The Effect of Commissions on the Mutual Fund Market: Evidence from a Natural Experiment*

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Abstract

I analyze the causal effect of reduction in commissions paid to financial advisers for distributing mutual fund shares. I exploit a policy experiment in Israel and a difference-in-differences design by comparing outcomes for mutual funds that were subject to exogenous reductions in commissions. Commissions can produce two opposing effects: they can increase fund expense ratios leading to lower investor demand and they can motivate advisers to steer investors resulting in higher demand. The reduction in commissions leads to a reduction in fund expense ratios and an increase in net fund flows. Investors reallocate capital to mutual funds from other saving vehicles. An increase in net flows consists of a large increase in sales and a small increase in redemptions suggesting that high commissions prevent redemptions. Fund families open new funds and shift existing funds into investment categories with reduced commissions and high flows. My study concludes that the expense ratio effect of commissions produces a stronger impact on investor demand than their steering effect.

Keywords: Financial Advice; Financial Regulation; Mutual Funds

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1 Introduction

Financial advisers are important intermediaries who provide households access to a variety of financial products. In a typical situation, advisers help households to make investment choices and charge commissions in return. In many cases advisers receive their pay indirectly, obtaining payments from the providers of financial products rather than directly from the client. In the mutual fund market fund families frequently pay commissions to brokers and financial advisers enhancing distribution of funds shares. The U.S. mutual funds charge investors annual marketing and distribution fees (12b-1 fees) together with one-time sales loads in order to compensate brokers.[1] As of 2016, the average domestic U.S. equity mutual fund charged an expense ratio of 0.45% with 0.05% being 12b-1 fees. The total 12b-1 payments amounted to $3.6B or more than 10% of mutual fund expenses.[2]

What is the effect of commissions on investor behavior? On the one hand, commission represents a cost from the perspective of mutual fund providers. Higher commission can lead fund families to charge higher expense ratios as suggested by Ferris and Chance (1987). Bergstresser, Chalmers and Tufano (2009), Del Guercio, Reuter and Tkac (2010) and Del Guercio and Reuter (2014) confirm that products distributed through brokers and financial advisers are more expensive. As a result, high expense ratios may reduce demand and deter investors from choosing high commission funds. On the other hand, commissions can create incentives for financial advisers to steer investors into high commission products.[3] Christoffersen, Evans and Musto (2013) demonstrate that high commissions are associated with high inflows of capital into mutual funds. Accordingly, the expense ratio effect and the steering effect of commissions are expected to shift investor demand in opposite directions.

[1]The practice of using 12b-1 fee in order to provide ongoing compensation to brokers for selling mutual fund shares is discussed in SEC proposed rule on mutual fund distribution fees (https://www.sec.gov/rules/proposed/2010/33-9128.pdf). Since only broker/dealers can receive 12b-1 fees, FINRA regulates how much they can receive in 12b-1 fees. FINRA allows 25 basis points to be paid out for marketing and service fees and provides a cap of 75 basis points to be paid to brokers for fund distribution. This in effect creates a 1% cap on 12b-1 fees with the maximum possible trail commission of 75 basis points.

[2]The expense ratio and the 12b-1 fee are calculated as averages across funds weighted by fund total net assets as of December 2016 using CRSP mutual fund database.

[3]See, for example,Bergstresser, Chalmers and Tufano (2009), Hoechle, Ruenzi, Schaub and Schmid (2018) and Anagol, Cole and Sarkar (2017a) for the empirical evidence. For theoretical studies see, for example, Inderst and Ottaviani (2012a), Inderst and Ottaviani (2012b) and Inderst and Ottaviani (2012c). Foerster, Linnainmaa, Melzer and Previtero (2017) show that advisers can substantially influence their client asset allocation decisions. Egan, Matvos and Seru (2019) present evidence that some firms persistently engage in misconduct employing advisers with misconduct records.

The combined effect of commissions is an empirical question and cannot be determined on theoretical grounds a priori.

The ideal setting for studying the effect of commissions would be to randomly split investors into treatment and control groups, and to observe differences in demand between the groups following an exogenous change in commissions. Since the U.S. fund families simultaneously set ongoing 12b-1 fees, one-time sales loads and fund expense ratios, such a setting would be hard to attain by studying the U.S. market.[4] In addition, the U.S. mutual funds do not report which portion of 12b-1 fee is paid to brokers as a commission. While the early work provided some suggestive evidence on the effect of commissions, the estimation of casual effects still represents an empirical challenge.[5]

In this paper, I overcome this challenge by taking advantage of the unique structure of the Israeli mutual fund market. Exploiting a recent policy experiment, I estimate the casual effect of commissions and examine the effect of adviser compensation on behavior of investors and fund families. The Israeli market offers a good laboratory to study the effect of commissions. It has a simple market structure with a full legal separation between mutual fund management and share distribution. Fund families create and manage mutual funds while bank-employed financial advisers distribute fund shares. The majority of Israeli investors do not directly pay for advisory services as fund families have to compensate banks for distribution. In particular, families have to pay commissions to banks on an ongoing basis similarly to 12b-1 fees in the U.S. The commissions are determined by the government, are directly observed, are fixed within a given mutual fund category and cannot be renegotiated. In May 2013, the Israeli government revised the schedule of commissions introducing significant reductions for equity mutual funds and smaller reductions for other asset categories. Such a major regulatory change represents a natural experiment that allows me to study the effects of commissions and to provide a causal interpretation of the findings.[6]

Employing a difference-in-differences design, I first document a reduction in mutual

[4]For analysis of sales loads, see, for example, Sirri and Tufano (1998), Nanda, Wang and Zheng (2009), Bergstresser, Chalmers and Tufano (2009) and Anagol, Marisetty, Sane and Venugopal (2017b).

[5]Earlier work includes Ferris and Chance (1987), Trzcinka and Zweig (1990), Walsh (2004), Barber, Odean and Zheng (2005) and Christoffersen, Evans and Musto (2013).

[6]My key identifying assumption is that in the absence of the 2013 reform, the outcomes for funds in different asset categories would have maintained parallel trends. I validate this assumption by demonstrating that the key outcomes across fund categories move together in the pre-reform period.

fund expense ratios following a reduction in commissions. For each percentage point of reduction in commissions fund families reduced expense ratios by one percentage point. Since lower expense ratios can increase flows, we would expect to observe more investor flows after the reform. On the other hand, a reduction in commissions can weaken adviser incentives to sell funds which would lead to a decline in flows. I find that the reform generated an increase in net flows. These results indicate that the expense ratio ratio effect of commissions produces a stronger impact on demand of the average investor than their steering effect.

Furthermore, I use a single difference approach to study the effect of commissions separately for each asset category. The increase in net flows in the categories with the large reduction in commissions could arise from two sources: reallocation of capital from the categories with the small reduction or withdrawals from other investment vehicles outside of the mutual fund industry.[7] Reallocation across categories within the mutual fund industry would lead to net inflows in some categories and net outflows in others. Reallocation between mutual funds and other saving vehicles would not generate net outflows from the mutual funds. I find that none of the mutual fund asset categories experienced net outflows. The evidence suggests that investor transferred capital from outside of mutual fund industry into mutual funds for the most part.

I next separately study sales (gross inflows) and redemptions (gross outflows) to further examine the opposing effects of commissions. Fund inflows come from the new investors while fund outflows arise from the existing investors. A number of studies suggests that existing consumers exhibit inertial behavior after they sign up for an ongoing service. The inertial behavior makes consumers less sensitive to changes in prices that they pay for a service.[8] Consequently, outflows can be less sensitive to the reduction in expense ratios which results from the reduction in commissions. The differences in price sensitivity between inflows and outflows can result in a different response to the reform. In particular, the expense ratio effect may impact outflows only weakly, leaving them exposed to the steering effect. In a case of redeeming investors, high ongoing asset-based commissions can encourage advis-

[7]For example, investors can withdraw capital from their bank accounts, ETFs or from investments in individual securities.

[8]For evidence on consumer inertia, see, for example, Viard (2007), Farrell and Klemperer (2007), Dubé, Hitsch and Rossi (2009), Handel (2013) and Marzilli Ericson (2014).

ers to prevent outflows and a reduction in commissions can increase outflows.

Consistent with this intuition, I find that both inflows and outflows increase following the reform. The increase in inflows is three times larger and it fully subsumes the increase in outflows. The expense ratio effect is of the first order: it leads to an increase in inflows despite the diminished incentives of financial advisers to sell fund shares. At the same time, the expense ratio effect is weaker than the steering effect for outflows as the outflows increased after the reduction in commissions despite lower expense ratios. This finding suggests that high ongoing commissions motivate advisers to prevent redemptions. I confirm that the relative importance of the expense ratio effect results from different price sensitivities: inflows are ten times more sensitive to changes in expense ratios than outflows.

How does the reduction in commissions affect profitability of asset management and product market strategy of fund families? A fund family pockets the difference between expense ratios and commissions which remains almost the same after the reform. Thus, families may be able to generate additional revenue through the increase in assets under management coming from fund flows. I confirm that the reform led to an increase in fund assets under management and to an increase in fund revenues. The asset categories with large reduction in commissions became more profitable for fund families despite the reduction in expense ratios.

Finally, I examine how families respond to the increased profitability in the categories with reduced commissions. I find that fund families change their product market strategy in two complementary ways. First, fund families open new funds in the categories with reduced commissions. Second, fund families shift existing funds from the categories with small reductions in commissions to the categories with large reductions in commissions. These results indicate that fund families are aware of the effect of the reform on investor behavior and try to capture investor flows by strategically introducing funds into the high flow categories.

1.1 Contributions to Literature

My findings make three principal of contributions to several areas of research. First, a number of empirical studies examine the effect of ongoing commissions paid to financial intermediaries such as 12b-1 fees on fund expense ratios and investor asset allocation. Early work by Ferris and Chance (1987) shows that 12b-1 fees and expense ratios are positively correlated. Walsh (2004), Barber, Odean and Zheng (2005), Bergstresser, Chalmers and Tufano (2009), Christoffersen, Evans and Musto (2013) find positive correlation between 12b-1 fees, other forms of ongoing revenue sharing and fund flows, while Trzcinka and Zweig (1990) do not find any significant relationship. My contribution to this strand of literature is to analyze the causal effect of commissions by designing identification strategy based on unique structure of Israeli asset management markets. Unlike the earlier work, I exploit a natural experiment that allows me to measure the causal effect of ongoing adviser compensation within a given product. My study also extends over the entire mutual fund industry within the given country across different types of investors and a variety of assets classes.

This paper also speaks to multiple studies on the effect of one-time sales loads, a different form of broker compensation in mutual fund industry. Anagol, Marisetty, Sane and Venugopal (2017b) exploit a policy experiment in India showing that loads do not have an effect on fund flows and fund assets under management. At the same time, Sirri and Tufano (1998), Barber, Odean and Zheng (2005), Bergstresser, Chalmers and Tufano (2009) and Christoffersen, Evans and Musto (2013) report positive relationship between sales loads and fund flows.

Second, this paper contributes to the literature on the effect of mutual fund expenses on investor behavior. Barber et al. (2005), Ivković and Weisbenner (2009), Khorana and Servaes (2011), Edelen, Evans and Kadlec (2012) and Sialm, Starks and Zhang (2015) find a negative relationship between fund expense ratio and investor flows. Choi, Laibson and Madrian (2009) conduct an experimental study and report than the many mutual fund investors fail to minimize expense ratios when investing in index funds. They also suggest that investors pay more attention to expense ratios when provided assistance with searching for fee information. This paper extends the literature by focusing on large, visible, and highly publicized

reform which reduced fund expenses ratios through the reduction in adviser commissions.

Finally, I contribute to the literature on strategic behavior of mutual fund families. Khorana and Servaes (1999) show that fund families are more likely to start new fund in investment objective with high past performance. Zhao (2005) finds that families shut down funds with low inflows. My analysis extends this literature by providing casual evidence on strategic behavior of fund families following an exogenous reductions in distribution costs and an increase in flows.

The rest of the paper is organized as follows. Section 2 describes the institutional environment, the dataset and my identification strategy. Section 3 presents main results on the effect of commissions on expense ratios and fund flows , Section 4 analyzes the impact of the reform on behavior of fund families, and Section 5 concludes.

2 Institutional Background, Data and Methodology

2.1 Regulation of Financial Advice and Financial Advisory Commissions in Israel

Over the sample period, Israeli financial advisory industry consisted of roughly 4,000 financial advisers licensed by the Israel Securities Authority with the vast majority being employed by the major banks.[9] Before 2006 banks were not only the dominant providers of financial advice but they also owned the major pension, providence and mutual fund companies. As a result, many investors were advised to invest in financial products offered by the banks which is typical for the market with bundled advisory and asset management services (White House Council of Economic Advisers (2015)).

The Israeli government became concerned of conflicts of interests in financial advice and launched a major reform of the market in 2006. The new regulations required a full separation between advice and asset management, and banks had to divest either their asset management arms or their advisory businesses. Banks chose the sell their mutual and pension fund businesses completing these transactions before 2007 and keeping the major market in

[9] See http://isia.calcalist.co.il/ for additional information.

distribution of mutual fund shares. I estimate that 80% of total assets under management of Israeli mutual funds are invested through financial advisers in banks.[10]

In addition, the regulation introduced a schedule of ongoing commissions that mutual fund companies have to pay to banks for distribution of fund shares. The commission is based on a holding period and is independent of the number of transactions that investors conduct. For example, if an annual commission is 0.8% and a client invests $100 into a mutual fund, given a holding period of one year, the fund family pays 80 cents to the financial adviser who referred the client. These unique features of the Israeli mutual fund market allow me to conduct a study of commissions in the simple setting. Specifically, the relationship between advisers, investors and mutual fund families is governed by a clear set of rules where exogenous commissions play an important role. In May 2013, the Israeli government revised the schedule of commissions introducing significant reductions for equity mutual funds and smaller reductions for other asset categories. I employ the 2013 revision to study the casual effect of commissions.

Figure 1 presents the schedule of commissions showing that their level increases with the riskiness of the asset class. The commission represents a revenue sharing arrangement between banks and fund families, with banks historically demanding one-third of the revenues. As a result, in asset classes with higher expense ratios, such as equities, the commissions were set at the higher level.

Figure 2 shows that the 2006 reform resulted in doubling in the assets under management as well as the number of funds offered to investors. The increased competition in the mutual fund industry led to a significant reduction in expense ratios over time, as can be seen in the bottom panel of Figure 2. Banks gained additional share of revenues at the expense of mutual fund companies, increasing their share from 30% in 2007 to 40% in 2012 as illustrated by Figure 3. The Israel Securities Authority concluded that further reduction in fees can be accelerated through a reduction in the marginal costs in the form of commissions. The regulator was also seeking to bring banks back to obtaining one-third of the revenue as the

[10] I construct this proxy relying on revenues of banks reported in their financial statements as well as the aggregate revenues from commissions in the mutual fund industry. This number is consistent with the results of the study initiated by Israeli Parliament before the reform (Koffman (2012)).

initial 2006 arrangement implied (Koffman (2012)). In November 2012, the Israel Securities Authority introduced a bill to Knesset proposing to reduce the commissions. The legislature immediately faced opposition from the banks but it was finally approved by Knesset in March 2013 and fully implemented in May 2013. As a result, the commissions went down across all the asset classes as summarized in Figure 1.

2.2 Dataset

In this paper I use a standard dataset on Israeli mutual fund market purchased from Praedicta - a large private Israeli data vendor. This is a survivorship-bias free database of the entire universe of Israeli mutual funds collected from public filings of mutual fund companies.[11] I use the entire universe of Israeli mutual funds between 2011 and 2015 with the reform going into effect in May 2013. My dataset includes detailed, monthly-updated information on fund characteristics such as returns, purchases, redemptions, commissions, expense ratios, fund age and fund assets under management. As fund flows are highly volatile, I follow Coval and Stafford (2007) and winsorize the flow data at the 1st and the 99th percentiles to avoid including extreme observations of flows.

Table 1 presents the descriptive statistics of the dataset across the asset categories described in Figure 1. Panel A reports the fund-level variables. The net monthly fund flow into the average Israeli mutual fund equals to 5%. We also observe some variation in net flows across the five asset categories with money market funds and index fund enjoying the highest flows over the sample period. The fund sales (inflows) are almost twice as high as fund redemptions (outflows): the average inflow is 11% and the average outflow is 6%. Israeli index funds enjoyed particularly high inflows (14%) and low outflows (5%) which is consistent with the well-known shift to passive investments around the world. The average fund charges an annualized expense ratio of 1.2% while equity funds are particularly expensive with the average expense ratio of 2.38%. We also can see that commissions and expense ratios are correlated within the asset categories such that the asset categories with high commissions tend to have high expense ratios.

[11] The dataset has been previously used by Shaton (2015)and Ben Naim and Sokolinski (2017).

The average Israeli mutual fund has 160M Israeli Shekels (roughly $45M) in assets under management. Equity funds are smaller (50M Shekels), bond and mixed funds manage 150M-170M Shekels on average and money market funds have the largest average AUM of roughly 1B Shekels. The average fund delivered a monthly return of 0.2% per month. The average returns across categories decline when proportion of debt instruments in fund assets increases: mixed funds delivered 0.2% per month, bond funds generated 0.12% per month and money market fund returned 0.05%. The average fund is 105 months (8.75 years) old with equity funds being the oldest investment category (146 months) and index funds being the youngest one (42 months).

Panel B reports the family level-variables. The probability of a new fund start in a given month equals to 7% while the probability of a fund liquidation is 5%. Mixed funds experience especially high turnover with a fund start probability of 16% and a fund liquidation probability of 8%. I also define three variables that capture the shifts of existing funds across asset categories because fund families can move funds by adjusting asset allocation. The unconditional probability of shifting a fund across categories is 8%. In addition, fund families may shift funds in two opposing directions. Families can shift funds up, from categories with small reduction in commissions to categories with large reduction in commission. At the same time, fund families can shift funds down, from categories with large reduction in commissions to categories with small reduction in commission. I use this distinction later when I analyze the effects of the reform on fund family behavior. Panel B shows that fund families are equally likely to shift funds up and down with the probability of 4% for any type of shift. By definition, families can never shift funds down into the equity category because it experienced the largest reduction in commissions. Families can also never shift funds up into the index category with no change in commissions.

2.3 Methodology and Identification

Figure 1 shows that the commissions were significantly reduced as a result of the reform with the strongest reduction - more than 50% - for equity mutual funds. As different asset categories experienced different reductions, I employ difference-in-differences methodologies

to estimate the causal effect of commissions on a variety of outcomes. The key identifying assumption behind my methodologies is that the outcomes of all types of funds would remain on the same trend in the absence of the new regulations in May 2013. Importantly, my identification strategy does not imply that funds should be similar in the cross section. For example, they are allowed to have different clienteles and be owned by different fund families as long as they exhibit parallel trends.

I first illustrate the effect of commissions non-parametrically by comparing funds with large reductions such as equity funds to the funds from other asset categories that experienced smaller reductions in commissions. In this setting I refer to equity funds as a treatment group and to other funds as a control group. To provide the comparison, I present my results graphically estimating cross-sectional differences in outcomes between the two groups every month through the following specification:

$$y_i = \alpha + \lambda T_i + \beta X_{i,t-1} + \epsilon_i, \tag{1}$$

where y_i is an outcome of interest for fund i , $T_i = 1$ for equity funds and zero otherwise and $X_{i,t-1}$is a set of control variables such as past performance, logarithm of fund assets under management and a logarithm of fund age.

This approach allows me to accomplish two empirical goals. First, I validate my identifying assumption by analyzing the pre-reform trends in outcomes and examining any differences across asset categories. The visual comparison of behavior of outcomes across categories helps to establish the plausibility of the parallel trend assumption. Second, I can observe the effect of the reform on the outcomes of interest through the differences between groups before and after the reform. I gain additional confidence in the identification strategy by visually checking that the effects of the reform appear exactly when expected.

Next I turn to regression analysis and apply a standard fixed effects regression framework. The reduction in commissions represents a continuous treatment that exogenously varies across five asset categories as presented in Figure 1. The baseline econometric specification is given by:

$$y_{itc} = \alpha_i + \alpha_t + \phi Commission_{tc} + mX_{i,t-1,c} + e_{itc}, \tag{2}$$

where y_{itc} is an outcome of interest for fund i at time t in category c, α_i and α_t are fund and time fixed effects and $X_{i,t-1,c}$ is a set of control variables in the previous month such as a logarithm of fund assets under management, past performance and a logarithm of fund age. I calculate monthly commissions (those from Figure 1 divided by 12) because fund flow data is at the monthly level. In this framework, funds in different categories experienced continuous treatment with different levels of intensity. The panel regression measures the causal effect employing an exogenous variation in commissions within a given fund and comparing the differences across funds.

Finally, I implement an additional difference-in-differences approach with binary treatment. While this framework does not directly use full information about the treatment intensity, it can serve as a robustness check. Equity funds are classified a treatment group as they receive a large treatment and other funds are classified as a control group as they receive a small treatment. This approach leads to the following econometric spesification:

$$y_{itc} = \delta Equity_i + \rho Post_t + \gamma \left(Equity_i \times Post_t\right) + zX_{i,t-1,c} + u_{itc}, \tag{3}$$

where y_{itc} is an outcome of interest for fund i at time t in category c, $Equity_i$ is binary indicator equals one if a fund is an equity fund, and $Post_t$ is binary indicator equals one if the observation is post-reform (after April 2013). $X_{i,t-1,c}$ is a set of control variables in the previous month such as a logarithm of fund assets under management, past performance and a logarithm of fund age. The effect of commissions is identified by γ, a coefficient on the interaction between $Equity_i$ and $Post_t$. The coefficient estimates the differences-in-differences between the outcomes for equity and non-equity funds before and after the reform.

Acorss all the approaches, I cluster the standard errors at the level of the fund. This method of adjusting standard errors allows to meaningfully account for the standard cross sectional and time series correlations in error terms (Bertrand and Mullainathan (2001)). Using five broad asset categories as five clusters instead would substantially limit the interpre-

tation of statistical inference (Angrist and Pischke (2009)).

3 Effect of Commissions on Expense Ratios and Fund Flows

3.1 Expense Ratios

Graphical Evidence. Figure 4 presents the graphical results displaying the evolution of the difference in expense ratios between equity and non-equity funds. We can see that equity funds charged especially high fees of roughly 2.6% while the average non-equity fund charged only 1% on an annual basis. Immediately after the introduction of the new regulations, expense ratios of equity funds went down by 0.4%, which roughly reflects the full reduction in commissions of 0.45%. We observe that expense ratios for equity and non-equity funds are on similar trends pre-reform such that the parallel trend assumption gains empirical support. The bottom graph shows the difference in expense ratios between the categories as estimated from monthly cross-sectional regressions implied by Equation (1). The difference shrinks from 1.7% before the reform to 1.3% immediately after the reform. We can also see that the effect of the reform starts to appear in the data exactly when predicted, allowing us to gain additional confidence in the identification strategy.

Regression Evidence. Table 2 shows the results of the regressions of expense ratios on commissions. Column (1) present the evidence from the baseline specification as implied by Equation (2) and confirms the graphical evidence from Figure 4. We can see that a one percentage point increase in trail commissions increases the expense ratio by 1.15 percentage points. As Figure 4 points out to a strong time trend in the expense ratios which tend to decrease over time, I incorporate linear time trends at the level of the asset category into the previous specification to formally verify that the results are not driven by this gradual decline. The specification with linear category trends is given by:

$$y_{itc} = \alpha_i + \alpha_t + \alpha_c t + \phi Commission_{tc} + mX_{i,t-1,c} + e_{itc}, \tag{4}$$

wherein I augment the baseline specification from Equation (2) with α_c - a fund category

dummy interacted with time variable t. Column (2) present the results showing that after accounting for the time trend, a pass-through of commissions into expense ratios is roughly one-to-one: for each percentage point of an increase in commissions expense ratios increase by one percentage point. Column (3) adds time-varying past performance of the average fund in the category as an additional control variable. As a result, the coefficient on commissions changes only slightly. Column (4) adds fund-level time-varying control variables. While the main coefficient of interest does not change materially, we observe that larger, younger funds and funds with good past performance tend to charge lower expense ratio.

In sum, the effect of commissions on expense ratios is of the first order, and commissions appear to play an important role in mutual fund price formation. A one percentage point increase in commissions causally increases fund expense ratio by approximately one percentage point.

In the Appendix I present two additional robustness checks to my results. Table B.1 reports the results from estimating the effect of commissions on expense ratios using a binary treatment approach suggested by Equation (3). The binary approach generates similar results. In addition, I match funds based on covariates such as part performance, assets under managements and fund age at the time of the reform. This approach ensures that the treatment and the control groups become more similar based on the observed characteristics. Table B.2 reports the results from estimating Equation (4) in the matched sample of 113 equity funds and 113 non-equity funds. The matching approach delivers quantitatively similar coefficients.

3.2 Net Fund Flows

Graphical Evidence. Figure 5 presents graphical analysis of net fund flows into Israeli mutual funds. Following the literature, the net flow is defined as a difference between fund sales and redemptions divided by fund assets under management. The top graph shows time variation in net flows across the treatment and the control groups. We can observe that net flows for equity and non-equity funds are on the same trend before the reform, perhaps, because flows are mostly affected by aggregate market conditions. At the same time, the

average equity fund grows slower than the average non-equity fund for every month before the change in commissions. We also observe that once the reform is implemented, the net flows in equity funds increase significantly. The average equity fund starts to grow faster than the average non-equity fund over the first few months after the reform, then the effect subsides, and net flows to both groups become quite similar. The results of monthly cross-sectional regressions on the bottom graph confirm that the difference between the treatment and the control group is getting larger after the reform.

Regression Evidence. Table 3 presents the results of the regressions of net fund flows on commissions. A negative coefficient on the commission variable implies that the reduction in commissions led to an increase in net investor flows as shown in Figure 5. Column (1) presents the baseline specification indicating that each basis point in monthly commissions increases monthly net flow by 0.9% relatively to average monthly net flow of 5%. When I control for the time trend in flows using the specification from Equation (4) in column (2), the magnitude of the effect of commissions increases further to 1.3%. This effect is not substantially affected by controlling for past performance of the asset category (column (3)). While the size of the coefficient declines when I introduce fund level time-varying control variables (column (4)), it remains large and significant. I cannot control for fund expense ratio in flow regressions, because expense ratio is an outcome of the natural experiment just like fund flow. Controlling for endogenous covariates would not allow me to give a casual interpretation to the effect of commissions on flows (Angrist and Pischke (2009)).

In sum the evidence indicates that a reduction in commissions translated into a major reduction in mutual fund expense ratios and an increase in net investor flows. These results suggest that the effect of commissions on demand through the expense ratio channel is dominating the effect of commissions through the steering channel for the average investor. Despite that lower commissions weaken the incentives of financial advisers to market the funds, the net fund flow increased significantly following the reform. This finding suggests that the expense ratio effect is a major effect of commissions on investor demand.

In the Appendix I present two additional robustness checks to my results. Table B.3 reports the results from estimating the effect of commissions on net flows using a binary

treatment approach suggested by Equation (3). The table shows that the results are robust to the specification choice. I also use matching approach which is similar to the robustness check used for expense ratios. Table B.4 reports the results from estimating Equation (4) in the matched sample and shows that the results are quantitatively comparable.

3.3 Net Fund Flows For Each Asset Category

Since a difference-in-differences approach compares outcomes between multiple groups simultaneously, we can interpret the increase in net flows in at least two ways. The first interpretation suggests that investors reallocate capital from mutual funds with small reductions in commissions to mutual fund with large reductions in commissions. The reallocation occurs primarily within the mutual fund industry. In this case, we expect to observe an increase in net flows in categories with large reductions in commissions and a reduction in net flows in other categories. The second interpretation suggests that investors transfer capital to mutual funds from other saving vehicles. As a result, we would either observe an increase in net flows across all the categories or an increase in some categories and no reduction in other categories. The difference-in-differences estimation does not allow to distinguish between the competing interpretations as in both cases the difference in net flows between high and low commission categories would be positive.

To discriminate between the competing explanations, I examine the effect of commissions on net flows for each asset category separately. I remove time fixed effects from Equation (4) and use the following econometric spesification:

$$y_{it} = \alpha_i + ht + \phi Commission_t + mX_{i,t-1} + e_{it}. \tag{5}$$

My spesification represents a single difference approach and uses only the time variation in commissions within the given fund. Since I test for potential reallocation across categories, I estimate Equation (5) separately for each asset category. I also exclude index funds from the test since the reform does not introduce any time variation in commissions for this group.

Table 4 presents the results. We observe that commissions reduce net flows for equity funds (column (1)) and does not significantly affects the flows for other fund categories

(columns (2)-(4)). As a robustness check, I also examine the effects of commissions on a net flows in shekels which is a difference between sales and redemptions without adjusting for fund size. Columns (5) and (7) confirm negative effect of commissions on flows into equity funds as well as bond funds. Column (6) and (8) show no effect of commissions on net shekel flows into other asset categories. The results imply that a reduction in commissions generates an increase in flows in some categories and does not affects flows in other categories. As none of mutual fund categories experiences significant net outflows, the evidence suggests that investors transfer capital from non-mutual fund saving vehicles into mutual funds for the most part.

3.4 Sales and Redemptions

Having documented the effects of the reform on net fund flows, I study the heterogeneity across different groups of investors separately analyzing fund share sales (inflows) and redemptions (outflows). After the consumers enroll in a service, they can become less sensitive to changes in ongong fees. Consequently, outflows can be less sensitive to the reduction in expense ratios which results from the reduction in commissions. The differences in price sensitivity between inflows and outflows can result in different response to the reform. In particular, the expense ratio effect may impact outflows only weakly, leaving them exposed to the steering effect. In a case of redeeming investors, high ongoing asset-based commissions can encourage advisers to prevent outflows and a reduction in commissions can increase outflows.

Graphical Evidence. Figure 6 presents graphical analysis of inflows and outflows. The top-left graph shows the differences in inflows between equity and non-equity funds. We can see that inflows in both categories of funds are on similar trend and we also observe a significant increase in inflows into equity funds after the reform. The top right-graph shows that outflows from equity funds also increase over several months after the reduction in commissions. Similarly to Figure 5, the bottom graphs in Figure 6 confirm that the effect of the reform on both inflows and outflows materialize in the data in May 2013, as expected.

Regression Evidence. Table 5 provides the regressions results on the effect of commis-

sions on inflows and outflows. Columns (1)-(4) show the results for inflows. Columns (1) presents the evidence from the baseline specification showing that a one basis point increase in monthly commissions leads to a 1.3% increase in inflows relatively to the average inflow of 11%. Controlling for a time trend increases the estimated coefficient to 1.9 (column(2)). Column (3) adds category-level time-varying control variables. The coefficient on commissions declines to 0.9 but remains large and significant. Controlling for time-varying fund-level characteristics does not change the magnitude of the effect of commissions (column (4)).

The next four columns repeat the same specifications using fund outflows as an outcome variable. The baseline specification in column (5) indicates that one basis point in monthly commissions increases the outflow by 0.4% relatively to the average outflow of 6%. The estimated coefficient increases after accounting for a time trend (column (6)) and declines to 0.3 after controlling for category-level time-varying variables that were shown to affect flows. Column (8) adds time-varying fund controls and the estimated coefficient remains at the same level.

The above results can be reconciled with the analysis of net fund flows from Table 3. The most stringent specification on inflows (column (4)) estimates the coefficient on commissions roughly being equal to -1. The same specification on outflows yields the coefficient of -0.3 (columns (8)). As net flow is defined as a difference between inflow and outflow, the coefficient on net flows is expected to be -1-(-0.3) = -0.7 which is the estimated effect of commissions on net flows from Table 3, column (5). These results help to clarify the sources of the change in net flow driven by the reform. The reduction in commission leads to an increase in both inflows and outflows but with substantially different magnitudes. As commissions produce a three-times stronger effect on inflows than on outflows, net flows increased significantly as a result of the reform. The evidence indicates that the commissions produce different combined effects for sales and redemptions. The expense ratio effect mostly affects sales as inflows increase following the reform. At the same time, the steering effect is mainly operative for redemptions as a reduction in commissions leads to more outflows.

If the expense ratio effect is stronger for inflows, we would expect inflows to be more sensitive to changes in expense ratios than outflows. I examine the differences in expense

ratio sensitivity directly, by regressing inflows and outflows on expense ratios. While these regressions do not have a casual interpretation, they help provide suggestive evidence on how inflows and outflows respond to price changes. Table 6 presents the results. The first four columns report the relationship between inflows and expense ratios. We observe that following increases in fund expense ratios, fund inflows decline. The coefficient on expense ratios roughly equals 2. Columns (4)-(8) analyze the relationship between expense ratios and fund outflows. We observe that outflows increase following an increase in expense ratios. However, the size of the coefficient is almost ten times smaller in its absolute value relative to the effect of expense ratios on inflows. The evidence indicates that inflows are significantly more sensitive to variation in expense ratios than outflows.

In sum, the results suggest that the expense ratio effect is stronger than the steering effect for inflows, but weaker than the steering effect for outflows. Fund inflows are much more price sensitive than fund outflows suggesting that the differences in price sensitivity drive the relative magnitudes of the effects of commissions.

4 Industry Response to Change in Commissions

I next examine how mutual funds families respond to the reform. The reduction in commissions generate two opposing effects on mutual fund profitability: it leads to a reduction in expense ratios but it can also increase fund assets under management through increased net flows. If the aggregate effect of commissions is positive such that fund fee revenues increase, we would expect fund families to capture additional revenue and to strategically reposition their fund offering. On the other hand, if the aggregate effect of commissions on revenues is negative, then fund families would prefer to reduce their offerings in asset categories with reduced commissions.

4.1 Fund AUM and Revenues

I first analyze the effect of commissions on fund assets under management (AUM) and fund revenue. I define fund family revenue from a given fund as fund AUM multiplied by the

difference between expense ratio and commission. Table 7 presents the results from regressing fund AUM and revenue on commissions. The first three columns study the effect on fund AUM. Column (1) shows that a reduction of one basis point in monthly commissions leads to an increase of roughly 25 basis points in fund size. Once category average returns are accounted for, the magnitude of the effect increases to 40 basis points (column (2)). The coefficient remains quantitatively similar when I add time-varying control variables at the fund level.

Next, I ask whether the increase in fund AUM following the reduction in commissions translated into the increase in fund revenues. I expect it to be the case for the following reasons. First, we already know that when commissions are reduced, fund expense ratios decline by roughly the same amount. This finding implies that the difference between expense ratio and commission did not change materially for the average fund. Second, columns (1)-(3) of Table 7 document an increase in fund AUM following the reduction in commissions. As a result, I expect fund revenues, a product of fund AUM and a difference between expense ratios and commissions, to increase as well. Columns (4)-(6) confirm this intuition. Column (4) shows that the reduction of one basis point in monthly commissions led to an increase of 90 basis points in fund revenues. When I add the rest of the control variables, the magnitude of the effect increases significantly to roughly 200 basis points.

In sum, both fund AUM and fund fee revenues increase following the reduction in commissions.

4.2 Fund Starts and Liquidations

I next analyze the effect of increased fund profitability following the reduction in commissions on mutual fund family strategic behavior. I first ask whether fund families capture additional flows and the resultant fee revenues. Families can do it by opening new funds in categories that experience increased net flows, or by liquidating funds in categories that experienced reduced net flows. I follow the methodology developed by Khorana and Servaes (1999) and conduct my analysis at the fund family level. My main specification is based on a linear probability regression model and is given by:

$$y_{ftc} = \alpha_f + \alpha_t + \alpha_c + \lambda Commission_{tc} + \beta X_{f,t-1,c} + \epsilon_{ftc}, \quad (6)$$

where y_{ftc} is an outcome of interest for fund family f at time t in category c, α_f,α_t, α_c are family, time and category fixed effects and $X_{f,t-1,c}$ is a set of control variables in the previous month such as a logarithm of family assets under management, family past performance and a logarithm of fund age. To obtain family-level fund age and performance variables within a given asset category, I calculate AUM-weighted averages of fund variables for fund family f at time $t-1$ in category c. Following Khorana and Servaes (1999), I introduce an additional set of control variables at the level of asset category, such as category past performance and category net fund flows. The standard errors are clustered at the fund family level.

Table 8 analyzes the effect of commissions on fund starts and fund liquidations. In these specifications, y_{ftc} is dummy variable that equals one if a family f introduces or liquidates a fund in category c at time t. Similarly to the previous fund-level regressions, I utilize the exogenous variation in commissions across time and asset categories. Columns (1)-(3) present the results for fund starts. Column (1) shows that the decline in commissions in category c increases the probability of a new fund offering in category c. A reduction of one basis point in monthly commissions generates an increase of 87 basis points in the probability of a new fund start. The coefficient on commission variable declines to 0.64 after I control for family time-varying characteristics in a given category (column (2)). It increases to 0.78 after category past performance and category net flow are accounted for (column (3)). The next three columns study the effect of commissions on fund liquidations. We can see that the reform did not change the probability of fund closure. While the coefficients are positive suggesting that families are less likely to liquidate funds following the reduction in commissions, these coefficients are not statistically significant at the conventional levels.

In sum, the evidence suggests that mutual fund families try to capture additional flows in categories with large reductions in commissions primarily through the opening of new funds in these categories.

4.3 Fund Category Shifts

Finally, I study another aspect of strategic behavior of mutual fund families through their ability to shift funds across categories. As Figure 1 suggests, the difference between the asset categories comes from variation in asset mix. As a result, a slight change in asset mix can affect the categorization of the fund. Such category shifts can generate an additional way for fund families to capture the differences in net fund flows across categories together with the resultant increase in revenues. In particular, fund families can strategically shift funds from categories with small reduction in commissions (such as mixed funds) to categories with large reductions in commissions (such as equity funds). As categories with large reduction benefited from increased flows and revenues, it would be a revenue maximizing approach for the fund families.

To test this hypothesis, I study the relationship between commissions and the probability of shifting the fund between asset categories. Figure 1 suggests that it would be profitable to move funds "up" - from categories with small reduction in commissions to categories with large reduction in commission. However, it would not be profitable to move funds across categories in the opposite direction. Therefore, if my hypothesis is correct, I expect to observe commission having a positive effect on a probability of shifting a fund "up" and no effect on a probability of shifting fund "down".

Table 9 formally tests this idea utilizing the specifications based on Equation (3) where y_{ftc} is dummy variable that equals one if a family f shifts fund into category c at time t. Columns (1) and (2) analyze the effect of commissions on the probability of shifting unconditionally on moving the fund up or down. We can see that the probability of fund recategorization increases following the reform. A reduction of one basis point in monthly commission in category c increases the probability of shifting the fund into category c by roughly 2%. The next four columns separately analyze the effect of the reform on the probability of shifting up and the portability of shifting down. In columns (3) and (4), we can see that the reduction in commissions in category c led to a significant increase in probability of shifting fund into category c from any other category with lower reduction in commissions. In particular, a reduction of one basis point in monthly commissions increases the probability

of shifting up by 2.8%. Columns (5) and (6) indicate the probability of shifting into category c from the categories with larger reduction in commissions is not significantly affected by the reform.

In sum, the results imply that fund families strategically shift funds from categories with small reduction in commissions to categories with large reduction to capture additional flows and revenues.

5 Conclusion

My paper studies the causal effect of ongoing asset-based commissions paid to financial advisers in a unique institutional setting in Israel. I highlight two opposing effects of commissions: (i) expense ratio effect - high commissions are translated in higher expense ratios that lead to lower investor demand; (ii) steering effect - financial advisers are expected to market high commission funds resulting in higher investor demand. I find that the expense ratios affect the demand of the average investor more than than the steering. The expense ratios mostly affect inflows increasing fund sales, while the steering mainly affects outflows preventing fund redemptions. I also find that mutual fund families respond to changes in investor behavior generated by ongoing commissions and strategically position new and existing funds to capture additional flows.

My paper has two key implications. First, it empathizes the double-edged effect of commissions on investor demand. While a number of recent studies focused on the steering effect of adviser compensation, in a causal setting this effect appears to be subsumed by the relationship between commissions and expense ratios. At the same time, the effect of adviser steering becomes particularly important for redemptions which are less price sensitive. My findings are potentially important for regulators interested in changing the adviser compensation structure. The evidence provided in this paper suggests that both the expense ratio effect and the steering effect should be taken in the account when designing such a regulation.

Second, this study highlights the importance of startegic response to the reform by fund

families. The results suggest that providers of financial products are aware of the effects of the reforms on investor behaviour and they respond following revenue-maximizing strategies. As a result, a change in financial adviser compensation not only impacts investors but also the entire market structure and product variety.

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Figure 1: Commission Schedule

This figure presents the schedule of commissions that mutual fund companies are legally obliged to pay to banks for financial advice and distribution of mutual fund shares. The funds are categorized into five asset categories that determine the level of commissions. The figure describes the level of commissions before and after the 2013 reform across asset categories and shows the magnitudes of the changes.

Category Name	Description	Before May 2013	After May 2013	Absolute Magnitude	Relative Magnitude
Index	Passive funds, track market indices	0%	0%	0%	0%
Money Market	Invest into short-term debt securities	0.125%	0.1%	-0.025%	-20%
Bond	Invest into: 1) up to 10% in equities 2) at least 85% in high graded debt securities	0.25%	0.2%	-0.05%	-20%
Mixed	Residual category	0.4%	0.35%	-0.05%	-16%
Equity	Invest more than 50% in equities	0.8%	0.35%	-0.45%	-43%

Figure 2: Evolution of Israeli Mutual Fund Industry.

This figure shows then evolution of the Israeli mutual fund market and some of its key parameters over the period of 2002-2015. Detailed definitions of variables can be found in Appendix A. The two top figures illustrate the growth in the number of funds as well as in the total industry AUM. The bottom figure illustrates gradual reduction in expense ratios. For obtaining equal-weighted variables, all the funds are equally weighted in a given month, while for the value-weighted variables, I weight fund-level data by fund AUM in a given month.

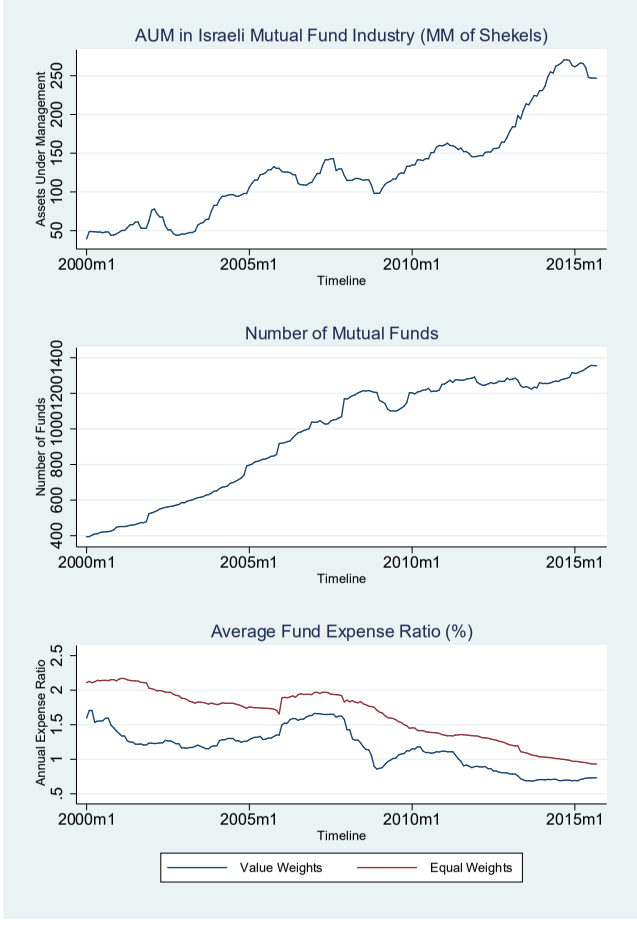

Figure 3: Revenue Sharing between Banks and Fund Families

This figure presents the evolution of the average share of fund revenues claimed by banks through commissions. Detailed definitions of variables can be found in Appendix A. Share of Banks represents the fund-level equally weighted average share of commissions in fund expense ratio.

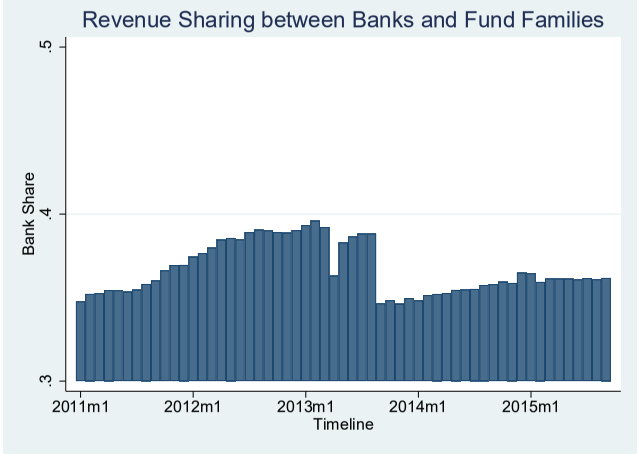

Figure 4: Commissions and Expense Ratios

This figure presents the effect of commissions on expense ratios using a cross-sectional approach. Detailed definitions of variables can be found in Appendix A. The treated group is equity funds, and the control group consists of all other funds. The top panel shows the time series of groups expense ratios with the reform going into the effect at time 0. The bottom panel presents the estimates and 95% confidence intervals for the parameter β in the monthly cross-sectional regressions of the form:

$$y_i = \alpha + \lambda T_i + \beta X_{i,t-1} + \epsilon_i$$

where y_i is a fund expense ratio,$T_i = 1$ for equity funds and zero otherwise and $X_{i,t-1}$ is a set of control variables such as past performance, logarithm of fund size and logarithm of fund age in the previous month.

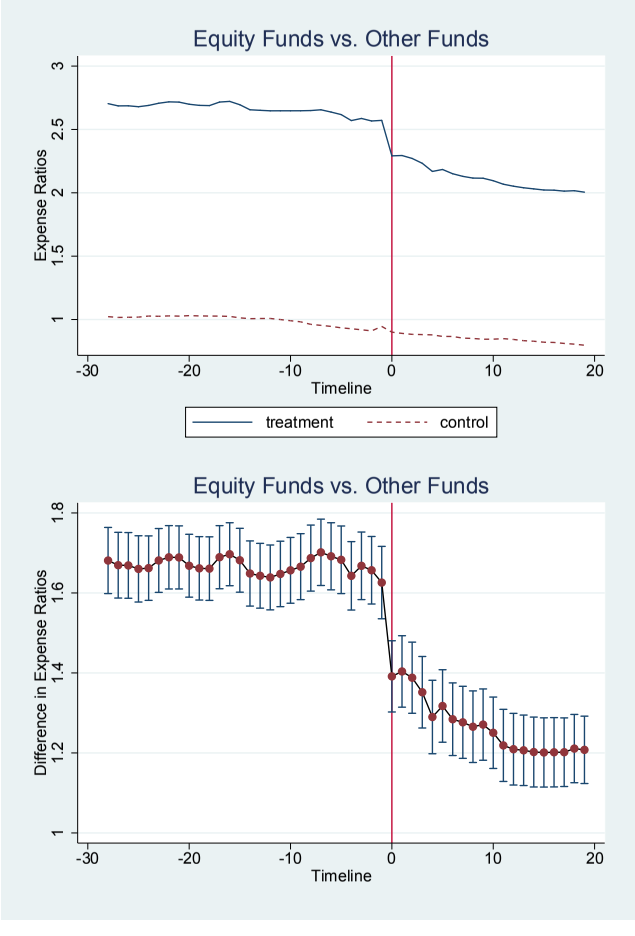

Figure 5: Commissions and Net Fund Flows

This figure presents the effect of commissions on net fund flows using a cross-sectional approach. Detailed definitions of variables can be found in Appendix A. The treated funds are equity funds, and the control group consists of all other funds. The top panel shows the time series of groups net flows with the reform going into the effect at time 0. The bottom panel presents the estimates and 95% confidence intervals for the parameter β in the monthly cross-sectional regressions of the form:

$$y_i = \alpha + \lambda T_i + \beta X_{i,t-1} + \epsilon_i$$

where y_i is a net fund flow, $T_i = 1$ for equity funds and zero otherwise and $X_{i,t-1}$is a set of control variables such as past performance, logarithm of fund size and logarithm of fund age in the previous month.

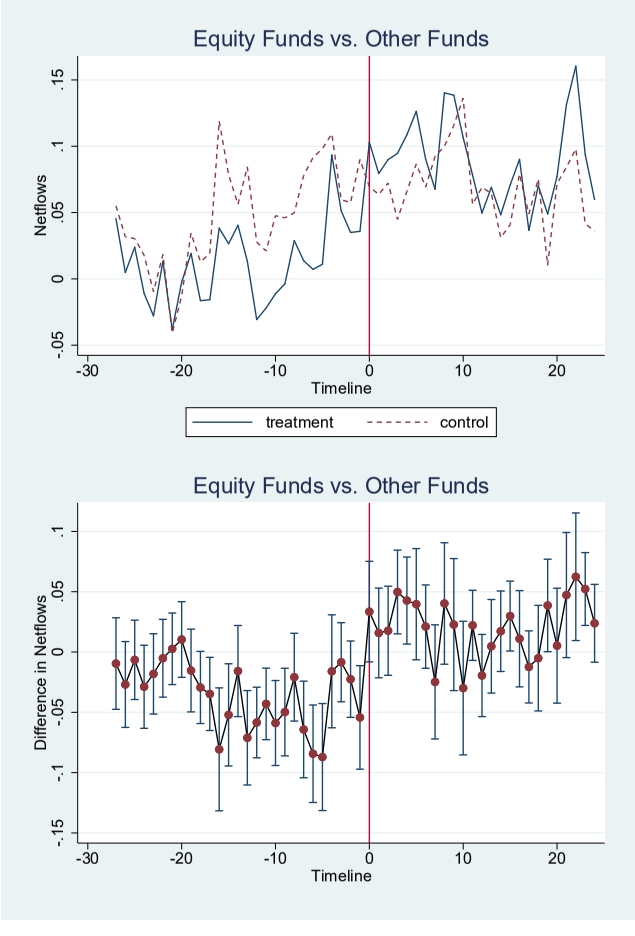

Figure 6: Commissions, Sales and Redemptions

This figure presents the effect of commissions on inflows (sales) and outflows (redemptions) using a cross-sectional approach. Detailed definitions of variables can be found in Appendix A. The treated funds are equity funds, and the control group consists of all other funds. The top panel shows the time series of groups inflows and outflows with the reform going into the effect at time 0. The bottom panel presents the estimates and 95% confidence intervals for the parameter β in the monthly cross-sectional regressions of the form:

$$y_i = \alpha + \lambda T_i + \beta X_{i,t-1} + \epsilon_i$$

where y_i is an outcome of interest, $T_i = 1$ for equity funds and zero otherwise and $X_{i,t-1}$is a set of control variables such as past performance, logarithm of fund size and logarithm of fund age in the previous month.

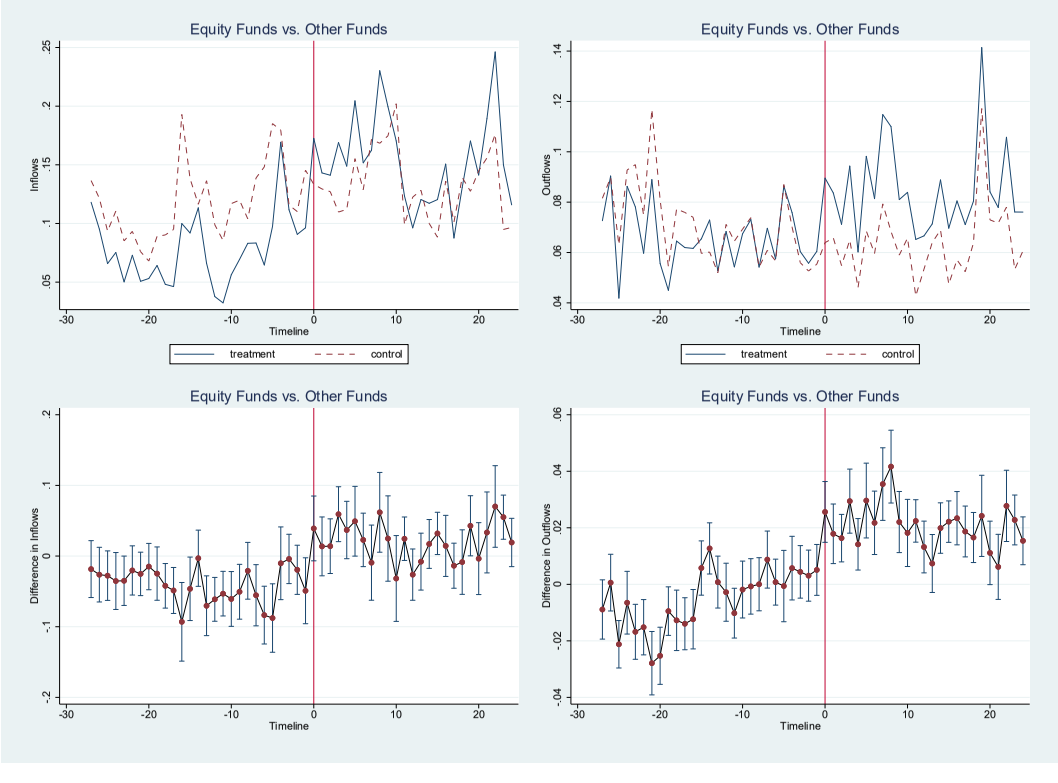

Table 1: Summary Statistics

This table presents summary statistics for the sample of 72,556 fund-month observations over the period of 2011-2015. Panel A presents the statistics for fund-level variables and Panel B presents the statistics for family level-variables. Detailed definitions of variables can be found in Appendix A. The table reports the means and the standard errors for the main variables across five asset categories as defined in Figure 1.

Panel A: Fund level variables	All	Equity	Mixed	Bond	Money Market	Index
Netflow	0.05	0.05	0.06	0.03	0.08	0.09
	(0.28)	(0.22)	(0.29)	(0.29)	(0.33)	(0.30)
Inflow	0.11	0.10	0.12	0.11	0.19	0.14
	(0.30)	(0.25)	(0.31)	(0.32)	(0.37)	(0.31)
Outflow	0.06	0.05	0.06	(0.08)	0.11	0.05
	(0.07)	(0.08)	(0.07)	(0.06)	(0.08)	(0.06)
Commission (%, annualized)	0.38	0.58	0.37	0.23	0.11	0
	(0.17)	(0.22)	(0.02)	(0.02)	(0.01)	-
Expense Ratio (%, annualized)	1.20	2.38	1.01	0.52	0.23	0.18
	(0.87)	(0.80)	(0.55)	(0.29)	(0.18)	(0.23)
Assets Under Management (millions of Shekels)	159.67	49.07	152.27	169.79	1049.63	89.13
	(415.50)	(80.60)	(273.13)	(291.01)	(1627.12)	(115.01)
Raw Return (%)	0.20	0.22	0.20	0.12	0.05	0.23
	(2.32)	(4.16)	(1.59)	(0.62)	(1.13)	(1.84)
Fund Age (months since the inception)	105.86	146.90	101.49	82.06	86.10	42.99
	(103.46)	(117.74)	(102.04)	(70.36)	(69.55)	(41.25)
Shekel Net Flow (millions of Shekels)	1.82	0.27	1.86	-0.02	12.96	3.32
	(49.42)	(7.24)	(25.46)	(38.29)	(237.61)	(12.89)
Observations (fund-month)	72,556	14,464	44,053	5,676	2,375	3,729

Panel B: Family level variables	All	Equity	Mixed	Bond	Money Market	Index
Start	0.07	0.03	0.16	0.02	0.02	0.07
	(0.25)	(0.18)	(0.36)	(0.15)	(0.13)	(0.26)
Liquidation	0.05	0.04	0.08	0.03	0.03	0.02
	(0.21)	(0.20)	(0.28)	(0.17)	(0.16)	(0.12)
Shift	0.08	0.07	0.13	0.07	0.02	0.07
	(0.27)	(0.25)	(0.33)	0.25)	(0.14)	(0.25)
Shift Up	0.04	0.07	0.06	0.02	0.002	0
	(0.20)	(0.25)	(0.24)	(0.11)	(0.05)	-
Shift Down	0.04	0	0.07	0.05	0.02	0.07
	(0.19)	-	(0.26)	(0.23)	(0.13)	(0.25)
Assets Under Management (millions of Shekels)	2,696.84	618.84	5883.93	1052.16	3726.27	886.35
	(4518.06)	(625.02)	(6246.16)	(1530.87)	(4652.38)	(982.56)
Raw Return (%)	0.18	0.19	0.23	0.11	0.05	0.19
	(1.85)	(3.24)	(1.06)	(0.39)	(0.16)	(1.45)
Fund Age (months since the inception)	94.68	133.06	92.64	76.82	85.51	42.94
	(52.79)	(58.56)	(39.58)	(33.95)	(52.29)	(21.79)
Observations (fund family-month-category)	4,296	1,147	1,140	916	669	375

Table 2: The Effect of Commissions on Fund Expense Ratios

This table reports the results from regressing expense ratios on commissions. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1) $ExpenseRatio_{it}$	(2) $ExpenseRatio_{it}$	(3) $ExpenseRatio_{it}$	(4) $ExpenseRatio_{it}$
$Commission_{ct}$	1.146***	1.023***	0.989***	0.991***
	(0.074)	(0.077)	(0.076)	(0.075)
$R_{i,t-1}$				-0.032***
				(0.008)
$log(AUM_{i,t-1})$				-0.002***
				(0.000)
$R_{c,t-1}$			0.009	0.009
			(0.011)	(0.011)
$log(FundAge_{i,t-1})$				0.006***
				(0.001)
Observations	72,724	70,443	68,183	68,183
R-squared	0.934	0.938	0.939	0.939
Fund fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Category time trends	No	Yes	Yes	Yes

Table 3: The Effect of Commissions on Net Fund Flows

This table reports the results from regressing net fund flows on commissions. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1) $NetFlow_{it}$	(2) $NetFlow_{it}$	(3) $NetFlow_{it}$	(4) $NetFlow_{it}$
$Commission_{ct}$	-0.966***	-1.392***	-1.351***	-0.602**
	(0.274)	(0.237)	(0.236)	(0.250)
$R_{i,t-1}$				1.022***
				(0.084)
$log(AUM_{i,t-1})$				-0.077***
				(0.003)
$R_{c,t-1}$			0.142	-0.913***
			(0.090)	(0.120)
$log(FundAge_{i,t-1})$				-0.088***
				(0.009)
Observations	63,586	63,586	63,586	63,324
R-squared	0.174	0.176	0.176	0.225
Fund fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Category time trends	No	Yes	Yes	Yes

Table 4: The Effect of Commissions on Net Fund Flows for Each Asset Category

This table reports the results from regressing net fund flows on commissions separately for each asset category Detailed definitions of variables can be found in Appendix A. Columns (1)-(4) report the results for net fund flow. Columns (5)-(8) report the results for net fund flows in shekels. All the specifications include linear category trends, an average category return and the time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			$NetFlow_{it}$				$ShekelNetFlow_{it}$	
	Equity	Mixed	Bond	Money Market	Equity	Mixed	Bond	Money Market
$Commission_{ct}$	-1.518***	-1.958	-2.540	-18.549	-48.367***	-198.491	-1,545.969**	34,708.892
	(0.306)	(1.850)	(4.641)	(13.910)	(15.857)	(163.619)	(691.395)	(23,015.824)
$R_{i,t-1}$	0.639***	1.466***	1.689*	0.003	21.503***	124.349***	239.039*	694.241*
	(0.085)	(0.194)	(0.999)	(0.616)	(2.594)	(14.333)	(138.837)	(361.222)
$log(AUM_{i,t-1})$	-0.073***	-0.071***	-0.129***	-0.127***	-0.440**	1.543***	-7.881***	-2.555
	(0.008)	(0.004)	(0.015)	(0.016)	(0.182)	(0.543)	(2.373)	(7.506)
$R_{c,t-1}$	-0.417***	0.106	-3.210	-1.246	-11.407***	26.792	-582.302**	-2,177.663
	(0.101)	(0.240)	(2.229)	(1.024)	(2.527)	(16.910)	(279.732)	(1,381.866)
$log(FundAge_{i,t-1})$	-0.061**	-0.089***	-0.123***	-0.131**	-0.089	-0.906	-1.018	-52.457*
	(0.025)	(0.012)	(0.034)	(0.063)	(0.606)	(0.816)	(3.474)	(30.570)
Observations	13,127	39,849	5,099	2,117	13,127	39,849	5,099	2,117
R-squared	0.227	0.176	0.296	0.225	0.100	0.165	0.118	0.051
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Category time trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: The Effects of Commissions on Sales and Redemptions

This table reports the results from regressing inflows (sales) and outflows (redemptions) on commissions. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification for fund inflows, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. Columns (5)-(8) report similar specifications for fund outflows. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1) $Inflow_{it}$	(2) $Inflow_{it}$	(3) $Inflow_{it}$	(4) $Inflow_{it}$	(5) $Outflow_{it}$	(6) $Outflow_{it}$	(7) $Outflow_{it}$	(8) $Outflow_{it}$
$Commission_{ct}$	-1.390***	-1.927***	-0.938***	-1.005***	-0.425***	-0.535***	-0.336***	-0.308***
	(0.292)	(0.274)	(0.281)	(0.300)	(0.072)	(0.082)	(0.075)	(0.074)
$R_{i,t-1}$				0.997***				0.137***
				(0.088)				(0.025)
$log(AUM_{i,t-1})$				-0.094***				-0.016***
				(0.003)				(0.001)
$R_{c,t-1}$			-0.866***	-0.687***			0.046	0.045
			(0.126)	(0.124)			(0.033)	(0.033)
$log(FundAge_{i,t-1})$				-0.096***				-0.015***
				(0.010)				(0.002)
Observations	63,586	63,586	63,324	63,318	63,586	63,586	63,324	63,318
R-squared	0.211	0.213	0.278	0.304	0.329	0.331	0.364	0.369
Fund fixed effetcs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Category time trends	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table 6: The Relationship Between Expense Ratios, Sales and Redemptions

This table reports the results from regressing inflows (sales) and outflows (redemptions) on expense ratios. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification for fund inflows, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. Columns (5)-(8) report similar specifications for fund outflows. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$Inflow_{it}$	$Inflow_{it}$	$Inflow_{it}$	$Inflow_{it}$	$Outflow_{it}$	$Outflow_{it}$	$Outflow_{it}$	$Outflow_{it}$
$ExpenseRatio_{it}$	-1.881***	-2.057***	-2.212***	-2.180***	0.154***	0.171***	0.191***	0.184***
	(0.136)	(0.149)	(0.175)	(0.168)	(0.036)	(0.039)	(0.038)	(0.036)
$R_{i,t-1}$				0.951***				0.132***
				(0.088)				(0.025)
$log(AUM_{i,t-1})$				-0.097***				-0.016***
				(0.003)				(0.001)
$R_{c,t-1}$			-1.010***	-0.813***			0.064*	0.058*
			(0.129)	(0.126)			(0.034)	(0.034)
$log(FundAge_{i,t-1})$				-0.083***				-0.015***
				(0.010)				(0.002)
Observations	63,582	63,582	63,320	63,314	63,582	63,582	63,320	63,314
R-squared	0.225	0.228	0.298	0.321	0.329	0.330	0.366	0.370
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Category time trends	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table 7: The Effect of Commissions on Fund AUM and Revenues

This table reports the results from regressing fund assets under management and its revenues on commissions. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification for fund AUM, column (2) adds average category return and column (3) adds time-varying fund controls. Columns (4)-(6) report similar specifications for fund revenues. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1) $log(AUM_{it})$	(2) $log(AUM_{it})$	(3) $log(AUM_{it})$	(4) $log(Revenue_{it})$	(5) $log(Revenue_{it})$	(6) $log(Revenue_{it})$
$Commission_{ct}$	-0.245**	-0.418**	-0.430**	-0.911**	-1.048**	-2.047*
	(0.121)	(0.202)	(0.209)	(0.431)	(0.414)	(1.045)
$R_{i,t-1}$			0.973***			0.548***
			(0.063)			(0.107)
$log(AUM_{i,t-1})$			0.943***			0.851***
			(0.003)			(0.009)
$log(FundAge_{i,t-1})$			-0.067***			-0.004
			(0.008)			(0.023)
$R_{c,t-1}$		-0.851***	-0.726***		-0.666***	-0.687***
		(0.116)	(0.121)		(0.196)	(0.199)
Observations	68,187	68,187	67,671	64,189	64,189	63,699
R-squared	0.977	0.977	0.978	0.943	0.943	0.945
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Category time trends	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: The Effect of Commissions on Fund Starts and Liquidations

This table reports the results from regressing a dummy fund start variable and a dummy fund liquidation variable on commissions. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification for fund starts, column (2) adds time-varying family controls and column (3) adds time-varying category controls. Columns (4)-(6) report similar specifications for fund liquidations. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the family level are in parentheses.

	(1) $Start_{fct}$	(2) $Start_{fct}$	(3) $Start_{fct}$	(4) $Liquidation_{fct}$	(5) $Liquidation_{fct}$	(6) $Liquidation_{fct}$
$Commission_{ct}$	-0.872***	-0.641*	-0.786**	0.333	0.410	0.238
	(0.012)	(0.068)	(0.028)	(0.479)	(0.604)	(0.704)
$R_{fc,t-1}$		-0.048	-0.027		0.037	0.288
		(0.205)	(0.131)		(0.034)	(0.538)
$log(AUM_{fc,t-1})$		0.006	0.005		-0.009	-0.009
		(0.001)	(0.001)		(0.015)	(0.015)
$log(FundAge_{fc,t-1})$		-0.035**	-0.036*		0.002	0.000
		(0.002)	(0.003)		(0.004)	(0.000)
$R_{c,t-1}$			-0.047			-0.309
			(0.140)			(0.481)
$Netflow_{c,t-1}$			0.196			-0.044
			(0.046)			(0.059)
Observations	4,247	4,147	3,933	4,247	4,147	3,933
R-squared	0.131	0.132	0.134	0.081	0.083	0.083
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Category fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund family fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: The Effect of Commissions on Fund Category Shifts

This table reports the results from regressing a dummy fund shift variables on commissions. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification for unconditional fund shifts into category c and column (2) adds time-varying category controls. Columns (3)-(4) report similar specifications conditionally on being shifted "up" - from a category with a small change into category c. Columns (5)-(6) report similar specifications conditionally on being shifted "down" - from a category with a large change in commissions into category c. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the family level are in parentheses.

Panel A: All Shifts	(1) $Shift_{fct}$	(2) $Shift_{fct}$	(3) $ShiftUp_{fct}$	(4) $ShiftUp_{fct}$	(5) $ShiftDown_{fct}$	(6) $ShiftDown_{fct}$
$Commission_{ct}$	-2.126**	-1.947*	-2.656***	-2.801***	0.612	0.971
	(0.615)	(0.989)	(0.044)	(0.062)	(0.666)	(1.063)
$R_{fc,t-1}$	0.223	0.295	0.103***	-0.056**	0.129	0.363
	(0.135)	(0.430)	(0.014)	(0.020)	(0.161)	(0.456)
$log(AUM_{fc,t-1})$	-0.015	-0.017	-0.005***	-0.005***	-0.010	-0.012
	(0.013)	(0.015)	(0.000)	(0.000)	(0.013)	(0.015)
$log(FundAge_{fc,t-1})$	-0.019***	-0.020***	-0.016***	-0.017***	-0.005	-0.005
	(0.004)	(0.003)	(0.001)	(0.001)	(0.005)	(0.004)
$R_{c,t-1}$		-0.283		0.168***		-0.460
		(0.577)		(0.037)		(0.580)
$Netflow_{c,t-1}$		0.375		0.043**		0.353
		(0.402)		(0.015)		(0.416)
Observations	4,147	3,933	4,147	3,933	4,147	3,933
R-squared	0.091	0.097	0.089	0.090	0.070	0.078
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Category fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund family fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Appendix A. Variable Definitions

Table A.1 - Definitions of variables

Variable	Description	Source
AUM	Assets under management.	Preadicta Israeli Mutual Fund Database
Expense ratio	A fund expense ratio.	Preadicta Israeli Mutual Fund Database
Commission	A fund commission paid to financial advisers by mutual fund families for distribution of fund shares. The schedule of commissions is described in Figure 1.	Preadicta Israeli Mutual Fund Database
Funds Age	A fund age in months.	Preadicta Israeli Mutual Fund Database
Inflow	A monthly inflow of capital into the fund defined as: $$Inflow_{it} = \frac{sales_{it}}{AUM_{i,t-1}}.$$	Preadicta Israeli Mutual Fund Database
Outflow	A monthly outflow of capital from the fund defined as: $$Outflow_{it} = \frac{redemptions_{it}}{AUM_{i,t-1}}.$$	Preadicta Israeli Mutual Fund Database
Netflow	A monthly net flow of capital defined as $$Netflow_{it} = Inflow_{it} - Outflow_{it}.$$	Preadicta Israeli Mutual Fund Database
Shekel Net Flow	A monthly net flow of capital in shekels defined as $$ShekelNetflow_{it} = sales_{it} - redemptions_{it}.$$	Preadicta Israeli Mutual Fund Database

Table A.1 - Definitions of variables (continued)

Variable	Description	Source
Past month raw fund return ($R_{i,t-1}$)	A fund raw return in the previous month.	Preadicta Israeli Mutual Fund Database
Past month raw category return ($R_{c,t-1}$)	An average fund category return in the previous month, calculated as an average fund return in a given category weighted by fund AUM. Fund categories are described in Figure 1.	Author calculation
Revenue	A revenue from a given fund defined as: $Revenue_{it} = AUM_{it} \cdot (ExpenseRatio_{it} - Commission_{it})$	Author calculation
Start	A dummy variable that equals one if fund family introduces a new fund in a given asset category.	Author calculation
Liquidation	A dummy variable that equals one if fund family liquidates an existing fund in a given asset category.	Author calculation
Shift	A dummy variable that equals one if fund family shifts an existing fund into a given category.	Author calculation
Shift Up	A dummy variable that equals one if fund family shifts an existing fund into a given category from a category with a smaller change in commissions as induced by the reform.	Author calculation
Shift Down	A dummy variable that equals one if fund family shifts an existing fund into a given category from a category with a larger change in commissions as induced by the reform.	Author calculation
Equity	A dummy variable that equals one if a fund is an equity fund.	Author calculation
Post	A dummy variable that equals one if an observation is after May 2013.	Author calculation

Appendix B. Additional Evidence

Table B.1: The Effect of Commissions on Fund Expense Ratios - Robustness to Test Specification

This table reports the results from regressing expense ratios on an indicator variable for the treated group (equity funds), an indicator variable for the post-reform period and an interaction of the two indicator variables. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)
	$ExpenseRatio_{it}$	$ExpenseRatio_{it}$	$ExpenseRatio_{it}$	$ExpenseRatio_{it}$
$Equity_i \times Post_t$	-0.036***	-0.022***	-0.022***	-0.023***
	(0.004)	(0.003)	(0.003)	(0.003)
$Equity_i$	0.138***	0.634***	0.656***	0.600***
	(0.003)	(0.066)	(0.067)	(0.063)
$Post_t$	-0.012***	-0.017***	-0.017***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)
$R_{i,t-1}$				-0.049***
				(0.015)
$log(AUM_{i,t-1})$				-0.002***
				(0.001)
$R_{c,t-1}$			0.010	0.039**
			(0.007)	(0.016)
$log(FundAge_{i,t-1})$				0.016***
				(0.001)
Observations	72,729	70,450	69,197	68,210
R-squared	0.482	0.858	0.857	0.877
Category time trends	No	Yes	Yes	Yes

Table B.2: The Effect of Commissions on Fund Expense Ratios - Matched Sample

This table reports the results from regressing expense ratios on commissions in the matched sample of 113 equity and 113 non-equity funds. The funds are matched on assets under management, age and past performance as of May 2013. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)
	$ExpenseRatio_{it}$	$ExpenseRatio_{it}$	$ExpenseRatio_{it}$	$ExpenseRatio_{it}$
$Commission_{ct}$	0.921***	0.822***	0.810***	0.780***
	(0.152)	(0.134)	(0.131)	(0.130)
$R_{i,t-1}$				-0.039***
				(0.014)
$log(AUM_{i,t-1})$				-0.004***
				(0.002)
$R_{c,t-1}$			-0.009	0.035
			(0.018)	(0.023)
$log(FundAge_{i,t-1})$				0.006
				(0.004)
Observations	12,177	11,811	11,607	11,561
R-squared	0.896	0.906	0.907	0.909
Fund fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Category time trends	No	Yes	Yes	Yes

Table B.3: The Effect of Commissions on Net Fund Flows - Robustness to Test Specification

This table reports the results from regressing net fund flows on an indicator variable for the treated group (equity funds), an indicator variable for the post-reform period and an interaction of the two indicator variables. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)
	$Netflow_{it}$	$Netflow_{it}$	$Netflow_{it}$	$Netflow_{it}$
$Equity_i \times Post_t$	0.016**	0.026**	0.023**	0.019**
	(0.008)	(0.012)	(0.011)	(0.008)
$Equity_i$	-0.036***	-0.289	0.011	0.278
	(0.006)	(0.216)	(0.222)	(0.193)
$Post_t$	0.022***	0.018***	0.018***	0.022***
	(0.005)	(0.005)	(0.005)	(0.004)
$R_{i,t-1}$				1.178***
				(0.095)
$log(AUM_{i,t-1})$				-0.034***
				(0.001)
$R_{c,t-1}$			0.543***	-0.512***
			(0.061)	(0.106)
$log(FundAge_{i,t-1})$				-0.050***
				(0.002)
Observations	72,724	70,443	68,183	68,183
R-squared	0.934	0.938	0.939	0.939
Category time trends	No	Yes	Yes	Yes

Table B.4: The Effect of Commissions on Net Fund Flows - Matched Sample

This table reports the results from regressing expense ratios on commissions in the matched sample of 113 equity and 113 non-equity funds. The funds are matched on assets under management, age and past performance as of May 2013. Detailed definitions of variables can be found in Appendix A. Column (1) reports the baseline specification, column (2) adds linear category trend, column (3) adds average category return and column (4) adds time-varying fund controls. *,**, and *** denote statistical significance at 10%, 5% and 1% levels respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)
	$NetFlow_{it}$	$NetFlow_{it}$	$NetFlow_{it}$	$NetFlow_{it}$
$Commission_{ct}$	0.772**	0.910*	0.887**	0.692**
	(0.339)	(0.497)	(0.392)	(0.319)
$R_{i,t-1}$				0.800***
				(0.139)
$log(AUM_{i,t-1})$				-0.064***
				(0.007)
$R_{c,t-1}$			-0.096	-0.846***
			(0.169)	(0.204)
$log(FundAge_{i,t-1})$				-0.002
				(0.023)
Observations	10,834	10,834	10,834	10,821
R-squared	0.104	0.109	0.109	0.157
Fund fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
Category time trends	No	Yes	Yes	Yes