

LEARNING BY TRADING

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Abstract

How can we help individuals handle financial decisions in an increasingly complex environment? We explore an easily scalable avenue for improving financial understanding: learning by online trading in stocks. We randomly assign 1345 adults incentives and opportunities to trade stocks for 4-7 weeks, with no additional educational content. The treatment significantly improves financial literacy and attenuates the gender gap in self-assessed financial knowledge. Treated individuals are more likely to subsequently invest in stocks and less likely to seek external advice. The effects strengthen for those exposed to index funds, foreign assets, and rising or more volatile asset prices.

JEL codes: A2, G11, G41, J16, O16

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1 Introduction

The ability of individuals to make sound financial decisions and obtain reliable advice is increasingly being questioned. These concerns have been rising, particularly in the aftermath of the Global Financial Crisis, leading to calls for both behavioral interventions, such as default retirement contributions, and increased regulation, such as the provisions underlying the Consumer Financial Protection Bureau in the United States and other countries (Campbell, 2016). Rises in life expectancy; the exacerbation of wealth inequality due to a lack of financial knowledge among certain groups (Piketty, 2014, Lusardi, Michaud and Mitchell, 2017); the poor advice sometimes given by financial officers (Hackethal, Haliassos and Jappelli, 2012, Inderst and Ottaviani, 2012) – all of these factors suggest the importance of improving financial understanding among non-professionals. The problem is particularly acute among women, who are consistently found to have lower financial literacy (Hung, Yoong and Brown, 2012, Lusardi and Mitchell, 2014), tend to be less confident about making financial decisions (Barber and Odean, 2001, Hung et al., 2012) and to receive inferior advice (Mullainathan, Noeth and Schoar, 2012).

Because firms often do not have strong incentives to debias naïve consumers (e.g. Gabaix and Laibson, 2006), efforts to improve financial literacy are increasingly seen as a major public policy question. Yet, getting people to learn about finance is challenging. Furthermore, even the most effective financial education programs are often costly to scale, particularly among adult populations. To address these issues, this paper explores a simple and relatively inexpensive method for improving financial literacy which we call *learning-by-trading*.

The idea is very simple. Financial information is not hard to find for anyone with internet access. Traditional methods of teaching may be effective in making such knowledge even more accessible, but many people lack the immediate incentives or the interest to learn it. Giving individuals both the incentives and the means to trade in financial markets may be enough to motivate them to learn on their own. To test this, we devel-

oped a highly simplified stock trading platform that individuals can access from home. We invited participants from a large nationally representative panel to trade on this platform for between four and seven weeks and followed both their financial literacy and investing behavior. Individuals who were assigned to the treatment group were endowed with between \$50 and \$100 worth of assets that tracked real stocks. They were entitled to the full value of their portfolios at the end of the trading period. We did not include any explicit financial education as part of our treatment: individuals were left to learn by themselves. While in the future such an intervention could be readily incorporated into a more comprehensive financial education program, in this study we sought to isolate the learning-by-trading effect.

To the best of our knowledge, ours is the first study outside a school classroom setting to randomly assign individuals incentives to trade financial assets and to study the effects on their financial knowledge and investment behavior. The experimental design is detailed in Section 2. In a nutshell, our population includes a sample of adult Israeli citizens who participate in a large nationally representative online panel. We randomly assigned 1345 participants to either a control or a treatment group. Individuals in the treatment group received endowments of assets that tracked the value of specific indices or company stocks, or vouchers that they could invest in stocks. Participants were encouraged to learn about the performance of their assigned asset and were incentivized to make weekly decisions to buy or sell part of their portfolio. We cross-randomized the assigned asset, the length of the experimental exposure to stocks as well as the initial value of the portfolio.¹

We have two main results. First, compared to the control group, individuals who were assigned to trade in assets significantly improved their financial literacy, even three to four months after the experiment. In particular, they appear to better appreciate

¹Individuals also participated in a parallel series of surveys that allowed us to also study their political attitudes and behavior. The results on these outcomes are reported in Jha and Shayo (2018). The surveys were designed so that participants answered the political surveys separately, and, as that paper demonstrates, they did not associate them with the financial study.

specific hard-to-teach financial principles such as the relative riskiness of stocks versus index funds, and learn relatively more from exposure to foreign assets, index funds as well as from exposure to more volatile stocks and stocks that perform well. Importantly, while the treatment was rather intensive, it did not in fact require prohibitively high sums of money or long durations: Higher stakes (\$100 vs. \$50) and especially longer duration (7 vs 4 weeks) did seem to generate stronger effects, but not significantly so. This suggests the feasibility of implementing similar interventions at scale and in a wide range of settings.

Second, consistent with previous findings in the literature, we find that women are significantly less confident in their financial knowledge than men – even conditional on their performance on our financial literacy questions. However, the experience in trading on our platform significantly shrinks this gender gap in confidence, mainly by increasing women’s confidence (and, slightly, by tempering that of men).

Beyond these main results, we find an array of evidence that is consistent with individuals’ decisions and behavior also changing in response to these increases in financial knowledge and confidence. Treated individuals show a lower propensity to consult others for financial advice. We find a range of evidence suggesting that individuals also increased their propensity to invest in the stock market *outside* the experiment. In addition, in Jha and Shayo (2018), we show that treated individuals become more likely to follow financial media, and re-assess the risks and returns of policies related to regional conflict.

Methodologically, too, we innovate relative to the existing literature by implementing random assignment to empirically identify the causal effects, not only of exposure to financial assets but also of opportunities to trade those assets, on financial literacy, confidence, investment behavior and advice-seeking. The closest paper in terms of approach is Bursztyn et al. (2014), who assign a financial asset randomly among those that chose to purchase it through a brokerage firm (using a sample of 150 pairs of clients), and find that holding this asset has effects on take up by peers. However, no previous

study has randomly assigned opportunities to trade in actual financial assets. Moreover, we are able to do this using a nationally representative sample. We develop our own simplified trading platform that allows inexperienced individuals to both hold and trade assets that track real stocks at their actual market prices. Notably, participants do not need to go through the process of purchasing the assets themselves, as everything is done through our platform. Thus, our experimental design features three factors emphasized by behavior design scientists as conducive for making technology persuasive and fostering behavior change (e.g. Fogg, 2009): (a) we provide a clear *motivation* to participate and take investment choices seriously, by giving participants a financial stake in the outcome of their decision; (b) we simplify the investment task so that even complete novices have the *ability* to perform it; and (c) we provide them with a weekly *trigger* to nudge them to complete their next investment decision just as they receive feedback on their last week’s performance as well as are most likely to have time to do so. Altogether, this offers researchers a new method of conducting experiments with an important set of financial factors that have thus far proven very hard to randomize, certainly at scale.

Related Literature. Financial literacy has been associated with large improvements in financial decisionmaking, planning and thus wealth (see Lusardi and Mitchell 2014 for a comprehensive discussion). Specifically in the stock market, Von Gaudecker (2015) shows that Dutch households with low financial literacy tend to be under-diversified, bearing more idiosyncratic risk than is optimal. Yet despite the large potential gains from financial literacy, less is known about effectively imparting financial knowledge, particularly for women, and particularly at scale for adults who have already left school.

Multiple studies examine the effects of financial education programs on financial literacy, financial outcomes, and economic behavior. Randomized control trials on financial education tend to yield positive but smaller effects than observational studies (see Entorf and Hou, 2018, Kaiser and Menkhoff, 2016, Lusardi and Mitchell, 2014, Hastings, Madrian and Skimmyhorn, 2013, for useful overviews). Financial education appears to

have its greatest effect when administered to segments of the population that have a low initial stock of financial literacy (e.g. Cole, Sampson and Zia, 2011). Some modes of financial education, such as “rule-of-thumb” education, appear particularly promising (e.g. Drexler, Fischer and Schoar, 2014, Carpena, Cole, Shapiro and Zia, 2015).² Still, a key challenge that remains is to develop means to implement effective financial education programs at scale that can reach the many time-constrained individuals that a classroom-style intervention may not.

Could learning-by-trading fill this gap? Studies among middle and high schoolers suggest that such an approach could work. In the large-scale, Jump\$tart Coalition study of American high school students, students who reported having previously participated in a stock market game exhibited higher financial literacy. In contrast, those who took a semester-long money management class without the game do not show any benefits (Mandell, 2008). Another stock market game implemented among students from 4th to 10th grade also showed promising results (Hinojosa et al., 2009).

This paper also contributes to an important and growing literature on the gender gap in financial literacy and decisionmaking. Across studies and countries, women exhibit lower financial literacy, more risk aversion, lower confidence, and occasionally lower interest in financial markets than do men (Bucher-Koenen, Lusardi, Alessie and van Rooij, 2014, Bucher-Koenen, Alessie, Lusardi and van Rooij, 2017). These differences persist across demographic and age groups. Furthermore, financial advisors tend to give worse financial advice to young and single women when compared to similar men (Mullainathan et al., 2012). While women who become solely responsible for their financial outcomes, such as single women and widows, tend to raise their levels of financial literacy, gender gaps still persist even for these groups (eg Fonseca, Mullen, Zamarro and Zissimopoulos, 2012, Hsu, 2015). In Israel too, women are less financially literate, and tend to be less

²Beyond financial education, other methods have also been studied. Also related to our approach, Cole et al. (2011) find that small subsidies are more effective than financial education programs in spurring financial market involvement in emerging markets.

likely to search for financial information on their own (Meir, Mugerman and Sade, 2016). We find that learning-by-trading raises not only women’s financial literacy, but also their confidence in their financial knowledge, and makes them less reliant on external advice.

Finally, the paper also links to the role of familiarity in facilitating stockmarket participation as well as potentially engendering home-market advantages or biases (eg Coval and Moskowitz, 1999, Huberman, 2001, Grinblatt and Keloharju, 2001, Goetzmann and Kumar, 2008). Indeed, Van Nieuwerburgh and Veldkamp (2009) argue that while information about foreign markets is not limited, investors are constrained in their capacity to absorb information. Even when investors can choose what to learn about, they choose to learn about local stocks. Our results suggest, however, that randomly assigned familiarity with a particular asset, including foreign assets, can increase the likelihood of future investment in those assets.

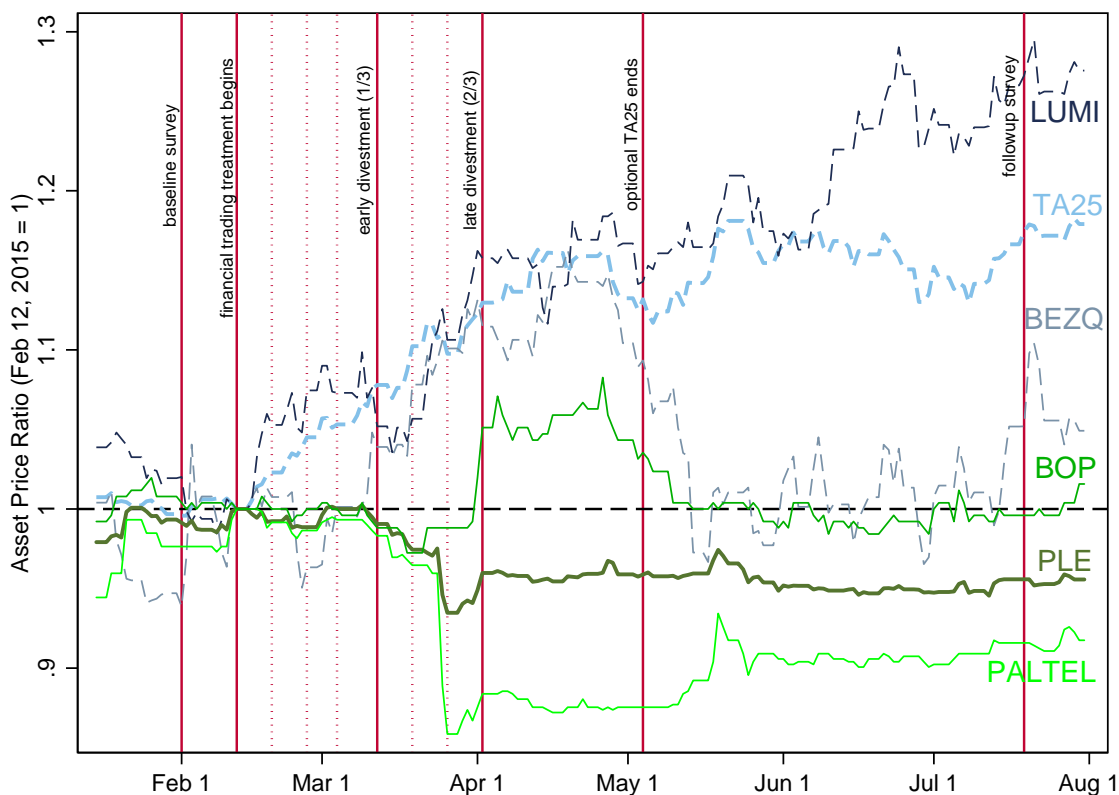
In what follows, we first introduce the experimental design and data. We then present our main results on financial literacy, gender and confidence, and how exposure to different assets can provoke different types of learning. Next we present an array of evidence on advice-seeking and the propensities to invest after and outside the experiment. Finally, we discuss follow-on research and potential policies in light of our study.

2 Experimental Design

We recruited 1681 participants from among Jewish Israeli citizens who participate in a large Israeli internet panel. This panel of about 60,000 participants is nationally representative in terms of age and sex, and is commonly used for commercial market research, political polling and academic studies.³ Individuals were invited to a study on investor behavior. They were informed that after completing the baseline surveys they would

³Because, in parallel with this study, we were also examining the effects of financial markets on political behavior (Jha and Shayo, 2018), we limited survey invitations to those that had voted in the past. We also over-sampled non-orthodox center voters (i.e. individuals who voted for the secular parties *Yesh Atid*, *Hatnu’ah* or *Kadimah* in 2013). All reported statistics and regressions include sampling weights to adjust for this sampling scheme.

Figure 1: Asset Prices during the Experiment.



Note: Vertical dotted lines indicate investment surveys. Individuals in the long duration group also traded on the week of the early divestment. Israeli stocks (Bezeq Telecoms (BEZQ), Bank Leumi (LUMI) and the Tel Aviv 25 (TA25)) are dashed and blue, Palestinian stocks (Palestine Telecoms (PALTEL), Bank of Palestine (BOP) and the Palestinian General Market Index (PLE)) are solid and green.

be entered into a lottery to win either stocks or voucher to invest, and that the stocks participating in the study would be from the entire region. Among those that consented, we conducted two parallel sets of surveys. Everyone received a set of surveys gauging their financial literacy, investment behavior and economic preferences, as well as social attitudes. In addition, those that won the lottery received a survey each week in which to make their financial investment decisions (described below). Figure 1 shows the timeline of the experiment and the performance of the participating stocks.

1418 individuals completed the two baseline surveys. We screened out those who provided incomplete answers, had been grossly inconsistent when asked the same factual

questions at different times, or had completed the survey extremely quickly. This left us with 1345 participants to randomly assign to the various treatment groups. The combined outcome of this sampling strategy is that the sample used for random assignment approximates the broader Jewish population of Israel in terms of geographical region and sex, but tends to be more educated and more secular, with fewer individuals under 24 and over 55 years (Table A1). Given these demographics, the sample is thus slightly weighted *towards* individuals of prime working age.

Among these 1345 respondents, we employed a block randomization procedure designed to increase balance across treatment groups.⁴ A sample of 309 were assigned to the control group, and 1036 were assigned to the asset treatment. Within the treatment group, participants were initially endowed with either vouchers they could use to invest in stocks, stocks from Israel or stocks from the Palestinian Authority.⁵ The initial endowment could be either low (NIS 200 \sim US\$50) or high (NIS 400 \sim US\$100) in value. Finally, some participants were randomized to hold assets for only four weeks (making three weekly investment decisions) whereas others were assigned to holding stocks for seven weeks (making six investment decisions). Table 1 summarizes the basic design and initial allocation.

We designed the trading decisions and interface to achieve two main goals. First, we aimed to encourage participation, active engagement and reinforcement learning (Erev and Roth, 1998, Fogg, 2009) even by individuals with no prior familiarity with financial markets. Second, we sought to expose individuals to real financial markets, using easily verifiable prices of publicly traded stocks. To this end, we kept the investment decisions extremely simple. Each individual in the asset treatment traded in one asset only, with

⁴Specifically, we created 104 blocks of 13 (less for one block), with the blocks created to stratify on: 2013 vote choice, sex, a dummy for whether the individual traded stocks in the last 6 months, a dummy for whether the individual would recommend to a friend to invest in stocks from Arab countries, geographical region, discrepancies in their reported voting in the 2013 elections and a measure of their willingness to take risks. This creates relatively homogeneous blocks. Within each block we then randomize individuals into the subtreatments.

⁵Each individual also had some chance of being assigned stocks from Cyprus, Egypt, Jordan and Turkey in addition to Israeli and Palestinian stocks.

Table 1: **Experimental Design**

	<u>Total</u>	<u>Short Duration</u>			<u>Long Duration</u>		
		All	NIS 200	NIS 400	All	NIS 200	NIS 400
Treatment	1036						
Voucher to Invest	206	64	32	32	142	71	71
Domestic Stocks	414	141	70	71	273	136	137
Foreign Stocks	416	141	71	70	275	137	138
Control	309						

no commission on transactions. Furthermore, every week, participants could reallocate no more than 10% of their holdings by buying or selling their assigned financial asset. This limit was chosen to encourage individuals to learn by doing rather than simply choosing their entire portfolios immediately. To further incentivize engagement with the stock market, participants who did not enter a decision lost the 10% that they could have traded that week. They could certainly decide to neither sell nor buy, but they had to enter a decision to avoid the loss.

The individuals who were assigned stock endowments could sell (and later buy back) a specific stock or index fund. Of these, 414 were assigned assets from Israel, evenly and randomly distributed between the Tel Aviv 25 Index as well as stocks from a commercial bank—Bank Leumi—and a telecoms company, Bezeq. The remaining 416 were assigned assets from the neighbouring Palestinian Authority, distributed evenly between the Palestine Stock Exchange General Index as well as stocks from a commercial bank—the Bank of Palestine—and a telecoms company, PALTEL. The vast majority of the individuals assigned vouchers could buy (and later sell) an asset that tracked the Tel-Aviv 25 Index.⁶ The assets were in fact a derivative claim on the authors’ research funds rather than an actual purchase of the underlying asset. This also meant that the study could not affect the asset prices directly even for those that are thinly traded. Since the Palestinian and other assets are listed in foreign currency (e.g. Jordanian Dinars), we fixed the exchange

⁶Four individuals traded for indices from Cyprus, Egypt, Jordan and Turkey. We included these four assets to be consistent with the information provided to participants, that the stocks participating in the study are from the entire region (see footnote 5).

rate for the duration of the experiment so that there was no exchange rate risk for the foreign stocks. We also did not mention or allow for the possibility of short sales.

As mentioned above, about one half of the participants in the treatment group were given assets initially valued at NIS 400 (equivalent to around \$100 at the time of the study), with the rest valued at NIS 200 (around \$50). These sums are not very large—they are comparable to the average Israeli *daily* wage of around NIS 312 in December 2014. However, they are arguably large enough to provoke attention among many, and certainly significant compared to the standard pay of NIS 0.1 per question these participants receive for our and other surveys, as well as relative to typical stakes in experimental studies.

All those assigned to the treatment group were invited to an instructions survey in which they were informed of their asset allocation (Figure A1), given detailed explanations about the rules of the game, and quizzed to make sure they understood how the value of their assets would be determined. 840 participants completed the instructions survey and agreed to continue. Henceforth, we refer to these 840 as the “compliers”. The incomplete takeup probably reflects some self-selection as well as differential willingness to hold different assets. Not surprisingly, the lowest takeup was for the low (NIS 200) assets (77.2%, 78.4% and 78.6% for Israeli, Palestinian and voucher endowments respectively). For the NIS 400 assets, vouchers had the highest takeup (91.3%), followed by Israeli (86.1%) and Palestinian (78.8%). Anticipating this, we took special care to survey the outcomes of non-compliers so we can estimate both Treatment on the Treated (TOT) and more conservative Intent to Treat (ITT) effects. The latter measure the effect of being assigned to treatment whether or not an individual actually took up the assets. For TOT we use the random assignment to treatment as an instrument for actual treatment.

The 840 participants who completed the instructions survey received weekly updates about the price of their assigned asset and a statement of the composition and current value of their financial portfolio. This was sent out after markets closed on the last business day of the week (usually on Thursdays). We also provided links to the Hebrew

version of *investing.com* to allow individuals to independently track and verify the historical performance and current price of their stocks. Participants were then asked to make their investment decisions and had until the opening of the stock market the following week to do so. All trades were implemented via a trading platform incorporated into our surveys (Figure A2 shows a screenshot of the trading screen).

More specifically, once the markets closed, we calculated for each individual: (1) the current number of stocks they own given previous trading decisions, (2) the value of these stocks given current prices and (3) the amount of cash at their disposal. We then informed them of their trading possibilities, namely how much they could buy (depending on the amount of cash at their disposal) and how much they could sell (depending on the amount of stocks owned). All trades were implemented at the current price, which was constant during the decision window. 69% of the 840 participants entered a trading decision at every opportunity they had and 80% did so in all but one week.

About a third of the treatment group were randomly assigned to be fully divested of their assets one month after the initial allocation, after making three weekly trades. Overall, these participants were exposed to the stock market via our intervention from around February 12 to around March 12 (depending on the exact day on which they logged on and completed the surveys). The remaining participants in the treatment group could continue to trade in their assets three more times before being divested on April 2nd. At that time, these participants were offered the option of either withdrawing their money or investing it for an additional month in the TA 25 index fund (until May 4).

Finally, on July 19 we fielded a follow-up survey to all participants in the study (both control and treatment, regardless of compliance). This survey was completed by 1114 participants. The response rate was similar in both the treatment group (82.6%) and the control (83.5%).

Table 2: Financial Literacy Questions

	Baseline Mean (February)	Post-Treatment Mean (July)
Individual Questions Correct? [0/1]		
Numeracy: Suppose you had NIS 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 in the account for the entire period? (i) > NIS 102; (ii) = NIS 102; (iii) < NIS 102; (iv) DK.	0.87	0.901
Compounding: Suppose you had NIS 100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have in this account in total? (i) >NIS 200; (ii) = NIS 200; (iii) < NIS 200; (iv) DK	0.706	0.725
Inflation: Imagine an average household in Israel that has a savings account with an interest rate equal to 1% per year. Suppose the inflation is 2% per year. After 1 year, how much would the household be able to buy with the money in this account? (i) > today; (ii) = today; (iii) < today; (iv) DK	0.725	0.734
Money Illusion: Suppose that in the year 2020, your income has doubled compared to today and prices of all goods have also doubled. In 2020, how much will you be able to buy with your income? (i) > today; (ii) =; (iii) < today; (iv) DK; .	0.786	0.783
Stock Meaning: Which of the following statements is correct? If somebody buys the stock of firm X in the stock market: (i) He owns a part of firm X; (ii) He has lent money to firm X; (iii) He is liable for firm X's debts; (iv) None of the above; (v) DK.	0.686	0.714
Highest Return: Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return? (i) Savings accounts; (ii) Bonds; (iii) Stocks; (iv) DK.	0.426	0.464
Diversification: When an investor spreads his investments among more assets, does the risk of losing money: (i) go up; (ii) go down; (iii) =; (iv) DK.	0.8	0.837
Risk: Stock vs Fund: True or False: Buying a single company's stock usually provides a safer return than a stock mutual fund. (i) T, (ii) F, (iii) DK		0.501
Financial Literacy Score [% Correct Overall]	71.4	70.8
Observations	1114	1114

Note: The data only include the participants who responded to the July survey. The "Risk: Stock vs Fund" question was only asked in the July survey. The financial literacy score is the percent correct out of all the items included in that survey.

3 Data

Our baseline survey included seven financial literacy questions adapted to the Israeli context from van Rooij, Lusardi and Alessie (2011).⁷ In our follow-up survey (in July) we added an eighth question. These questions are detailed in Table 2, which also reports the overall proportion of individuals who answered them correctly. While about 90% of

⁷To forestall potential attrition due to survey fatigue, we did not include all 16 literacy questions that van Rooij et al. (2011) used. In particular, we omit the following questions: on the time value of money, the main role of the stock market, the meaning of bonds, the response of bond prices to interest rates, and a comparison of fluctuations between bonds and stocks. Please see our websites, *linked here*, for the complete survey instruments.

participants pass the basic Numeracy question, there is much more variation in the other questions. On average, participants get about 71% of the questions right (bottom row).⁸ In the July survey, 42% got all the ‘Big Three’ questions (Lusardi and Mitchell, 2014) right: on numeracy, compounding and the risk of stocks relative to mutual funds. These proportions are comparable to that of the Netherlands (44.8% in 2010), but lower than Germany (53.2% in 2009) and Switzerland (50.1% in 2011), and higher than the United States (34.3% in 2009) and France (30.9% in 2011)(see Lusardi and Mitchell 2014 and references therein).

The baseline surveys included a rich set of economic and social questions. Beyond financial literacy, we also asked participants whether they had traded stocks in the last six months, and included measures of risk aversion and time preference (from Dohmen et al. (2011) and Benjamin, Choi and Strickland (2010)). Table 3, Columns 1-2 report descriptive statistics. Overall, about two thirds of our sample report not having traded in the six months preceding the experiment. Slightly over half the sample is male, with mean age of 39. The sample is also well distributed geographically across Israel.

Columns 3-6 in Table 3 report tests for systematic differences in these and other pre-treatment variables between the treatment and control groups. Column 3 shows that, as expected from random assignment, the treatment group does not systematically differ from the control. The joint hypothesis that none of the pre-treatment variables are associated with the assignment to treatment clearly cannot be rejected (F-tests are reported at the bottom of the table). Column 4 adds randomization strata fixed effects to the regression, yielding similar conclusions. In Columns 5-6 we restrict attention to the 1114 participants who completed the followup survey in July. Again, the treatment and control groups do not vary systematically from each other on pre-treatment variables. The only variable that shows a significant difference is self-reported risk tolerance. We

⁸These numbers can be compared to the following percentages of Dutch participants answering these questions correctly, as reported in van Rooij et al. (2011): Numeracy (90.8), Compounding (76.2), Inflation (82.6), Money Illusion (71.8), Stock meaning (67), Highest Return (47.2), Diversification (63.3) and Risk: Stock vs Fund (48.2).

Table 3: Descriptive Statistics and Balancing Tests

	Descriptive Statistics:		Balancing Tests			
	Baseline		Baseline sample		July Sample	
	Mean	SD	(3)	(4)	(5)	(6)
	(1)	(2)				
Bought/Sold Shares in Last 6 Mths	0.33	[0.47]	-0.017 (0.030)	-0.056 (0.052)	-0.031 (0.033)	-0.042 (0.062)
Financial Literacy [correct=1]:						
Numeracy	0.861	[0.346]	0.017 (0.043)	0.021 (0.046)	0.034 (0.051)	0.040 (0.054)
Compounding	0.678	[0.467]	-0.004 (0.030)	-0.005 (0.034)	0.014 (0.035)	0.018 (0.039)
Inflation	0.7	[0.458]	0.003 (0.032)	-0.004 (0.035)	0.020 (0.038)	0.016 (0.041)
Money Illusion	0.778	[0.416]	-0.002 (0.031)	-0.003 (0.034)	-0.036 (0.034)	-0.047 (0.038)
Stock meaning	0.682	[0.466]	0.000 (0.030)	0.002 (0.031)	0.010 (0.034)	0.018 (0.036)
Highest Return	0.405	[0.491]	0.024 (0.029)	0.022 (0.032)	0.041 (0.032)	0.042 (0.035)
Diversification	0.788	[0.409]	0.047 (0.035)	0.053 (0.038)	0.036 (0.041)	0.038 (0.044)
Male	0.526	[0.5]	-0.006 (0.026)	0.050 (0.078)	-0.001 (0.030)	0.054 (0.093)
Age [Yrs]	38.692	[13.32]	-0.004 (0.006)	-0.003 (0.007)	-0.003 (0.007)	-0.001 (0.008)
Age [Yrs] Squared			0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Post Secondary Education	0.221	[0.415]	0.018 (0.040)	0.025 (0.044)	0.023 (0.046)	0.044 (0.049)
BA Student	0.161	[0.368]	-0.043 (0.047)	-0.044 (0.050)	-0.000 (0.052)	0.015 (0.057)
BA Graduate and Above	0.428	[0.495]	0.001 (0.039)	0.000 (0.042)	-0.018 (0.044)	-0.011 (0.050)
Married	0.613	[0.487]	-0.004 (0.032)	-0.004 (0.035)	-0.000 (0.035)	0.006 (0.039)
Traditional	0.175	[0.38]	-0.012 (0.036)	-0.000 (0.041)	-0.050 (0.044)	-0.023 (0.051)
Religious	0.163	[0.37]	-0.014 (0.044)	0.008 (0.060)	-0.031 (0.048)	0.016 (0.066)
Ultra-Orthodox	0.111	[0.314]	0.001 (0.051)	0.065 (0.087)	-0.032 (0.056)	0.071 (0.099)
Region: Jerusalem	0.112	[0.315]	-0.011 (0.048)	-0.008 (0.063)	0.000 (0.052)	0.003 (0.069)
North	0.087	[0.282]	0.007 (0.049)	0.019 (0.061)	-0.009 (0.056)	0.021 (0.071)
Haifa	0.13	[0.337]	0.045 (0.041)	0.051 (0.050)	0.039 (0.045)	0.058 (0.056)
Tel Aviv	0.194	[0.396]	-0.014 (0.038)	-0.015 (0.051)	-0.031 (0.043)	-0.048 (0.058)
South	0.106	[0.308]	-0.029 (0.048)	-0.027 (0.059)	-0.053 (0.055)	-0.043 (0.067)
West Bank	0.097	[0.296]	0.025 (0.053)	0.035 (0.067)	0.033 (0.058)	0.053 (0.074)
Family Income [10,000s NIS]	1.048	[0.559]	-0.012 (0.027)	-0.015 (0.030)	-0.012 (0.030)	-0.022 (0.033)
Willing to Take Risks [1-10]	4.579	[2.281]	0.009* (0.006)	0.011* (0.006)	0.013** (0.006)	0.017** (0.007)
Patience (time pref above median)	0.647	[0.478]	0.001 (0.027)	0.003 (0.030)	0.009 (0.031)	0.005 (0.034)
Observations	1,345		1,345	1,345	1,114	1,114
R-squared			0.016	0.022	0.028	0.053
F-test			0.685	0.738	1.148	1.231
Prob>F			0.891	0.837	0.272	0.190

Notes: Columns 1-2 report means and [standard deviations] of the baseline variables. Columns 2-6 report OLS regressions where the dependent variable is indicator for asset treatment. Standard errors in parentheses. All variables measured pre-treatment. Columns 3-4 include the entire sample. Columns 5-6 include only those individuals who completed the post-treatment July survey. Columns 4 and 6 include strata fixed effects. The F test is for the joint hypothesis that all coefficients are zero. *** p<0.01, ** p<0.05, * p<0.1

control for this and other demographic variables in our regressions.

4 Results

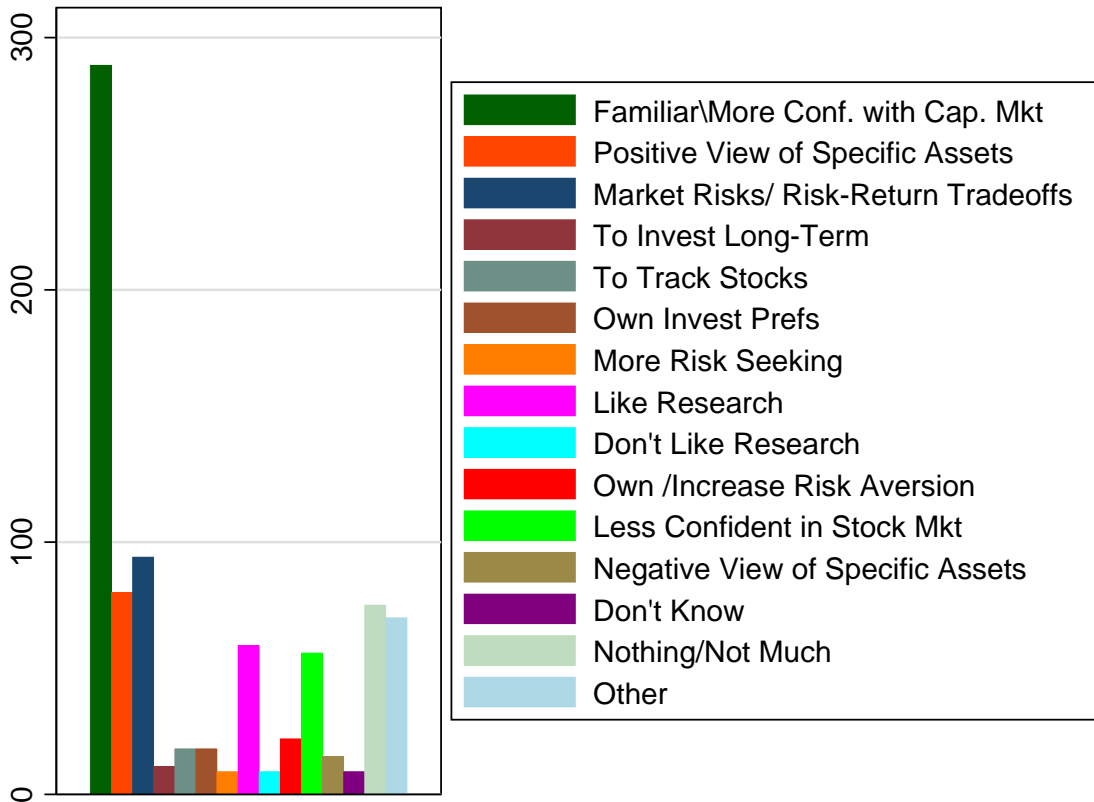
Before turning to the objective results on learning, it is helpful to examine whether participants themselves were conscious of this process. Figure 2 presents a histogram of responses to an open-ended question “What did you learn from the study?” among the treated following the experiment. While some treated participants, particularly those with pre-existing experience in the stock markets, replied that they learned nothing, by far the modal responses were that individuals felt more familiar and confident in interacting with the stock market, and that they became more cognizant of market risks and risk-return tradeoffs.

4.1 Financial Literacy

Table 4 shows the effect of being assigned to trade stocks on the percentage of financial literacy questions answered correctly three to four months later (Cols 1-3) and the probability of getting all Big Three questions correct (Cols 4-6). Columns 1 and 2 report conservative Intent To Treat (ITT) estimates. Controlling for the pre-treatment financial literacy score, being assigned incentives to trade in financial assets raised individuals’ literacy scores by 3.25 percentage points (relative to the mean of 70.9%). The estimated treatment effect is similar (at 3.37 pp) when we control for past experience investing in shares, sex, a quadratic in age, five education categories, marital status, wealth, four religiosity categories, five region fixed effects, pre-treatment measures of willingness to take risks and patience, as well as 104 fixed effects for the randomization strata (Col 2).

Column 3 estimates the Treatment Effect on the Treated (TOT), using assignment to treatment as an instrument for compliance. Not surprisingly, the treatment effect is stronger, at 4.08 percentage points. Columns 4-6 show the effects of the treatment

Figure 2: What did you learn from this study?



These are the results of an open-response question at the end of the trading period (eg March 12 or April 2) to the question “What did you learn from the study?”. Respondents only include the compliers. Notice that the modal responses reflect how individuals felt more familiar with and confident engaging with the stock market and financial assets and more aware of the volatility and the risks involved.

on the probability of an individual answering all the Big Three questions correctly. The treatment increases this probability by 6-7 pp in the ITT estimates and by 8.5 percentage points for the Treatment Effect on the Treated. These are large effects, particularly when compared to the sample mean of 42.82%.

Consistent with prior studies, it is useful to note that males score 8.6 pp better in their financial literacy relative to females, as do those studying for–or holding– an academic degree. Geographical proximity also matters: residents of Tel Aviv, Israel’s financial center and the home of the Israeli stock market, score 6 pp higher, even controlling for income, education and initial financial literacy.

Table 4: **Treatment Effects: Financial Literacy**

N=1114	(1)	(2)	(3)	(4)	(5)	(6)
	Literacy Score % Correct			All Big Three Correct		
	ITT	ITT	TOT	ITT	ITT	TOT
Asset Treatment	3.245** (1.272)	3.372** (1.315)	4.079*** (1.489)	0.058* (0.034)	0.070** (0.033)	0.085** (0.038)
Bought/Sold Shares in Last 6 Mths [0/1]		3.969 (2.489)	3.731 (2.310)		0.118* (0.061)	0.113** (0.057)
Male		8.654** (3.380)	8.165*** (3.162)		0.026 (0.084)	0.016 (0.078)
Age [Yrs]		-0.149 (0.301)	-0.130 (0.280)		-0.000 (0.008)	0.000 (0.007)
Age [Yrs] Squared		0.002 (0.003)	0.002 (0.003)		0.000 (0.000)	0.000 (0.000)
Post Secondary Education		1.271 (1.860)	1.028 (1.745)		0.043 (0.047)	0.038 (0.044)
BA Student		5.003** (2.304)	4.936** (2.157)		0.072 (0.060)	0.071 (0.056)
BA Graduate and Above		3.164* (1.854)	3.105* (1.730)		-0.010 (0.047)	-0.012 (0.044)
Married		0.163 (1.468)	0.230 (1.367)		-0.039 (0.036)	-0.038 (0.033)
Family Income [10,000s NIS]		0.683 (1.264)	0.484 (1.184)		0.017 (0.032)	0.013 (0.030)
Traditional		-1.777 (1.712)	-1.500 (1.609)		-0.028 (0.048)	-0.022 (0.045)
Religious		-2.094 (2.457)	-2.105 (2.276)		-0.014 (0.060)	-0.014 (0.056)
Ultra-Orthodox		-7.692** (3.710)	-7.888** (3.477)		-0.079 (0.081)	-0.083 (0.076)
Tel Aviv		5.938*** (2.011)	5.804*** (1.882)		0.164*** (0.051)	0.161*** (0.048)
Willing to Take Risks [1-10]		0.107 (0.284)	0.074 (0.267)		0.004 (0.007)	0.003 (0.007)
Time preference above median		0.722 (1.283)	0.779 (1.199)		0.012 (0.034)	0.013 (0.031)
Initial Financial Literacy Score FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.439	0.535	0.540	0.194	0.330	0.330

This table shows the Intent to Treat (ITT: OLS) and Treatment Effect On the Treated (TOT: 2SLS) estimates of financial asset exposure on the % of 8 financial literacy questions answered correctly (Cols 1-3) and on the probability of answering all *Big Three* questions (on numeracy, inflation and the risk of individual stocks vs index funds) (Cols 4-6). Both were measured three to four months after the experiment, in July 2015. All the demographic and other controls above were measured pre-treatment. In addition to the controls above, Cols 2-3, 5-6 also include 104 strata fixed effects, 4 religiosity categories, and 6 location categories (the excluded category is the Center District). Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 5 breaks down the effect on each component question of the literacy score using the full set of controls from Table 4 (Cols 2 and 3). Recall from Table 3 that the baseline proportions answering some of the basic literacy questions correctly were already high, approaching 90% in the case of the numeracy question. Nonetheless, it is useful to point out that the point estimates are positive on all but one of the eight financial literacy questions. Consistent with the self-reported increase in understanding of risk-return tradeoffs, exposure to incentives to trade stocks has particularly pronounced effects on questions related to stocks. It raises the probability of correctly answering the Big Three question on the relative riskiness of stocks versus mutual funds by 9.4-11.4 percentage points (relative to a mean of 51.4 %) and raises the probability that individuals understand the meaning of stocks by 5.2-6 percentage points (relative to the mean of 70.4%).

Table 6 examines whether the treatment had a weaker or stronger effect on the financial literacy of different subgroups. Overall, there is little conclusive evidence that the treatment is driven by particular subgroups: within our sample, there are no statistically significant differences when the treatment is interacted with gender, age, initial literacy, patience, education or past experience in the stock market. Nonetheless, the effects do seem to be somewhat stronger for females. As the point estimates suggest, the exposure to stocks raises the probability that women will answer all Big Three questions correctly by 9.8 percentage points, compared to a 4.6 percentage point effect for men (Panel B, Col 7). This provides initial suggestive evidence that our approach, if scaled up to provide more power, could mitigate part of the gender gap in financial literacy.

In terms of effect sizes, the *Hedge's g* measure on the Intent to Treat estimate is 0.18 on the proportion of financial literacy questions answered correctly three to four months after the experiment. For the treatment effect on the treated, this rises to 0.39, and the treatment effect on treated women is 0.411. These effect sizes are comparable to those gleaned from experiments randomizing the assignment of financial education classes (see

Table 5: **Financial Literacy: Component by Component**

N=1114	ITT	R-squared	TOT	R-squared
1. Numeracy	0.018 (0.023)	0.238	0.022 (0.027)	0.240
2. Inflation	-0.008 (0.030)	0.345	-0.009 (0.034)	0.345
3. Risk: Stock vs Fund	0.094*** (0.036)	0.277	0.114*** (0.041)	0.273
4. Compounding	0.047 (0.035)	0.246	0.057 (0.039)	0.248
5. Money Illusion	0.023 (0.033)	0.167	0.028 (0.037)	0.168
6. Stock Meaning	0.052 (0.034)	0.259	0.063* (0.038)	0.262
7. Highest Return	0.034 (0.036)	0.351	0.042 (0.041)	0.353
8. Diversification	0.009 (0.028)	0.238	0.011 (0.032)	0.239

Each coefficient represents a separate OLS (ITT) or 2SLS (TOT) regression on a measure of financial literacy on the asset treatment, measured three to four months after the experiment, in July 2015. The first three questions are considered the *Big Three*. All regressions include strata and the full set of demographic controls, and indicators for initial financial literacy scores as in Table 2, Col 2. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

e.g., Kaiser and Menkhoff 2016).

Next, we use the rich set of sub-treatments to better understand which features of exposure to financial markets were particularly powerful in changing financial literacy. Panel A of Table 7 examines the treatment effect of being exposed to domestic assets (either by being initially endowed with domestic stocks or being assigned vouchers that can be traded for domestic stocks) and the effect of being exposed to foreign assets. Both effects are relative to the control group. Domestic assets are more familiar and cognitively accessible, while foreign assets—in this case, mainly Palestinian—are arguably more novel. Theoretically, either could in principle induce greater learning. In practice,

Table 6: Who Learns?

A. Literacy Score % Correct						
	(1)	(2)	(3)	(4)	(5)	(6)
Asset Treatment	4.088** (2.064)	3.704** (1.562)	4.262** (1.941)	1.299 (2.348)	4.249** (1.775)	5.552*** (1.938)
Treatment*Male	-1.351 (2.649)					
Treatment*Age>=50		-1.372 (3.008)				
Treatment*High Baseline Literacy			-2.059 (2.645)			
Treatment*Patience				3.194 (2.929)		
Treatment*Non-Academic Education					-2.193 (2.716)	
Treatment*Inexperienced						-3.412 (2.569)
Observations	1,114	1,114	1,114	1,114	1,114	1,114
R-squared	0.535	0.535	0.535	0.536	0.535	0.536
B. All Big Three Correct						
	(7)	(8)	(9)	(10)	(11)	(12)
Asset Treatment	0.098** (0.045)	0.066* (0.039)	0.071* (0.043)	0.033 (0.060)	0.080* (0.044)	0.091* (0.055)
Treatment* Male	-0.052 (0.065)					
Treatment*Age>=50		0.020 (0.077)				
Treatment*High Baseline Literacy			-0.001 (0.071)			
Treatment*Patience				0.057 (0.074)		
Treatment*Non-Academic Education					-0.024 (0.067)	
Treatment*Inexperienced						-0.032 (0.069)
Observations	1,114	1,114	1,114	1,114	1,114	1,114
R-squared	0.330	0.330	0.330	0.330	0.330	0.330

Notes: This table shows the treatment effect (ITT), interacted with pre-treatment characteristics. Dependent variables are % of 8 financial literacy questions answered correctly (panel A); and the probability of answering all Big Three questions (on numeracy, inflation and the risk of individual stocks vs index funds) in Panel B. Both were measured three to four months after the experiment, in July 2015. All regressions include the full set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

however, while the point estimate for domestic assets is slightly higher (4.039-4.720 vs 2.436-3.108 on the percentage correct), the overall effects on financial literacy are not statistically different.

Panel B of Table 7 examines whether stakes matter. It seems plausible that randomly receiving an endowment of \$100 would generate increased attention relative to receiving \$50. The results indicate that the effects are indeed slightly higher in the high-stakes treatments (3.818- 4.440 vs 2.906-3.671) but not significantly so. In terms of duration, one might expect that longer exposure to financial markets would have a stronger effect. Again, while the point estimates are consistent with this expectation, the effects of four weeks of treatment are not much weaker than those of seven weeks (2.780-3.377 vs 3.662-4.435: Panel C). Receiving initial endowments of stocks that can then be divested and traded versus vouchers to purchase stocks have about the same effects on financial literacy (3.236-3.969 vs 3.966 - 4.518: Panel D). Taken together, these results suggest that, while learning can be enhanced by adding higher stakes with longer durations, much of the gain in financial literacy can be achieved with lower-cost interventions and a month-long exposure.

Beyond general financial literacy, the effects of trading specific stocks may help individuals learn and internalize specific principles. Being assigned an index fund for example, may nudge individuals to learn about the logic of index funds and thereby may be more effective at helping them understand their riskiness relative to stocks. Indeed, as Panel E reveals, while the average effect on the percentage of financial literacy questions answered correctly are pretty similar, being exposed to an index fund raises the probability of answering all Big Three questions correctly by 10-12 percentage points, compared with 4.3-5.4 percentage points for other types of asset (a statistically significant increase). This result reflects the fact that those exposed to index funds were 12.4 percentage points (se = 4.01) more likely than the control to answer the question on the riskiness of stocks versus funds correctly, compared to 6.7 pp (se= 4.00) for those exposed to individual

Table 7: **Financial Literacy: Treatment Effects by Sub-Treatments**

N=1114	(1)	(2)	(3)	(4)
	Literacy Score % Correct		All Big Three Correct	
	ITT	TOT	ITT	TOT
A. Foreign Assets	2.436	3.108*	0.055	0.070
	(1.528)	(1.795)	(0.038)	(0.045)
Domestic Assets	4.039***	4.720***	0.081**	0.095**
	(1.406)	(1.533)	(0.036)	(0.040)
R-squared	0.536	0.541	0.330	0.331
B. \$100 Endowment	3.819***	4.440***	0.074**	0.086**
	(1.449)	(1.574)	(0.037)	(0.040)
\$50 Endowment	2.906**	3.671**	0.067*	0.084*
	(1.476)	(1.724)	(0.037)	(0.044)
R-squared	0.474	0.585	0.330	0.330
C. Four Weeks Exposure	2.780*	3.377**	0.035	0.043
	(1.530)	(1.696)	(0.042)	(0.047)
Seven Weeks Exposure	3.662**	4.435***	0.088**	0.106***
	(1.427)	(1.617)	(0.035)	(0.040)
R-squared	0.535	0.540	0.332	0.330
D. Stock Treatment	3.236**	3.969**	0.069**	0.085**
	(1.359)	(1.556)	(0.034)	(0.039)
Voucher Treatment	3.966**	4.518**	0.077	0.088*
	(1.754)	(1.845)	(0.049)	(0.051)
R-squared	0.535	0.540	0.330	0.330
E. Exposed to Company Stocks	2.771*	3.420**	0.043	0.054
	(1.449)	(1.652)	(0.037)	(0.042)
Exposed to Index Funds	4.054***	4.806***	0.101***	0.120***
	(1.495)	(1.658)	(0.038)	(0.042)
R-squared	0.536	0.541	0.332	0.332
F. Positive Price Change over Experiment	4.000***	4.740***	0.075**	0.090**
	(1.378)	(1.527)	(0.035)	(0.039)
Negative Price Change over Experiment	2.117	2.668	0.060	0.075
	(1.627)	(1.894)	(0.041)	(0.048)
R-squared	0.536	0.541	0.330	0.330
G. Asset Price Change over Experiment	0.046	0.041	-0.001	-0.001
	(0.087)	(0.100)	(0.002)	(0.003)
Standard Deviation of Price	71.176**	85.538**	1.587**	1.934**
	(29.166)	(33.491)	(0.744)	(0.860)
R-squared	0.536	0.542	0.330	0.331

This table shows the separate effect of different sub-treatments on the % of 8 financial literacy questions answered correctly (Cols 1 & 2) and on the probability of answering all *Big Three* questions (on numeracy, inflation and the risk of individual stocks vs index funds) (Cols 3 & 4). Both were measured three to four months after the experiment, in July 2015. *Foreign Assets* include (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. *Domestic Assets* include Israeli Stock endowments and Vouchers to purchase the Tel Aviv 25. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

stocks. These are large effects, given that only 51.4% of respondents got the right answer on this question.

A particularly useful feature of our study is that, since each individual was randomly assigned to a specific financial asset, they were also exogeneously assigned to the price changes and volatility of their asset. This allows us to also estimate the effects of these features of the stock market. As Panel F of Table 7 shows, financial literacy scores improve more among those individuals exposed to stocks with positive price changes rather than negative price exposure (in line with Malmendier and Nagel (2011)), though respondents had similar success in answering the Big Three questions correctly. Furthermore, as Panel G reveals, relative to effects of the overall asset price change, assets with greater volatility in the asset price during the study induced greater learning. Both of these latter differences are statistically significant.

So far we have examined each set of the cross-randomized sub-treatments in isolation. However, an equally pertinent question is: which of the sub-treatments has incrementally the most effect, holding the others constant? For example, how much of the domestic asset effect can be explained by the fact that the domestic assets also had positive price changes (see Figure 1)? As Table 8 reveals, holding other features of the treatment constant, the features with significantly greater effects on overall financial literacy scores (Cols 1-2) include exposure to foreign assets, index funds, positive price changes and assets with high volatility. Again, exposure to index funds has an important (14-16.7 percentage point) effect on answering all Big Three questions correctly.

Table 9 provides two useful robustness checks. The table presents the effects for additional waves of the financial literacy test which we administered for compliers at the time of divestment (in March or April, Cols 1-2) as well as the effects in the July survey (Cols 3-4). In both cases, we assign all *non*-respondents in both the March-April and July surveys to their pre-treatment values, under the (conservative) assumption that non-respondents learned nothing from the experiment. This assumption thus provides

Table 8: **Financial Literacy: Incremental Effects of Sub-Treatments**

N=1114	(1)	(2)	(3)	(4)
	Literacy Score % Correct		All Big Three Correct	
	ITT	TOT	ITT	TOT
Asset Treatment	-17.612** (8.232)	-21.503** (9.344)	-0.334 (0.222)	-0.409 (0.253)
Foreign Assets	7.333* (3.958)	9.274** (4.477)	0.096 (0.108)	0.125 (0.122)
\$100 Endowment	0.966 (1.279)	0.936 (1.426)	0.007 (0.034)	0.004 (0.038)
Seven Weeks Exposure	-1.067 (1.576)	-1.119 (1.662)	0.021 (0.044)	0.027 (0.046)
Stock Endowment	2.497 (2.027)	3.167 (2.166)	0.077 (0.055)	0.096 (0.059)
Exposed to Index Funds	5.368** (2.280)	6.345** (2.497)	0.140** (0.061)	0.167** (0.068)
Positive Price Change over Exp.	6.157** (3.032)	7.637** (3.497)	0.059 (0.081)	0.074 (0.093)
Standard Deviation of Price	223.945** (97.966)	267.241** (111.146)	4.225 (2.642)	5.116* (3.010)
R-squared	0.540	0.545	0.337	0.335
F/ Chi2 (joint test treatments=0): Prob>p	0.042	0.018	0.087	0.045

This table shows the ITT (OLS) and TOT (2SLS) effect of different sub-treatments, holding each other constant, on the % of 8 financial literacy questions answered correctly (Cols 1 & 2) and on the probability of answering all *Big Three* questions (on numeracy, inflation and the risk of individual stocks vs index funds) (Cols 3 & 4). Both were measured three to four months after the experiment, in July 2015. *Foreign Assets* include (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient include Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

plausible lower bound estimates. As the results reveal, the financial literacy gains are already visible by the end of the experiment (Cols 1-2), and are similar to the effects measured in July in Table 4. Furthermore, the effects on financial literacy in July are robust to assigning all non-respondents to their initial values (Cols 3-4).

4.2 Gender and Confidence in Financial Knowledge

As discussed above, the effects of being exposed to incentives to trade in stocks on financial literacy accrue to both men and women, but appear somewhat more favorable

Table 9: **Financial Literacy: Dynamic Effects and Attrition**

Month of Financial Literacy Test	(1)	(2)	(3)	(4)
	March-April		July	
	ITT	TOT	ITT	TOT
Asset Treatment	3.194*** (1.229)	4.020*** (1.462)	2.372** (1.095)	2.986** (1.305)
<u>Literacy Score for Unobserved Fixed at:</u>	<u>Pre-Treatment</u>	<u>Pre-Treatment</u>	<u>Pre-Treatment</u>	<u>Pre-Treatment</u>
Strata FE	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes
<u>Initial Financial Literacy Score FE</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>
Observations	1,345	1,345	1,345	1,345
R-squared	0.618	0.624	0.596	0.600

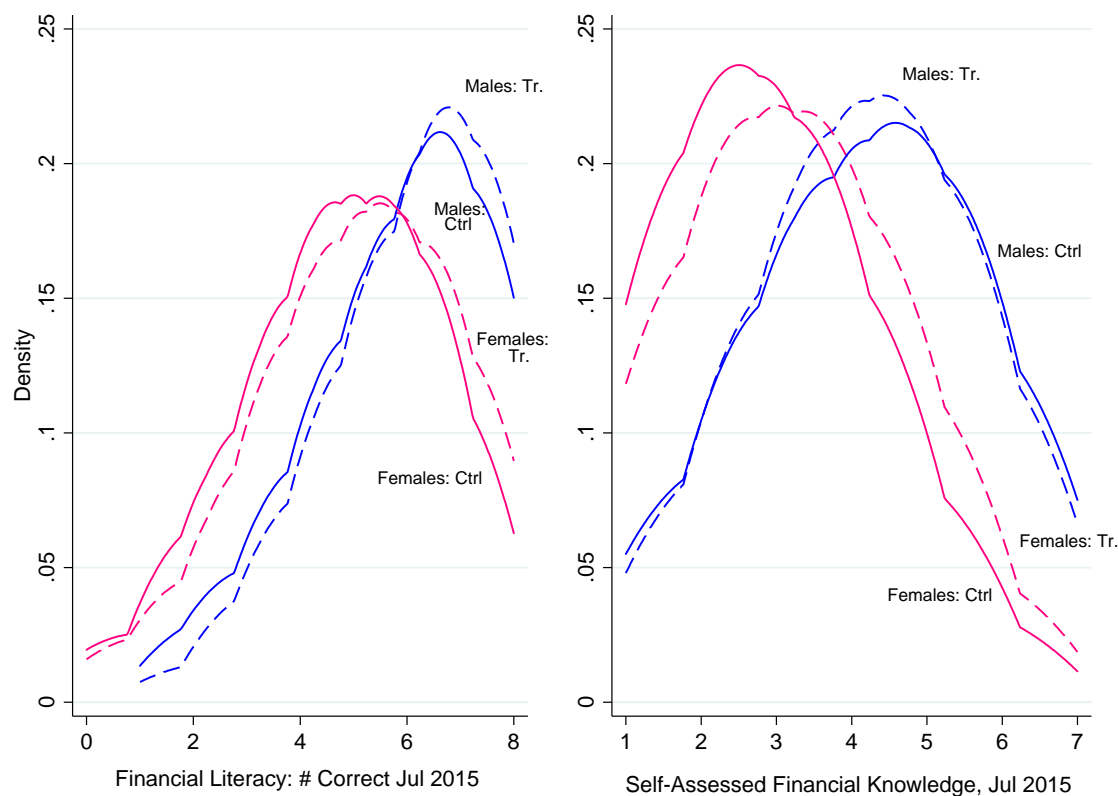
This table shows the Intent to Treat (ITT: OLS) and Treatment Effect On the Treated (TOT: 2SLS) estimates of financial asset exposure on the % of financial literacy questions answered correctly. The outcomes were measured in two waves: March-April (i.e. at the time of divestment- Cols 1-2), and in July 2015 (Cols 3-4). In March-April we only tested compliers, whereas in July we tested non-compliers as well. In all columns, we assign any non-respondents to their pre-treatment financial literacy scores, assuming that they learned nothing. All columns include 104 strata fixed effects and all controls from Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

for women. Figure 3, left panel, provides the raw distributions by treatment status and gender. For both men and women, the proportion answering six or more financial literacy questions correctly (out of eight) is higher in the treated group (dashed lines) than in the control (solid). The proportion scoring less than six falls among those exposed to incentives to trade in financial assets.

An intriguing question is whether the intervention also affected participants' confidence in their financial knowledge. A number of studies have documented that men tend to be over-confident about their financial knowledge, while women tend to be less confident (eg Barber and Odean, 2001, Bucher-Koenen et al., 2017). Indeed, when asked after the experiment to rate their financial knowledge on a scale of 1 (terrible) to 7 (excellent), on average males assessed their subjective financial knowledge to be more than a whole point higher than females (4.18 vs 3.06). The distributions are shown in the right panel of Figure 3.

A comparison of the two panels of Figure 3 provides two interesting insights. First, consistent with the literature, though women do score lower than men in financial literacy, the differences in confidence between males and females—as measured by differences in

Figure 3: Financial Literacy and Self-Assessed Financial Knowledge, by Gender and Treatment Status

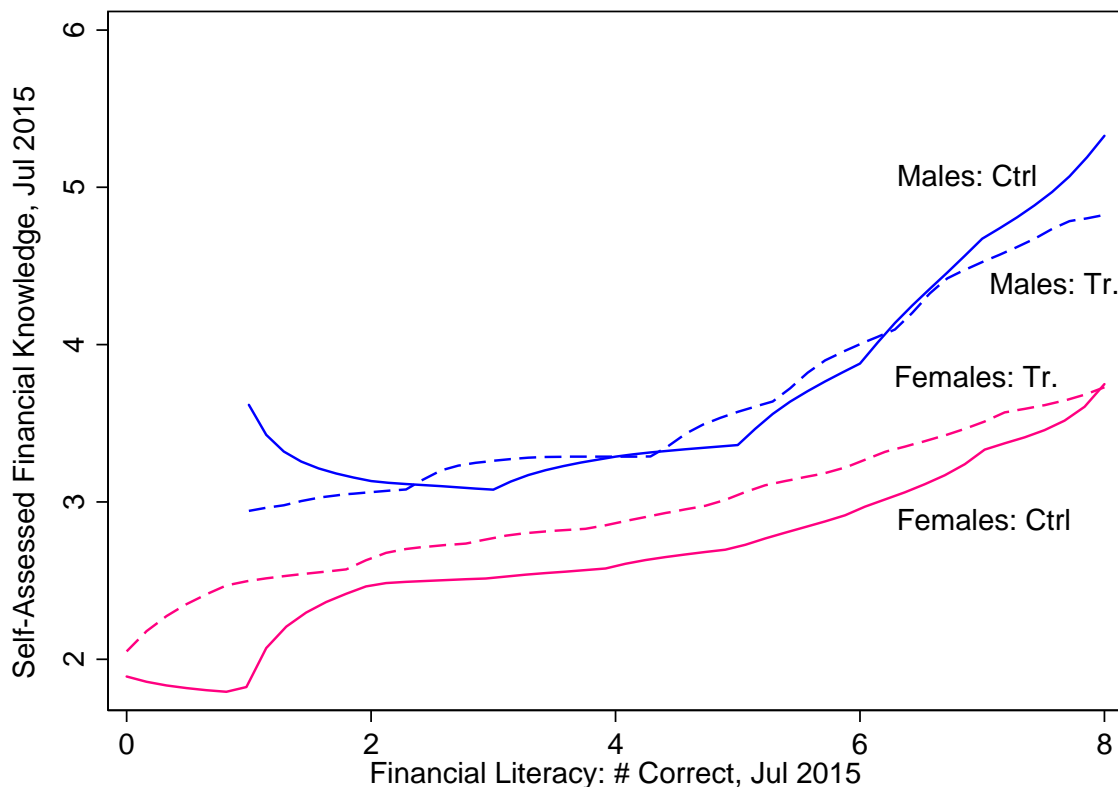


Epanechnikov kernel densities with unit bandwidth. Dashed lines show the distribution of the treatment group, the control is shown in solid lines. All variables measured post-treatment.

their self-assessed degree of financial knowledge—seems considerably more pronounced than their actual financial literacy differences (we will see this more explicitly in Figure 4 below). Second, while the treatment increases financial literacy for both genders, it raises women’s confidence in financial knowledge to a greater extent than for men. In fact, males in the treatment group tend to be slightly more likely to believe that their financial knowledge is closer to the average than the control. The overall effect is to reduce the gender gap in confidence, both by raising the confidence of women, and it appears, even attenuating some of the *over-confidence* of some men.

To gain a better understanding of these patterns, in Figure 4 we plot subjective evaluations of financial knowledge against their actual performance on the financial literacy

Figure 4: Self-Assessed Financial Knowledge by Actual Literacy Test Score



Kernel-weighted local polynomial regression. Dashed lines are for the treatment group, the control is solid.

test. As expected, individuals with higher financial literacy tend to have more confidence in their financial knowledge. More interesting however, are the gender differences in self-evaluations. For any given level of measured financial literacy, confidence in one's own financial knowledge is higher among men than among women. Furthermore, women in the treatment group raise their confidence across the board, reducing the gap with men. For men, in contrast, the treatment does not appear to change the level of confidence on average, though consistent with Figure 3, both the least scoring and the highest scoring appear to become more measured in their self-assessed financial knowledge.⁹

⁹Men tend to rate themselves as more willing to take risks (5.11 vs 4.07 on 1 to 10 scale at baseline). In line with the increases in confidence in financial knowledge, we also find some suggestive evidence that the treatment also raised women's willingness to take risks three to four months after the experiment (by 0.375 [0.264], while having a zero effect on men (-0.006 [0.181])).

Table 10 examines these issues in a regression framework. As the table reveals, even controlling for individuals' initial financial literacy scores and other characteristics, the treatment raises individuals' self-assessment of their financial knowledge by between 0.15-0.18 of a step on average (Cols 1-2). However, consistent with Figure 3, these differences mask a strongly significant 0.38-0.48 increase for women, and, if anything, a very slight *decrease* in confidence for men (Cols 3-4).

Columns 5-6 unpack which features of the treatment have the greatest effect on confidence. Holding other components constant, confidence in financial knowledge appears to rise more among those exposed to foreign assets, index funds (relative to company stocks), endowments that experienced positive price changes over the experiment, and those assets that were relatively more volatile. Notably, the experimental features that raised confidence were also more effective for increasing financial literacy (Table 8).¹⁰ This suggests that individuals are, to some extent, conscious of the learning going on (consistent with Figure 2).

4.3 Investment Behavior and Intentions

So far, we have established that individuals randomly assigned to trade in assets become more financially literate, better appreciate specific hard-to-teach financial principles such as the relative riskiness of stocks versus index funds, and learn relatively more from foreign assets, index funds as well as volatile and well-performing stocks. The overall gains in confidence appear to accrue more for women.

A separate question, however, is whether learning and familiarity translate into a greater tendency to engage in financial trading. To address this we gauged investment behavior and intentions in three different ways. First, within the treatment group, we traced whether individuals reported buying or selling stocks *outside* the experiment. As

¹⁰Note however that, unlike with financial literacy, receiving endowments of stocks (rather than vouchers with which to buy stocks) also seems to raise confidence. One possibility is that those that received vouchers and whose investment subsequently had mixed results may feel more personal responsibility for the outcome than those that were endowed with stocks of which they had limited ability to divest.

Table 10: **Effects on Self-Assessed Financial Knowledge**

How would you rate your overall financial knowledge?	(1)	(2)	(3)	(4)	(5)	(6)
	ITT	TOT	ITT	TOT	ITT	TOT
Asset Treatment	0.149 (0.095)	0.180* (0.107)	-0.029 (0.132)	-0.029 (0.139)	-1.556*** (0.592)	-1.829*** (0.667)
Asset Treatment x Female			0.380** (0.189)	0.482** (0.213)	0.368* (0.190)	0.468** (0.214)
Foreign Assets					0.542* (0.285)	0.665** (0.323)
\$100 Endowment					0.061 (0.095)	0.078 (0.106)
Seven Weeks Exposure					-0.083 (0.113)	-0.073 (0.120)
Stock Treatment					0.307** (0.150)	0.363** (0.159)
Exposed to Index Funds					0.400** (0.156)	0.463*** (0.170)
Positive Price Change over Exp.					0.394* (0.217)	0.473* (0.249)
Standard deviation of Price					14.864** (7.035)	16.792** (8.016)
Male	0.696*** (0.234)	0.674*** (0.218)	0.956*** (0.276)	0.941*** (0.254)	0.991*** (0.277)	0.980*** (0.255)
Observations	1,109	1,109	1,109	1,109	1,109	1,109
R-squared	0.422	0.423	0.425	0.425	0.430	0.427
F/ Chi2 (joint test treatments=0): Prob>p					0.0534	0.0253

This table shows the Intent to Treat (ITT: OLS) and Treatment Effect On the Treated (TOT: 2SLS) estimates of financial asset exposure on individual's self-assessed financial knowledge, ranging from 1: "Terrible", to 7: "Excellent", measured three to four months after the experiment, in July 2015. Foreign Assets include (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient in Cols 5-6 include the Male response to Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Figure 5 reveals, there tended to be an increase in the proportion engaging in external trading over the course of the experiment among both experienced and inexperienced investors (though naturally the initial levels were much higher for the former).

Second, in the July survey, three to four months after the experimental intervention, we asked individuals if they had invested in stock since May (i.e. after all had been divested from their experimental assets). We both asked a general question about whether individuals invested in any stocks following the experiment, and about their investments

Figure 5: Did Compliers Buy and Sell Outside Stocks During the Experiment?



in assets from specific regions. Table 11 (Col 1) reports the treatment effect on the treated. The overall probability that individuals report investing in *any* stock after the experiment increased by about 6.6 percentage points among the treated (relative to an average of 47.5%).¹¹ Furthermore, a similar set of sub-treatments as those that raised confidence and financial literacy had the greatest relative impact on propensity to invest: being exposed to foreign assets, and assets with positive price changes.

Breaking down the responses into investment in domestic and foreign assets is also illuminating. Being randomly assigned an endowment of stock (relative to a voucher) or an index fund (relative to company stocks) is particularly effective (close to a 10pp increase) at raising the probability of subsequent investment in domestic financial assets (Col 5). Further, those that received foreign assets in the experiment were also more

¹¹The p-value on the t-test of an *increase* is 0.039. See Table A3 for ITT results.

Table 11: Investment Post-Treatment

Invested in ... Stock [0/1]?, May-July	(1)	(2)	(3)	(4)	(5)	(6)
	Any		Domestic		Foreign	
	TOT	TOT	TOT	TOT	TOT	TOT
Asset Treatment	0.066*	-0.426*	0.025	-0.227	0.033	-0.386*
	(0.037)	(0.231)	(0.037)	(0.232)	(0.032)	(0.216)
Foreign Assets		0.241**		0.021		0.249**
		(0.113)		(0.113)		(0.107)
\$100 Endowment		0.043		0.032		-0.004
		(0.036)		(0.036)		(0.032)
Seven Weeks Exposure		-0.003		-0.003		0.017
		(0.041)		(0.043)		(0.035)
Stock Treatment		0.093		0.096*		0.060
		(0.057)		(0.058)		(0.048)
Exposed to Index Funds		0.096		0.107*		0.028
		(0.061)		(0.062)		(0.054)
Positive Price Change over Exp.		0.235***		0.057		0.180**
		(0.088)		(0.088)		(0.086)
Standard deviation of Price		2.246		1.466		2.975
		(2.811)		(2.795)		(2.568)
Observations	1,118	1,118	1,118	1,118	1,118	1,118
R-squared	0.392	0.396	0.359	0.361	0.267	0.272
Chi2 (joint test treatments=0): Prob>p		0.0813		0.554		0.0814

This table shows the TOT (2SLS) effect of the treatment and various sub-treatments on the probability an individual reported having invested in any domestic or foreign stock between May and July (i.e in the three months after the experiment). The *Foreign Assets* treatment includes (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient include Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

likely to report that they had invested in foreign financial assets thereafter (Col 6). Taken together, these results provide evidence consistent with individuals' self-reports in Figure 2: that the experiment rendered individuals more familiar with and aware of different types of financial assets, increasing their propensity to subsequently invest.¹²

¹²In the July survey, we also asked individuals about the likelihood that they would invest in different

Table 12: **Which Sub-Treatments Raise Chances of Reinvestment?**

	(1)	(2)	(3)	(4)
	Reinvest [Y/N]	Reinvest [Y/N]	% To Reinvest	Trust [0/1]
	Probit dF/dX	OLS	OLS	OLS
Domestic Assets	0.410** (0.189)	0.356 (0.226)	37.149** (16.525)	0.042 (0.087)
Voucher Treatment	-0.193*** (0.070)	-0.162** (0.074)	-11.060* (5.739)	-0.082** (0.041)
\$100 Endowment	-0.106* (0.055)	-0.077 (0.054)	-11.069*** (4.136)	-0.007 (0.029)
% Asset price change at time of divestment	-0.019* (0.010)	-0.015 (0.010)	-1.823*** (0.700)	-0.001 (0.004)
Standard deviation of Price	-7.099 (4.535)	-5.552 (4.390)	-552.411 (346.035)	1.008 (1.809)
Observations	478	515	515	858
(Pseudo) R-squared	0.179	0.248	0.299	0.415

This table shows how different sub-treatments influence the probability that those in the long duration treatment will reinvest their portfolios for an additional month in the Tel Aviv 25 index (Cols 1-2) and, if so, the percentage of the value of their portfolios they are willing to re-invest (Col 3). Col 4 shows the same relationship among those that trust when asked "generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" within those assigned to treatment. All regressions include the same set of controls as Table 4, Col 2, except Col 4 which also controls for pre-treatment trust. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1.

Beyond individuals' self-reported investment behaviours, we also gave all individuals participating in the long-duration subtreatment an option to either cash out their portfolios immediately or reinvest the value of their portfolio in an asset that tracked the value of the Tel-Aviv 25 index fund for an additional month. 41% of participants chose to reinvest, while the remaining 59% did not. Again, consistent with the idea that the experiment increased familiarity with particular assets that also raised the propensity to

stocks in the subsequent three months. Specifically, the questions asked "What are the chances you will invest in any [Israeli/Arab/international] stocks in the coming three months?" with answers on a four point scale, from very low to very high. As Table A2 suggests, while there was no increase in intention to invest in Israeli stocks (an average of 2.23 in the control vs 2.24 in the treatment), the propensity to invest in Arab stocks among the treated increases significantly (from a low base of 1.22 in the control to 1.36). Most of this effect is from moving individuals from rating their probability of investing in Arab stocks away from very low (82.9% of the control and 68.6% of the treatment) to low (12.5% versus 27.0%). Among sub-treatments, exposure to the Israeli index has a greater positive effect on the propensity to invest in Israeli stocks, while receiving foreign (i.e. Arab) assets (somewhat) raises the probability of being less opposed to investing in Arab stocks in the future. All in all, Tables 11 and A2 and suggest that while exposure to Arab assets does appear to reduce home preferences (or potential biases), it has a more muted effect on non-Arab international stocks.

invest, the probability of choosing to re-invest their portfolio into the Israeli index was between 35.6% - 41.% higher for those who had received Israeli assets rather than those that received foreign assets (Table 12 (Cols 1-2)). As seen in Column 3, those familiar with Israeli assets chose to reinvest 37.15% more of their portfolio (relative to an average of 27.4%). Receiving endowments of stock also appears to have raised the probability of re-investment (by 16.2-19.3pp) relative to those that received vouchers.¹³ Column 4 suggests an additional mechanism for why this might be: being randomly assigned endowments of stock rather than vouchers also appears to raise individuals' general willingness to trust others by 8.2pp (relative to 28.9% in the treatment group). The average effect of the treatment on increasing the probability of expressing generalized trust is, however, more muted at 0.277 (se=0.297). In this way, stock endowments may have been more effective than vouchers at overcoming a lack of trust that tends to also be associated with a lack of stock market participation (e.g. Guiso, Sapienza and Zingales, 2008).

4.4 Seeking Financial Advice

Familiarity and confidence should also translate into changes in the extent to which individuals consult others in their financial decisions. In principle, financial advice could be a complement or a substitute to an individual's own financial knowledge (Collins, 2012). However, Von Gaudecker (2015) finds a 'Goldilocks' relationship between the gains from and propensity to seek financial advice: those with the highest financial literacy tend to not seek professional financial advice and have more optimized portfolios. Ironically, those with the least financial literacy also tend to rely on themselves rather than professionals, but obtain worse outcomes. Financial advisors themselves appear to steer clients, particularly women, towards more costly fee-generating financial products (Hackethal et al., 2012, Inderst and Ottaviani, 2012, Mullainathan et al., 2012). For

¹³Interestingly, individuals with exogenously higher portfolio levels, whether due to a higher initial endowment or due to asset price increases, were more interested in realizing their gains than those with paper losses (consistent with Imas (2016) and effects in Jha and Shayo (2018).)

Table 13: Sources of Information: Whom Did you Consult?

Whom have you consulted when making your financial decisions? [0/1]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	TOT	Family	Friends	Financial Advisors	Investing.com	Other Fin. Web	Newspapers	Other Web News	Others	No One	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT
Asset Treatment	-0.047 (0.043)	0.168 (0.265)	-0.132*** (0.042)	0.108 (0.254)	-0.154*** (0.043)	-0.308 (0.239)	0.063*** (0.015)	-0.120 (0.146)	-0.021 (0.036)	-0.315 (0.241)	0.050* (0.029)	-0.150 (0.219)	0.002 (0.031)	-0.129 (0.124)	-0.009 (0.021)	0.191 (0.128)	0.086*** (0.031)	-0.075 (0.209)
Foreign Assets		-0.128 (0.125)	-0.223* (0.117)		0.015 (0.115)	0.042 (0.070)	0.074 (0.097)	0.038 (0.059)	0.033 (0.116)	0.074 (0.097)	0.038 (0.059)	0.038 (0.059)	0.038 (0.059)	0.038 (0.059)	0.038 (0.059)	0.038 (0.059)	0.038 (0.059)	0.114 (0.107)
\$100 Endowment		0.035 (0.040)	0.002 (0.038)		-0.024 (0.038)	0.027 (0.021)	-0.013 (0.031)	0.009 (0.035)	0.009 (0.035)	0.009 (0.035)	-0.013 (0.031)	-0.013 (0.031)	-0.013 (0.031)	-0.006 (0.017)	0.011 (0.018)	0.011 (0.018)	0.011 (0.018)	-0.000 (0.034)
Seven Weeks Exposure		-0.025 (0.045)	0.002 (0.042)		-0.073 (0.047)	0.043** (0.022)	-0.030 (0.035)	0.098** (0.041)	0.098** (0.041)	0.098** (0.041)	-0.030 (0.035)	-0.030 (0.035)	-0.030 (0.035)	0.004 (0.021)	0.004 (0.019)	0.004 (0.019)	0.004 (0.019)	0.012 (0.040)
Stock Treatment		0.031 (0.063)	0.074 (0.061)		-0.048 (0.060)	0.026 (0.036)	0.026 (0.036)	0.026 (0.036)	0.026 (0.036)	0.086 (0.057)	0.038 (0.057)	0.038 (0.057)	0.038 (0.057)	-0.002 (0.031)	-0.002 (0.026)	-0.030 (0.026)	-0.030 (0.026)	0.010 (0.055)
Exposed to Index Funds		-0.015 (0.069)	-0.034 (0.068)		0.036 (0.063)	0.033 (0.039)	0.033 (0.039)	0.033 (0.039)	0.033 (0.039)	0.058 (0.064)	0.050 (0.057)	0.050 (0.057)	0.050 (0.057)	0.028 (0.034)	0.028 (0.032)	0.028 (0.032)	0.028 (0.032)	0.031 (0.058)
Positive Price Change over Exl		-0.040 (0.100)	-0.205** (0.092)		-0.012 (0.091)	0.003 (0.053)	0.003 (0.053)	0.003 (0.053)	0.003 (0.053)	0.020 (0.092)	0.053 (0.076)	0.053 (0.076)	0.053 (0.076)	0.028 (0.044)	0.028 (0.044)	0.028 (0.044)	0.028 (0.044)	0.080 (0.084)
Standard deviation of Price		-3.667 (3.009)	-1.345 (2.896)		5.617** (2.772)	1.986 (1.750)	1.986 (1.750)	1.986 (1.750)	1.986 (1.750)	2.347 (2.763)	2.492 (2.569)	2.492 (2.569)	2.492 (2.569)	1.937 (1.413)	1.937 (1.413)	1.937 (1.413)	1.937 (1.413)	0.732 (2.531)
Observations	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120
R-squared	0.193	0.198	0.147	0.147	0.241	0.251	0.154	0.165	0.252	0.263	0.178	0.178	0.156	0.130	0.130	0.135	0.151	0.154
chi2 (joint test=0); Prob>p		0.647	0.00604	0.000465				0.00517		0.104	0.805	0.805	0.448	0.448	0.764	0.764	0.320	0.320

This table shows the TOT (2SLS) effect of the treatment and various sub-treatments on the probability an individual reported having consulted different sources for their financial decisions. The question was answered in July, three to four months after the experiment. *Foreign Assets* include (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient include Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

that reason, holding wealth constant, increases in financial knowledge, along with more measured confidence, could mute the demand individuals face for professional financial advice. Indeed, as Table 13 shows, we find that relative to the control, those in our treatment reduced their consultation of financial advisors by 15.4pp (compared to 39.6% who consulted them on average).¹⁴ Instead, treated individuals were 6.3 percentage points more likely to consult the investing.com website (relative to 5.8%), and 5 percentage points more likely to consult newspapers for news relevant for their financial decisions (relative to 15.5%).¹⁵ They were also 8.6 percentage points more likely to consult no one (relative to 18.7% on average). Among the subtreatments, those with longer exposure were more likely to consult websites in their financial decisions. Interestingly, while the overall effect was to reduce consultation with financial advisors among the treated, such advice was relatively more sought after by individuals exposed to more volatile stocks.

5 Conclusion

A fundamental question in economics and finance is how to help constrained individuals make better financial decisions. A key input into such decisions is financial literacy. Our study—the first to experimentally assign individuals incentives, opportunities and nudges to trade in actual financial assets—suggests durable effects, comparable in size to those of more standard educational programs. Active engagement in the market also appears to close some of the confidence gap between men and women, conditional on measured financial literacy: it raises the confidence of women and appears to mitigate some of the over-confidence of men.

Our research further points to the type of asset providing a link to the learning: for example, index funds appear to help individuals learn about the relative riskiness of stocks

¹⁴Please see Table A4 for ITT results.

¹⁵In Jha and Shayo (2018), we confirm that treated individuals increased the number of financial news sources they read, and become more aware of the performance of the stock market, even without changing their consumption of news more generally, or their knowledge of other salient economic and political facts.

versus funds, while exposure to foreign assets appears to mitigate home biases. In light of these results, we conjecture that adult learners (and possibly women in particular) may benefit more from learning opportunities when they can see and experience the direct relevance of financial concepts.

More generally, financial assets can allow novel exposures that can help individuals learn other economic ideas as well. In our follow-on research (Jha, Margalit and Shayo, in progress), we find that providing undecided UK voters opportunities to trade financial British assets from companies that were complementary to the economy of the rest of the European Union and European assets from companies that complemented the UK economy close to doubled their propensity to vote for Remain in the Brexit referendum. Exposing individuals to opportunities to learn about the risks and considerations of the financial markets may be a potent tool in helping their decisions and, ultimately, their welfare.

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SUPPLEMENTAL APPENDIX (FOR ONLINE PUBLICATION)
SAUMITRA JHA AND MOSES SHAYO

Note: All survey instruments used in this study are available on our websites. See e.g.: web.stanford.edu/~saumitra/papers/JhaShayo_Finance_SurveyInstruments.pdf.

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Figure A1: Initial Allocation Screen: Example.

בטבלה הבאה מופיעה הרשימה המלאה של הנכסים הפיננסיים שישתתפו במחקר. הרשימה כוללת גם מניות של חברות מסוימות וגם מדדים (index funds).

- המניות כלולות בקיום וחברות תקשורת.
- המדדים עוקבים אחר הערך של כמה מהחברות הציבוריות הגדולות בכל מדינה (בדרך כלל מדד מסוים כולל בין 20 ל-30 חברות).

ישו לי לב במיוחד לנסך שבו זכות ולמספר המניות שברשותי. אותו מספר המניות יעמוד לרשותך גם בשבוע הבא. לפיכך, אם המחיר של הנכס יעלה - ערך הנכסים שלך יעלה בהתאם. אם המחיר של הנכס ירד - ערך הנכסים שלך ירד בהתאם. הרשימה מסודרת בסדר אלפביתי לפי סימול המניה או המדד באנגלית.

שם	שם באנגלית	סימול	מטבע	מחיר הנכס היום (במטבע מקומי)	מספר המניות שברשותי	ערך הנכסים שלי כנצטבע מקומי (יש)	ערך הנכסים שלי (בש"ח)
בנק אקבנק, טורקיה	Akbank Turkey	AKBNK	TRY	8.55			
מדד של בורסת רבת עמון בירדן	Amman SE General Index Fund	AMGNRLX	JOD	2,186.18			
בזק (חברת תקשורת ישראלית)	Bezeq	BEZQ	ILS	663.10			
בנק ירדן	Bank Of Jordan	BOJX	JOD	2.80			
בנק פלסטין	Bank Of Palestine	BOP	JOD	2.78			
מדד של 20 המניות הגדולות בקפריסין	Cyprus/FTSE Top 20 Index Fund	CYFT	EURO	44.44			
מדד של 30 המניות הגדולות בבורסת קהיר במצרים	Egypt EGX 30 Index Fund	EGX30	EGP				
מצרים טלקום	Telecom Egypt	ETEL	EGP				
ירדן טלקום	Jordan Telecom	JTEL	JOD				
בנק לאומי לישראל	Bank Leumi	LUMI	ILS	1,288.00			
פלסטין טלקומוניקיישן (חברת תקשורת פלסטינית)	Palestine Telecommunications	PALTEL	JOD	5.94	6.122	36.36	200
מדד של הבורסה הפלסטינית בשנים	Palestine Stock Exchange Index Fund	PLE	JOD	504.76			
מדד תל-אביב 25	Tel Aviv TA-25 Index Fund	TA25	ILS	1,452.46			
טורקסל (חברת תקשורת טורקית)	Turkcell	TCELL	TRY	14.80			
בנק יוניון הלאומי של מצרים	Union National Bank of Egypt	UNBE	EGP	5.90			
מדד של 30 המניות הגדולות בבורסת איסטנבול בטורקיה	Borsa Istanbul 30 Index Fund	XU030	TRY	106,359.21			
כסף מזומן	CASH	CASH	ILS	1.00			

total value in NIS total value in JOD # shares current price in JOD

• Here is a list of all the assets participating...
 • Both company stocks and index funds (explained).

• Note the asset you won and the # of shares you own.
 • If the price of your asset increases, the value of your assets will increase accordingly. If the price goes down...

לקבלת מידע מפורט ועדכני על כל אחד מהנכסים הנ"ל, באפשרותך להקליד את הסימול של אותו נכס באתר <http://www.investing.com>, או באתרים של הבורסות השונות.

Figure A2: Weekly Trading Screen: Example.

The screenshot displays a trading interface with the following sections and callouts:

- Link to website with info on assigned stock:** Points to the URL <http://il.investing.com/equities/bezeq-ord> under the heading "להלן העדכון על ביצועי תיק ההשקעות שלך."
- Composition, price and updated value of portfolio:** Points to the "מצב תיק הנכסים שלך" section, which includes text about the portfolio's composition and value.
- Buying decision (if current portfolio includes cash):** Points to the "קניה" section, which discusses buying decisions based on cash availability.
- Selling decision (if current portfolio includes stocks):** Points to the "מכירה" section, which discusses selling decisions based on stock holdings.

The "מכירה" section includes a text input field with the value "10" and a "המשך" button.

Table A1: Comparison of the Sample and the Israeli Population

	Baseline Sample (N = 1345)	July Sample (N=1114)	Israeli Population
1. Region: Jewish Population in District (%)			
Jerusalem District	11.2	12.6	11.1
Northern District	8.7	8.4	9.5
Haifa District	13.0	13.0	10.7
Central District	27.3	27.3	28.5
Tel Aviv District	19.4	19.1	20.2
Southern District	10.6	10.2	14.2
West Bank	9.7	9.4	5.8
2. % Female in Jewish Pop., 18+	47.4	46.4	51.4
3. Age (Jewish Population above age 18 (%))			
Male			
18-24	10.5	8.5	14.6
25-34	31.8	30.0	20.4
35-44	27.4	28.3	18.7
45-54	14.4	16.3	14.7
55-64	8.2	8.9	15.1
65+	7.8	7.9	16.5
Female			
18-24	15.1	15.5	13.3
25-34	31.6	29.5	19.2
35-44	28.0	26.9	17.9
45-54	11.7	12.1	14.6
55-64	9.7	11.5	15.5
65+	3.8	4.5	19.5
4. Religiosity (Jewish Population, %)			
Not religious/Secular	55.1	56.0	43.4
Traditional	17.5	15.8	36.6
Religious	16.3	16.4	10.6
Ultra-orthodox	11.1	11.8	9.1
5. Education (Jewish Population level of schooling (%))			
Less than high school grad (0 to 10 yrs.)	6.3	6.1	13.7
High school graduate (11 to 12 yrs.)	12.8	12.7	33.3
Post-secondary/BA Student (13 to 15 yrs.)	38.2	36.8	24.1
College grad and above (16+ yrs.)	42.8	44.4	28.9
6. Net Monthly Income per Household (NIS)			
Mean	10,483	10,589	14,622
Median	12,000	12,000	13,122

All survey data weighted to account for sampling scheme.

1. Statistical Abstract of Israel 2015, Table 2.15, 2014 Totals

2. Statistical Abstract of Israel 2015, Table 8.72, 2014 Totals

3. Statistical Abstract of Israel 2015, Table 8.72, 2014 Totals

4. Statistical Abstract of Israel 2015, Table 7.6, 2013 Totals. The data for the Israeli population is for age 20 and over.

5. Statistical Abstract of Israel 2015, Table 8.72, 2014 Totals

6. Statistical Abstract of Israel 2015, Table 5.27, 2013 Total (mean). Median is midpoint between 5th and 6th deciles. Data are for entire population, not just Jewish. Survey data represents midpoint of SES categories.

Table A2: Chances of Investing in the Next Three Months

Chances of Investing in ... in the next 3 months [July 15]	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)					
	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT	ITT	TOT				
Asset Treatment	0.009 (0.064)	0.011 (0.073)	-0.539 (0.393)	-0.650 (0.452)	0.135*** (0.043)	0.164*** (0.049)	0.081 (0.278)	0.134 (0.321)	0.135*** (0.043)	0.164*** (0.049)	0.081 (0.278)	0.134 (0.321)	0.028 (0.059)	-0.034 (0.067)	-0.091 (0.383)	-0.034 (0.067)	0.134 (0.321)	0.028 (0.059)	-0.034 (0.067)	-0.091 (0.383)	-0.034 (0.067)	0.134 (0.321)	0.028 (0.059)	-0.034 (0.067)	-0.091 (0.383)	-0.034 (0.067)	0.134 (0.321)	
Foreign Assets			0.065 (0.189)	0.079 (0.216)			0.070 (0.138)	0.081 (0.160)			0.070 (0.138)	0.081 (0.160)			0.042 (0.192)	0.042 (0.192)			0.042 (0.192)	0.042 (0.192)			0.042 (0.192)	0.042 (0.192)			0.042 (0.192)	
\$100 Endowment			0.067 (0.062)	0.077 (0.069)			-0.023 (0.042)	-0.037 (0.047)			-0.023 (0.042)	-0.037 (0.047)			-0.099* (0.060)	-0.099* (0.060)			-0.099* (0.060)	-0.099* (0.060)			-0.099* (0.060)	-0.099* (0.060)			-0.099* (0.060)	
Seven Weeks Exposure			-0.048 (0.075)	-0.051 (0.080)			-0.053 (0.050)	-0.060 (0.054)			-0.053 (0.050)	-0.060 (0.054)			-0.085 (0.068)	-0.085 (0.068)			-0.085 (0.068)	-0.085 (0.068)			-0.085 (0.068)	-0.085 (0.068)			-0.085 (0.068)	
Stock Treatment			0.157 (0.104)	0.188* (0.111)			0.046 (0.071)	0.052 (0.077)			0.046 (0.071)	0.052 (0.077)			0.115 (0.099)	0.115 (0.099)			0.115 (0.099)	0.115 (0.099)			0.115 (0.099)	0.115 (0.099)			0.115 (0.099)	
Exposed to Index Funds			0.220** (0.106)	0.264** (0.117)			0.020 (0.072)	0.017 (0.080)			0.020 (0.072)	0.017 (0.080)			0.029 (0.098)	0.029 (0.098)			0.029 (0.098)	0.029 (0.098)			0.029 (0.098)	0.029 (0.098)			0.029 (0.098)	
Positive Price Change over Exp.			-0.021 (0.146)	-0.032 (0.166)			0.013 (0.112)	0.011 (0.130)			0.013 (0.112)	0.011 (0.130)			-0.067 (0.152)	-0.067 (0.152)			-0.067 (0.152)	-0.067 (0.152)			-0.067 (0.152)	-0.067 (0.152)			-0.067 (0.152)	
Standard deviation of Price			7.112 (4.608)	8.650 (5.332)			0.368 (3.244)	0.001 (3.782)			0.368 (3.244)	0.001 (3.782)			2.140 (4.314)	2.140 (4.314)			2.140 (4.314)	2.140 (4.314)			2.140 (4.314)	2.140 (4.314)			2.140 (4.314)	
Observations	1,122	1,122	1,122	1,122	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122
R-squared	0.350	0.350	0.357	0.356	0.171	0.164	0.175	0.166	0.171	0.164	0.175	0.166	0.166	0.310	0.318	0.310	0.310	0.310	0.318	0.310	0.310	0.318	0.310	0.315	0.315	0.315	0.315	0.315
F/ Chi2 (joint test treatments=0): Prob>p			0.314	0.221			0.0757	0.0403			0.0757	0.0403			0.341	0.341			0.341	0.341			0.341	0.250	0.250	0.250	0.250	0.250

This table shows the ITT (OLS) and TOT (2SLS) effect of the treatment and various sub-treatments on individual's self-reports of the chances of investing in stocks from different sources in the next three months, on a scale of 1-4 (very low, low, high, very high). These were measured three to four months after the experiment, in July 2015. *Foreign Assets* include (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient include Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table A3: Probability of Investment Post-Treatment ITT

	(1)	(2)	(3)	(4)	(5)	(6)
Invested in ... Stock [0/1]?, May- July	Any		Domestic		Foreign	
	ITT	ITT	ITT	ITT	ITT	ITT
Asset Treatment	0.066*	-0.346*	0.021	-0.191	0.027	-0.307
	(0.037)	(0.203)	(0.032)	(0.202)	(0.028)	(0.188)
Foreign Assets		0.189*		0.015		0.195**
		(0.098)		(0.099)		(0.092)
\$100 Endowment		0.035		0.027		-0.006
		(0.032)		(0.032)		(0.028)
Seven Weeks Exposure		-0.004		-0.003		0.013
		(0.038)		(0.040)		(0.032)
Stock Treatment		0.078		0.081		0.053
		(0.053)		(0.054)		(0.044)
Exposed to Index Funds		0.080		0.089		0.023
		(0.055)		(0.056)		(0.049)
Positive Price Change over Exp.		0.187**		0.047		0.142*
		(0.076)		(0.076)		(0.073)
Standard deviation of Price		1.907		1.286		2.340
		(2.442)		(2.418)		(2.213)
Observations	1,118	1,118	1,118	1,118	1,118	1,118
R-squared	0.392	0.399	0.357	0.362	0.268	0.280
Chi2 (joint test treatments=0): Prob>p		0.120		0.636		0.120

This table shows the ITT (OLS) effect of the treatment and various sub-treatments on the probability an individual reported having invested in any domestic or foreign stock between May and July (i.e in the three months after the experiment). The Foreign Assets treatment includes (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient include Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table A4: Sources of Information: Whom Did you Consult? ITT

Whom have you consulted when making your financial decisions? [0/1]	(1) Family		(2) Friends		(3) Financial Advisors		(4) Investing.com		(5) Other Fin. Websites		(6) Newspapers		(7) Other Web News		(8) Others		(9) No One	
	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT	ITT
Asset Treatment	-0.039 (0.038)	0.129 (0.233)	-0.108** (0.037)	0.086 (0.222)	-0.126*** (0.038)	-0.255 (0.215)	0.052*** (0.013)	-0.083 (0.129)	-0.017 (0.031)	-0.236 (0.212)	0.041 (0.026)	-0.131 (0.191)	0.001 (0.027)	-0.214 (0.190)	-0.008 (0.018)	0.157 (0.112)	0.071** (0.028)	-0.061 (0.185)
Foreign Assets		-0.099 (0.110)		-0.176* (0.102)		0.025 (0.103)		0.023 (0.062)		0.014 (0.102)		0.061 (0.085)		0.112 (0.093)		-0.061 (0.053)		0.088 (0.094)
\$100 Endowment		0.028 (0.036)		-0.004 (0.034)		-0.026 (0.034)		0.026 (0.019)		0.004 (0.031)		-0.008 (0.027)		0.017 (0.029)		0.010 (0.016)		0.003 (0.031)
Seven Weeks Exposure		-0.021 (0.043)		0.001 (0.040)		-0.064 (0.044)		0.037* (0.020)		0.084** (0.039)		-0.027 (0.033)		-0.047 (0.035)		-0.008 (0.018)		0.010 (0.037)
Stock Treatment		0.027 (0.059)		0.068 (0.056)		-0.039 (0.056)		0.019 (0.034)		0.073 (0.053)		0.033 (0.048)		0.033 (0.047)		-0.025 (0.024)		0.006 (0.051)
Exposed to Index Funds		-0.012 (0.063)		-0.030 (0.062)		0.031 (0.059)		0.025 (0.036)		0.044 (0.059)		0.044 (0.052)		0.047 (0.052)		-0.044 (0.029)		0.026 (0.053)
Positive Price Change over Ex		-0.031 (0.088)		-0.163** (0.079)		-0.002 (0.081)		-0.003 (0.047)		0.010 (0.081)		0.046 (0.066)		0.054 (0.074)		-0.045 (0.039)		0.063 (0.073)
Standard deviation of Price		-2.875 (2.629)		-1.237 (2.533)		4.519* (2.486)		1.471 (1.528)		1.590 (2.416)		2.155 (2.213)		2.507 (2.236)		-1.572 (1.310)		0.657 (2.223)
Observations	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120
R-squared	0.192	0.196	0.141	0.149	0.235	0.245	0.143	0.153	0.254	0.264	0.182	0.184	0.156	0.160	0.130	0.135	0.147	0.149
F (joint test=0); Prob>p		0.740		0.0117		0.00239		0.0172		0.169		0.855		0.878		0.832		0.429

This table shows the ITT (OLS) effect of the treatment and various sub-treatments on the probability an individual reported having consulted different sources for their financial decisions. The question was answered in July, three to four months after the experiment. *Foreign Assets* include (mainly) Palestinian assets, but also Cypriot, Egyptian and Jordanian Index Fund allocations. The excluded treatment categories captured by the Asset Treatment coefficient include Domestic Assets, \$50 Endowment, 4 Weeks Exposure, Voucher Endowment, Exposed to Company Funds and Negative Price Change. All regressions include the same set of controls as Table 4, Col 2. Robust standard errors in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1