THE IMPACT OF EDUCATION ON SAVINGS AND FINANCIAL BEHAVIOR

Technical Report

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Abstract

This paper estimates the effect of years of education on savings, financial market participation, and choices between different financial instruments for men and women. Using data from the Turkey's Saving Tendencies Survey from 2018-2020, we exploit the school reform in Turkey that extended compulsory schooling from 5 to 8 years as a source of exogenous variation in schooling. While we find no evidence of an effect of schooling on men, there are significant effects on women. Among women, both the propensity to save and the amount of monthly savings increase. Moreover, women become more likely to participate in the formal financial system.

Keywords: savings, financial market participation, formal and informal financial system, compulsory schooling, gender

1. Introduction

There is large variation across countries in saving rates, as well as, the choices individuals make regarding how they keep their savings (Lewis and Messy, 2012). Some individuals prefer to stay out of the financial sector, converting their savings to foreign currencies or precious materials such as gold, while others choose to invest in the financial sector. Individuals who participate in the financial sector also make different choices such as investing in interest bearing bank deposits, mutual funds, retirement funds, or the stock market. These choices lead to differences in time and geography in the rate of financial markets, and the rate of ownership of investment products.

In this research we investigate the role of formal education on individual's financial decisions. In particular, we are interested in whether education shapes saving decisions and the choice between alternative forms of investments. There is a vast body of literature that aims to understand the impact of financial literacy education. Our study aims to contribute to this knowledge base by investigating the role of formal education within the context of Turkey.

Savings and financial decisions play an important role in financial well-being and security of individuals as they affect the ability to weather economic shocks and unexpected earnings losses, enable entrepreneurial activities, shape economic status during retirement. At an aggregate level, savings and financial decisions are also important for economic growth as they determine the level of credit available for financing businesses and firm investments. Hence, understanding factors that affect saving behavior and choice between available financial instruments is important. Education is potentially an important determinant since education may affect earnings capacity as well as skills that are instrumental in financial decision making.

Previous studies on the relationship between education and financial behavior has so far mainly focused on a specific type of education, i.e. financial education. In several countries, governments introduced financial literacy education into school curriculums and have been providing financial education to general public with the aim of promoting greater financial inclusion and helping individuals make better financial decisions (Lyons, 2005). A recent empirical literature aims to assess the impact of these programs on financial behavior using surveys and experimental work.

This literature has grown rapidly over the last decade. Available studies so far provided mixed evidence on the effectiveness of financial education. Some studies report improvements in financial decision making (e.g. Mastrobuoni, 2011; Elliehausen et al., 2007; Clark et al., 2006) while other studies provide evidence that individuals pay little attention to financial information, have limited capacity to process this information, and high rates of debt, high rates of default and low savings remain despite the availability of financial education (e.g. Bernheim et al., 2001; Duflo and Saez, 2003; Cole and Shastry, 2009; Booij et al., 2008). Several papers argue that financial training programs lead to only marginal improvements in financial behavior (e.g. Collins, 2013; Bruhn et al., 2016).

While formal education has been expanding rapidly across the globe we have limited evidence on the consequences of these expansions for the financial behavior of individuals. Although the correlation between education and various financial outcomes can easily be established, it is much more challenging to identify the causal role of education since education is not amenable to randomization and control. There may be some inherent

unobservable characteristics of individuals that are correlated with both education level and financial behavior. For example, individuals with higher genetic ability may be better at acquiring formal education as well as processing information required for financial calculations, increasing their propensity to invest in complex financial products. Identifying the causal effect of education requires to account for such unobservable characteristics.

There are few studies that aim to identify these causal effects (e.g. Cole et al., 2014 in the US context, Black et al., 2015 in the Swedish context, Banks et al., 2018 in the UK context, and Ajayi and Ross, 2020 in the context of Kenya). Some of these find a positive effect of education on financial market participation and provide evidence that education affects financial decision making (Cole et al., 2014; Black et al., 2015; Ajayi and Ross, 2020). Banks et al. (2018), on the other hand, finds no effects on financial decision-making or decision-making quality.

This research aims to expand this sparse literature by providing novel evidence from Turkey. In 1997, compulsory school (CS) was extended from 5 to 8 years that led to substantial increases in educational attainment. Using this policy as a source of exogenous variation, we estimate the causal effect of education on savings behavior, financial market participation, and choices between different financial instruments. In the analysis, we study the impact of education by gender to understand potential differences in the effects among men and women – an issue that received little attention to date.

While financial inclusion has risen globally, there are large differences in savings behaviour across countries. These differences may be partly driven by contextual differences such as ease of access to financial services, returns on savings, differences in age and education structure of populations. For example, account ownership is lower among younger individuals and those with lower levels of education. About half of the unbanked individuals live in less developed countries (Demirgüç-Kunt et al. 2017). In lower income countries formal education levels are lagging high-income countries and there are many countries where compulsory schooling is around 5 years.[2] In these countries, education reforms may pave the way for higher education that may bring about important consequences for saving behaviour. More evidence is needed on the potential consequences of education reforms on savings behaviour in such settings. By providing evidence from a middle-income country, this study adds to the evidence on the effects of education on financial behaviour outside the high-income country contexts.

Our findings show that education plays little role in the financial behavior of male household heads. Among women, however, education leads to an increase in saving propensity and the level of savings. Moreover, we find evidence for improvement in financial inclusion as women become more likely to channel their savings into the formal financial sector. There is also suggestive evidence that savings towards retirement increases among women. In the next section we discuss the conceptual framework followed by a discussion of methodology in Section 3. Section 4 reports the results and last section concludes with a discussion of our findings and some recommendations.

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[2] The duration of compulsory schooling in 2014 was 5 years in Bangladesh, Laos, Madagascar, and Myanmar; 6 years in Angola, UAE, Cameroon, Guinea, Haiti, Iraq, Jamaica, Malaysia, and Congo.

2. Theoretical Framework

The past decades have witnessed significant progress in educational attainment of individuals. The number of primary-school-age children who do not attend primary school declined substantially, eliminating most of the gender gap in primary school completion enrolments. Similar improvements in enrolment numbers are documented at higher education levels (UNESCO, Education Statistics). As a result of these gains in enrolment rates, average years of schooling in the world increased by about 5 years over the period of 1950 to 2010 (Lee and Lee, 2016).

Higher levels of education may increase productivity of individuals resulting in higher earnings. In fact, estimates for a large number of countries show strong correlation between education and earnings, and this correlation is stronger among women than men (Psacharopoulos and.Patrinos, 2018). In the Turkish context, causal estimates show that the return from an extra year of schooling is about 7–8% for women and 2–2.5% for men (Aydemir and Kırdar, 2017). The increased earnings capacity due to education may enable savings among individuals, especially among those who would otherwise have low incomes, and strive to make ends meet.

In addition to increasing the earnings capacity, increased education may also enhance cognitive skills. Several studies that uses sources of exogenous variation in schooling indeed find a sizeable link between schooling and cognitive skills (e.g. Bedard and Dhuey, 2006; Black et al., 2011). Beyond its impact on earnings, higher schooling may matter for financial decisions through these enhanced skills. There has been a substantial increase in the number and complexity of financial products recently, as a result, financial decisions have become increasingly complicated. Lusardi (2009) argues that individuals must spend considerable time and effort to acquire necessary information for saving decisions, therefore, they may not possess the skills and ability to perform the calculations inherent in devising a saving plan. Unlike financial education, general education aims to provide a much broader set of skills that may be crucial for handling complicated financial decisions. Through education, individuals acquire quantitative and analytic skills that are applicable to financial questions.

There may be further channels through which education may affect financial behavior. For example, education may induce individuals to move within a country. Various papers provide evidence for increased internal mobility of individuals due to education (Machin et al., 2012; Weiss, 2015; Malamud and Wozniak, 2012; Aydemir et al., 2020). For individuals moving from rural to urban areas, for example, both access to financial service providers and information about financial services may improve, affecting their financial behaviours.

Through these various channels, formal education may affect savings and alter financial decisions. The direction of the resulting effects is, however, not clear. For instance, while education increases earnings whether this makes individuals more likely to undertake financial investments is ambiguous since consumption bundles may also change with increased education. Therefore, it is an empirical question whether increased education leads to higher level of savings.

Many studies exploring the economic effects of education focus on earnings. In terms of the economic benefits of education, wage returns may provide an underestimate if education has further effects on savings, financial market participation, and financial health of individuals. Hence, effects of education on financial behavior provides an important aspect in the cost-benefit analysis of educational expansions.

3. Methodology

ING's Tasarruf Eğilimleri Araştırması (TTEA, the Turkey's Saving Tendencies Survey in English) is a rich survey data that samples individuals 18 years and older from 13 broad regions covering Turkey.[3] The data includes information on age, education, gender, savings behavior as well as information on the types of financial instruments used by individuals. We use 2018-2020 waves of this survey data in which detailed information on educational attainment of household heads were available for this study.

In order to account for unobservable characteristics of individuals that are correlated with both education level and financial behaviour, we exploit the exogenous variation in schooling due to the 1997 school reform that extended compulsory schooling from 5 to 8 years. Using exposure to this reform as an instrument, we estimate the following two-stage least squares model:

$$F_i = \beta_0 + \beta_1 s_i + X'\delta + \varepsilon_i \qquad (1)$$

$$s_i = \alpha_0 + \alpha_1 D_i + X'\theta + u_i \qquad (2)$$

where *s* refers to years of schooling, *D* is a dummy variable for the policy, and *X* denotes the set of covariates including year and region fixed effects, a quadratic term in age, time trends.[4] The variable *F* denotes financial outcomes of interest. When the outcome of interest is savings propensity, *F* refers to a dummy variable that equals 1 if individual *i* has savings; 0 otherwise. It is similarly defined for the outcomes described below that refers to participation in specific types of investments. When the define the outcome as the monthly saving amount the outcome is in levels. The parameter of interest is β_1 , the impact of an extra year of schooling on financial outcome of interest.

The 1997 school reform affected students who were in grade 4 or lower in 1996-1997 school year. Most children in Turkey start school at age six, hence a child who starts school at this age and is born in or after Jan 1987 is bound by the policy. The identification of the causal effect of education comes from the variation across birth cohorts in the exposure to the policy. We construct our policy dummy which we use as an instrument for schooling as follows:

$$D_i = 1 \text{ if year of birth of individual i} \geq 1987$$
$$= 0 \text{ otherwise}$$

Aydemir and Kirdar (2017) and Aydemir et al. (2019) provide supporting evidence that the policy change was independent of macro conditions and show that there is a strong first-stage allowing causal identification of parameters of interest. The instrument varies at year of birth level, therefore we cluster standard errors at this level. Since we have few clusters, we also report p-values from wild-cluster bootstrap (Cameron and Miller, 2015).

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[3] The data collection is conducted throughout the year to capture quarterly patterns.
[4] In one of the specifications we also include a time dummy for the observations in our data from the COVID19 period (post March 2020), the period following the first confirmed case in Turkey.

3.1 Descriptive Statistics

Household head is defined in the TTEA data as the individual who resides within the household and is the main source of household income. We refer to household heads as primary earners although non-labour income may be one of the sources of income. The survey reports detailed education levels only for the household heads. Our analysis sample includes household heads aged 18 to 44 at the time of survey.[5]

The survey asks questions about saving behavior of the respondents, collecting information on whether they have personal savings at the time of survey, monthly personal earnings reported in 12 brackets, monthly savings amount reported in 13 brackets. We used the 2018 Household Budget Survey (the most recent year for which micro data is available), that also reports personal income and savings, to compute the mean income and mean savings within each of these brackets. We then assign these values as the income and savings amounts to the individuals in the corresponding brackets in the TTEA data.

For individuals with savings, the survey also collects information on instruments used for savings. We define someone as a saver in formal financial system if the individual reports saving in bank accounts, funds, stock market, government bonds or retirements funds. As an indication of long-term savings, we separately analyse having savings in retirement funds.[6] An individual who has savings outside the formal financial system –in foreign currency, precious materials such as gold, real estate (such as land) or as cash in national currency– is defined as a saver in informal financial system.[7],[8] We define a 0-1 dummy variable for each of these outcome variables. For example, the dummy variable "formal saver" takes the value of 1 for those who save in formal financial system; 0, otherwise.

Table 1 presents descriptive statistics for our sample. In the Turkish setting most of the bread winners are men in the household. This is reflected by the larger number of men in our sample. Although average age is similar between men and women, a much smaller fraction of female household heads are married. Women are also on average more educated and less likely to be employed. Our analysis reflects the effect of education on financial behaviour among these primary earners who are more likely to make their own decisions on financial issues –as opposed to, for example, individuals who depend on their spouses or parents for income. In terms of savings, similar fraction of men and women are savers. Monthly saving amount and saving rate is lower among women, and women are more likely to save in the formal financial system.

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[5] Including older individuals does not change our results. Given the timing of the policy there is no variation in policy exposure among those older groups.

[6] In our sample saving in funds, stock market or government bonds are very rare. Due to sample size considerations we do not study them separately with this data.

[7] The precious materials and cash in foreign or national currency in the nonformal sector are not kept in financial institutions. Individuals may be safeguarding these savings in personal safe or by other means.

[8] Note that in principle an individual may have savings in both the formal and informal financial system and hence these categories are not mutually exclusive.

Table 1 – Descriptive Statistics

	Full sample	Men	Women
age	34.37	34.54	33.39
	(6.110)	(6.003)	(6.612)
year of birth	1984.57	1984.39	1985.63
	(6.148)	(6.040)	(6.644)
years of schooling	11.05	10.95	11.63
	(3.706)	(3.642)	(4.009)
married	0.70	0.75	0.40
	(0.458)	(0.432)	(0.491)
number of children	2.33	2.40	1.93
	(1.300)	(1.311)	(1.155)
employed	0.84	0.86	0.75
	(0.363)	(0.346)	(0.436)
saver	0.28	0.28	0.29
	(0.448)	(0.447)	(0.454)
monthly saving amount	280.80	299.42	173.83
	(902.8)	(948.8)	(559.6)
saving rate	0.04	0.05	0.04
	(0.120)	(0.123)	(0.0991)
saver in formal financial system	0.24	0.23	0.27
	(0.425)	(0.422)	(0.442)
saver in informal financial system	0.15	0.16	0.12
	(0.360)	(0.365)	(0.326)
saver in retirement funds	0.14	0.14	0.17
	(0.348)	(0.343)	(0.377)
N	7934	6758	1176

Notes: The sample includes household heads aged 18 to 44. Standard deviations in parentheses.

3.2 The effect of policy on schooling

Table 2 presents the estimates of the effect of the policy on years of schooling in our sample. The specification allows for split-time trends on each side of the policy cut-off and includes survey year fixed effects. Panel A includes 1976-2002 birth cohorts. Panel B zooms in by narrowing the bandwidth to 8 years around the cut-off. All estimates in Table 2 show a strong effect of the policy on schooling. In Panel A, among the full sample of household heads average years of schooling increases by about 0.63 years. The effect is more pronounced among women leading to about 1.2 more years of schooling compared to 0.55 years among men. The larger effect among women is expected since prior to the policy, a much larger fraction of women did not continue schooling beyond grade 5. The effect sizes are all precisely estimated with corresponding F-values above 20 (wild bootstrap p-values also corroborate statistical significance).

Table 2 – Policy effects on schooling

|	A) 1976-2002			B) 1979-1994		
	Full sample	Men	Women	Full sample	Men	Women
policy	0.631***	0.546***	1.210***	0.571***	0.484***	1.277***
	[0.113]	[0.116]	[0.411]	[0.101]	[0.087]	[0.369]
Wild Bootstrap p-value	0.000	0.001	0.062	0.009	0.006	0.033
Observations	7,934	6,758	1,176	5,850	5,033	817
R-squared	0.014	0.016	0.013	0.009	0.010	0.011

Notes: The sample refers to household heads aged 18 to 44. Each cell reports the results from a separate regression of schooling variable on policy dummy, split linear time trends an ach side of the policy cut-off and survey year fixed effects. Standard errors are clustered at the year of birth level. P-values using the wild bootstrap estimation of Cameron et al. (2008) are reported. Statistical significance is *** at 1 % level, ** at 5 % level and * at 10 % level.

3.3 Saving behaviour

The saving propensity and saving rate of individuals across time is depicted in Figure 1. The figure shows that saving propensity was stable over time, which stood around 30%. Similarly, saving rate defined as the fraction of monthly savings to monthly personal income is about 4%, and remains stable throughout the sample period.[9] Figure 2 shows savings propensity by age for men and women. While there is little change in saving propensity by age among men, there is a strong age profile among women showing an inverted U shape. Further analysis of age patterns in saving also reveal important heterogeneity in birth year trends within age groups. Our empirical analysis account for these patterns through a specification that allows for separate trends by age groups.

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[9] According to Household Budget Survey savings at household level was around 8.5% in 2016.

Figure 1 - Savings propensity over time
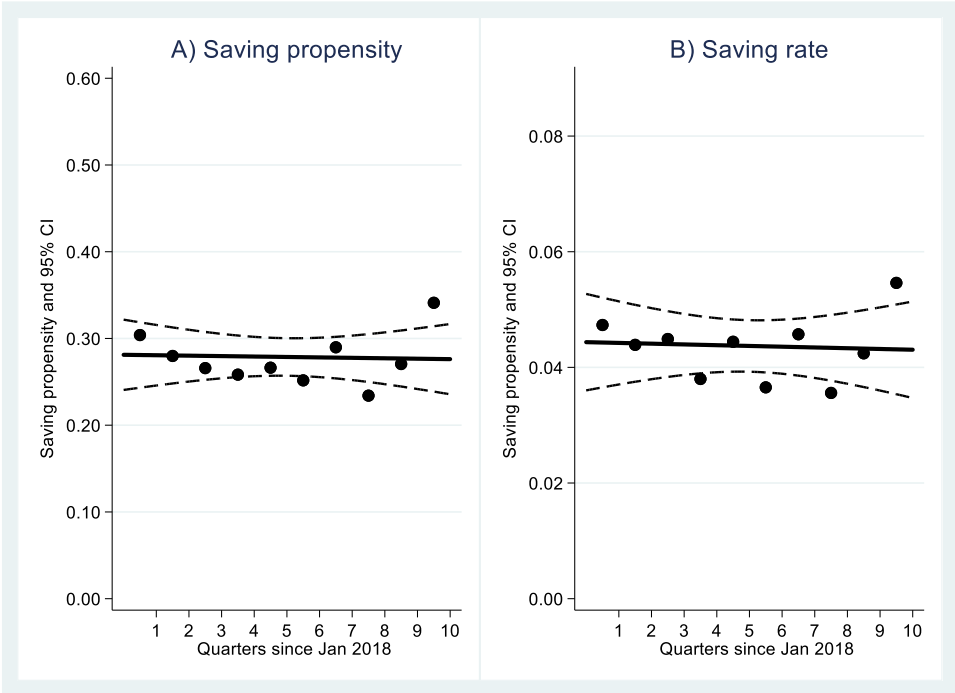
Notes: The sample, drawn from the 2018-2020 ING-TFI, is restricted to household heads aged 18 to 44. Panel A of shows the fraction of individuals who report having savings at the time of the survey, Panel B shows the ratio of savings to income.

Figure 2 – Saving propensity by age
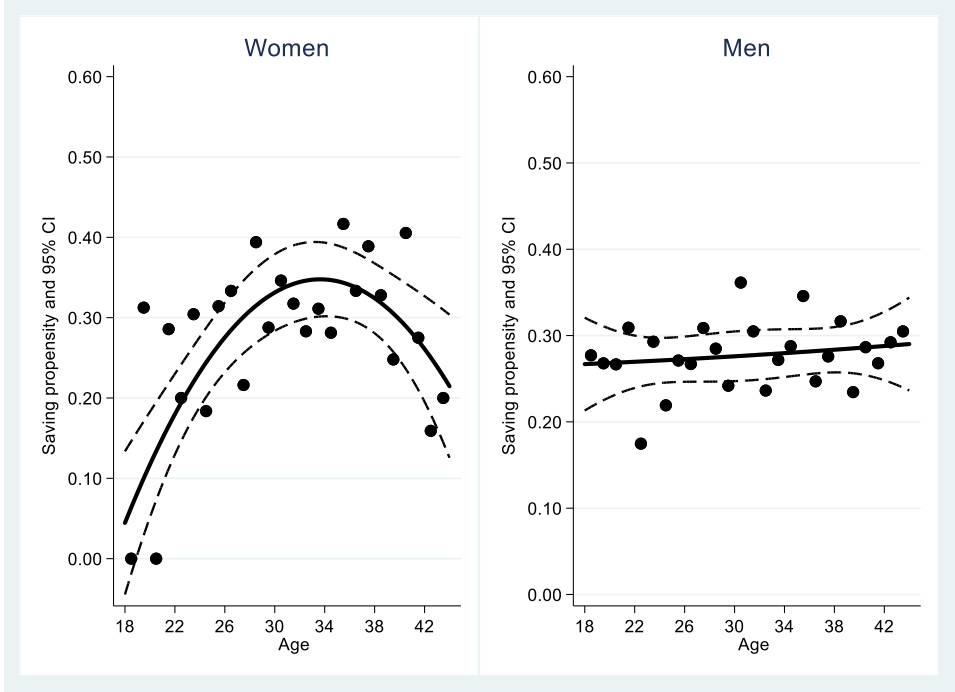
Notes: The sample, drawn from the 2018-2020 ING-TFI, is restricted to household heads aged 18 to 44. The figure shows the fraction of individuals who report having savings at the time of the survey

4. Results

We first present the estimation results for the effect of education on saving propensity that can be found in Table 3. OLS results indicate a strong positive correlation between schooling and saving propensity of similar magnitude for men and women. Results from 2SLS estimation, on the other hand, show that there is no effect of schooling on saving propensity of men. For women, however, each additional year of schooling increases saving propensity by 4 to 5 percentage points.[10] This effect is large considering that on average, about 30 percent of women report having savings.

Table 3 – Effect of education on saving propensity

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(1) 2SLS	(2) 2SLS	(3) 2SLS
			Men			
Years of schooling	0.034***	0.034***	0.033***	0.005	0.010	0.010
	[0.001]	[0.001]	[0.001]	[0.046]	[0.035]	[0.028]
Observations	6,758	6,758	6,545	6,758	6,758	6,545
R-squared	0.077	0.077	0.082	0.023	0.040	0.048
Bootstrap p-value	0.000	0.000	0.000	0.990	0.835	0.865
Sample Mean	0.277	0.277	0.276	0.277	0.277	0.276
First-stage F-test				20.61	21.01	23.09
			Women			
Years of schooling	0.035***	0.035***	0.034***	0.039*	0.038*	0.047*
	[0.003]	[0.003]	[0.003]	[0.022]	[0.022]	[0.025]
Observations	1,176	1,176	1,147	1,176	1,176	1,147
R-squared	0.105	0.105	0.127	0.103	0.104	0.114
Bootstrap p-value	0.000	0.000	0.000	0.191	0.130	0.137
Sample Mean	0.290	0.290	0.292	0.290	0.290	0.292
First-stage F-test				11.15	10.36	12.74
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age and Agesq	Yes	Yes	Yes	Yes	Yes	Yes
Age group specific trends	Yes	Yes	Yes	Yes	Yes	Yes
Policy*Trend	--	Yes	Yes	--	Yes	Yes
Region FE	--	--	Yes	--	--	Yes
After March2020 dummy	--	--	Yes	--	--	Yes

Notes: The sample includes household heads aged 18 to 44. The dependent variable is whether the respondent has savings at the time of the survey. In addition to the key variable of interest, years of schooling, the control variables include year fixed effects, a quadratic in age, and age group specific trends (5-year age groups interacted with birth year trends). Specification (2) adds interaction of the year trend with policy, specification (3) adds region fixed effects and a dummy for observation for March 2020 and later. Standard errors are clustered at the year of birth level. Table also reports wild-cluster bootstrap p-values. Statistical significance is *** at 1 % level, ** at 5 % level and * at 10 % level.

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[10] The differences in OLS and 2SLS estimates may stem from various sources. If more educated are positively selected in terms of ability this would lead to higher OLS estimates whereas classical measurement error in reported schooling would lead to a downward bias. The difference may also be due to nonlinearities in the effects across the schooling distribution.

Table 4 reports the effect of education on the level of monthly savings. Similar to the saving propensity results in Table 3, OLS results in Table 4 show a strong positive correlation between years of schooling and the monthly savings –the size of the effect being larger for men. Results from 2SLS estimation, however, provide no evidence for an effect of schooling on monthly savings for men. For women, estimated effects are larger in size than the corresponding OLS estimates and become significant in the third specification.

Aydemir and Kırdar (2017) shows that the return from an extra year of schooling is much larger for women than men in Turkey. Hence, while increased schooling may be enabling women to save through increased earnings capacity, this channel may be much weaker for men. The difference in results between men and women may also be due to a level effect. Men, who save on average more than women in our sample, may not be responding to increases in earnings if they already attain their target savings amount.

Table 4 – Effect of education on the amount of monthly savings

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(1) 2SLS	(2) 2SLS	(3) 2SLS
			Men			
Years of schooling	45.686***	45.690***	44.056***	12.289	19.595	10.429
	[3.146]	[3.146]	[3.186]	[81.384]	[67.273]	[60.573]
Observations	6,758	6,758	6,545	6,758	6,758	6,545
R-squared	0.032	0.032	0.035	0.016	0.023	0.018
Bootstrap p-value	0.000	0.000	0.000	0.879	0.806	0.965
Sample Mean	299.4	299.4	296.6	299.4	299.4	296.6
First-stage F-test				20.61	21.01	23.09
			Women			
Years of schooling	31.917***	31.968***	30.043***	40.284	44.033	63.009**
	[4.005]	[4.005]	[4.110]	[24.735]	[27.241]	[28.710]
Observations	1,176	1,176	1,147	1,176	1,176	1,147
R-squared	0.058	0.059	0.071	0.055	0.052	0.017
Bootstrap p-value	0.000	0.000	0.000	0.107	0.168	0.215
Sample Mean	173.8	173.8	171.9	173.8	173.8	171.9
First-stage F-test				11.15	10.36	12.74
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age and Agesq	Yes	Yes	Yes	Yes	Yes	Yes
Age group specific trends	Yes	Yes	Yes	Yes	Yes	Yes
Policy*Trend	--	Yes	Yes	--	Yes	Yes
Region FE	--	--	Yes	--	--	Yes
After March2020 dummy	--	--	Yes	--	--	Yes

Notes: The sample includes household heads aged 18 to 44. The dependent variable is the amount of monthly personal savings. In addition to the key variable of interest, years of schooling, the control variables include year fixed effects, a quadratic in age, and age group specific trends (5-year age groups interacted with birth year trends). Specification (2) adds interaction of the year trend with policy, specification (3) adds region fixed effects and a dummy for observation for March 2020 and later. Standard errors are clustered at the year of birth level. Table also reports wild-cluster bootstrap p-values. Statistical significance is *** at 1 % level, ** at 5 % level and * at 10 % level.

We next turn to the saving rate as the outcome. Saving rate is defined as the fraction of monthly personal savings to personal income. Results for saving rates are presented in Table 5. While for both men and women, OLS results show a positive association between schooling and saving rate, 2SLS results show no effect of schooling for both genders. These results for women reveal that despite an increase in saving propensity and the monthly saving amount, women on average do not change the rate at which they save out of their monthly income.

Table 5 – Effect of education on saving rate

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(1) 2SLS	(2) 2SLS	(3) 2SLS
			Men			
Years of schooling	0.005***	0.004***	0.004***	-0.001	0.001	-0.001
	[0.000]	[0.000]	[0.000]	[0.009]	[0.007]	[0.007]
Observations	6,495	6,495	6,297	6,495	6,495	6,297
R-squared	0.019	0.020	0.022		0.007	0.002
Bootstrap p-value	0.000	0.000	0.000	0.813	0.942	0.883
Sample Mean	0.0451	0.0451	0.0451	0.0451	0.0451	0.0451
First-stage F-test				17.33	20.03	21.30
			Women			
Years of schooling	0.004***	0.004***	0.004***	0.000	0.000	0.002
	[0.001]	[0.001]	[0.001]	[0.007]	[0.008]	[0.008]
Observations	1,101	1,101	1,076	1,101	1,101	1,076
R-squared	0.037	0.037	0.047	0.010	0.011	0.042
Bootstrap p-value	0.000	0.000	0.000	0.950	0.968	0.800
Sample Mean	0.0356	0.0356	0.0355	0.0356	0.0356	0.0355
First-stage F-test				7.532	6.980	8.300
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age and Agesq	Yes	Yes	Yes	Yes	Yes	Yes
Age group specific trends	Yes	Yes	Yes	Yes	Yes	Yes
Policy*Trend	--	Yes	Yes	--	Yes	Yes
Region FE	--	--	Yes	--	--	Yes
After March2020 dummy	--	--	Yes	--	--	Yes

Notes: The sample includes household heads aged 18 to 44. The dependent variable is the savings rate. In addition to the key variable of interest, years of schooling, the control variables include year fixed effects, a quadratic in age, and age group specific trends (5-year age groups interacted with birth year trends). Specification (2) adds interaction of the year trend with policy, specification (3) adds region fixed effects and a dummy for observation for March 2020 and later. Standard errors are clustered at the year of birth level. Table also reports wild-cluster bootstrap p-values. Statistical significance is *** at 1 % level, ** at 5 % level and * at 10 % level.

Previous results show no effects of schooling on savings behaviour of men. Next, we turn to the choice of instruments for savings. Similar to the earlier results, 2SLS results show no causal effect of schooling on choice of financial instruments for the male sample. For this reason, below in Table 6 we present results only for women.

On the top panel of Table 6, the outcome is the propensity to save in formal financial system. The 2SLS results show that a one-year increase in schooling increases the propensity to save in formal financial system by 7 to 8 percentage points. Given a sample mean of about 27%, this estimate implies that the propensity to save in the formal financial system increases by about 25%. The middle panel for the propensity to save in the informal financial system, on the other hand, points to an –imprecisely estimated– effect in the opposite direction. A one-year increase

in schooling leads to a 3.5 percentage point decline in saving propensity in the informal financial system. These two results indicate that increased schooling leads to a shift in the savings portfolio of women from informal to formal financial system.

Table 6 – Effect of education on choice of financial instruments, Women

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(1) 2SLS	(2) 2SLS	(3) 2SLS
			Saving in formal financial system			
Years of schooling	0.035***	0.035***	0.034***	0.070***	0.070***	0.078***
	[0.003]	[0.003]	[0.003]	[0.024]	[0.024]	[0.028]
Observations	1,176	1,176	1,147	1,176	1,176	1,147
R-squared	0.112	0.112	0.133	0.015	0.014	-
Bootstrap p-value	0.000	0.000	0.000	0.0220	0.0450	0.0430
Sample Mean	0.266	0.266	0.268	0.266	0.266	0.268
First-stage F-test				11.15	10.36	12.74
			Saving in informal financial system			
Years of schooling	0.012***	0.012***	0.011***	-0.034*	-0.035	-0.035
	[0.002]	[0.002]	[0.002]	[0.020]	[0.022]	[0.023]
Observations	1,176	1,176	1,147	1,176	1,176	1,147
R-squared	0.028	0.028	0.037	-	-	-
Bootstrap p-value	0.000	0.000	0.000	0.0430	0.110	0.0621
Sample Mean	0.121	0.121	0.123	0.121	0.121	0.123
First-stage F-test				11.15	10.36	12.74
			Saving in retirement funds			
Years of schooling	0.025***	0.025***	0.024***	0.042*	0.041	0.040
	[0.003]	[0.003]	[0.003]	[0.025]	[0.025]	[0.025]
Observations	1,176	1,176	1,147	1,176	1,176	1,147
R-squared	0.097	0.097	0.108	0.063	0.066	0.082
Bootstrap p-value	0.000	0.000	0.000	0.371	0.248	0.179
Sample Mean	0.172	0.172	0.173	0.172	0.172	0.173
First-stage F-test				11.15	10.36	12.74
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age and Agesq	Yes	Yes	Yes	Yes	Yes	Yes
Age group specific trends	Yes	Yes	Yes	Yes	Yes	Yes
Policy*Trend	--	Yes	Yes	--	Yes	Yes
Region FE	--	--	Yes	--	--	Yes
After March2020 dummy	--	--	Yes	--	--	Yes

Notes: The sample includes female household heads aged 18 to 44. The dependent variables are i) the top panel - propensity to save in the formal financial system, ii) middle panel - propensity to save in the informal financial system, iii) bottom panel – propensity to save in retirement funds. In addition to the key variable of interest, years of schooling, the control variables include year fixed effects, a quadratic in age, and age group specific trends (5-year age groups interacted with birth year trends). Specification (2) adds interaction of the year trend with policy, specification (3) adds region fixed effects and a dummy for observation for March 2020 and later. Standard errors are clustered at the year of birth level. Table also reports wild-cluster bootstrap p-values. Statistical significance is *** at 1 % level, ** at 5 % level and * at 10 % level.

As discussed above, increased earnings may be an important channel for the observed effects among women. To test for this possibility, we extend our third specification in Tables 3 through 6 by adding personal income to the set of explanatory variables. We report 2SLS estimates resulting from this specification in Table 7 for women.

Controlling for income, the coefficient estimates for saving propensity and monthly savings become much smaller and lose significance. These results suggest that increased earnings may be an important mechanism in deriving the observed effects on saving propensity and monthly earnings. Importantly, the coefficient estimates for saving in the formal financial system and saving in the informal financial system become larger in magnitude while the coefficient estimate for saving in retirement funds remains similar to that in Table 6. These results indicate that education may be affecting financial market participation through channels other than increased income such as improved cognitive skills, better access to financial services, better information about the financial market.[11]

Table 7– Effect of education on financial behavior, women

VARIABLES	Saver	Monthly saving	Saving rate	Formal saver	Informal saver	Saver-retirement funds
school	0.028	-29.829	-0.003	0.094*	-0.100*	0.043
	[0.049]	[64.401]	[0.014]	[0.052]	[0.057]	[0.043]
Observations	1,081	1,081	1,076	1,081	1,081	1,081
R-squared	0.173	0.165	0.002			0.080
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Age and Agesq	Yes	Yes	Yes	Yes	Yes	Yes
Age group specific trends	Yes	Yes	Yes	Yes	Yes	Yes
Policy*Trend	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
After March2020 dummy	Yes	Yes	Yes	Yes	Yes	Yes
Personal income	Yes	Yes	Yes	Yes	Yes	Yes
Bootstrap p-value	0.644	0.648	0.831	0.172	0.006	0.404
Sample Mean	0.287	176.4	0.0355	0.262	0.118	0.171
First-stage F-test	4.389	4.389	4.485	4.389	4.389	4.389

Notes: The sample includes female household heads aged 18 to 44. The dependent variables for each column are reported by column heading. In addition to the key variable of interest, years of schooling, the control variables include year fixed effects, a quadratic in age, and age group specific trends (5-year age groups interacted with birth year trends), interaction of the year trend with policy, region fixed effects and a dummy for observation for March 2020 and later, and monthly personal income. Standard errors are clustered at the year of birth level. Table also reports wild-cluster bootstrap p-values. Statistical significance is *** at 1 % level, ** at 5 % level and * at 10 % level.

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[11] We also check robustness of our results by creating fake policy implementation dates preceding 1997. The results for women that show significant effects in Table 3 through 6 all disappear in this falsification test.

5. Conclusion and discussion

Education levels have been rapidly expanding across countries. The potential effects of this change for the saving rate and financial choices of individuals are interesting for both government policy makers and the financial sector. Our analysis within Turkish context estimates the impact of schooling on the savings behaviour of men and women in a middle-income country.

The results show that the effect of schooling differs between male and female household heads. While schooling does not alter saving behaviour or choice of financial instruments among men, there are significant effects on women. Among women, propensity to save and the amount of monthly savings increase. Moreover, women become more likely to save in the formal financial system and for the long term by increasing their participation in retirement funds.

Our findings are in line with Cole et al. (2014) and Ajayi and Ross (2020) who find that education has positive effects on financial market participation and formal financial inclusion. The analysis in this paper differs from these two earlier studies in that it focuses on gender differences and finds significant effects only for women. Interestingly, in their analysis of the effect of education on stock market participation and risky asset holdings in the US context, Black et al. (2015) find small effects for men but they find no evidence of any positive effect for women. Thus, our results indicate that in less developed countries, the effect of education on financial behavior of men and women may differ from that in high-income settings.

Additionally, our results indicate that improving formal education has the potential to directly improve financial inclusion. In a context where many governments try to promote greater financial inclusion through financial literacy education, formal education provides an alternative instrument which may also supplement the efficacy of financial literacy education. Given the generally low level of education in many low- and middle-income countries, the results in this paper also suggest that improving education holds promise for greater financial inclusion.

Research on the effects of education primarily focuses on earnings capacity and provide evidence for increased earnings as a result of increased schooling. The findings in this research indicate that for individuals, in particular for women, education not only affects how much people earn but also how they make use of their earnings. For female household heads, education increases savings propensity while also shifting savings portfolio towards the formal instruments. These can improve the financial health of individuals under a formal financial system and provide long term financial security in old age through retirement funds. The results also point to an empowering effect of education for women as they become more likely to undertake decisions that shapes their financial health.

The results also show that the effects are not solely driven through improved earnings. Education may enhance cognitive skills, enable access to better information about the financial market that affect financial decisions. This has some implications for promoting greater financial inclusion. Making financial decisions, in a world with an increasing number and complexity of financial products, may be strenuous. Devising a savings plan, choosing between various financial instruments require a considerable amount of skills, time and effort to process the inherent information. In this context, financial institutions can play a significant role in helping individuals improve their

financial health. The information about alternative formal financial instruments could also be tailored in a way that is easily accessible to a wide audience from a variety of socioeconomic backgrounds. In less developed countries, providing information about the risks associated with informal savings instruments and the benefits of channelling informal savings into formal ones could support efforts aimed at greater financial inclusion and improving financial health in society. Many of the individuals who are more prone to increase their education and seek formal financial services also live in less developed regions where they face higher costs for accessing formal financial services. Improving access of these individuals to financial institutions can thus be beneficial for improving financial inclusion.

6. References

Ajayi, K. F. and P. Ross (2020). "The Effects of Education on Financial Outcomes: Evidence from Kenya", Economic Development and Cultural Change, Vol. 69, No. 1, pp. 253-289.

Aydemir, A. and M. Kırdar (2017). "Low Wage Returns to Schooling in a Developing Country: Evidence from a Major Policy Reform in Turkey", Oxford Bulletin of Economics and Statistics, 79 (6), 1046-1086

Aydemir, A., M. Kırdar, H. Torun (2020). "The effect of education on geographic mobility: Incidence, Timing and Type of Migration". Working paper

Bedard, K., and E. Dhuey (2006): "The Persistence of Early Childhood Maturity: International Evidence of Long-Run Age Effects," The Quarterly Journal of Economics, 121(4), 1437–1472.

Banks, J., L. Carvalho, and F. Perez-Arce (2018). "Education, Decision-Making, and Economic Rationality", forthcoming, The Review of Economics and Statistics

Bernheim, D., Garrett, D. and Maki, D. (2001). "Education and saving: the long-term effects of high school financial curriculum mandates". Journal of Public Economics 85: 435–565.

Black, S., P. Devereux, and K. Salvanes (2011): "Too Young to Leave the Nest? The Effects of School Starting Age," Review of Economics and Statistics, 93(2), 455–467.

Black, Sandra E., Paul J. Devereux, Petter Lundborg, and Kaveh Majlesi. (2015). "Learning to Take Risks? The Effect of Education on Risk-Taking in Financial Markets." NBER Working Paper 21043.

Booij, A. S., Leuven, E., & Osterbeek, H. (2012). "The role of information in the take-up of student loans". Economics of Education Review, 31, 33–44.

Bruhn, M., L. de Souza Leão, A. Legovini, R. Marchetti, and B. Zia (2016). "The Impact of High School Financial Education: Evidence from a Large-Scale Evaluation in Brazil." American Economic Journal: Applied Economics, 8 (4): 256-95.

Cameron, C., Gelbach, J., & Miller D. (2008). Bootstrap-Based Improvements for Inference with Clustered Errors. Review of Economics and Statistics 90, 414-427.

Cameron, C., & Miller D. (2015). "A Practitioner's Guide to Cluster-Robust Inference". Journal of Human Resources 50, 317-373.

Clark, R.L., D'ambrosio, M.B., McDermed, A.A. and Sawant, K. (2006). "Retirement plans and saving decisions: the role of information and education". Journal of Pension Economics and Finance 5(01): 45–67.

Cole, S. and Shastry, G.K. (2009). "Smart money: the effect of education, cognitive ability, and financial literacy on financial market participation". Working Paper 09–071, Harvard Business School, Boston, MA.

Collins, J. M. (2013). "The Impacts of Mandatory Financial Education: Evidence from a Randomized Field Study." Journal of Economic Behavior and Organization 95: 146–58

Demirgüç-Kunt, A., L. Klapper, D. Singer, S. Ansar, and J. Hess. (2018). "The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution". Washington, DC: World Bank. doi:10.1596/978-1-4648-1259-0.

Duflo, E. and Saez, E. (2003). "The role of information and social interactions in retirement plan decisions: evidence from a randomized experiment". Quarterly Journal of Economics 119: 815–842.

Elliehausen, G., E. C. Lundquist, M. E. Staten (2007). "The Impact of Credit Counseling on Subsequent Borrower Behavior". The Journal of Consumer Affairs , Volume 41, Issue 1, Summer Pages 1-28

Lewis, S. and F. Messy (2012). "Financial Education, Savings and Investments: An Overview", OECD Working Papers on Finance, Insurance and Private Pensions, No. 22, OECD Publishing.

Lusardi, A. (2009). "U.S. Household Savings Behavior: The Role of Financial Literacy, Information and Financial Education Programs," in C. Foote, L Goette, and S. Meier (eds), Policymaking Insights from Behavioral Economics, Federal Reserve Bank of Boston, pp. 109-149.

Lyons, A.C. (2005). "Financial education and program evaluation: challenges and potentials for financial Professionals". Journal of Personal Finance 4(4): 56–68.

Machin, S., Pelkonen, P., & Salvanes, K.G. (2012). Education and mobility. Journal of European Economic Association, 10(2), 417–450

Malamud, O., & Wozniak, A.K. (2012). The impact of college education on geographic mobility. Journal of Human Resources 47(4), 913–950.

Mastrobuoni, Giovanni, 2011. "The role of information for retirement behavior: Evidence based on the stepwise introduction of the Social Security Statement," Journal of Public Economics, Elsevier, vol. 95(7), pages 913-925.

Psacharopoulos, G. , and H. A.Patrinos . 2018. "Returns to Investment in Education: A Decennial Review of the Global Literature." Education Economics 26 (5): 445–58.

Weiss, C. T. (2015). Education and regional mobility in Europe. Economics of Education Review 49, 129-141.

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