therefore, depending on one’s view regarding the underlying cause of these differences, one should – or should not – control for these job preferences when estimating the effect of gender norms on gender-stereotypical occupational aspirations.

The other likely competing mechanism is due to the intergenerational transmission of preferences, norms, and other traits – above and beyond the well-known intergenerational correlation in the acquisition of human capital (e.g. Black *et al.*, 2005). Most relevant to us, empirical studies have found that parents pass on work preferences (Blau *et al.*, 2013; Fernández and Fogli, 2009), employers (Corak and Piraino, 2011), the choice of self-employment (Holtz-Eakin and Dunn, 2000), as well as occupations (Aina and Nicoletti, 2014; Hederos, 2016) to their children. Moreover, there is also empirical evidence suggesting intergenerational transmission in risk, and possibly other, preferences (Dohmen *et al.*, 2012; Escriche, 2007; Necker and Voskort, 2014), including gender preferences themselves (Farré and Vella, 2013).

In this paper, we use a unique combination of different data sources that allows us to discriminate between these different explanatory factors and thus to shed light on this important policy question. Specifically, we combine data from a computer-assisted classroom survey among 8th grade children, about 14 years old on average, in Switzerland with a measure of local gender norms that is based on the results of several votes (mostly popular plebiscites) on gender issues and policy in Switzerland. The data will also allow us to test the importance of the two competing explanations mentioned above, preferences and intergenerational transmission of occupational aspirations from parents to their children. In a first step, we show that occupational aspirations among the children in our sample are highly gendered, and that both girls and boys aspire for gender-stereotypical occupations, i.e. occupations mainly chosen by same-sex individuals. We then show that there is a strong and statistically significant correlation between local gender norms and gender-stereotypical occupational aspirations. As expected, children who live in regions that are characterized by a stronger norm towards (more) gender equality are less likely to aspire for a gender-stereotypical occupation. Moreover, this finding turns out to be robust to the inclusion of a series of additional control variables, such as school track and school grades. Our data also allow us to show that the effect of the local gender

norm on occupational aspirations is robust to the inclusion of several variables measuring risk preferences, competitiveness, as well as general job preferences. We finally find that controlling for parent's occupation drives the partial effect of local gender norms towards zero, suggesting that parents pass on occupational preferences to their children, either actively and/or passively, and that adults working in different occupations have different views on gender equality.

The remainder of this paper proceeds as follows. We start with a short description of the Swiss educational system in the following section, focusing on those features of the system that are potentially important for the process of individual occupational aspirations. In section 3, we discuss the different data sources and the construction of the key variables that we will use in the empirical part of the paper as well as the spatial structure of our final data set used in most parts of the empirical analysis. Section 4 presents some descriptive statistics, focusing mainly on occupational choice among adolescents as well as on regional differences in the strength of gender norms. In sections 5 and 6, we discuss our econometric framework and present our estimation results, respectively. Section 7 summarizes our results and concludes.

## **2 The Swiss educational system**

The Swiss educational system has a few specificities that potentially bear some importance for our analysis of occupational choice among adolescents (see SCCRE, 2014, for a detailed description of the Swiss educational system; a schematic illustration is shown in appendix figure B.1).

### **2.1 General and vocational education and training at the upper-secondary level**

Certainly the most unique characteristic of the Swiss educational system is that, at the upper-secondary level, a majority of adolescents enters some form of vocational education and training (VET) after completing mandatory schooling (see Wettstein *et al.*, 2017, for a detailed description of the Swiss VET system). Usually, this training is in the form of a dual apprenticeship training lasting from two to four years, combining practical training and work at a private or public enterprise with schooling at a vocational school, usually one day per workweek. Accord-

ing to the most recent statistics available, about 72% of the young people finishing compulsory schooling eventually enter a VET program; the vast majority of them (close to 90%) enters a dual-track apprenticeship, while the remainder attends full-time vocational school (SERI, 2017).

Moreover, for those unfamiliar with the Swiss VET system, a perhaps rather surprising feature is that it is mainly run and financed by the employers who provide the training positions themselves (e.g. Muehleemann and Wolter, 2014). In contrast, vocational schools and expenditures for some other school measures are financed publicly. Importantly, employers essentially decide for themselves whether or not they want to provide, on a fully voluntary basis, any apprenticeship positions.<sup>3</sup> The fact that the Swiss VET system relies on firms' voluntary participation means that a market for apprenticeship positions exists. Indeed, adolescents have to apply for open apprenticeship positions in the occupation that they want to learn (while employers also have to search for suitable apprentices), and wages during apprenticeship training are not regulated publicly.

Those individuals opting for a general education mostly aim for a baccalaureate school (called "Gymnasium" in the German-speaking part of Switzerland), which will prepare them for and grant them access to (almost all) university studies.<sup>4</sup> Access to the baccalaureate schools is handled differently in the different cantons, however. In the canton of Bern, from where our sample is drawn (see section 3 below), access to baccalaureate schools is possible either via a recommendation by a teacher or by passing an entrance examination. A minority of those opting for general education enters a specialized school (usually called "Fachmittelschule" in German) which prepares them for a couple of specific fields of study (e.g. becoming a teacher).

A final feature of relevance in our context is that, after primary school, children are separated into different school tracks (mainly) based on their performance in primary school. In the canton of Bern, as in most other cantons, children are separated into two different tracks with essentially the same curriculum, but with different cognitive demands ("Realschule" and "Sekundarschule", respectively, with the latter having higher academic demands). While the higher track prepares

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<sup>3</sup>To be precise, employers who want to train apprentices have to meet certain criteria that the cantonal administration controls. It is rarely the case, however, that applying employers do not receive the educational permit which allows them to train apprentices.

<sup>4</sup>Medical studies being the notable exception, as prospective students have to pass an entrance examination.

children for baccalaureate school and the more demanding apprenticeships, the lower track mostly leads to an apprenticeship with lower cognitive demands. Moreover, communities in the canton of Bern are free to offer a third option (“spezielle Sekundarklassen”) with even higher demands. Children choosing this track usually aim for further general education after mandatory schooling.

## **2.2 Implications for adolescents’ occupational choice**

Quite obviously, the structure of the Swiss educational system at the upper secondary level has potential implications for the process of occupational choice among adolescents. First, those choosing the VET track have to decide at an early age on the specific occupation that they want to learn. Mandatory schooling lasts nine years and usually ends in the year the children turn 16 years old, and most of them start their apprenticeship immediately afterwards. Career choice preparation is part of the curriculum at secondary school, usually starting in grade 8 when children turn 13 years old (ERZBE, 2013). Because they have to search and apply for an apprenticeship position beforehand, they have to actively start searching for an open apprenticeship position quite some time before actually leaving school. Thus most adolescents (along with their parents) sign an apprenticeship contract in the second half of 8th grade or in the first half of 9th grade.

Moreover, not only the adolescents’ own aspirations, but external factors, such as the availability of apprenticeship positions within a given occupation or the employers’ selection and screening processes, drive the ultimate occupational choice. Similarly, some of the youths initially aspiring for a general education will eventually not be able to pursue that course if they, for example, fail the entrance exam (in case they have to take it) or if they fail the probation time because of inadequate performance. For that reason, most of the adolescents aiming for further general education presumably also consider the possibility of starting an apprenticeship after the completion of mandatory schooling, if only as a fallback option.

## 3 Data

### 3.1 Classroom survey among 8th grade schoolchildren

Our main data source is a computer-assisted personal classroom survey among 1'514 schoolchildren in 8th grade (i.e. the children in the sample were about 14 years old on average at the time they were surveyed; see appendix table B.1 for details) that was administered in the summer of 2013 (during August and September, i.e. at the beginning of the school year) in 28 different schools spread across the German-speaking part of the canton of Bern.<sup>5</sup> The survey was originally designed with the purpose of studying how the willingness to compete (with each other) influences adolescents' study and occupational choices in the context of the Swiss educational context (see Buser *et al.*, 2017a,b, for additional details).

One obvious concern is that the survey only covers the German-speaking part of the canton of Bern. However, the canton of Bern is, in terms of its population size, the second-largest canton of Switzerland. In the year 2014, about 12.3% of the overall Swiss resident population lived in the canton of Bern. More importantly for the purpose of our analysis, however, note that the canton of Bern is also one of the largest cantons in terms of its geographical area and that it covers, for that reason, both urban and rural areas. We therefore expect to find significant variation in gender norms within the canton of Bern, allowing us to study the effect of gender norms on occupational aspirations in this specific context. Moreover, we will also provide some direct evidence on the external validity of our results later on (section 4 contains some pieces of evidence related to this issue, and section 6.4 will tackle the issue directly).

The survey covers a large number of additional individual-level variables that are potentially related to occupational aspirations among adolescents. Specifically, the survey contains information on school track and school grades (e.g. in mathematics), psychological factors (e.g. competitiveness), as well as information on parental background (such as parents' educational attainment).

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<sup>5</sup>Appendix figure B.3 shows the geographic location of the schools (more precisely, the communities hosting the schools) that participated in the survey, as well as the position of the canton of Bern within Switzerland.

## Occupational aspirations versus occupational choices

For our purpose, however, the most important feature of the survey is that adolescents were directly asked about their occupational aspirations (“What apprenticeship would you most like to complete?”). They could select their desired occupation(s) from a list containing the thirty most popular learnable occupations (which make up about two-thirds of all actual apprenticeship contracts). Students recorded their occupational aspirations in the remaining cases as open text, which we recoded in a consistent set of occupations (see appendix A for details). The children in the sample were about 14 years old on average, just before they started to think about an apprenticeship position, as we explained in section 2. Those aiming for general education at the moment of the survey were also asked about their occupational aspirations in case that they were not able to attend a baccalaureate or specialized school (e.g. in case they did not pass the entrance exam).

It is important to realize that there is a subtle though potentially important difference between occupational aspirations on the one hand and realized occupational choices on the other hand. External factors (such as those discussed in section 2 above) should not (yet) affect occupational aspirations at this early stage. Factors external to the apprentice almost certainly influence actual choices, however. This would make it very difficult to isolate the effect of gender norms from the effect of, for example, firm’s discriminatory hiring behavior. For these reasons, we believe that occupational aspirations are the obvious and most relevant outcome for the research question pursued in this study.

### 3.2 Gender-stereotypical occupational aspirations

In a further and independent step, we collected detailed data on the gender distribution within each aspired occupation  $o$  as our main measure of occupational gender segregation. More specifically, we collected information on the fraction of girls and boys in each occupation  $o$ , denoted by  $\pi_o^g$  and  $\pi_o^b$ , respectively, in what follows (see appendix A for additional details concerning the construction of these two variables).

Our main dependent variable in the empirical analysis below will be the fraction of own-gender adolescents in occupation  $o$ , chosen by child  $i$  as his or her preferred occupation. For-

mally, this variable is simply given by:

$$\pi_{o[i]} = \begin{cases} \pi_o^g \in [0, 1] & \text{if child } i \text{ is a girl,} \\ \pi_o^b \in [0, 1] & \text{if child } i \text{ is a boy.} \end{cases} \quad (1)$$

By construction, because both  $\pi_o^g$  and  $\pi_o^b$  strictly vary between 0 and 1,  $\pi_{o[i]}$  also only varies between 0 and 1. Further note that values of  $\pi_{o[i]}$  larger (smaller) than 0.5 indicate that an adolescent has stated a preference for an occupation which is predominantly chosen by same-sex (different-sex) children. Thus values of  $\pi_{o[i]}$  closer to the maximum value of 1 (the minimum value of 0) denote more (less) gender-stereotypical occupational aspirations (descriptives related to  $\pi_{o[i]}$  are presented in section 4.1 below).

### 3.3 Measuring the strength of gender norms

To measure the strength of gender-equality norms, we use municipality-level outcomes from several national-level plebiscites about gender issues. Swiss citizens are regularly asked to cast their vote on very diverse subjects, including questions related to gender policy.<sup>6</sup> The votes are often highly consequential, and voters thus have an incentive to reveal their true preferences. Voting results at the regional level have already been used in similar contexts (Janssen *et al.*, 2016; Lalive and Stutzer, 2010).

Table 1

Table 1 lists the five votes, all held at the national level, that we identified as those most closely related to issues of gender equality and which are therefore included in the empirical analysis. The first vote in our list, held in June 1981, requested that the equality between men and women be explicitly entered into the Swiss constitution and was accepted by a clear majority of the voters. In 1985, a majority of the voters also agreed upon a revision of the civil code (aiming for a more equal treatment of men and women). Then there were two popular plebiscites demanding the introduction of a paid maternity leave, one that was rejected in

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<sup>6</sup>There are votes at the national, cantonal, and municipal levels. At the national level, voters can cast their vote on both referenda (either a mandatory referendum, if the national parliament decides to amend the constitution, or an optional referendum, as an instrument to force a vote about national-level legislation) or on popular plebiscites. Popular plebiscites allow citizens to demand constitutional changes themselves.

1999 and one that was accepted by a majority of the voters in 2004. The fifth and final vote included in our analysis was an initiative demanding the introduction of a gender quota within the Federal Administration. This vote was rejected by an overwhelming majority of the votes (about 82% of the votes were opposing the demand formulated in the initiative).

In the main part of the empirical analysis, we will simply use the mean share of supporting votes of the five votes listed in table 1 as our main measure of the local strength of gender norms, denoted by  $N_j$  below (where  $j$  is indexing communities, the smallest regional unit for which separate voting results are available):

$$N_j = \frac{1}{5} \cdot (y_j^{306} + y_j^{336} + y_j^{458} + y_j^{461} + y_j^{513}), \quad (2)$$

with  $y_j^v$  the share of supporting votes in community  $j$  at vote number  $v$ . Because all five votes considered can be understood as asking for more gender equality, or for a more stringent legislation pushing for more gender equality, the supporting vote shares can directly be averaged across the five different votes.<sup>7</sup> One of the key advantages of using  $N_j$  as measure of gender norms is that it has a straightforward interpretation (i.e. in terms of vote shares). Thus higher values of  $N_j$  indicate a stronger communal norm towards more gender equality and/or towards less conservative gender roles. In section 4.2 below we will provide further evidence on the internal validity of our measure of gender norms using independent survey data.

### 3.4 Spatial structure of the final data set

Our final dataset consists of 1'434 children (which equals the overall sample size of 1'514 children less the 80 children with no or ambiguous occupational aspirations; cf. appendix A), who are nested within 90 different school classes from 28 distinct schools spread across the German-speaking part of the canton of Bern. The different schools themselves are located in 24 different municipalities (as illustrated graphically in appendix figure B.3).

Moreover, we can merge regional voting results at the municipal level to the individual-level survey data using the location of the schools. Note that the number of distinct schools also

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<sup>7</sup>Section 4.2 below presents a supplementary analysis of alternative parameterizations of gender norms based on local voting results, showing that the local voting results on gender issues are all very closely correlated with each other at the community level. As a consequence, the choice of the exact parameterization of gender norms indeed turns out to be irrelevant (as explicitly shown in section 6.3).

determines the variation in gender-equality norms available to pin down the impact of gender norms on occupational aspirations in the empirical analysis (i.e. because the voting results vary only across municipalities, it is the number of municipalities which is ultimately relevant in this regard; cf. section 5 below).

## 4 Descriptives

We next present some descriptives regarding gender segregation in occupational aspirations in our sample, and we then present some evidence on regional differences in gender norms.<sup>8</sup>

### 4.1 Gendered occupational aspirations

We start with a graphical description of occupational aspirations among the adolescents in our sample. Figure 1 shows the distribution of  $\pi_{o[i]}$ , separately for boys and for girls. It is immediately evident from the figure that boys and girls alike have occupational aspirations that are heavily tilted towards occupations that are dominated by their own gender. Indeed, the average value of  $\pi_o$  equals about 0.72 for both boys and girls; which implies that, on average, children aspire for occupations in which the share of own-gender individuals equals about 72%. In the case of boys, occupations characterized by an average value of  $\pi_o$  are a bricklayer's assistant or a micromechanic. Typical occupations, in that sense, for girls are a retail assistant or an optometrist.<sup>9</sup>

Figure 1

In fact, however, the preference for gender-stereotypical occupations in our sample is much stronger than the mean value of  $\pi_o$  suggests, given the high skewness of the distribution of  $\pi_o$  in the sample (which is evident for both boys and girls). Indeed, about 50% (75%) of the children in our sample state a preference for an occupation with a value of  $\pi_o$  of 0.87 (0.95) or higher.

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<sup>8</sup>Descriptives for the control variables taken from the survey are given in appendix table B.1.

<sup>9</sup>See also appendix table B.2, which lists the most popular occupations, as well as the most typical and atypical occupations chosen by girls and by boys.

## 4.2 Gender norms

We next present some descriptives for our measure of gender norms based on community-level voting results (as described in section 3.3 above). Because our sample covers only relatively few distinct communities, we not only show the distribution of gender norms across the sample communities in what follows, but also across the canton of Bern as well as across all Swiss communities.

### Spatial variation in the strength of gender-equality norms

To start with, panel (a) of figure 2 shows the frequency distribution of our measure of gender norms across all communities within the canton of Bern ( $J = 362$ ). The first feature that is immediately evident is the huge variation in the mean share of votes in support of more gender equality, ranging from a low of about 16% (in the community of “Eriz”, located in a rural part of the German-speaking part of Bern) to a high of almost 63% (the community of “Belprahon”, located in the French-speaking part of the canton). The lower panel of figure 2 further shows that the distribution of gender norms in the canton of Bern is not very different from the overall distribution of gender norms in Switzerland as a whole.<sup>10</sup> The figure also suggests that the sample communities are fairly representative of the canton of Bern. Thus, in terms of gender norms, our sample does not appear to be unusual in any sense within the Swiss context.

Figure 2

Figure 3 shows the spatial variation in gender norms across the communities in the canton of Bern. Darker shaded areas on the map represent communities with larger shares of votes in support of (more) gender equality, while lighter shaded areas represent those communities with more conservative attitudes with regards toward gender roles.

Figure 3

Again, the map shows that there is large variation in the fraction of votes in favor of (more) gender equality. However, though not surprisingly, the map further shows that part of the

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<sup>10</sup>Appendix table B.3 shows that this is also true for the single vote results constituting our measure of regional gender norms.

spatial variation in gender norms appears to be systematically related to the cultural region a community belongs to: gender norms tend to be much more pronounced in the French than in the German language areas of the canton of Bern (this pattern is also evident beyond the canton of Bern; see also appendix figure B.4, which maps our measure of gender norms across all Swiss communities). Secondly, it is also apparent that the more urban areas have stronger norms towards (more) gender equality than the more rural communities (e.g. the city of Bern near the centroid of the canton or the cities of Thun and Interlaken near the two lakes in the southern part of the canton).<sup>11</sup>

### **The correlation of voting shares across different votes, and the irrelevance of the exact parameterization of the measure of local gender norms**

There have been several plebiscites on gender issues at the national level in Switzerland (cf. table 1) since 1980.<sup>12</sup> This gives us, on the one hand, the possibility to argue more convincingly that community-level vote shares really represent some common underlying gender norm. On the other hand, we can show that the exact way of parameterizing the local gender norm is irrelevant because the votes are so highly correlated with each other.

Table 2

Table 2 illustrates how closely the communal voting results are correlated with each other. It shows the pairwise correlations in the share of supporting votes across the five votes listed in table 1, for different regional sub-entities. Given the high correlations among the voting shares from the different single plebiscites, it is perhaps not surprising that different possible (and reasonable) parameterizations of a measure of local gender norms are also all highly correlated with each other (this is illustrated graphically in appendix figure B.5). Not surprisingly, it turns out that the choice over one or the other possible parameterization of local gender norms is irrelevant in the regression analysis as well, as shown below in section 6.3.

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<sup>11</sup>The same pattern (more support of gender equality in the French-speaking regions and in urban regions) holds true for Switzerland as a whole (see appendix figure B.4).

<sup>12</sup>The main reason to focus on votes that were held in 1980 or later is that community-level results are readily available for these votes, while results for the earlier plebiscites are only available at higher levels of spatial aggregation (district and/or canton).

## Validating our measure of gender-norms using independent survey data

Using additional and independent data from the Swiss Household Panel (SHP), it is possible to further validate our measure of gender norms based on communal voting results. Specifically, the SHP contains a couple of items asking respondents about their personal views on gender issues.<sup>13</sup> We use the individual-level data from wave 16 (dating from the year 2014, thus matching the year of survey among the children) of the SHP, aggregate the individual item responses by community and then merge them with the corresponding measure of gender norms based on the communal voting results.

Table 3

Table 3 presents estimates from a series of regressions where the dependent variable is the mean item response in a given community, and where the key regressor is our proposed measure of gender norms based on the voting results throughout.<sup>14</sup> We show estimates both without and with the inclusion of cantonal dummies as well as unweighted and weighted estimates (in which case we use weights that are proportional to the number of observations per community in the SHP data). We use answers from women and men alike – except in columns 3 and 4, where we focus on women only.

The general pattern of table 3 is unambiguous. Mean survey responses tend to be both significantly as well as substantively associated with our measure of gender norms based on voting results. Indeed, it is notable that most approximate elasticities associated with the underlying estimates (shown in brackets in table 3) are relatively large, the majority of the (absolute) elasticities lies in the range between 0.07 and 0.37, and many of the estimated elasticities are even substantively larger. This analysis shows that our measure of gender norms based on local voting results does not exclusively reflect individuals’ attitudes towards (more)

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<sup>13</sup>For example, one of the items in the SHP asked respondents whether they thought that “in Switzerland women are penalized compared with men in certain areas”.

<sup>14</sup>That is, in the simplest specification, the estimates in table 3 are from a regression that takes the following form:

$$\bar{y}_j = \pi_0 + \pi_1 N_j + \varepsilon_j,$$

with  $\bar{y}_j$  denoting the mean response on item  $y$  in community  $j$  and with  $N_j$  denoting our measure of gender norms within community  $j$ . Table 3 only reports estimates of parameter  $\pi_1$ .

gender equality, but that it also reflects their personal view on the appropriate role of men and women in society, respectively.

## 5 Econometric framework

Our main empirical analysis is based on a series of regression models that basically all take the following form:

$$\pi_{o[i]} = \alpha + \beta N_{j[i]} + \gamma x_i + \delta p_i + \epsilon_{i[j]}, \quad (3)$$

with  $\pi_{o[i]}$  denoting the fraction of own-gender individuals in occupation  $c$  which child  $i$  has identified as his or her preferred occupation, as defined in equation (1) above (see section 3.2 above as well as appendix A for details).

Throughout the analysis, the regressor of main interest is the strength of gender norms in community  $j$  in which child  $i$ 's school is located,  $N_{j[i]}$ . It is therefore parameter  $\beta$  that is of key interest because it will quantify, at least under appropriate conditions, the partial effect of regional gender norms on gendered occupational aspirations among schoolchildren. Because larger values with respect to the regressor  $N_{j[i]}$  are associated with stronger attitudes towards gender equality in any given region, a positive (negative) point estimate of  $\beta$  would indicate that a stronger norm towards gender equality is associated with children being more (less) likely to choose gender-stereotypical occupations. Accordingly, we expect that  $\beta < 0$ . Obviously, however, we have to rule out unobserved heterogeneity so that we can give estimates of  $\beta$  a causal interpretation. In our setup, this heterogeneity could be either due to variables characterizing the children (or their parents) living in different communities or due to characteristics of the communities.

In most of the regression models presented below, we therefore include various sets of individual- and/or parental-level controls, such as school track and school grades in different subjects or parents' education or their occupation. In equation (3),  $x_i$  and  $p_i$ , respectively, is used as a shorthand to denote the inclusion of (potentially different sets of) individual-level and parental-level controls. We will discuss these variables in more detail in section 6 below when we discuss our estimation results.

An final issue relates to the fact that our key regressor,  $N_{j[i]}$ , varies at the community-level only, while the dependent variable varies at the individual level. Conventional standard errors will tend to overestimate the precision of the resulting point estimates in such a scenario, and we thus report standard errors that are clustered at the regional level throughout the analysis (e.g. Cameron and Miller, 2015).

## 6 Results

We next present our estimates of the effect of gender norms on gendered occupational aspirations. We start with some graphical evidence before presenting our main regression estimates. We then present an elaborate series of robustness checks and, finally, discuss the external validity of our findings.

### 6.1 The raw association between gender norms and gendered occupational aspirations

To start with, figure 4 visualizes the raw association between regional gender norms and gendered occupational aspirations in two slightly different but equivalent ways (thereby highlighting different features of the underlying data). The upper panel of figure 4 shows, on the  $y$ -axis, mean values of  $\pi_o$  at the community level versus our voting measure of gender norms,  $N_j$ , which is naturally measured at the community level, on the  $x$ -axis. The size of the circles is proportional to the number of children in the sample in a given community. The dashed line corresponds to estimated regression function, using weights proportional to the number of children in a community. Clearly, there is an obvious and surprisingly strong negative correlation between the two variables at the municipality level – showing that, as expected, children living in communities characterized by a stronger gender norm have occupational aspirations that, on average, are less gender-stereotypical than those of children living in regions with weaker gender norms. More precisely, comparing communities with the weakest and the strongest gender norms suggests that the difference is economically large as well. Indeed, there is an about ten percentage-point difference in the mean value of  $\pi_o$  between these communities (see also table 4 below). Of course, however, this does not imply that gender norms have a causal impact on

occupational aspirations because communities, and/or the children living in these communities, may differ on other relevant dimensions as well.

Figure 4

The lower panel of figure 4, in contrast, plots individual-level values of  $\pi_{o[i]}$  against the voting measure of gender norms,  $N_{j[i]}$ . Again, the dashed line in the figure corresponds to the estimated regression function describing the association between the two variables (by the mechanics of OLS, the fitted line in panel (b) is exactly the same as that shown in panel (a) of figure 4). This figure highlights the fact that there is huge variation in individual-level values of  $\pi_o$ , given any specific value of  $N_j$ . This of course mainly implies that there are presumably many additional factors determining individual-level occupational aspirations. It also implies that there is huge overlap in the distribution of  $\pi_{o[i]}$  across the different communities.

A final notable finding from figure 4 is that there generally is a strong preference towards gender-stereotypical occupations among both boys and girls – even in the communities with the strongest norm towards gender equality. Indeed, while  $\pi_o$  is clearly lower among the children living in these communities, note that the conditional mean of  $\pi_o$  still equals about 0.7. Occupational aspirations therefore remain highly gender-stereotypical, even in these communities.

## 6.2 Regression estimates of the impact of gender norms on gendered occupational aspirations

Table 4 presents our main regression estimates of the impact of gender norms on occupational aspirations among the sample of 8th grade schoolchildren.

Table 4

The first column of table 4 shows the estimate resulting from a simple regression of  $\pi_{o[i]}$  on  $N_{j[i]}$ , without the inclusion of any further controls (thus this specification yields the regression parameters associated with the regression function shown graphically in the two panels of figure 4). This specification yields a point estimate of  $\hat{\beta} = -0.207$ , with a cluster-robust standard error of about 0.099 (implying a robust t-value of about -2.06). The point estimate implies an approximate elasticity of  $\pi_o$  with respect to gender norms of about -0.123 (shown in brackets in

table 4). This estimate shows that there is a strong negative association between the strength in the local norm towards gender equality, as measured by the local share of votes in favor of (more) gender equality, and the probability of choosing a gender-stereotypical occupation. As expected, adolescents in communities with a stronger norm towards gender equality tend to be less likely to state that they aspire for a gender-stereotypical occupation. At the same time, however, also note that the associated R-squared is very low (consistent with panel (b) of figure 4). In fact, it is close to zero – suggesting that gender norms are but one among many, many factors influencing occupational choice among adolescents.

### Individual-level controls

In column 2, we add two individual-level demographic variables as controls, gender and age. Evidently, the inclusion of these two variables hardly changes the point estimate of parameter  $\beta$ . Note that the observation that gender does not have any notable effect on the estimate of  $\beta$  is consistent with the observation that the two empirical distributions (for girls and for boys) of  $\pi_o$  are virtually indistinguishable.

We next add some individual-level variables describing the school track and children’s school grades in column 3. Together, these variables have an influence on the choice of  $\pi_o$  (the p-value of the associated robust F-test equals 0.0235), but controlling for these variables does obviously not impact the estimate of  $\beta$ . This in turn implies that there are no or only small differences in these school-related variables across children from different communities.

In the fourth column, we further add a couple of variables describing a few of the children’s psychological traits and preferences (such as competitiveness or preferences for different work attributes). Again, this has almost no impact on the estimated size of  $\beta$ , nor on the associated standard error, although the variables, taken together, do explain some variation in the dependent variable (robust F-statistic of 7.28, with an associated p-value of 0.0001).

Overall, it appears that regional differences in the children’s observable individual-level characteristics cannot explain the observed association between gender norms and gendered occupational aspirations.<sup>15</sup>

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<sup>15</sup>A potential objection at this point is that the variables have generally no predictive value (because of measurement error, for example). For that reason, we have also estimated a series of ancillary regressions where we regress a dummy variable indicating that a child aspires for further general education (“Gymnasium”) on

## Parental-level controls

In the remaining columns of table 4, we add different sets of parental-level controls, on top of the individual-level controls discussed above. In a first step (column 5), we add a full set of dummies controlling for parents' highest educational attainment (10 dummies are necessary to represent the educational attainment of both of a child's father and the mother). Once again, this yields a point estimate of parameter  $\beta$  that is very similar in size to the estimates from the preceding columns ( $\hat{\beta} = -0.193$ , with a robust standard error of 0.105).

In stark contrast, however, once we include a full set of dummies representing parents' occupation (at the ISCO-4 level), the estimated partial effect of gender norms shrinks towards zero, yielding an insignificant point estimate of  $\hat{\beta} = -0.029$  (with a robust standard error of 0.116).<sup>16</sup> Because one might argue that the estimate of column 6 could be driven by the fact that there are a lot of parameters involved in estimating the underlying regression, we also ran regressions that include randomly generated sets of dummies (with the same number of dummies and about the same correlation across the two sets of dummies as for the original dummies used to represent the true occupations of a child's parents). Column 7 of table 4 shows one of these regressions yielding a significant negative point estimate of  $\hat{\beta} = -0.186$  – an estimate that is to be expected when controlling for random occupational dummies (as evident from appendix figure B.6, which plots the distribution of  $\hat{\beta}$  across the 250 simulations).

We next check whether we can reproduce the result from column 6 by only including controls for the gender-stereotypicality of parents' occupations – instead of the full set of occupational dummies.<sup>17</sup> Column 7 shows that this specification does not yield the same qualitative result as the preceding specification from column 6. In contrast, this specification again yields a significant negative estimate of  $\hat{\beta} = -0.199$  (with a robust standard error of about 0.108).

It thus appears that children's occupational aspirations are influenced by their parents'

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the same set of controls used in our main analysis (results are shown in appendix table B.4). These additional estimates clearly show that the variables do a reasonable job in predicting the dependent variable in that setting. Moreover, other studies using the same data have already shown that the individual-level variables predict educational choices (Buser *et al.*, 2017a,b; Jaik and Wolter, 2016).

<sup>16</sup>Note that the robust standard error associated with the point estimate from column 6 is not much larger than the standard error from the previous columns. Thus, the insignificance of the point estimate from column 6 is mainly driven by the shrinkage of the point estimate, not by an inflated standard error.

<sup>17</sup>Using data from the Swiss census from the year 2000, we construct the fraction of females working in a given occupation (at the ISCO-4 level) among individuals living in the canton of Bern between 15 and 35 years of age. These individuals were aged between 28 and 48 in the year 2013 (i.e. the year the survey took place).

occupations, either actively, by passing on their enthusiasm for and/or information about their own occupation, and/or passively, simply by serving as role models for their own children. At the same time, yet not surprisingly, the regression estimates also imply that there are regional differences in the type of occupations (that adults work in). Taken together, the full set of estimates from table 4 appears consistent with an explanation based on regional variation in parents' occupations, as parents pass on information and/or preferences about occupations to their children. At the same time, adults working in different occupations appear to differ with respect to their gender norms, which explains the spatial correlation between adolescents' gender-stereotypicity of occupational aspirations and local gender norms.

The following section will document that the main finding from table 4 is robust to a variety of sensitivity checks, including the use of alternative outcome measures and different parameterizations of the measure of gender norms.

### 6.3 Robustness checks

#### Unobserved community characteristics

A first concern with the estimates from table 4, given that we only include our measure of gender norms as the only regressor at the community level, is that they might be biased due to some unobserved community characteristics. We try to approach this issue in the following way. In a first step, we estimate equation (3) and compute individual-level predictions of  $\pi_{o[i]}$ , denoted by  $\hat{\pi}_{o[i]}(N_j)$ . We then compare these results with predictions stemming from estimating the following regression:

$$\pi_{o[i]} = \alpha + \gamma x_i + \delta p_i + \psi_j + \epsilon_{i[j]}, \quad (4)$$

where  $\psi_j$  denotes that we include a full set of community-level fixed effects to control for any observable as well as unobservable differences between the communities (instead of only controlling for  $N_j$ ). We denote these predictions by  $\hat{\pi}_{o[i]}(\psi_j)$ . If there are no relevant community-level characteristics, conditional on any other controls included in the regression, we would expect the predictions from the two specifications to be (very) close to each other.

Table 5

Table 5 shows the pairwise correlation between the two predictions, i.e.  $\rho(\widehat{\pi}_{o[i]}(N_j), \widehat{\pi}_{o[i]}(\psi_j))$ , for each of the eight specifications from table 4 (with the associated p-value shown in parentheses below). The correlation between corresponding predictions is low in the first few specifications, but it becomes very large in the specifications that include dummies for parents' occupations, suggesting that there are no important omitted regional controls in the full-blown specification of the regression model.

### Different parameterizations of gender norms and alternative outcome measures

In a next step, we present some robustness checks based on different parameterizations of our measure of gender norms, and on alternative outcome measures. For the ease of comparison, the first column of table 6 simply replicates our main result from column 6 of table 4.

Table 6

We use three different parameterizations of our measure of gender norms as a first robustness check. Instead of the mean share of supporting votes across the five votes listed in table 1, we use the first principal component derived from a principal-component analysis based on the voting results from the five votes in column 2.<sup>18</sup> In column 3, we simply use the share of supporting votes from the most recent vote (i.e. vote number 513, held in September 2004). We utilize yet another parameterization in column 4, where we use the mean voting share across all five votes, aggregated up to the level of local labor markets (in this case we cluster the standard errors at the level of local labor markets). Given that the single-vote results are all highly correlated with each other, it is perhaps not too surprising to find that these three specifications yield point estimates of  $\beta$  that are very close to the estimate from our baseline specification.

As a second robustness check, we use some slightly different definitions of the dependent variable. In column 5, we use a dummy variable taking on the value 1 if  $\pi_o$  is larger than the third quartile of the distribution of  $\pi_o$  in the sample (about 0.949) and 0 otherwise. In column

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<sup>18</sup>The first principal component is derived using the voting results from all communities, not just those covered in the sample.

6, the dependent variable indicates that a child has stated a preference for an occupation with a value of  $\pi_o$  lower than the first quartile of the distribution of  $\pi_o$  in the sample, equal to about 0.566. In both specifications,  $\hat{\beta}$  is statistically insignificant (but we also note that the point estimate from column 6 is relatively large, compared to the other estimates).

Taken together, the estimates from table 6 rather clearly show that the qualitative finding from our main estimates neither depends on the parameterization of gender norms nor on the exact definition of the dependent variable.

### **Further robustness checks**

Table 7 presents a series of additional robustness checks. As above, the first column replicates our main result from column 6 of table 4.

Table 7

In the second column, we only use the subsample of children who are Swiss citizens (because natives and foreigners tend to have different preferences towards general and vocational education and training). In column 3, we restrict the sample to those children who stated in the survey that they aspire for an apprenticeship (and not for further general education). Column 4 uses only those observations where the aspired occupation is usually attainable through an apprenticeship (and not general education), and column 5 restricts the sample to those children who only stated one occupation. Furthermore, because gender norms might influence preferences (especially preferences for different work attributes), which would make them unsuitable control variables, we exclude them as controls in the specification shown in column 6. The final two columns control for parents' occupation on a less detailed level (ISCO-3 and ISCO-2, respectively) than in our main estimates (again, however, the point estimates from the final two columns appear relatively large). In sum, however, all the additional specifications shown in table 7 yield statistically insignificant estimates of parameter  $\beta$ , thus further corroborating our main finding from table 4.

## 6.4 External validity

A final issue of potential concern is that our analysis might lack external validity because it is only based on a sample of schoolchildren from the German-speaking part of the canton of Bern. We already presented some partial evidence suggesting that our sample is not very different from other parts of Switzerland.<sup>19</sup> Using additional individual-level data from the Swiss Census (from the year 2000), we can in fact show that the association between gender norms and gendered occupational choice does not only exist in the canton of Bern. From the census data, we select all individuals between 15 and 65 years old. For each individual selected, we then compute  $\pi_{o[i]}$  using the ISCO code available in the census data (analogous to the way we compute  $\pi_o$  in the main part of the analysis). We then estimate the following regression (which is similar to that in column 1 of table 4, but note that  $\pi_o$  in this case describes gendered occupational choices, not merely aspirations):

$$\bar{\pi}_j = \alpha + \beta N_j + \psi_{r[j]} + \epsilon_j, \quad (5)$$

where the dependent variable  $\bar{\pi}_j$  is the mean value of  $\pi_o$  in community  $j$ . As above,  $N_j$  is our measure of gender norms within community  $j$ . In some specifications we also include regional dummies, denoted by  $\psi_{r[j]}$ , and where region  $r$  indexes either cantons or local labor markets.

Table 8

Table 8 reports the resulting estimates. The first column estimates  $\beta$  using a simple regression of  $\bar{\pi}_j$  on  $N_j$  using the full set of communities available. The second (third) column adds a full set of dummies at the cantonal (local labor market) level. The next two columns restrict the sample to the communities from the canton of Bern (in which case it is not possible to include fixed effects at the cantonal level). Finally, the last two columns of table 8 restrict the sample to the 24 communities from the German-speaking part of the canton of Bern used in the main part of the analysis (again, it is not possible to include cantonal fixed effects in this case).

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<sup>19</sup>First, appendix figure B.2 shows that the gender stereotypicality of occupational aspirations in our sample is comparable to the canton of Bern as a whole. Second, figure 2 and appendix figure B.4 show that the distribution of gender norms within the canton of Bern is similar to the overall distribution of gender norms in Switzerland.

The estimates from table 8 show, first, that the association between the gender stereotypicality of occupational choices and regional gender norms is also found using the census data. Specifically, the last two columns of table 8 yield estimates that are close to the corresponding estimates shown in column 1 of table 4 and in column 9 of table 6. Second, and reassuringly, the estimates from table 8 show that the corresponding estimate does not vary too much across the different regions, suggesting that there is no reason to worry too much about lack of external validity.

## 7 Conclusions

In this paper we use a unique combination of different data sources to estimate the association between the local norm towards (more) gender equality and gender-stereotypical occupational aspirations among 8th grade schoolchildren in Switzerland. Each child in our sample stated his or her occupational aspirations, and we were able to collect precise information on the gender distribution for the majority of the distinct occupations mentioned in our sample of children. We are – to our knowledge – the first to use aspirations instead of choices or realizations. We consider this a major improvement because choices and realizations are subject to other influences, such as employers not being willing to offer girls an apprenticeship in a male dominated occupation. We combine the survey data with information on the local strength of gender norms, which we measure using community-level results from different national-level votes about gender issues in Switzerland. Not surprisingly, we first document that the adolescents in our sample generally have aspirations that are heavily biased towards gender-typical occupations.

We then show that children living in communities characterized by a stronger norm towards gender equality are significantly and substantively more likely to state that they aspire for a gender-typical occupation. This correlation is not only statistically significant, it also turns out to be significant in quantitative terms (with an implied approximate elasticity of about -0.12). Moreover, the association is also robust with regard to the inclusion of several individual-level controls, such as school grades or school track.

We further find that the partial effect of gender norms shrinks towards zero, both econom-

ically and statistically, once we also control for parents' occupations. This finding is robust to a variety of sensitivity checks, including the use of alternative parameterizations of the measure of gender norms as well as the usage of different outcome measures. We also find that simply controlling for the gender-stereotypicity of parents' occupation does not yield the same result as when we include the full set of occupational dummies. Taken together, these results suggest that the observable correlation between local gender norms and the degree of gender-stereotypicity of adolescents' occupational aspirations is almost exclusively driven by regional differences in parents' occupations, which in turn suggests that parents pass on occupational preferences to their children, either actively and/or passively. Either way, our results clearly demonstrate that it is key to control for parents' occupation when trying to estimate the effect of gender norms on occupational aspirations and/or choices.

Interestingly, our results also imply that individuals who work in occupations characterized by stronger gender segregation tend to have weaker norms towards (more) gender equality, suggesting that individuals might acquire their subjective views on the appropriate role of women and men, at least in part, at work. This additional finding is consistent with an increasing number of empirical studies showing that preferences are partly shaped by one's economic and social environment (e.g. de Mello *et al.*, 2014; Giuliano and Spilimbergo, 2013). It is also consistent with findings from qualitative studies which argue that the acquisition of gender norms in part takes place at the workplace (e.g. Moret *et al.*, 2017).

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Table 1: Selected national-level votes on gender issues in Switzerland

Nr.	Date	Key subject of the vote	Result	Approval
513	26.09.2004	Introduction of paid maternity leave	Accepted	55.50%
461	12.03.2000	Introduction of gender quota within the Federal Administration	Rejected	18.00%
458	13.06.1999	Introduction of paid maternity leave	Rejected	39.00%
336	22.09.1985	Revision of the civil code (marital law)	Accepted	54.70%
306	14.06.1981	“Equal rights for men and women”	Accepted	60.30%

Notes: Additional information on the different votes can be found on the website of the Swiss Federal Administration (<https://www.admin.ch/gov/en/start/documentation/votes.html>). The vote number refers to the official numbering used by the Federal Statistical Office.

Table 2: Correlations of the share of supporting votes across different votes

Vote Nr.	513	461	458	336
<i>(a) All communities</i>				
461	0.5844			
458	0.9230	0.6017		
336	0.6327	0.5506	0.6643	
306	0.6098	0.4969	0.5796	0.7034
<i>(b) All German-speaking communities</i>				
461	0.5035			
458	0.8121	0.5150		
336	0.6357	0.4367	0.5828	
306	0.6692	0.3952	0.6051	0.6559
<i>(c) All communities in the canton of Bern</i>				
461	0.5985			
458	0.8541	0.5880		
336	0.7913	0.5794	0.7773	
306	0.6222	0.4437	0.5255	0.7028
<i>(d) German-speaking communities in the canton of Bern</i>				
461	0.4901			
458	0.7802	0.4479		
336	0.7282	0.4931	0.7067	
306	0.5800	0.3584	0.4611	0.6680
<i>(e) Sample communities</i>				
461	0.8618			
458	0.9594	0.9115		
336	0.8889	0.7831	0.8698	
306	0.8746	0.7517	0.8456	0.9255

Notes: The table shows pairwise correlations of supporting vote shares (at the community-level) for the five votes listed in table 1, for different regional subsets of communities.

Table 3: Validating the measure of gender norms based on voting results using independent survey data

	“Women in general are penalized”	“Personally feel penalized”	“In favor of measures”	“Job preserves independence”	“Child suffers with working mother”					
Mean	5.087	1.675	5.550	8.490	5.372					
Standard deviation	1.730	1.594	2.114	1.211	2.014					
<i>(a) Unweighted estimates</i>										
$N_j$	2.297*** (0.395) [0.189]	1.801** (0.758) [0.148]	1.870*** (0.495) [0.365]	-0.312 (0.964) [-0.064]	6.465*** (0.460) [0.483]	4.410*** (0.898) [0.331]	1.391*** (0.280) [0.069]	0.498 (0.608) [0.025]	0.050 (0.462) [0.004]	-2.898*** (0.935) [-0.229]
<i>(b) Weighted estimates</i>										
$N_j$	2.460*** (0.298) [0.218]	1.492*** (0.516) [0.132]	2.509*** (0.389) [0.509]	0.954 (0.755) [0.198]	6.347*** (0.375) [0.509]	4.631*** (0.588) [0.373]	1.471*** (0.201) [0.079]	1.370*** (0.433) [0.074]	-0.338 (0.495) [-0.031]	-4.902*** (0.935) [-0.448]
Cantonal FEs	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Women only	No	No	Yes	Yes	No	No	No	No	No	No
Number of observations	1,222	1,111	1,223	1,222	1,215	1,222	1,215	1,215	1,215	1,215

Notes: \*, \*\*, \*\*\* denotes statistical significance on the 10%, 5%, and 1% level, respectively. Robust standard errors are given in parentheses, and approximate elasticities in brackets. The dependent variables are items on gender issues taken from wave 16 of the Swiss Household Panel and aggregated by community. The exact formulation of the items is given in the survey questionnaire, which is available online at <http://forscenter.ch/wp-content/uploads/2013/12/QuestionML-P-W16.pdf>.

Table 4: The impact of gender norms on adolescents' occupational aspirations, OLS estimates

	$\pi_o$						
Mean	0.723	0.723	0.723	0.723	0.723	0.723	
Standard deviation	0.274	0.274	0.274	0.274	0.274	0.274	
$N_j$	-0.207** (0.099) [-0.123]	-0.193* (0.098) [-0.114]	-0.233** (0.092) [-0.138]	-0.222** (0.094) [-0.131]	-0.193* (0.105) [-0.114]	-0.186* (0.105) [-0.110]	-0.199* (0.108) [-0.118]
<i>Individual-level controls:</i>							
Demographics	No	Yes	Yes	Yes	Yes	Yes	
School track and grades	No	No	Yes	Yes	Yes	Yes	
Preferences	No	No	No	Yes	Yes	Yes	
<i>Parental controls:</i>							
Education	No	No	No	No	Yes	Yes	
Occupation (dummies)	No	No	No	No	No	No	
Occupation (random dummies)	No	No	No	No	No	No	
Occupation ( $\pi$ )	No	No	No	No	No	Yes	
Number of observations	1,434	1,434	1,434	1,434	1,434	1,434	
R-Squared	0.004	0.006	0.019	0.025	0.032	0.298	
Adjusted R-Squared	0.003	0.004	0.013	0.013	0.012	0.022	

Notes: \*, \*\*, \*\*\* denotes statistical significance on the 10%, 5%, and 1% level, respectively. Standard errors are clustered by community and are given in parentheses. Approximate elasticities of  $\pi_o$  with respect to  $N_j$  are given in brackets.

Table 5: The (un)importance of unobserved community characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\rho(\widehat{\pi}_i(N_{j[i]}), \widehat{\pi}_i(\psi_{j[i]}))$	0.387 (0.000)	0.453 (0.000)	0.697 (0.000)	0.737 (0.000)	0.774 (0.000)	0.966 (0.000)	0.975 (0.000)	0.755 (0.000)
<i>Individual-level controls:</i>								
Demographics	No	Yes						
School track and grades	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Preferences	No	No	No	Yes	Yes	Yes	Yes	Yes
<i>Parental controls:</i>								
Education (dummies)	No	No	No	No	Yes	Yes	Yes	Yes
Occupation (dummies)	No	No	No	No	No	Yes	Yes	No

Notes: The table shows pairwise correlations between  $\widehat{\pi}_{o[i]}(N_j)$  and  $\widehat{\pi}_{o[i]}(\psi_j)$  for each specification from table 4 (see main text for details). Associated p-values are given in parentheses.

Table 6: Different parameterizations of local gender norms and alternative outcome measures

	$\pi_o$	$\pi_o$	$\pi_o$	$\pi_o$	$1(\pi_o > 0.95)$	$1(\pi_o \leq 0.57)$
Mean	0.723	0.723	0.723	0.723	0.233	0.265
Standard deviation	0.274	0.274	0.274	0.274	0.423	0.441
$N_j$	-0.029 (0.111) [-0.017]				-0.042 (0.197) [-0.077]	0.179 (0.190) [0.289]
$pc_j$		-0.002 (0.007) [-0.000]				
$y_j^{513}$			-0.041 (0.113) [-0.030]			
$N_k$				0.054 (0.184) [0.029]		
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,434	1,434	1,434	1,434	1,434	1,434
R-Squared	0.275	0.275	0.271	0.271	0.287	0.267
Adjusted R-Squared	0.013	0.013	0.009	0.009	0.028	0.002

Notes: \*, \*\*, \*\*\* denotes statistical significance on the 10%, 5%, and 1% level, respectively. Standard errors are clustered by community (by local-labor markets in column 4) and are given in parentheses. Approximate elasticities of  $\pi_o$  with respect to  $N_j$  are given in brackets. The full set of controls corresponds to the set of controls included in the specification shown in column 6 of table 4.

Table 7: Further robustness checks

	$\pi_o$												
Mean	0.723	0.727	0.733	0.731	0.723	0.723	0.723	0.723	0.723	0.723	0.723	0.723	
Standard deviation	0.274	0.274	0.272	0.277	0.276	0.274	0.274	0.274	0.274	0.274	0.274	0.274	
$N_j$	-0.029 (0.111) [-0.017]	0.012 (0.188) [0.007]	-0.009 (0.107) [-0.005]	0.024 (0.108) [0.014]	-0.033 (0.112) [-0.019]	-0.036 (0.109) [-0.022]	-0.132 (0.120) [-0.078]	-0.132 (0.120) [-0.078]	-0.132 (0.120) [-0.078]	-0.132 (0.120) [-0.078]	-0.132 (0.120) [-0.078]	-0.132 (0.120) [-0.078]	-0.136 (0.111) [-0.081]
Full set of controls	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
Check	-	Swiss citizen	Apprentice-ship	Occupational number	Only one occupation	Preferences excluded	ISCO-3	ISCO-3	ISCO-3	ISCO-3	ISCO-3	ISCO-2	
Number of observations	1,434	1,124	1,128	1,330	1,402	1,434	1,434	1,434	1,434	1,434	1,434	1,434	
R-Squared	0.275	0.310	0.309	0.279	0.278	0.270	0.171	0.171	0.171	0.171	0.171	0.098	
Adjusted R-Squared	0.013	-0.004	0.016	0.007	0.016	0.014	0.012	0.012	0.012	0.012	0.012	0.021	

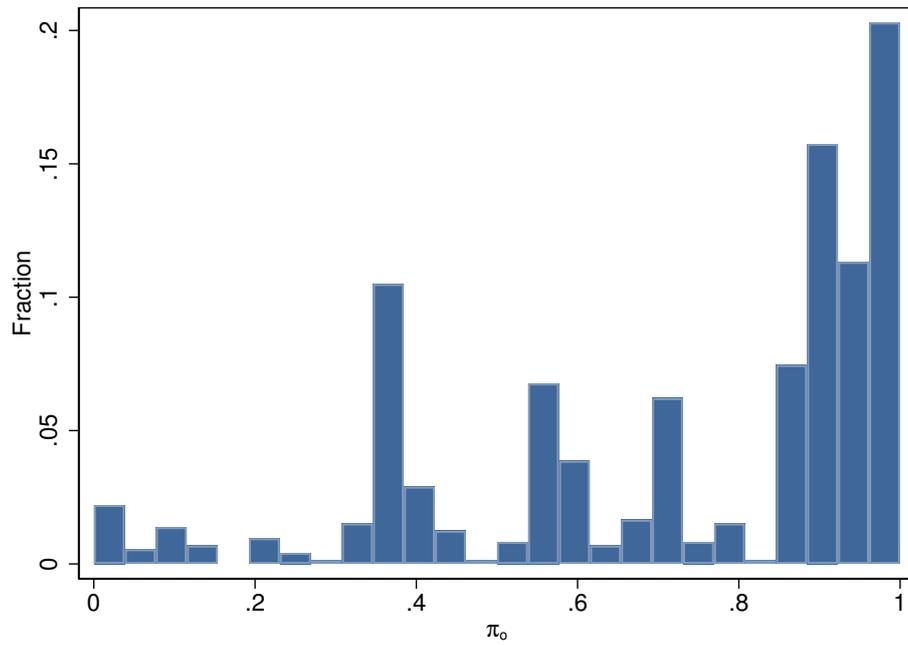
Notes: \*, \*\*, \*\*\* denotes statistical significance on the 10%, 5%, and 1% level, respectively. Standard errors are clustered by community and are given in parentheses. Approximate elasticities of  $\pi_o$  with respect to  $N_j$  are given in brackets. The full set of controls corresponds to the set of controls included in the specification shown in column 6 of table 4.

Table 8: External validity

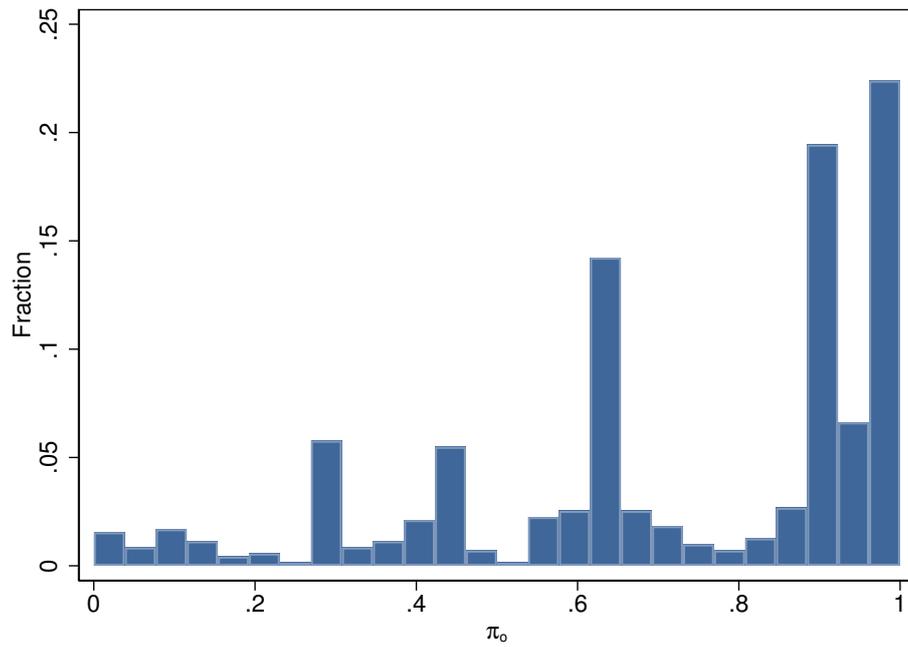
	$\bar{\pi}_j$								
Mean	0.634	0.634	0.634	0.643	0.643	0.643	0.633	0.633	
Standard deviation	0.022	0.022	0.022	0.019	0.019	0.019	0.017	0.017	
$N_j$	-0.077*** (0.003) [-0.052]	-0.103*** (0.006) [-0.069]	-0.092*** (0.008) [-0.061]	-0.105*** (0.010) [-0.062]	-0.106*** (0.020) [-0.062]	-0.124*** (0.036) [-0.080]	-0.244*** (0.054) [-0.156]		
Cantonal FEs	No	Yes	No	No	No	No	No	No	
LLM FEs	No	No	Yes	No	Yes	No	Yes	Yes	
Number of observations	2,342	2,342	2,342	354	354	354	24	24	
R-Squared	0.201	0.359	0.442	0.277	0.338	0.445	0.840	0.840	
Adjusted R-Squared	0.200	0.352	0.416	0.275	0.307	0.419	0.633	0.633	

Notes: \*, \*\*, \*\*\* denotes statistical significance on the 10%, 5%, and 1% level, respectively. Robust standard errors are given in parentheses, and approximate elasticities in brackets.

Figure 1: Gender segregation in occupational aspirations



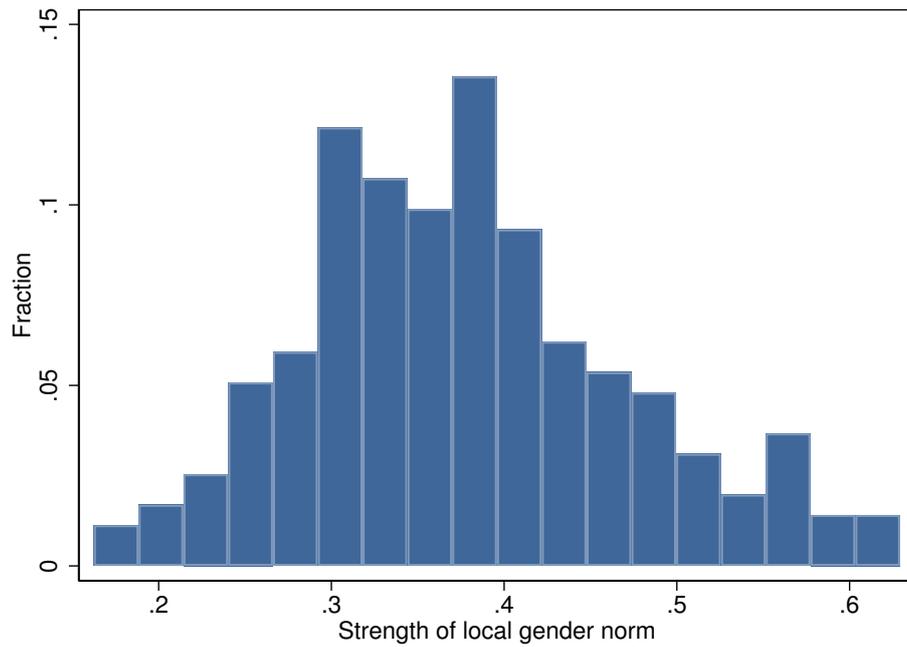
(a) Boys ( $n = 724$ )



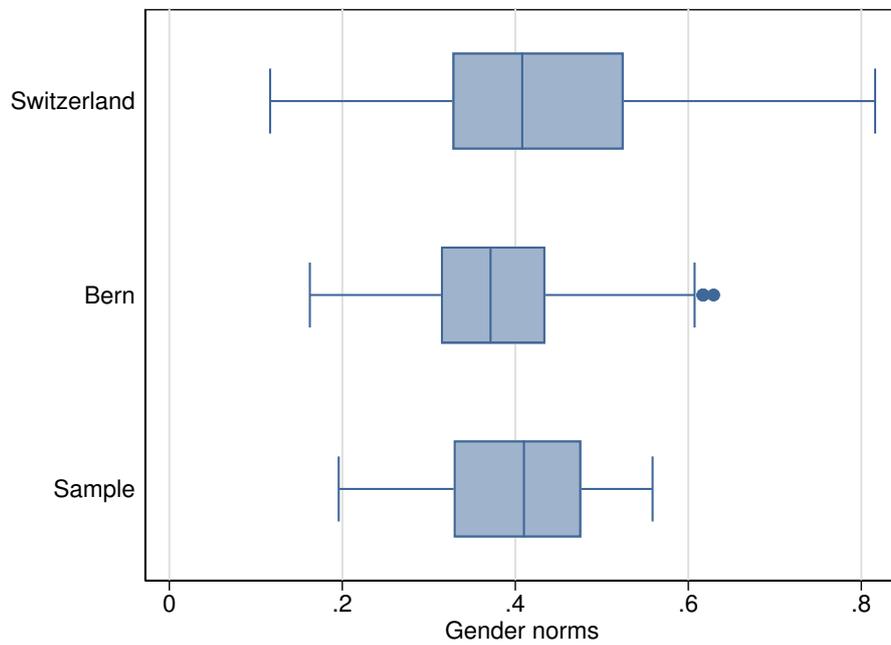
(b) Girls ( $n = 710$ )

Notes: The figure shows the frequency distribution of  $\pi_{o[i]}$  in our sample, as defined in equation (1) in the main text, separately for boys (upper panel) and for girls (lower panel).

Figure 2: Spatial variation in the strength of gender norms



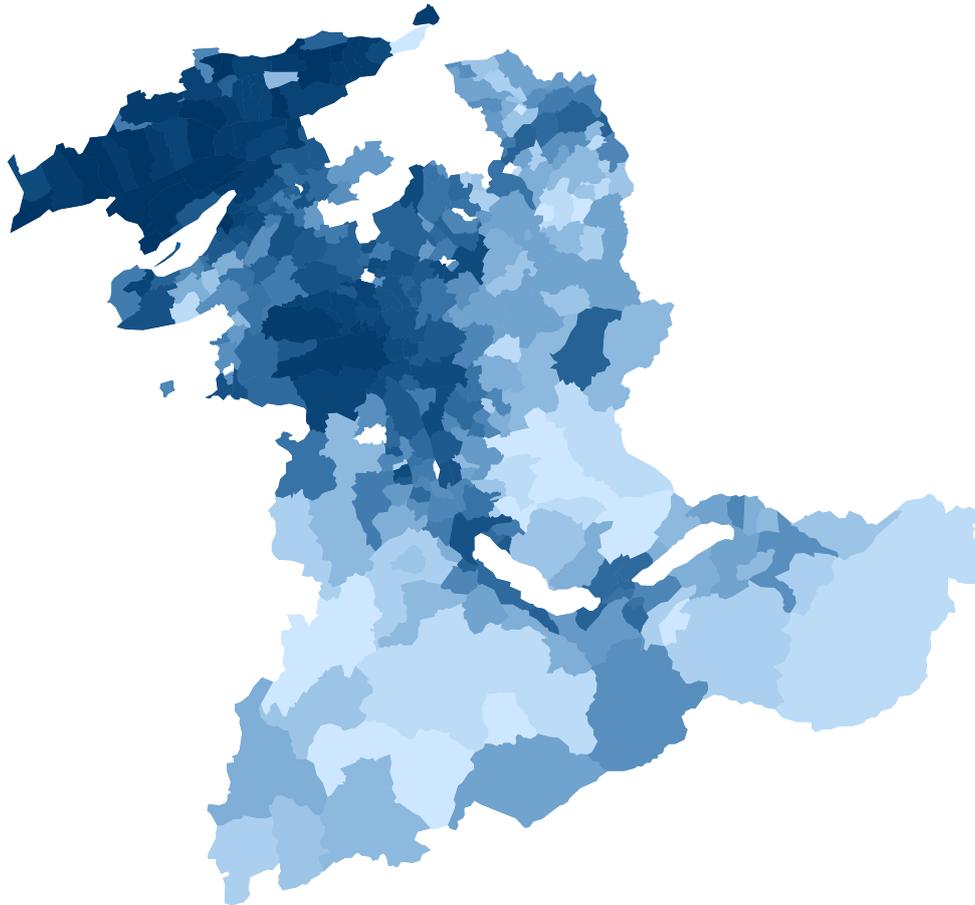
(a) Distribution of gender norms across all communities in the canton of Bern



(b) Comparison of the distribution of gender norms in different regional entities

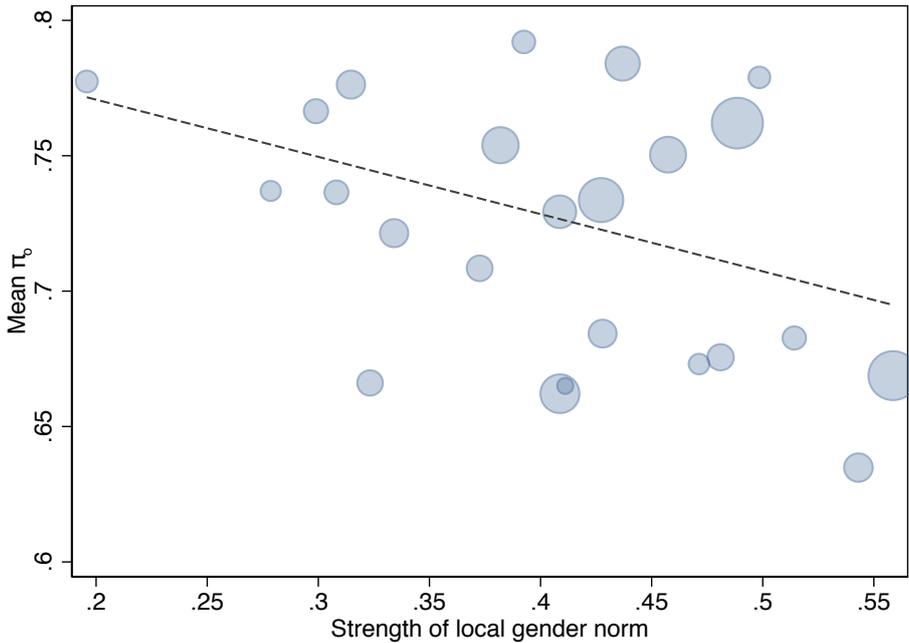
Notes: Panel (a) shows the frequency distribution of the measure of gender norms across all communities in the canton of Bern. Panel (b) compares the distribution of gender norms across (i) all Swiss communities, (ii) the communities within the canton of Bern, and (iii) the sample communities (i.e. the communities hosting the schools that took part in the survey).

Figure 3: Regional variation in the strength of gender norms in the canton of Bern

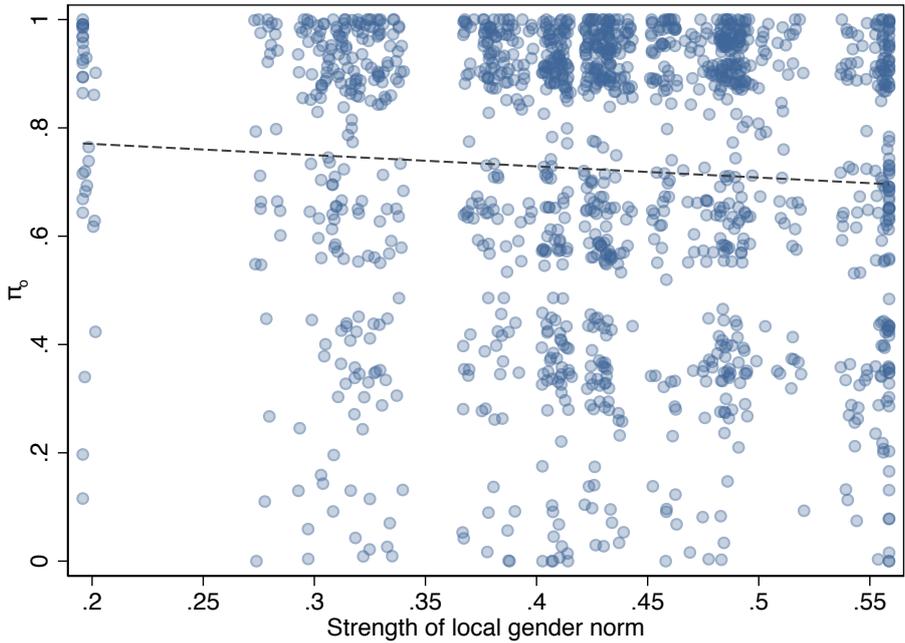


Notes: The figure maps the regional variation in the strength of gender norms across the communities of the canton of Bern. The strength of gender norms,  $N_j$  is measured by the mean share of supporting votes across all five votes listed in table 1 (see main text for details). Darker shaded areas represent communities with stronger, lighter shaded areas communities with weaker norms towards (more) gender equality. See also appendix figure B.4, which shows a corresponding map of  $N_j$  across all Swiss communities.

Figure 4: Gendered occupational aspirations and the strength of regional gender norms



(a) Municipality-level data ( $J = 24$ ), weighted by the number of children within each municipality



(b) Individual-level data ( $n = 1,434$ )

Notes: The figure shows the association between  $\pi_o$ , i.e. the degree to which adolescents aspire for a gender-stereotypical occupation (as defined in equation (1) in the main text), and our measure of gender norms based on community-level voting results. By the underlying mechanics of OLS, the estimated regression functions shown in the two panels are exactly the same (but note that the two figures use a different scaling on the y-axis).

## A Measuring gender segregation in adolescents’ occupational aspirations

As in the main text, let  $o$  denote a child’s aspired occupation, and let  $\pi_o^g$  denote the fraction of girls in a given occupation  $o$ . Consequently,  $(1 - \pi_o^g) = \pi_o^b$  equals the fraction of boys in any given occupation  $o$ . We measure  $\{(\pi_o^g, \pi_o^b)\}_o$  using different sources of data, depending on the educational track (i.e. formal qualification) that must usually be taken to be able to actually work a specific occupation  $o$  later on:

- The majority of occupations mentioned in the survey are accessible through an apprenticeship. In a first step, we thus assigned the occupational number (“Berufsnummer”) officially used by the State Secretariat for Education, Research and Innovation (SERI), the administrative unit responsible for VET policy and regulation at the Federal level.<sup>20</sup> Fortunately, we are able to precisely measure  $(\pi_o^g, \pi_o^b)$  in these cases because we obtained access to the population of apprenticeship contracts in the canton of Bern (as of August 2014).<sup>21</sup> These data cover all apprenticeship contracts approved by the canton of Bern, and they include the same occupational coding that we assigned to occupational aspirations for the children in our sample. Computing the fraction of boys and girls in any given occupation (learnable through an apprenticeship) is thus straightforward. As an example, consider a child who stated in the survey that he/she wants to become a “hairdresser”. In a first step, we assign the official occupational number of the corresponding apprenticeship, in this case number 82014. We then merge, in a second step, the corresponding fractions of boys ( $\pi_o^b = 0.05$ ) and girls ( $\pi_o^g = 0.95$ ) in that occupation, calculated from the population of apprenticeship contracts in the canton of Bern. It is important to stress that the two data sets are independent of each other and that they cover different sets of individuals (more specifically, the data set covering the population of apprenticeship contracts does not include the children participating in the survey).
- In the remaining cases, the preferred occupation is only attainable through studies at the tertiary level (either at the general or at the vocational level). In these cases, we use data from published statistics from the Federal Statistical Office (FSO) on the fraction of females/males in the subject or field of study that one must usually choose to later work in that occupation. For example, if a child stated that she/he wanted to become a lawyer, we calculate  $\pi_o$  based on the number of women and men in the corresponding degree programs at both universities and universities of applied sciences.
- Moreover, in cases where a child has stated more than one preferred occupation, we simply average the occupation-specific  $\pi_o$ ’s across all the occupations a given child mentions. In our sample, a large majority of about 98% of the children stated one preferred occupation only, with a remaining 2% of the children stating two or more different occupations.
- Similarly, in the case that a child’s occupational aspiration was ambiguous (in the sense that it was not possible to assign only one specific occupation or in the sense that there is only one educational route preparing for a given occupation), we again use the average share of girls/boys across the occupations that most closely fit the description given in

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<sup>20</sup>The numbers are available online here: <http://www.bvz.admin.ch/bvz/grundbildung/index.html?lang=de>, along with additional information for each occupation (not in English, however).

<sup>21</sup>For each apprenticeship position, employers and apprentices both have to sign an apprenticeship contract (“Lehrvertrag”), which the canton then has to approve (i.e. the canton acts as supervisor).

the survey.

For example, if a child stated that she/he wanted to become a computer/information scientist, we averaged the share of males/females from the corresponding apprenticeship programs as well as from the corresponding programs at universities and universities of applied sciences.

Using this procedure, we are able to classify occupational aspirations for 1,434 children. In the remaining cases, by a large majority, children simply stated that they did not (yet) know what they would like to become later on, in which case  $\pi_{o[i]}$  is not defined (80 cases, representing about 5% of the overall sample).

## B Additional tables and figures

Table B.1: Descriptive statistics for the individual-level variables taken from the survey

	Mean	Standard deviation	Unique values
<i>Demographics:</i>			
Age (in years)	14.06	0.59	–
Boy (yes = 1)	0.51	0.50	2
<i>School track and grades:</i>			
Realschule (yes = 1)	0.33	0.47	2
Sekundarschule (yes = 1)	0.50	0.49	2
Spez. Sek. (yes = 1)	0.08	0.27	2
Grade in German	4.72	0.50	–
Grade in Mathematics	4.68	0.65	–
Grade in French	4.64	0.62	–
Grade in English	4.77	0.67	–
<i>Preferences:</i>			
Competitiveness (entry into tournament)	0.49	0.50	2
Risk preference	38.07	24.54	–
Locus of control	37.33	6.38	–
Occupation: job satisfaction important	2.62	1.73	5
Occupation: pay important	2.94	1.20	5
Occupation: prestige important	3.17	1.38	5
Occupation: helping someone important	3.04	1.22	5
Occupation: job security important	3.24	1.40	5
<i>Parental controls:</i>			
Education (father)	–	–	7
Education (mother)	–	–	7
Occupation (father)	–	–	218
Occupation (mother)	–	–	159

Notes: The table shows descriptives for the individual- and parental-level controls taken from the survey ( $n = 1,434$ ). The number of unique values is only given for categorial variables.

Table B.2: Most popular, most typical, and most atypical occupations chosen by girls and boys in the canton of Bern (in the year 2014)

		Girls		Boys		
Rank	Nr.	Occupation	$\pi^g$	Nr.	Occupation	$\pi^b$
<i>(a) Most popular occupations</i>						
1	68600	Commercial employee	0.657	68600	Commercial employee	0.343
2	86911	Dental assistant	0.906	45705	Polymechanic	0.965
3	71200	Retail trade assistant	0.654	47413	Electrician	0.974
4	94306	Child care expert	0.891	15005	Farmer	0.854
5	86910	Medical practice assistant	0.992	95504	Logistician	0.872
<i>(b) Most typical occupations</i>						
1	17204	Florist	1.000	19102	Forest caretaker	1.000
2	82112	Cosmetician	1.000	44727	Plant and apparatus manufacturer	1.000
3	27121	Clothing designer	1.000	44506	Metal construction practitioner	1.000
4	82117	Podologist	1.000	51908	Polybuilder	1.000
5	18104	Horse expert	1.000	47406	Network electrician	1.000
<i>(c) Most atypical occupations</i>						
1	51006	Bricklayer	0.003	86910	Medical practice assistant	0.008
2	30302	Carpenter	0.007	86908	Veterinary practice assistant	0.011
3	51411	Road builder	0.008	86912	Dental assistant	0.013
4	47604	Heating installer	0.010	79613	Specialist in home economics	0.031
5	46317	Automobile assistant	0.013	70610	Pharmaceutical assistant	0.031

Notes: The most popular occupations are those with the most apprentice contracts, the most typical occupations are those with the highest shares of own-gender individuals (and with the largest number of apprenticeship contracts), the most atypical occupations are those with the lowest share of own-gender individuals (but with a positive number of apprenticeship contracts).

Table B.3: Comparison of the voting results in different regions within Switzerland

Vote	Community-level results (weighted)					Community-level results (unweighted)				
	Switzerland			Canton of Bern		Switzerland			Canton of Bern	
	Overall	German	Overall	German	Sample	Overall	German	Overall	German	Sample
513	55.33%	48.78%	54.94%	54.16%	61.19%	53.92%	42.61%	47.97%	45.53%	51.31%
461	17.97%	16.38%	16.38%	16.11%	20.58%	15.19%	12.87%	13.21%	12.26%	14.57%
458	38.94%	31.49%	36.24%	35.05%	42.01%	39.04%	26.22%	31.20%	28.14%	32.32%
336	54.95%	52.16%	49.71%	49.03%	57.46%	49.81%	43.77%	41.13%	38.50%	46.59%
306	60.51%	57.94%	61.66%	61.33%	64.97%	55.44%	51.01%	55.53%	54.35%	58.01%

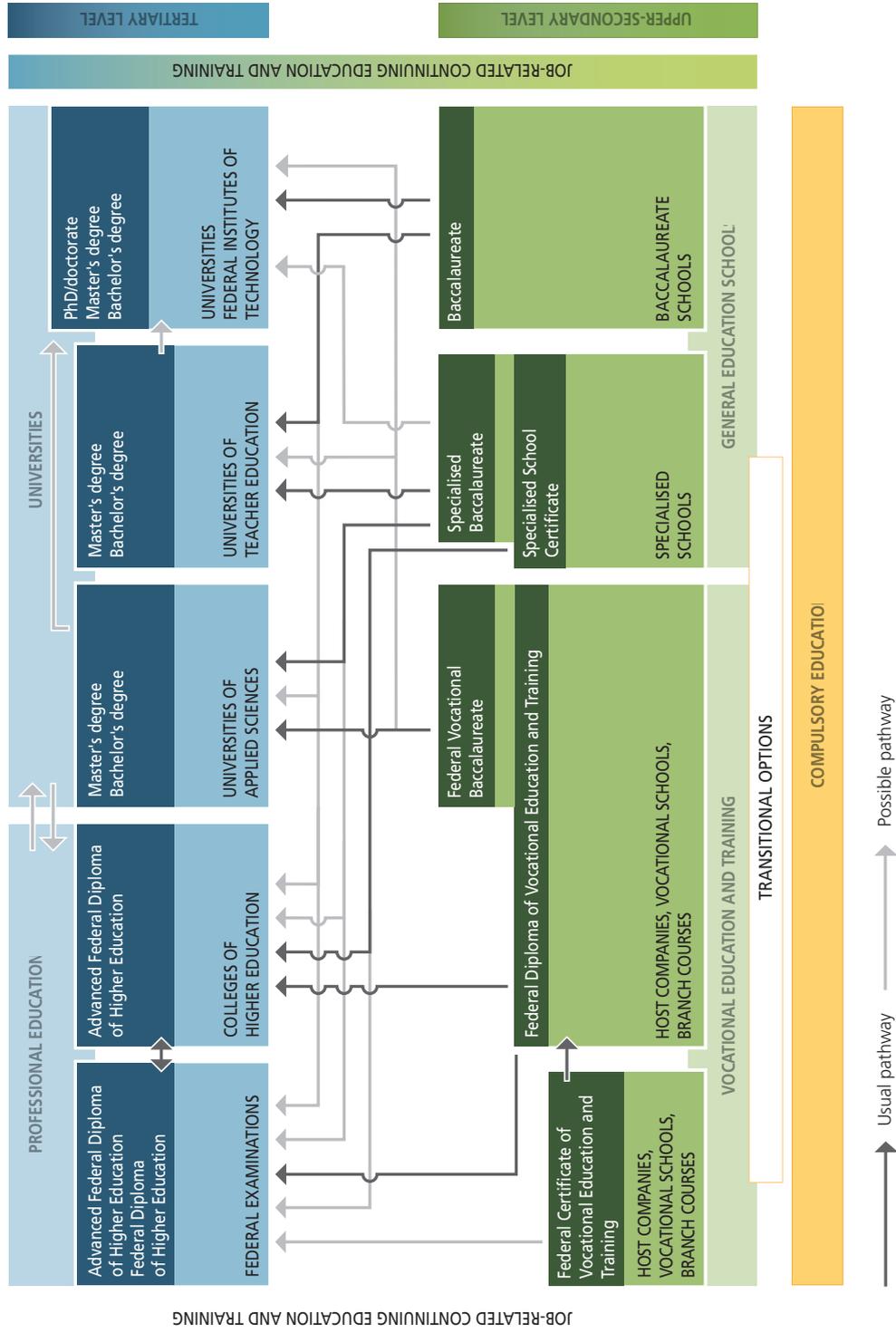
Notes: The table shows the share of supporting votes for the votes listed in table 1 and for different regional subentities. Weighted results are weighted by the number of valid votes in a community.

Table B.4: Aspirations for a baccalaureate school

	Gymnasium				
Mean	0.207	0.207	0.207	0.207	0.207
Standard deviation	0.406	0.406	0.406	0.406	0.406
<i>School track (Baseline = Realschule):</i>					
Sekundarschule	0.217*** (0.015)	0.209*** (0.015)	0.170*** (0.015)	0.164*** (0.021)	0.155*** (0.023)
Spez. Sek	0.546*** (0.046)	0.539*** (0.046)	0.476*** (0.045)	0.463*** (0.054)	0.531*** (0.056)
<i>School grades:</i>					
German	0.060*** (0.021)	0.054** (0.021)	0.053** (0.021)	0.035 (0.025)	0.037 (0.026)
Mathematics	0.034** (0.014)	0.033** (0.015)	0.026* (0.015)	0.029* (0.017)	0.030* (0.016)
French	0.084*** (0.015)	0.082*** (0.015)	0.076*** (0.015)	0.073*** (0.018)	0.073*** (0.018)
English	0.029** (0.014)	0.029** (0.014)	0.024* (0.014)	0.019 (0.017)	0.026 (0.017)
<i>Individual-level controls:</i>					
Demographics	Yes	Yes	Yes	Yes	Yes
Preferences	No	Yes	Yes	Yes	Yes
<i>Parental controls:</i>					
Education	No	No	Yes	Yes	Yes
Occupation	No	No	No	Yes	Yes
Communal dummies	No	No	No	No	Yes
Number of observations	1,519	1,519	1,519	1,519	1,519
R-Squared	0.221	0.227	0.275	0.510	0.533
Adjusted R-Squared	0.217	0.219	0.261	0.338	0.355

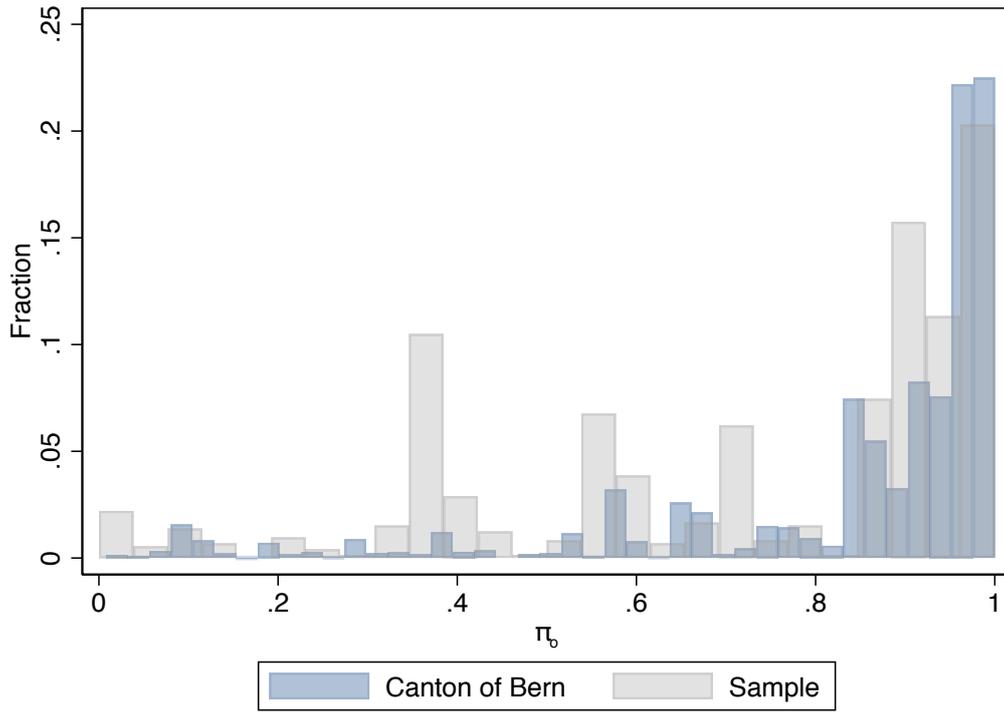
Notes: Notes: \*, \*\*, \*\*\* denotes statistical significance on the 10%, 5%, and 1% level, respectively. Robust standard errors in parentheses. The dependent variable is a binary variable taking on the value of 1 if a child aspires for baccalaureate school (“Gymnasium”), and 0 otherwise.

Figure B.1: The Swiss educational system

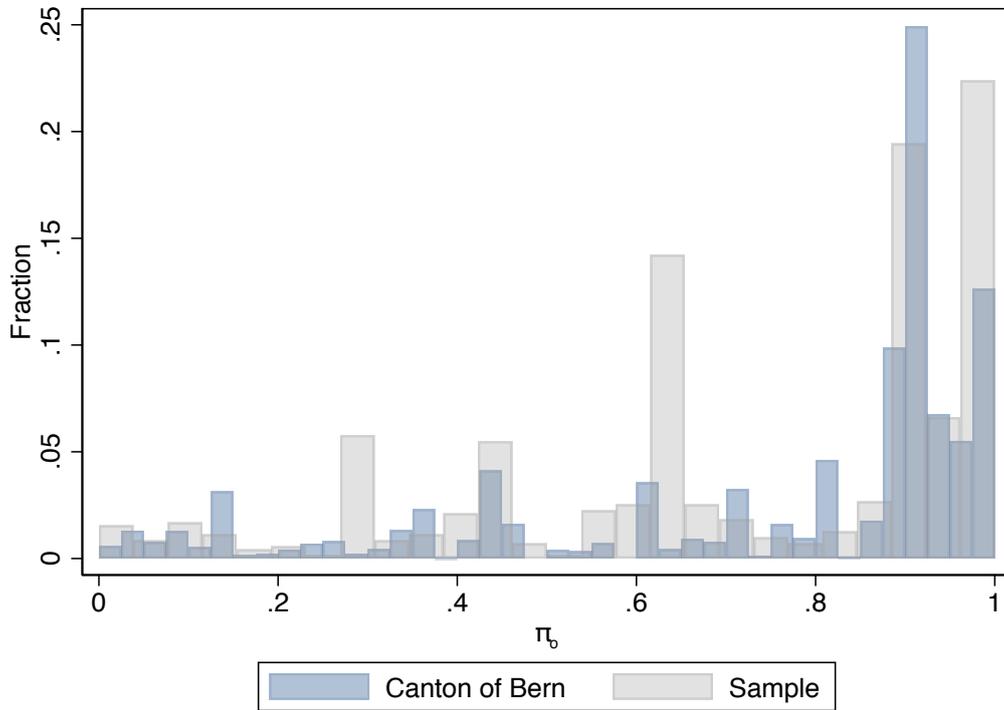


Source: State Secretariat for Education, Research and Innovation (SER).

Figure B.2: Occupational gender segregation



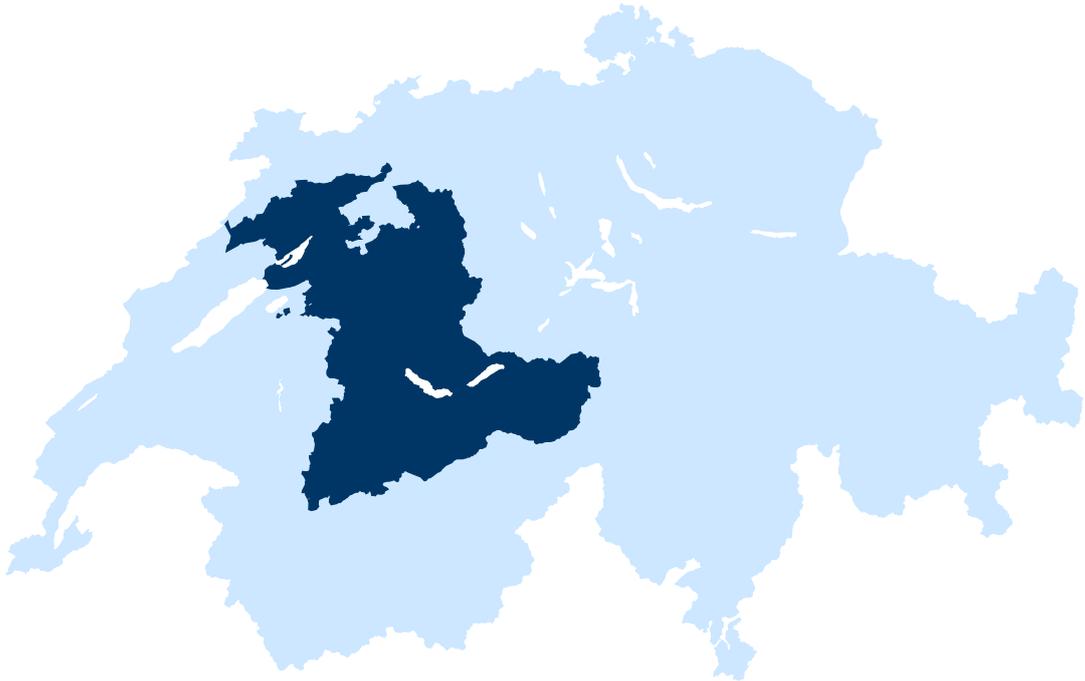
(a) Boys



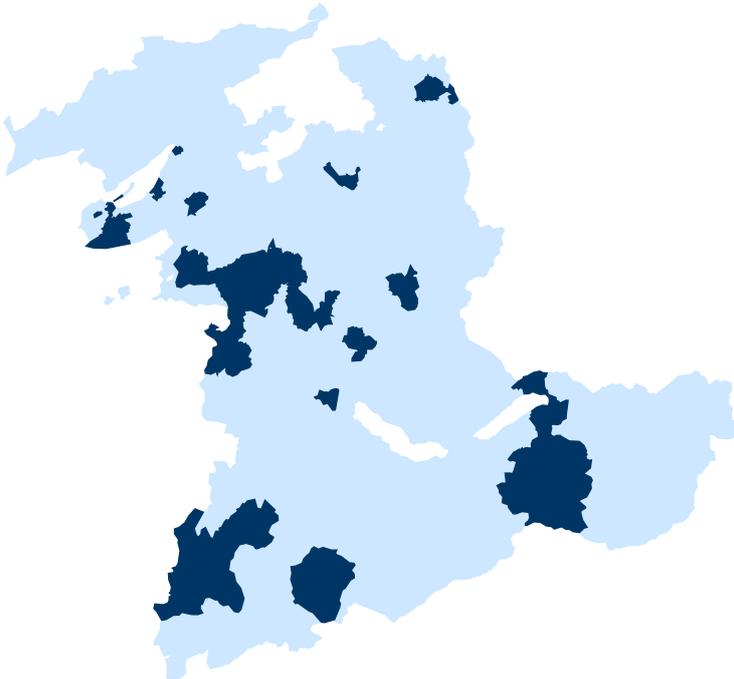
(b) Girls

Notes: The figure shows the frequency distribution of  $\pi_o$  in the population of all apprenticeship contracts in the canton of Bern in August 2014 (smaller bars in blue), in comparison to the frequency distribution of  $\pi_o$  in the sample (wider bars in grey). Note that the data for the canton of Bern describe actual choices, while those for the sample describe aspirations.

Figure B.3: Location of the canton of Bern and the sample communities



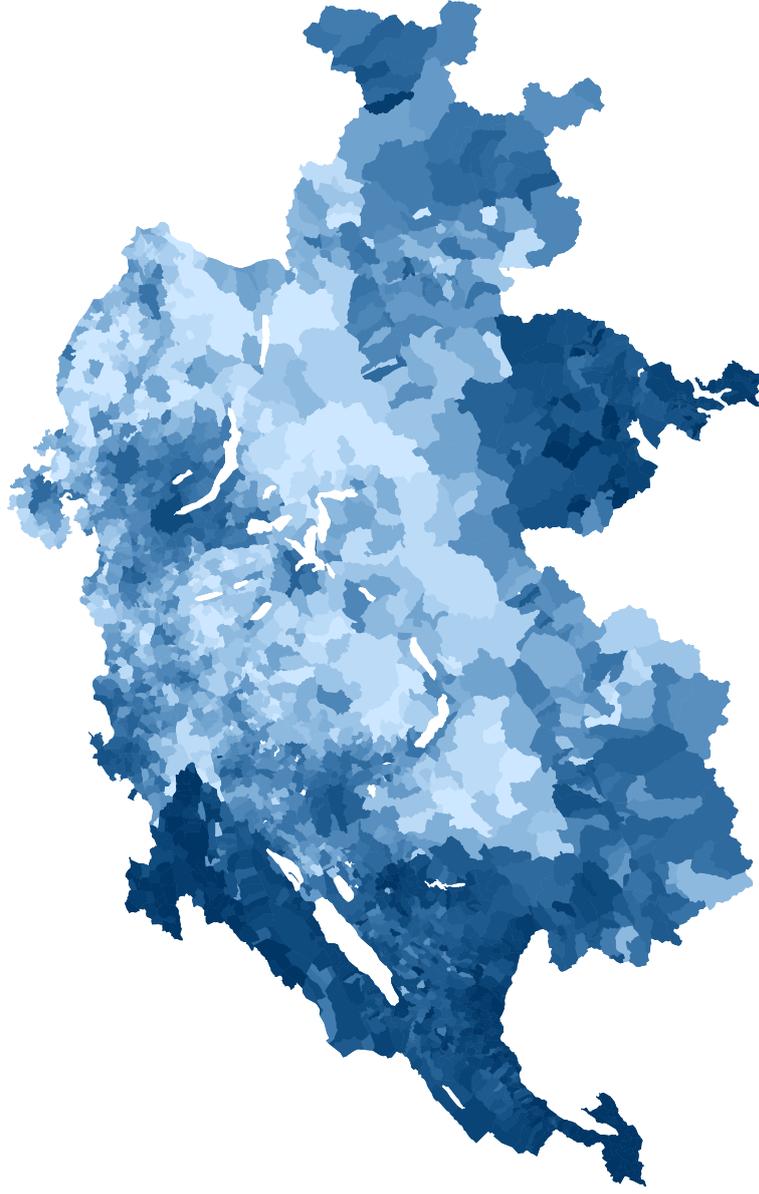
(a) Location of the canton of Bern within Switzerland



(b) Location of the sample communities within the canton of Bern

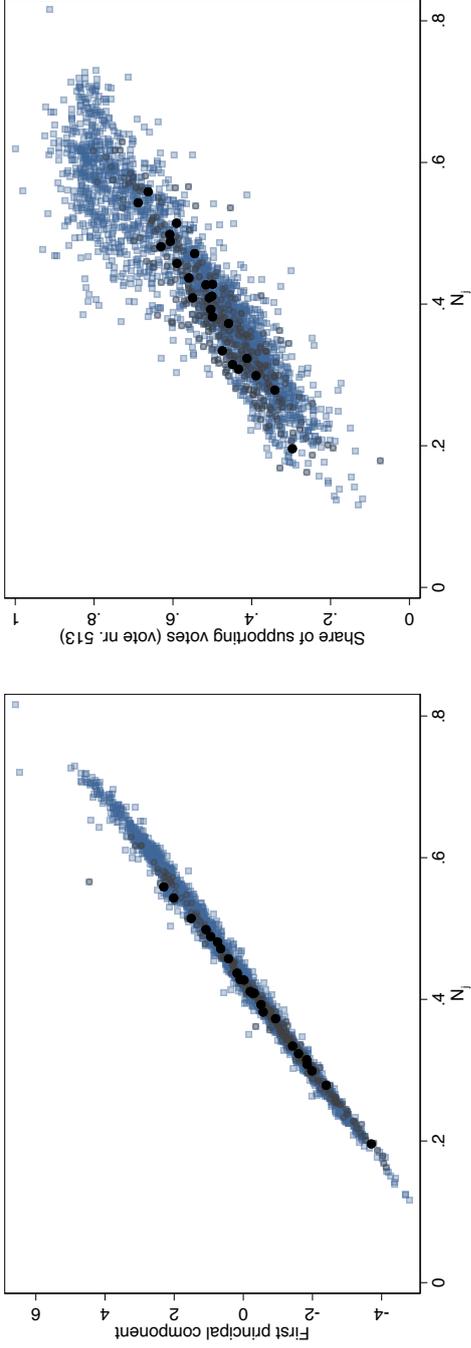
Notes: Panel (a) shows the size and the geographic location of the canton of Bern (darker shaded area) within the borders of Switzerland. Panel (b) highlights those communities actually covered by the survey (i.e. the communities hosting one or more of the schools that participated in the survey) within the borders of the canton of Bern. Darker shaded areas represent the communities that are part of the survey.

Figure B.4: Regional variation in the strength of gender norms across all Swiss communities



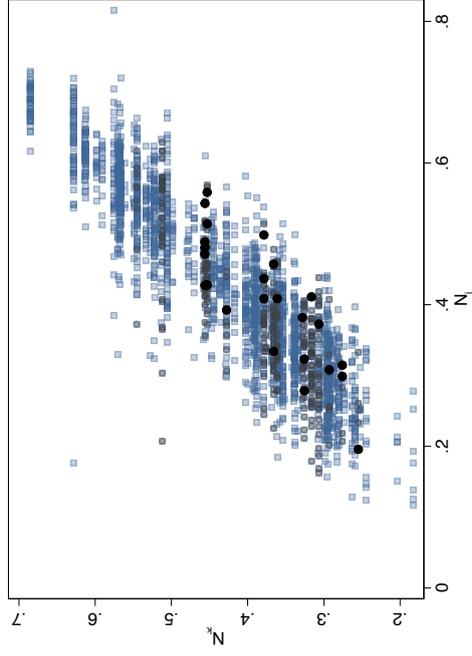
Notes: The figure maps the mean share of supporting votes of all votes listed in table 1 across all Swiss municipalities. Darker (lighter) shaded areas represent municipalities with a higher (smaller) vote share in support of (more) gender equality.

Figure B.5: Correlations across different parameterizations of the measure local gender norms



(a) First principal component

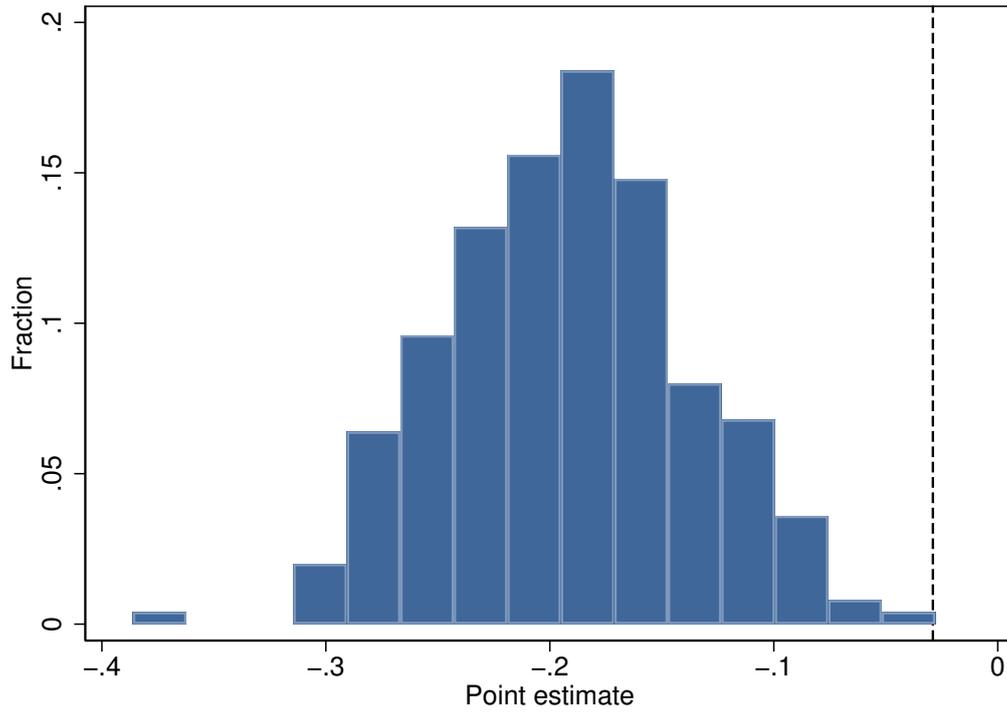
(b) Most recent vote (i.e. vote nr. 513)



(c) Mean vote share at the level of local labor markets

Notes: Each figure plots our measure of gender norms,  $N_j$ , on the x-axis against an alternative parameterization of local gender norms on the y-axis. In panel (a) we use the first principal component, in panel (b) we use the most recent vote (i.e. vote nr. 513), and in panel (c) we use the mean vote share at the level of local labor markets. Each figure simultaneously plots all Swiss communities (shown as transparent blue squares), all communities from the canton of Bern (shown as transparent grey dots) as well as the sample communities (shown as black dots).

Figure B.6: Distribution of  $\hat{\beta}$  based on regressions using different sets of randomly generated dummies



Notes: The figure shows the frequency distribution of  $\hat{\beta}$  across 250 regressions, each using a randomly generated set of dummies simulating the structure of the dummies necessary to represent parents' true occupational status. The dashed vertical line illustrates the estimated size of  $\hat{\beta}$  when using the dummies representing the true occupational status of a child's parents.