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Financial Literacy and Retirement Planning in Switzerland

Martin Brown
Swiss Institute of Banking & Finance, University of St. Gallen, martin.brown@unisg.ch

Roman Graf
University of St. Gallen, roman.graf@student.unisg.ch

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Abstract
We use a representative survey covering 1,500 households to document the level of financial literacy in Switzerland and to examine how financial literacy is related to retirement planning. We measure financial literacy with standardized questions that capture knowledge about three basic financial concepts: Compound interest, inflation, and risk diversification. We measure retirement planning by the incidence of a voluntary retirement savings account. Our results show that financial literacy in Switzerland is high by international standards--a result which is compatible with the high ranking of Switzerland on the PISA mathematical scales. Financial literacy is lower among low-income, less-educated, and immigrant, non-native-speaking households as well as among women. We find that financial literacy is strongly correlated with voluntary retirement saving. Our results also show that financial literacy is correlated with financial market participation and mortgage borrowing.

Keywords
financial literacy, retirement planning, financial market participaton, household debt

Cover Page Footnote
Martin Brown is Full Professor of Banking at the University of St. Gallen. He completed his PhD at the University of Zürich. Prior to joining the University of St. Gallen he worked as Senior Economist at the Swiss National Bank and as an Associate Professor of Finance at Tilburg University.

Roman Graf works in the corporate finance department of a Swiss bank. He holds a Bachelor of Science degree in Business Administration and is a candidate in the Master's Programme Banking & Finance at the University of St. Gallen. He gained professional experience in various functions in the Swiss financial industry.

Introduction

Since the onset of the global financial crisis, financial literacy has come to the forefront of policy agendas aimed at enhancing financial sector stability. Heavy losses by retail investors during the crisis have led to renewed policies to protect these investors from making ill-informed financial decisions. Limited financial literacy is further viewed as one driver of delinquencies in the US (subprime) mortgage market (Gerardi et al. 2010). Even before the recent turmoil in asset and mortgage markets, policy makers in the United States and the European Union (EU) showed a heightened interest in the relationship between financial literacy, household investment, and household debt. Individual responsibility for retirement planning and soaring levels of consumer debt have raised the question of whether households have sufficient financial knowledge to make adequate decisions on saving and debt and to manage their investments.

Mirroring the developments in the United States and the EU, household finance in Switzerland is characterized by increased individual responsibility for retirement planning, increased exposure of retail investors to complex assets, exposure of mortgage borrowers to interest rate and housing price risk, and rising levels of consumer debt.[1] These developments are met by government policies to enhance the protection of retail investors[2] and borrowers.[3] In addition, several initiatives have been undertaken to promote financial literacy in Switzerland, especially among the youth.[4] Surprisingly though, no survey so far has documented the level of financial literacy in Switzerland with internationally comparable indicators for a representative sample of the population or has

[1] Private indebtedness is especially considered to be a concern among the younger population in Switzerland. In an online survey 38% of adult respondents between 18 and 24 years of age reported having outstanding monetary liabilities (Streuli 2007).

[2] In a report released in 2010 and a subsequent position paper published in 2012, the Swiss Financial Market Supervisory Authority (FINMA) announced new guidelines regarding information provisions and business conduct applicable to financial institutions. Those new guidelines intend to strengthen retail investor protection, which is also the aim of current ongoing revisions of the Federal Act on Collective Investment Schemes (KAG) and the introduction of the prospective Federal Financial Services Act (FFSA). Both initiatives mirror the revision of the MiFiD regulation in the European Union (http://www.efd.admin.ch/dokumentation/zahlen/00578/02686/index.html?lang=en).

[3] In 2001, Switzerland introduced a consumer credit law to protect households from overindebtedness through interest rate caps and mandatory information exchange between credit institutions. For details see http://www.admin.ch/ch/d/sr/22.html#221.214.

[4] See Brown and Graf (2013) for an overview of financial literacy initiatives in Switzerland.

documented how financial literacy is related to the financial behavior of households.[5] This paper takes a first step at filling that gap.

We examine whether households in Switzerland are equipped with the financial knowledge necessary to plan for retirement and to make well-informed investment and borrowing decisions. In a first step, we provide a description of financial literacy in Switzerland and how it is related to the socioeconomic characteristics of households. Following Lusardi and Mitchell (2011b) we measure financial literacy using questions that capture knowledge about three basic financial concepts: compound interest, inflation, and risk diversification. By employing these standard questions we can compare the level and socioeconomic determinants of financial literacy in Switzerland to that in other countries that are part of the Organisation for Economic Co-operation and Development (OECD). In a second step we relate financial literacy to retirement planning, as measured by the incidence of having a voluntary retirement savings account. In robustness tests, we examine the relationship between financial literacy and financial market participation as well as between financial literacy and household debt (mortgage loans, consumer loans).

We find that the level of financial literacy in Switzerland is comparable to that reported by Bucher-Koenen and Lusardi (2011) for Germany and Alessie et al. (2011) for the Netherlands. Each individual financial literacy question was answered correctly by more than 70% of respondents, with half of the respondents answering all three questions correctly. Compared to other OECD countries, this level of financial literacy is high and thus compatible with the high ranking of Switzerland in the 2009 Program for International Student Assessment (PISA) mathematical scales (eighth out of sixty-five participating countries).

We find that female respondents, respondents with low educational attainment, foreign nationals, and respondents with low income and wealth have significantly lower levels of financial literacy. We further find that young and old respondents are less financially literate than middle-aged respondents. This result is driven by two countervailing effects: Knowledge about inflation is positively correlated with age, while knowledge about compound interest and risk diversification is negatively correlated with age.

Financial literacy is positively related to retirement planning. Respondents who answer all three financial literacy questions correctly are 9 percentage points

[5] Staeheli and Zobl (2008) examine financial literacy among predominantly young and well-educated respondents but do not use the "standardized" financial literacy questions employed in our survey. Similarly, Birchler et al. (2011) examine a representative survey of stock-market participation of Swiss households. They relate stock market participation to self-assessed measures of financial literacy but do not employ the "standardized" financial literacy questions employed in our survey.

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more likely to have a voluntary retirement savings account than respondents who do not answer all questions correctly. Financial literacy also correlates with financial market participation and mortgage debt, while we find no such relationship for consumer debt.

Related Literature

Our findings add to the growing literature that measures the extent of financial literacy around the world and examines which segments of the population are most or least financially literate. We confirm the findings of Alessie et al. (2011) for the Netherlands, Almenberg and Säve-Söderbergh (2011) for Sweden, Bucher-Koenen and Lusardi (2011) for Germany, and Sekita (2011) for Japan. All these studies document a significant income gap and gender gap in financial literacy. We further confirm the relationship between financial literacy and age documented by Crossan et al. (2011) for New Zealand, Fornero and Monticone (2011) for Italy, Klapper and Panos (2011) for Russia, and Lusardi and Mitchell (2011a) for the United States.

Our analysis contributes to the recent evidence on the relationship between financial literacy and household financial management. We confirm the positive relationship between financial literacy and retirement planning documented, e.g., by Bucher-Koenen and Lusardi (2011), Almenberg and Säve-Söderbergh (2011), and Sekita (2011). We also confirm that financially literate households are more likely to participate in financial markets, as shown by Van Rooij et al. (2011) for the Netherlands and Yoong (2011) for the United States. We confirm the results of Fornero and Monticone (2011), who find that households with a mortgage display a higher level of financial literacy. Contrary to the findings of Lusardi and Tufano (2009), McCarthy (2011), and Gathergood (2012), we do not find that financially literate households are less likely to have consumer debt.

Data

Our analysis is based on survey data from 1,500 individuals age 20–74 from the German-speaking part of Switzerland. The data were elicited by an international market research company in April 2011 on behalf of the University of St. Gallen. The survey was implemented with telephone interviews that lasted, on average, fifteen minutes. Respondents were not remunerated for their participation in the survey but were told that their responses would only be used for academic research purposes.

The survey is representative of the population in terms of age, gender, and geographic location. Self-employed respondents were screened out as the aim of

the survey was to gather information on financial behavior of households only. Respondents with insufficient knowledge of the German language were screened out by the survey administrators. As a result the survey is not representative of the population in terms of economic activity, nationality, or household income. In particular, the survey undersamples the non-German-speaking immigrant population and by doing so undersamples the low-income population and oversamples the home-owning population.

The survey questionnaire includes the three questions on financial literacy that were first developed for the 2004 American Health and Retirement Survey (see Lusardi and Mitchell 2011b). The exact wording of the questions is as follows:[6]

1. **Compound interest**
Suppose you have CHF 100 in a savings account, the interest rate is 2% per year, and there are no account management fees. After 5 years, how much do you think you would have in the account if you left the money in the account: (a) more than CHF 102, (b) exactly CHF 102, (c) less than CHF 102, or (d) don't know/ no answer.

2. **Inflation**
Imagine that the interest rate on your savings account is 1% per year and inflation is 2% per year. After 1 year, would you be able to buy (a) more than, (b) exactly the same as, or (c) less than today with the money in this account? or (d) don't know/ no answer.

3. **Diversification of risk**
Which of the following investments do you consider to be less risky? (a) an investment in stocks of a single company, (b) an investment in a mutual fund, or (c) don't know/ no answer.

The survey questionnaire further elicits socioeconomic characteristics from respondents (e.g., age, gender, education, employment status, household income), indicators of behavioral traits (risk aversion, time preferences), and information on the number of banking relationships and the types of financial products used by the respondent (e.g., retirement savings account, investment account, mortgage loan, consumer loan). The appendix provides definitions and summary statistics of all variables used in our analysis.

[6] The questions were translated from English to German, as the survey was conducted in German only.

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Results

How Much Do Individuals Know?

Table 1 displays the answers to the financial literacy questions. The question about compound interest was answered correctly by 79% of survey respondents, while the question on inflation was answered correctly by 78% of respondents. For the interest and inflation questions the share of incorrect answers (18% and 17% respectively) was substantially higher than the share of nonresponses (3% and 4% respectively). Correct answers to the question on risk diversification were slightly lower at 73%. This question displays a higher share of nonresponses (13%) compared to the first two questions, but similar levels of incorrect answers. Table 1 shows that responses to each of the three questions are robust to the exclusion of the youngest and oldest respondents (below 25 years or above 65 years).

Table 1
Financial Literacy: Summary Statistics

	Full sample [*n* = 1,500] (in %)	Age 25–65 [*n* = 1,297] (in %)
Question 1: Interest		
More than CHF 102 *(correct answer)*	79.3	80.7
Exactly CHF 102	11.1	10.7
Less than CHF 102	6.9	6.3
Don't know / refuse to answer	2.8	2.2
Question 2: Inflation		
More	6.3	6.4
Exactly the same	11.1	11.2
Less *(correct answer)*	78.4	78.5
Don't know / refuse to answer	4.2	3.9
Question 3: Risk		
Investment in single stock	13.5	13.3
Investment in mutual fund *(correct answer)*	73.5	74.9
Don't know / refuse to answer	13.0	11.8
Overall		
Interest & Inflation correct	64.0	65.3
All correct	50.1	52.1
None correct	3.4	3.3
At least one *don't know / refuse to answer*	16.9	15.3
All *don't know / refuse to answer*	0.7	0.5

Table 1 shows that exactly 50% of the respondents in our sample answered all three financial literacy questions correctly. The share of respondents who could correctly answer all three questions is similar to that documented by Bucher-Koenen and Lusardi (2011) for Germany (53%) and by Alessie et al. (2011) for the Netherlands (45%). This is surprising given that our survey was implemented through telephone interviews—in contrast with the survey for Germany (paper and pencil) and the Netherlands (Internet)—and that previous

telephone-based surveys in OECD countries have been characterized by substantially lower shares of respondents answering all questions correctly, e.g., 30% as documented for the United States by Lusardi and Mitchell (2011a). The comparatively high level of financial literacy in Switzerland may be related to the high level of mathematical education at the primary and secondary school levels: The PISA 2009 results rank Switzerland eighth among sixty-five participating countries on the mathematics scale.[7]

The share of nonresponses in our survey is low. Table 1 reports nonresponse rates of 3%, 4%, and 13% for the Interest, Inflation, and Risk questions respectively.[8] By comparison, Bucher-Koenen and Lusardi (2011) find nonresponse rates of 11%, 17%, and 32% for the three questions. One potential explanation for the low frequency of nonresponses in our survey is that the financial literacy questions were posed at the end of a fifteen-minute survey that asked detailed questions about respondents' banking relationships and financial behavior during the financial crisis. Thus by the time respondents were asked the financial literacy questions they may have already been "warmed up" in terms of reflecting on financial issues.[9]

Who Knows the Least?

Table 2 relates the financial literacy of respondents to the demographic indicators *age*, *gender*, *education*, and *employment status*. See the appendix for definitions of all variables included in the analysis.

Table 2 documents the usual hump-shaped relationship between age and financial literacy. Respondents between 36 and 50 years of age have the highest level of financial literacy, with 52% answering all questions correctly. By contrast, in the under-35 age group (above 65 years) only 45% (42%) of respondents answered all questions correctly. A closer look at the three financial literacy questions reveals that the hump-shaped relationship between financial literacy and age is driven by two countervailing effects: age is positively correlated with knowledge about inflation, while it is negatively correlated with knowledge about risk diversification. The youngest age group displays a similar share of correct answers to the interest and risk questions compared to middle-aged respondents, but they are less likely to answer the inflation question

[7] See http://www.oecd.org/pisa/46643496.pdf. By comparison Switzerland ranks fourteenth on the reading scale and fifteenth on the science scale.

[8] Contrary to other papers, it is not possible to differentiate between "do not know" and refuse to answer.

[9] Alternatively, the telephone interviewers may have repeatedly asked the questions or prompted respondents. However, all interviewers received strict instructions not to prompt respondents and random controls of interviews suggest that these instructions were followed.

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correctly. By contrast, the oldest age group displays higher shares of correct answers to the inflation question than middle-aged respondents but is less likely to answer the risk and interest questions correctly.

Table 2

Financial Literacy and Socioeconomic Characteristics

	Interest		Inflation		Risk		Overall	
Characteristics	Correct (%)	DK (%)	Correct (%)	DK (%)	Correct (%)	DK (%)	All correct (%)	At least one DK (%)
Whole sample	79.3	2.8	78.4	4.2	73.5	13.0	50.1	16.9
Age								
35 and younger	78.7	3.6	63.9	9.5	77.5	11.8	45.0	19.5
36–50	82.1	2.2	73.9	3.6	78.1	8.6	52.4	12.7
51–65	79.2	2.1	83.0	3.2	70.7	14.5	49.1	17.0
Older than 65	72.8	5.4	84.0	3.5	61.5	21.4	41.6	24.9
Sex								
Men	85.6	1.4	84.9	2.8	78.6	9.1	62.0	11.8
Women	73.5	4.1	72.5	5.5	68.8	16.5	39.3	21.6
Education								
Primary or lower secondary	62.9	10.5	64.5	0.1	53.2	29.0	26.6	34.7
Vocational	76.7	2.8	73.2	5.1	72.4	12.2	43.1	17.2
Upper secondary	79.4	2.9	78.7	4.4	66.2	18.4	44.9	22.8
Tertiary	87.5	0.0	90.2	1.7	82.5	8.6	68.9	10.2
Employment status								
Employed	82.7	1.7	79.3	3.5	77.3	10.5	54.2	13.9
Not employed	70.4	4.7	68.2	7.3	69.1	15.0	41.2	20.6
Retired	74.2	5.2	85.9	4.2	61.5	22.1	41.8	25.8

Notes: This table presents the answers to the three financial literacy questions by age, gender, education, and employment status of respondents. *DK* indicates that respondents refused to answer the question or didn't know the answer. See the appendix for definitions of all variables.

Table 2 documents a strong correlation between financial literacy and education: Only 27% of respondents with primary or lower secondary education as their highest degree answer all questions correctly compared to 69% of respondents with a university degree. These results mirror the findings for the Netherlands by Alessie et al. (2011). With respect to employment status we find that respondents with wage employment have substantially higher levels of financial literacy (54% all correct) than respondents who are not employed (41%) and retired respondents (42%).

Table 2 confirms the significant gender gap in financial literacy that has been documented in previous studies: Men outperform women on all three questions. We find that 62% of men answered all three questions correctly compared to only 39% of women. In line with previous evidence (Lusardi and Mitchell 2011a) we find that the gender gap in financial literacy is not only driven by a higher frequency of incorrect answers but also a higher frequency of nonresponses. The

share of women who indicate they don't know an answer or who refuse to answer at least one question (22%) is almost double that of men (12%).[10]

The Gender Gap in Financial Literacy

In Table 3a we examine two potential explanations for the substantial gender gap in financial literacy. First, the within-household division of labor may imply that women are less involved in financial decision making than men and are thus less familiar with the basic financial concepts captured by our financial literacy questions. Second, women may be less interested in financial matters than men. To examine these two conjectures we conduct univariate tests.[11]

Table 3a
Financial Literacy: Exploring the Gender Gap

Dependent variable: **All correct (%)**	Marital status: single	Marital status: other	Difference / **Diff in Diff**
Men	64.8 [*n* = 182]	61.0 [*n* = 531]	3.6 (4.17)
Women	36.6 [*n* = 134]	40.0 [*n* = 648]	-3.4 (4.64)
Difference	28.2*** (5.47)	21.0*** (2.86)	**7.2 (6.24)**

Dependent variable: **All correct (%)**	Financial interest: yes	Financial interest: No	Difference / **Diff in Diff**
Men	64.9 [*n* = 530]	59.0 [*n* = 154]	5.8 (4.4)
Women	45.2 [*n* = 405]	35.6 [*n* = 329]	9.6** (3.63)
Difference	19.7*** (3.21)	23.5*** (4.72)	**-3.8 (5.72)**

Dependent variable: **At least one DK (%)**	Marital status: single	Marital status: other	Difference / **Diff in Diff**
Men	9.3 [*n* = 182]	12.6 [*n* = 531]	-3.2 (2.77)
Women	26.1 [*n* = 134]	20.7 [*n* = 648]	5.4 (3.9)
Difference	-16.7*** (4.12)	-8.0*** (2.19)	**-8.7* (4.75)**

Dependent variable: **At least one DK (%)**	Financial interest: yes	Financial interest: No	Difference / **Diff in Diff**
Men	8.9 [*n* = 530]	18.2 [*n* = 154]	-9.3*** (2.84)
Women	19.5 [*n* = 405]	22.8 [*n* = 329]	-3.2 (3.02)
Difference	-10.6*** (2.22)	-4.6 (4.00)	**-6.0 (4.28)**

Notes: This table shows univariate difference-in-difference estimates for financial literacy measures (*all correct, at least 1 DK*) by gender, marital status, and financial interest of respondents. For example, the difference-in-difference estimator in the top left panel shows whether the gender difference in the share of respondents who answer all questions correctly is different among single respondents than among respondents with another marital status. *DK* indicates that respondents refused to answer the question or didn't know the answer. Standard errors are reported in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 level. The appendix provides all variable definitions.

First, we estimate the gender effect separately by marital status (*single* vs. *other marital status*). The results reported in Table 3a suggest that the gender gap in financial literacy is stronger among single respondents than among married or

[10] The finding that women are more likely to say that they don't know an answer is compatible with existing evidence on gender differences in overconfidence (Barber 2001).

[11] The term *univariate* in this context relates to the fact that we do not control for other household characteristics that may vary by gender and also affect financial literacy, e.g. household income.

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divorced respondents. Single women (compared to single men) are much less likely to answer all three questions correctly and more likely to not answer at least one question than women with other marital status (compared to men with other marital status). These findings contradict the hypothesis that a low level of involvement of women in household financial decision making is responsible for observed differences in financial literacy.

Second, we estimate the gender effect separately for respondents who are more (vs. less) interested in financial topics. Our *financial interest* indicator is a dummy variable[12] that takes the value one if the respondent reports that he/she followed the financial crisis very closely or closely and takes the value zero if he/she followed the crisis less closely or not at all. We find substantial gender differences in this indicator: while 45% of male respondents report that they followed the financial crisis closely, only 23% of female respondents did so. The results reported in Table 3a provide no evidence that a lack of financial interest is responsible for the gender gap in financial literacy. We find that among financially interested respondents, the gender difference in the share of respondents who answer all questions correctly (20 percentage points) is only slightly weaker than for respondents who are less interested in financial topics (24 percentage points). Furthermore, Table 3a shows that among financially interested respondents, the gender difference in the share of respondents with at least one nonresponse (11 percentage points) is *higher* than for respondents who are less interested in financial topics (5 percentage points). Interestingly, we find that men and women who are not interested in financial issues have similar propensities to not respond. This may suggest that men are only more confident (or overconfident) in answering financial questions if they are also interested in financial matters.

The Nationality Gap in Financial Literacy

We find a strong nationality gap in financial literacy: Only 34% of foreign citizens resident in Switzerland answered all three questions correctly while 28% did not respond to at least one question.[13] By comparison, 52% of Swiss citizens answered all questions correctly and only 16% did not answer all questions. One obvious reason for the difference between Swiss and foreign citizens lies in their German language skills. While households with insufficient German-language

[12] In empirical economics, binary (or indicator or categorical) variables are typically referred to as dummy variables. These variables takes the value of zero or one to indicate the absence or presence of some categorical effect.

[13] At the end of 2012 1.8 million of the 8.0 million residents in Switzerland had a foreign citizenship (23%). The majority of the foreign citizens resident in Switzerland are citizens of the European Union (1.2 million).
http://www.bfs.admin.ch/bfs/portal/en/index/themen/01/02/blank/key/bevoelkerungsstand/02.html

knowledge were screened out of our telephone survey, language skills may still vary substantially across the sample. Switzerland is populated by a significant share of immigrants with German as their native language (immigrants from Germany and Austria) as well as a significant share of Swiss citizens located in the German-speaking area but with a different native language (Swiss citizens from the French- or Italian-speaking regions or who are naturalized immigrants). This unique constellation allows us to examine in more detail whether the observed nationality gap in financial literacy is driven by citizenship (and therefore potentially by the education system) or simply by language skills.

Table 3b compares the financial literacy of Swiss citizens vs. that of citizens of other countries, conditional on their native language. Our results suggest that citizenship per se cannot explain our observed nationality gap. We find no statistically significant nationality gap in financial literacy among households with German as their native language. Differences in native language also do not, per se, induce a statistically significant gap in financial literacy: Swiss citizens without German as their native language are just as financially literate as Swiss citizens with German as their native language.

Table 3b
Financial Literacy: Exploring the Nationality Gap

Dependent variable: **All correct (%)**	Nationality: Swiss	Nationality: Other	Difference / **Diff in Diff**
Total	*51.9* [*n* = 1,357]	*33.6* [*n* = 135]	*18.3**** (4.37)
Language: German	52.0 [*n* = 1,278]	46.3 [*n* = 67]	5.7 (6.26)
Language: Other	50.6 [*n* = 79]	22.4 [*n* = 76]	28.2*** (7.45)
Difference	1.3 (5.79)	23.9*** (7.71)	**22.6** (10.11)**

Dependent variable: **At least one DK (%)**	Nationality: Swiss	Nationality: Other	Difference / **Diff in Diff**
Total	*15.8* [*n* = 1,357]	*28.0* [*n* = 135]	*-12.2**** (3.28)
Language: German	15.4 [*n* = 1,278]	17.9 [*n* = 67]	-2.5 (4.54)
Language: Other	21.5 [*n* = 79]	36.8 [*n* = 76]	-15.3** (7.23)
Difference	-6.1 (4.22)	-18.9** (7.41)	**-12.8* (7.60)**

Notes: This table shows univariate difference-in-difference estimates for financial literacy measures (*all correct, at least 1 DK*) by language and nationality of respondents. For example, the difference-in-difference estimator in the top panel shows whether the nationality-gap in the share of respondents which answer all questions correctly is different among respondents with German as their native language than among respondents with another native language. *DK* indicates that respondents refused to answer the question or that they didn't know the answer. Standard errors are reported in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 level. The appendix provides all variable definitions.

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Table 3b does, however, document a strong difference in financial literacy between immigrants with a non-German native language and the other three population groups in our analysis (Swiss citizens with and without German as a native language and immigrants with German as their native language). Immigrants without German as their native language are 24 percentage points less likely to answer all questions correctly and 19 percentage points more likely to have at least one nonresponse compared to immigrants with German as their native language. This finding may be driven by substantial differences in education levels between immigrants from Germany and Austria, compared to immigrants from Southern Europe. However, it may also be driven by the fact that the actual German language skills vary more among immigrants than among Swiss citizens.

Does Financial Literacy Matter for Retirement Planning?

In this section we relate financial literacy to retirement planning. Similar to Fornero and Monticone (2011) we employ an indicator of actual retirement savings rather than a measure of whether respondents have thought about their financial needs after retirement (as in Alessie et al. 2011; Bucher-Koenen and Lusardi 2011; Lusardi and Mitchell 2011a). Our *retirement account* indicator is a dummy variable[14] that takes the value one for households that report having a tax-exempt voluntary retirement savings account under the third pillar of the Swiss pension system. Our data document a high level of retirement planning among the Swiss population, with 41% of respondents reporting that they have a voluntary retirement savings account. By comparison, evidence from the 2007 US Consumer Finance Survey and the 2010 Eurosystem Household Finance and Consumption Survey suggests that only 35% of US households and 33% of euro zone households have a voluntary retirement savings account (Bucks et al. 2009; ECB 2013).[15]

Table 4 documents that respondents who plan for retirement are more financially literate. Households with a retirement account are much more likely to answer all three financial literacy questions correctly (60%) than households without a retirement account (44%). The difference in financial literacy between retirement planners and nonplanners is larger for the *risk* question (13 percentage

[14] In empirical economics, binary (or indicator or categorical) variables are typically referred to as dummy variables. These variables take the value 0 or 1 to indicate the absence or presence of some categorical effect.

[15] The popularity of tax-exempt retirement accounts in Switzerland may, however, be driven by the fact that such accounts are frequently required by banks for indirect mortgage amortization and are often used by younger citizens to save in a tax-efficient manner for a later property purchase rather than for retirement.

points) than it is for the *interest* question (8 percentage points) or the *inflation* question (10 percentage points).

Table 4
Financial Literacy and Retirement Planning

	Retirement account: yes [*n* = 610] (%)	Retirement account: no [*n* = 890] (%)
Question 1: Interest		
Correct	83.9	76.1
DK	1.5	3.7
Question 2: Inflation		
Correct	84.3	74.4
DK	2.6	5.3
Question 3: Risk		
Correct	81.1	68.2
DK	8.7	16.0
Overall		
Interest & Inflation correct	72.0	58.7
All correct	59.8	43.5
At least one DK	11.5	20.7

Notes: This table reports summary statistics for the three financial literacy questions, comparing respondents with a retirement savings account to respondents without a retirement savings account. *DK* indicates that respondents refused to answer or said that they did not know the answer.

Table 5 examines the relationship between financial literacy and retirement planning in a multivariate framework, controlling for household age, sex, education, employment status, and income. We further include regional fixed effects to account for differences in the proximity to financial centers as well as differences in local school curricula. In column (1) we measure financial literacy with the dummy variable *all correct* which is equal to one for respondents who answered all three questions correctly and zero otherwise. In column (2) we measure financial literacy by the variable *number correct* which measures the number of correct answers of the respondent (0–3). In column (3) we include the dummy variables *interest correct*, *inflation correct*, and *risk correct* which are equal to one for respondents who answer the respective questions correctly and zero otherwise. The reported coefficients in Table 5 are marginal effects based on probit estimates.[16]

Table 5 results show that, even after controlling for differences in socioeconomic characteristics, the relationship between financial literacy and retirement planning is economically and statistically significant. The estimate for *all correct* reported in column (1) suggests that a respondent who is able to answer all three financial literacy questions correctly is 9 percentage points more likely to have a retirement account. The estimate for *number correct* reported in

[16] We chose a nonlinear estimation (probit) model rather than a linear model (OLS) due to the fact that our dependent variable is a dummy (indicator, binary) variable.

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column (2) suggests that respondents who answer one more question correctly are 8 percentage points more likely to have a retirement account. The similarity between the estimates in columns (1 and 2) relates to the fact that the overwhelming majority of respondents either answer two questions correctly (34%) or all three questions correctly (50%). Thus the indicator *all correct* mainly distinguishes between these two groups, which differ only by one correct answer.

Table 5
Financial Literacy and Retirement Planning: Multivariate Analysis

	(1)	(2)	(3)
Dependent variable	Retirement account	Retirement account	Retirement account
All correct	0.0900***		
	[0.0280]		
Number correct		0.0776***	
		[0.0180]	
Interest correct			0.0277
			[0.0342]
Inflation correct			0.0893***
			[0.0329]
Risk correct			0.107***
			[0.0302]
Age: 35–50	0.0379	0.0374	0.0347
	[0.0337]	[0.0337]	[0.0339]
Age: 51–65	0.0803**	0.0782**	0.0777**
	[0.0389]	[0.0390]	[0.0395]
Age: Older than 65	-0.148**	-0.145*	-0.151**
	[0.0751]	[0.0753]	[0.0749]
Sex: Women	0.01	0.01	0.01
	[0.0295]	[0.0294]	[0.0295]
Education: Vocational	0.07	0.06	0.06
	[0.0538]	[0.0543]	[0.0544]
Education: Upper secondary	0.119*	0.11	0.11
	[0.0696]	[0.0700]	[0.0701]
Education: Tertiary	0.148**	0.134**	0.134**
	[0.0591]	[0.0596]	[0.0596]
Employment: Not employed	-0.06	-0.05	-0.05
	[0.0383]	[0.0386]	[0.0386]
Emploment: Retired	-0.109*	-0.114*	-0.111*
	[0.0646]	[0.0643]	[0.0644]
Income: Middle	0.174***	0.167***	0.167***
	[0.0319]	[0.0321]	[0.0321]
Income: High	0.286***	0.278***	0.279***
	[0.0435]	[0.0438]	[0.0439]
Income: DK	0.0943*	0.0938*	0.0922*
	[0.0503]	[0.0505]	[0.0506]
Estimation method	Probit	Probit	Probit
Canton fixed effects	Yes	Yes	Yes
No. of observations	1,500	1,500	1,500
Pseudo R^2	0.11	0.11	0.11

Notes: This table reports marginal effects of probit estimations with *retirement account* as the dependent variables. Standard errors are reported in brackets. Omitted categories for the displayed explanatory variables are Gender: Male, Age: 20–35 years, Education: Primary or lower secondary, Income: Low. All regressions include regional fixed effects (per canton). *DK* indicates that respondent refused to answer or said they did not know the answer. ***, **, *: significant at 0.01, 0.05, 0.10 confidence level. See the appendix for definitions of all variables.

Column (3) results show that retirement planning is significantly higher among respondents who answer the risk question (11 percentage points) and inflation question (9 percentage points) correctly, but not for respondents who answer the interest question correctly.

Considering our socioeconomic control variables we find the expected relationship between household age and retirement planning: Respondents between 50 and 65 years of age are more likely to have a retirement account than younger or older respondents. We also confirm a substantial education and income gap in retirement planning: Households with tertiary education and middle or high income are more likely to have a retirement account than households with low education and low income. Controlling for age, income, education, and financial literacy we find no difference in retirement planning between male and female respondents or between respondents who are employed or not employed.

Table 5 establishes a positive correlation between financial literacy and retirement planning. However, this correlation may not be causal. Ownership of a retirement account may result in a better understanding of interest, inflation, and risk due to exposure to information about financial products, financial advice from bank employees, or discussions with friends and family about savings plans and potential investments. Previous studies have used instrumental variables estimation to identify a causal relationship between financial literacy and retirement planning (see, e.g., Bucher-Koenen and Lusardi 2011; Alessie et al. 2011; Lusardi and Michell 2011a). Using an array of instruments, e.g., the regional vote share for liberal parties, financial education in schools, parent education, or the financial situation of siblings, these studies typically conclude that the correlation between financial literacy and retirement planning becomes stronger once the endogeneity of financial literacy is accounted for. In this paper we refrain from presenting an instrumental variables analysis for lack of strong instruments in our dataset.

Robustness

We provide two robustness checks to our analysis. First, following up on the studies by Gathergood (2012) and McCarthy (2011) we control for behavioral traits (risk aversion, time preferences) that may be correlated with financial literacy and that may also affect the financial behavior of households and thus their retirement planning. Second, we examine whether the observed correlation between financial literacy and retirement savings carries over to other types of financial behavior, i.e., financial market participation (as in Van Rooij et al. 2011) and household borrowing (as in Lusardi and Tufano 2009; Gerardi et al. 2010).

Our survey elicited measures of risk aversion and time preferences which have been shown to be correlated with financial literacy and financial behavior

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(Gathergood 2012; McCarthy 2011). The *risk averse* variable is a dummy variable that takes the value one for households who report a low willingness to take risk in their financial investments as indicated by a self-assessment of one or two on a scale of one (no risk) to six (high risk). The *myopic* variable is a dummy variable that takes the value one if the household fully or partially agrees to the statement "I live for the present and don't think about my financial future." The *impulsive* variable is a dummy variable that takes the value one if the household fully or partially agrees to the statement "I am impulsive and tend to buy things that I cannot afford."[17]

In column (1) of Table 6 we replicate our analysis from Table 5 (column 1) including our three measures of behavioral traits. The estimation model includes a full set of socioeconomic controls and regional fixed effects, but for brevity we report only the estimates for our indicators of financial literacy and behavior traits. The estimate for *all correct* suggests that, controlling for risk aversion and time preferences, a respondent who is able to answer all three financial literacy questions correctly is 8 percentage points more likely to have a retirement account. Importantly, the point estimate is only slightly lower than that reported in Table 5 column (1). Thus it appears that the observed relationship between financial literacy and retirement planning is not driven by an underlying correlation of both with risk aversion or time preferences.

Table 6

Financial Literacy, Behavioral Traits, and Financial Behavior

	(1)	(2)	(3)	(4)
Dependent variable	Retirement account	Investment account	Mortgage loan	Consumer loan
All correct	0.0837***	0.169***	0.0953***	-0.01
	[0.0287]	[0.0274]	[0.0301]	[0.00872]
Risk averse	-0.0605**	-0.150***	0.03	-0.00255
	[0.0294]	[0.0289]	[0.0306]	[0.00900]
Myopic	-0.0906***	-0.0711**	-0.0699**	0.00013
	[0.0301]	[0.0294]	[0.0319]	[0.00912]
Impulsive	-0.04	0.01	-0.05	0.0732**
	[0.0530]	[0.0545]	[0.0575]	[0.0305]
Estimation method	Probit	Probit	Probit	Probit
Socioeconomic controls	Yes	Yes	Yes	Yes
Canton-fixed effects	Yes	Yes	Yes	Yes
No. of observations	1,457	1,457	1,457	1,396
Pseudo R^2	0.11	0.13	0.18	0.19

Notes: This table reports marginal effects of probit estimations with *retirement account, investment account, mortgage loan,* and *consumer loan* as the dependent variables. Standard errors are reported in brackets. All regressions include a full set of socioeconomic control variables (see Table 5) as well as fixed effects per canton. *DK* indicates that respondent refused to answer or said they did not know the answer.***, **, *: significant at 0.01, 0.05, 0.10 confidence level. See the appendix for definitions of all variables.

[17] See Tsukayama et al. 2012 for a discussion of domain-specific measures of impulsiveness as implemented in our survey, i.e., the temptation to buy, as opposed to domain-unspecific measures.

Not surprisingly we find in column (1) of Table 6 that impatient households, as measured by *myopic*, are less likely to plan for retirement. By contrast, a lack of self-control, as measured by *impulsive*, does not reduce retirement planning. Rather surprisingly our results suggest that risk-averse households are less likely to plan for retirement. This may be due to the fact that risk-averse households are more likely to save in ordinary savings accounts rather than retirement savings accounts, as the former have no restrictions on withdrawals. An alternative explanation is that risk-averse households save through insurance solutions that offer benefits in the case of unemployment, disability, or death.

Our survey elicited detailed information on the banking relationships of respondents and the types of products held within each relationship. This allows us to relate financial literacy not only to retirement planning but also to financial market participation, mortgage borrowing, and consumer borrowing. In Table 6, columns (2–4) we examine these relationships. We employ three indicators of household investment and borrowing. The variable *investment account* measures financial market participation and is a dummy variable that takes the value one for households that report having a custody account with a bank for financial market investment purposes. The variables *mortgage loan* and *consumer loan* measure the incidence of secured and unsecured household borrowing, i.e., they are dummy variables that take the value one for households reporting that they have either type of loan.

Our data show a high level of financial market participation: 36% of respondents have an investment account. By comparison, evidence from the 2007 US Consumer Finance Survey and the 2010 Eurosystem Household Finance and Consumption Survey suggests that 18% (10%) of US (EU) households invest in stocks and 16% (11%) in mutual funds (Bucks et al. 2009, European Central Bank 2013). Our data further document a similar level of mortgage borrowing compared to US or EU households, but a much lower level of consumer debt. In our sample 46% of households report having a mortgage, compared to 45% in the US, 40% in the UK, or 43% in the Netherlands (see Crook 2006). The high incidence of mortgage debt confirms that we are oversampling homeowners in our survey, as in Switzerland only 40% of households own their own home.[18] By contrast, only 5% of our respondents report having a consumer loan compared to 49% in the United States, 34% in the UK, and 26% in the Netherlands. The very low incidence of consumer debt in our sample confirms that we are undersampling the low-income population with an immigration background due to the screening out of respondents with limited German language skills.[19]

[18] http://drs.srf.ch/www/de/drs/nachrichten/schweiz/334700.quote-der-eigenheimbesitzer-auf-rekordniveau.html

[19] In Switzerland unsecured consumer loans are strongly targeted toward the low-income immigrant population, as is evident from the fact that many consumer lenders' websites (in

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Results shown in Table 6 reveal a significant positive relationship between financial literacy, financial market participation, and mortgage debt. Respondents who answer all three financial literacy questions correctly are 17 percentage points more likely to have an investment account and 10 percentage points more likely to have a mortgage loan. By contrast, we find no significant relationship between financial literacy and the incidence of consumer debt. Our results also show that household investment and borrowing is strongly related to risk attitudes and time preferences. Risk averse and myopic households are less likely to invest in financial markets. In line with evidence by Meier and Sprenger (2010) we find that impulsive households are more likely to have a consumer loan.

Summary and Conclusions

In this paper we use survey data covering a representative sample of 1,500 households to document the level of financial literacy in Switzerland and to examine how financial literacy is related to retirement planning. We find that by international standards, financial literacy is high in Switzerland. This result is in line with Switzerland's high ranking on the mathematical scale of the 2009 PISA tests. In line with recent evidence we find that financial literacy is substantially lower among low-income and less-educated respondents as well as among women. We also find low levels of financial literacy among immigrants, especially those from non-German-speaking countries. We find that young respondents are not generally less financially literate than the rest of the population. While knowledge about inflation is low among the young population, knowledge about risk or interest rates is not. This result confirms recent evidence suggesting that—on average—Switzerland's young population is just as capable of making sound financial decisions as the rest of the population (BFS 2012; Henchoz and Wernli 2012). Mirroring recent evidence from other OECD countries we find that financial literacy is strongly correlated with voluntary retirement savings as well as with financial market participation and mortgage borrowing.

Our findings support the view that public initiatives to improve financial literacy may reduce the negative externalities of individual financial decisions on

contrast with banks' websites) are presented in languages of low-income populations, e.g., Serbian or Portuguese, in addition to German (see, for example, http://www.credit-now.ch/de/home/kredit-credit-now/). Swiss households may be particularly reluctant to report the incidence of consumer loans, as borrowing for consumption purposes is frowned upon in Swiss society. Karlan and Zinman (2008) report that US households strongly underreport their use of consumer loans in surveys. Aggregate data from the Swiss consumer credit bureau suggest that consumer borrowing is much higher in Switzerland than the 5% reported in our survey. The bureau reports that at the end of 2011, 454,576 consumer loans and 497,011 leasing contracts were outstanding compared to an adult population of 6.4 million inhabitants (see http://www.zek.ch).

society, e.g., the impact of inadequate retirement planning on the social welfare system. However, it is less clear to which segments of the population financial literacy initiatives should be targeted. In contrast with current practice in Switzerland, our results suggest that financial literacy initiatives should not be exclusively targeted toward the youth. Financial literacy policies should also be targeted toward the low-income and less-educated populations and maybe especially toward immigrant households from low-income countries. With regard to the gender gap in financial literacy, our results provide limited guidance for policy makers. They do, however, cast doubt on policies that aim to increase women's interest in financial matters, as strong financial interest does not seem to close the gender gap in financial literacy.

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Appendix: Variables

Variable	Description	Obs.	Mean	Min	Max
	Financial literacy				
All correct	1= answered all three financial literacy questions correctly.	1500	0.50	0	1
Number correct	Score of correct answers to all three questions (value: 0-3).	1500	2.31	0	3
At least 1 DK	1= At least 1 question was not answered, or respondent replied "don't know."	1500	0.17	0	1
Interest correct	1= answered question on interest correctly.	1500	0.79	0	1
Inflation correct	1= answered question on inflation correctly.	1500	0.78	0	1
Risk correct	1= answered question on risk diversification correctly.	1500	0.73	0	1
	Financial behavior				
Retirement account	1= household has at least 1 tax-exempted voluntary retirement account with a bank.	1500	0.41	0	1
Investment account	1= household has at least 1 investment account with a bank.	1500	0.36	0	1
Mortgage	1= household has at least 1 mortgage.	1500	0.46	0	1
Consumer loan	1= household has at least 1 consumer loan with a bank.	1499	0.05	0	1
	Main socioeconomic controls				
Age: below 35 years	1= respondent age between 20 and 35 years.	1500	0.26	0	1
Age: 36–50 years	1= respondent age between 36 and 50 years.	1500	0.37	0	1
Age: 51–65 years	1= respondent age between 51 and 65 years.	1500	0.26	0	1
Age: above 65 years	1= respondent age between 66 and 74 years.	1500	0.11	0	1
Gender: Women	1= female respondent, 0= male respondent.	1500	0.52	0	1
Education: Primary or lower secondary	1= respondent who attended only primary or secondary school.	1500	0.08	0	1
Education: Vocational	1= respondent who attended vocational training.	1500	0.51	0	1
Education: Upper secondary	1= respondent who attended grammar school (mittelschule, gymnasium, seminar).	1500	0.09	0	1
Education: Tertiary	1= respondent with tertiary (university, FH) education.	1500	0.32	0	1
Employed	1= respondent who is employed for wages.	1500	0.69	0	1
Not employed	1= respondent works in household, is student or is unemployed.				
Retired	1= respondent is retired.	1500	0.16	0	1
Income: Low	1= monthly household income below CHF 7,000.	1500	0.14	0	1
Income: Middle	1= monthly household income between CHF 7,000 and CHF 12,000.	1500	0.40	0	1
Income: High	1= monthly household income above CHF 12,000.	1500	0.14	0	1
Income: DK	1= respondents who refused to answer or said that they did not know the correct answer.	1500	0.10	0	1
	Other socioeconomic controls				
Marital status: Single	1= respondents is single. 0= respondent is married, in a permanent relationship, widowed or divorced.	1495	0.21	0	1
Financial interest: High	1= respondent followed the financial crisis closely or very closely.	1418	0.66	0	1
Nationality: Swiss	1= respondent with Swiss citizenship, = respondent without Swiss citizenship.	1500	0.90	0	1
Language: German	1= respondent with German as native tongue: 0= other native language.	1500	0.90	0	1
Risk averse	1= amount of risk the respondent is willing to take with his/her financial wealth on scale of 1(no risk) to 6 (high risk) = 1 or 2.	1469	0.68	0	1
Myopic	Agree partially or fully to the statement “I live for the present and don’t think about my financial future”.	1486	0.28	0	1
Impulsive	Agree partially or fully to the statement “I am impulsive and tend to buy things that I cannot afford.”	1495	0.07	0	1