

# The importance of financial literacy: Evidence from Singapore\*

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## **Abstract**

In this paper, we examine financial literacy in Singapore. Using data from the SKBI-GFLEC Sustainable Investment Survey, we find that approximately 40% of Singaporeans are financially literate. We also find that financial literacy is low among specific groups such as women, less educated, and not employed people. We explore further financial literacy by examining it across race/ethnicity and ESG literacy. Our data reveals that Chinese are more financially literate compared to Malays and Indians who instead chose the do-not-know option more frequently than the others. Also, we find that those with higher ESG knowledge are also more financially literate compared to those who are ESG illiterate. Finally, our results show that financial literacy positively correlates with active financial behavior such as choosing how the money is invested, which may affect investments' return and, consequently, their wealth and financial well-being in the long run.

**Keywords:** Financial literacy, investments, active investors, financial behavior, ESG.

**JEL codes:** G53, D1, I3.

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## 1. Introduction

Asian economies have been facing huge expansion due to advanced technologies and the advent of globalization. However, the increasing uncertainty in the global outlook and financial stability have huge economic consequences on financial wealth and financial well-being worldwide, also exacerbating racial inequality (Hasler et al., 2023). The positive effects of being financially literate to deal with unexpected exogenous shocks and do sound wealth management have been widely documented across countries (Lusardi and Mitchell, 2023) but still limited evidence is available among the Asian population. A pioneering study by Klapper and Lusardi (2020), using data from the S&P Global Financial Literacy Survey conducted in 2014, shows that Singaporeans are better off than their peers in other countries<sup>2</sup>. According to their findings, on average, 59% of the population is financially literate in Singapore compared to only one-third of the total population<sup>3</sup>. However, the Asian population is still an understudied subgroup of the population, and further evidence is needed to make conclusive statements about their financial literacy level.

In this paper, we aim to fill this gap by further examining financial literacy in Singapore, which has a highly developed and diversified economy, positioning itself as a global leader in various domains. It is one of the world's leading financial centers and a major hub for trade, shipping, and logistics. Singapore's country-specific characteristics make worthwhile addressing the following research questions: How many Singaporeans are financially literate? Who knows the most and who knows the least? Does financial literacy matter for investing behavior in Singapore? To the best of our knowledge, we are the first one aiming to address the above research questions in Singapore. By using the SKBI-GFLEC Sustainable Investment Survey which includes the “Big Three” financial literacy questions (Lusardi and Mitchell, 2011b) we also ensure comparability with other studies and across countries.

Our findings show that 40% of Singaporeans correctly answer all the “Big Three” questions in our sample. Interest and inflation knowledge are the most known concepts compared to risk diversification. Although Singaporeans show a higher level of financial literacy compared to the average around the

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<sup>2</sup> Data are available upon request to the authors and refer to the S&P Global FinLit Survey conducted in 2014 by McGraw Hill Financial in collaboration with Gallup, Inc., the World Bank Development Research Group, and GFLEC.

<sup>3</sup> Klapper and Lusardi (2020) define financially literate as those who correctly answer three out of four questions about numeracy, interest compounding, inflation, and risk diversification, which is a broader and more flexible measure compared to the Big Three by Lusardi and Mitchell (2011b), which require the knowledge of interest, inflation, and risk diversification simultaneously. The definition of financial literacy and how it is measured affects the results and should be taken into account when comparing our results to previous evidence.

world, still many of them (60%) are financially illiterate. We also find that financial literacy is low among specific groups such as women, less educated, and not employed people. We explore further financial literacy in Singapore by examining it across race and ethnicity. Our data reveals that Chinese are more financially literate compared to Malay and Indians who instead chose the do-not-know option more frequently than the others.

Renowned as one of the world's foremost financial centers, Singapore is committed to fostering innovation and technological advancement, attracting numerous multinational corporations and startups. In addition, more attention is currently paid to the consequences of investment choices on the environment. Businesses and financial institutions in Singapore have been actively promoting and integrating ESG considerations into their operations and decision-making processes. In addition, the Monetary Authority of Singapore (MAS), the country's central bank, provided guidelines, frameworks, and incentives to foster financial institutions to implement Environmental, Social, and Governance (ESG) practices. One of the main initiatives introduced by the government is the Singapore Green Plan 2030<sup>4</sup>, which defines the country's sustainability goals and strategies in several sectors such as energy, transportation, and waste management. We take advantage of our dataset by looking at financial literacy across ESG literacy. We find that those with basic ESG literacy are also more financially literate compared to those who are ESG illiterate. This is particularly important considering that our outcome of interest is active investing behavior, meaning choosing how the money is invested in both employer-provided retirement accounts and other investments. Active investors are much more financially literate than those who are not, particularly in terms of risk literacy which may affect their investments' return and, consequently, their financial well-being in the long run. Finally, our results are confirmed by multivariate regression analyses revealing that financial knowledge positively correlates with active investing behavior.

The remainder of the paper is organized as follows. Section 2 describes our data and reports financial literacy measures and summary statistics across a subsample of the population. Section 3 explains how we define our main outcome of interest and active investing behavior, and summarizes the main findings. Finally, Section 4 concludes.

## **2. Data overview and summary statistics**

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<sup>4</sup> Discover more about the plan at the following link <https://www.greenplan.gov.sg/> (Last retrieved: May 16, 2023).

Over the past 50 years, the historical inflation trajectory in Singapore can be broadly categorized into six periods. The 1970s were marked by high inflation with average rates of 6.6%, while the 1980s saw significant declines (2.2%). From 1988 to 1996, inflation expectations remained stable but fell further from 1997 to 2004, reaching 0.2% in early 2002, due to economic shocks. Inflation increased from 2005 to 2012 during the Global Financial Crisis. Since 2013, inflation expectations have gradually declined, with a dip during the COVID-19 pandemic. In 2022 the overall inflation rate was equal to 5.3% but in 2023 the projections speak about a moderate inflation rate equal to 3.8%, but still above the pre-pandemic rates (Monetary Authority of Singapore, 2023)<sup>5</sup>. This downward trend in inflation can be attributed to structural factors such as the impact of globalization, the influence of domestic industry liberalization on consumer prices, reduced currency volatility, and import strategies. Overall, Singapore has generally kept inflation lower than most advanced and regional economies<sup>6</sup>.

Moreover, the nation is recognized for its educational excellence. Singaporean students have consistently demonstrated exceptional academic performance on a global scale. Furthermore, Singaporean students showcased remarkable success by securing the highest positions in the Program for International Student Assessment (PISA). Across all the topics assessed by PISA, 15-year-olds in Singapore score well above the average in OECD countries (they scored 549 points versus 487 points in OECD countries in reading, 569 in mathematics compared to an average of 489 points in OECD countries, and 551 points in science versus 489 points in OECD countries)<sup>7</sup>. Contrary to other countries that took part in the Financial Literacy module available in PISA since 2012, no evidence of financial literacy level among students is available in Singapore. Evidence from other studies suggests it is positively correlated with numeracy, which seems very high among Singaporean students. The above results speak about the excellence of the Singaporean educational system. Additionally, Singapore is the sole Asian country to rank among the top ten performers in English proficiency, with a commendable 6th position in the 2016 EF English Proficiency Index, which encompassed 72 nations. This represents a huge advantage for Singaporeans compared to other Asians who may face additional language barriers in international programs and surveys administered in English (Hasler et al., 2023).

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<sup>5</sup> Discover more here: <https://www.mas.gov.sg/-/media/mas-media-library/publications/macroeconomic-review/2023/apr/mrapr23.pdf> (last retrieved on May 5, 2023).

<sup>6</sup> Discover more here: <https://www.mas.gov.sg/-/media/MAS/Monetary-Policy-and-Economics/Education-and-Research/Education/Explorer/Economics-Explorer-2-Inflation.pdf> (last retrieved on May 23, 2023).

<sup>7</sup> Further information is available here: [https://www.oecd.org/pisa/publications/PISA2018\\_CN\\_SGP.pdf](https://www.oecd.org/pisa/publications/PISA2018_CN_SGP.pdf)

In September 2022, we fielded the SKBI-GFLEC Sustainable Investment Survey through YouGov's Global Omnibus online polling service. YouGov is a platform that enables accurate consumer targeting and research and reaches over 9M people in North America, Europe, the Middle East, and the Asia-Pacific.<sup>8</sup> The survey cover questions aimed at collecting information about respondents' preferences toward ESG investments, ownership of ESG investments, and knowledge of ESG topics, but our primary focus in this paper is on questions that measure individuals' understanding of basic financial concepts (financial literacy) and investment-specific concepts (investor sophistication)<sup>9</sup>.

After the data-cleaning process, we ended up with a sample of 1,699 observations. Table A1 in the Appendix reports summary statistics of the main demographic variables in our sample. These statistics are mostly in line with the latest census data in Singapore<sup>10</sup>, some exceptions are discussed below. It is worth noting that in our sample the minimum age is 23 years old, and the maximum age is 86. For this reason, the average age in our sample is lower (46) compared to the whole population in Singapore (42). Our sample includes 30% of people aged or younger than 35 years old. People aged between 36 and 50 years old represent 29% of the sample. Lower is the percentage of adults aged 51-65 (26%) and elderly people (15%). Overall, 75% of the population represents the working-age group (25-65). The sample is homogeneously distributed across gender (51% men and 49% women).

They are well educated (44% of the sample received at least a college degree). In our sample, the percentage of people with less than High School is 2% as well as those with the highest educational attainment, only 11% are postgraduates. In terms of marital status, Singaporeans are mainly married or living with a partner (56%), 36% are single or in a relationship but not living with a partner, about 6% are separated or divorced, instead a lower percentage represents widowed (1% in our sample versus 4% in the census data). Most of the population (55%) is in the first two quartiles of household income.

In line with census data, respondents are mostly employed (78%). However, for the sake of comparison, we aggregate under the "not employed/not in the labor force (NLF)" category (12%) both those identifying themselves as not working (4%), others not in the labor force (4%), unemployed (3%) and

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<sup>8</sup> Further information on YouGov sampling methodology is available at the following link <https://business.yougov.com/frequently-asked-questions> (Last retrieved: June 1, 2023).

<sup>9</sup> These data are part of a bigger project and were already used by the authors for a different study on ESG topics across countries. We focus on Singapore to provide evidence on the financial literacy level among an understudied group.

<sup>10</sup> Census data are available at the following link: <https://www.singstat.gov.sg/-/media/files/publications/population/population2022.ashx>.

full-time students (1%). Finally, 9% of our sample consists of retirees. In terms of race and ethnicity, the Singaporean population is representative of the entire population, and it is distributed as follows: 74% of the respondents are Chinese, 14% Malay, 9% Indian, and 3% other races and ethnic groups. Finally, half of the respondents have at least one kid. In the next section, we will explore the level of financial literacy in Singapore taking into account all the demographic characteristics reported above.

## **2.1 Findings regarding financial literacy**

To investigate Singaporeans' financial knowledge, we use the "Big Three" questions proposed by Lusardi and Mitchell (2011b), which measure the basic knowledge of fundamental concepts for most economic decisions. These questions jointly test the understanding of interest rates in wealth accumulation, inflation's effects on purchasing power, the risk diversification concept, and the knowledge of such terms, including what stocks or mutual funds are. The Big Three are currently included in several national and international surveys due to their simplicity, relevance, brevity, and ability to differentiate respondents' knowledge. In other words, these three simple and brief questions, related to general concepts useful for daily financial decisions are an effective indicator to measure financial knowledge levels across countries (Lusardi and Mitchell, 2011b). Moreover, the structure of the questions does not require difficult calculations and allows the respondent to avoid guessing the answer by including both the "do not know" and the "refuse to answer" options. This is an additional source of information that is worthwhile exploring to investigate further people's lack of knowledge. Below we report the wording of the Big Three questions:

1. Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- More than \$102
- Exactly \$102
- Less than \$102
- Don't know
- Prefer not to say

2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy...

- More than today
- Exactly the same as today
- Less than today
- Don't know
- Prefer not to say

3. Do you think the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund.

- True
- False
- Don't know
- Prefer not to say

The first two questions investigate whether the respondents know about basic economic concepts which affect saving decisions. The third question investigates risk literacy about diversification which is important to make savvy investment decisions.<sup>11</sup> Being unable to correctly answer all the Big Three questions, has been found economically important to financial behavior and outcomes such as paying higher fees, debt-burden<sup>12</sup> and lower level of accumulated wealth and consequently well-being (see Hastings et al., 2013; Lusardi & Mitchell, 2014, 2023; Lührmann et al., 2018, Gerardi et al., 2013; Lusardi and Tufano, 2015; CFPB, 2017a,b; Hasler et al., 2022). Lo Prete (2018, 2013) shows how financial knowledge reduces inequality across countries and over time.

Table 1 (column 1) shows summary statistics on the three financial literacy questions reported above<sup>13</sup>. Knowledge of interest and inflation is higher compared to risk knowledge. Approximately 78% of respondents could correctly answer the numeracy question (Panel A). Even if this is not a discouraging number, the simplicity of the question and its multiple-option structure make relevant the 16% of people

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<sup>11</sup> The SKBI-GFLEC Sustainable Investment Survey includes also has other questions about bond pricing and mortgages, with the three questions reported above representing the so-called "Big Five", Lusardi et al. (2011). Since these questions are not always included in other surveys, for the purpose of this paper we focus on the Big Three only.

<sup>12</sup> Hasler et al. (2022), discussing their in-depth interview findings report that Asians often use their network of family and friends to support people in financial distress, borrow from their families to make ends meet, and address their needs when in financial trouble.

<sup>13</sup> By using sampling weights, our findings are representative of the Singaporean population.

who get it wrong or choose the DK option (6%) or refuse to answer (1%). Approximately 75% of respondents understand the impact of inflation on purchasing power (Panel B). This may be explained by the inflation history in Singapore. However, 16% of respondents wrongly answered the question and 9% of them chose the DK option. The results are different when it comes to basic risk literacy. Only half of the sample correctly answered the risk diversification question (Panel C). Only 10% of respondents got it wrong. While a fraction of the sample chooses the DK option, revealing low knowledge of this concept which is critically important to make savvy financial investments. Overall, in line with previous literature, about 1/3 of the population answer all the Big Three questions correctly (39%) in Singapore (Panel D).

In more detail, more than 60% of respondents correctly answer both numeracy and inflation questions. Looking at the DK option, 40% of respondents choose at least one DK option which seems driven by a lack of risk literacy (38% of the full sample chose DK for the risk diversification question). Considering that in our sample the minimum age is 23 and that only 14% are older than 65 years old, is reasonable that we do not find much difference between the full sample (column 1) and the working-age-restricted sample (column 2). Our results show a higher level of financial literacy compared to other countries, in line with previous financial literacy data available for Singapore in the 2014 S&P Global FinLit Survey.

**Table 1: Summary statistics on three financial literacy questions**

	Full sample (%)	Age 25-65 (%)
<b>(A) Interest question</b>		
>\$102	77.7	77.3
= \$102	5.7	5.7
<102	9.7	10.1
DK	5.6	5.6
RF	1.2	1.3
<b>(B) Inflation question</b>		
More	6.1	6.8
Exactly the same	9.9	10.0
Less	74.8	74.2
DK	8.7	8.2
RF	0.5	0.7
<b>(C) Risk question</b>		
Correct (false)	49.8	50.0
Incorrect (true)	9.9	10.4



DK	38.4	37.8
RF	1.9	1.8
(D) Cross-question consistency		
Interest and Inflation	63.2	62.1
All correct	39.3	38.9
None correct	8.3	8.0
At least 1 DK	40.8	40.4
All DK	2.6	2.4
<u>Number of observations</u>	<u>1,699</u>	<u>1,284</u>

Note: All figures are weighted. DK indicates respondent does not know.

## 2.2 Who is financially illiterate?

Although more than one-third of the population can correctly answer the Big Three questions, financial literacy in Singapore is still low. In other words, basic financial knowledge cannot be taken for granted, even in a country such as Singapore with well-developed financial markets. Table 2a shows the distribution of responses to financial literacy questions across demographics. We identify some vulnerable groups in line with previous literature in other countries (Lusardi, 2019; Hasler et al., 2022; Yakoboski et al., 2022).

Our findings show that across age knowledge is mostly flat in Singapore. Interestingly, we do not observe an inverted U-shaped pattern of financial knowledge across generations, as reported in other countries (Lusardi and Mitchell, 2011). Noteworthy, in line with previous evidence, the elderly seem to have a higher level of inflation knowledge compared to the young cohort (83% vs 70%) which can be due to having experienced inflationary periods over their life cycle.

The gender gap is consistent across every single topic and for the overall Big Three questions. Women are 3 percentage points (p.p.) less likely to respond to the interest rate question correctly, 4 p.p. less likely to know about inflation, and 11 p.p. less likely to be knowledgeable about risk diversification than men. The gender gap seems to be driven by the risk diversification knowledge. Only 44% of women correctly answer the risk diversification question, compared to 55% of men. Overall, only 33% of women answer all three questions correctly, versus 45% of men. This gender difference holds across topics, and it has been found consistently across countries (Yabokoski et al. 2022; Klapper and Lusardi, 2020). Moreover, the lower financial literacy level compared to men contributes to preventing women's access to banking

products and consequently leaves them behind in stock market participation (Bucher-Koenen et al., 2021, van Rooij et al., 2012).

Also, education plays a key role. People better educated show higher percentages of correct answers across all the Big Three questions and overall (55% for those with at least a degree and 44% for postgraduates, compared to 39% of the full sample). The importance of education is clearer when looking at the percentages of the DK options. In line with previous evidence, the percentage of DK falls with higher educational attainment. People with low education more frequently chose the DK option (both across questions and overall) compared to those with a college degree or postgraduate education. Considering their employment status, the differences are lower between those employed and those who are not, except for inflation knowledge (approximately 85% of retirees got it correctly compared to 74% of employed respondents). It can be correlated with age. As described above, elderly people may have experienced periods of higher inflation that lead them to handle the effects of inflation on purchasing power.

**Table 2a: Distribution of responses to financial literacy questions by age, sex, education, and employment status (%)**

	Interest		Inflation		Risk		Overall		
	Correct	DK	Correct	DK	Correct	DK	3	>= 1	
<i>Age group</i>									
<35	81.0	4.5	70.0	8.7	51.6	34.9	41.2	38.1	
36-50	75.4	5.7	73.6	8.5	48.2	39.4	36.9	41.5	
51-65	75.4	6.7	76.6	8.8	48.8	41.7	37.8	44.0	
>65	79.5	5.8	83.4	8.9	51.1	37.6	43.3	38.7	
<i>Gender</i>									
Male	79.1	5.2	76.9	6.1	55.3	31.1	45.4	32.6	
Female	76.2	6.1	72.6	11.3	44.1	46.0	33.1	49.1	
<i>Education</i>									
Less than HS	60.6	22.0	49.9	29.8	33.0	53.2	20.6	63.2	
High school	68.2	8.5	67.7	15.5	29.7	55.4	20.6	57.8	
Some College	75.2	6.7	70.1	10.6	43.8	47.0	32.7	49.8	
College Degree	86.3	2.8	84.0	3.3	63.9	26.6	55.3	27.7	
Postgraduate	77.9	2.9	77.5	4.2	60.6	17.8	45.0	20.5	
<i>Employment status</i>									
Employed	78.1	5.0	73.8	8.4	51.3	35.9	40.5	38.3	
Not Employed	76.6	7.8	73.8	11.0	41.4	52.1	30.2	55.3	
Retired	76.4	7.7	84.6	8.2	47.6	42.5	41.4	43.1	

Note: All statistics are weighted. DK indicates respondent does not know.

### 2.2.1 Diving into Singaporeans' inflation knowledge

Since inflation is one of the Big Three topics Singaporeans know better, in this section we provide context and investigate which factors are the determinants of that knowledge. One of the most likely explanations is the direct experience of inflation. Singaporeans experienced downturn in inflation over the last 20 years. Starting from a low level of 0.5% in 2005, it peaked at 6.8% in 2008. The Global Financial Crisis dropped inflation back down in 2009, and since then Singapore's inflation has been low with inflation of around 1% or less from 2015, until around 2021<sup>14</sup>. Moreover, the high inflation in the U.S. led people to decrease or stop saving for retirement in 2022 (Yakoboski et al., 2023).

To better understand inflation knowledge among Singaporeans, in Table 2b we report the results from a Linear Probability Model (LPM) where inflation knowledge on socio-demographics is the outcome of interest. In sum, age and a higher degree of education positively correlate with inflation knowledge. Specifically, the results confirm that inflation knowledge increases with age. Both the magnitude of the coefficients and their statistical significance increase with age brackets. The Over-65 are 20 p.p. more likely to correctly answer the inflation question compared to respondents aged less than 36. Moreover, better-educated people are 33 percentage points (p.p.) more likely to correctly answer the inflation question compared to those who did not attend High School (Less than High School). Those who are not employed are 7 p.p. more likely to know more about inflation compared to those who are in the workforce (employed).

**Table 2b – LPM estimates of inflation knowledge on socio-demographic characteristics in Singapore**

VARIABLES	(1) Inflation question correct
<i>Socio-demographic controls</i>	
36-50	0.059** (0.029)
51-65	0.129***

<sup>14</sup> See more here [https://www.mas.gov.sg/-/media/MAS/EPG/MR/2021/Oct/MROct21\\_SF\\_A.pdf](https://www.mas.gov.sg/-/media/MAS/EPG/MR/2021/Oct/MROct21_SF_A.pdf) (last retrieved on May 5, 2023).

	(0.031)
>65	0.195***
	(0.041)
Female	-0.028
	(0.022)
High School	0.182**
	(0.091)
Some College	0.248***
	(0.088)
College Degree	0.422***
	(0.089)
Postgraduate	0.330***
	(0.092)
Not employed, NLF	0.072*
	(0.038)
Retired	0.062
	(0.040)
Constant	0.369***
	(0.091)
Observations	1,699
R-squared	0.061

Note: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All statistics are weighted.

Singaporeans not only have experienced periods of deflation in the past, but they also benefited from policies to help households dealing with inflation, such as groceries vouchers and rebates for utilities equivalent to a month's cost for those living in four-room HDB flats, or for those in public housing<sup>15</sup>.

### 2.3 Racial/Ethnic differences in financial literacy

Previous evidence suggests that financial literacy is also heterogeneous across race and ethnicity (Hasler et al., 2022; Lusardi and Mitchell, 2011). In Singapore, there are several ethnicities: 74% of the respondents are Chinese, 14% Malay, 9% Indian, and 3% other race and ethnicity. Statistics in Table 3a show the distribution of financial literacy questions by race and ethnicity. Chinese Singaporeans have better financial knowledge (both overall and across questions) compared to other races and ethnicities. Specifically, 81% of Chinese correctly answer the numeracy question, compared to 62% of Malays and 69% of Indians. For the inflation question, Chinese respondents still show the highest knowledge (82%),

<sup>15</sup> Discover more here: <https://lkyspp.nus.edu.sg/ips/publications/details/mitigating-the-impact-of-rising-inflation-rates-in-singapore> (last retrieved on May 5, 2023).

but Malays seem more aware of the effects of inflation on purchasing power compared to Indians (59% vs 47%, respectively). When it comes to the risk diversification question, the percentages are different. Only 54% of Chinese got it correctly, followed by Malays (47%). But Indians are those who know the least: Only 24% of them got it correctly. This is clear also by looking at the distribution of the DK options: Indians are those who chose the DK option more frequently (both overall and across questions). Also high is the percentage of Indians who admit they do not know the risk diversification concept.

**Table 3a: Distribution of responses to financial literacy questions by race/ethnicity (%)**

	Interest		Inflation		Risk		Overall	
	Correct	DK	Correct	DK	Correct	DK	3 Correct	>= 1 DK
<i>Race and ethnicities</i>								
Chinese	80.9	4.1	81.9	5.7	54.4	35.1	45.0	36.9
Malay	62.4	8.6	58.9	12.5	47.2	38.6	27.5	43.6
Indian	69.2	12.0	47.2	22.2	24.4	56.8	14.9	60.5
Other*	84.1	4.52	71.3	8.3	57.2	35.6	45.5	37.0

Note: All statistics are weighted. DK indicates respondent does not know. \*N=59. The exact wording of the question used by YouGov to investigate respondents' ethnicity is as follows: "What is your ethnicity? a) Chinese b) Malay c) Indian d) Other".

The differences in financial literacy levels across races and ethnic groups in Singapore can be driven by several socioeconomic factors. Financial literacy levels can be influenced by an individual's socioeconomic background, such as income level, educational attainment, and exposure to financial resources. In addition, cultural values, beliefs, and practices can impact financial behavior and attitudes towards money management (Hasler et al, 2023). Diverse ethnic groups may hold varying cultural perspectives on financial matters, which can influence their approach to financial literacy and decision-making.

In our sample, minorities such as Malays and Indians have a lower income compared to Chinese. Moreover, Chinese seem to have more financial educational opportunities compared to the other racial groups which may shape their financial knowledge and skills. Given Singapore's polyglot society, it is important to consider that language barriers may prevent access to financial resources and initiatives.

Finally, individual circumstances, economic opportunities and social mobility can vary considerably within racial groups and can significantly influence financial knowledge and skills. To foster financial education effectively, targeted programs should be tailored to address the specific needs and challenges faced by distinct communities, ensuring that resources and initiatives are accessible, culturally relevant,

and equitable. In the next section, we further explore Singaporeans' financial literacy among other country-specific factors.

## **2.4 Financial Literacy and ESG Literacy**

The Singapore government has been focusing on Environmental, Social, and Governance (ESG) principles positioning itself as a leading hub for sustainable finance and ESG investing in Asia. Moreover, sustainability-focused organizations, industry associations, and research institutions collaborate to drive ESG awareness, research, innovation, and implementation.

Considering Singapore's commitment to ESG, we decide to explore further respondents' financial knowledge by focusing on the differential knowledge among those who know the basics of ESG principles and those who do not know them. To measure ESG literacy our survey includes nine ESG questions, three for each topic. We consider ESG literate those who correctly answer at least one question out of three for each single topic of the ESG, in other words, they should correctly answer three questions out of nine<sup>16</sup>. In line with previous literature, we find that those with higher ESG knowledge are also more financially literate compared to those who are ESG illiterate. This is true across topics, and it is clear looking at the percentages of DK.

In more detail, 89% of those with basic knowledge about ESG principles can correctly answer the numeracy question compared to 72% of those who are ESG illiterate. In turn, they chose the DK option (7.5%) much more than ESG-literate respondents (1.6%). The difference is even more consistent for inflation knowledge. 90% of those who know the basic of sustainable knowledge can correctly answer the inflation question, compared to only 67% of those who do not know the basics of ESG principles. Approximately, the difference between the DK answers reported by ESG literate and ESG illiterate people is 11 p.p. for both the inflation and the risk diversification questions.

Overall, risk diversification is still the most difficult topic to grasp, also among those whose knowledge is more sophisticated and related to environmental risks. The percentage of DK options chosen by both groups of respondents is much higher for the risk diversification question (32% vs 41%) compared to the

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<sup>16</sup> The exact wording of the ESG questions is available upon request.

DK answers to interest and inflation questions. Interestingly, 56% of the ESG literate respondents are able to correctly answer all the Big Three questions, compared to approximately 32% of those who are ESG illiterate. These results speak of the strong positive relationship between being financially literate and having basic knowledge to make sustainable financial decisions.

**Table 3b: Distribution of responses to financial literacy questions by ESG literacy (%)**

	Interest		Inflation		Risk		Overall	
	Correct	DK	Correct	DK	Correct	DK	3 Correct	>= 1 DK
ESG illiterate	72.4	7.5	67.3	12.2	44.2	41.5	31.6	44.4
ESG literate	88.7	1.6	90.5	1.3	61.5	31.9	55.7	33.0

Note: All statistics are weighted. DK indicates respondent does not know.

### 3. Active investing behavior

Understanding whether financial literacy matters for investing behavior in Singapore is one of our research questions. In this section, we have decided to focus on investment given the importance of pensions and their effects on financial well-being in the long run. To understand better investment choices, we have to note that Singapore’s formal pension system, before the introduction of the opt-in option to actively invest money for retirement, required mandatory retirement savings through the Central Provident Fund. These savings also include housing, medical savings, and other social objectives. This system may discourage Singaporeans from actively managing their wealth. Considering the change in the retirement contribution system in which people may decide how their money is invested and the growing financial markets in Singapore, it is worthwhile exploring the relationship between being active investors<sup>17</sup> and their financial literacy. However, we have to consider that with higher inflation, households rearrange their savings and investing behavior.

For active investors, we consider those who own retirement accounts where they get to choose how the money is invested and those who have other investments in stocks, bonds, mutual funds, or other securities, not including private or employer-provided retirement accounts. In other words, we consider active investors those who reply “yes” to at least one of the following questions:

<sup>17</sup> We followed a similar definition of “active investor” proposed by Fisch et al. (2020). Active investors are approximately 60% of the respondents in our sample (see Table A1).

1. Do you have any investments in retirement accounts where you get to choose how the money is invested?

- Yes
- No
- Don't know
- Prefer not to say

2. Not including private or employer-provided retirement accounts, do you have any investments in stocks, bonds, mutual funds, or other securities?

- Yes
- No
- Don't know
- Prefer not to say

Previous evidence has established that financially literate people are more likely to invest in the stock market, accumulate more retirement wealth, and better manage their wealth compared to financially illiterate people (Lusardi et al., 2017; Van Rooij et al., 2011). In our sample, only 60% of our respondents actively invest their money and the percentage is lower when it comes to those who get to choose how retirement savings are invested, 29%. One possible explanation that we have to take into account to correctly interpret our results is that the possibility of choosing how to invest retirement savings was given only a few decades ago in Singapore<sup>18</sup>. This may discourage people that were already enrolled in the previous system from changing their asset allocation, as well as those close to retirement. Only 24% of elderly people (aged 65 and over) decided to choose how to invest their money compared to 33% and 29% of younger respondents aged 36-50 and 51-65, respectively. Other scholars have demonstrated that a lack of assets can also contribute to financial vulnerability (Hasler et al., 2018; Christelis et al., 2009;

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<sup>18</sup> The CPF has allowed members to invest money from their Ordinary Accounts since 1986. In 2001, members were allowed to invest using money over a certain threshold from both their Ordinary Account and their Special Account. Profits from these cannot be withdrawn until retirement. In 2018, this was enhanced by reducing the sales charges and wrap fees and, more interestingly, by introducing a self-awareness questionnaire that helps CPF members assess their financial knowledge. The latter does not prevent members from investing but if the assessment is not favorable, they are encouraged to just take the risk-free interest rates from the CPF. See Fong (2020) and CPF (2018) for more information.



Jappelli et al., 2013). However, it is noteworthy to explore further the relationship between financial literacy and financial behavior such as active investments in Singapore.

Table 4 shows that being active investors and financial literacy are strongly correlated in our sample. Those who correctly answer the Big Three questions are almost three times more likely to be active investors compared to those who are not financially literate. Among the three questions, the one related to risk diversification is the one that makes the difference the most among active and non-active investors. This question confirms that risk literacy is low even among those who actively invest money in the stock market. The difficulty people face in front of this question is clear by looking at the DK options shares: approximately 23% for active investors and 61% for non-active investors. We further explore these preliminary findings with a multivariate regression analysis presented in the next section.

**Table 4: Financial literacy of those who are active investors and those who are no active investors (%)**

		Active- Investors (N=783)	Non-Active Investors (N=459)
Interest question			
	Correct	84.0	67.1
	DK	2.2	10.7
Inflation question			
	Correct	81.8	61.5
	DK	2.85	17.4
Risk diversification question			
	Correct	63.2	30.0
	DK	22.6	60.8
Summary			
	Correct: Interest and inflation	73.0	45.2
	Correct: all three	52.0	18.6
	Number of correct answers	2.28	1.59

Note: All statistics are weighted. DK indicates the respondent does not know. The sample consists of 1,242 non-retired respondents aged 25-65.

### 3.1 A multivariate model of active investing behavior and financial literacy

Financial literacy matters. This is the conclusion that many authors draw looking at the relationship between financial literacy and wealth management across countries (van Rooij et al., 2011; van Rooij et

al., 2012; Lusardi and Mitchell, 2023; Almenberg et al., 2021; Hasler et al., 2022). However, still, limited evidence is available for Singapore. Our survey provides the possibility to fill this gap in the aftermath of the Covid-19 Pandemic. Multivariate regression analyses' results confirm what we discussed in previous tables but more rigorously, controlling for all the socio-demographic characteristics that may affect the results.

To investigate the link between financial literacy and active investments, we run Ordinary Least Squares (OLS) regression models on the full sample. We repeat our analysis on a restricted subsample for those non-retirees aged 25-65. Results are almost the same in the two samples. We control for age, age squared, gender, and marital status. Other socio-demographic characteristics include income, district of residence, and educational attainment. Finally, we control for having kids, since this may affect the liquidity constraints of the household.

Following Lusardi and Mitchell's approach (2011a), we measure financial literacy by adopting three different specifications: i) a dummy variable that takes the value of 1 if the respondent correctly answers the Big Three questions, 0 otherwise; ii) an indicator of the number of total correct answers to the Big Three; iii) and a third indicator is a vector of the three dummy variables indicating which question among the Big Three was correctly answered by each respondent. Table 5 reports the main findings from our analyses for both samples. Those who are financially literate, no matter the specification used, are more likely to be active investors compared to those who are not. The effect of financial knowledge is high and statistically significant even after controlling for several socio-demographic characteristics. These results show that financial literacy has an effect on investing behavior above and beyond demographic variables.

In more detail, results reported in column 1 show that those who are financially literate (all Big Three correct) show the highest likelihood to be active investors. In fact, the ability to correctly answer all three questions increased the probability of being active investors by 23 percentage points (p.p.). Instead, results in column 2 highlight that providing an additional financial literacy correct answer increases the probability of being active investors by 12 p.p. Column 3 shows the single questions' contribution to investing behavior. The main finding here is that being aware of risk diversification enables people to get to choose how to invest their money with a probability of 17 p.p. more compared to those who are not.

In line with previous evidence, we confirm that also in Singapore educational attainment is positively correlated with investing. Better-educated people and those with higher income are more likely to be active investors, these results are robust and hold for both samples, regardless of how we measure financial literacy. This result is in line with previous literature. In addition, there is a gender gap, and it is highly statistically significant, but only in the full sample. Women are less likely to report being active investors compared to men in Singapore. The pattern is inverted for widowed whose chances of being active investors raise by more than 40 p.p. only in the restricted sample compared to married people, regardless of the financial literacy specifications (columns 4 to 6). Finally, those who are not employed are about 8 p.p. less likely to be active investors compared to those who have a job. This result is no longer statistically significant in the restricted sample (columns 4 to 6).

**Table 5 – OLS estimates of active investments on financial literacy in Singapore**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Active investors	Full Sample Active investors	Active investors	Active investors	Age 25-65 Active investors	Active investors
<i>Financial literacy measures</i>						
All Big Three correct	0.230*** (0.024)			0.226*** (0.028)		
N. of correct answers		0.122*** (0.013)			0.128*** (0.015)	
Inflation correct			0.104*** (0.031)			0.079** (0.035)
Interest correct			0.081*** (0.031)			0.108*** (0.036)
Risk correct			0.170*** (0.026)			0.186*** (0.030)
<i>Socio-demographic controls</i>						
Age	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.007 (0.010)	-0.007 (0.010)	-0.008 (0.010)
Female	-0.054** (0.023)	-0.059*** (0.023)	-0.057** (0.023)	-0.042 (0.027)	-0.044* (0.026)	-0.041 (0.027)
High School	0.130* (0.073)	0.100 (0.076)	0.107 (0.076)	0.085 (0.094)	0.053 (0.098)	0.061 (0.099)
Some College	0.208*** (0.071)	0.174** (0.074)	0.179** (0.074)	0.179** (0.091)	0.143 (0.096)	0.148 (0.096)
College Degree	0.327***	0.289***	0.292***	0.327***	0.288***	0.290***

	(0.074)	(0.077)	(0.077)	(0.094)	(0.098)	(0.099)
Postgraduate	0.323***	0.286***	0.286***	0.338***	0.301***	0.300***
	(0.078)	(0.081)	(0.081)	(0.098)	(0.102)	(0.102)
Single/Not Married	0.032	0.026	0.028	0.040	0.035	0.040
	(0.035)	(0.036)	(0.035)	(0.040)	(0.040)	(0.039)
Divorced/Separated	-0.016	-0.024	-0.023	-0.020	-0.035	-0.031
	(0.053)	(0.052)	(0.051)	(0.064)	(0.063)	(0.062)
Widowed	0.176	0.185*	0.184*	0.411***	0.407**	0.426***
	(0.110)	(0.111)	(0.110)	(0.137)	(0.165)	(0.158)
Income, 2 <sup>nd</sup> quartile	0.126***	0.112***	0.110***	0.130***	0.106**	0.110***
	(0.034)	(0.034)	(0.034)	(0.041)	(0.041)	(0.041)
Income, 3 <sup>rd</sup> quartile	0.130***	0.115***	0.114***	0.142***	0.117***	0.121***
	(0.035)	(0.036)	(0.036)	(0.043)	(0.044)	(0.044)
Income, 4 <sup>th</sup> quartile	0.283***	0.272***	0.270***	0.292***	0.268***	0.272***
	(0.037)	(0.037)	(0.037)	(0.044)	(0.045)	(0.045)
Not employed, NLF	-0.074*	-0.088**	-0.085**	-0.028	-0.039	-0.035
	(0.039)	(0.039)	(0.038)	(0.049)	(0.048)	(0.048)
Retired	-0.052	-0.051	-0.052			
	(0.051)	(0.050)	(0.051)			
Has kids	0.019	0.013	0.015	0.038	0.042	0.040
	(0.033)	(0.033)	(0.032)	(0.037)	(0.037)	(0.036)
Constant	0.316*	0.227	0.240	0.379	0.271	0.272
	(0.175)	(0.178)	(0.178)	(0.267)	(0.272)	(0.269)
Observations	1,699	1,699	1,699	1,242	1,242	1,242
R-squared	0.224	0.227	0.230	0.243	0.252	0.256

Note: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Other control includes age squared and district of residence. All regressions use weights.

Since financial literacy may be endogenous or suffer from measurement error (van Rooij et al., 2011), we explore further the relationship between financial literacy and investing behavior considering a more exogenous exposure to financial literacy such as financial education offered in schools or at the workplace, regardless people participated or not<sup>19</sup>. The exact wording of the question is reported below:

- 1) Was financial education offered by a school or college you attended or a workplace where you were employed?
  - Yes, but I did not participate in the financial education offered

<sup>19</sup> We could use this variable as an instrumental variable for financial literacy, but we did not for two main reasons: the sample size is not big enough and the F statistic is too low (3.48).

- Yes, and I did participate in the financial education
- No
- Don't know
- Prefer not to say

Table 6 reports the result of this last model specification. Those who reported that financial education was offered in school or at the workplace are 12 p.p. more likely of being active investors. In this model specification, there is a gender gap and is statistically significant in both samples underlying a lower involvement of Singaporeans women in active investing behavior. These results are in line with previous literature and contribute to the international comparison as expected.

**Table 6 – OLS estimates of active investments on financial education offered in Singapore**

VARIABLES	(1) Full Sample Active investors	(2) Age 25-65 Active investors
<i>Financial literacy measure</i>		
Was offered financial education	0.117*** (0.025)	0.120*** (0.029)
<i>Socio-demographic controls</i>		
Age	-0.002 (0.005)	-0.004 (0.010)
Female	-0.073*** (0.023)	-0.061** (0.027)
High School	0.133* (0.077)	0.086 (0.096)
Some College	0.233*** (0.075)	0.201** (0.093)
College Degree	0.392*** (0.077)	0.390*** (0.096)
Postgraduate	0.353*** (0.081)	0.357*** (0.100)
Single/Not Married	0.048 (0.036)	0.043 (0.040)
Divorced/Separated	0.001 (0.055)	-0.010 (0.065)
Widowed	0.182* (0.104)	0.350*** (0.113)
Income, 2 <sup>nd</sup> quartile	0.161*** (0.034)	0.160*** (0.041)
Income, 3 <sup>rd</sup> quartile	0.170***	0.176***

	(0.036)	(0.044)
Income, 4 <sup>th</sup> quartile	0.339***	0.344***
	(0.036)	(0.044)
Not employed, NLF	-0.070*	-0.020
	(0.039)	(0.049)
Retired	-0.028	
	(0.053)	
Has kids	-0.004	0.007
	(0.033)	(0.037)
Constant	0.237	0.302
	(0.179)	(0.263)
Observations	1,699	1,242
R-squared	0.189	0.212

Note: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Other control includes age squared and district of residence. All regressions use weights.

#### 4. Discussion and conclusions

In this paper, we provide evidence of the financial literacy level in Singapore, according to the “Big Three” questions. Although 40% of the population correctly answers all the Big Three questions, there are specific groups that lack basic financial knowledge, such as women, less educated, and not employed people.

To put our results in context is worthwhile considering that some characteristics in Singapore may affect people’s financial knowledge and behavior. First, Singapore is a trade-dependent economy, so any world fluctuations in these prices affect Singapore directly.<sup>20</sup> Singaporeans experienced downdrawn in inflation over the last 50 years. The high inflation may lead people to change their saving and investment strategies. Second, classes and modules are available at the autonomous universities and polytechnics of Singapore but are currently required only for Year 1 polytechnic students. Good financial behavior and relevant concepts are taught from primary school in the Form Teacher Guidance Period, Character and Citizenship Education lessons, and the A-level economics curriculum<sup>21</sup>. Since 2003, Singaporeans may benefit from freely available initiatives in schools, workplaces, and communities, as part of the “MoneySense” program. This financial education program is coordinated and overseen by the MoneySense Council, which is co-chaired by the Monetary Authority of Singapore and the Ministry of Manpower and

<sup>20</sup> Discover more here: <https://www.mas.gov.sg/-/media/MAS/Monetary-Policy-and-Economics/Education-and-Research/Education/Explorer/Economics-Explorer-2-Inflation.pdf> (last retrieved on May 5, 2023).

<sup>21</sup> See the reply of the Minister of Education to Member of Parliament Leon Perera (MOE, 2020) for more information.

comprises representatives from various government agencies. However, we find some differences across the population.

As widely documented in other countries, also in Singapore financial literacy differs across races and ethnicity with Chinese being the most knowledgeable ethnic group, followed by Malays and Indians. Moreover, financial literacy is higher for those who know the basics of ESG principles.

Finally, financial literacy matters. Those who correctly answer the Big Three questions are roughly three times those who do not show active investing behavior. The strong relationship between financial literacy and active investing behavior is confirmed by our estimations results, regardless of the financial literacy specifications.

The risk diversification concept which is the most related to active investing behavior is the most difficult one and may strongly affect optimal asset allocation and consequently wealth and financial well-being in the long run. Our results suggest promoting targeted programs for vulnerable groups such as women, those not working and minorities addressing in particular the risk diversification concept.

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## Appendix

**Table A1: Summary statistics in the Singapore total sample**

	Obs	Mean	SD	Min	Max
Age	1,699	46.49824	15.52746	23	86
<35	1,699	0.295994	0.456623	0	1
36-50	1,699	0.294947	0.456153	0	1
51-65	1,699	0.262923	0.440351	0	1
>65	1,699	0.146136	0.353346	0	1
25-65	1,699	0.755432	0.429957	0	1
Male	1,699	0.50769	0.500088	0	1
Female	1,699	0.49231	0.500088	0	1
Less than HS	1,699	0.022326	0.147784	0	1
Highschool	1,699	0.17498	0.380062	0	1
Some College	1,699	0.352179	0.47779	0	1
Degree	1,699	0.336584	0.47268	0	1
Postgraduate	1,699	0.113932	0.317822	0	1
Married	1,699	0.563481	0.4961	0	1
Single not married	1,699	0.363382	0.481115	0	1
Divorced/separated	1,699	0.058591	0.234928	0	1
Widowed	1,699	0.014546	0.11976	0	1
HH 1st quartile	1,699	0.285383	0.451729	0	1
HH 2nd quartile	1,699	0.271885	0.445062	0	1
HH 3rd quartile	1,699	0.232066	0.422275	0	1
HH 4th quartile	1,699	0.210667	0.407903	0	1
Employed	1,699	0.7888	0.40828	0	1
Not employed NLF	1,699	0.120742	0.325923	0	1
Retired	1,699	0.090458	0.286921	0	1
Chinese	1,699	0.741728	0.437813	0	1
Malay	1,699	0.136494	0.343414	0	1
Indian	1,699	0.091309	0.288132	0	1
Other	1,699	0.030469	0.171925	0	1
Has kids	1,699	0.508607	0.500073	0	1
Active investors	1,699	0.594683	0.491098	0	1
Retirement investors	1,699	0.289835	0.453819	0	1
Other investors	1,699	0.527534	0.499388	0	1

Note: All statistics are weighted.

**Table A2: LPM estimates of inflation knowledge on additional socio-demographic characteristics in Singapore**

VARIABLES	(1) Inflation correct
36-50	0.038 (0.028)
51-65	0.093*** (0.030)
>65	0.149*** (0.039)
Female	-0.035* (0.021)
High School	0.211** (0.088)
Some College	0.223*** (0.086)
College Degree	0.320*** (0.087)
Postgraduate	0.267*** (0.090)
Unemployed, NLF	0.103*** (0.036)
Retired	0.099** (0.039)
HH 2nd quartile	0.127*** (0.031)
HH 3rd quartile	0.117*** (0.032)
HH 4th quartile	0.156*** (0.033)
Malay	-0.268*** (0.043)
Indian	-0.224*** (0.051)
Other	-0.113** (0.057)
Constant	0.399*** (0.089)
Observations	1,699
R-squared	0.139

Note: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Other control includes age squared and district of residence. All regressions use weights.