

The Pied Piper of Pensioners*

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Abstract

We document how pension investments by individuals in the Chilean social security system are influenced by portfolio recommendations of Happy and Loaded (H&L), a pension advice firm. Following H&L's recommendations about which of five portfolios to invest in, investors shift amounts that often exceed 20% of portfolios value and 1.3% of Chilean *annual* GDP, in a week. We uncover what drives investment recommendations, the resulting return consequences for the Chilean stock market and social security portfolios, and the characteristics of followers and their investment outcomes. Paradoxically, investors who followed H&L's advice would have earned more by sticking with their original portfolio over time, regardless of the portfolio selected. These findings provide a cautionary tale for the design of privatized social security systems.

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1 Introduction

On March 6, 2012, the Chilean government took the unprecedented step of ordering *Felices y Forrados* (Happy and Loaded, henceforth H&L) to cease providing pensioners guidance on portfolio choice for their retirement savings. The government’s action stemmed from concerns that massive swings in investment flows induced by investors following H&L’s advice were destabilizing the Chilean economy. The order was revoked on April 24, 2012. Still, the government’s worries did not cease, as indicated by an April 26, 2013 report from the Financial Stability Board [13] stating “...movements between different pension funds have increased markedly...movements of this quantity, in such a short term, affect the system as a whole by affecting the prices of some financial assets, creating stress on market infrastructures...”

Chile’s private social security system is perhaps the most widely-emulated social security design in the world. More than 20 countries have adopted variants of the Chilean design (Berstein et al. [6]), including countries in Latin America,¹ central and eastern Europe,² Africa (Nigeria), Asia (Kazakhstan, Singapore), and developed countries (Sweden, Denmark). Aspects of the Chilean design are central to a recent Blackstone proposal for a privatized social security plan in the United States.³ It is clearly important for policy makers to understand the consequences of its design for Chile, and to understand how consequences might differ in other countries, in order to gain insights into how the design could be improved.

The Chilean social security system is a fully funded, defined contribution, multi-fund, personal account system. On December 31, 2014, total savings were \$165 billion USD, or roughly 60% of the Chilean GDP in 2014. Average pension savings were \$38,600 USD, or about 54% of total net wealth (Behrman et al. [4]). Formal workers must save 10% of monthly earnings. Workers choose a Pension Fund Administrator (AFP) to manage their investments. Government regulation sharply limits asset allocations by AFPs to reduce the possibility of poor pension performance that could endanger retirement savings. Each AFP only offers five types of funds ordered from A to E by their riskiness. Fund A, which is largely invested in foreign mutual funds, ETFs and domestic stocks, is the riskiest; while fund E, which is invested mainly in government and Central Bank bonds, and bank deposits, is the safest.

¹Peru, Colombia, Argentina, Uruguay, Bolivia, Mexico, El Salvador, Costa Rica, Dominican Republic, Nicaragua and Ecuador.

²Bulgaria, Croatia, Estonia, Hungary, Latvia, Poland, Russia, and Slovakia.

³See Ghilarducci and Hamilton [16].

Our paper shows how the design of Chile’s social security system led to massive, coordinated portfolio reallocations following the recommendations of a single financial advisor, H&L. These transfers often exceeded one percent of Chile’s annual GDP, sometimes exceeding the *total monthly trading volume* in domestic stocks. We uncover what drives H&L’s recommendations, and show how they altered investment strategies of pensioners. We derive the impacts on asset prices in domestic financial markets, including portfolio and stock market returns. Using administrative and survey data, we document that followers of H&L are far wealthier than the typical pension investor, with over twice the savings. Followers are also more educated, quite financially sophisticated and informed about how their pension returns compare to alternative buy-and-hold strategies. Nonetheless, we find that *most* investors who flocked to follow H&L’s advice would have done better to stick with their original portfolio over time, *no matter which portfolio they originally held*. We show that most of this underperformance emerges because not only have pension investors come to believe that H&L’s recommendations have value, but so has the market. As a result, stock prices adjust to reflect H&L’s recommendations before pension investors can transfer their funds, with the outcome that pension investors end up buying high and selling low. These findings provide a cautionary tale for the design of privatized social security systems.

H&L, founded in July 2011, charges a small annual fee of about \$24 USD for advice.⁴ Advice takes the form of emails, issued after the close of a trading day, typically instructing clients to switch 50% or 100% of savings from portfolio A to portfolio E, or vice versa. Between July 2011 and September 2016, H&L issued instructions to switch savings from one portfolio to another on 35 occasions. Using daily flow data from October 2011 to September 2016, we first document that investors have come to *believe* that H&L’s advice is sound. H&L started with 54 paid followers, and did not have new customers until after its 4th recommendation.⁵ Remarkably, beginning with the sixth recommendation, accompanied by surges in Google trends and Google searches for H&L, each new recommendation led to net shifts of more than 25,000 investors (a mix of paid subscribers and second-hand followers) to the newly endorsed portfolio, and away from the portfolio that had previously been en-

⁴H&L’s founder claims to have developed a statistical model, based on Harry Markowitz’ 1952 model, that allows him to forecast the performance of social security portfolios.

⁵We have H&L’s administrative data through September 30, 2016. These data include the payment history of all clients plus basic demographics like gender and age. H&L has two types of clients: premium and basic. Premium followers pay an annual fee of \$24USD, while basic followers have a free three month trial period, in which they receive announcements with a three day lag. The number of premium followers reached 66,000 in August 2016, and there are many more second-hand followers.

dorsed. Strikingly, the five recommendations issued between April 2013 and January 2014 on a date $t - 1$,⁶ on average, led over 100,000 (net) investors to switch to the recommended portfolio over the first six trading days that their requests could be executed. The average funds shifted following these five recommendations exceeded 20% of portfolio E's value at the time of the new recommendation, equivalent to *more than 1.3% of the Chilean GDP in 2013*. Cumulative net flows to the risky portfolios A and B were of comparable magnitudes. H&L-recommended changes directly precede *every* large shift in pension investments.

Having established the remarkable impact of H&L's advice on pension investments, we investigate what drives H&L's advice, whether investors benefit, and whether and how H&L's advice affects portfolio returns, and domestic stock markets.

1. We find that H&L's advice primarily reflects the immediate past performance of the Chilean stock market: very high past returns on the Chilean market directly precede recommendations to transfer funds into risky portfolio A and out of safe portfolio E; while very bad returns are associated with the opposite recommendation pattern.
2. We find positive announcement effects on the day following a recommendation of portfolio A (negative announcement effects after a recommendation of portfolio E) for portfolios A through D and Chilean stock market indexes, followed by positive cumulative excess returns on days $t + 3$ to $t + 7$ where portfolio transfers are high.

These latter results lead naturally to a conjecture that the induced transfers of funds in and out of portfolios must have had short-run price impacts on domestic equity prices. This leads us to search for impacts of these mass transfers on stock market volume. There are *none*. Domestic stock market volumes are *not* unusually high on days where portfolio transfers are high: AFPs seem to accommodate mass transfers by adjusting positions in liquid foreign equity markets, and not illiquid domestic markets.

We then ask: do investors benefit from following H&L's advice? We get at this in two ways. We first use H&L's payment records to compute returns for each follower starting with the first announcement he could follow until the last announcement for which his account with H&L was active, i.e., until his subscription expired. We then determine whether a follower's return exceeded that from a buy-and-hold strategy for each portfolio. We find

⁶The timing convention is that date $t - 1$ is the date on which the recommendation is made (after the close of trading), so that the recommendation is known at the open of trading day t .

that most followers are hurt by following H&L’s advice: fewer than 10% of followers beat portfolio E and fewer than 30% beat their riskiest option. We then compare the performance of H&L’s strategy with that of holding the other portfolios, starting at *any* of the first twenty announcements through September 30, 2016. Without adjusting for risk, an investor would have done better following H&L from the first announcement than investing in any of the other five portfolios. However, only 54 investors did this; and at any other starting point H&L is not the option with the highest return. Indeed, at almost all other starting points, investors would have done better to stick with whichever portfolio they held, *no matter what it was*.

These results beg the question: why do so many investors come to believe that H&L’s recommendations have value? We establish a sense in which H&L’s recommendations look very good. Someone who started following H&L beginning at *any* of the first 14 recommendations and who hypothetically could transfer funds at the *exact* moment a recommendation was made—rather than one day later—would have earned returns that exceed those from buying and holding *any* of the other portfolios. Thus, this hypothetical possibility reverses the ordering of returns. Paradoxically, what harms followers is not that they come to believe H&L’s recommendations have value, but rather that the *entire market* does. As a result, the Chilean stock market experiences a large positive announcement effect following a recommendation by H&L to switch to the risky portfolio A, and a large negative announcement effect after a recommendation to switch away from the risky portfolio A. Followers cannot switch portfolios in time to benefit from the announcement effect—they end up buying high and selling low, reducing their cumulative portfolio returns by 20-25%. The difference in results reflects the time it takes AFPs to shift funds between pension portfolios and the complex pricing rules used by AFPs to value transferred funds; pricing rules that may conceal from investors the fact that they do not benefit from the announcement effect.

These findings lead us to investigate further *why* individuals follow H&L, despite the under-performance of their investments. To identify whether followers are less financially sophisticated or less informed, we surveyed a *large* sample of over 8,700 current followers of H&L. We then contrast our survey results with findings regarding the population characteristics of pension investors derived from the broad Social Protection Survey (EPS).

Surprising results obtain. H&L followers are *far* more sophisticated than the average investor. In particular, they are more educated, with higher incomes and over twice the savings of the average investor. They are also much more likely to make additional volun-

tary savings, highlighting their patience and understanding of the tax benefits. Answers to questions related to risk diversification and compound interest underscore that H&L followers are extremely financially sophisticated, especially relative to non-followers. One striking illustration of this is that 64% of followers correctly calculate a compound interest problem vs. only 3-5% of non-followers! One might then conjecture that followers are just uninformed about portfolio returns or that they systematically over-estimate returns from following H&L vis à vis buy-and-hold strategies. This conjecture is also false. Followers are well informed about portfolio returns. Among followers providing full rankings, 57% correctly rank the 12 month returns on portfolios A, C and E, and slightly more than half correctly rank portfolio *E*'s return above H&L's. Paradoxically, the key reasons that investors give for why they follow H&L are: higher returns, minimize losses, and they trust H&L more than their AFP.

Our findings have implications for the design of privatized social security systems in which individuals have some choice over pension investments that may serve as a primary source of retirement funds. These lessons are relevant for the many countries that use variants of the Chilean design. One goal of such systems is to align investments better with individual attitudes toward risk. A second goal is to minimize risks of inadequate retirement savings due to bad investment choices or moral hazard by investment advisors. The Chilean design addresses this by sharply limiting the portfolio choices available to investors. We show that despite these constraints—or perhaps because of them—investors may be harmed due to responses by the market. Our analysis highlights the risk that with few portfolio alternatives, information arrival, here taking the form of recommendations by H&L, can lead to massive coordinated reallocations of funds. In Chile, liquidity provision is not overwhelmed due to the limited portfolio exposure to the domestic market, which allows AFPs to accommodate large portfolio transfers by adjusting holdings of liquid foreign assets, mitigating price impacts. However, greater exposure to domestic markets—as might occur in the United States or England—could magnify the ramifications of transfers induced by such information arrival.

Ghilarducci and Hamilton [16] lay out a personal savings plan to confront what they term “the US retirement savings crisis.” This Blackstone plan contains many features of the Chilean system: savings are mandatory, private accounts are managed by professionals, and it is built on personal choice. The authors do not detail the set of portfolio alternatives nor specify how individuals can change portfolio selection. Our paper highlights mechanisms and considerations that should enter the design of these details.

We next discuss related literature and provide details about the Chilean social security system. We then present our empirical analysis and survey findings. A conclusion follows.

1.1 Related Literature

Our paper contributes to a broad literature that studies how the design of a social security system affects the economy. Edwards [12] argues that the massive amount of assets held by AFPs helped Chile by contributing to a more dynamic and modern capital market, allowing private firms to rely on long-term financing. Joubert [22] builds a dynamic model analyzing how the Chilean pension system affects a household’s labor supply, formal/informal sector choice, and saving decisions. He shows that the presence of a large informal sector, not covered by the mandatory savings system, offers workers competitive earnings opportunities, thus mandatory pensions contributions can create a significant reduction in formality and tax revenue. Arenas de Mesa et al. [1] analyze savings, participation patterns and the financial literacy of investors in the Chilean social security system. They find that only a small fraction knows basic key details such as the payroll tax or commission rates.

Our analysis also pertains to the literature on the informativeness of analyst recommendations. Just as investors in Chile come to believe H&L’s recommendations, as reflected by the announcement returns, researchers find that recommendation upgrades by financial analysts are associated with positive announcement returns (Stickel [26], Womack [29], Barber et al. [3], Ivković and Jegadeesh [19], Loh and Stulz [23]). More generally, analyst recommendation changes contain relevant information, and investment strategies based on portfolio constructions that use recommendation information have positive value (Barber et al. [2], Jegadeesh et al. [21], Jegadeesh and Kim [20], Boni and Womack [7]). Consistent with this, Dahlquist et al. [11] find that active investors in Sweden’s Premium Pension System tend to follow recommendations of financial advisors, and that, gross of advisor fees, active investors seem to outperform passive ones. Jegadeesh et al. [21] show that analysts often recommend stocks with positive momentum; we show that H&L adopts an even shorter-horizon momentum strategy.⁷

Our analysis also relates to the literature showing that better-performing mutual funds draw greater cash inflows (Chevalier and Ellison [9], Sirri and Tufano [25], Zheng [30]; see Bernhardt and Davies [5] for a theoretical model). Of note, we show that the advent of H&L

⁷Inderst and Ottaviani [17] and Gennaioli et al. [15] provide theoretical analyses of strategic financial advisor behavior.

changed how individuals make pension investments. Prior to H&L, shifts in investments reflected long-term portfolio performances: investments flowed to portfolios that had higher returns over the previous three months. Once H&L began to have influence, only its recommendations (which we show are based on the *immediate* past performance of the market) affected portfolio flows.

Carlin and Davies [8] theoretically analyze the implementation of state sponsored retirement plans, showing how the optimal menu of options and default option depends on the financial sophistication of participants and their behavioral biases. They assume that only unsophisticated investors make bad active trading decisions, making it optimal to limit access to risky portfolios. Here we provide evidence that agents adopting active strategies tend to do worse; but in Chile these investors are far more sophisticated than the average investor.

The fact that so many followers pay for advice that seems to have harmed them has suggestive links to Powdthavee and Riyanto [24]. Their experimental analysis shows that people can be induced to believe in an “expert” who provides “transparently useless” advice. People pay for the advice, perceiving a hot hand after a string of successes; while long streaks of incorrect predictions generate beliefs that the “unlucky” agent’s luck was likely to revert.

1.2 Chilean Social Security System

The Chilean Social Security System has three key pillars: a welfare pillar, a mandatory contribution pillar and a voluntary savings pillar. For a full description see Superintendence of Pensions [27]. The mandatory contribution pillar is a defined contribution, multi-fund, personal account system. Each worker accumulates savings in a personal account until retirement. Formal workers must save at least 10% of monthly wages up to a cap. Participation by self-employed workers was voluntary prior to 2015.

The savings accounts are privately managed by the AFPs. There are currently six AFPs. AFPs are highly regulated and face constraints on their investments. Individuals choose among five portfolios, portfolios A to E, which differ in their exposure to stocks and other variable yield instruments. The portfolios are ordered according to riskiness: Portfolio A is the riskiest, while portfolio E is the safest. Table 1 presents the distribution of assets in each portfolio on the last day of 2014. Of note, less than 20% of the risk in portfolios A and B reflects exposure to domestic securities; most of the risk exposure is to foreign assets such as ETFs or mutual funds. Further (unreported) investigation reveals that the *composition* of do-

mestic stock holdings is *very* similar across portfolios; the portfolios differ largely only according to the *scale factor* weighting domestic stock holdings. This composition can vary within a month: AFPs alter their holdings in response to market conditions. In particular, we will provide evidence that following large portfolio shifts, AFPs do not alter investments in domestic equities. Instead, they accommodate these shifts in their holdings of more liquid (foreign) assets. In practice, the returns of portfolios A through E are similar across AFPs; see Table 2.⁸

Table 1: Total assets of each portfolio (millions \$US) and asset distribution (in %) on 12/31/2014.

	A	B	C	D	E
Total assets	26,348	27,169	61,277	26,385	24,253
Asset distribution					
Domestic stocks	11.8	12.8	10.0	3.8	0.7
Domestic mutual and investment funds	2.5	2.6	2.4	0.9	0.1
Foreign ETFs	16.6	12.2	9.4	6.5	3.7
Foreign mutual and investment funds	61.9	45.3	32.6	21.5	1.9
Other foreign assets	1.2	1.0	1.0	1.5	1.7
Central bank bonds	0.4	3.7	5.9	9.4	15.0
Government bonds	0.7	7.6	14.4	22.7	28.3
Bank bonds	1.6	4.6	8.5	11.6	11.7
Domestic firm bonds	1.8	4.5	8.6	9.4	10.2
Deposits	0.3	3.5	3.3	8.9	22.9
Others	1.2	2.4	3.8	3.9	3.8

Table 2: Real annual returns across AFPs: 27 Sept 2002-Aug 2015

Portfolio	CAPITAL	CUPRUM	HABITAT	PLANVITAL	PROVIDA*
A	6.78%	6.83%	6.88%	6.43%	6.78%
B	5.75%	5.90%	5.85%	5.67%	5.50%
C	5.13%	5.68%	5.65%	5.29%	5.08%
D	4.86%	5.18%	5.19%	4.58%	4.67%
E	4.23%	4.20%	4.33%	3.47%	3.78%

*MODELO, the 6th AFP, entered 2010, and had similar returns over that subperiod.

Individuals make two important choices—the choice of administrator and the allocations of savings across portfolios. Men under the age of 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 portfolio B (for mandated savings). A worker

⁸ AFPs differ more in terms of the fees that they charge. H&L’s recommendation that its followers select one of two specific AFPs—one due to higher returns, and the other due to lower fees—has not varied over time. However, H&L’s motto is “if you are happy with your AFP, stick with it.”

who does not choose a fund is assigned a default option that places weights on portfolios B, C and D that depend on the worker’s age. Workers are otherwise free to shift savings from one portfolio or AFP to another, and there are no fees associated with such transfers. Transfers among portfolios within an AFP are made four working days after a request,⁹ unless the total transfer request from a particular portfolio exceeds 5% of its value, in which case the excess is delayed to the next working day, on a prorated basis. Transfers between AFPs are delayed until the first working day of the following month if made during the first fifteen days of a month; otherwise they are delayed until the fifteenth day of the following month. Using the convention that date t is the first trading day after a recommendation to switch savings from one portfolio to another, AFPs first transfer savings based on a recommendation on trading day $t+3$. Importantly, when a transfer is made on $t+3$ due to an investor acting on a recommendation made after close on day $t-1$, an AFP uses asset prices on day t (e.g., weighted average for domestic stocks and closing prices for foreign stocks) to value the funds being transferred.

2 H&L’s Impact

2.1 Portfolio Transfers

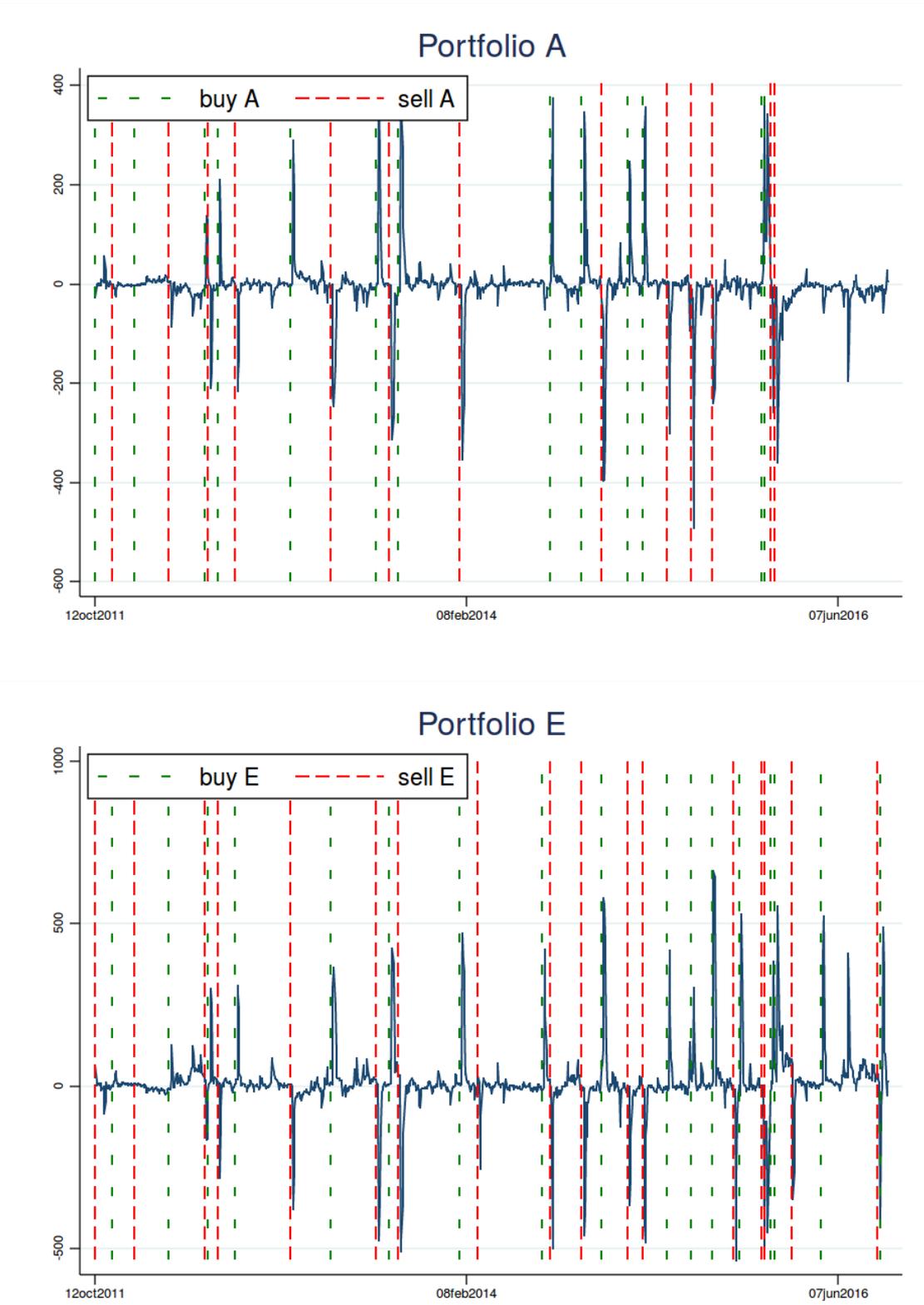
H&L makes recommendations after the close of a trading day. Figure 1 presents overwhelming evidence that social security investors come to believe in H&L recommendations: their new recommendations explain the bulk of transfers in and out of the different portfolios.¹⁰ Beginning with the fifth recommendation by H&L, advice to switch from A to E causes funds to flow from portfolio A to E, and advice to switch from E to A leads to flows from E to A. Not only is *every* large shift in pension investments directly preceded by a recommendation from H&L to redirect investments in that way, but so is *every moderate* shift, save one.

H&L’s administrative records provide us the number of official (paid) followers. To estimate the number of second-hand followers, given the age restrictions on who can hold portfolios A and B, we use recommendations to move all money in or out of portfolio *E* that all investors can follow. A conservative estimate of the number of second-hand followers is given by 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. The measure is conservative

⁹This delayed response by AFPs is administrative in nature.

¹⁰Daily data on portfolio flows around the initial recommendation on July 27, 2011 do not exist.

Figure 1: H&L recommendations and daily net flows to portfolios *A* and *E* (billions of CLP).

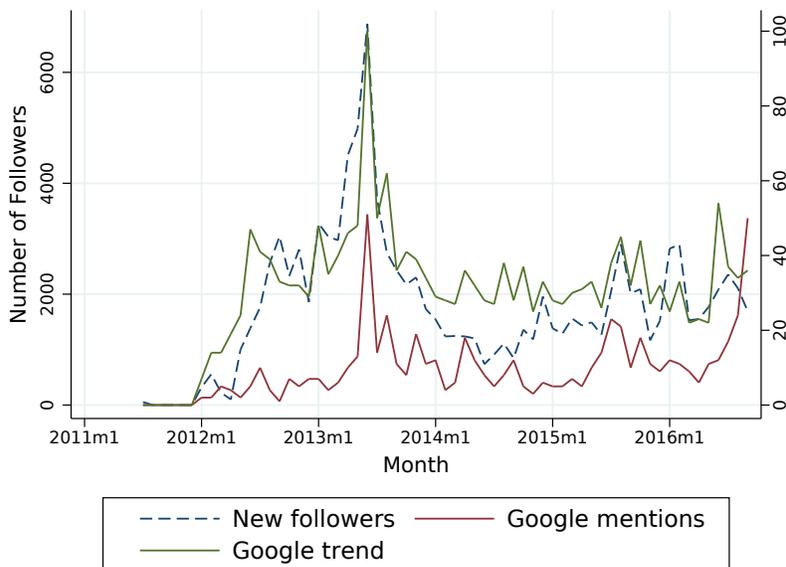


because some paying followers may not follow a given recommendation.¹¹ Table 3 shows that by the 11th recommendation, H&L had more than 100,000 followers. The table also reveals that followers have more than double the average savings of typical pension investors.

Table 3: Number of followers, estimated number of second hand followers and their average savings switched (CLP), and total number of members of the system and their average savings in the month of the announcement.

Recommendation Number	Type	Followers			System	
		Official	Second hand	Mean savings switched	Members	Mean savings
5	buy E	1,113	8,201	16,124,583	9,169,709	7,061,000
6	sell E	3,168	19,430	19,020,284	9,169,709	7,061,000
7	buy E	3,587	30,688	17,687,873	9,220,325	7,165,000
8	sell E	4,456	21,627	17,643,342	9,220,325	7,165,000
9	buy E	7,486	46,309	17,106,715	9,220,325	7,165,000
10	sell E	17,130	45,696	18,414,688	9,373,955	7,521,000
11	buy E	18,010	86,994	17,434,146	9,461,060	7,453,000
12	sell E	27,132	76,054	17,426,833	9,509,439	7,637,000
13	buy E	42,304	79,830	16,582,820	9,509,439	7,637,000
14	sell E	44,935	45,818	16,565,331	9,509,439	7,637,000
15	buy E	45,736	66,489	17,093,872	9,634,711	8,149,000
20	buy E	51,431	55,226	19,634,988	9,746,467	9,079,000

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



Investors who followed H&L’s first few recommendations earned higher returns than those

¹¹Mean savings of followers are even more conservatively estimated as they may only shift some savings.

who did not change portfolio allocations. Figure 2 shows that—likely as a result—H&L experienced a massive upsurge in media coverage and investor attention followed by massive numbers of investors beginning to follow H&L’s advice. We document this surge using data from Google trends, searching for the phrase “Felices y Forrados.” Figure 2 shows the Google trend index, taking on the value of 100 in the month where 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. Both series show similar trends. H&L was almost unknown before 2012. Media coverage and interest from Internet users increase and then explode, peaking in July 2013; after this point, interest in H&L remains steady. We see that the numbers of new clients closely track these Google indexes.

Table 4 shows the daily net flows to portfolios after recommendations. For the last six recommendations to shift 100% of funds from portfolio *A* to portfolio *E* or vice versa,¹² the net inflows/outflows for each of these portfolios exceed 1,000 billion CLP. These flows represent as much as 25% of the total value of portfolio *E* as of day $t + 2$, or *more than* 1.3% of the annual Chilean GDP. These flows reveal that pension investors *believe* that H&L’s recommendations contain material information about the future performances of portfolios. The data show heavy flows of savings into the recommended portfolio following a recommendation on date t on days $t + 3$ to $t + 8$, but *not* at earlier dates.¹³ Underscoring the high fraction of active investors influenced by H&L’s advice, the Superintendence of Pensions (2013) using data through May 2013, found that 60% of pension investors used the default investment strategy.

Table 5 provides other metrics for the amounts of funds transferred. For each recommendation, we compare the cumulative net transfers to portfolio *E* on days $t + 3$ to $t + 8$ with measures of the “size” of the Chilean economy. These net portfolio reallocations can exceed 5% of GDP for the associated quarter; and they sometimes exceed the total value of *all* trade of domestic stocks on the Santiago Stock Exchange in the month of the recommendation.

We next estimate flow regressions of the form:

$$y_\tau = \alpha + \sum_{s=-3}^{10} \beta_s \delta_{E\tau}(s) + \epsilon_\tau,$$

¹²All other recommendations, the bulk of which were made later, were to shift 50% of funds from one of portfolios *A*, *C* and *E* to another.

¹³The patterns in Figure 1 and Table 4 also show up in net numbers of accounts shifted. Portfolios *B* and *C* follow similar patterns to those documented in Figure 1 and Table 4 for portfolio *A*, but they are of smaller magnitudes. This reflects that some investors are over the age limit for investing in portfolio *A*, making portfolios *B* or *C* their closest feasible alternative.

Table 4: Net flows to portfolios (in billions of CLP) around new recommendation days. Day t represents the first trading day after a recommendation is made. Net flow to portfolio X on day $t + s$ is defined as the inflow minus the outflow to portfolio X on day $t + s$.

Date	From	To	Portfolio A						sum	$\frac{\text{sum}}{\text{value on } t+2}$
			$t + 3$	$t + 4$	$t + 5$	$t + 6$	$t + 7$	$t + 8$		
13-Oct-2011	E	A	0	-3	1	-1	-2	1	-4	0.00
23-Nov-2011	A	E	-8	-21	-26	-16	-3	-3	-76	-0.01
12-Jan-2012	E	A	-1	0	-3	-3	-1	-2	-12	0.00
30-Mar-2012	A	E	-18	-87	-9	1	-1	3	-110	-0.01
20-Jun-2012	E	A	137	130	99	20	2	-4	385	0.03
29-Jun-2012	A	E	-209	-177	-10	-6	-2	-7	-412	-0.03
20-Jul-2012	E	A	211	109	61	4	-3	3	384	0.03
30-Aug-2012	A	E	-217	-193	-153	-22	-12	-8	-605	-0.05
3-Jan-2013	E	A	289	273	191	50	26	21	850	0.06
4-Apr-2013	A	E	-223	-245	-244	-208	-160	-142	-1223	-0.08
18-Jul-2013	E	A	378	357	281	249	95	22	1382	0.11
19-Aug-2013	A	E	-304	-313	-269	-248	-207	-63	-1404	-0.10
9-Sep-2013	E	A	405	356	272	116	10	2	1162	0.09
27-Jan-2014	A	E	-353	-348	-273	-242	-134	-22	-1372	-0.09
7-Mar-2014	E	E+C	-13	-29	-16	-6	-9	-17	-89	-0.01
4-Aug-2014	E+C	E	-52	-30	-27	-24	-7	-9	-148	-0.01
20-Aug-2014	E	E+A	375	133	48	16	18	13	603	0.04
3-Nov-2014	E+A	A	345	291	61	37	108	39	881	0.05
16-Dec-2014	A	E	-397	-394	-305	-232	-67	-6	-1400	-0.08
13-Feb-2015	E	E+A	247	206	94	31	24	11	613	0.04
19-Mar-2015	E+A	A	311	355	117	85	14	6	888	0.05
14-May-2015	A	E+A	-301	-170	-61	-50	-4	2	-584	-0.03
9-Jul-2015	E+A	C+E	-492	-292	-108	-46	4	-2	-936	-0.05
25-Aug-2015	C+E	E	-239	-210	-180	-45	7	-14	-681	-0.04
14-Oct-2015	E	E+C	8	-22	-9	16	1	-3	-9	0.00
27-Oct-2015	E+C	E	-29	-30	-15	-12	-4	-2	-93	-0.01
17-Dec-2015	E	E+A	293	363	87	87	201	342	1372	0.08
23-Dec-2015	E+A	A	201	342	140	31	14	5	733	0.04
7-Jan-2016	A	E+A	-259	-235	-52	-44	-9	-7	-605	-0.03
18-Jan-2016	E+A	E	-282	-360	-100	-115	-109	-60	-1026	-0.06
23-Feb-2016	E	E+C	-14	-24	-19	-20	-11	-19	-107	-0.01
2-May-2016	E+C	E	-34	-58	-29	-23	-9	-6	-158	-0.01
7-Sep-2016	E	E+C	-5	-11	-12	-14	-3	-57	-101	-0.01
14-Sep-2016	E+C	E	-57	-32	-11	-19	-8	-7	-135	-0.01

Date	From	To	Portfolio E						sum	$\frac{\text{sum}}{\text{value on } t+2}$
			$t + 3$	$t + 4$	$t + 5$	$t + 6$	$t + 7$	$t + 8$		
13-Oct-2011	E	A	3	8	5	7	10	2	35	0.01
23-Nov-2011	A	E	18	36	45	30	9	8	146	0.03
12-Jan-2012	E	A	7	3	8	9	7	7	41	0.01
30-Mar-2012	A	E	22	128	10	-3	-1	-5	150	0.03
20-Jun-2012	E	A	-166	-161	-106	-17	5	14	-430	-0.06
29-Jun-2012	A	E	299	253	19	13	9	13	606	0.09
20-Jul-2012	E	A	-281	-133	-64	3	10	5	-460	-0.06
30-Aug-2012	A	E	310	285	240	40	27	18	920	0.13
3-Jan-2013	E	A	-379	-366	-270	-71	-38	-32	-1157	-0.13
4-Apr-2013	A	E	303	353	364	313	250	248	1831	0.25
18-Jul-2013	E	A	-474	-475	-360	-335	-127	-27	-1799	-0.17
19-Aug-2013	A	E	402	424	376	365	330	128	2025	0.23
9-Sep-2013	E	A	-508	-474	-367	-147	-8	0	-1504	-0.13
27-Jan-2014	A	E	469	466	385	352	209	38	1918	0.19
7-Mar-2014	E	E+C	-253	-252	-90	-7	3	21	-579	-0.05
4-Aug-2014	E+C	E	422	221	107	70	33	19	871	0.07
20-Aug-2014	E	E+A	-500	-181	-57	-20	-30	-19	-807	-0.06
3-Nov-2014	E+A	A	-458	-395	-80	-51	-155	-53	-1191	-0.09
16-Dec-2014	A	E	578	561	452	383	111	9	2094	0.17
13-Feb-2015	E	E+A	-366	-295	-152	-52	-34	-20	-919	-0.06
19-Mar-2015	E+A	A	-429	-479	-154	-119	-19	-8	-1208	-0.09
14-May-2015	A	E+A	419	234	86	66	5	0	809	0.07
9-Jul-2015	E+A	C+E	304	212	83	10	-14	-1	594	0.05
25-Aug-2015	C+E	E	661	642	510	168	1	42	2025	0.14
14-Oct-2015	E	E+C	-535	-278	-88	-90	-22	-4	-1016	-0.06
27-Oct-2015	E+C	E	529	359	103	60	12	3	1065	0.07
17-Dec-2015	E	E+A	-422	-496	-108	-108	-272	-450	-1857	-0.11
23-Dec-2015	E+A	A	-272	-450	-185	-38	-17	-8	-970	-0.06
7-Jan-2016	A	E+A	384	342	75	70	22	15	907	0.06
18-Jan-2016	E+A	E	436	553	157	194	186	110	1635	0.11
23-Feb-2016	E	E+C	-348	-264	-50	-16	19	14	-644	-0.03
2-May-2016	E+C	E	404	523	114	91	23	17	1173	0.06
7-Sep-2016	E	E+C	-392	-408	-95	-61	-2	489	-470	-0.02
14-Sep-2016	E+C	E	489	368	105	100	42	23	1127	0.05

Table 5: Net flow to portfolio E ($t+3$ to $t+8$) as percentage of: the value of portfolio E in $t+2$, the domestic GDP in the quarter of the recommendation, and the total value of transactions in domestic stocks in the Santiago stock exchange in the month of the announcement.

Recom. #	Direction of Recom.	% Value at $t+2$ of Portfolio E	% of Quarterly GDP shifted	% monthly total dollar trading volume in domestic stocks
5	A to E	2.894	0.48	7.52
6	E to A	-6.020	-1.36	-15.13
7	A to E	8.950	1.91	21.35
8	E to A	-6.133	-1.47	-22.75
9	A to E	12.578	2.93	57.34
10	E to A	-12.789	-3.48	-46.11
11	A to E	25.438	5.48	99.24
12	E to A	-17.081	-5.33	-105.40
13	A to E	22.760	6.00	137.09
14	E to A	-13.257	-4.45	-83.67
15	A to E	18.671	5.35	83.14
16	E to E+C	-4.647	-1.62	-40.21
17	E+C to E	6.942	2.41	43.93
18	E to E+A	-5.856	-2.23	-40.68
19	E+A to A	-8.882	-3.01	-38.71
20	A to E	16.784	5.29	169.24
21	E to E+A	-6.290	-2.38	-75.35
22	E+A to A	-8.849	-3.12	-78.12
23	A to E+A	6.734	2.10	56.24
24	E+A to E+C	4.568	1.54	61.22
25	C+E to E	14.438	5.24	198.62
26	E to E+C	-6.231	-2.44	-99.69
27	E+C to E	6.971	2.56	104.55
28	E to E+A	-11.424	-4.46	-205.00
29	E+A to A	-6.413	-2.33	-107.08
30	A to E+A	6.455	2.20	71.39
31	E+A to E	10.875	3.97	128.68
32	E to E+C	-3.463	-1.56	-75.26
33	E+C to E	6.298	2.88	92.27
34	E to E+C	-1.955	-1.15	-37.72
35	E+C to E	4.859	2.76	90.41

where y_τ are daily flows on date τ (measured in percentage terms) as a function of the indicator function:

$$\delta_{E\tau}(s) = \begin{cases} \rho & \text{if } \tau - s \text{ is the first trading day after a recommendation to sell fraction } \rho \text{ of portfolio E,} \\ -\rho & \text{if } \tau - s \text{ is the first trading day after a recommendation to buy fraction } \rho \text{ of portfolio E,} \\ 0 & \text{otherwise.} \end{cases}$$

Thus, $\delta_{E\tau}(0) = 1$ if on the previous day $\tau - 1$, H&L recommended shifting all holdings from portfolio E to portfolio A.

The left panel of Table 6 presents the results. The coefficients on the indicator functions are very large and highly statistically significant on dates $t + 3$ to $t + 9$. The astonishing fit (adjusted R^2 of 0.64 for portfolio E) reveals that H&L’s advice is *the* primary driver of fluctuations in transfers of funds between portfolios.¹⁴ The findings indicate that (a) investors respond quickly and massively to recommendations; (b) there is no leakage of information about a recommendation prior to its announcement—investors do not systematically shift in or out of a portfolio before a new recommendation; and (c) investors finish responding to a recommendation within a week.

To see whether investor responses differ according to the direction of a recommendation (i.e., to or from A) we estimate the following regression:

$$y_\tau = \alpha + \sum_{s=2}^{10} \beta_s \delta_{E\tau}(s) + \sum_{s=2}^{10} \phi_s \delta_{A\tau}(s) + \epsilon_\tau,$$

where y_τ are daily flows on date τ (measured in percentage terms) as a function of:

$$\delta_{E\tau}(s) = \begin{cases} \rho & \text{if } \tau - s \text{ is the first trading day after a recommendation to sell fraction } \rho \text{ of portfolio E,} \\ 0 & \text{otherwise.} \end{cases}$$

and

$$\delta_{A\tau}(s) = \begin{cases} \rho & \text{if } \tau - s \text{ is the first trading day after a recommendation to sell fraction } \rho \text{ of portfolio A,} \\ 0 & \text{otherwise.} \end{cases}$$

The right panel of Table 6 shows that investor responses do not differ materially according to the direction of a recommendation: a recommendation of portfolio A leads to transfers into A and out of E that roughly equal transfers from portfolio A and into E following a recommendation of E. Table 6 also reveals clear but muted responses of investors in portfolios B and C to recommendations to switch to/from E: the funds shifted in and out of portfolios B and C are less than 25% of those for portfolio A. These “echo” shifts reflect that some investors are too old to invest in portfolio A, making portfolios B or C their closest feasible alternative.

Did the advent of H&L change in other ways how investors allocated savings?

Chevalier and Ellison [9] and Sirri and Tufano [25] have established that higher past returns

¹⁴Empirical identification of the causal impact of H&L’s recommendations is clean: (a) Figures 1 and 2 show that reallocations and recommendations coincide only after investors started showing interest in H&L as measured by the Google indicators; (b) the fact that only tiny numbers of investors switched portfolios in the direction of H&L’s first few recommendations reveals that a common force does not drive both recommendations and reallocations. Indeed, H&L only had 54 paid followers for its first four recommendations.

Table 6: Recommendations and portfolio transfers. OLS regression of $y_\tau = \alpha + \sum_{s=-3}^{10} \beta_s \delta_{E\tau}(s) + \epsilon_\tau$ and $y_\tau = \alpha + \sum_{s=2}^{10} \beta_s \delta_{E\tau}(s) + \sum_{s=2}^{10} \phi_s \delta_{A\tau}(s) + \epsilon_\tau$ using daily data for the period 12Oct2011–30Sep2016, where y_τ is the percentage net flow to portfolio X on day τ : y_τ is the value of the inflow minus the value of the outflow to portfolio X on τ divided by the value of the portfolio on day $\tau - 1$.

	A	B	C	D	E	A	B	C	D	E
$\delta_E(-3)$	0.007 (0.036)	-0.002 (0.013)	-0.002 (0.014)	0.007 (0.004)	0.036 (0.074)					
$\delta_E(-2)$	0.010 (0.029)	0.002 (0.012)	-0.027 (0.025)	0.006* (0.003)	0.049 (0.047)					
$\delta_E(-1)$	0.061 (0.044)	0.018 (0.018)	-0.031 (0.026)	0.001 (0.003)	-0.018 (0.065)					
$\delta_E(0)$	0.062 (0.046)	0.016 (0.017)	-0.015* (0.008)	-0.002 (0.002)	-0.034 (0.070)					
$\delta_E(1)$	0.030 (0.022)	-0.000 (0.010)	-0.011* (0.007)	-0.002 (0.003)	0.013 (0.073)					
$\delta_E(2)$	0.062*** (0.022)	0.020** (0.009)	-0.003 (0.003)	-0.002 (0.002)	-0.096* (0.053)	0.061** (0.024)	0.017* (0.010)	-0.003 (0.005)	-0.003 (0.002)	-0.039 (0.048)
$\delta_E(3)$	1.629*** (0.224)	0.469*** (0.065)	0.278*** (0.082)	-0.014** (0.007)	-3.683*** (0.410)	1.749*** (0.370)	0.482*** (0.101)	0.260** (0.117)	-0.031*** (0.010)	-3.464*** (0.596)
$\delta_E(4)$	1.520*** (0.206)	0.472*** (0.064)	0.240*** (0.068)	-0.018** (0.008)	-3.458*** (0.360)	1.501*** (0.342)	0.470*** (0.107)	0.219** (0.097)	-0.038*** (0.011)	-3.143*** (0.588)
$\delta_E(5)$	0.951*** (0.167)	0.303*** (0.055)	0.095*** (0.025)	-0.007 (0.006)	-2.051*** (0.330)	0.882*** (0.234)	0.272*** (0.076)	0.078** (0.032)	-0.030*** (0.007)	-1.835*** (0.443)
$\delta_E(6)$	0.602*** (0.147)	0.197*** (0.049)	0.063*** (0.015)	0.000 (0.005)	-1.263*** (0.294)	0.439** (0.173)	0.136** (0.055)	0.048** (0.019)	-0.017*** (0.004)	-0.931*** (0.358)
$\delta_E(7)$	0.325*** (0.099)	0.113*** (0.034)	0.028*** (0.010)	-0.004 (0.004)	-0.648*** (0.208)	0.198*** (0.074)	0.069*** (0.027)	0.012 (0.010)	-0.011*** (0.003)	-0.374** (0.167)
$\delta_E(8)$	0.175*** (0.062)	0.064** (0.026)	-0.005 (0.023)	0.002 (0.004)	-0.338** (0.145)	0.165** (0.074)	0.055** (0.025)	-0.039 (0.048)	-0.009** (0.004)	-0.227** (0.107)
$\delta_E(9)$	0.097*** (0.032)	0.040*** (0.014)	-0.006 (0.017)	-0.001 (0.003)	-0.191*** (0.069)	0.122*** (0.042)	0.043*** (0.015)	-0.030 (0.037)	-0.005 (0.003)	-0.181*** (0.068)
$\delta_E(10)$	0.104*** (0.037)	0.038*** (0.015)	0.015 (0.011)	-0.004 (0.003)	-0.162** (0.073)	0.093** (0.043)	0.034** (0.015)	0.004 (0.014)	-0.007* (0.004)	-0.089 (0.117)
$\delta_A(2)$						-0.076* (0.040)	-0.028* (0.016)	0.004 (0.007)	0.001 (0.004)	0.173* (0.095)
$\delta_A(3)$						-1.643*** (0.291)	-0.503*** (0.095)	-0.108 (0.081)	0.005 (0.010)	3.617*** (0.549)
$\delta_A(4)$						-1.624*** (0.249)	-0.490*** (0.077)	-0.142** (0.071)	0.007 (0.013)	3.614*** (0.395)
$\delta_A(5)$						-1.032*** (0.247)	-0.330*** (0.081)	-0.063*** (0.020)	-0.006 (0.009)	2.166*** (0.494)
$\delta_A(6)$						-0.781*** (0.236)	-0.260*** (0.081)	-0.058*** (0.019)	-0.012 (0.008)	1.577*** (0.465)
$\delta_A(7)$						-0.461*** (0.177)	-0.150*** (0.061)	-0.042*** (0.016)	-0.003 (0.007)	0.948*** (0.368)
$\delta_A(8)$						-0.185* (0.103)	-0.075 (0.047)	-0.024 (0.015)	-0.012** (0.006)	0.459* (0.274)
$\delta_A(9)$						-0.069 (0.053)	-0.037 (0.026)	-0.014* (0.009)	-0.005** (0.003)	0.207 (0.126)
$\delta_A(10)$						-0.118* (0.066)	-0.046* (0.026)	-0.014* (0.008)	0.000 (0.004)	0.246** (0.107)
Obs.	1,239	1,239	1,239	1,239	1,239	1,239	1,239	1,239	1,239	1,239
R^2	0.545	0.481	0.161	0.030	0.649	0.566	0.500	0.087	0.080	0.603
Adj. R^2	0.539	0.475	0.151	0.018	0.645	0.560	0.493	0.073	0.067	0.597

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Intercept not reported

of a mutual fund increase cash flows into the fund. We now modify Sirri and Tufano’s approach to study the relationship between measures of past performance of portfolio A and net flows to portfolios A and E to determine whether this relationship changed once investors began following H&L’s advice. Because there are no daily data on portfolio flows prior to October 2011, we use monthly data for the period October 2002–September 2016. Table 7

presents OLS estimates of the following equation:

$$\begin{aligned} \text{Flow}_t = & \alpha + \left(\sum_{s=1}^3 \beta_{1,s} \text{Return } A_{t-s} + \sum_{s=1}^3 \beta_{2,s} \text{Risk } A_{t-s} + \beta_3 \log TA_{t-1} \right) \times (1 - d_t) \\ & + \left(\sum_{s=1}^3 \beta_{4,s} \text{Return } A_{t-s} + \sum_{s=1}^3 \beta_{5,s} \text{Risk } A_{t-s} + \beta_6 \log TA_{t-1} \right) \times d_t + \beta_7 d_t + \epsilon_t. \end{aligned}$$

Flow_t is the net flow to portfolio X in month t as a percent of the total assets in X on the last day of month $t - 1$; $\text{Return } A_{t-s}$ is the monthly return on portfolio A computed as the log difference using the price on the last day of month $t - s$ and the price on the last day of month $t - (s + 1)$; $\text{Risk } A_{t-s}$ is the standard deviation of the daily returns of portfolio A in month $t - s$; and TA_{t-1} is the total assets of portfolio A on the last day of month $t - 1$. We consider two formulations for the dummy variable d_t indicating H&L’s presence in the market: one where $d_t = 1$ once H&L enters the market in October 2011, so $d_t = 0$ before October 2011; and one where $d_t = 1$ starting in April 2012, when substantial numbers of investors began shifting investments in line with H&L’s recommendation.

Table 7 shows how H&L’s entry changed investor behavior. Prior to H&L, and consistent with Chevalier and Ellison [9] and Sirri and Tufano [25], higher lagged monthly returns of portfolio A led investors to shift funds into A and out of E. After H&L’s entry, investments no longer vary with the long-term performance of portfolio A—investors only rely on H&L.

2.2 Returns

Having established how H&L’s recommendations affected the flow of investors and money in and out of portfolios, we now investigate asset returns around the recommendation announcements. This lets us (a) uncover what drives H&L’s recommendations to switch portfolios; (b) derive the informational consequences (announcement effects) of recommendations for different assets; and (c) probe the impacts of the portfolio transfers on asset returns.

To do this, we estimate regressions of the form:

$$y_\tau = \alpha + \sum_{s=-2}^0 \beta_s \delta_{E\tau}(s) + \beta_1 \delta_{E\tau}(1 : 2) + \beta_2 \delta_{E\tau}(3 : 7) + \beta_3 \delta_{E\tau}(8 : 10) + \epsilon_\tau,$$

where y_τ is the daily return¹⁵ on day τ of a selected asset (social security portfolios A and

¹⁵Returns are defined as: $r_\tau = 100 (\log(p_\tau) - \log(p_{\tau-1}))$.

Table 7: The effect of past performance on monthly cash flows to portfolios A and E , before and after the emergence of H&L.

	$d_t = 1$ starting October 2011		$d_t = 1$ starting April 2012	
	Port. A	Port. E	Port. A	Port. E
Before H&L				
Return A_{t-1}	0.212* (0.110)	-1.456*** (0.342)	0.223** (0.099)	-1.437*** (0.322)
Return A_{t-2}	0.210*** (0.077)	-0.882*** (0.277)	0.204*** (0.070)	-0.876*** (0.261)
Return A_{t-3}	0.176* (0.098)	-0.288 (0.192)	0.163* (0.089)	-0.282 (0.178)
Risk A_{t-1}	1.057 (1.417)	-9.436** (4.608)	1.117 (1.309)	-8.940** (4.393)
Risk A_{t-2}	1.311 (1.243)	-3.457 (4.665)	1.133 (1.040)	-3.744 (4.280)
Risk A_{t-3}	-0.697 (0.851)	2.237 (2.702)	-0.695 (0.782)	2.373 (2.469)
log TA_{t-1}	-0.022*** (0.007)	0.016** (0.007)	-0.022*** (0.006)	0.015** (0.007)
After H&L				
Return A_{t-1}	-0.097 (0.219)	0.022 (0.406)	-0.063 (0.236)	0.020 (0.468)
Return A_{t-2}	0.131 (0.180)	-0.264 (0.365)	0.150 (0.236)	-0.253 (0.502)
Return A_{t-3}	-0.178 (0.163)	0.319 (0.331)	-0.190 (0.217)	0.410 (0.460)
Risk A_{t-1}	-2.180 (4.286)	1.132 (9.147)	-2.534 (5.067)	1.176 (11.381)
Risk A_{t-2}	-3.968 (3.551)	10.778 (6.997)	-6.495 (5.182)	15.470 (11.411)
Risk A_{t-3}	4.346* (2.350)	-9.525* (4.962)	6.813** (3.220)	-11.427 (7.191)
log TA_{t-1}	-0.047 (0.049)	0.066 (0.097)	-0.040 (0.059)	0.040 (0.118)
d_t	0.770 (1.488)	-1.612 (2.935)	0.573 (1.782)	-0.864 (3.546)
Constant	0.641*** (0.192)	-0.376* (0.191)	0.638*** (0.189)	-0.354* (0.182)
Obs.	164	164	164	164
R^2	0.399	0.359	0.408	0.363
Adj. R^2	0.338	0.294	0.348	0.298

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

E ,¹⁶ and IPSA stock market index¹⁷). $\delta_{E\tau}(0)$ is an indicator function that takes on the value ρ if a recommendation was made on the previous day ($\tau - 1$) to sell fraction ρ of portfolio E, it takes on the value $-\rho$ if a recommendation was made on the previous day to buy fraction ρ of portfolio E, and it is zero otherwise. $\delta_{E\tau}(1 : 2)$ is the analogous indicator function for recommendations made either one or two days earlier (i.e., on days $\tau - 2$ or $\tau - 3$). The indicator function $\delta_{E\tau}(3 : 7)$ captures days where portfolio transfers are high following recommendations; and the indicator function $\delta_{E\tau}(8 : 10)$ captures days where portfolio transfers have largely returned to normal.

To control for market returns, we also augment regressions by adding the return of a

¹⁶The website of the superintendency of pensions provides daily data on official prices for all portfolios of all AFPs. These official prices reflect regulations that specify the prices used to value each asset (e.g. closing price for foreign equity, or weighted average price for domestic stocks). We use the weighted average price, lagged one day because the price of a portfolio on day τ reflects the day $\tau - 1$ prices of the underlying assets.

¹⁷IPSA is an index of the 40 stocks with the highest annual volume from the set of stocks with a market capitalization that exceed USD 200 MM and a free-float of at least 5%. The index is market capitalization weighted and free float adjusted, and includes dividends.

foreign stock market index as a regressor. We use the return on the MSCI ACWI and MSCI World indexes as controls when using portfolio returns as a dependent variable.¹⁸ When using the return of a domestic stock market index as a dependent variable, we use returns on the MSCI Emerging Markets and MSCI Emerging Markets Latin America indexes.^{19,20}

Table 8: Recommendations and asset returns. OLS regression of $y_\tau = \alpha + \sum_{s=-2}^0 \beta_s \delta_{E\tau}(s) + \beta_1 \delta_{E\tau}(1 : 2) + \beta_2 \delta_{E\tau}(3 : 7) + \beta_3 \delta_{E\tau}(8 : 10) + \epsilon_\tau$ using daily data for the period 3Jan2011–30Sep2016, where y_τ is the daily return (in %) of a social security portfolio, or stock market index.

	Social Security Portfolios				Stock Market		
	A	A	A	E	IPSA	IPSA	IPSA
$\delta_E(-2)$	0.479*** (0.0809)	0.225*** (0.0741)	0.250*** (0.0736)	-0.00379 (0.0184)	0.750*** (0.177)	0.308* (0.174)	0.352** (0.162)
$\delta_E(-1)$	0.642*** (0.106)	0.184** (0.0758)	0.204*** (0.0756)	0.000443 (0.0249)	1.024*** (0.186)	0.467*** (0.179)	0.432** (0.172)
$\delta_E(0)$	0.251* (0.143)	0.176** (0.0810)	0.199** (0.0847)	-0.0110 (0.0254)	0.541** (0.224)	0.264* (0.146)	0.351** (0.152)
$\delta_E(1 : 2)$	-0.0635 (0.0767)	-0.00894 (0.0508)	-0.0147 (0.0525)	-0.00210 (0.0175)	-0.0220 (0.137)	0.0674 (0.119)	0.103 (0.116)
$\delta_E(3 : 7)$	0.233*** (0.0699)	0.112*** (0.0370)	0.116*** (0.0382)	0.00642 (0.00863)	0.280** (0.120)	0.142 (0.0869)	0.146* (0.0782)
$\delta_E(8 : 10)$	-0.0519 (0.0716)	-0.0388 (0.0393)	-0.0353 (0.0391)	-0.0384* (0.0210)	-0.252 (0.159)	-0.267* (0.150)	-0.251** (0.128)
ACWI		0.419*** (0.0206)					
World			0.403*** (0.0209)				
Emerging Markets						0.488*** (0.0312)	
Latin America							0.355*** (0.0207)
Observations	1,436	1,436	1,436	1,436	1,437	1,437	1,437
R^2	0.048	0.501	0.484	0.006	0.045	0.356	0.385
Adjusted R^2	0.044	0.499	0.482	0.002	0.041	0.353	0.382

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Intercept not reported

What drives H&L’s advice? Table 8 reveals that H&L’s advice overwhelmingly reflects the *immediate* past performance of the Chilean stock market. On the two trading days *prior* to a recommendation to switch into portfolio A and out of E, on average, the Chilean stock market rose by 1.8%. Roughly the opposite occurs prior to recommendations to switch out

¹⁸The ACWI index captures large and mid-cap representation in 23 developed markets and 24 emerging markets countries. The World index captures large and mid cap representation in 23 developed markets countries.

¹⁹The Emerging Markets index captures large and mid-cap representation in 24 emerging markets countries. The Emerging Markets Latin America index captures large and mid-cap representation for five emerging markets countries in Latin America.

²⁰Results similar to those for portfolio A obtain when using returns of portfolios B and C as dependent variables. The magnitude of the effects fall due to the lesser risk exposure of these portfolios. Findings similar to those for the IPSA index obtain for the IGPA index of all stocks on the Santiago Exchange with an annual volume above UF 10,000 (US\$400,000-450,000), free float of at least 5% and a market presence of at least 5%, and for the INTER-10 index, which consists of 10 stocks selected from the IPSA, listed in foreign markets through ADRs, with the highest annual volume or if we use indexes without dividends. We also considered the US\$ over CLP exchange rate and indexed Central Bank bonds. All results are available upon request.

of portfolio A and into E. That is, following good returns on the Chilean stock market, H&L recommends that investors hold the risky portfolio A, and following bad returns on the market, H&L recommends that they hold the safe portfolio E. This suggests that H&L employs a simple, very short-term, momentum strategy.

To reinforce this conclusion, we show that the cumulative return (the sum of daily returns) of the ACWI and VIX indexes in the week before an announcement predict the nature of the recommendation.²¹ Table 9 divides recommendations according to whether the direction of the recommendation represents an increase or a reduction in risk exposure. A momentum strategy suggests that preceding a recommendation to increase risk exposure, we should see positive cumulative returns on the ACWI index, and negative returns on the VIX index; and prior to a recommendation to reduce risk exposure, the opposite should obtain. This is precisely what we find. Indeed, prior to *every* recommendation to increase risk, the five day cumulative return on the ACWI index is positive, and the analogous return on the VIX index is negative. The opposite happens for the vast bulk of recommendations to reduce risk exposure.²²

Putting these results together with those in Table 7 proves revealing: it is not that investors no longer base investments on past performance; rather, via the model that H&L uses to formulate recommendations, investors have switched from basing investments on intermediate-term historical performance to basing investments on very recent market performance. Moreover, many more investors now implicitly follow this momentum strategy.

Consequences of H&L’s advice. Table 8 also reveals positive announcement effects on the day after a recommendation of portfolio A. Most notably, there are abnormal returns of half a percent on the Chilean stock market, and smaller announcement effects for portfolio A that remain significant when we control for foreign market returns. In addition, after a recommendation of risky portfolio A on day $t-1$ there are positive abnormal returns on both the stock market and portfolio A on days $t+3$ to $t+7$ where pension transfers are high, followed by slight reversals. Similar return patterns emerge for portfolios B, C and D, where the magnitudes decline as the riskiness of the portfolio declines, and there are no systematic return patterns for portfolio E, which is comprised of very liquid, information-insensitive securities.

²¹The CBOE Volatility Index (VIX) is a measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices.

²²These results are robust to choosing different short term horizons (e.g. four, six or seven days).

Table 9: Cumulative returns of the ACWI and VIX indexes in the five trading days preceding an announcement.

Type of recommendation	ACWI	VIX
Increase risk exposure		
2	0.07	-0.19
4	0.00	-0.05
6	0.03	-0.18
8	0.03	-0.17
10	0.02	-0.19
12	0.02	-0.03
14	0.02	-0.06
16	0.01	0.01
18	0.02	-0.15
19	0.02	-0.13
21	0.01	-0.09
22	0.03	-0.19
26	0.01	-0.09
28	0.00	-0.09
29	0.00	-0.23
32	0.04	-0.27
34	0.01	-0.07
Reduce risk exposure		
1	0.00	0.19
3	-0.06	0.02
5	0.00	-0.01
7	-0.01	-0.02
9	0.00	0.12
11	0.00	0.11
13	-0.01	0.07
15	-0.02	0.37
17	-0.02	0.29
20	-0.04	0.36
23	0.01	-0.10
24	-0.02	0.08
25	-0.10	1.14
27	0.01	0.02
30	-0.04	0.25
31	-0.03	0.00
33	-0.01	0.17
35	-0.03	0.40

At first blush, these results suggest that reinvestments by AFPs in response to the portfolio reallocations on days $t+3$ to $t+7$ had price impacts. It *looks* as if AFPs trades in the stock market induced by the re-allocations of pension savings moved the market—it *looks* as if the market was not sufficiently liquid to absorb the re-allocations. To investigate, we explore the impact of portfolio reallocations on domestic stock market trading volume, regressing log of total daily trading volume in millions of CLP on indicator functions that take on the value of one s trading days after a new recommendation, for $s = -2, -1, 0, 1 \dots 10$. Table 10 presents those results. Surprisingly, Figure 3 and Table 10 reveal that there is *no pass through from the massive portfolio re-allocations to stock market trading volume*. Trades by AFPs induced by portfolio re-allocations do *not* drive the excess returns on dates $t + 3$ through $t + 7$.

Figure 3: Trading volume of IPSA and H&L’s announcements

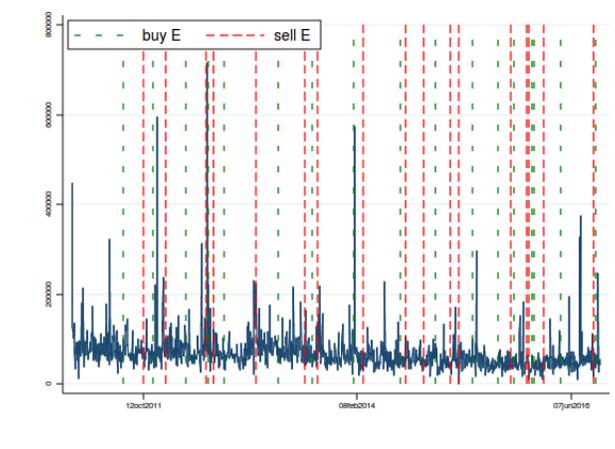


Table 10: Trading volume around new recommendations. OLS regression of $y_\tau = \alpha + \sum_{s=-2}^{10} \beta_s \delta_{E\tau}(s) + \epsilon_\tau$ using daily data from 3Jan2011–30sep2016, where y_τ is daily volume of a stock market index, and $\delta_{E\tau}(s)$ is an indicator function that equals 1 s days after a new recommendation.

	IPSA	IGPA	INTER-10
$\delta_E(-2)$	-0.040 (0.079)	-0.061 (0.084)	0.038 (0.096)
$\delta_E(-1)$	0.057 (0.065)	0.029 (0.071)	0.127 (0.079)
$\delta_E(0)$	-0.005 (0.077)	-0.023 (0.079)	0.029 (0.077)
$\delta_E(1)$	-0.267 (0.202)	-0.080 (0.093)	-0.047 (0.111)
$\delta_E(2)$	-0.035 (0.115)	-0.051 (0.113)	-0.000 (0.141)
$\delta_E(3)$	-0.062 (0.063)	-0.063 (0.068)	-0.099 (0.084)
$\delta_E(4)$	-0.040 (0.071)	0.007 (0.084)	-0.037 (0.100)
$\delta_E(5)$	-0.100 (0.091)	-0.115 (0.097)	-0.030 (0.114)
$\delta_E(6)$	-0.079 (0.079)	-0.103 (0.078)	-0.065 (0.100)
$\delta_E(7)$	-0.037 (0.076)	-0.030 (0.083)	-0.014 (0.083)
$\delta_E(8)$	0.009 (0.068)	-0.034 (0.069)	0.085 (0.070)
$\delta_E(9)$	-0.024 (0.088)	-0.043 (0.089)	-0.035 (0.110)
$\delta_E(10)$	0.135 (0.114)	0.088 (0.117)	0.147 (0.132)
Obs.	1,436	1,436	1,436
R^2	0.012	0.005	0.006
Adj. R^2	0.003	-0.004	-0.003

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1
 Intercept not reported

The question becomes: what does underlie these return patterns? Suggestive insights come from decomposing the sample into early recommendations (recommendations one to six) and later recommendations (recommendations seven onwards)—as individual investors only began switching between pension portfolios in large numbers beginning with the seventh

recommendation (see Figure 1). We estimate regressions of the form:

$$y_\tau = \alpha + \sum_{s=-2}^0 \beta_s \delta_{E\tau}(s) + \beta_1 \delta_{E\tau}(1 : 2) + \beta_2 \delta_{E\tau}(3 : 7) + \beta_3 \delta_{E\tau}(8 : 10) \\ + \sum_{s=-2}^0 \phi_s \gamma_{E\tau}(s) + \phi_1 \gamma_{E\tau}(1 : 2) + \phi_2 \gamma_{E\tau}(3 : 7) + \phi_3 \gamma_{E\tau}(8 : 10) + \epsilon_\tau.$$

The δ_E indicators are active (taking on values of $\pm\rho$) only for the first six recommendations, and the γ_E indicators become active starting with the seventh recommendation, and the notation is as before. Table 11 underscores that portfolio reallocations do not underlie these excess returns. For early recommendations that almost no investors acted on, there are large abnormal returns on days $t + 3$ to $t + 7$ of about 0.7-0.8% on stock market indexes and 0.5% on portfolio A. Thus, initially investors would have benefited from following H&L's advice. However, once large numbers of investors began to follow H&L's recommendations, the excess returns in the stock market vanish: portfolio reallocations and market illiquidity do *not* drive the observed return patterns.²³

Instead, following later recommendations, the market immediately responds with announcement effects on stock market indexes of 0.5–0.6%. Thus, it appears that at the outset H&L correctly anticipated the near-term performance of the risky portfolio *A*. In turn, this seems to have led to a shared belief among individual investors *and* the market that H&L's recommendations contain valuable information. As a result large numbers of individual investors started following H&L's advice. Paradoxically, though, *because* the market also comes to believe that H&L's advice has value, this information is immediately incorporated into portfolio valuations and stock prices. Unfortunately for followers of H&L, it takes time to transfer investments between portfolios. Consequently, investors following H&L's advice fail to benefit from these announcement effects.

As a placebo test, the last column of Table 11 reports results using daily returns of the S&P 500 index as the dependent variable, as returns on this index are highly correlated with those on the domestic stock market and portfolio A. For early recommendations, we expect results similar to those for the domestic stock market indexes; but for later recommendations, we expect positive lagged returns and no announcement effects. This is exactly what we find.

²³A recent working paper (Da et al. [10]) also looks at H&L's returns, positing that trades by AFPs might be driving the return patterns. The absence of increased trading volume in domestic stock markets and return reversals in the days following recommendations, indicates that this premise is incorrect.

Table 11: Recommendations and asset returns. OLS regression of $y_\tau = \alpha + \sum_{s=-2}^0 \beta_s \delta_{E\tau}(s) + \beta_1 \delta_{E\tau}(1:2) + \beta_2 \delta_{E\tau}(3:7) + \beta_3 \delta_{E\tau}(8:10) + \sum_{s=-2}^0 \phi_s \gamma_{E\tau}(s) + \phi_1 \gamma_{E\tau}(1:2) + \phi_2 \gamma_{E\tau}(3:7) + \phi_3 \gamma_{E\tau}(8:10) + \epsilon_\tau$ using daily data for the period 3Jan2011–30Sep2016, where y_τ is the daily return (in %) of a social security portfolio, stock market index, exchange rate (foreign currency over CLP), or government bond.

	Social Security Portfolios				Stock Market			Placebo
	A	A	A	E	IPSA	IPSA	IPSA	S&P500
$\delta_E(-2)$	0.678*** (0.115)	0.154 (0.139)	0.185 (0.134)	-0.027 (0.035)	1.160*** (0.333)	0.453 (0.414)	0.561 (0.364)	0.645** (0.258)
$\delta_E(-1)$	0.398** (0.166)	0.056 (0.105)	0.062 (0.101)	-0.009 (0.050)	1.035*** (0.364)	0.688* (0.358)	0.587* (0.337)	0.768*** (0.280)
$\delta_E(0)$	0.312 (0.200)	0.151 (0.104)	0.174 (0.113)	0.013 (0.055)	0.531 (0.443)	0.210 (0.268)	0.259 (0.268)	0.326 (0.371)
$\delta_E(1:2)$	-0.059 (0.113)	-0.019 (0.073)	-0.030 (0.079)	0.006 (0.049)	-0.016 (0.203)	0.107 (0.171)	0.052 (0.194)	-0.318 (0.384)
$\delta_E(3:7)$	0.475** (0.193)	0.198*** (0.076)	0.208** (0.081)	-0.012 (0.020)	0.755*** (0.317)	0.441** (0.215)	0.459*** (0.177)	0.702** (0.354)
$\delta_E(8:10)$	0.099 (0.193)	0.067 (0.096)	0.089 (0.094)	-0.120* (0.063)	-0.434 (0.437)	-0.641 (0.424)	-0.455 (0.351)	-0.020 (0.526)
$\gamma_E(-2)$	0.410*** (0.100)	0.242*** (0.091)	0.266*** (0.092)	0.021 (0.019)	0.621*** (0.204)	0.255 (0.186)	0.291* (0.176)	0.603** (0.252)
$\gamma_E(-1)$	0.758*** (0.127)	0.244*** (0.095)	0.269*** (0.095)	0.004 (0.029)	1.055*** (0.211)	0.402** (0.197)	0.397** (0.193)	1.130*** (0.252)
$\gamma_E(0)$	0.242 (0.174)	0.192* (0.104)	0.215** (0.108)	-0.021 (0.026)	0.583** (0.246)	0.314* (0.174)	0.417** (0.185)	0.080 (0.235)
$\gamma_E(1:2)$	-0.055 (0.099)	0.002 (0.066)	-0.000 (0.067)	-0.011 (0.014)	-0.036 (0.179)	0.027 (0.157)	0.110 (0.145)	-0.275 (0.175)
$\gamma_E(3:7)$	0.130** (0.055)	0.076* (0.042)	0.079* (0.042)	0.013 (0.009)	0.072 (0.100)	0.009 (0.083)	0.011 (0.081)	0.148 (0.101)
$\gamma_E(8:10)$	-0.115* (0.061)	-0.082** (0.038)	-0.086** (0.038)	-0.005 (0.011)	-0.181 (0.134)	-0.117 (0.113)	-0.169 (0.107)	-0.162 (0.134)
ACWI		0.417*** (0.021)						
World			0.401*** (0.021)					
Emerging Markets					0.487*** (0.030)			
Latin America						0.353*** (0.020)		
Observations	1,436	1,436	1,436	1,436	1,437	1,437	1,437	1,446
R^2	0.058	0.503	0.486	0.019	0.056	0.363	0.391	0.037
Adjusted R^2	0.050	0.498	0.481	0.011	0.048	0.357	0.385	0.029
	Testing equality of before and after coefficients (p-value)							
$\delta_E(-2) = \gamma_E(-2)$	0.079	0.594	0.614	0.225	0.167	0.660	0.502	0.906
$\delta_E(-1) = \gamma_E(-1)$	0.085	0.176	0.128	0.816	0.962	0.482	0.623	0.340
$\delta_E(0) = \gamma_E(0)$	0.790	0.783	0.790	0.570	0.918	0.744	0.628	0.577
$\delta_E(1:2) = \gamma_E(1:2)$	0.976	0.832	0.774	0.744	0.941	0.727	0.812	0.919
$\delta_E(3:7) = \gamma_E(3:7)$	0.086	0.160	0.160	0.250	0.040	0.062	0.022	0.135
$\delta_E(8:10) = \gamma_E(8:10)$	0.289	0.150	0.083	0.071	0.581	0.231	0.435	0.795

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Intercept not reported

2.3 Do followers gain?

We next investigate whether investors benefit from following H&L's advice. We employ two approaches:

1. We use H&L's payment records to compute returns for each follower starting with the first announcement he could follow through the last announcement before his subscription expired. We then determine whether the follower's return exceeded that from a buy-and-hold strategy for each feasible portfolio over that period of time.

2. We compare the cumulative returns starting at each of the first twenty announcements through September 30, 2016 from (a) following H&L’s strategy vs. (b) investing and then holding any given portfolio.

Because some investors must select from less risky portfolios due to their age or gender, we divide followers into risk categories according to the riskiest portfolio that they can choose. If age or gender is missing, or if the age when the account was open is below eighteen, we drop the observation.²⁴

Table 12 compares returns for each follower starting with the first announcement he could follow through the last announcement before his subscription expired with the analogous return from a buy-and-hold strategy for each (age and gender) feasible portfolio over that period of time. The top panel reveals the percentage of followers that obtained a higher return than they would have obtained from holding an 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 those they would have received from investing in the riskiest portfolio that they could choose, and over 90% earned worse returns than those from holding the safe portfolio E . The table also plots the distribution of net returns: the median is negative and a non-trivial fraction of followers earn a net return of -10% or worse; in contrast, those who outperformed the social security portfolios, barely did so.

The bottom panel of Table 12 compares returns of followers if the pricing convention were changed so that returns reflect prices at the moment a request is made, rather than with a one day lag. Consistent with our regression results, followers would have done far better if they could have benefitted from the stock market announcement effect. Plausibly, this finding can reconcile why some individuals continued to follow H&L despite their poor actual performance—they may not have recognized this poor performance.²⁵ The complex pricing rules used by AFPs to value portfolio transfers may make difficult for followers to realize that the announcement effect is hurting them rather than helping them. We recall: following a request to switch portfolios on day $t - 1$, when the AFP moves the money on day $t + 3$ (as is typical), the AFP uses the portfolio price on day $t + 1$ to value the funds

²⁴Of the 111,351 observations in H&L’s administrative records, about 22% do not have information for gender or age, or has a starting age below eighteen. Results are robust to assigning risk type A to the dropped observations.

²⁵In the next subsection we will show that this fact can only partially explain why so many workers follow H&L. In particular, many followers *know* that H&L underperformed buy and hold in the previous 12 months.

being shifted, which is computed based on the day t prices of the underlying assets.

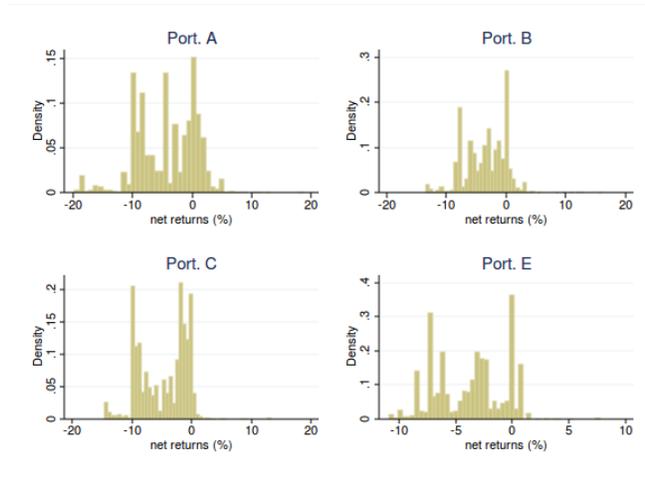
Table 13 provides even starker evidence. The table compares the return from following H&L strategy with those from buying and holding each of the five portfolios. The comparison considers an investor who starts following H&L at recommendation k for $k = 1, \dots, 20$ and continues to do so until September 30, 2016. That is, we compare the return from beginning to follow H&L at different points in time with all possible buy and hold strategies. Column $t-1$ shows the return assuming a follower acts the same day the recommendation is made. We see that with the exception of the first recommendation, any other starting point is outperformed by at least one the five portfolios, and, in almost all cases, H&L's strategy ranks last. Column $t-2$ shows the analogous returns were investments transferred at the exact moment when H&L made its recommendation at prices based on close of that trading day—returns that H&L can highlight, and returns that an investor would obtain if he could benefit from the announcement effect. For the first 14 recommendations, this return exceeds that from buying and holding *any* portfolio, essentially reversing the true return pattern. Comparing columns $t-1$ and $t-2$ reveals the impact of the announcement effect, which results in investors buying portfolio A high, and selling it low, and the consequences for cumulative returns.

Columns $t-3$ and $t-4$ show that a hypothetical investor who could have acted on H&L's advice two or three days before the recommendation was made would have vastly outperformed any buy and hold strategy. This, of course, simply reflects the market/portfolio returns that entered into H&L's decision to change recommendations. But, such returns raise the possibility that some investors may naively lump those returns in with the returns that they actually realize and conclude that the performance of H&L is better than it actually was. The qualitative results in Table 13 obviously hold if returns are adjusted by risk. Appendix C presents the analogous table computed using the modified Sharpe ratio (Israelsen [18]).

Table 12: Percentage of followers by risk type that beat a *Buy & Hold* strategy for different feasible portfolios. Followers are assumed to act immediately on all recommendations while their subscription is active. The top panel reflects the existing pricing convention. The bottom panel supposes that the pricing convention is changed so that returns reflect prices at the moment a request is made, rather than with a one day lag.

		Acting immediately											
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 returns



		Incorporating announcement effect											
Risk type		A					B				C		
Benchmark		A	B	C	D	E	B	C	D	E	C	D	E
		0.36	0.49	0.21	0.07	0.16	0.46	0.25	0.14	0.23	0.32	0.32	0.47

Distribution of net returns

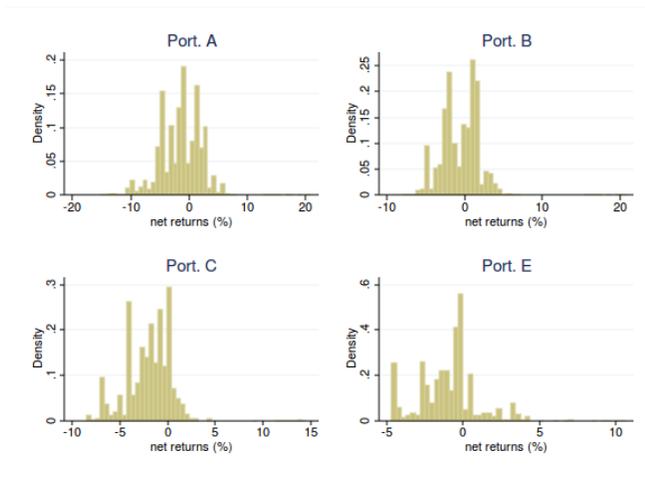


Table 13: Nominal cumulative return for H&L’s strategy and the five social security portfolios starting with any of the first 20 recommendations until September 30, 2016. Column $t - 1$: cumulative return for follower acting the day a recommendation is made. Column $t - j$, $j = 2, 3, 4$: hypothetical cumulative return for a follower who acts j days before a recommendation is made. Column $t - 2$ captures the return that would obtain were investments transferred as soon as a recommendation is made.

Starting recomm.	Benchmark					H&L			
	A	B	C	D	E	$t - 1$	$t - 2$	$t - 3$	$t - 4$
1	0.399	0.393	0.461	0.484	0.514	0.525	0.632	0.805	0.932
2	0.535	0.480	0.504	0.485	0.460	0.470	0.573	0.737	0.858
3	0.541	0.483	0.509	0.492	0.472	0.476	0.553	0.706	0.790
4	0.483	0.438	0.474	0.462	0.440	0.444	0.519	0.669	0.749
5	0.390	0.367	0.420	0.430	0.433	0.354	0.429	0.565	0.620
6	0.458	0.410	0.438	0.428	0.409	0.331	0.407	0.541	0.596
7	0.443	0.399	0.426	0.419	0.402	0.318	0.413	0.545	0.595
8	0.466	0.414	0.435	0.424	0.403	0.318	0.415	0.546	0.592
9	0.472	0.422	0.439	0.418	0.388	0.324	0.419	0.545	0.584
10	0.360	0.337	0.377	0.380	0.376	0.312	0.403	0.523	0.560
11	0.349	0.327	0.361	0.362	0.355	0.302	0.389	0.484	0.512
12	0.342	0.326	0.348	0.337	0.329	0.277	0.359	0.451	0.478
13	0.345	0.329	0.346	0.330	0.314	0.279	0.351	0.435	0.448
14	0.339	0.322	0.341	0.326	0.312	0.277	0.347	0.432	0.446
15	0.277	0.271	0.286	0.269	0.260	0.217	0.252	0.310	0.312
16	0.216	0.221	0.245	0.241	0.247	0.205	0.241	0.298	0.301
17	0.130	0.142	0.168	0.174	0.182	0.142	0.175	0.229	0.230
18	0.097	0.113	0.140	0.149	0.160	0.120	0.153	0.211	0.214
19	0.123	0.129	0.146	0.147	0.150	0.111	0.142	0.196	0.199
20	0.123	0.125	0.135	0.136	0.135	0.110	0.128	0.156	0.154

This evidence is striking given that H&L only had 54 followers at the time of the first announcement, and did not attract new clients until announcement five (see the top panel of Figure 4, which plots the matrix of clients according to the first and last announcement they could follow according to their payment records).²⁶ This figure shows that an important part of H&L’s subscribers were still active in the last announcement in our sample, and many have been following for over a year. The bottom panel of Figure 4 reveals that over half of H&L customers renew their membership, and so presumably choose to continue following recommendations despite the poor realized returns from doing so. This leads us to ask: Why do followers act on H&L’s recommendations? Are they aware of their performance? We investigate these questions next, presenting results from a survey of H&L clients.

²⁶Our sample features 35 announcements, but the matrix in Figure 4 has 36 rows and columns because some followers joined after the last announcement (or their membership has not expired).

Figure 4: Membership length of H&L followers according to their payment records. The top figure shows the heat map of the matrix with the first and last announcement while the account was active for each follower. The bottom table shows the distribution of followers according to the length of their membership in years, and we decompose each category in whether they are active or inactive (expired) as of September 30, 2016.



Distribution of membership length

	Number of followers	Inactive	Active
One year or less	53,037	29,594	23,433
	47%	56%	44%
Between 1 and 2 years	7,862	3,686	4,176
	7%	47%	53%
Between 2 and 3 years	17,022	8,267	8,755
	15%	49%	51%
Between 3 and 4 years	18,494	5,469	13,025
	16%	30%	70%
More than 4 years	15,833	716	15,117
	14%	5%	95%
Total	112,248	47,732	64,516
	100%	43%	57%

2.4 Characterizing followers

Table 3 reveals that paid and second-hand followers of H&L have over twice the savings of the average investor, consistent with Fuentes et al. [14] who find that active investors in the system have higher savings than those who do not change portfolio choices. To glean more insights, we conducted a survey during October and November 2016 of followers of H&L

and other advisers providing a similar service. We invited them to distribute the survey to followers by email. Appendix A lists the questions. We also launched our survey in Facebook. The Facebook post was randomly displayed to stratified segments of adults in Chile according to age and gender. We now compare the results of our survey with the EPS.

The vast majority of respondents—almost 87%—claim to be current followers of H&L (see Table 18 in appendix B), so our analysis focuses on this sub-population. We contrast these respondents with the 68% of respondents from the 2015 EPS who claim to be members of the AFP system. We divide AFP members into two groups according to whether they claim to know which portfolio(s) they are holding. About 77% of AFP members do *not* know their portfolio (see Table 19 in appendix B). We label these groups AFP DNK if do not know the portfolio, and AFP otherwise. Table 14 provides some demographics of these groups. Striking differences appear when comparing education and income: H&L followers are far more educated (almost 75% have university degrees vs. 36% for AFP members who know their portfolios, and only 14% for those who do not), they have incomes that are several multiples of the other two groups, and they are more than twice as likely to hold savings other than mandatory savings. These three findings are consistent with Fuentes et al. [14]. The three groups do not differ substantially in risk aversion. Interestingly, a *smaller* proportion of followers self-describe themselves as having a good or very good financial knowledge.

Greater savings and income, and higher education suggest that followers are more sophisticated than typical members of the other two groups. Our survey features two questions pertaining to financial sophistication. These questions belong to a group of “sophisticated” questions designed by the United States Health and Retirement Study (HRS) to identify knowledge of key financial concepts (Behrman et al. [4]). These two questions were also asked in the 2009 and 2012 EPS. One question is a TRUE/FALSE question about risk diversification; and the other question asked respondents to compute a two-period compound interest problem. We coded answers as correct or incorrect. Table 15 reveals that 85% of followers answered the diversification question correctly, but non-followers did no better than would be expected by chance. The question related to compound interest is even more telling: 64% of followers answer the question correctly versus only 3-5% of non-followers. In sum, followers are *very* financially sophisticated, whereas the typical investor is quite unsophisticated.

The fact that followers are sophisticated does not ensure that they are aware of the poor performance of H&L’s strategy. To test their awareness we had respondents rank portfolios

Table 14: Demographics from our survey and the 2015 EPS. Table entries represent percent 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		2.5	11.6	37.3	48.5
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		19.6	53.6	13.2	12.7	1

		Financial knowledge self perception (2012 EPS)				
		Very bad	Bad	Intermediate	Good	Very good
H&L		6.7	28.2	53.5	10.7	0.9
AFP		6.8	16.1	47.7	24.9	4.6
AFP DNK		16.9	29.2	41.8	11.1	1

		Risk aversion (2012 EPS)										
		0	1	2	3	4	5	6	7	8	9	10
H&L		2.45	1.76	3.57	5.93	6.81	23.44	15.39	20.78	14.12	2.39	3.38
AFP		5.01	1.86	2.77	5.46	6.08	17.9	12.62	13.6	14.24	8.75	11.71
AFP DNK		7.81	4.39	6.13	6.98	7.12	17.39	11.18	11.65	10.71	4.59	12.05

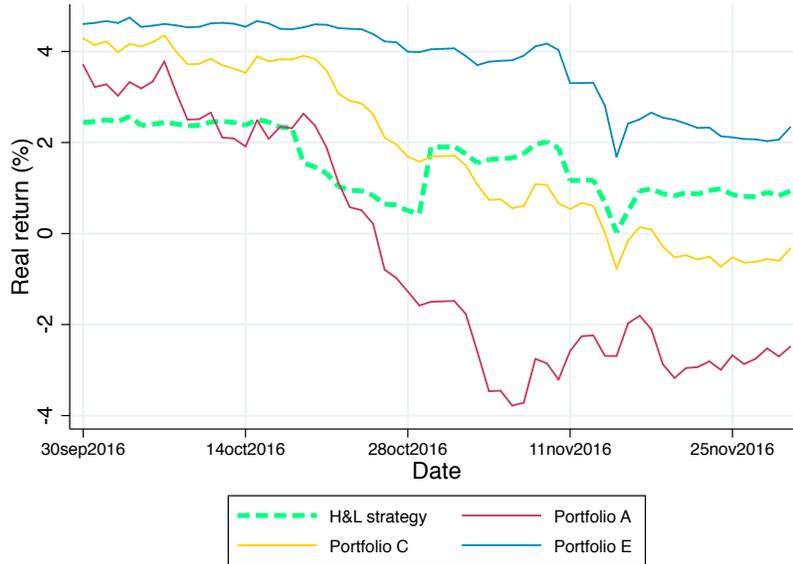
A, C, E and their own savings in terms of returns over the past twelve months. The survey was “open” from October to November 2016; Figure 5 plots these twelve month returns starting on the 30th September until the end of November. The figure shows that the ranks of portfolios A, C and E do not change over this period, but the rank of H&L’s strategy varies depending on the specific day agents used to compute the ranking. Therefore, we only compare the relative rank of their own savings with respect to portfolio E.

Using only observations of individuals who have been following H&L for over a year, we divide respondents who ranked portfolios into groups. The “full-ranking” group consists of

Table 15: Percent 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%

Figure 5: Twelve month return during survey period for each portfolio and for H&L’s strategy.



those who ranked all three portfolios and their own savings. We divide those who only give a partial ranking into three groups: partial ranking group 1 consists of those who ranked portfolio E, their own portfolio, and either A or C. Partial ranking group 2 consists of those who provided rankings for at least two portfolios but failed to provide a ranking for their own savings. Partial ranking group 3 consists of those who ranked portfolio E and their own savings only. About 40% of followers do not provide rankings, and about 9% only give his own ranking and a portfolio other than E, and are omitted.

Table 16 shows that those who rank portfolio returns tend to be well informed—over 60% rank the returns on portfolios A, C and E correctly, and little over half correctly recognize that the return on the safe portfolio E exceeded the return from following H&L’s strategy and over 75% of those giving a response correctly assessed that the real return on their savings from following H&L’s strategy in the past twelve months was between 0 and 4%.²⁷ In sum,

²⁷This question is demanding—a reader should reflect on how the 12-month return on their own portfolio

most investors have good ideas of the actual return that they obtained, and a non-trivial majority of followers pay extensive attention to the relative performance of different pension portfolios. Some investors overestimate the performance of H&L’s strategy relative to the safe portfolio E, but even then a majority get this ordering right.

Table 16: Portfolios ranking and H&L relative performance.

Group	Sample size	(A < C < E)	(H&L < E)
	Num. respondents	Correct answers	Correct answers
Full ranking	2,964	1,693 57%	1,489 50%
Partial ranking 1	300	197 66%	191 64%
Partial ranking 2	1,083	702 65%	
Partial ranking 3	89		50 56%

Respondents are classified into four groups: (i) Full ranking, those who ranked all portfolios including their own savings; (ii) Partial ranking 1 have rankings for portfolio E, their own portfolio and either A or C; (iii) Partial ranking 2 have rankings for at least two portfolios but not for their own savings; (iv) Partial ranking 3 have rankings for portfolio E and their own savings only.

Table 17: Real returns on own savings over the previous 12 months. Actual return on H&L’s strategy fluctuated between 0 and 4%.

Group	Num. of respondents	Less than 0%	Between 0 and 4%	Higher than 4%	Don’t know / No Response
Full ranking	1,859	37 1.9%	1,202 64.7%	361 19.4%	259 13.9%
Partial ranking 1	178	1 1%	122 69%	33 19%	22 12%
Partial ranking 2	676	13 2%	435 64%	129 19%	99 15%
Partial ranking 3	60	0 0%	45 75%	8 13%	7 12%
No ranking	1,852	39 2%	953 52%	267 14%	593 32%

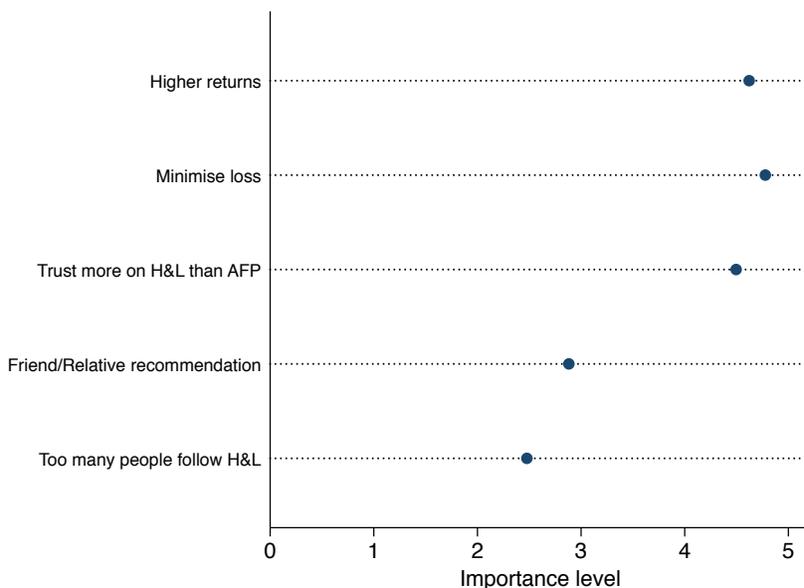
Respondents are classified into four groups: (i) Full ranking, those who ranked all portfolios including their own savings; (ii) Partial ranking 1 have rankings for portfolio E, their own portfolio and either A or C; (iii) Partial ranking 2 have rankings for at least two portfolios but not for their own savings; (iv) Partial ranking 3 have rankings for portfolio E and their own savings only.

Thus, we have documented that (1) followers are highly financially sophisticated—far more so than the average investor—and they have a lot more at stake, (2) most followers were harmed by following H&L, and (3) a majority of followers is aware of the bad performance. Why then do investors follow H&L? Our survey asks respondents to rank five ranked vis à vis the S&P 500 or MSCI World Index.

possible reasons for why they follow their current advisor.²⁸ Figure 6 presents a puzzle: it reveals that current H&L followers indicate that the most important reasons for following H&L are: higher returns, loss minimization and trust...

Of course, inverting the standard investment caveat, past bad performance is no guarantee of future bad performance. The fact that most respondents cite trust in H&L as a key reason for following him, may indicate that they believe that H&L offers them a higher *expected* return, or that they value having someone “looking after” their savings for them. Moreover, some followers appear to over-estimate relative returns of H&L, possibly due to the complex pricing rules used by AFPs to value transferred funds, and some may also confuse the good performance of a portfolio just prior to H&L’s recommendation. The bottom line remains that understanding how and why individuals allocate pension investments as they do is germane not only to the Chilean Social Security system, but to retirement savings everywhere.

Figure 6: Why current followers follow H&L.



3 Conclusion

Our paper documents the massive effects that portfolio recommendations by the pension advisory service H&L have had on pension investments by individuals, and the consequences for

²⁸Only a few respondents selected an “other” option, and its average importance level is low.

the Chilean stock market. Investors have come to believe that H&L’s recommendations contain information with predictive value—leading to pension transfers that amount to as much as 25% of total portfolio holdings and 1.3% of GDP. Prior to investors following this advice in large numbers, investors could have benefited from it; but once investors started following H&L’s advice, stock prices responded before investors could reallocate pension investments in time to benefit. As a result, pension investors are harmed by following H&L’s advice; most investors would have done better to stick with *whatever* pension position they had at the outset.

We establish that H&L bases recommendations on the immediate past performances of the Chilean stock market—recommending riskier portfolios after the market rises, and recommending safer portfolios after it falls. The extreme short-run nature of the recommendation model means that others cannot forecast and frontrun H&L’s advice; consistent with this, we do not observe abnormal portfolio flows or stock volume before new recommendations.

Individuals following H&L have high incomes and are highly educated and financially sophisticated, especially relative to non-followers. Moreover, followers have a good understanding of the relative performances of different portfolios, albeit modestly over-estimating the returns from following H&L. Remarkably, despite evidence of poor past performance, the key reasons that individuals give for following H&L are: high returns, minimize risk and trust.

Our findings suggest care in the design of “privatized” social security. “Privatized” systems seek to align individual investments with risk attitudes, while avoiding shortfalls in savings due to bad investment choices or moral hazard by investment advisors. One way to do this is to limit the set of investment alternatives. We show that even with sharp limitations, sophisticated pension investors can still be harmed. Our analysis also highlights a potentially adverse consequence of limited choice sets. With few investment alternatives, common information arrival—here taking the form of portfolio recommendations by H&L—can result in massive portfolio reallocations. In Chile, these reallocations did not overwhelm liquidity provision because AFPs can allocate them to liquid foreign equity markets, avoiding volume surges in the Chilean stock market. This might not be possible for savings plans with greater exposure to domestic equity markets.

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Appendix A Survey questions

1. Do you currently follow the recommendation of an adviser to manage your social security savings? Which one?
2. Currently do you 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 did it pass since you first heard about your current adviser and when you started following the recommendations?
8. Usually, how fast do you 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. In a scale from 0 to 10, how risk averse are you? (where 0 is not willing to take any risk)

21. True or false: buying share of a single firm is less risky compared to 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?

Appendix B EPS and survey samples

This appendix reports sample statistics for followers and members of the AFP system. Table 18 reports the number of observations in our survey, and the number of observations in the different EPS. Table 19 decomposes the observations used in our analysis.

Table 18: Survey observation numbers by method of collection

Own survey		EPS [†] survey		
Source	Obs.	Source	Obs.	Obs.(iw)
H&L email list	9,373	EPS 2015	16,906	13,560,981
Other advisors	118	EPS 2012	15,998	12,718,525
Facebook	547	EPS 2009	14,463	12,765,015

[†] The Obs. (iw) column refers to the expanded sample by "importance weights" provided in the EPS.

Table 19: Sample selection

Source		Sample size	Per cent 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

Appendix C Modified Sharpe ratio

In this appendix we show the modified Sharpe ratio (Israelsen [18]) for H&L's strategy and for each portfolios besides portfolio E. We use Portfolio E as the risk free portfolio when calculating the modified Sharpe ratio. The original Sharpe ratio is not valid when the excess return is negative. The modified ratio corrects this. As Table 13 reports, portfolio E yields the highest return for the period analyzed. Interpretations of the modified ratio are similar to those of the original Sharpe ratio: a higher ratio reveals a higher return after controlling for risk.

Let ER be the average of the daily excess return of portfolio X relative to portfolio E, and SD the standard deviation of the daily excess return. The modified Sharpe ratio is defined as:

$$\text{Modified Sharpe ratio} = \frac{\text{ER}}{\text{SD}^{\text{ER}/\text{abs ER}}}, \quad (1)$$

where abs ER is the absolute value of ER. From equation (1) we see that if ER is positive then the Sharpe ratio and the modified version coincide. If ER is negative then the exponent in the denominator is -1, and so the modified Sharpe ratio becomes the product of ER and SD, instead of their ratio.

The results presented in Table 20 are obtained adjusting equation (1) in two ways: first we multiply the ratio by 252, the (average) number of trading days in a year; and second, because both ER and SD are close to zero, when ER is negative the ratio becomes very small, therefore we multiply negative entries by 100,000 so that scales are similar.

Table 20: Modified Sharpe Ratios for H&L’s strategy and social security portfolios A, B, C & D starting with any of the first 20 recommendations until September 30, 2016. Column $t - 1$: modified Sharpe ratio if a follower acts the day a recommendation is made. Column $t - j$ for $j = 2, 3, 4$: modified Sharpe ratio if follower acts j days before a recommendation is made.

Starting recomm.	Benchmark				H&L			
	A	B	C	D	$t - 1$	$t - 2$	$t - 3$	$t - 4$
1	-6.46	-5.65	-1.59	-0.48	0.83	4.64	9.76	12.75
2	2.70	1.24	2.97	3.21	0.85	4.71	9.88	12.90
3	2.63	0.88	2.63	2.73	0.58	3.89	9.40	11.97
4	1.97	0.33	2.62	3.22	0.58	3.92	9.59	12.09
5	-1.86	-3.02	-0.30	-0.03	-3.45	0.21	6.27	8.26
6	2.38	0.49	2.54	3.07	-3.72	0.33	6.52	8.61
7	2.13	0.25	2.18	2.76	-4.05	0.99	7.29	9.14
8	2.95	1.01	2.86	3.57	-4.13	1.05	7.34	9.04
9	3.81	2.24	4.52	5.06	-3.13	2.19	8.36	9.80
10	-0.14	-2.06	0.38	0.93	-3.55	2.08	8.33	9.77
11	0.39	-1.52	0.87	1.50	-3.14	2.67	8.15	9.36
12	1.30	0.26	2.40	2.04	-3.57	2.56	8.30	9.54
13	2.21	1.50	3.87	3.63	-2.35	3.13	8.57	9.10
14	2.08	1.21	3.76	3.54	-2.42	3.11	8.65	9.23
15	1.67	1.40	3.82	2.72	-3.60	-0.36	4.91	5.01
16	-3.25	-2.30	0.01	-0.20	-3.85	-0.18	5.14	5.33
17	-8.74	-5.08	-1.11	-0.34	-4.95	-0.40	5.52	5.53
18	-11.53	-6.29	-1.67	-0.46	-5.09	-0.28	6.09	6.25
19	-4.43	-2.81	-0.26	-0.12	-5.65	-0.69	6.01	6.32
20	-1.43	-1.22	0.23	0.57	-3.77	-0.73	3.29	3.02