



Culture and financial literacy: Evidence from a within-country language border

Martin Brown^{a,*}, Caroline Henchoz^b, Thomas Spycher^a

^a University of St. Gallen, Switzerland

^b University of Fribourg, Switzerland

ARTICLE INFO

Article history:

Received 22 August 2017

Revised 4 March 2018

Accepted 13 March 2018

Available online 25 April 2018

JEL classification:

D03

D14

Z10

Keywords:

Culture

Financial literacy

Financial socialisation

ABSTRACT

We study the effect of culture on financial literacy by comparing secondary-school students along the German–French language border within Switzerland. We find that students in the French-speaking region have a lower level of financial literacy than students in the German-speaking region. The difference in financial literacy across the language groups is stronger for native students and monolingual students than for immigrant students and bilingual students. This supports the hypothesis that embedded cultural differences rather than unobserved heterogeneity in schooling are driving the effect. A mediation analysis suggests that the cultural divide in financial literacy is related to systematic differences in financial socialisation across the language groups. Students in the German speaking region are more likely to receive pocket money at an early age, and are more likely to have independent access to a bank account than students in the French speaking region.

© 2018 The Author(s). Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license.

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

1. Introduction

A growing body of research documents that financial literacy is associated with better personal financial decision making. Individuals with a higher level of financial literacy perform better in retirement planning (Lusardi and Mitchell, 2007; van Rooij et al., 2012), are less prone to overindebtedness (Lusardi and Tufano, 2015) and participate more often in financial markets (van Rooij et al., 2011) with better diversified portfolios (Gaudecker, 2015). Financial literacy is also related to higher yields on deposit accounts (Deuflhard et al., 2018) and a higher propensity to withdraw deposits from distressed banks (Brown et al., 2017).

Theory models the accumulation of financial literacy as an endogenous human capital choice (Lusardi et al., 2017; Jappelli and Padula, 2013), but is largely silent about heterogeneity in the initial stock, i.e. the level of financial literacy when entering the labour market. Recent empirical work focusses on the analysis of financial education interventions for the youth and adults (see Fernandes et al. (2014), Miller et al. (2015) and Kaiser and Menkhoff (2017) for meta-studies on financial education programs). But again, there is little empirical work analysing heterogeneity in the initial level of financial literacy which is very likely to influence the impact of financial education initiatives.

In this paper we study the effect of culture on the initial stock of financial literacy among the youth. Following Guiso et al. (2006), we define culture as the set of beliefs, norms and preferences that are shared among the members

* Corresponding author.

E-mail addresses: martin.brown@unisg.ch (M. Brown), caroline.henchoz@unifr.ch (C. Henchoz), thomas.spycher@unisg.ch (T. Spycher).

of a social group. From an economics perspective, culture may thus affect financial knowledge and decision making through systematic variation in time or risk preferences (Falk et al., 2018) or variation in social norms regarding the incurrence and repayment of debt as well as informal insurance for households in financial distress (Lindbeck, 1997). From a psychological perspective, culture may further influence financial knowledge and decision making through differences in financial socialisation or attitudes towards money (Yamauchi and Templer, 1982). Lusardi et al. (2010) document substantial differences in financial literacy among the youth in the US by ethnicity and race. This raises the question of how cultural background may influence initial financial literacy levels. Race and ethnicity are, however, often correlated with differences in socio-economic background making it difficult to identify the effect of cultural background on financial literacy.

Our aim in this paper is twofold: First, we examine the magnitude of differences in financial literacy among the youth across well-defined cultural groups. Second, we examine to what extent these differences may be accounted for by systematic variations in different dimensions of culture, i.e. preferences, financial socialisation, norms or money attitudes across these groups.

We study the impact of culture on financial literacy at the French-German language border within Switzerland. Two institutional features make this setting ideal to study questions related to culture. First, the language border allows cultural differences in preferences, norms and attitudes to coexist over time within a small geographic area.¹ Second, the language border runs through cantons, the first administrative division of Switzerland. Since most laws and policies are set either at the federal or cantonal level, there is no major change in institutions or policies at the language border within cantons. This setting allows to mitigate the two-way interaction between culture and institutions (Alesina and Giuliano, 2015). Further, there are no geographic barriers and the transport system is fully integrated across the language border. Consequently, economic conditions that potentially influence financial literacy hardly change at the language border. Importantly, we do not study the influence of language per se on financial literacy. In contrast to the recently formulated linguistic-savings hypothesis (Chen, 2013) which focuses on the one-dimensional influence of language on patience, we use language as a proxy for a broader range of cultural differences. The language border in our setting allowed for the historical persistence of cultural heterogeneity within a narrow region and we exploit it mainly for purpose of identification.

We study survey responses of 649 secondary-school students who are located in a narrow geographic region along the language border within the Swiss canton of Fribourg. Besides measures of financial literacy, our survey captures detailed information on economic preferences, financial socialisation, norms and attitudes towards money and consumption, as well as the socio-economic background. Our subjects are on average 15 years old and in their final year of compulsory schooling. The survey covers students from all educational levels.² Moreover, the survey covers students which are differentially embedded in local culture on either side of the language border. We can compare native students and in particular those with a single mother tongue to bilingual native students and students with an immigrant background.

Our survey population allows us to study the initial level of financial literacy at an age relevant for future financial decision making. First, the youth in our sample have already been strongly exposed to cultural influences in their parental home, from family and friends as well as at school. However, as they are all still subject to mandatory schooling, their level of financial literacy is less influenced by endogenous education, labour market and financial decisions than this would be in an adult population. Second, the majority of the students in our sample are very likely to make significant independent financial decisions within a year of the survey. In particular, two-thirds of the surveyed students plan to continue their education with an apprenticeship which will provide them with a first salary. Thus we measure financial literacy at an age when independent financial decision making is looming.

We document substantial differences in financial literacy between the two cultural groups. Responding to ten questions on financial literacy, German-speaking students scored on average 1.3 points (23%) higher than French-speaking students. Moreover, assessing their own understanding of financial matters on a five-point scale, German-speaking students scored on average 0.6 points (again 23%) higher than French-speaking students. We find that differences between the language groups are particularly strong among Swiss nationals with a monolingual family background while they are weaker among students with a bilingual family background or students with an immigration background. This supports our conjecture that locally embedded culture influences financial literacy and suggests that the observed differences are not driven by unobserved heterogeneity in schooling across the language border.

In line with previous evidence we document that - at the individual level - financial literacy is strongly correlated with financial socialisation (receiving pocket money at an early age, independent access to a bank account) and time preferences (patience). We further document a substantial difference in financial socialisation between the two cultural groups, but find no significant difference in time preferences. In a formal mediation analysis, financial socialisation, thus emerges as the strongest mediator of financial literacy between the two cultural groups.

Our findings contribute to two main strands of literature: First, we contribute to the recent literature on the determinants of financial literacy. Financial literacy among adults has been modelled as an endogenous choice (Jappelli and Padula, 2013; Lusardi et al., 2017) in which the inherent stock of financial literacy, expected lifetime income as well as time and risk preferences influence the investment in acquiring financial literacy. In line with these predictions, Meier and Sprenger (2013) show

¹ The differences in norms and preferences are for example observed in the voting behaviour. There is a clear cut in support for example for work-time regulations (Eugster, et al., 2017) or left-of-centre referenda (Eugster and Paret, 2018).

² The Swiss school system has on secondary level (13–16 years old) three levels with increasing academic difficulty. Students are assigned after the 6th grade based on their academic performance to a class on basic, medium or high level.

that participation in voluntary financial education programs is strongly related to patience.³ By contrast, there is scarce empirical evidence on the origins of the “initial” stock of financial literacy. Lusardi et al. (2010) analyse how sociodemographic characteristics and family financial sophistication influence the inherent level of financial literacy among the youth. In this paper, we document that the “initial” level of financial literacy – among 15-year olds – varies strongly across cultural groups and is related to differences in financial socialisation. Our findings on the mediating role of financial socialisation add to the literature on intergenerational transmission of financial literacy and financial behaviour which shows that parents play a key role in developing financial literacy (Webley and Nyhus, 2006; Bucciol and Veronesi, 2014; Lusardi and Mitchell, 2014; Grohmann et al., 2015; Shim et al., 2015).

Second, we contribute to the literature on the role of culture in economic behaviour (see e.g. Chen and Hungerman (2014) for an introduction) and specifically in financial decision making. Using survey information from 76 countries, Dohmen et al. (2015) show that observed cross-country differences in saving rates are associated with differences in time preferences. Exploiting differences in the cultural origins of immigrants to Canada and the U.S., Carroll et al. (1994, 1999) argue that culture has little impact on household savings. More recently, Haliassos et al. (2017) document substantial cultural differences in the financial assets and liabilities of immigrants to Sweden, while Fuchs-Schündeln et al. (2017) document cultural differences in saving behaviour among immigrants in Germany and the UK. Related to our study, Guin (2017) studies household saving behaviour among adults at the language border within Switzerland. He documents a significantly higher propensity to save among German-speaking households. We extend this strand of literature by documenting substantial cultural differences in financial literacy among the youth which is very likely to influence subsequent financial decision making.

The remainder of the paper is organized as follows. Section 2 describes the institutional background. Section 3 introduces the survey design and the dataset. Section 4 presents the analysis for differences in financial literacy. Section 5 presents the mediation analysis and Section 6 concludes.

2. Institutional background

Switzerland has four official languages, whereby the overwhelming majority of the population speaks either German (63.3%) or French (22.7%) as their main language.⁴ Fig. 1 displays a map of Switzerland with areas shaded according to the majority language spoken in each municipality. The historical language border between the French-speaking and German-speaking regions is clear cut, leading to a sharp change in the main language spoken from one municipality to the next. This language border has allowed differences in attitudes, norms and preferences to persist over time within a narrow geographic area.⁵ Thus, while neighbouring regions usually assimilate through social interaction, in this particular case the language border prevented the mixing of attitudes, norms and preferences. Hence, the French–German language border within Switzerland is equivalent to a cultural border.⁶ While recent studies (Chen, 2013; Sutter et al., 2015) focused on how language itself influences preferences and behaviour, we use language as a proxy for cultural group membership.

Large parts of the German – French language border within Switzerland do not feature a geographical barrier. Importantly, the language border also runs through cantons, the first administrative subdivision of Switzerland. Since the institutional framework is mainly set at the federal and cantonal level, there is no major change in policies and institutions at the language border. The language border thus provides an ideal laboratory to study the economic effects of cultural heterogeneity. That said, potential differences may exist in the implementation of policies and the day-to-day operation of institutions. In our setting the specificities of school curricula, the training of teachers and the implementation of the curricula in schools may differ across the language border.⁷

Several studies exploit the clear cut border between cultural groups within one institutional setting at the Swiss language border. Eugster et al. (2011) document a persistent, strong difference in the demand for social insurance between the French and German language region. In addition, work attitudes and unemployment durations sharply change at the language border (Eugster et al., 2017). Both studies show that the differences persist even within groups with the same economic fundamentals. Guin (2017) documents that German-speaking households are more likely to save and less prone to spend excessively compared to French-speaking households.

³ Numerous studies analyse the effect of financial education programs on financial literacy and financial behaviour (see Fernandes et al. (2014), Miller et al. (2015) and Kaiser and Menkhoff (2017) for meta-studies). Their findings with respect to causal effects of education programs on financial literacy and financial behaviour are ambiguous.

⁴ 8.1% declare Italian, 0.5% Romansh and 6.8% other languages as their main language. Source: Swiss federal statistics office in 2015.

⁵ Eugster et al. (2011) provide a detailed discussion of languages in Switzerland and historical language borders.

⁶ There is evidence that the difference at the within-country language border with respect to financial decisions is smaller than differences across countries (as for example exploited by Carroll et al., 1994). Bachmann and Hens (2016) show that Swiss investors in all language groups are less prone to investor mistakes compared to investors in the same language region from neighbouring countries and that there are greater similarities in investment decisions of residents of Switzerland speaking different languages than there are between these and their linguistically closest neighbours.

⁷ Differences in the implementation of policies may reflect the influence of culture since the local administration as well as teachers are also influenced by culture.

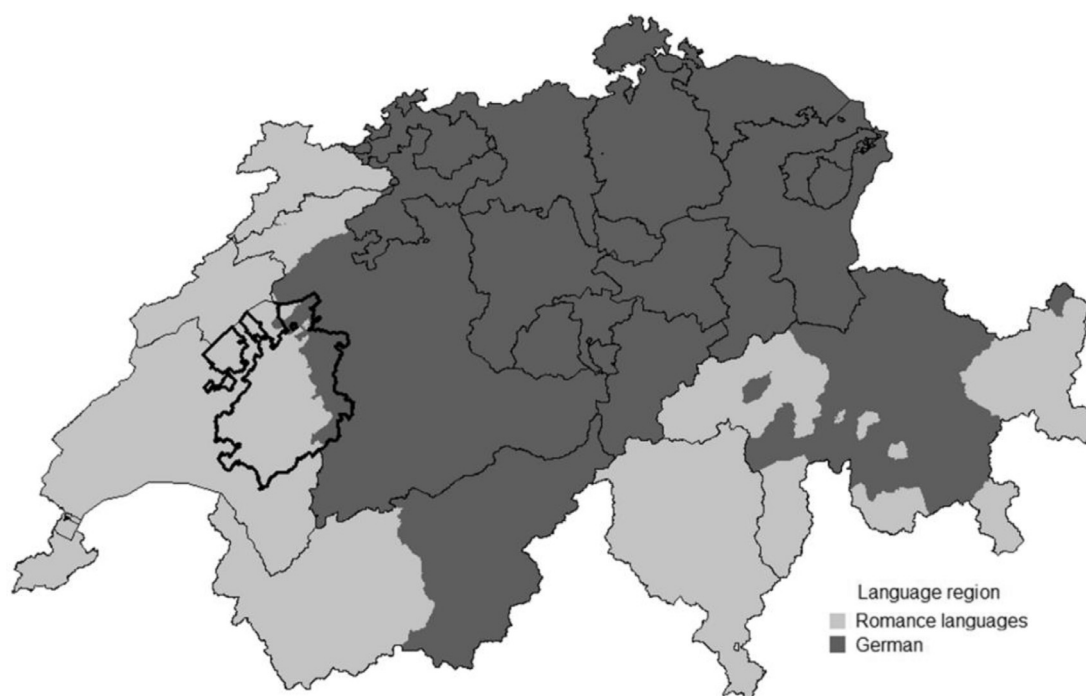


Fig. 1. Language regions in Switzerland. Dark-grey areas indicate a majority of German language speakers on municipal level. Light-shaded areas indicate municipalities with a majority speaking a Romance language (French in the West, Italian in the South and Romansh in the East). Dark lines indicate cantonal borders. The canton of Fribourg is specially highlighted using an increased line width. Source: swisstopo and Federal Statistical Office (FSO).

The above mentioned studies all exploit within-canton variation provided by the French-German language border running through the three cantons Berne, Fribourg and Valais.⁸ By comparison, our study narrowly focuses on the language border region which runs through the bilingual canton of Fribourg. Fribourg has a francophone majority (125 municipalities with a total population of 235,769) in the west and a German-speaking minority (38 municipalities with a total population of 67,608⁹) in the east. Most municipalities have a distinct majority language and can therefore be clearly assigned to one language region (see Fig. 2A). There are only few bilingual municipalities where the share of native French speakers is not below 20% or not above 80%.¹⁰

3. Data

3.1. Sample selection and procedure

Our analysis is based on a survey of secondary school students located in a narrow geographic region along the French-German language border within the canton of Fribourg. The students are on average 15 years old and in their final year of compulsory education. The public secondary school system in Fribourg features three levels, which differ by the level of difficulty of the curriculum. Our Online Appendix provides details of the public education system in Fribourg. There we describe important commonalities of the education system across the language border (primary school starting age, assignment of students to secondary school levels) and point to relevant variation in curricula.

Table 1 shows the number of observations by school level, gender and school language.¹¹ The aim was to survey a similar number of students for both genders on each of the three school levels for each language region. From all secondary schools in the canton we pre-selected four German-speaking schools and three French-speaking schools based on the number of students at each school level and the schools' proximity to the language border. Fig. 2B displays the location of the selected

⁸ Other studies exploit the Swiss language border to investigate inter-jurisdictional tax competition (Eugster and Parchet, 2018) or fertility and labour force participation (Steinhauer, 2013).

⁹ The number of municipalities and population information refer to December 2014; Source: Federal statistics office permanent resident population by municipality.

¹⁰ One notable exception is the cantonal capital of Fribourg. Fribourg had in 2015 38,489 inhabitants. 63.6% stated French and 21.2% German as their main language (15.2% other languages). We run a robustness check focusing on municipalities with a distinct majority language (Table 3).

¹¹ In 2015 35% of students in the canton of Fribourg were in classes on the highest level that prepare for an academic high school which will later on qualify for the entry of university. 44% on the medium level and 19% on the lowest school level (Source: StatA Fribourg). Thus, the survey over-samples students from the lowest level.

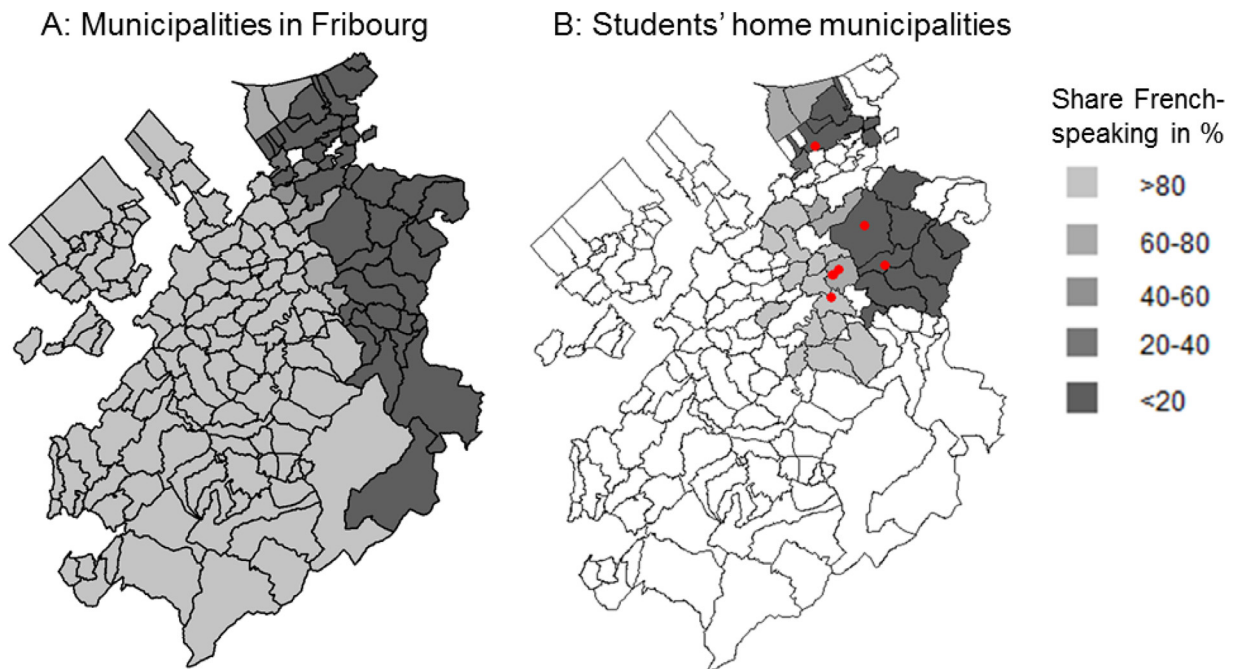


Fig. 2. Canton of Fribourg. Map A displays the share of the population that states French as the main language for each municipality in the canton of Fribourg. Individuals who state other languages than French and German as their main language are excluded. Map B displays home municipalities of students in the sample and the share of French-speakers in the respective municipalities. White coloured municipalities are not in the sample. Red dots mark locations of schools. Source: StatA Fribourg.

Table 1

Sample composition: Number of observations.

Panel A. Sample by school level and gender					
School level	German-speaking		French-speaking		Total
	Male	Female	Male	Female	
Basic	40	36	65	43	184
Medium	77	45	55	54	231
High	51	56	57	70	234
Total	168	137	177	167	649
Panel B. Sample by school level and citizenship					
School level	German-speaking		French-speaking		Total
	Swiss	Non-Swiss	Swiss	Non-Swiss	
Basic	66	10	51	57	184
Medium	112	10	58	51	231
High	105	2	106	21	234
Total	283	22	215	129	649

schools and the students' municipality of residence. The study was supported by the cantonal department of education which encouraged all selected schools to participate in the survey. Within the seven selected schools, we randomly selected classes of students, stratified by educational level. Overall, 786 students in 40 classes were selected for the survey. Due to non-attendance, 63 students could not be surveyed. There is no indication that non-attendance was related to the survey.¹²

The survey was conducted in November 2015 during regular school hours with paper and pen. The setting was similar to an exam situation and students were not allowed to communicate.¹³ There was no reward for the completion of the survey

¹² 12 students were participating in a program that allows them to retake the final year on a higher level or in a different language. These students are excluded from the sample.

¹³ The survey was conducted by the authors and research assistants. They introduced the survey and replied to general questions. Instructions were always presented by a native speaker of the respective school language. During the completion of the survey no questions were answered and students were told to leave questions blank if they do not understand them. The teachers were present in the classroom but did not intervene in the process.

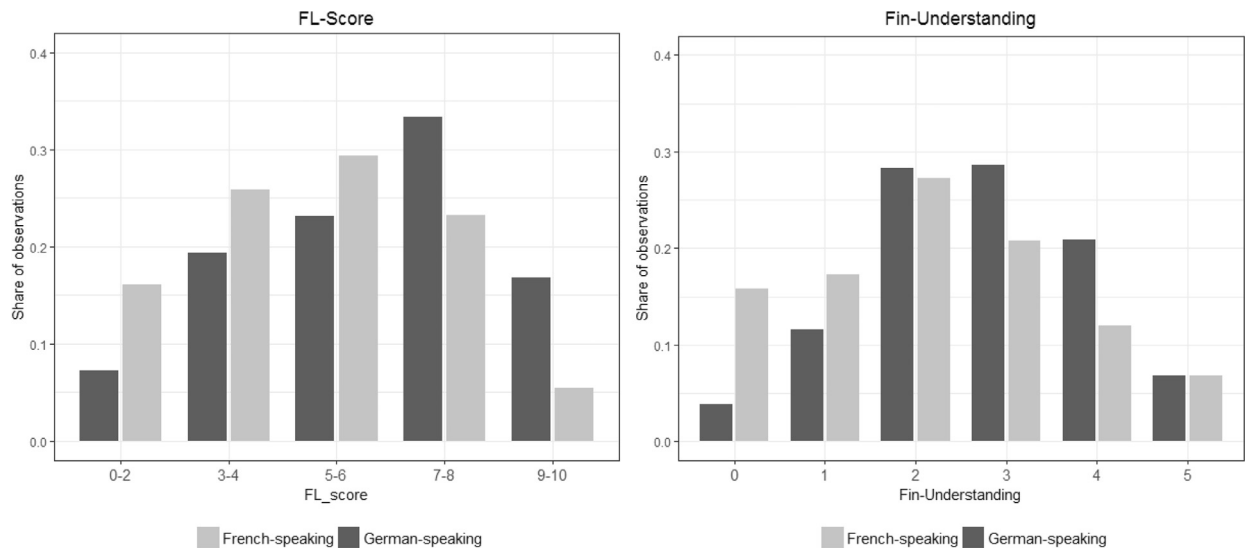


Fig. 3. Distribution of financial literacy by school language.

and questions were not incentivized. The order of the questions was the same for all students. On average, it took students 30 min, with a minimum of 20 and a maximum of 45 min, to complete the survey.

The custom-made survey included a total of 67 questions covering financial literacy, risk and time preferences, financial socialisation, debt norms, money attitudes and socioeconomic background. Survey questions were chosen with respect to the suitability for this particular age group. Given the bilingual setting, the translation of survey questions received particular attention. Students on both sides of the language border should perceive and understand questions with the same meaning. In order to obtain a high quality of translation, several bilingual translators assessed the translation of the survey. Many questions originate from similar studies that were conducted in English. Some questions were first translated to German and then to French while others were first translated to French and then to German.¹⁴

3.2. Financial literacy

We define financial literacy as the degree to which students have acquired the knowledge and skills to make sound financial decisions.¹⁵ The survey contains 10 financial literacy questions which are based on comparable studies and adjusted to the Swiss environment as well as to the students' age. The financial literacy questions cover the following topics: Simple interest, compound interest, percentage calculation for a purchase decision, budgeting, understanding of a bank statement, graphical understanding of stock price development, inflation, and diversification. Appendix 1 provides the details and sources of the ten questions. The financial literacy score (*FL-Score*) counts the number of correct responses to the 10 questions.

Students also gave a subjective assessment of their understanding of financial matters (see e.g. Gathergood, 2012a). They stated on a six-point Likert scale how strongly they agree to the statement: "Financial matters are complicated and confusing to me". Based on the answers to this question we construct a measure of financial understanding (*Fin-Understanding*) which runs from 0 (strongly agree) to 5 (strongly disagree).

We obtain responses from 711 students. Due to missing values we restrict the sample to 649 students.¹⁶ Fig. 3 displays histograms of our two financial literacy measures by language group. The share of German-speaking students with high financial literacy scores is clearly larger than that of French-speaking students. Similarly, German-speaking students are more likely to assess their own financial understanding as higher than French-speaking students. The summary statistics in Appendix 2a confirm a significant difference in financial literacy across the language groups. Compared to a sample mean of 5.53 points German-speaking students score on average 1.25 points higher on *FL-Score*. German-speaking students also score 0.56 points higher on *Fin-Understanding*, compared to a sample mean of 2.43 points.

¹⁴ An English version of the survey is available in our Online Appendix.

¹⁵ This is in line with the OECD definition of finance literacy (OECD, 2014).

¹⁶ 6 surveyed students come from another region and we therefore exclude them. For 12 observations, we lack information on gender, for 19 observations on citizenship, for 7 observations on the year of birth and for 18 observations on the municipality of residence.

3.3. Mediators of culture

Dohmen et al. (2012) provide evidence for a strong intergenerational transmission of risk attitudes.¹⁷ Hence, cultural differences in financial literacy may be related to systematic differences in preferences across the language groups. We assess risk and time preferences of students with qualitative and quantitative questions.

Falk et al. (2016) suggest non-incentivized survey questions for the assessment of time and risk preferences that provide the best measure compared to values obtained from incentivized experiments.¹⁸ We use the suggested general attitude questions addressing the subjectively perceived willingness to take risks and the attitude towards allocating consumption and work between present and future. For risk preferences, students state on a 6-point scale how strongly they agree with the statements (1 (strongly disagree) to 6 (strongly agree)): “I am a person who is willing to take risks”. We construct a binary variable that takes on value 1 if a student stated 4 or higher. For the time preference measure, we use three questions in a 6-point scale: 1. “I rather go without something today in order to be able to afford more tomorrow.” 2. “I tend to procrastinate tasks even though it would be better to get them done immediately.” 3. “I am prepared to spend now and let the future take care of itself.” We assign the value 1 to a question if the student indicated to be more patient than the mid-category (thus values >3 for question 1 and values <4 for 2 and 3). The qualitative measure of time preferences reflects the mean over the three questions.

We also elicit quantitative measures of time and risk preferences. Since the students are only 15 years old, we apply a framework based on the design used in Sutter et al. (2015): Students allocate a given amount between a future and an immediate payoff as well as between a safe and risky choice.¹⁹ In contrast to Sutter et al. (2015), however, we do not make use of a choice list, responses are elicited by a pen and paper survey, and choices are not incentivized. The qualitative and quantitative measures are combined with equal weights to yield one indicator of time preferences (*Patience*) and one indicator of risk preferences (*Risk seeking*) per respondent.

Parents play an important role in the financial education of their children (Grohmann et al., 2015; Lusardi and Mitchell, 2014; Shim et al., 2015; Van Campenhout, 2015).²⁰ Through the dissemination of norms, the teaching of financial concepts and by giving their children the opportunity to handle their own money they also influence financial decisions (Norvilitis and MacLean, 2010) as well as financial literacy (Lusardi et al., 2010).²¹ We capture parental *Financial socialisation* by constructing a measure related to observable actions of parents in fostering financial independence of their children. The measure is constructed as the average of three binary measures of financial socialization. They include (a) whether a student has a bank account, (b) whether a student has independent access to a bank account and (c) whether the student received the first pocket money earlier than the median student in our sample (at age 12). The measure is comparable to the economic socialization measure used in Webley and Nyhus (2006).²² The literature documents for both actions a positive correlation with savings behaviour in adult life (Webley and Nyhus, 2006; Buccioli and Veronesi, 2014).

Norms towards saving and debt could be an important factor of how culture influences financial literacy.²³ We elicit the exposure of students to such norms by measuring how often they heard the following two statements from their parents²⁴: (i) “You should not spend more than what you have”. (ii) “You should not have debts”. Students rated the frequency on a 6-point scale ranging from 1 (never) to 6 (very often). Both scores are transformed to a binary variable equal to 1 if students indicated values 4–6. The variable *Debt norms* then reflects the mean over the two answers.

Evidence from the psychology and consumer behaviour literature suggests that personal attitudes towards money and consumption, e.g. the importance of money as a means to achieve social prestige and freedom, are associated with financial literacy (Sohn et al., 2012) of adolescents. Differences in money attitudes across the language groups in our study may therefore be one driver of cultural differences in financial literacy. We capture two dimensions of money attitudes similar to the attributes mentioned in Mitchell and Mickel (1999). First, we elicit the freedom and control component of money attitudes by measuring how strongly students agree to the following two statements: 1. “For me, money is a tool to accomplish goals”. 2. “I am living according to the motto: Money gives me the freedom to do what I feel like.” Students rated the statements on a 6-point scale ranging from 1 (strongly agree) to 6 (strongly disagree). Each answer is again transformed to a binary variable equal to 1 if students indicated values 4 – 6. The variable *Freedom & control* then reflects the mean over the two answers. Second, we construct a measure from two questions capturing how strongly money is connected to social

¹⁷ Our setting does not allow to identify the relative importance of vertical (intergenerational) and horizontal transmission of culture.

¹⁸ The use of non-incentivized survey questions to elicit risk and time preferences may lead to different values compared to incentivized questions. For our study, this would only bias our results if the difference is influenced by cultural group membership.

¹⁹ Sutter et al. (2015) elicit time preferences with the use of a choice list. Each child made decisions in three binary decision problems where the payoff was varied. Hence, their measure of time preferences is not fully comparable to ours.

²⁰ Strong correlations in financial behaviour are reported across generations (Fagereng et al., 2018; Kreiner et al., 2016; Black et al., 2017).

²¹ Webley and Nyhus (2013) provide numerous examples of parental practices that provide a learning experience.

²² The economic socialization index in Webley and Nyhus (2006) includes having a bank account at age 16 and receiving money regularly from parents (or relatives). It further captures whether parents discuss the financial situation with children, whether children earn money and how economical parents were during childhood relative to other households.

²³ Gathergood (2012b) shows that the impact of problem debt on psychological health is less severe in localities in which problem debt is more widespread and therefore the social stigma is weaker.

²⁴ The survey also aimed at capturing norms towards saving. The question however suffers from an endogeneity bias and mainly students who save little state that they are often told to save. We therefore do not make use of this variable.

status and power (Social prestige). Students rate the following two statements on a 6-point scale ranging from 1 (strongly agree) to 6 (strongly disagree): “1. For me, money is a tool to make friends.” 2. “I am prepared to do everything it takes to get money”. Again, each answer is transformed to a binary variable equal to 1 if students indicated values 4–6. The variable *Social prestige* reflects the mean over the two answers.

[Appendix 2a](#) provides definitions, summary statistics and univariate comparisons across language groups for our potential mediators of culture. Financial socialisation is much stronger among German-speaking students than among French-speaking students: They receive pocket money at an earlier age and more often have (independent access to) a bank account. German-speaking students are more often discouraged from taking on debt by their parents. Looking at money attitudes, French-speaking students connect money more strongly with freedom while the importance of money for social prestige is only marginally different between the two groups. [Appendix 2a](#) documents small differences for time preferences and risk preferences between the two groups: French-speaking students are on average less patient and more risk seeking.

3.4. Socioeconomic background

We collect a broad set of information on the socioeconomic background of students. Besides personal characteristics such as gender and birth year we further elicit religion and citizenship. Citizenship provides a proxy of how long a family has been resident in the country.²⁵ Religion is reported to influence social norms and preferences ([Basten and Betz, 2013](#)). We also elicit which languages the student speaks at home with her parents and siblings. Further, we try to capture the economic background of students through several proxies; having an own room at home, whether the home is owned or rented, as well as the number of weeks on holidays each year approximate parental wealth and income.

We further elicited information on parental education and activities (cinema, theatre, classical music concerts and museums) which may influence the (financial) literacy of their children ([Lusardi et al., 2010](#)). However, these display a large number of missing values as students often respond “Do not know” or not at all. For those students which do reply [Appendix 8](#) displays pairwise correlations of parental education and activities with our above described control variables. The table shows that parental education is highly correlated with the educational level of the student as well as with our proxies for income and wealth. We therefore do not control for parental education in our main specifications. In [Appendix 6](#) we replicate our results by levels of parental education and show that they are robust across students with / without highly-educated parents.

Summary statistics and univariate comparisons of our student-level control variables are presented in [Appendix 2b](#). We find some significant differences in household characteristics across the language border. Students from the French-speaking region are less often Swiss citizens. This reflects the fact that the capital city of the canton of Fribourg (the City of Fribourg from which we also sample schools) is majority French speaking. German-speaking students are more likely to live in a family which owns (rather than rents) their home and are more likely to have their own room.

One major advantage of our chosen sample is that we are comparing students across language groups, but within the same administrative setting. In particular, the main features of the public education system are set at the cantonal level and thus identical for both language groups (see the Online Appendix for details). There are, however, separate administrative offices responsible for the detailed curricula and teacher training on either side of the language border. This may cause some differences in the specificities and implementation of the curricula between the two language regions within the canton of Fribourg. At the time of our survey the school curricula in neither language region included mandatory financial education (see our Online Appendix for details on the educational system). However, teachers do have the discretion to cover financial topics at both the primary school level (e.g. use of money/coins to teach math) and the secondary school level (e.g. teaching personal finance as part of “general formation studies”). Thus not only teacher training, but also teacher attitudes towards finance and its importance for their students may influence the intensity of financial education in our sample. Our survey responses indicate variation in the coverage of financial topics both within and across language groups. As shown in [Appendix 2b](#), 39% of French-speaking students and 25% of German-speaking students state that topics related to economic and financial education were covered in secondary school.²⁶

All students report the municipality in which they live. This allows us to match our survey-data to municipal-level statistics of economic conditions. The data presented in [Appendix 3](#) reveal that there are some differences between the municipalities in the two language regions. French-speaking students are more likely to live in urban municipalities with a higher share of non-Swiss residents.²⁷ Likely related to the urban-rural divide we find differences in the sector allocation of employees, the number of cars per inhabitant and the number of bank branches. Importantly though, the municipal financial situation measured by the tax potential index is very similar. This suggests that schools' financial resources are comparable across the language border.

²⁵ In Switzerland citizenship is not birth place dependent. It depends on the citizenship of the parents. In the canton of Fribourg, adults can launch the process of naturalisation after they have lived 12 years in Switzerland. Thus, the measure does not only capture a recent immigration history but also many families who immigrated decades ago.

²⁶ The measure is vague, since for example interest rate calculations discussed in math classes can be considered as part of financial literacy. The coverage of financial literacy in class is not significantly correlated with the financial literacy score controlling for the students background (basic and extended controls).

²⁷ Urban municipalities have a population of more or equal 10,000.

4. Cultural differences in financial literacy

4.1. Methodology

In the first step of our analysis, we examine how exposure to a language group influences financial literacy. We aim at estimating the Average Treatment Effect (ATE) for the population of the youth where the exposure to the French-speaking language group is defined as treatment.²⁸ We use the school language as the mutually exclusive treatment variable.

$$\text{ATE} = E[Y_i(1) - Y_i(0)]$$

The dummy variable $T_i = 1$ indicates that student i attends a French-speaking school and is treated. T_i is equal to 0 for students of German-speaking schools. $Y_i(1)$ indicates the potential outcome of student i if she is exposed to the French-speaking region while $Y_i(0)$ indicates the potential outcome if she is exposed to the German speaking region.

Our treatment variable – the language of the school which the student attends – deserves particular discussion.²⁹ We argue that by defining treatment as the school language we assign students to the cultural group they are most exposed to. First, we note that for most students the school language is exogenously determined by the majority spoken language in the municipality where the family resides. However, in some bilingual municipalities parents can actively choose which school their children attend. In these municipalities, most parents choose the school according to the language spoken at home.³⁰ Moreover, where parents are bilingual or speak a third language it is reasonable to assume that they choose the school language they feel is closer to their own cultural values. In addition, as children are influenced by their peers for our subject pool of 15-year-old students school is likely to be an important location of socialisation. To rule out that the endogenously chosen school language biases our results we run a robustness check where we limit our sample to students whose home municipality has a clear majority language, meaning their school language is exogenous (Appendix 4).

We estimate the following equation in an OLS model:

$$\text{FL} - \text{Score}_i = \alpha + \beta \text{French}_i + \gamma' X_i + \varepsilon_i$$

where French_i is a dummy variable that is equal to one for students from French-speaking schools and vector X_i contains a set of control variables. For all estimations, standard errors are clustered on class level. As a robustness check, we apply a semi-parametric propensity score matching estimation.

We assume that the vector of observable confounders X_i captures all differences in socioeconomic characteristics of students, as well as institutions, policies and economic conditions across the language border which may influence financial literacy but are not caused by the treatment. Our data allows us to control for a wide range of indicators which capture differences in socioeconomic conditions between the two language groups. As discussed in Section 3.4, our sample displays significant differences in these observables across language groups for several observed characteristics at the student-level and household-level (Appendix 2) and municipal-level (Appendix 3). However, many of these variables may be endogenous to our treatment (Rosenbaum, 1984; Huber, 2015). Specifically, observed differences in education levels, income, wealth or economic activity between the two language groups may simply reflect the influence of culture.

Given the potential for endogenous confounders at the student-level, household-level and municipal level we perform our empirical analysis with two main specifications. In a first specification, control variables are limited to student-level variables which we consider to be less prone to the influence of culture (age, gender and citizenship). In a second specification, we include student-level (school-level, religion), household-level (own room, rent home, holidays) and municipal-level controls (urban location) which are potentially influenced by culture. We acknowledge that our basic and extended controls do not account for all potential confounders, e.g. unobserved differences in student (or parent) preferences. However, we again note that systematic differences in preferences (or beliefs and norms) across the two language groups may actually be the outcome of differences in culture and thus again endogenous to our treatment.

Finally, a bias may arise from measurement error related to the language region. Many qualitative questions ask the students to assess how often they perform an action or how strongly they agree to a particular statement. These are relative measures and the choice could be influenced by the reference point determined by the social environment. This may potentially cause a downward bias of our estimate. Importantly, as documented in Section 3.1 reference dependent answers may

²⁸ The treatment effects literature suggests that only mutable characteristics should be considered as treatment (e.g. Holland, 1986). Even though culture is nearly immutable post-birth, the exposure to a language group is a treatment that can be manipulated. Our strategy focuses on the ATE since the definition of the treatment could be easily reversed.

²⁹ Our empirical strategy differs from the spatial regression discontinuity design applied by other studies exploiting the same language border (e.g. Eugster et al., 2011; Guin, 2017). We argue that using school language as treatment allows for a more precise classification of cultural group membership than the classification by the majority language of the home municipality which is typically used in RDD analyses. This is especially important since students in our sample reside in municipalities very close to the language border. Our approach, however, comes at the cost that we primarily capture the exposure to culture in school and the parental home and may not fully capture the effect from the neighborhood's culture. In a robustness tests we redefine the treatment based on the majority language in the municipality of residence and yield similar results (Appendix 4).

³⁰ The parental language for Swiss students is highly correlated with the school's language. Only 4 students in the sample attend French-speaking schools while they speak to their parents predominantly in German (And 14 students attending German-speaking schools vice versa). 31% of students from German-speaking schools state that they speak sometimes or often in French to their parents (6% of students at French-speaking schools sometimes or often speak in German to their parents). The exposure to both cultural groups leads to a downward bias of our estimate.

Table 2

Language group and financial literacy.

This table reports results of the OLS regression of the French dummy variable on financial literacy. Basic control include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. Standard errors are clustered at class level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Due to missing values, the number of observations fluctuates across specifications.

Dependent variable:	FL-Score (1)	FL-Score (2)	FL-Score (3)	Fin-Understanding (4)	Fin-Understanding (5)	Fin-Understanding (6)
French	−1.252*** (0.435)	−0.904** (0.428)	−1.140*** (0.214)	−0.556*** (0.115)	−0.512*** (0.135)	−0.515*** (0.137)
Constant	6.197*** (0.328)	5.057*** (0.380)	4.775*** (0.508)	2.719*** (0.079)	2.905*** (0.219)	2.968*** (0.324)
Sample mean	5.53	5.53	5.51	2.43	2.43	2.41
Observations	649	649	588	640	640	579
R-squared	0.066	0.126	0.357	0.041	0.087	0.108
Basic controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes

also influence the variation in one of our financial literacy measures; our subjective assessment of financial understanding. For this reason we choose to use the objective financial literacy score *FL-Score* as our main outcome variable. We replicate our main analyses with the subjective measure *Fin-Understanding*.

4.2. Results

Table 2 presents results of our baseline OLS regressions relating school language to financial literacy. Estimates for the financial literacy score (*FL-Score*) are presented in columns (1–3), while estimates for self-assessed financial understanding (*Fin-Understanding*) are presented in columns (4–6). Columns (1, 4) display the difference in mean, columns (2, 5) include our basic student-level controls, while columns (3, 6) add our extended student-level, household-level and municipal-level controls. The column (2–3) results show that French-speaking students obtained 0.9 to 1.1 point less on the financial literacy score. This corresponds to roughly one-fifth of the full-sample mean. The column (5–6) results show that French-speaking students also score 0.5 points lower on self-assessed financial understanding which again corresponds to almost one-fifth of the total sample mean. Our multivariate estimates are only slightly lower than the univariate difference reported in columns (1, 4). Moreover, the choice of control variables does not strongly influence our point estimates. Thus, even though there are considerable differences in observable characteristics at the student-level, household-level and municipal-level, they hardly account for the observed differences in financial literacy between students of the two language regions.

Several robustness tests confirm our baseline results. In Appendix 4 we define our treatment variable as the majority language of the municipality in which the student lives (rather than the school language). In Appendix 5 we replicate our analysis, using a semi-parametric propensity score matching estimation. In Appendix 6 we add further household-level controls (parental education) and municipal-level controls (structure of economic activity, presence of bank branches). In Appendix 6 we also show that our estimates are robust across subsamples of students with different levels of parental education.

The subsample analysis by citizenship in Table 3 (columns 1–2) documents that there is considerable heterogeneity in the effect of language group on financial literacy between Swiss nationals and students with an immigrant background. We find a large and statistically significant treatment effect among Swiss nationals. By comparison, among immigrants the magnitude of the estimated effect is substantially smaller and not significant.

The subsample analysis based on citizenship as well as the language a student speaks with her parents (columns 3–5) reveals that the treatment effect is strongest among monolingual Swiss students. Bilingual Swiss students, i.e. students that speak both French and German at home, display a much smaller and statistically insignificant treatment effect. The subsample of students with *Foreign languages* refers to students that speak languages other than French or German with their parents. Hereby, the group contains only students that speak foreign languages that are observed on both sides of the language border. The estimated treatment effect is again much smaller for this group of students than for monolingual Swiss students. Together these findings suggest that the observed difference in financial literacy are rooted in a historical cultural divide between the two language groups.

Subsample comparisons by gender (columns 6–7) show similar treatment effects in both subsamples. We further split the sample according to whether students plan to start an apprenticeship after secondary school or whether they plan to go to high school (columns 8–9). Again, we find similar treatment effects in both subsamples for the financial literacy score. This suggests that the observed differences in financial literacy across the language groups is unlikely to be driven by differences in required financial skills for anticipated future career paths.

As several of our financial literacy questions require mathematical calculations the observed difference in the financial literacy score could be related to differences in the math skills between the two language groups. Our Table 4 (Panel A) results suggest, however, that this is not the case. We group our financial literacy questions by their “math intensity” and document significant language group differences in the number of correct responses for questions with high, low and

Table 4

Language group and financial literacy: Subgroups of financial literacy questions.

This table reports results of the OLS regression of the French dummy variable on financial literacy questions grouped by how answers are correlated with a higher math grade (Panel A) and the context of the question (Panel B). All outcome variables are all normalized to [0,1] to enable the comparison of the magnitude of the treatment effects. For Panel A we run a linear regression on a dummy variable indicating a correct answer on the math grade using class fixed effects and the basic and extended controls. The groups are then formed based on the magnitude of the coefficient of the math grade variable. Most math is the share of correctly answered questions 2.1, 2.3 and 2.6b. Medium math is the share of correctly answered questions 2.2, 2.4, 2.5b and 2.6a. Least math is the share of correctly answered questions 2.5a, 2.7 and 2.8. For Panel B Bank account related questions are 2.1, 2.2, 2.5a, 2.5b and 2.7. 2.6a, 2.6b, while questions 2.8 are asked in the context of stocks and questions 2.3 and 2.4 are classified as other questions. All outcome variables are normalized to a range of 0 to 1. Basic control variables include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. Standard errors are clustered at class level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level.

Panel A: Math skills	Most math (1)	Medium math (2)	Least math (3)
French	−0.167*** (0.030)	−0.084*** (0.025)	−0.100*** (0.030)
Constant	0.584*** (0.063)	0.386*** (0.071)	0.493*** (0.059)
Mean	0.62	0.51	0.53
Observations	588	588	588
R-squared	0.315	0.210	0.190
Basic controls	Yes	Yes	Yes
Extended controls	Yes	Yes	Yes

Panel B: Context	Bank account related (4)	Stock related (5)	Other (6)
French	−0.154*** (0.025)	−0.070** (0.033)	−0.082** (0.031)
Constant	0.551*** (0.066)	0.508*** (0.064)	0.248*** (0.067)
Mean	0.284	0.329	0.37
Observations	588	588	588
R-squared	0.282	0.163	0.233
Basic controls	Yes	Yes	Yes
Extended controls	Yes	Yes	Yes

medium math intensity. To do so we first relate correct answers for each question in a within class regression to the math grade of students. Then we group the financial literacy questions according to the measured correlation with the math grade. Table 4 reports the treatment effect separately for financial literacy questions which are differentially correlated with the math grade. Considering the three questions most strongly related to the math grade the estimated treatment effect of French-speaking students is 16.7 percentage points. This corresponds to 27% of the sample mean (0.62) for these three questions. For the questions with the lowest correlation with the math grade, the estimated treatment effect is 10 percentage points, corresponding to 19% of the mean score (0.53) for these three questions. Thus, the estimated treatment effect is also strong for questions which require the understanding of concepts such as inflation or diversification and the interpretation of financial graphs rather than pure calculus.

In Table 4 (Panel B), we group the financial literacy questions by their context and estimate the effect of culture separately for each group. Five of the questions refer to a bank account, three refer to other financial products (stocks) and two were related to a purchase decision and budgeting. The estimated difference in financial literacy between students from German- and French-speaking schools is strongest for questions related to a bank account (32% of the mean) and weaker for questions related to stocks (11% of mean) and purchasing and budgeting (14% of mean). This finding is particularly interesting since we show in the following section that the observed cultural difference in financial literacy is mainly mediated by differences in financial socialisation, i.e. the age at which the subjects receive pocket money and have access to a bank account.

Is the observed difference in financial literacy across the language border specific to financial topics - or does it simply mirror differences in general cognitive ability across the two cultural groups. Unfortunately, our survey does not include measures of the general cognitive ability of students. Moreover, no results of a standardized student test are available across the language border within the Canton of Fribourg. However, the PISA 2012 study, a standardized test by the OECD conducted worldwide, was conducted for the French-speaking region of the canton of Fribourg. Hereby, students from French-speaking municipalities in the canton of Fribourg performed significantly better than the Swiss average (French- and German-speaking) in all tested subjects (reading, math and science).³¹ Over all students in Switzerland for which data is available, students from the German-speaking region performed better in math and science questions of the test compared

³¹ Students from French-speaking municipalities in the canton of Fribourg scored 520 points (Swiss average: 507) in reading, 550 points (531) in math and 518 points (513) in science. The PISA 2012 test covered both language groups in the bilingual cantons Valais and Bern. In the canton of Valais, students

to students from the French-speaking region of Switzerland. No statistical difference exists in reading. However, it is important to note that observed regional differences are small, compared to the difference in financial literacy observed in our sample. The difference in the average PISA math score between the French-speaking and the German-speaking region is 11 points (German-speaking: 534, French-speaking: 523) representing 2% of the sample mean. Thus, the observed cultural differences in financial literacy in our sample seem to far exceed observed differences in general cognitive ability among a similar student population.

5. Explaining cultural differences in financial literacy

In this section we examine to what extent the observed differences in financial literacy across the language groups can be explained by systematic differences in time and risk preferences, financial socialisation, norms or money attitudes. We disentangle the previously estimated average treatment effect of culture on financial literacy into a direct effect and an indirect effect, going through the above mentioned mediators.

5.1. Methodology

Our analysis aims to identify the mediation effect of different potential mediators (see e.g. Baron and Kenny (1986), Pearl (2001) and Imai et al., (2011) for a detailed discussion of the methodology). In addition to the outcome Y_i and the treatment T_i we observe the value of the mediator M_i for student i . $M_i(1)$ denotes the potential mediator value for treated students while $M_i(0)$ denotes the potential mediator value in case of non-treatment. $Y_i(t, m)$ denotes the potential outcome under treatment status t and mediator value m . We can now define the direct effect and the mediation effect (defined as ACME: Average Causal Mediation Effect).

$$\text{Direct effect} = E[Y(1, M(t)) - Y(0, M(t))]$$

$$\text{ACME} = E[Y(t, M(1)) - Y(t, M(0))]$$

The direct effect is based on the idea of exogenously varying the treatment - the exposure to a language region - under fixed values for the mediator variable. For the ideal estimation of the ACME, an exogenous variation in the mediating variable is required while the treatment status is kept constant. In our setting, it would for example require an exogenous change in economic preferences of students that remain in their language region.

The sum of the two effects equals to the previously observed ATE or the total effect.

$$\text{ATE} = \text{Total effect} = \text{Direct effect} + \text{ACME} = Y_i(1, M_i(1)) - Y_i(0, M_i(0))$$

We are able to estimate the average causal mediation effect assuming sequential ignorability (Imai et al., 2010). The first component of sequential ignorability requires an unbiased estimation of ATE for Y and for M (as previously discussed in 4.1). The second underlying assumption requires that:

$$Y_i(t, m) \perp M_i | T_i = t, X_i = x$$

Any factor mutually influencing Y and M may bias our result. Since mediators potentially influence other mediators, this might be a source of bias. We apply the methodology suggested by Imai and Yamamoto (2013) to control for other mediators that could potentially influence the mediator of interest and the outcome Y in a robustness check (Appendix 7).³²

In order to distinguish between a direct and a mediation effect, we estimate the following two linear regressions:

$$M_i = \alpha_2 + \beta_2 T_i + \xi_2 X_i + \varepsilon_{i2}$$

$$Y_i = \alpha_3 + \beta_3 T_i + \gamma M_i + \xi_3 X_i + \varepsilon_{i3}$$

The mediation effect is defined as $\text{ACME} = \beta_2 \times \gamma$ while the Direct effect $= \beta_3$.

5.2. Results

By construction, a strong mediator needs to be highly correlated with the outcome variable (financial literacy) and needs to vary significantly with the treatment (language group). Table 5 shows that all potential mediators are significantly correlated with financial literacy in a simple pairwise correlation test. Students who are less risk seeking and more patient have a higher financial literacy score. Financial socialisation, debt norms and money attitudes are also strongly correlated

from French-speaking schools performed better than students attending German-speaking schools in all three subjects. In the canton of Bern, students from German-speaking schools performed better than students from French-speaking schools in all three subjects. The PISA 2012 test results for Swiss cantons are available on <http://pisa.educa.ch/de/pisa-2012-0>.

³² The underlying assumptions that allow to establish causality of the mediation effect are very strong, not testable and nearly impossible to fully meet in a setting without controlled variation of mediators (see Green et al. (2010) for a critical analysis of the methodology). While we cannot rule out a potential bias of estimated mediation effects, the approach provides a structured analysis of potential channels of the treatment effect.

Table 5

Pairwise correlations of outcome variables and mediators. This table reports pairwise correlations. ***, **, * denote significance of the correlation coefficient at the 0.01, 0.05 and 0.10-level.

	FL-Score	Fin-Understanding
FL-Score	1.00	
Fin-Understanding	0.33***	1.00
Risk seeking	−0.1**	−0.02
Patience	0.27***	0.21***
Financial socialisation	0.23***	0.15***
Debt norms	0.1**	0.09**
Freedom & control	−0.08**	0.03
Social prestige	−0.18***	−0.07*

Table 6

Language group and potential mediators.

This table reports results of the OLS regression of the French dummy variable on preferences, financial socialisation and money attitudes. Basic control variables include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. Standard errors are clustered at class level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level.

Dependent variable:	Preferences		Financial socialisation	Norms and money attitudes		
	(1) Risk seeking	(2) Patience	(3) Financial socialisation	(4) Debt norms	(5) Freedom & control	(6) Social prestige
French	0.042** (0.020)	−0.013 (0.017)	−0.138*** (0.035)	−0.096** (0.040)	0.219*** (0.035)	0.016 (0.020)
Constant	0.347*** (0.051)	0.649*** (0.047)	0.570*** (0.084)	0.751*** (0.098)	0.428*** (0.090)	0.137** (0.051)
Mean	0.41	0.67	0.52	0.67	0.48	0.12
Observations	528	535	546	570	583	580
R-squared	0.049	0.143	0.122	0.061	0.147	0.064
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes
Extended controls	Yes	Yes	Yes	Yes	Yes	Yes

with the financial literacy score. Considering the magnitude of the pairwise correlations we find that *Patience* and *Financial socialisation* have the highest correlation with the financial literacy score. These two variables are also the two mediators most significantly correlated with our self-assessed measure of financial understanding.

Table 6 presents the estimated differences in preferences, financial socialisation, norms and money attitudes between the two language groups estimated in a linear model. Our estimates reveal only small differences in relevant economic preferences between the language groups. Students at French-speaking schools are slightly more willing to take risks. By contrast our estimates do not yield significant differences for *Patience*. In line with the linguistic-savings hypothesis (Chen, 2013), Sutter et al. (2015) report significant differences in time preferences among students of a bilingual town in Southern Tirol. There, German-speaking students are reported to be significantly more patient. Our findings, by contrast, do not support the linguistic-savings hypothesis.

Students at French-speaking schools obtain on average a by 0.14 lower value in *Financial socialisation*, which corresponds to one-fourth of the mean in the full sample. Students at French-speaking schools also report a significantly lower value for *Debt norms*, indicating that their parents less often discourage them from taking on debt. This point estimate corresponds to one-seventh of the mean in the full sample. Further, students at French-speaking schools report money as more important in attitude questions assessing the *Freedom & control* component. The estimated effect of 0.22 corresponds to 46% of the mean in the full sample. We do not observe any significant difference in money attitudes related to social prestige. Combining the results from Tables 5 and 6, we would expect that the strongest mediator of culture on financial literacy is financial socialisation. This mediator is both strongly correlated with financial literacy and differs significantly across the language groups.

In Table 7 we present the results of our formal mediation analysis. The table reports for the outcome variable *FL-Score* and our six mediators of culture the average causal mediation effect (ACME) and the direct effect as well as the proportion of the estimated total effect that is mediated. In line with our findings from Tables 5 and 6, we find that *Financial socialisation* is the only statistically significant mediator of cultural group membership on financial literacy. For our objective measure of financial literacy, financial socialisation can account for 12% of the observed difference in financial literacy between the language groups.

The mediation analysis presented above may suffer from a potential violation of the sequential ignorability assumption since it implicitly assumes that the multiple mediators are causally independent of another. We apply the methodology

Table 7

Mediation analysis.

This table reports results of the mediation analysis. The R package mediation (Tingley et al., 2014) was used to implement the analysis. ACME is the average causal mediation effect capturing the mediation effect of a particular mediation channel. The proportion mediated is defined as ACME/Total effect. Basic control variables include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level.

Dependent variable: FL-Score						
	Preferences		Financial socialisation	Norms and money attitudes		
	(1)	(2)	(3)	(4)	(5)	(6)
	Risk seeking	Patience	Financial socialisation	Debt norms	Freedom & control	Social prestige
ACME	0.00 (0.93)	−0.02 (0.5)	−0.12*** (0)	−0.03 (0.29)	−0.01 (0.81)	−0.02 (0.25)
Direct effect	−1.03*** (0.00)	−1.01*** (0.00)	−0.89*** (0.00)	−0.99*** (0.00)	−1.01*** (0.00)	−1.01*** (0.00)
Total effect	−1.02*** (0.00)	−1.02*** (0.00)	−1.02*** (0.00)	−1.02*** (0.00)	−1.03*** (0.00)	−1.03*** (0.00)
Prop. mediated	0.00 (0.93)	0.01 (0.5)	0.12*** (0)	0.02 (0.29)	0.02 (0.81)	0.02 (0.25)
Obs	461	461	461	461	461	461
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes
Extended controls	Yes	Yes	Yes	Yes	Yes	Yes

suggested by Imai and Yamamoto (2013) to control for potential causal effects between mediators. Results from this analysis (Appendix 7) confirm the results presented in Table 7.

Cultural differences in financial literacy may be transmitted from one generation to another (vertical transmission) as well as via peers (horizontal transmission) (see for example Bisin and Verdier, 2001). Our analysis does not allow us to identify the relative importance of vertical as opposed to horizontal transmission. Specifically, our measure of *Financial socialisation* is related to actions of the students' parents; i.e. giving their children pocket money and access to a bank account. However, we do not know whether parents give their children pocket money (or set up a bank account) because they themselves received pocket money at an early age (intergenerational transfer). Alternatively, parents may give their children pocket money because all other children in their neighbourhood (or at school) receive pocket money (peer effects). Thus, while our mediation analysis does allow us to identify financial socialisation as an important driver of cultural differences in financial literacy, we remain silent on the role of parents and peers in this process.

6. Discussion

This paper studies to what extent and through which channels culture influences financial literacy among the youth. We employ survey data for 15-year old secondary school students located in a narrow geographic region along the German-French language border within the Swiss canton of Fribourg.

We find that students from the German-speaking area are more financially literate as revealed by their responses to a standard set of financial literacy questions as well as by their own subjective assessment. The difference mainly exists for native students from monolingual families that are arguably most strongly influenced by local culture. A mediation analysis suggests that financial socialisation is a significant driver of the cultural divide in financial literacy. Systematic variation in the age at which children receive pocket money and whether they have their own bank account is the predominant mediator through which culture translates into financial literacy in our context.

Our empirical setting at a within-country language border ensures that both cultural groups are exposed to very similar institutions, policies and economic conditions. Nevertheless, we do observe significant differences in relevant household-level and municipal-level characteristics across the language border. Our analysis shows that our estimates are robust to model specifications which include varying sets of household-level and municipal-level controls. Nevertheless, there remains a concern that households and their socioeconomic environments may also differ in unobservable characteristics which could potentially bias our estimates. That said, many unobservable differences in socioeconomic conditions across the language border may be endogenous to culture - i.e. systematic differences in preferences, beliefs and norms between the two language groups.

Our analysis provides a case-study of how cultural differences - i.e. systematic differences in preferences, beliefs or norms across distinct social groups - can impact on financial knowledge and skills. Further research in our empirical setting suggests that the observed differences in financial literacy among the youth are consistent with differences in saving and consumption behaviour among the youth (Spycher, 2018) and adults (Guin, 2017) as well as with indebtedness among young adults (Henchoz et al., 2017). Our results do not imply that in all contexts different cultural backgrounds will translate into significant differences in economic literacy or behaviour. However, they do support previous findings which suggest that the cultural background of consumers may strongly impact on their economic decision making under very similar economic institutions and conditions.

Financial literacy has gathered considerable attention among policy makers in recent years. Substantial investments in financial education initiatives have been made by the public and private sector with many countries implementing financial education initiatives on a countrywide scale, e.g. in public schools. The findings of our study are especially relevant for designing more effective programs in countries with a culturally diverse population, e.g. due to a large immigrant population or historical language and religious borders. Our results suggest that in such contexts policy makers should carefully assess the initial levels of knowledge among their target population before they administer financial education initiatives. In our context, for example, teachers in secondary school should be aware that the familiarity of students with basic financial products varies significantly due to differences in financial their socialisation. In other contexts the relevant differences in initial financial literacy levels may lie elsewhere.

Acknowledgments

We thank the Department of Public Instruction, Culture and Sport of the canton of Fribourg (EKSD / DICS) for supporting this study. We thank Christian Biener, Kristian Blickle, Lionel Cottier, Geraldo Cerqueiro, Andrew Ellul, Beatrix Eugster, John Gathergood, Xavier Giroud, Antonia Grohmann, Martin Huber, Søren Leth-Petersen, Lukas Menkhoff and Stefan Trautmann, as well as seminar and conference participants at the 3rd Cherry Blossom Financial Education Institute, ETH Zurich, LMU Munich, SSES Annual Congress 2017, the Swiss National Bank, the University of Glasgow, the University of Lausanne and the University of St. Gallen for helpful comments. We are grateful to Sébastien Bétrisey, Céline Buntschu, Manuela Frey, Benjamin Guin and Manuel Wälti for their assistance with the development and translation of the survey. We are grateful to the Swiss National Science Foundation for financial support. Brown gratefully acknowledges financial support from the [European Investment Bank](#) Institute through its EIBURS initiative. The findings, interpretations and conclusions presented in this article are entirely those of the authors and should not be attributed in any manner to the European Investment Bank or its Institute.

Appendix 1

Financial literacy questions.

The table displays the individual topics covered in the financial literacy score and the source of the question. It further provides the share of correctly answered questions by school language. The sample means are compared using a *t*-test. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. For questions 2.5 and 2.6a and b were related to the same graphical element (2.5 image of a bank statement: a reading the balance in the account statement b the sum of account outflows; 2.6 line plot of a stock price; a the best month to buy a stock, b the stock price increase over 12 months.).

Question	Concept	Question adapted from:	Share correctly answered		
			German-speaking	French-speaking	Difference
2.1	Simple interest	Atkinson and Messy (2012)	0.77	0.42	0.35***
2.2	Compound interest	Lusardi and Tufano (2015)	0.37	0.22	0.15***
2.3	Percentage calculation of purchase decision	FSA (2006)	0.80	0.71	0.09***
2.4	Budgeting	OECD (2012)	0.50	0.42	0.08**
2.5a	Understanding of bank statement	OECD (2012)	0.63	0.58	0.05
2.5b	Understanding of bank statement	OECD (2012)	0.70	0.54	0.16***
2.6a	Graphical understanding of stock price development	OECD (2012)	0.64	0.71	−0.07*
2.6b	Graphical understanding of stock price development	OECD (2012)	0.62	0.47	0.15***
2.7	Inflation	Lusardi and Mitchell (2011)	0.37	0.25	0.12***
2.8	Diversification	Lusardi and Mitchell (2011)	0.80	0.62	0.18***

Appendix 2a

Summary statistics and variable definitions.

Variable	Obs	Mean	SD	Min	Max	Mean German	Mean French	Diff	P-value <i>t</i> -test	Description	Question
FL-Score	649	5.53	2.44	0.00	10.00	6.20	4.94	1.25	0.00	Financial literacy score; 10 = highest FL	2.1–2.8
Fin-Understanding	640	2.43	1.37	0.00	5.00	2.72	2.16	0.56	0.00	Financial matters are confusing; 0 - 5; 5 = fully disagree	3.1 i)
Patience	584	0.67	0.16	0.07	1.00	0.69	0.66	0.02	0.06	Average of quantitative and qualitative time preference measure	
Time preferences quant. measure	599	0.74	0.25	0.00	1.00	0.77	0.70	0.07	0.00	Share allocated to patient choice in time preference game	3.4
Time preferences qual. measure	633	0.61	0.18	0.07	1.00	0.60	0.61	−0.02	0.27	General qualitative patience questions; High if more patient	3.1 b)-d)
Risk seeking	581	0.41	0.18	0.00	1.00	0.39	0.43	−0.05	0.00	Average of quantitative and qualitative risk preference measure	
Risk preferences quant. measure	593	0.26	0.23	0.00	1.00	0.25	0.27	−0.01	0.47	Share allocated to risky choice in risk preference game	3.5
Risk preferences qual. measure	635	0.64	0.21	0.17	1.00	0.60	0.67	−0.06	0.00	General risk attitude from qualitative question; High if high willingness to take risks	3.1a)
Financial socialisation	598	0.52	0.32	0.00	1.00	0.61	0.43	0.18	0.00	Average over next 3 variables	
Bank account	642	0.75	0.43	0.00	1.00	0.88	0.63	0.25	0.00	Binary variable = 1 if student has a bank account	1.1
Independent bank account	638	0.33	0.47	0.00	1.00	0.40	0.27	0.13	0.00	Binary variable = 1 if can independently use bank account	1.1
Dummy pocket money	611	0.45	0.50	0.00	1.00	0.55	0.37	0.18	0.00	Binary variable = 1 if first pocket money received < 12 years old (median 12 years)	1.5
Debt norms	629	0.67	0.41	0.00	1.00	0.74	0.62	0.12	0.00	Average over next 2 variables	
Not spend more than what you have	641	0.66	0.47	0.00	1.00	0.73	0.60	0.13	0.00	Binary variable = 1 if parents told student sometimes or often not to spend more than what she/he has	3.2 c)
Should not make debt	633	0.68	0.47	0.00	1.00	0.74	0.62	0.12	0.00	Binary variable = 1 if parents told student sometimes or often not to make debt	3.2 d)
Freedom & control	642	0.48	0.41	0.00	1.00	0.35	0.59	−0.24	0.00	Average over next 2 variables; high = money important for freedom and control	
Tool to obtain goals	642	0.56	0.50	0.00	1.00	0.45	0.65	−0.21	0.00	Binary variable = 1 if student agrees or tends to agree that money is a tool to obtain goals	3.1 e)
Provides freedom	647	0.39	0.49	0.00	1.00	0.26	0.51	−0.26	0.00	Binary variable = 1 if student agrees or tends to agree that money provides freedom to do what I feel like	3.1 f)
Social prestige	639	0.12	0.23	0.00	1.00	0.11	0.14	−0.03	0.09	Average over next 2 variables; high = money important for social prestige	
Tool to make friends	644	0.06	0.23	0.00	1.00	0.09	0.02	0.07	0.00	Binary variable = 1 if student agrees or tends to agree that money is a tool to make friends	3.1 g)
Willing to do everything required to obtain money	641	0.19	0.40	0.00	1.00	0.12	0.26	−0.13	0.00	Binary variable = 1 if student agrees or tends to agree that he/she is willing to do everything required to obtain money	3.1 h)

Appendix 2b

Summary statistics control variables and variable definitions.

Variable	Obs	Mean	SD	Min	Max	Mean German	Mean French	Diff	P-value t-test	Description	
<i>Basic controls: Variables independent of cultural group membership</i>											
Female	649	0.47	0.50	0.00	1.00	0.45	0.49	−0.04	0.36	Binary variable = 1 if female	4.3
Swiss	649	0.77	0.42	0.00	1.00	0.93	0.63	0.30	0.00	Binary variable = 1 if Swiss citizen	4.6
Born in 2000	649	0.63	0.48	0.00	1.00	0.65	0.60	0.04	0.24	Binary variable = 1 if born in year 2000	4.1
Born after 2000	649	0.21	0.41	0.00	1.00	0.23	0.19	0.04	0.17	Binary variable = 1 if born after year 2000	4.1
<i>Extended controls: Variables potentially influenced by cultural group membership</i>											
Urban	649	0.29	0.45	0.00	1.00	0.17	0.39	−0.22	0.00	Binary variable = 1 if home municipality has > = 10,000 inhabitants	
Basic school level	649	0.28	0.45	0.00	1.00	0.25	0.31	−0.06	0.07	Binary variable = 1 if basic school level	
Medium school level	649	0.36	0.48	0.00	1.00	0.40	0.32	0.08	0.03	Binary variable = 1 if medium school level	
High school level	649	0.36	0.48	0.00	1.00	0.35	0.37	−0.02	0.63	Binary variable = 1 if high school level	
Single room	615	0.86	0.35	0.00	1.00	0.91	0.81	0.10	0.00	Binary variable = 1 if student has own room	4.16
Rent home	633	0.42	0.49	0.00	1.00	0.27	0.56	−0.29	0.00	Binary variable = 1 if family rents home	4.14
Holidays	640	3.02	1.56	0.00	5.00	3.08	2.97	0.11	0.36	Weeks of holidays together with parents this year	4.15
Catholic	637	0.59	0.49	0.00	1.00	0.55	0.62	−0.08	0.05	Binary variable = 1 if catholic	4.18
Protestant	637	0.14	0.35	0.00	1.00	0.23	0.06	0.17	0.00	Binary variable = 1 if protestant	4.18
Other religion	637	0.14	0.34	0.00	1.00	0.10	0.17	−0.07	0.02	Binary variable = 1 if other religion	4.18
Not religious	637	0.14	0.35	0.00	1.00	0.13	0.15	−0.02	0.39	Binary variable = 1 if not religious	4.18
<i>Variables not used in main specifications</i>											
Economic education	634	0.33	0.47	0.00	1.00	0.25	0.39	−0.14	0.00	Binary variable = 1 if topics related to financial education were covered in school	
Father university	570	0.31	0.46	0.00	1.00	0.34	0.29	0.05	0.24	Binary variable = 1 if father attended university	
Father no add. educ	570	0.12	0.33	0.00	1.00	0.03	0.22	−0.19	0.00	Binary variable = 1 if father neither attended university nor completed an apprenticeship	
Mother university	551	0.27	0.45	0.00	1.00	0.28	0.27	0.01	0.73	Binary variable = 1 if mother attended university	
Mother no add. educ	551	0.21	0.41	0.00	1.00	0.10	0.33	−0.23	0.00	Binary variable = 1 if mother neither attended university nor completed an apprenticeship	
Parents activities	626	0.29	0.45	0.00	1.00	0.30	0.27	0.03	0.42	Binary variable = 1 if parents attend concerts, visit museums and visit theatres (2 out of 3)	

Appendix 3

Heterogeneity of home municipalities.

The table displays the mean by language group of municipality characteristics in our sample. The variables are weighted by the number of students in the sample from the respective municipality.

Variable	German-speaking	French-speaking	Diff	p-value t-test
Nr of students	305	344		
Nr of municipalities	31	23		
<i>Main language spoken</i>				
Share German	0.67	0.17	0.49***	0.00
Share French	0.25	0.72	−0.47***	0.00
Share other language	0.08	0.11	−0.02***	0.00
<i>Population</i>				
Population in 1000	9.04	17.02	−7.98***	0.00
Urban municipalities (> = 10,000 residents)	0.17	0.39	−0.22***	0.00
Share of non-Swiss residents	0.18	0.29	−0.1***	0.00
<i>Economic activity</i>				
Share employed in primary sector	0.09	0.04	0.05***	0.00
Share employed in secondary sector	0.28	0.21	0.08***	0.00
Share employed in tertiary sector	0.63	0.75	−0.12***	0.00
Nr of cars per 1000 inhabitants	568.09	517.28	50.81***	0.00
Nr of bank branches in municipality	4.8	8.0	−3.2***	0.00
Municipalities without bank branch	0.16	0.13	0.04	0.16
Tax on income and wealth as share of cantonal tax	0.79	0.81	−0.02***	0.00
Municipal tax potential; Index cantonal average: 100	102.24	102.39	−0.15	0.93
<i>Religion</i>				
Share catholic	0.66	0.78	−0.12***	0.00
Share protestant	0.23	0.10	0.13***	0.00
Share other	0.05	0.05	0.00	0.86
Share not religious	0.06	0.07	−0.01***	0.00

Source: StatA Fribourg; bank branch information from [Brown and Hoffmann \(2016\)](#).

Appendix 4

Municipal majority language and financial literacy.

This table reports results of the OLS regression of a French municipality dummy variable on financial literacy. The framework corresponds to the RDD framework applied in other studies exploiting the language border (e.g. [Eugster et al., 2011](#); Guin, 2015). Since our observations stem from municipalities very close to the language border we do not apply a Local Border Contrast. The French municipality dummy takes on value 1 for 419 students and 0 for 215 students. A home municipality is defined as French-speaking if more than 50% of its inhabitants state French as their main language. The cantonal capital Fribourg is classified as a French-speaking municipality since 64% of the population state French as their first language. Consequently, 98% of students at the German-speaking school in Fribourg are classified as French-speaking according to the majority language definition. Basic control variables include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. Standard errors are clustered at class level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level.

Dependent variable:	(1) FL-Score	(2) FL-Score	(3) Fin-Understanding	(4) Fin-Understanding
French municipality	−0.558 (0.429)	−0.954*** (0.233)	−0.586*** (0.122)	−0.693*** (0.131)
Constant	4.783*** (0.425)	4.318*** (0.557)	2.977*** (0.212)	3.014*** (0.332)
Sample mean	5.494	5.464	5.494	5.465
Observations	629	570	620	561
R-squared	0.100	0.330	0.095	0.122
Basic controls	Yes	Yes	Yes	Yes
Extended controls	No	Yes	No	Yes

Appendix 5a

Propensity score matching: Language group and financial literacy.

This table reports the ATE of the propensity score matching model. The propensity score is estimated in a probit model. The table reports three matching procedures: NN(2) refers to 2 nearest neighbours; NN(5) refers to 5 nearest neighbours; IPW refers to inverse probability weighting. Basic control variables include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. Standard errors are bootstrapped. The p-value indicates the level of significance.

		Financial literacy	
		(1) FL-Score	(2) FL-Score
NN(2)	ATE	−0.79***	−1.14***
	SE	0.21	0.27
	p-value	0.00	0.00
NN(5)	ATE	−0.73***	−1.07***
	SE	0.21	0.24
	p-value	0.00	0.00
IPW	ATE	−0.81***	−1.12***
	SE	0.20	0.19
	p-value	0.00	0.00
Observations		649	588
Pscore estimation:			
Basic controls		Yes	Yes
Extended controls		No	Yes

Appendix 5b

Propensity score matching: Balancing properties.

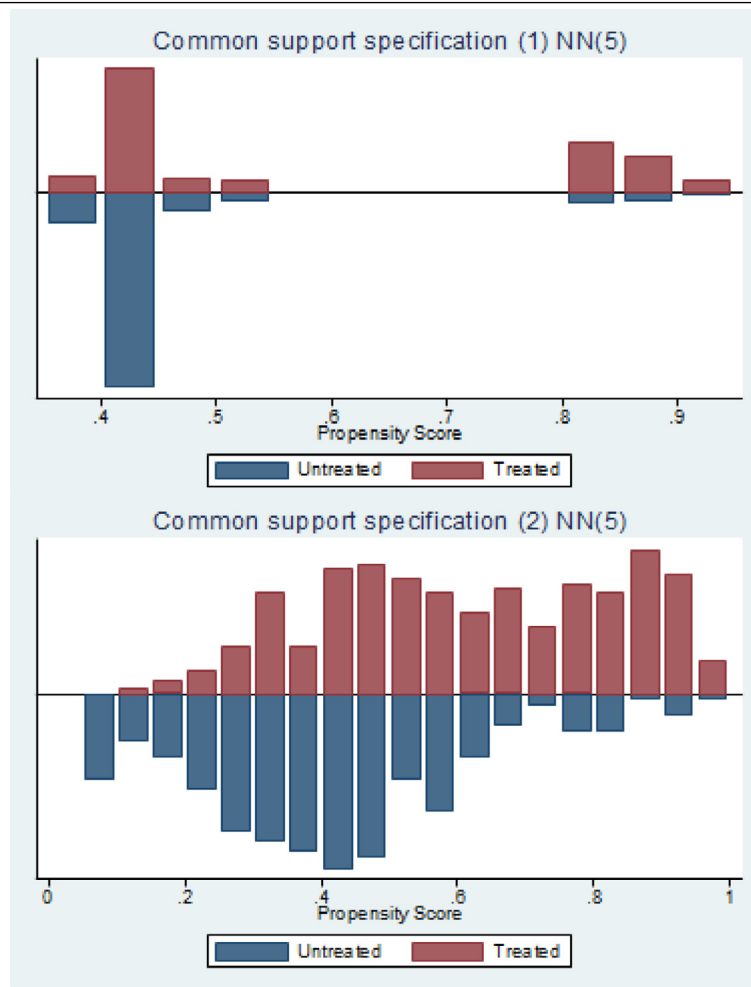
The tables below display the balancing properties of variables used in the propensity score estimation with basic (1) and extended (2) controls.

Specification (1) NN(5)					
Variable	Mean			t-test	
	Treated	Control	%bias	t	p > t
Obs	344	305			
Female	0.49	0.49	−0.5	−0.06	0.95
Swiss	0.63	0.63	0.0	0.00	1.00
Born in 2000	0.60	0.64	−6.8	−0.90	0.37
Born after 2000	0.19	0.16	8.1	1.15	0.25
Specification (2) NN(5)					
Variable	Mean			t-test	
	Treated	Control	%bias	t	p > t
Obs	307	281			
Female	0.50	0.52	−3.10	−0.39	0.70
Swiss	0.64	0.64	0.30	0.03	0.97
Born in 2000	0.60	0.59	2.10	0.26	0.79
Born after 2000	0.20	0.21	−3.50	−0.44	0.66
Urban	0.36	0.32	10.50	1.19	0.23
Rent home	0.54	0.52	3.60	0.42	0.68
Single room	0.81	0.82	−4.10	−0.46	0.65
Holidays	2.98	2.98	0.10	0.01	0.99
Medium school level	0.34	0.34	−1.10	−0.14	0.89
High school level	0.37	0.35	3.70	0.45	0.65
Catholic	0.62	0.64	−3.60	−0.45	0.65
Not religious	0.15	0.15	−0.20	−0.02	0.98
Protestant	0.06	0.04	7.30	1.41	0.16
Other religion	0.17	0.18	−1.90	−0.21	0.83

Appendix 5c

Propensity score matching: Common support for (1) and (2).

The two figures show the distribution of propensity scores of the treated (French-speaking) and untreated (German-speaking) group.



Appendix 6

Parental education and additional municipal controls.

This table reports robustness tests adding additional control variables to our baseline OLS regressions presented in Table 2. Basic controls include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious. Parental education includes Mother: apprenticeship, Mother: University, Father: Apprenticeship, Father: University. Additional municipal controls include: Nr. of bank branches, Share employed in tertiary sector, Tax potential. Standard errors are clustered at class level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Due to missing values, the number of observations fluctuates across specifications.

Dependent variable Sample	FL-Score Full sample		FL-Score by maternal level of education			FL-Score by paternal level of education		
	(1)	(2)	No add. educ (3)	Apprenticeship (4)	University (5)	No add. educ (6)	Apprenticeship (7)	University (8)
French	−1.259*** (0.277)	−1.237*** (0.243)	−1.648*** (0.422)	−1.147*** (0.320)	−1.270** (0.499)	−1.157 (0.707)	−1.050*** (0.295)	−1.140** (0.432)
Constant	4.683*** (0.616)	4.590*** (0.689)	4.867*** (1.110)	4.600*** (0.925)	4.389*** (1.094)	6.037*** (1.143)	4.458*** (0.751)	4.436*** (1.162)
Sample mean	5.7	5.465	5.22	5.543	6.176	4.719	5.418	6.3
Observations	471	570	109	256	142	64	292	167
R-squared	0.375	0.351	0.420	0.384	0.430	0.539	0.320	0.358
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Extended controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parental education	Yes	No	No	No	No	No	No	No
Additional municipal controls	No	Yes	No	No	No	No	No	No

Appendix 7

Mediation analysis with confounding by alternative mechanisms.

This table reports results of the mediation analysis taking into account causally dependent multiple mechanisms as described in Imai and Yamamoto (2013). The R package mediation (Tingley et al., 2014) was used to implement the analysis. The Diff column reports the difference of the estimate in this table compared to the estimate reported in Table 7. Alternative mediators included in the analysis are listed in the rightmost column. Basic control variables include: Female, Swiss, Born in 2000, Born after 2000. Extended controls include: Urban, School level, Single room, Rent home, Holidays, Catholic, Protestant, Other religion, Not religious.

		FL-Score					Mediators used as potentially confounding mediators
		Estimate	95%-CI	Diff			
Risk seeking	ACME	−0.01	−0.07	0.04	−0.02		Patience
	Direct effect	−1.01	−1.42	−0.61	0.01		Financial socialisation
	Total effect	−1.03	−1.44	−0.65	0.00		
	Prop. mediated	0.01			0.02		
Patience	ACME	−0.04	−0.10	0.03	−0.02	0.00	Financial socialisation
	Direct effect	−0.99	−1.39	−0.59	0.02	0.00	
	Total effect	−1.03	−1.40	−0.60	−0.01	0.00	
	Prop. mediated	0.03			0.02		
Financial socialisation	ACME	−0.11	−0.22	−0.01	0.01	0.00	Patience
	Direct effect	−0.91	−1.30	−0.52	−0.02	0.00	Debt norms
	Total effect	−1.03	−1.40	−0.64	0.00	0.00	
	Prop. mediated	0.11			−0.01		
Debt norms	ACME	−0.02	−0.08	0.04	0.01	0.00	Patience
	Direct effect	−1.00	−1.40	−0.61	−0.01	0.00	Financial socialisation
	Total effect	−1.03	−1.42	−0.63	−0.01	0.00	
	Prop. mediated	0.02			0.00		
Freedom & control	ACME	0.00	−0.13	0.12	0.01	0.00	Patience
	Direct effect	−1.02	−1.43	−0.61	−0.01	0.00	Social prestige
	Total effect	−1.03	−1.43	−0.65	0.00	0.00	
	Prop. mediated	0.00			−0.01		
Social prestige	ACME	−0.02	−0.07	0.03	−0.00	0.00	Patience
	Direct effect	−1.00	−1.40	−0.61	0.00	0.00	Freedom & control
	Total effect	−1.03	−1.44	−0.64	0.00	0.00	
	Prop. mediated	0.02			0.00		
Obs		461				0	
Basic controls		Yes					
Extended controls		Yes					

Appendix 8

Pairwise correlations of control variables capturing socioeconomic background with parental education.

This table reports pairwise correlations. ***, **, * denote significance of the correlation coefficient at the 0.01, 0.05 and 0.10-level. Parental education variables and parents culture have some missing values. The pairwise correlations are reported for all the available observations in the sample. Parent university is a binary variable equal to 1 if the parent attended university. Parent no additional education is a binary variable equal to 1 if the parent did neither attend university nor do an apprenticeship. Parents culture is a binary variable equal to 1 if parents attend at least two of the three events: Theatre, museum, classical music concerts or opera.

	Swiss	Urban	Basic school level	High school level	Rent home	Single room	Holidays
Father university	0.079*	0.188***	−0.194***	0.214***	−0.094**	−0.037	0.207***
Father no additional education	−0.377***	0.112***	0.133***	−0.107***	0.261***	−0.152***	−0.011
Mother university	0.01	0.199***	−0.163***	0.126***	−0.119***	0.023	0.245***
Mother no additional education	−0.351***	0.138***	0.133***	−0.048	0.250***	−0.204***	−0.01
Parents culture	0.198***	0.056	−0.172***	0.233***	−0.240***	0.117***	0.140***

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jebo.2018.03.011](https://doi.org/10.1016/j.jebo.2018.03.011).

References

- Alesina, A., Giuliano, P., 2015. Culture and institutions. *J. Econ. Lit.* 53 (4), 898–944.
- Atkinson, A. and Messy, F.-A., 2012. Measuring Financial Literacy.
- Bachmann, K., Hens, T., 2016. Is there Swissness in investment decision behavior and investment competence? *Financial Markets Portfolio Manag.* 30 (3), 233–275.
- Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* 51 (6), 1173–1182.
- Basten, C., Betz, F., 2013. Beyond work ethic: Religion, individual and political preference. *Am. Econ. J.: Econ. Policy* 5 (3), 67–91.
- Bisin, A., Verdier, T., 2001. The economics of cultural transmission and the dynamics of preferences. *J. Econ. Theory* 97 (2), 298–319.
- Black, S., Devereux, P., Lundborg, P., Majlesi, K., 2017. On the origins of risk-taking in financial markets. *J. Finance* 72 (5), 2229–2278.
- Brown, M., Hoffmann, M., 2016. Relationship banking in the residential mortgage market? Evidence from Switzerland. *Swiss J. Econ. Stat.* 152 (1), 23–48.
- Brown, M., Guin, B. and Morkoetter, S., 2017. Deposit Withdrawals from Distressed Commercial Banks: Client Relationships Matter. University of St.Gallen School of Finance Research Paper, 2013/19.
- Buccioli, A., Veronesi, M., 2014. Teaching children to save and lifetime savings: What is the best strategy. *J. Econ. Psychol.* 45, 1–17.
- Carroll, C.D., Rhee, B.-K., Rhee, C., 1994. Are there cultural effects on saving? Some cross-sectional evidence. *Q. J. Econ.* 109 (3), 685–699.
- Carroll, C.D., Rhee, B., Rhee, C., 1999. Does cultural origin affect saving behavior? Evidence from immigrants. *Econ. Develop. Cultural Change* 48 (1), 33–50.
- Chen, K., 2013. The effect of language on economic behavior: Evidence from saving rates, health behaviors, and retirement assets. *Am. Econ. Rev.* 103 (2), 670–731.
- Chen, D.L., Hungerman, D.M., 2014. Economics, religion, and culture: a brief introduction. *J. Econ. Behav. Organ.* 104, 1–3.
- Deuflhard, F., Georgarakos, D., Inderst, R., 2018. Financial literacy and savings account returns. *J. Eur. Econ. Assoc.* https://www.eeassoc.org/doc/upload/Deuflhard_Georgarakos_Inderst20180105223543.pdf
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., 2012. The intergenerational transmission of risk and trust attitudes. *Rev. Econ. Stud.* 79 (2), 645–677.
- Dohmen, T., Enke, B., Falk, A., Huffman, D., and Sunde, U., 2015. Patience, Accumulation and Comparative Development. Working Paper.
- Eugster, B., Lalive, R., Steinhauer, A., Zweimueller, J., 2011. The demand for social insurance: Does culture matter? *Econ. J.* 121, F413–F448.
- Eugster, B., Parchet, R., 2018. Culture and taxes. *J. Polit. Econ.*
- Eugster, B., Lalive, R., Steinhauer, A., Zweimueller, J., 2017. Culture, work attitudes and job search: Evidence from the Swiss language border. *J. Eur. Econ. Assoc.* 15 (5), 1056–1100.
- Fagereng, A., Mogstad, M. and Ronning, M., 2018. Why do Wealthy Parents have Wealthy Children?. Working Paper https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3146928.
- Falk, A., Becker, A., Dohmen, T.J., Enke, B., Huffman, D., 2018. Global evidence of economic preferences. *Q. J. Econ.*
- Falk, A., Becker, A., Dohmen, T., Huffman, D., and Sunde, U., 2016. The Preference Survey Module: A Validated Instrument for Measuring Risk, Time, and Social Preferences. Working Paper.
- Fernandes, D., Lynch Jr., J.G., Netemeyer, R.G., 2014. Financial literacy, financial education, and downstream financial behaviors. *Manag. Sci.* 60 (8), 1861–1883.
- FSA, 2006. Financial Services Authority. Financial capability baseline survey: Questionnaire.
- Fuchs-Schündeln, N., Masella, P. and Paule-Paludkiewicz, H., 2017. Cultural Determinants of Household Saving Behavior. Working Paper.
- Gathergood, J., 2012a. Self-control, financial literacy and consumer over-indebtedness. *J. Econ. Psychol.* 33 (3), 590–602.
- Gathergood, J., 2012b. Debt and depression: causal links and social norm effects. *Econ. J.* 122 (563), 1094–1114.
- Gaudecker, H.-M.v., 2015. How does household portfolio diversification vary with financial literacy and financial advice? *J. Finance* 70 (2).
- Green, D.P., Ha, S.E., Bullock, J.G., 2010. Enough already about “black box” experiments: studying mediation is more difficult than most scholars suppose. *Ann. Am. Acad. Pol. Soc. Sci.* 628 (1), 200–208.
- Grohmann, A., Kouwenberg, R., Menkhoff, L., 2015. Childhood roots of financial literacy. *J. Econ. Psychol.* 51, 114–133.
- Guin, B., 2017. Culture and Household Saving. *ECB Working Paper* 2069.
- Guiso, L., Sapienza, P., Zingales, L., 2006. Does culture affect economic outcomes? *J. Econ. Perspect.* 20 (2), 23–48.
- Haliassos, M., Jansson, T., Karabulut, Y., 2017. Incompatible European partners? Cultural predispositions and household financial behavior. *Manag. Sci.* 63 (11), 3780–3808.
- Henchoz, C., Coste, T. and Wernli B., 2017. Culture, Money Attitudes and Economic Outcomes. Working Paper.
- Holland, P.W., 1986. Statistics and causal inference. *J. Am. Statist. Assoc.* 81 (396), 945–960.
- Huber, M., 2015. Causal pitfalls in the decomposition of wage gaps. *J. Bus. Econ. Stat.* 33, 179–191.
- Imai, K., Keele, L., Tingley, D., 2010. A general approach to causal mediation analysis. *Psychol. Methods* 15 (4), 309.

- Imai, K., Keele, L., Tingley, D., Yamamoto, T., 2011. Unpacking the black box of causality: Learning about causal mechanisms from experimental and observational studies. *Am. Polit. Sci. Rev.* 105 (4), 765–789.
- Imai, K., Yamamoto, T., 2013. Identification and sensitivity analysis for multiple causal mechanisms: Revisiting evidence from framing experiments. *Political Anal.* 21 (2), 141–171.
- Jappelli, T., Padula, M., 2013. Investment in financial literacy and saving decisions. *J. Bank. Finance* 37, 2779–2792.
- Kaiser, T., Menkhoff, L., 2017. Does financial education impact financial behavior, and if so, when? *World Bank Econ. Rev.* 31 (3), 611–630.
- Kreiner, C.T., Leth-Petersen, S. and Willerslev-Olsen, L., 2016. Financial Trouble Across Generations: Evidence From the Universe of Personal Loans in Denmark. *Working Paper*.
- Lindbeck, A., 1997. Incentives and social norms in household behavior. *Am. Econ. Rev.* 87 (2), 370–377.
- Lusardi, A., Mitchell, O.S., 2007. Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *J. Monet. Econ.* 54 (1), 205–224.
- Lusardi, A., Mitchell, O.S., Curto, V., 2010. Financial literacy among the young. *J. Cons. Affairs* 44 (2), 358–380.
- Lusardi, A. and Mitchell, O.S., 2011. Financial Literacy Around the World: an Overview. *NBER Working Paper*.
- Lusardi, A., Mitchell, O.S., 2014. The economic importance of financial literacy: theory and evidence. *J. Econ. Lit.* 52, 5–44.
- Lusardi, A., Tufano, P., 2015. Debt literacy, financial experiences, and overindebtedness. *J. Pension Econ. Finance* 14 (4), 332–368.
- Lusardi, A., Michaud, P., Mitchell, O.S., 2017. Optimal financial knowledge and wealth inequality. *J. Polit. Econ.* 125 (2), 431–477.
- Meier, S., Sprenger, C., 2013. Discounting financial literacy: Time preferences and participation in financial education programs. *J. Econ. Behav. Organ.* 95, 159–174.
- Miller, M., Reichelstein, J., Salas, C., Zia, B., 2015. Can you help someone become financially capable? A meta-analysis of the literature. *World Bank Res. Obs.* 30 (2), 220–246.
- Mitchell, T.R., Mickel, A.E., 1999. The meaning of money: an individual-difference perspective. *Acad. Manage. Rev.* 24 (3), 568–578.
- Norvilitis, J.M., MacLean, M.G., 2010. The role of parents in college students' financial behaviors and attitudes. *J. Econ. Psychol.* 31 (1), 55–63.
- OECD, 2012. PISA 2012 Assessment and Analytical framework. Mathematics, Reading, Science, Problem Solving and Financial Literacy, Paris: OECD Publishing.
- OECD, 2014. PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century (Volume VI), Paris: OECD Publishing.
- Pearl, J., 2001. Direct and indirect effects. In: *Proceedings of the Seventeenth Conference on Uncertainty in Artificial Intelligence*. Morgan Kaufmann Publishers Inc, pp. 411–420.
- Rosenbaum, P.R., 1984. The consequences of adjustment for a concomitant variable that has been affected by the treatment. *J. R. Statistical Soc. Series A (General)* 656–666.
- Shim, S., Serido, J., Tang, C., Card, N., 2015. Socialization process and pathway to healthy financial development for emerging adults. *J. Appl. Devel. Psychol.* 38, 29–35.
- Sohn, S.H., Joo, S.H., Grable, J.E., Lee, S., Kim, M., 2012. Adolescents' financial literacy: The role of financial socialization agents, financial experiences, and money attitudes in shaping financial literacy among South Korean youth. *J. Adolesc.* 35 (4), 969–980.
- Spycher, T., 2018. Culture, Saving and Consumption: Evidence from the Youth. *Working Paper*.
- Steinhauer, A., 2013. Identity, working moms, and childlessness: Evidence from Switzerland. University of Zurich Discussion Paper.
- Sutter, M., Angerer, S., Glaetzel-Ruetzler, D. and Lergetporer, P., 2015. The Effect of Language on Economic Behavior: Experimental Evidence from Children's Intertemporal Choice. IZA Discussion Paper Series.
- Tingley, D., Yamamoto, T., Hirose, K., Keele, L., Imai, K., 2014. Mediation: R package for causal mediation analysis. *J. Stat. Softw.* 59 (5).
- Van Campenhout, G., 2015. Revaluating the role of parents as financial socialization agents in youth financial literacy programs. *J. Consumer Affairs* 49 (1), 186–222.
- van Rooij, M., Lusardi, A., Alessie, R., 2011. Financial literacy and stock market participation. *J. Financial Econ.* 101 (2), 449–472.
- van Rooij, M., Lusardi, A., Alessie, R., 2012. Financial literacy, retirement planning, and household wealth. *Econ. J.* 122 (560), 449–478.
- Webley, P., Nyhus, E.K., 2006. Parents' influence on children's future orientation and savings. *J. Econ. Psychol.* 27, 140–164.
- Webley, P., Nyhus, E.K., 2013. Economic socialization, saving and assets in European young adults. *Econ. Educ. Rev.* 33, 19–30.
- Yamauchi, K.T., Templer, D.J., 1982. The development of a money attitude scale. *J. Pers. Assess.* 46 (5), 522–528.