

Essays on retail investors' mutual fund flows

Jukka Johansson

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This dissertation examines policyholder and mutual fund investor behavior in unit linked investment-type policies through three connected essays. The first essay shows that positive returns significantly reduce termination rates, suggesting that previously studied models in actuarial science are insufficient for explaining policyholder behavior in unit-linked policies. The second essay analyzes mutual fund withdrawals relative to the fund's holding period return. The results reveal a downward V-shaped relationship between selling rates and returns, with withdrawal rates peaking near zero returns and decreasing as returns move further from zero. We explain the results through a prospect theory-based model. The third essay studies how individual investor actions impact mutual fund flows. The essay finds reallocations between funds, rather than new inflows or terminations, primarily drive the flow–performance relationship. The reallocations out of funds increase with fund performance, but the money is reallocated mainly to other high-performing funds. We also find asymmetry between withdrawal and investment decisions: an unadjusted 12-month return or a cross-sectional ranking based on it mainly explains fund inflows, while outflows are also explained by holding period returns. The findings suggest that common monotonic learning models are insufficient in explaining mutual fund flows.

Tekijä Jukka Johansson

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Esseeväitöskirja

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Avainsanat sijoitusrahastot, rahavirrat, prospektiteoria, behavioristinen rahoitus

Tämä väitöskirja sisältää kolme esseetä, joissa tutkitaan vakuutuksenottajien ja rahastosijoittajien käyttäytymistä. Ensimmäinen essee osoittaa, että sijoitussidonnaisten vakuutusten positiivinen tuotto vähentää merkittävästi vakuutusten irtisanomisia. Tämän perusteella vakuutustieteessä aiemmin tutkitut mallit eivät siis riitä selittämään vakuutuksenottajien käyttäytymistä sijoitussidonnaisissa vakuutuksissa. Toinen essee tarkastelee, miten rahaston tuotto vaikuttaa siihen, kuinka paljon sijoittajat nostavat varojaan rahastosta. Empiiriset tulokset paljastavat, että yhteys tuottojen ja nostojen välillä muistuttaa ylösalaisin olevaa V-kirjainta: nostot ovat yleisimpiä nollatuoton tuntumassa ja vähenevät, kun tuotot ovat kauempana nollasta. Empiirisiä tuloksia selitetään prospektiteoriaan perustuvalla mallilla. Kolmas essee tutkii, miten yksittäisten sijoittajien toimet vaikuttavat sijoitusrahastojen rahavirtoihin. Essee osoittaa, että rahastojen väliset uudelleensijoitukset pääasiassa selittävät rahavirtojen ja rahastojen tuottojen välisen yhteyden. Rahastoista nostetaan enemmän varoja tuoton kasvaessa, mutta varat sijoitetaan useimmiten uudelleen muihin, hyvin tuottaviin rahastoihin. Lisäksi esseessä havaitaan epäsymmetria sijoitus- ja nostopäätösten välillä: uusia sijoituksia rahastoihin selittää pääasiassa 12 kuukauden tuotto, kun taas nostoja selittää myös koko pitoajan tuotto. Tulokset viittaavat siihen, että yleisesti käytetyt monotoniset oppimismallit eivät riitä selittämään sijoitusrahastojen rahavirtoja.

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Author's contribution

- Essay 1: The Impact of Policy Returns on Surrender Behavior in Investment-Type Unit-Linked Life Insurance
 - Jukka Johansson: sole author
- Essay 2: Prospect Theory and Investors' Mutual Fund Trading by Jukka Johansson and Markku Kaustia
 - Jukka Johansson: theoretical framework, literature review, research design, writing, data collection, empirical analysis
 - Markku Kaustia: theoretical framework, literature review, research design, writing
- Essay 3: Individual Investor Behavior and Mutual Fund Flows by Jukka Johansson, Petri Jylhä and Markku Kaustia
 - Jukka Johansson: theoretical framework, literature review, research design, writing, data collection, empirical analysis
 - Petri Jylhä: theoretical framework, literature review, research design, writing
 - Markku Kaustia: theoretical framework, literature review, research design, writing

Introduction

This dissertation consists of three essays that examine policyholder behavior in unit-linked investment-type policies. Policyholder behavior is an important topic in its own right, as unit-linked policies are a significant asset class for households, and households' investment behavior in unit-linked policies has received less attention than their behavior in more common asset classes, such as stocks, bonds, or mutual funds. Unit-linked policies studied in this thesis also provide an interesting setting for examining mutual fund investor behavior. The reason is that the unit-linked policies in the sample are similar to broker accounts, in which the only available investments are the insurance firm's pre-specified mutual funds, and reallocations within the policy are free of taxes and transaction costs. The essays examine how policy returns affect the decision to terminate the policy, how fund returns affect the decision to withdraw and reallocate funds within the policy, and how individual investment decisions affect aggregate mutual fund flows.

Essay 1: The Impact of Policy Returns on Surrender Behavior in Investment-Type Unit-Linked Life Insurance

Existing actuarial science mainly explains life insurance termination rates through macroeconomic, policyholder-specific, and policy-specific variables, emphasizing the interest rate hypothesis (IRH) and emergency fund hypothesis (EFH) (e.g., Dar and Dodds 1989; Kuo et al. 2003; Outreville 1990), which suggest that higher interest rates and income shocks, respectively, result in higher lapse rates. However, unit-linked policies also serve as investment vehicles, suggesting that surrender decisions may depend on policy performance, consistent with findings in behavioral finance, such as the disposition effect (Shefrin and Statman, 1985; Odean, 1998).

In the first essay, I aim to answer the aforementioned question by examining how policy returns affect the unit-linked policy termination rate using policyholder-level data from two Finnish life insurers, comprising about 20,000 unit-linked policies from 2009 to 2019. The main finding is that policies with a positive holding-period return have almost 40% lower termination rates than those with a negative return, even after con-

trolling for standard macroeconomic and policy-specific variables. The result suggests that the previously proposed IRH and EFH, along with other basic covariates, are insufficient to explain policy termination behavior for unit-linked policies. Additional analyses confirm that short-term rolling returns and excess returns also significantly affect surrender rates.

The first essay also examines the IRH in unit-linked policies in more detail. The analyses show a positive relationship between interest rate and termination rate, as IRH suggests. However, when policy return is explicitly controlled for, the coefficient of the interest rate (10-year government bond yield) becomes statistically insignificant or negative. This indicates that the observed IRH in unit-linked policies is primarily driven by a return effect: rising interest rates decrease the value of fixed-coupon bond funds linked to the policy, thereby increasing the termination rate. This return effect offers an alternative or complementary explanation to the traditional opportunity cost effect, which states that higher interest rates make alternative investments more appealing, thereby increasing the termination rates.

Essay 2: Prospect Theory and Investors' Mutual Fund Trading

Prospect theory provides a powerful framework for explaining risk-taking behavior. However, its application to investors' selling decisions, particularly the disposition effect, has produced mixed results. Empirical research consistently shows that individuals are more inclined to sell winning stocks than losing ones, a behavior that prospect theory struggles to reproduce quantitatively. One reason may be that stock trading behavior intertwines prospect theory's gain-loss preferences with cognitive dissonance from admitting mistakes (Chang, Solomon, and Westerfield, 2016), complicating the identification of prospect theory's true role.

In the second essay, we seek to isolate the effect of prospect theory by focusing on mutual fund investments, where cognitive dissonance is expected to be weaker because investors can attribute poor performance to external fund managers. Using a simple and static cumulative prospect theory (Tversky and Kahneman, 1992) model, we derive

a relative likelihood of selling as a function of holding period returns and compare it with actual selling patterns in investor-level mutual fund data. The theoretical model predicts an inverse V-shaped selling-return relationship, peaking around zero returns. The empirical estimates exhibit a strikingly similar pattern. The theoretical model can also capture the differences in selling behavior for investors with high and low risk aversion.

Extending the model to include learning about fund manager ability further improves the empirical fit, particularly around the zero-return region, without diminishing the explanatory power of prospect theory preferences. The combined model demonstrates that even in the presence of learning, the prospect theory seems to explain mutual fund investors' selling behavior. Overall, this essay suggests that prospect theory also explains investor behavior in delegated assets.

Essay 3: Individual Investor Behavior and Mutual Fund Flows

The relationship between mutual fund performance and fund flows, known as the flow-performance relationship (FPR), has been widely studied. A consistent finding is that fund flows into funds increase with better performance: investors reward outperforming funds with higher net flows. While some studies find a convex FPR for equity funds (Chevalier and Ellison, 1997; Sirri and Tufano, 1998), others report a linear one (Guercio and Tkac, 2002; Spiegel and Zhang, 2013). However, most prior research uses fund-level data and focuses only on net flows, making it impossible to distinguish how individual investor actions and, more generally, investor behavior, contribute to the aggregate FPR.

In the third essay, we examine the flow-performance relationship using a unit-linked policy that resembles investment accounts that allow reallocations between a predefined set of actively managed bond and equity funds, free of taxes and transaction costs. The data enables decomposition of aggregate fund flows into investor-level actions: new premium inflows, partial and full policy terminations, and reallocations between funds. The results show that reallocations between mutual funds are the primary drivers of the flow-performance relationship, while new premium inflows and policy terminations play a smaller role. For equity funds, reallocations exhibit an

increasing, convex FPR, implying that investors disproportionately allocate savings to top-performing funds and withdraw from poorly performing ones. The convexity in equity funds' FPR is largely driven by inflows into new funds — those the investor did not hold previously — as investors actively search for and invest in high-ranking funds. Bond funds show a flatter, slightly decreasing FPR. Because equity fund outflows slightly exceed inflows into held equity funds, the net flow from held funds decreases with fund performance. This result seemingly contradicts common models based on monotonic learning, which predict that good performance would lead investors to increase, not decrease, their net investment in the fund.

Further analyses reveal an asymmetry in investment decisions: inflows are best explained by funds' 12-month unadjusted returns or cross-sectional performance rankings, while outflows are also influenced by investors' holding-period returns, consistent with behavioral anchoring to purchase prices. Investors predominantly reallocate savings to higher-ranking funds, indicating return-chasing rather than contrarian behavior.

The results paint a picture of an equity mutual fund investor who pays more attention to investment markets when the funds have performed well recently, as the Ostrich effect indicates. The increased attention leads the investor to seek new funds to invest in, and the main performance measure for finding such funds is the cross-sectional ranking based on unadjusted returns, consistent with the findings of Ben-David et al. (2021). Regarding equity fund outflows, there are two forces at play. Firstly, the effect of recent strong fund performance, which leads to negative outflows due to increased attention and the search for even better mutual funds. Secondly, the outflows are affected by the holding-period return and exhibit a similar FPR pattern to that predicted by cumulative prospect theory (Essay 2).

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