Following the Pied Piper of Pensioners

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Abstract

Using survey and administrative data, we study followers of H&L, a massively popular Chilean pension advisor, establishing that financial literacy is not a panacea for poor retirement decision-making. We find that followers are wealthy, well-educated and truly financially sophisticated. Indeed, exposure to H&L increases financial sophistication and likelihood of additional voluntary savings. Nonetheless, followers are badly hurt by H&L's advice, earning mean annual returns that are 1.4-1.9% below all buy-and-hold strategies, and they are aware of this underperformance. Moreover, performance does not materially affect renewal rates, and 77% renew. Perversely, reasons given for following are: high returns, loss minimization and trust.

JEL Classification: H55, H31, D14, G23, G41.

1 Introduction

The household finance literature is replete with research documenting the harm caused by a lack of financial sophistication of individuals making personal retirement savings decisions. For example, Choi et al. (2011) identify a setting where pension investors failed to exploit an opportunity to costlessly raise retirement savings. Brown et al. (2019) exhaustively detail papers identifying behavioral factors underlying why individuals make systematic errors and fail to save enough for retirement or make poor retirement timing decisions (e.g., Brown et al. (2016)). Indeed, researchers have used behavioral factors to nudge individuals into making better retirement choices (e.g., Thaler (2015)), for example, by requiring individuals to opt out of a default retirement savings rate. A broad literature suggests that financial sophistication may be a remedy for investment mistakes (see, e.g., Calvet et al. (2009), or the review by Lusardi and Mitchell (2014), which documents the extent of financial illiteracy, its impact on economic decision making, and what might help offset the adverse consequences). A sub-theme is that better retirement savings outcomes might obtain if only pension investors were more financially competent and knowledgeable.

Our paper establishes that financial competence and knowledge are not a panacea for poor retirement decision-making. We study followers of *Felices y Forrados* (Happy and Loaded, henceforth H&L), a hugely popular pension advisory firm in Chile. For an annual fee of about $24, H&L emails occasional recommendations after the close of a trading day telling followers how to re-allocate retirement savings across five available portfolios. We first detail the dynamics of who follows H&L and why. H&L attracted a massive following: after recommendations, followers shift amounts that can exceed 100% of monthly trading volume on the Santiago stock exchange. Nonetheless, followers do *badly*—the vast majority would have done better to stick with their original portfolio, no matter what it was.

This analysis sets the stage for our investigation of followers. We combine administrative data from H&L that includes client payment histories with a large survey of 9,478 current and former clients of H&L. We contrast followers with pension investors in the Social Protection Survey (EPS), a broad population survey, and we link investors in the EPS with those who shift pension investments to identify future followers *before* their exposure to H&L. Our survey analysis reveals that financial literacy and competency are associated with bad retirement savings choices. Followers are far wealthier, more educated and remarkably more financially sophisticated than typical investors. In fact, exposure to H&L sharply increased their financial understanding and competency. Followers are also well aware that recommendations do badly, indeed *under-estimating* H&L's actual

returns. Nonetheless, over 77% of followers renew, recommendation performance does not materially affect renewal rates, and those who cease following are less sophisticated.

Chile's pension design is the most widely-emulated design in the world, adopted in some form by over 20 countries (Berstein et al. (2006)).[1] It features mandatory and voluntary components. The mandatory component is a defined contribution, multi-fund, personal account system. Workers accumulate savings in personal accounts until retirement. Formal workers must save at least 10% of wages up to a cap. Total savings on Dec 31, 2014 were $165 billion USD, or 60% of the Chilean GDP. Average pension savings were $38,600, or 54% of total net wealth (Behrman et al. (2012)), making it the primary source of savings for most individuals.

Workers choose a Pension Fund Administrator (AFP) to manage investments. AFPs are highly regulated and face investment constraints. AFPs only offer five funds ordered from A to E by their riskiness.[2] Fund A is the riskiest, invested mostly in foreign mutual funds, ETFs and domestic stocks. Fund E is the safest, invested mainly in government and Central Bank bonds, and bank deposits. The behavioral logic underlying the limited choice set reflects that many pension investors are unsophisticated. The limited, easy-to-compare options let investors align investments with risk attitudes while protecting against choices that could endanger retirement savings.

Individuals choose how to allocate savings across portfolios. Men under 55 and women under 50 face no constraints on portfolio choices; and no restrictions apply to voluntary savings. Older workers cannot select portfolio A, and pensioners cannot select B. A worker who does not choose a fund is assigned a default option that places weights on portfolios B, C and D. Transfers of savings from one portfolio or AFP to another incur no fees. Transfers among portfolios within an AFP are made four working days after a request, unless the total transfer request from a portfolio exceeds 5% of its value, in which case the excess is delayed to the next working day, on a first-come, first-serve basis.

H&L's emailed recommendations typically instruct clients to shift 50% or 100% of savings from portfolio A to portfolio E, or vice versa. Between July 2011 and September 2016, H&L recommended shifting savings between portfolios on 35 occasions. H&L only had 54 paid followers for its first four recommendations. However, its first few recommendations earned high returns. Indeed, H&L's strategy outperformed any buy and hold strategy dur-

[1] Sweden, Denmark, Peru, Colombia, Argentina, Uruguay, Bolivia, Mexico, El Salvador, Costa Rica, Dominican Republic, Nicaragua, Ecuador, Bulgaria, Croatia, Estonia, Hungary, Latvia, Poland, Russia, Slovakia, Nigeria, Kazakhstan and Singapore.

[2] There are currently six AFPs. The return on a given portfolio is similar across AFPs. H&L's motto is "if you are happy with your AFP, stick with it."

ing 2011 and 2012. Drawn by the high initial returns, by the seventh recommendation, each new recommendation led to net shifts of over 25,000 investors to the newly-endorsed portfolio, and away from the old one. By the end of 2014, H&L had over 100,000 followers, and over time, many of them *chose* to pay to receive recommendations that they could (and once did) receive for free via social connections. H&L changed investor behavior, inducing massive shifts across portfolios—in the week after a recommendation, pension flows in the direction recommended by H&L amount to as much as 1.5% of Chile's annual GDP.

We find that although investors flocked to follow H&L's advice, they are harmed by following it. The vast bulk of followers would have done better to stick with whichever portfolio they held, *no matter what it was*. Average realized annual losses from following vs. holding a given portfolio are high, ranging from -1.4% to -1.9% (from -$406 to -$551), depending on the comparison portfolio. What harms followers is not that they believe the recommendations have value, but rather that the *market* believes: the Chilean stock market rises by $\frac{1}{2}$% the day after a recommendation to shift to risky portfolio A, and it falls by $\frac{1}{2}$% after a recommendation to shift away (Cuevas and Bernhardt (2020)). The one-day delay in how transferred funds are valued means that followers cannot switch in time to benefit—they buy high and sell low, reducing their cumulative returns by 20-25%.

This poor performance begs the question: why do so many investors come to believe that H&L's recommendations have value? One might posit that followers are financially unsophisticated or are unaware of the poor performance of H&L's recommendations. Our survey analysis gets at this. We characterize who follows and why. Our data let us address questions like: Who demands financial advice? Do investors pay attention to the performance of advisers? Do investors stop following if advisers do badly?

We document that H&L followers are *far* more sophisticated than the average investor. They are more educated, with higher incomes and over twice the savings. Underscoring their financial competence, a remarkable 64% of followers correctly calculate a compound interest problem vs. only 3-5% of non-followers. Importantly, we show that only some of this financial competence and knowledge is innate: H&L's financial literacy outreach sharply increased the financial sophistication of followers. To establish causal impacts, we identify individuals in the 2012 EPS (pre-H&L) who later became followers by linking their future portfolio shifts to H&L's recommendations. Exposure to H&L increased the percentage of followers who were aware of the tax benefits of voluntary pension savings by 75%; and increased the percentage who exploited those tax benefits by 63%. This

indicates that H&L provided tangible information benefits to its followers.[3]

We find that followers are also surprisingly well-informed about portfolio returns and do not over-estimate returns from following H&L. Among followers who rank returns on all portfolios and their own savings, 57% correctly rank the 12 month returns on the three portfolios, and about half correctly rank portfolio E's return above H&L's. In fact, far more followers *under-estimate* H&L's returns than over-estimate them. Moreover, the poor performance of H&L's recommendations does not materially affect decisions to follow—worse relative returns have only tiny impacts on the probability of continuing to follow, and this effect is *smaller* for more sophisticated followers.

This raises the question: why *do* investors continue to follow H&L? Paradoxically, we find that the key reasons investors give for following H&L are: higher returns, minimize losses, and they trust H&L more than their AFP. More paradoxically yet, it is the more sophisticated followers who tend to emphasize minimizing losses, even though so many lose.

Our analysis shows that financial sophistication is not a panacea. Followers are truly knowledgeable, in part due to H&L's financial literacy outreach. Warren Buffett offers similar outreach, providing a parallel. Berkshire Hathaway has not out-performed the market in recent years,[4] but some investors respond to news of its investments by mimicking them. Such investors buy high and sell low, so their returns lag the market. Section 4 provides policy and practical implications. We posit that what drives decisions to follow is that investors respond to information that they can discern has value, e.g., tax advantages of voluntary savings, and assume that this expertise should extend more broadly. However, the large annual losses from following H&L swamp any informational benefits.

Related Literature. Arenas de Mesa et al. (2008) analyze savings, participation patterns and the financial literacy of pension investors in Chile. They find that few investors know such basic details as the payroll tax or commission rates. Da et al. (2018) and Cuevas and Bernhardt (2020) document returns in the Chilean stock market in a window around H&L's recommendations, for example uncovering that H&L employs an ultra-short term momentum strategy. Dahlquist et al. (2016) find that active pension investors in Sweden who follow recommendations of financial advisers seem to outperform passive investors, gross of adviser fees. Anderson and Robinson (2018) show that investors who mistakenly believe they are financially sophisticated are more likely to respond to informational nudges encouraging them to actively manage investments. These investors are

[3]Relatedly, Bernheim and Garret (1996) and Bayer et al. (2009) find that employer-based financial education increases retirement savings, and Duflo and Saez (2002) find that peers influence retirement savings.

[4]https://qz.com/1216260/warren-buffett-doesnt-beat-the-market-anymore/

more likely to work with mass-market advisers, leading them to underperform. Deuflhard et al. (2018) find that in the Netherlands, higher financial literacy is associated with higher returns in savings accounts.

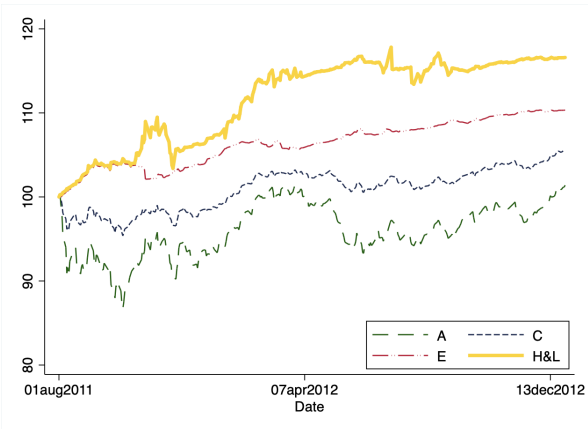
Carlin and Davies (2016) theoretically analyze state-sponsored retirement plans, showing how the optimal menu hinges on participants' sophistication and behavioral biases. They assume that only unsophisticated investors make bad active trading decisions, while we find that investors in Chile who adopt active strategies are sophisticated, but do worse.

There is little research on the determinants of demand for financial advice, partly due to lack of data. Two recent papers are Bhattacharya et al. (2019) and Egan (2019). Bhattacharya et al. evaluate the effects of extending fiduciary duty to broker-dealers on the set of products sold to clients. They find that fiduciary duty reduces the likelihood of selling variable annuities; and, when selling a variable annuity, brokers are more likely to steer clients toward higher-quality investment options. Egan (2019) studies the market for equity reverse convertible bonds and shows that consumers often purchase dominated bonds. He argues that this is due to incentives that brokers have to sell such bonds. Our paper exploits richer data on investor attributes (especially concerning financial sophistication), to show the measurable impact of H&L's advice on financial sophistication and behavior.

2 The Performance and Impact of H&L

H&L only had 54 paid followers for its first four recommendations. However, its first few recommendations earned very high returns. Six of H&L's first seven recommendations outperformed the other portfolios during the window of the recommendation. Figure 1 shows that H&L's strategy outperformed any buy and hold strategy during 2011 and 2012.

Figure 1: H&L initial performance: Money accumulated from following the first seven recommendations by an investor who starts with 100 CLP.



The strong performance of its initial recommendations led to a surge in media coverage and attention for H&L, followed by sharp increases in paid followers.[5] To show this, we use Google trends data, searching for the phrase "Felices y Forrados." Figure 2 shows the Google trends index, taking on the value of 100 in the month when the most users "Googled" H&L, and a "Google search" series, constructed using a monthly search on Google of the same phrase. We only count results from media sites, news sites, and opinion blogs. H&L was almost unknown before 2012. Media coverage and internet interest rise and then explode, peaking in July 2013; after this, interest remains steady. The numbers of new clients closely track the Google indexes. The high fit (adjusted $R^2 = 0.70$) from regressing the number of new (paid) followers each month on the Google trends index (GT) and its first lag reveals the tight relationship between media attention and followers.

Figure 2: Investors interest, media coverage, and new subscriptions.

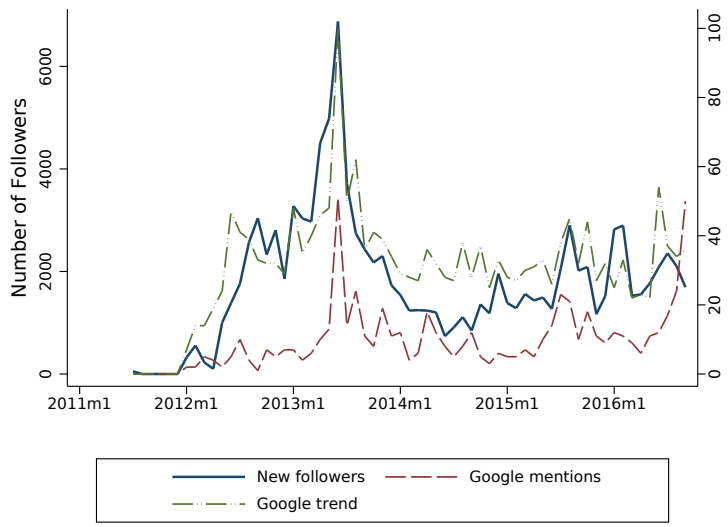


Table 1: Investors interest, media coverage, and new subscriptions.

OLS regression of new (paid) followers on the Google trends index (GT).

Constant	GT_t	GT_{t-1}	Obs.	R^2	adjusted R^2
-374.3**	56.3***	13.2**	62	0.71	0.70
(165.0)	(9.3)	(5.9)			

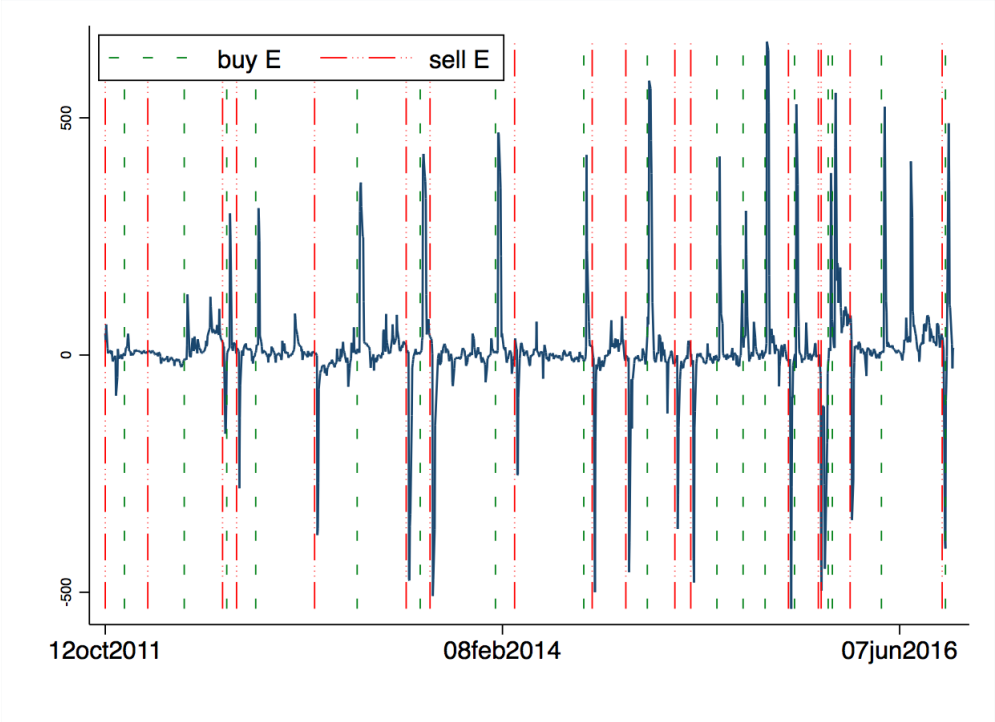
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 3 shows how H&L's recommendations are *the* driver of portfolio transfers, with little else mattering. It plots daily net portfolio flows (money) in and out of portfolio E beginning in October 2011 when reliable data became available. The direction and timing

[5]In a similar way, hedge funds must do well at the outset to survive (Malkiel and Saha (2005)).

of *all* big spikes in transfers *perfectly* align with H&L's recommendations. Net portfolio reallocations often exceed the total value of *all* trade of domestic stocks on the Santiago Stock Exchange in the month of a recommendation.

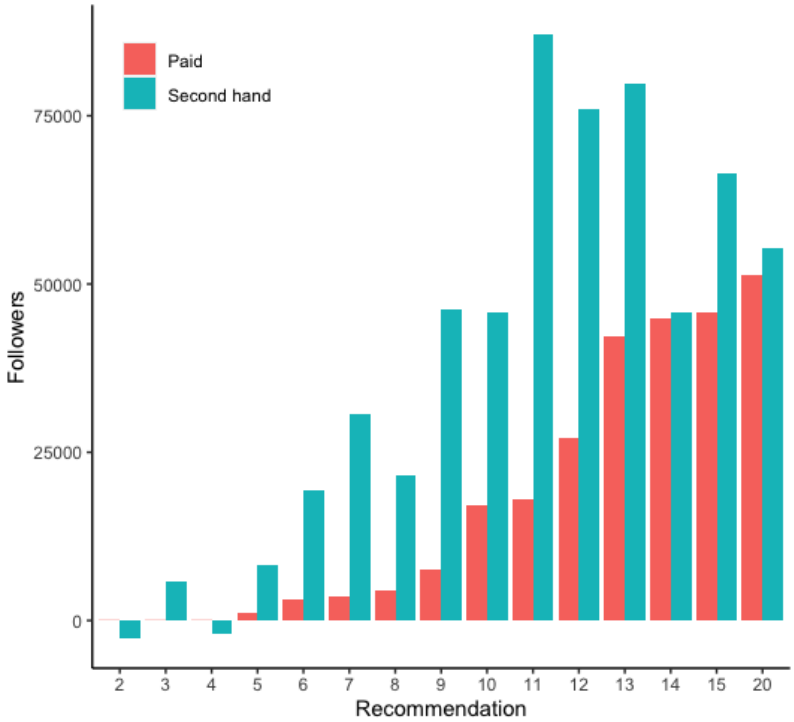
Figure 3: H&L recommendations and daily net flows to portfolio E (billions CLP).



Followers are a mix of paid subscribers and second-hand followers. H&L's administrative records reveal how this composition evolves over time. We estimate the number of second-hand followers using recommendations to move all money in or out of portfolio E that all investors can follow (there are age restrictions on portfolios A and B). The number of second-hand followers is defined as the *net* number of accounts shifted on days $t+3$ through $t+8$ in the direction suggested by a recommendation minus the number of official followers, where day t is the first trading day after a recommendation. Figure 4 shows that when H&L first became popular, most followers were non-paying free-riders who relied on social networks for access to recommendations. However, over time, so many free-riders switch to becoming paying subscribers that the numbers of paid and second-hand followers become roughly equal. That is, we find that investors come to value the recommendations by enough that they *choose* to pay for something that they were receiving for free.

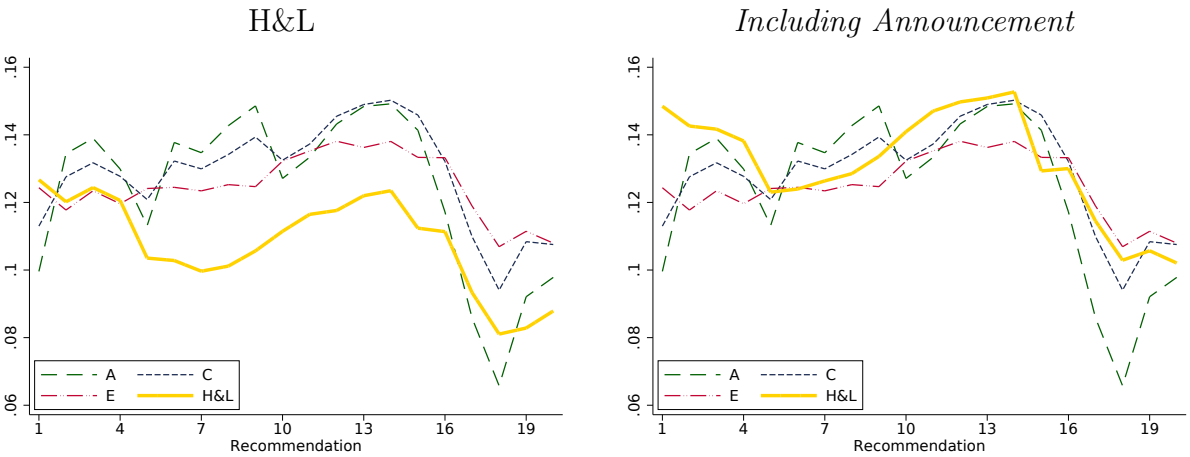
Figure 5 shows that investors who follow H&L's advice are harmed. It compares the (annualized) performance of H&L's strategy vs. holding any other portfolio, starting at *any* of the first twenty announcements and following every recommendation up to September 30, 2016. The figure on the left shows the return for a follower who shifted portfolio

Figure 4: Paid followers and estimated second-hand followers.



investments in response to recommendations as soon as possible. Save for the very first recommendation (followed by only 54 subscribers), any other starting point is outperformed by at least one portfolio, and, in almost all cases, H&L's strategy ranks last.

Figure 5: Annualized nominal return (vertical axis) for H&L's strategy and pension portfolios starting with any of the first 20 recommendations until September 30, 2016. *Including Announcement* details the return obtained were transferred funds priced using closing prices at the moment a recommendation is made, before the market response.

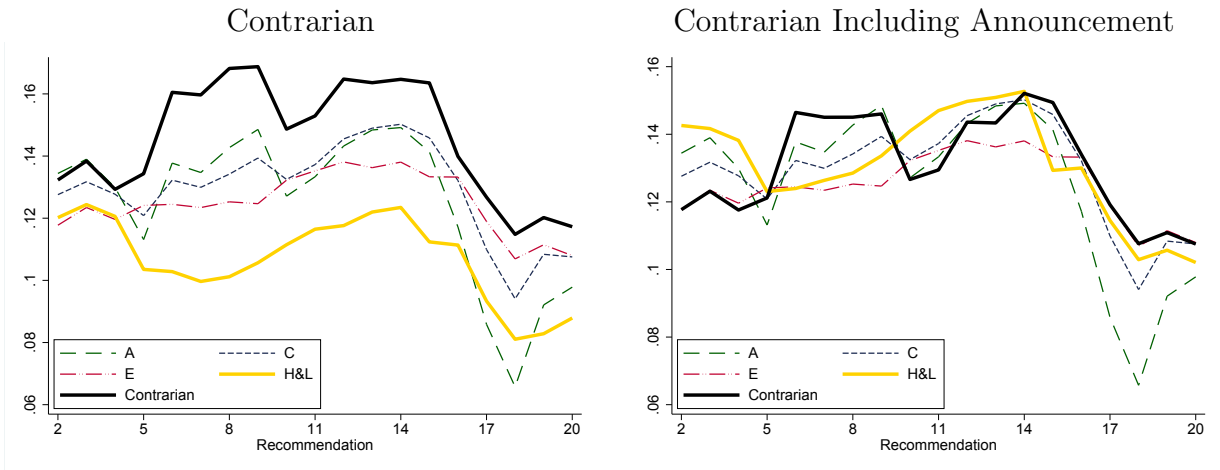


What harms pension investors is not that they believe the recommendations have value, but rather that there is a one-day delay in the pricing of shifted funds. Once H&L

attracts followers, the Chilean stock market rises by 1/2% the day after a recommendation to shift to risky portfolio A, and it falls by 1/2% after a recommendation to switch away (Cuevas and Bernhardt (2020)). The conventions on how transferred funds are valued mean that followers cannot switch in time to benefit—they buy high and sell low, reducing their cumulative returns by 20-25%. What harms followers is that the *market* believes the recommendations have value, and it moves faster.[6] To show the impact, the right panel of Figure 5 compares returns based on closing prices on the day that H&L made its recommendation—returns that H&L highlights, and returns that an investor would obtain absent the delay in the pricing of shifted funds. For nine of the first 14 recommendations, this return exceeds that from holding *any* portfolio, reversing the true pattern.

To underscore that what hurts investors is the market response, we calculate returns for an investment strategy that reverses H&L's advice by shifting into the portfolio that H&L recommends exiting: starting with recommendation k, after each recommendation $t \geq k$ we instead follow recommendation $t-1$, for $k = 2, ..., 20$. This strategy *gains* from the market response. Figure 6 shows that this contrarian strategy beats all buy and hold strategies for essentially all starting points, but that it ceases to outperform were shifted funds valued using closing prices on the day of the recommendation.

Figure 6: Annualized nominal return (vertical axis) for the contrarian strategy and pension portfolios starting with recommendation 2 to 20, until September 30, 2016. Contrarian H&L shows return for someone who shifts funds toward the portfolio that H&L recommends exiting. Contrarian Including Announcement details the return were funds transferred at the moment a recommendation is made, before the market responds.



Figures 5 and 6 compare the hypothetical returns to investors who begin following H&L's recommendations at specific points in time and never stop. In practice, many

[6]While stock prices adjust, domestic stock trading volume is abnormally *low* after recommendations: individuals and institutions do not follow recommendations by increasing trade of underlying securities.

followers start at other times, and some later cease following, so their return experiences will differ. This observation leads us to provide individual-level evidence. We use H&L's payment records to identify the period over which each follower held a subscrption, and compute each follower's actual return over that period. We compare that realized return with those from different buy-and-hold strategies over the same time period. Some investors cannot select portfolio A (or B) due to their age or gender, so we divide followers according to the riskiest portfolio that they can hold.[7]

Table 2: Percentage of followers beating a *Buy & Hold* strategy for feasible portfolios. Followers are assumed to act immediately on recommendations while a subscription is active. For example, Port. A plots the distribution of followers' returns minus the return of portfolio A in the period while the subscription was active.

Risk type	A					B				C		
Benchmark	A	B	C	D	E	B	C	D	E	C	D	E
	0.27	0.21	0.12	0.11	0.08	0.24	0.11	0.08	0.06	0.25	0.23	0.05

Distribution of net holding returns

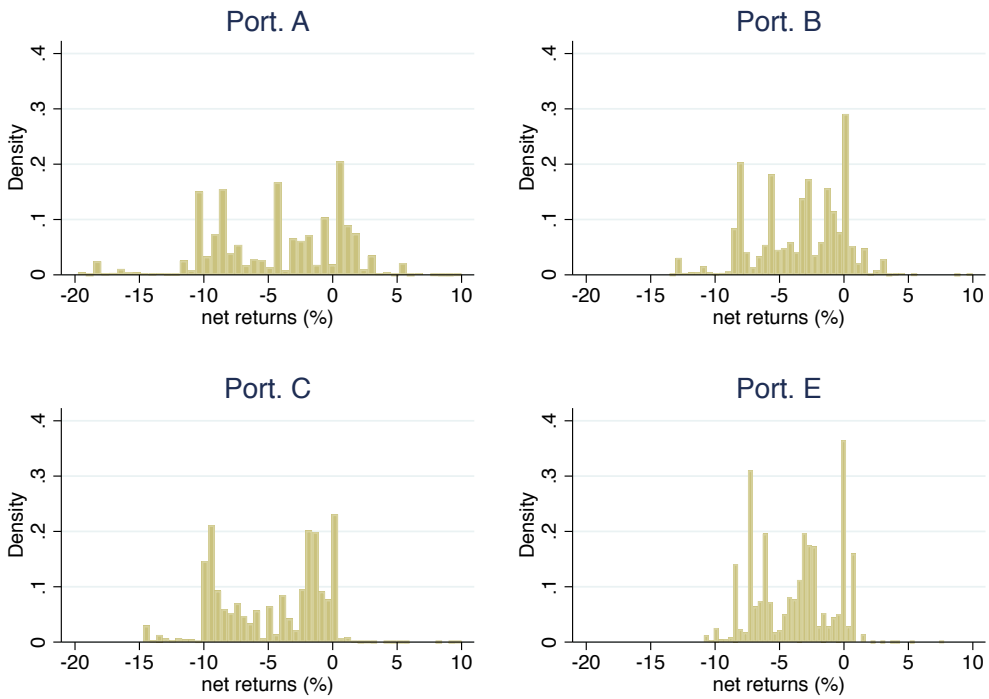


Table 2 presents the distribution of net holding period returns from following H&L vs. holding an alternative portfolio. It reveals that very few followers timed subscription so as to earn a higher return from following H&L. The vast bulk earn lower returns than they

[7]We drop observations if age or gender is missing—these observations account for about 22% of the 111,351 observations in H&L's administrative records. Results are robust to assuming that these observations are unconstrained (risk type A).

would have obtained from holding *any* alternative (age and gender) feasible portfolio presuming that followers request that investments be shifted as soon as a recommendation is received. Over 70% obtained lower returns than they would have received from investing in the riskiest feasible portfolio, and over 90% would have done better to hold the safe portfolio E. Moreover, the distribution of net returns shows that many followers earned net returns of -5% or worse, while the handful who outperformed the pension portfolios, barely did so. The associated mean annualized losses from following H&L range from -1.4% (vis à vis portfolio A) to -1.9% (vis à vis portfolio E), which translate into high mean annual dollar losses that range from -$406 to -$551. In sum, followers are hurt.

3 Survey Analysis: Who follows and why?

Followers do badly, but the probability a follower renews exceeds 0.77. This leads us to ask: Why do followers *keep* acting on H&L's recommendations? Is it a lack of financial knowledge or competence, or do followers not know how poorly recommendations have done?

To get at this we surveyed current and former paid followers of H&L during October and November 2016 by email, obtaining 9,373 responses. Our sample also includes responses from 105 current and former followers obtained from a Facebook survey displayed to stratified segments of adults in Chile according to age and gender. About 93% of the respondents were current followers of H&L (see Table 15 in appendix A), and our analysis primarily focuses on this group. We contrast these respondents with those from the broad national Social Protection Survey (EPS) from 2015 who said they were members of the AFP system. Most AFP members know very little about the retirement system: 77% said that they did *not* even know which portfolios they held (labeled AFP DNK). The 23% of AFP members who said they know their portfolios are labeled AFP.

Table 3 reveals striking demographic differences. For example, almost 75% of H&L followers have university degrees vs. 35% for AFP members who know their portfolios, and only 14% for those who do not. Followers also have incomes that are *several* multiples of the other two groups, and are more than twice as likely to have other savings.

Greater savings and income, and higher education suggest that followers are likely to be more financially knowledgeable and financially competent. To get at this, our survey included two questions pertaining to financial competence. The questions belong to a group of "financial competence" questions designed by the United States Health and Retirement Study (HRS) to identify knowledge of key financial concepts (Behrman et al.

Table 3: Demographics from our survey and the 2015 EPS. Table entries present percentage of observations in that category.

			Gender*		
	Male			Female	
H&L	79.3			20.7	
AFP	61.4			38.6	
AFP DNK	51.8			48.2	
			Hold other savings*		
	Yes			No	
H&L	69.4			30.6	
AFP	32.4			67.6	
AFP DNK	19			81	
			Age**		
	18-34	35-54		55-64	65+
H&L	25.6	57.2		15	2.3
AFP	29.2	58.1		10.5	2.3
AFP DNK	35.9	43.9		12	8.1
			Income (USD)**		
	500	500-1,000		1,000-2,000	2,001+
H&L	2.3	10.4		33.5	53.8
AFP	31.8	32.2		27.6	8.5
AFP DNK	65.9	25.5		7.3	1.3
			Education**		
	Primary	Secondary	Tech. Degree	Uni. Degree	Postgraduate
H&L	0	4	21.7	56.5	17.8
AFP	3.7	40.1	20.9	30.1	5.2
AFP DNK	20.2	53.1	13.1	12.6	1

Statistics for AFP and AFP DNK are computed using sample weights.
Sample sizes: H&L: 8,703 obs; EPS 2015: 11,406.
* The null hypothesis of equal means is rejected at the 1% significance level.
** The null hypothesis that the samples come from the same distribution is rejected at the 1% significance level using the Kolmogorov-Smirnov test.

(2012)). These questions were asked in the 2009 and 2012 EPS, but not in 2015. One question is a TRUE/FALSE question about risk diversification. The other question asked respondents to compute a two-period compound interest problem:

> "Let's say you have $200 in a savings account. The account pays 10% interest per year. How much do you have after two years?"

We coded answers as correct or incorrect. Table 4 reveals that 85% of followers answered the diversification question correctly, but respondents in the general population did no better than would be expected by chance. The compound interest question is even more telling: 64% of followers answer this complex question correctly versus only 3-5% of EPS respondents. In sum, followers are *very* financially competent, but the typical investor is not. Table 17 in the appendix further reveals that among followers, financial competence, as measured by the probability of answering the financial competence questions correctly

(especially the compound interest question) is strongly positively associated with measures of general competence and sophistication such as education, or holding other savings.

Table 4: Percentage of correct answers to questions related to financial sophistication.

	Risk diversification	Compound interest
H&L followers	85%	64%
AFP	55%	5%
AFP DNK	48%	3%
	P-value for equal means	
H&L – AFP	0.000	0.000
H&L – AFP DNK	0.000	0.000
AFP – AFP DNK	0.007	0.057

Statistics for AFP and AFP DNK are computed using sample weights.
Sample sizes: H&L: 8,703 obs; EPS 2012: 10,209 obs.

Our sample is very large, but not comprehensive. One might therefore worry that the competence exhibited by respondents reflects selection in terms of who responds. That is, competent followers might be more motivated to answer our survey, biasing results.

To rule selection out as an explanation for these results, we exploit the fact that the same individual identifier number is used in the EPS surveys and the administrative data on daily portfolio changes. We use this to identify followers in the broad national 2015 EPS survey where selection concerns are absent. For the period between March 3, 2014 and September 30, 2016, for each investor who made a voluntary change in her mandatory savings account within an AFP, we know the initial and final portfolio for each change, and the amount shifted. We use this information to identify EPS respondents who were followers or who later became followers. We say a portfolio shift is due to H&L if it matches the direction recommended by H&L and the money is moved during days $t+3$ to $t+10$ after a post-close recommendation on day $t-1$.[8] An investor who made at least two such shifts between March 3, 2014 and September 30, 2016 is considered to be a (paid or unpaid) follower. Table 5 reveals that the qualitative features of followers identified in this way mirror those in Table 3, even though only some of those identified are paid followers.

3.1 Were followers always sophisticated, or did H&L create sophisticated followers?

We have shown that current followers are truly financially knowledgeable and competent. But were they always financially sophisticated or did exposure to H&L *make* them so?

[8] Qualitative results are unaffected by altering this window slightly.

Table 5: Demographics of followers and non-followers according to the 2015 EPS matched with individual data on daily portfolio changes.

	Hold other savings*				
	Yes		No		
H&L Followers	50		50		
Non H&L Followers	21.8		78.2		
	Income (USD)**				
	500	500-1,000	1,000-2,000		2,001+
H&L Followers	19.4	13.8	30.4		36.4
Non H&L Followers	58.4	27.1	11.8		2.7
	Education**				
	Primary	Secondary	Tech. Degree	Uni. Degree	Postgraduate
H&L Followers	4.3	25.7	20.3	37	12.7
Non H&L Followers	16.6	50.3	14.8	16.4	1.9

Sample size: 11,409 obs.

* The null hypothesis of equal means is rejected at the 1% significance level .

** The null hypothesis that the samples come from the same distribution is rejected at the 1% significance level using the Kolmogorov-Smirnov test.

We next identify the causal impacts of exposure to H&L. To do this, we now use data from the 2009 EPS survey, i.e., prior to the advent of H&L, and hence exposure to H&L.

We first show that there *is* selection on competence in terms of who becomes a follower. In particular, individuals who were highly financially competent prior to exposure to H&L differentially *chose* to become followers. To illustrate this, we observe that among those who answered both questions in the 2009 survey correctly, about 9.6% requested a voluntary change in portfolio, and 46% of that group subsequently became H&L followers.[9]

To establish formally that sophisticated individuals in 2009 were more likely to become future followers of H&L we estimate a linear probability model using data from the 2009 EPS. The dependent variable is a dummy equal to one if the observation in the 2009 EPS is classified by our definition as a follower and zero otherwise. Controls include: basic demographics (gender, age, two education dummies, log of net total wealth), five indicators for the 'Big-Five personality dimensions' (Gosling et al. 2003), a measure of risk aversion,[10] and a financial sophistication index. The financial sophistication index is computed following Behrman et al. (2012). Using six questions that measure financial competency[11]

[9]Matching the 2009 EPS with the data on portfolio movements reveal that future H&L followers were more educated, more likely to hold voluntary savings, and had higher incomes relative to non-followers.

[10]Following Behrman et al. (2012), we use an indicator function that equals one if the observation chooses alternative A in the following question: Suppose that you, as the only source of household income, have to choose between the following two jobs. Which alternative would you choose in this situation? A: A fixed income job that is stable for life; B: A job where you have the same possibility of earning double or only three-quarters of your income for the rest of your life. We also interact the indicator function with a discrete variable measuring the willingness to take risks using the question: On a scale from 0 to 10, where ten means you are *not* willing to take risks, how do you describe yourself in this scale?

[11]The financial competence questions are: 1. If the chance of catching an illness is 10%, how many

and six questions that measure financial knowledge of the Chilean retirement system,[12] we employ the PRIDIT (Brockett et al. (2002)) weighted scoring mechanism to construct the index. We also control for the importance of pension savings to individuals.[13]

The first three regressions in Table 6 confirm that individuals in 2009 who were wealthier, more educated, and more financially sophisticated were also more likely to follow H&L in the future, indicating that some sophistication pre-dated exposure to H&L.

The financial sophistication index mixes questions measuring financial competence (questions 1 to 6), and pension knowledge (questions 7 to 12). Ambuehl, Bernheim and Lusardi (2014) found that educational interventions that increased financial competence led to better choices, but rhetoric-laden interventions that are commonly used for adult financial education led to worse choices. To test whether differences in competence and pension knowledge matter in our setting, we construct two indexes, one for competence and one for pension knowledge using the same methodology as before. The correlation in the two measures is 0.4. The second and third panels in Table 6 show that differences in the measures have no significant impact on decisions to become a future follower of H&L.[14,15]

Thus, financially-sophisticated individuals select into following H&L. We now establish the *causal* impact of exposure to H&L on the financial competence and knowledge of

people out of 1,000 would get the illness? 2. If 5 people share winning lottery tickets and the total prize is 2 Million pesos, how much would each receive? 3. Assume that you have $100 in a savings account and the interest rate you earn on this money is 2% a year. If you keep this money in the account for five years, how much would you have after five years? 4. Assume that you have $200 in a savings account, and the interest rate that you earn on these savings is 10% a year. How much would you have in the account after 2 years? 5. Assume that you have $100 in a savings account, and the interest rate that you earn on these savings is 1% a year. Inflation is 2% a year. After one year, if you withdraw the money from the savings account you could buy more/less/the same? 6. T/F: Buying shares in one company is less risky than buying shares from many different companies with the same money?

[12]The financial knowledge questions are: 7. Do you know what percentage of income is (has been or would be) deducted monthly for pension system contributions? 8. Do you know the legal retirement age for women? 9. Do you know the legal retirement age for men? 10. Do you know how to calculate pensions in the AFP? 11. Do you know there is a minimum state guaranteed old age pension for people aged 65 and over? 12. Have you heard of the Voluntary Pension Savings system introduced in 2002?

[13]The two questions capturing the relevance of pension savings were: (i) Regarding your retirement, do you think you will stop working at once, or will you reduce your working hours at a given age or year? (Possible answers: 1: I will stop at once; 2: I will work until I'm not healthy anymore; 3: I will reduce my working hours; 4: I will work independently/ for myself; 5: I do not know/ I have not thought about it; 6: I'm already retired, and I stopped working; 7: I'm already retired, and I reduced my working hours) (ii) Once you stop working, how do you plan to finance your living costs? (Possible answers: 1: With a pension from my AFP; 2: With a pension from the INP; 3: With the help of my children; 4: Renting some properties; 5: With income from my business; 6: With life insurance with savings; 7: With my savings; 8: With a public welfare pension; 9: With the help of the state; 10: Another way; 11: I have not thought about it.)

[14]The null hypothesis that the coefficient associated to the financial competence index and the pension knowledge index are equal cannot be rejected at 10% significance level for the three specifications.

[15]Similar results obtain if we replace the financial sophistication index with a dummy variable that is one if the observation had an active investment behavior in the pension system. An observation is defined as active, if she voluntarily changed her initial portfolio selection (but if all changes are due to the age restrictions in the system, the observation is classified as inactive).

Table 6: Probability of following H&L in the future. Linear probability model using the 2009 EPS matched with individual data on daily portfolio changes. The dependent variable is a dummy equal to one if the observation is classified as a H&L follower, and zero otherwise. An observation is classified as a follower if she followed at least two announcements between March 2014 and September 2016.

	Fin Comp & Pen knowledge			Financial Competence		Pension knowledge	
Fin. Soph.	0.010***	0.003**	0.004**	0.009***	0.003**	0.010***	0.003*
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Sec. Ed.		0.000	0.000		0.001		0.001
		(0.002)	(0.002)		(0.001)		(0.002)
Post Sec. Ed.		0.015***	0.015***		0.016***		0.016***
		(0.003)	(0.003)		(0.003)		(0.003)
Log Wealth		0.003***	0.003***		0.004***		0.003***
		(0.001)	(0.001)		(0.001)		(0.001)
Demographics		yes	yes		yes		yes
Personality ind.		yes	yes		yes		yes
Risk aversion		yes	yes		yes		yes
Importance of pension sav.			yes		yes		yes
Obs.	11,652	7,623	7,623	11,652	7,623	11,652	7,623

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

followers. We show that exposure *increased* their financial sophistication. In addition to making portfolio recommendations, H&L engages in extensive free financial literacy outreach. Its website offers videos related to financial education and explaining aspects of the pension system, and a section 'H&L informs' posts and analyzes news about the pension system. The Facebook page on which its videos are posted has over 700,000 subscribers.

Table 7 uses the 2012 and 2015 EPS matched with individual data on daily portfolio changes to show that followers became notably more sophisticated in 2015 than they were in 2012 along multiple dimensions, especially relative to non-followers. For example, in 2012, prior to exposure to H&L, of those who became followers, only 30% exploited the tax benefits related to voluntary pension savings; but by 2015, after exposure to H&L, 49% had voluntary savings. In contrast, in 2012 10% of non-followers had voluntary savings and by 2015 this only rose to 11%. The table shows that exposure to H&L greatly increased their followers' understanding of the pension system, as indicated by a sharp rise between 2012 and 2015 in the fraction knowing how many portfolios there were, and the fraction that knew whether or not their savings had increased.

To establish the causal impact of exposure to H&L formally, we use panel data from

Table 7: Evidence on learning for followers and non-followers according to the 2012 and 2015 EPS matched with individual data on daily portfolio changes. An observation is classified as a H&L follower if she followed at least two announcements between March 2014 and September 2016.

Does the state grant benefits for having voluntary savings?[1]		
	2012	2015
H&L Followers	32	72
Non H&L Followers	7	13
Do you have voluntary savings?[2]		
	2012	2015
H&L Followers	30	49
Non H&L Followers	10	11
In the last 12 months, do you know if your savings have gone up or down?[2]		
	2012	2015
H&L Followers	52	93
Non H&L Followers	27	50
How many portfolios exist?[1]		
	2012	2015
H&L Followers	49	74
Non H&L Followers	18	22

Sample sizes: EPS 2015: 11,409; EPS 2012: 10,211.

[1] percentage of correct answers

[2] percentage of observations answering "yes"

the 2009, 2012 and 2015 EPS to estimate the regression

$$y_{it} = \alpha + \beta\,(\text{Treat}_i \times \text{Post}_t) + \gamma X_{it} + \delta_i + \delta_t + \epsilon_{it},$$

where Treat_i is a dummy variable equal to one if observation i is identified as a follower and zero otherwise, Post_t is a dummy variable equal to one if the year is equal to 2015, and zero otherwise, and X_{it} is the highest education level of other family members living in the same home as i. The dependent variable is an index measuring financial sophistication, or a dummy variable equal to one if i has voluntary savings. The financial sophistication index is constructed using the same methodology as before (PRIDIT score). However, due to changes in the 2015 EPS, the set of questions are different.[16] This index is similar to the pension knowledge index used in Table 6.[17]

Table 8 reveals that exposure to H&L increased the financial sophistication index for followers, in particular their understanding of the pension system, by roughly half a stan-

[16]The questions are: 1. Do you know what percentage of your income goes monthly into your pension account? 2. Do you know who pays the fee that your AFP charges for managing your pension account? 3. Do you know, or have your heard about, the multiple portfolios? 4. Do you know how many types of portfolios exist? 5. Do you know in how many portfolios you can invest your savings? 6. Do you know if the state offers benefits if you have voluntary savings? 7. Do you know the different type of pensions you can get after retirement? 8. Do you know the conditions for opting to an early retirement?

[17]We obtain similar results to those in Table 6 if we use this alternative index as a measure of financial sophistication before exposure to H&L, i.e., in 2009.

Table 8: Evidence on learning by followers. Panel data regression using the 2009, 2012 and 2015 EPS matched with individual data on daily portfolio changes. The dependent variables are: An index measuring financial sophistication constructed using the PRIDIT score methodology, and a dummy variable equal to one if the observation has voluntary savings. Treat_i is a dummy variable equal to one if observation i is identified as a follower, and Post_t is a dummy variable equal to one if the year is equal to 2015.

	Financial Sophistication			Voluntary Savings		
$\text{Treat}_i \times \text{Post}_t$	0.872***	0.287***	0.304***	0.408***	0.210**	0.206**
	(0.109)	(0.106)	(0.107)	(0.096)	(0.105)	(0.105)
Individual fixed effect		yes	yes		yes	yes
Year fixed effect		yes	yes		yes	yes
Family member education			yes			yes
Obs.	12,310	12,310	11,762	17,874	17,874	16,750

Standard errors, clustered at the individual level, in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

dard deviation. Exposure also increased their likelihood of having voluntary savings by over 20%. To test the common trend hypothesis we follow Autor (2003), and add to all regressions in Table 8 the interaction of the Treat dummy with an indicator function for the year 2009, i.e., we use the year 2012 as the baseline year. This interaction is statistically insignificant for all regressions.

To reinforce that exposure to H&L drives our findings rather than some selection on unobservables, we next exploit the fact that we can distinguish individuals who started following before the 2015 EPS survey (early followers) from those who started following after the 2015 EPS survey (late followers). The former had been exposed to H&L at the time they were surveyed, but the latter were not. Table 9 displays results for the same specification as in Table 8, save that there are separate coefficients on $\text{Treat}_i \times \text{Post}_t$ for early and late followers. It shows that all of the effect found in Table 8 is driven by early followers, indicating that the increased sophistication found is *caused* by exposure to H&L and not by other unobservables. Qualitatively identical estimates to Tables 8 and 9 also obtain using a repeated cross-section analysis for the entire sample.[18] This analysis makes clear that H&L's financial literacy services had tangible value for many followers.

[18]The repeated cross-section regression includes as time-invariant controls the answers to three questions asked the first time someone enters the EPS sample: (i) When you joined the system, or when the five portfolios were introduced in 2002, did you chose where to invest your savings? (ii) For those answering yes: What was the main reason for this choice? (iii) Which of the five portfolios is the riskiest?

Table 9: Evidence of learning by followers. Panel data regression using the 2009, 2012 and 2015 EPS matched with individual data on daily portfolio changes. The dependent variables are: An index measuring financial sophistication constructed using the PRIDIT score methodology, and a dummy variable equal to one if the observation has voluntary savings. Treat_i is a dummy variable equal to one if observation i is identified as a follower, Early_i is a dummy variable equal to one if observation i started following before the 2015 EPS survey round, Late_i is a dummy variable equal to one if observation i started following after the 2015 EPS survey round and Post_t is a dummy variable equal to one if the year is equal to 2015.

	Financial Sophistication			Voluntary Savings		
$\text{Treat}_i \times \text{Post}_t \times \text{Early}_i$	0.991***	0.355***	0.377***	0.441***	0.228*	0.224*
	(0.107)	(0.119)	(0.119)	(0.108)	(0.127)	(0.127)
$\text{Treat}_i \times \text{Post}_t \times \text{Late}_i$	0.449*	0.040	0.041	0.291	0.143	0.144
	(0.231)	(0.200)	(0.201)	(0.191)	(0.146)	(0.147)
Individual fixed effect		yes	yes		yes	yes
Year fixed effect		yes	yes		yes	yes
Family member education			yes			yes
Obs.	12,310	12,310	11,762	17,874	17,874	16,750

Standard errors, clustered at the individual level, in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

3.2 Does performance affect decisions to follow?

We have established that followers are truly financially competent and knowledgeable. We next address whether the performance of recommendations materially affects decisions to follow. Our survey asked respondents if they were currently following an adviser and if they had previously followed an adviser. We identify 703 investors who had followed H&L in the past, but had ceased following by the time of the survey. Table 10 shows that those who stop are less likely than non-stoppers (8,703 investors) to hold other savings, and less likely to answer the financial sophistication questions correctly. That is, stoppers are *less* sophisticated than those who keep following.[19]

This begs the question: does H&L's performance affect the decisions of investors to continue following? To address this formally, we use daily account level data to see how the relative returns on H&L's strategy affect the probability of following the next announcement *conditional* on following the previous one. We define a follower to be an investor who followed at least two announcements during our sample. We say a portfolio shift is due to H&L if it matches the direction recommended by H&L and the money is moved

[19]There are no meaningful differences in education, income or gender between the two groups.

Table 10: Measures of financial sophistication for non-stoppers and stoppers. Non-stoppers were 'currently following' H&L at the time of our survey. Stoppers had followed in the past but had ceased following by the time of the survey. For both groups the data is after "exposure" to H&L.

	Risk diversification	Compound interest	Voluntary savings
Non-stopper	84.9%	63.5%	69.4%
Stopper	81.6%	60.1%	65.2%
	P-value for equal means (H_a: NS>S)		
	0.024	0.053	0.021

during days $t+3$ to $t+10$.[20] In Table 11 we estimate variants of the following regression:

$$y_{it} = \alpha + \beta r_{t-1} + \mu_i + \epsilon_{it},$$

where $y_{it} = 1$ if investor i followed both recommendations $t-1$ and t, and $y_{it} = 0$ if i followed recommendation $t-1$, but not t,[21] and r_{t-1} is the return on H&L strategy between announcement $t-1$ and t *net* of the return on the best portfolio out of A, B, C, D and E, over that period. By construction $r_{t-1} \leq 0$, and its sample mean is -1.15. The regression includes individual fixed effects to control for the possibility that some investors may be slower to react and thus miss a recommendation according to our definition, or for the possibility that some investors may be less attentive, and thus miss some recommendations for reasons other than H&L's performance.[22] We also augment the regression to include the return of H&L's next-to-last recommendation, r_{t-2}. When using r_{t-2} as a control we modify the dependent variable: $y_{it} = 1$ if investor i followed both recommendations $t-2$ and t, and $y_{it} = 0$ if i followed recommendation $t-2$, but not t.

The second regressions in Table 11 show that a one percentage point rise in the net return on H&L's strategy raises the probability of following the next announcement, but only by a tiny 0.2 percentage point: H&L's relative performance does not materially affect decisions of whether or not to continue to follow H&L. Similar results obtain using the return on H&L's strategy net of that on the worst-performing portfolio.

To uncover the impact of investor sophistication on decisions to cease following, we exploit the fact that financial sophistication is strongly positively correlated with the level of an investor's savings. To measure an investor's savings, we use the maximum amount that an investor shifted following a recommendation (S_i). We then interact r_{t-1} with

[20] Results are unaffected by small variations in the investment window.

[21] Thus, if i did not follow recommendation $t-1$, then the observation is omitted.

[22] Investors who act more quickly are more likely to be wealthier, hold other savings and correctly answer the financial sophistication questions. Results are available upon request.

Table 11: Linear probability model for the probability of following a recommendation. r_{t-s} is H&L's return net of the best portfolio during the window of recommendation $t-s$ for $s = 1, 2$. S_i is the maximum amount that an investor moved following a recommendation. LA_{t-1} is a dummy variable equal to one if the return on recommendation $t-1$ was higher than that on portfolio A *and* the return on A was negative. $r^{H\&L}$ and r^{A} are the returns of H&L's strategy and portfolio A respectively.

	H&L's return (net of the top performing portfolio)					Avoided losses	
r_{t-1}	0.022***	0.002***	0.0096***	0.013***	0.005***		
	(0.000)	(0.000)	(0.0009)	(0.000)	(0.000)		
$r_{t-1} \times S_i$			-0.0002***				
			(0.0000)				
r_{t-2}				0.024***	0.005***		
				(0.000)	(0.000)		
LA_{t-1}						0.025***	
						(0.001)	
$\text{LA}_{t-1} \times \left\lvert r^{\text{H\&L}}_{t-1} - r^{\text{A}}_{t-1} \right\rvert$							0.016***
							(0.000)
Constant	0.794***	0.771***	0.7707***	0.739***	0.706***	0.759***	0.761***
	(0.001)	(0.000)	(0.0005)	(0.001)	(0.001)	(0.000)	(0.000)
Individual fixed effect		yes	yes		yes	yes	yes
Obs.	991,526	991,526	991,526	934,413	934,413	991,526	991,526

Standard errors, clustered at the individual level, in parentheses
*** p<0.01, ** p<0.05, * p<0.1

S_i to see if there are heterogeneous effects of H&L's performance on decisions to follow by more and less sophisticated investors. We find that recent performance has an even *smaller* effect on the decision to follow of (more sophisticated) investors with greater savings. Regressions four and five show the results when adding H&L's relative return from the next-to-last recommendation. The coefficient of r_{t-2} is also positive and of a similar magnitude as that on the return of the last recommendation.

Qualitatively similar findings obtain when we use a measure of avoided losses from following H&L's recommendations rather than the relative return of H&L's recommendation as an explanatory variable. One of H&L's mottos is to help followers minimize losses, and Figure 7 shows that loss minimization is a key reason for why individuals follow H&L. To construct a measure of avoided losses, we define a dummy LA_{t-1} that equals one if H&L's return for recommendation $t-1$ exceeded that on portfolio A *and* the return on A was negative. We also interact this dummy with the absolute value of the difference in these two returns. The last two regressions in Table 11 show how the probability of following a recommendation (conditional on following the previous one) varies with avoided losses. If recommendation $t-1$ avoided (some of) the loss in portfolio A, then a follower is more

likely to follow recommendation t, and the greater the avoided loss, the more likely a follower is to keep following. The point estimate exceeds those found using H&L's relative return as explanatory variable, but is still small.

3.3 Do followers know about H&L's poor performance?

We have shown that H&L's past performance has only a small impact on decisions to follow. This may suggest that followers, although sophisticated, do not know that H&L's investment strategy does badly. In particular, the reason underlying why the strategy underperforms is subtle: it would not under-perform if investments were valued at the moment investors received a recommendation, rather than the next day. Moreover, H&L can highlight and does highlight the returns that would obtain were investors to shift immediately.

To test their awareness, we had survey respondents rank returns on portfolios A, C, E and their own savings over the previous twelve months. This is a demanding task, akin to asking someone to order the 12-month returns on the NASDAQ, S&P 500 and Russell 2000 indices. The survey was "open" from October 1 to November 30, 2016. Figure 8 in the appendix plots the twelve month returns as a function of the survey date. It shows that although the ranks of portfolios A, C and E did not vary with the survey date, the rank of H&L's strategy vis à vis portfolio C and E did, underscoring the challenge involved. As a result, we only use investors who responded before October 30, 2016 (98% of observations), as the ordering of portfolios E, C and H&L's strategy did not vary for this subsample. Of the respondents, 6,199 were current followers who had followed H&L for over a year. We divided these respondents into groups according to how many portfolios they ranked. The full-ranking group ranked all three portfolios and their own savings. Those giving partial rankings were divided into five groups, according to the portfolios they ranked. We dropped the 38% of respondents who did not rank enough options. We assume that respondents followed all recommendations, i.e., their returns equal those on H&L's strategy.

Table 12 shows that about 60% of each group correctly ordered the portfolios that they ranked. Among those that ranked (at least) portfolios C, E and their own portfolio, most correctly believed that portfolio E had higher returns than their own savings, but most incorrectly thought that their savings outperformed portfolio C (likely because the return on H&L's strategy approached that on portfolio C late in the sample period, crossing afterwards). Thus, investors are well informed about the relative rankings of portfolios, but slightly overestimate H&L's relative return.

Table 12: Portfolio ranking and H&L's relative performance.

Group	Sample size Num. respondents	Portfolio return order	H&L<C<E	H&L<C	H&L<E
		Percent correct answers			
Full ranking	2,495	57%	20%	37%	49%
Group 1	108	62%	36%	57%	64%
Group 2	537	62%			
Group 3	349	69%	39%	26%	61%
Group 4	140		48%	41%	53%
Group 5	143	66%			

Respondents are classified into six groups: (i) Full ranking, those who rank all portfolios including own savings; (ii) Group 1 ranks portfolios C, E and own savings; (iii) Group 2 rankings A, C and E, but not own savings; (iv) Group 3 ranks portfolios A, E and own savings, or A, C and own savings; (v) Group 4 ranks E and own savings, or C and own savings; (vi) Group 5 only ranks two portfolios and not own savings.

We also asked respondents about the realized 12-month *real* return on their savings. Table 13 presents the percentage of answers in each available category for investors who had followed H&L for over a year, and who answered the survey before October 19, 2016. About one third correctly place H&L's return in the $(2\%, 4\%]$ range, and about a quarter slightly under-estimate the return, placing it in the [0%, 2%] range that it entered on October 19. In fact, less than 20% followers who believe they know H&L's returns over-estimate them—more pessimistically *under-estimate* H&L's returns than over-estimate them. The qualitative results in Tables 12 and 13 hold if we discard respondents who took a long time to finish the survey, and only use respondents who took 9 minutes or less (median duration). That is, respondents no not appear well-informed only because they 'learned' the rankings and returns when they 'sat down' to answer the survey.

Table 13: Real returns on own savings over past 12 months. Actual return on H&L's strategy fluctuated between 2% and 4%.

Group	Obs.	$< -2\%$	$[-2\%, 0\%)$	$[0\%, 2\%]$	**(2%,4%]**	$(4\%, 6\%]$	$> 6\%$	Don't know
Some ranking	3,764	1%	1%	29%	**36%**	14%	4%	15%
No ranking	2,401	1%	1%	24%	**27%**	10%	3%	34%
All obs.	5,778	1%	1%	27%	**33%**	12%	3%	22%

Respondents are classified into: (i) Some ranking, i.e., those who ranked at least 2 portfolios; (ii) No ranking, those who did not rank at least 2 portfolios.

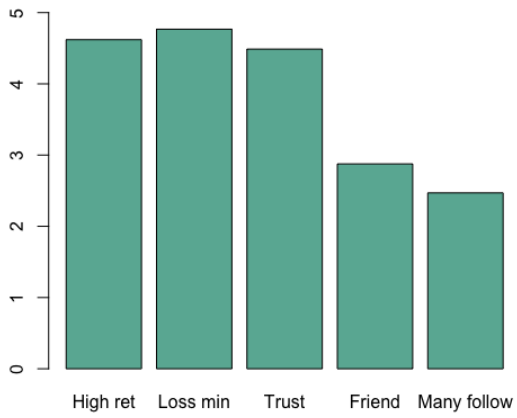
Thus, a non-trivial majority of followers pay close attention to the performances of different portfolios, and estimates by most investors of their actual returns are close to the mark. That is, although one might have posited the complex pricing rules used by AFPs to value portfolio transfers make it hard for followers to discern that the announcement

effect hurts them rather than helps them, most followers are surprisingly well informed.[23]

In sum, (1) followers are highly financially sophisticated—far more so than the average investor—and they have a lot at stake; (2) almost all followers were harmed by following H&L; (3) most followers are aware of the bad performance; but (4) they keep following.

The question is: why? Our survey asked respondents to rank five reasons for why they follow H&L.[24] Figure 7 presents a conundrum: current H&L followers indicate that the most important reasons for doing so are: higher returns, loss minimization and trust...

Figure 7: Why current followers follow H&L. For each reason, respondents gave an importance level from 1 to 5. The figure shows the average importance attached to each reason.



To gain insight into how the reasons for following are related to follower characteristics we create a variable that is 5 if the reason had the highest importance rating, 4 if it had the second highest importance ranking, and so on, where in case of a tie, the reason is assigned the average ranking (so if two reasons receive the highest ranking, they are both assigned 4.5). We then regress these measures on follower characteristics. Table 14 shows that the importance followers give to loss minimization is positively and significantly related to all measures of sophistication (higher income or education, financial competence, holding other savings); and the importance given to high returns and trust are also positively

[23]To see whether those who followed H&L's recommendations more closely are more or less likely to be aware of H&L's poor performance, we aggregate the data in Table 12 for the 'Portfolio return order' and 'H&L<C<E' across all 6 groups (Full ranking to Group 5) and create two dummies equal to one if the ranking is correct and zero otherwise. We split observations according to whether they act on a recommendation within a day, and those who take more than a day or do not act on each recommendation. A test for the equality of means across these two groups yields no statistically significant differences. A similar test creating a dummy equal to one if the observation correctly estimated the return over the past 12 months and zero otherwise also reveals no statistically significant differences between the groups.

[24]Potential reasons are: higher returns, loss minimization, trust H&L more than AFP, friend/relative recommendation, H&L has many followers. Only a few respondents selected an "other" option, and its average importance level is low.

Table 14: What explains reasons for following H&L? Income, Education, and Age are categorical variables. Other Savings is a dummy variable equal to one if the observations has other savings besides her mandatory savings. Q1 and Q2 are dummy variables equal to one if the observations gave a correct answer for questions one and two pertaining financial sophistication. Potential answers to the question Why do you follow? are assigned rankings from 1 to 5, where a ranking equal to 5 means that that particular reason was assigned the highest importance level among all reasons. In case of a tie between two or more reasons, the average ranking is assigned.

	High returns	Loss min.	Trust	Friend	Many Follow
1.Income	-0.013	0.082**	0.054	-0.088	-0.112*
	(0.046)	(0.041)	(0.051)	(0.071)	(0.059)
2.Income	0.001	0.077**	-0.011	-0.063	0.001
	(0.037)	(0.033)	(0.040)	(0.058)	(0.049)
3.Income	0.016	0.068**	0.026	-0.111**	-0.028
	(0.035)	(0.031)	(0.038)	(0.056)	(0.047)
4.Income	0.004	0.098***	0.030	-0.055	-0.124***
	(0.036)	(0.033)	(0.039)	(0.057)	(0.046)
5.Income	0.023	0.093***	-0.003	-0.163***	0.021
	(0.037)	(0.034)	(0.041)	(0.058)	(0.049)
6.Income	0.009	0.081**	0.010	-0.136**	-0.035
	(0.039)	(0.036)	(0.044)	(0.061)	(0.049)
7.Income	-0.015	0.108***	-0.017	-0.128**	0.002
	(0.044)	(0.039)	(0.048)	(0.065)	(0.053)
8.Income	0.023	0.104***	-0.060	-0.123*	-0.010
	(0.043)	(0.040)	(0.050)	(0.067)	(0.055)
9.Income	0.044	0.084**	-0.004	-0.106*	-0.086*
	(0.040)	(0.037)	(0.045)	(0.062)	(0.048)
10.Income	0.079	0.135***	-0.104**	-0.109	-0.034
	(0.049)	(0.042)	(0.053)	(0.070)	(0.056)
11.Income	0.035	0.166***	-0.140***	-0.038	-0.093*
	(0.043)	(0.037)	(0.048)	(0.062)	(0.049)
1.Education	0.034	0.084**	0.041	-0.022	-0.179***
	(0.041)	(0.037)	(0.048)	(0.069)	(0.063)
2.Education	0.054	0.163***	0.103**	-0.059	-0.319***
	(0.041)	(0.037)	(0.048)	(0.068)	(0.062)
3.Education	0.042	0.163***	0.069	-0.043	-0.307***
	(0.045)	(0.040)	(0.052)	(0.072)	(0.065)
1.Age	0.149*	-0.115	-0.198**	0.201*	0.044
	(0.090)	(0.083)	(0.090)	(0.117)	(0.112)
2.Age	0.155*	-0.086	-0.167*	0.174	0.017
	(0.090)	(0.082)	(0.090)	(0.116)	(0.112)
3.Age	0.193**	-0.127	-0.210**	0.224*	0.072
	(0.090)	(0.083)	(0.090)	(0.117)	(0.112)
4.Age	0.176*	-0.173**	-0.193**	0.255**	0.163
	(0.091)	(0.084)	(0.091)	(0.118)	(0.114)
5.Age	0.191*	-0.227**	-0.219**	0.430***	0.245*
	(0.103)	(0.099)	(0.108)	(0.147)	(0.135)
Other Savings	0.026	0.040**	-0.009	0.001	-0.040*
	(0.017)	(0.016)	(0.019)	(0.026)	(0.021)
Q1	0.102***	0.092***	0.037	-0.125***	-0.102***
	(0.023)	(0.020)	(0.025)	(0.034)	(0.029)
Q2	0.071***	0.156***	0.042**	-0.179***	-0.119***
	(0.017)	(0.015)	(0.019)	(0.026)	(0.021)
Constant	3.363***	3.621***	3.684***	2.259***	2.137***
	(0.098)	(0.095)	(0.102)	(0.134)	(0.126)
Observations	7,070	7,091	7,056	6,793	6,792

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

and significantly related to financial competence, but insignificantly related to most other sophistication measures. In contrast, rating friends recommendations or many followers

more highly is associated with lower education and reduced financial knowledge.

4 Policy and practical implications

Our analysis has implications for the design of pension systems. An extensive literature documents investors' behavior in such systems and provides "optimal" designs that seek to account for the behavioral biases found. The literature argues that these systems should be designed to minimize the chances that people make bad choices (Carlin and Davis (2016)).

For example, the literature on choice overload advocates for limited choice sets, finding that a person's willingness to enroll in a 401(k) plan is reduced by the size of the choice set (Iyengar et al. (2004), Iyengar and Kamenica (2010)). Benartzi and Thaler (2001) discuss a "$1/n$ heuristic," where someone divides her contributions evenly among the n options offered in a retirement savings plan. They find that, as a result, the array of funds offered can influence asset allocations, and that when the share of funds that are stock funds rises, so does the allocation to equities, leading them to suggest that choice sets be restricted.

Reflecting concerns such as these, the Chilean pension system provides a menu with only five portfolios. The goal of this design is to let unsophisticated investors align investments with risk attitudes, while avoiding savings shortfalls due to bad choices. Our analysis highlights a risk: with few options, common information arrival—here taking the form of portfolio recommendations—can result in massive coordinated portfolio reallocations and market responses that may hurt investors, even sophisticated investors.

Carlin and Davies (2016) show how the right menu of portfolios and the optimal default option in a defined contribution system depends on the financial sophistication of participants, and their behavioral biases. If more knowledgeable people procrastinate and herd into default, or more uninformed people make active decisions, the optimal risk cap should be lower. Carlin et al. (2013) argue that libertarian paternalism can affect welfare via the choice of default option. They note that information acquisition incentives, and thus welfare, depend on the default option: "... default options provide information to market participants, [reducing] individuals' willingness to educate themselves about the choices available to them. Ultimately, this changes the financial decisions that individuals make." We find that sophisticated participants switch to following H&L rather than invest on their own. Thus, H&L differentially takes sophisticated participants out of the market, possibly reducing their information acquisition and imposing another cost on the economy.

Many researchers posit that financial sophistication is a remedy for bad financial

decision-making by individuals. The idea is that the poor decision-making found in the data reflects a lack of financial sophistication and knowledge among participants (Mitchell and Zeldes (1996), Bernheim (1996)). In a stochastic life cycle model with endogenous financial knowledge accumulation, Lusardi et al. (2017) argue that the accumulation of financial knowledge accounts for a large share of wealth inequality. Agents who are (rationally) financially "ignorant" depend on the generosity of the retirement system. They conclude that educational efforts to enhance financial savvy early in the life cycle would benefit people in all educational groups. Indeed, Lusardi and Mitchell (2007) find that more sophisticated and financially literate individuals are more likely to plan for retirement; and that such planning increases wealth accumulation. Their 2014 survey paper highlights evidence that groups in society that are generally associated with low financial sophistication are more likely to make decisions using crude rules of thumb and make financial "mistakes." More generally, they cite many studies that find that greater financial sophistication is associated with "better" financial decision-making and retirement planning.

In stark contrast, we find that financially competent individuals are far more likely to become followers of H&L, but almost all followers obtain far lower returns on their savings: financial sophistication and competence are associated with bad financial outcomes.

The question is why? We posit that many follow H&L due to the tangible value of what they learn from H&L's financial outreach. It is not just that we uncover strong evidence that more sophisticated agents tend to follow, but we also find that H&L's outreach increases followers' sophistication. This outreach has benefits—for example, it causes followers to increase tax-advantaged voluntary pension savings contributions. This information is freely available to everyone, but it may inspire trust and lead investors to endow H&L with an undeserved expertise about how investments should be made. Consistent with this, most survey respondents cite trust in H&L as a key reason for following. Relatedly, Guiso et al. (2008) find that trust is a key driver of stock market participation decisions.

This driving force may be reinforced by overconfidence (Daniel and Hirshleifer (2015), French (2008)). If followers are overconfident in H&L's ability, they may not be discouraged by knowledge that H&L underperforms, attributing it, instead, to bad luck. Indeed, we find that past poor performance of recommendations does not materially affect decisons to follow. Daniel and Hirshleifer (2015) argue that overconfidence is supported by a cognitive process they label *self-attribution bias*, in which people credit their own abilities for past successes while blaming failures on bad luck. In our context, this cognitive process takes the form of an *expert-attribution bias*.

One can also draw parallels between decisions to opt out of the default pension investment and decisions to trade in the stock market. Just as van Rooij et al. (2011) show that investors with low financial literacy are less likely to invest in stocks, so are pension investors who stick with the default strategy. Just as active stock market traders tend to under-perform (see e.g., Barber and Odean (2000)), so do most followers. By becoming followers, agents engage in active investment management and under-perform.

Statman (2004) offers a behavioral explanation for active investing. He suggests that in addition to expected return and risk, investors care about the "expressive characteristics of their portfolios." He argues that the expressive characteristics let investors identify their values, social class, and lifestyle, and convey them to themselves and others. Thus, some investors may be willing to accept a lower expected return in exchange for "bragging rights" (French (2008); see also Dorn and Segmuller (2009) and Kumar (2009)). In our context, followers may enjoy being part of the H&L community, and informing their network about new recommendations. The fact that so many followers now choose to pay for H&L's information that they could access second hand (as most did at the outset) suggests that these forces may matter.

The bottom line is that while a lack of financial sophistication can lead to bad investment outcomes, greater financial knowledge can also lead investors to believe that their expertise is greater than it is, again resulting in bad outcomes. Unraveling how and why individuals allocate retirement savings as they do remains important to understand.

5 Conclusion

Our paper suggests that "privatized" social security plans must be designed with care. We document the effects of portfolio recommendations by the pension advisory service H&L on pension investments. H&L's initial recommendations did well, drawing media attention that attracted followers in vast numbers. Unfortunately, once this happened, stock prices responded before pension investments could be shifted. Almost every follower would have done better to stick with whatever pension position they had at the outset, no matter what it was. Remarkably, despite this, the key reasons investors give for following H&L are: high returns, minimize losses and trust.

A large literature points to the harm caused by a lack of financial sophistication of individuals for retirement savings decisions. Our survey analysis reveals that while a lack of financial sophistication may be damaging, financial literacy is not a panacea for poor

individual retirement decision-making. In fact, we find that sophisticated investors are differentially harmed: followers are wealthy, well-educated and truly financially competent. Indeed, H&L sharply increased their financial understanding. Followers are also well-informed about their poor returns. Nonetheless, over 77% renew their subscriptions.

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Appendix A Survey questions and details

1. Do you currently follow the recommendation of an adviser to manage your pension savings? Which one?

2. Do you currently follow any of the following advisers in social media?

   If Yes in 1:

3. When did you start following the recommendations of your current adviser?

4. Why do you follow the announcements of your current adviser?

5. In the last twelve months, what is the return on your savings?
6. Rank portfolios A, C, E and your own savings in terms of returns in the last twelve months
7. How much time passed since you first heard about your current adviser and when you started following the recommendations?
8. How fast do you usually act upon recommendations?
9. Did you follow the recommendations of another adviser before?

If No in 1:

10. What is the return on your savings in the last twelve months?
11. Rank portfolios A, C, E in terms of returns in the last twelve months
12. Are mandatory savings your main source of savings for retirement?
13. Did you follow the recommendations of another adviser before?

For everyone:

14. Gender
15. Education
16. Age
17. Income (monthly individual income)
18. Where do you live?
19. Generally, how is your knowledge on financial issues?
20. On a scale from 0 to 10, how risk averse are you? (0 is not willing to take any risk)
21. True or false: buying share of a single firm is less risky than buying, with the same money, shares of different companies.
22. Let's say you have 200 in a savings account. The account pays 10% interest rate per year. How much do you have after two years?
23. Do you have voluntary savings?

A.1 Sample statistics for followers and members of AFP system

Table 15: Observations by source

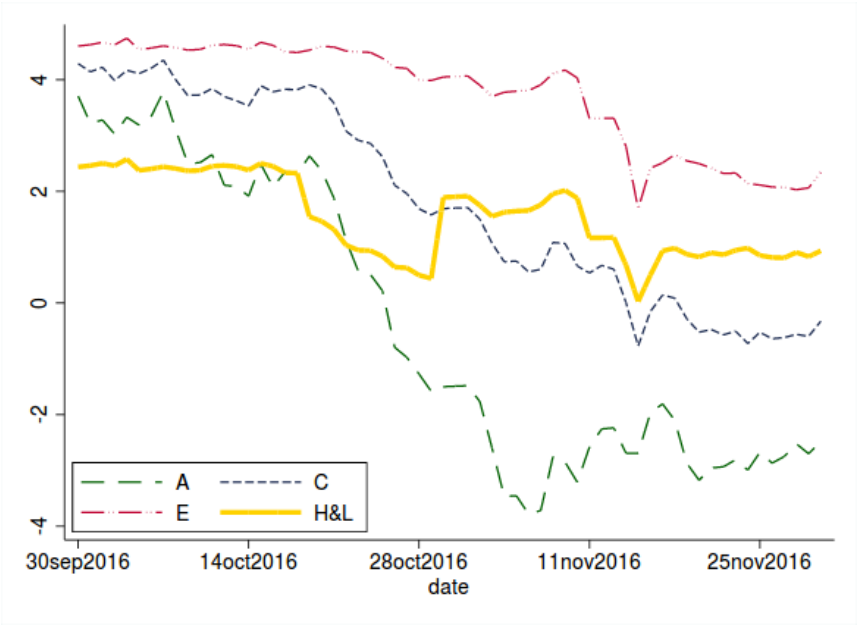
Our survey		EPS survey		
Source	Obs.	Source	Obs.	Obs.(w)
H&L email list	9,373	EPS 2015	16,906	13,560,981
		EPS 2012	15,998	12,718,525
Facebook	105	EPS 2009	14,463	12,765,015

The Obs. (w) column refers to the expanded sample using survey weights

Table 16: Sample selection

Source		Sample size	Percent of total N
Our survey	current H&L followers	8,703	86.7
EPS 2015	in AFP system	9,253,512	68.2
	Know portfolio	2,090,012	22.5
	Don't know portfolio	7,163,500	77.5
EPS 2012	in AFP system	8,431,177	66.3
	Know portfolio	2,577,376	30.5
	Don't know portfolio	5,853,801	69.5
EPS 2009	in AFP system	8,288,982	64.9
	Know portfolio	2,905,235	35.0
	Don't know portfolio	5,383,747	65.0

Figure 8: Twelve month return during survey period for each portfolio and H&L's strategy.



A.2 What explains the financial sophistication of followers?

Table 17: What explains sophistication? Income, Education, and Age are categorical variables. Other Savings is a dummy variable that is 1 if the observation has savings in addition to mandatory savings. Q1 and Q2 are dummy variables that equal one if the observation correctly answered financial sophistication questions 1 and 2. Q1&Q2 is a dummy that is 1 if Q1=Q2=1.

	Q1	Q2	Q1&Q2
1.Income	0.051*	0.016	0.028
	(0.027)	(0.030)	(0.029)
2.Income	0.048**	0.050**	0.033
	(0.021)	(0.025)	(0.024)
3.Income	0.060***	0.077***	0.085***
	(0.021)	(0.024)	(0.024)
4.Income	0.079***	0.073***	0.072***
	(0.020)	(0.025)	(0.024)
5.Income	0.065***	0.144***	0.116***
	(0.021)	(0.025)	(0.025)
6.Income	0.101***	0.175***	0.174***
	(0.021)	(0.026)	(0.026)
7.Income	0.098***	0.190***	0.175***
	(0.023)	(0.028)	(0.028)
8.Income	0.087***	0.206***	0.185***
	(0.023)	(0.028)	(0.029)
9.Income	0.110***	0.250***	0.252***
	(0.021)	(0.026)	(0.026)
10.Income	0.127***	0.314***	0.311***
	(0.022)	(0.027)	(0.029)
11.Income	0.118***	0.349***	0.341***
	(0.021)	(0.024)	(0.025)
1.Education	0.081***	0.126***	0.092***
	(0.025)	(0.025)	(0.025)
2.Education	0.141***	0.281***	0.253***
	(0.025)	(0.025)	(0.025)
3.Education	0.140***	0.269***	0.245***
	(0.026)	(0.028)	(0.027)
1.Age	-0.007	-0.028	-0.059
	(0.052)	(0.060)	(0.060)
2.Age	-0.018	-0.080	-0.110*
	(0.052)	(0.060)	(0.060)
3.Age	-0.006	-0.083	-0.104*
	(0.052)	(0.060)	(0.060)
4.Age	-0.027	-0.081	-0.111*
	(0.053)	(0.060)	(0.060)
5.Age	-0.058	-0.051	-0.103
	(0.057)	(0.066)	(0.066)
Other Savings	0.050***	0.057***	0.071***
	(0.009)	(0.012)	(0.012)
Constant	0.625***	0.274***	0.263***
	(0.056)	(0.062)	(0.062)
Obs.	8,189	8,155	8,135

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1