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

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Abstract

I examine the causal effects of a reduction in commissions paid to financial advisers for distributing mutual fund shares. I exploit the 2013 policy experiment in Israel and a difference-in-differences approach by comparing outcomes for mutual funds that experienced exogenous reductions in commissions. The reform led to a sharp decline in fund expense ratios and an increase in net fund flows. Fund families responded by opening new funds and shifting existing funds into asset categories with reduced commissions. The results suggest that adviser compensation strongly influences investors through its effects on price competition among funds and on fund variety.

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1 Introduction

Many individual investors rely on financial advisers when making financial decisions. In a typical situation, advisers help investors 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 their clients. In the mutual fund market, fund families frequently pay commissions to brokers and financial advisers that enhance the distribution of funds shares. The mutual funds in the United States charge investors annual marketing and distribution fees (12b-1 fees), together with one-time sales loads in order to compensate brokers.[1]

What is the effect of adviser compensation on investor behavior? On the one hand, a commission represents a significant cost from the perspective of mutual fund providers. Higher marginal costs can affect price competition leading 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 funds distributed through brokers 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.[2] Christoffersen, Evans and Musto (2013) demonstrate that higher broker payments are associated with high inflows of capital into mutual funds. Accordingly, the price competition effect and the steering effect of commissions are expected to shift investor demand in opposite directions. The combined effect of commissions is an empirical question and cannot be determined on theoretical

[1]The practice of using a 12b-1 fee in order to provide ongoing compensation to brokers for selling mutual fund shares is discussed in the U.S. Securities and Exchange Commission's 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, the Financial Industry Regulatory Authority (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]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.

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. In addition, the U.S. mutual funds do not report which portion of the 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.

I overcome this challenge by taking advantage of the unique structure of the Israeli mutual fund market. Exploiting the 2013 policy experiment, I estimate the casual effect of commissions and examine the effect of adviser compensation on the behavior of mutual fund 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 most of the fund shares.

Israeli investors do not directly pay for advisory services as fund families have to compensate banks for their distribution of fund shares. The indirect compensation of bank-based advisers by mutual funds is embedded in the Israeli law. In particular, mutual fund families have to pay commissions to banks on an ongoing basis which is similar to 12b-1 fees in the U.S. The Israel government classifies mutual funds into the five broad asset categories: equity funds, mixed funds, bond funds, money market funds and index funds. A fixed, non-negotiable commission is set within each asset category. In May 2013, the Israeli government revised the schedule of commissions, introducing significant reductions for equity mutual funds and smaller reductions for mixed, bond and money market funds. 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.

Employing a difference-in-differences (DiD) design across asset categories, I first document a reduction in mutual fund expense ratios following a reduction in commissions, suggesting that funds engage in price competition due to the reduction in costs. For each percentage point of reduction in commissions, fund

families reduced expense ratios by one percentage point on average. Since lower expense ratios can increase investor demand, measured by net fund flows, more investor flows could be expected after the reform. On the other hand, a reduction in commissions can weaken adviser incentives to sell funds, which could lead to a decline in flows. I find that the reform in Israel generated an increase in net fund flows. These results indicate that the effect of commissions on demand through price competition produces a stronger impact on the average investor than their steering effect. My findings do not confound the trends in outcomes across asset categories, and they are robust to a number of alternative designs and sampling approaches.

Furthermore, I explore two potential mechanisms of capital reallocation: transfers across different asset categories within the mutual fund industry, and transfers between mutual funds and other investment vehicles.[3] Using a single difference approach for each asset category, I find that none of the mutual fund asset categories experienced net outflows. Consequently, net fund flows that arise from the reduction in commissions, mostly come from other investments vehicles. By making mutual funds cheaper, the reduction in adviser compensation attracts capital from outside of the mutual fund industry.

I next examine the effects of commissions on the profitability of asset management and product market strategy of fund families. The fund revenues depend on its expense ratio, the commission as well as on the fund AUM, which depends on the net fund flows. The 2013 reform led to a reduction in commissions and expense ratios but fund flows increased. As a result, fund revenues may either increase or decline. I find that the reform led to an increase in fund AUM and to an increase in fund revenues. The asset categories with a large reduction in commissions became more profitable for fund families despite the reduction in expense ratios.

When exploring how fund families respond to the increased profitability, I find that they change their product market strategy in two complementary ways: (1) they open new funds in the categories with reduced commissions; and (2) they shift some of the 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 be-

[3]For example, investors can withdraw capital from their bank accounts, ETFs, or from holdings of individual securities.

havior and try to capture investor flows by introducing funds into the high flow categories.

Finally, I examine the role of investor sophistication in explaining the heterogeneous effects of the reform across funds. In the experimental setting, Choi, Laibson and Madrian (2009) document that investors vary in their response to information about mutual fund fees. I build on their work and focus on the effects of variation in price sensitivity among investors. I measure flow-to-expense ratio sensitivity at the fund level using an approach similar to the one Gil-Bazo and Ruiz-Verdú (2009) use to evaluate flow-to-performance sensitivity. I show that funds with more price sensitive investors experience not only stronger increases in flows in a response to the reduction in commissions but also larger reductions in expense ratios. This result suggests that investor sophistication influences the effects of the reform through at least two channels: (1) price sensitivity directly affects the response to price declines since more price sensitive investors exhibit stronger increase in flows; and (2) fund families introduce larger cuts to their fund expense ratios if their investors are more price sensitive. Consequently, higher investor sophistication in the form of price sensitivity leads to the heterogeneous effects of the reform, which are associated with increased price competition among funds and a stronger investor response to price declines.

My results suggest that the reduction in broker compensation can increase investor demand through its equilibrium effect on fund expense ratios. At the same time, a number of studies find that higher broker compensation either increases fund flows or has no effect on them (Anagol, Marisetty, Sane and Venugopal (2017b)). My findings can be potentially reconciled with the U.S. and the international evidence in the following way. The U.S. mutual fund market is highly segmented across the distribution channels as fund shares are marketed either directly or via brokers. Del Guercio and Reuter (2014) document that less sophisticated investors are more likely to invest with brokers while more sophisticated investors invest directly. Since less sophisticated investors are more likely to be price insensitive and more exposed to broker promotional efforts, flows into broker-sold funds exhibit low sensitivity to the price effect of commissions and higher sensitivity to their steering effect (Sun (2019)). In contrast, the Israeli market exhibits very little segmentation since most of the domestic investors invest through banks and have to pay a commission. As a result, the typical Israeli mutual fund places so-

phisticated and less sophisticated investors in the same pool. This may lead funds to introduce larger price cuts and produces larger, first order effects of these cuts on investor flows. While the reconciliation based on market segmentation seems reasonable, I cannot fully rule out that the differences in results are driven by varying methodological approaches and identification strategies.

1.1 Contributions to Literature

This paper makes three contributions to the literature. My primary contribution is to provide novel evidence on the causal effect of adviser compensation by designing an identification strategy based on the unique institutional structure of Israeli asset management markets. A number of studies examine the relationship between ongoing adviser compensation, such as 12b-1 fees, and fund outcomes, such as fund expense ratios, and investor flows. 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), and Christoffersen, Evans and Musto (2013) find a positive relation between 12b-1 fees, other forms of ongoing revenue sharing and fund flows, while Trzcinka and Zweig (1990) do not find any significant relationship. These studies focus on the cross-sectional relationship between adviser compensation and fund outcomes, providing correlational evidence. Unlike that work, I exploit a natural experiment that allows me to measure the causal effect of ongoing adviser compensation within a given product. As a result, my approach allows to identify a previously undetected effect of adviser compensation on price competition among mutual funds. In particular, I find that commissions can generate significant price variation, producing large, first-order effects on investor demand, on the top of the standard steering effect.

Second, this paper contributes to the literature on the determinants of mutual fund variety (Massa (2003), Hortaçsu and Syverson (2004)). It provides a novel link between adviser compensation and fund offerings, suggesting that fund families engage in strategic positioning of their products following an exogenous reduction in distribution costs and an increase in flows. Khorana and Servaes (1999) and Zhao (2005) show that fund entry and exit decisions strongly depend on fund size, which is largely driven by fund performance. I extend this literature by high-

lighting the role of adviser compensation as an important driver of fund variety. Specifically, I show that changes in commissions cause mutual fund families in Israel to change their fund offerings in the response to variation in both fund size and equilibrium profitability of different investment categories.

Finally, this paper contributes to the literature on variation in mutual fund fees and its effects on investor behavior. I show that variation in price sensitivity among fund investors can significantly affect price competition among funds. 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 the mutual fund expense ratio and investor flows at the fund level. At the same time, the variation across investors appears to be substantial. While many mutual fund investors fail to utilize expense ratio information when choosing funds, some investors do better than the others (Choi, Laibson and Madrian (2009)). Sun (2019) demonstrates that price sensitivity matters when actively managed funds respond to index fund entry. I extend this literature by documenting that funds with price-sensitive investors engage in stronger price competition and introduce larger price cuts in a response to an exogenous reduction in marginal costs.

This paper also speaks to multiple studies on the effect of one-time sales loads, a different form of broker compensation in the 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 AUM. 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 a positive relationship between proxies for one-time broker compensation and fund flows.

The rest of the paper is organized as follows. In Section 2, I describe the institutional environment, the dataset, and my identification strategy. In Section 3, I present main results on the effect of commissions on expense ratios and fund flows. I analyze the impact of the reform on behavior of fund families in Section 4. In Section 5, I examine the role of investor sophistication. Concluding remarks are in Section 6.

2 Institutional Background, Data, and Methodology

In this section, I discuss the market for financial advice in Israel. I also describe the dataset as well as the methodologies that I use to identify the causal effects of commissions.

2.1 Regulation of Financial Advice and Financial Advisory Commissions in Israel

Historically, the banking system dominated the Israeli financial services sector. Before 2007, banks were not only the largest providers of financial advice but they also owned the largest pension, providence, and mutual fund companies. As a result, financial advisers recommended to their clients to invest in funds offered by the banks, which is typical for a market with bundled advisory and asset management services (White House Council of Economic Advisers (2015)).

Over the period of 2007-2013, the market for financial advice went through a number of structural changes. In 2007, the Israeli Parliament passed the major reform in response to the Bahar Committee Recommendations. The new regulations - known collectively as the Bahar reform - required a full separation between financial advice and asset management, and banks had to divest either their asset management businesses or their advisory businesses. Banks decided to divest their mutual and pension funds, while keeping control over the business of financial advice. As a result, the market for distribution of mutual fund shares remained bank-centered. As of 2013, the Israeli financial advisory industry employed approximately 4,000 financial advisers, licensed by the Israel Securities Authority, with the vast majority being bank employees.[4] I estimate that 80% of total AUM of Israeli mutual funds are invested through financial advisers in banks.[5]

Furthermore, the 2007 Bahar reform introduced a schedule of ongoing commissions that mutual fund companies had to pay to banks for distributing 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 to

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

[5] I construct this proxy by relying on the 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 the Israeli Parliament (Koffman (2012)).

the bank is 0.8% and a investor invests $100 into a mutual fund, given a holding period of one year, the fund pays 80 cents to the financial adviser who referred the client. The commission represents a revenue sharing arrangement between banks and mutual fund families. If the same fund charges an expense ratio of 2%, the mutual fund family is left with $1.2, after obtaining $2 from the investor and paying the 80 cent commission to the bank. As a result, the fund family retains $1.2/$2 = 60% of the revenue and the bank gets 40% of the revenue.

In May 2013, the Israeli government revised the initial schedule of commissions. This revision represents a policy experiment which I use to study the casual effect of commissions. In particular, the government introduced significant reductions for equity mutual funds and smaller reductions for other asset categories. Table 1 presents the details of the May 2013 revision. Before May 2013, equity mutual funds had to pay to banks a commission of 0.8%. After May 2013, this commission was reduced to 0.35%. Other asset categories experienced much smaller reductions in commissions. In the case of bond and mixed funds, the commissions declined by 0.05%, and money market funds received a reduction of only 0.025%. Index funds were commission-free before the May 2013 change, and they remained commission-free after the revision.

Why did the government decide to reduce financial adviser commissions in 2013? When financial advice was separated from asset management in 2007, banks demanded one-third of the revenues to be compensated for distributing fund shares.[6] However, the mutual fund industry was gradually becoming much more competitive over 2007-2013 period. Panel A of Figure 1 shows that the Bahar reform resulted in a doubling in the mutual fund industry AUM, as well as the number of funds offered by the fund families to investors (Panel B). The increased competition in the mutual fund industry led to a significant reduction in fund expense ratios, as shown in Panel C. Figure 2 shows that banks gained additional revenues at the expense of mutual funds, increasing their share from 30% in 2007 to 40% in 2012. The Israel Securities Authority concluded that a further reduction in expense ratios 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 in the initial 2007 arrangement (Koffman (2012)). In

[6] As a result, in asset classes with higher expense ratios, such as equities, the commissions are set at the higher level.

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.

2.2 Dataset

I use a standard dataset on the Israeli mutual fund market purchased from Praedicta, which is a large private Israeli data vendor. This is a survivorship bias-free database of the entire universe of Israeli mutual funds collected from the public filings of mutual fund companies.[7] 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 AUM. 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 2 presents the descriptive statistics, across the asset categories described in Table 1. Panel A reports the fund-level variables. The net monthly fund flow into the average Israeli mutual fund equals 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 average fund charges an annualized expense ratio of 1.2%. The equity funds are particularly expensive, with an average expense ratio of 2.38%. The commissions and expense ratios are correlated within the asset categories, such that the asset categories with high commissions tend to have high expense ratios.

The average Israeli mutual fund has 160 million Israeli Shekels (roughly $45 million) 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 1 billion Shekels. The average fund delivered a monthly return of 0.2% per month. The average returns across categories decline when the proportion of debt instruments in mutual fund assets increases: mixed funds delivered 0.2% per month, bond funds generated 0.12%

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

per month, and money market funds 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 (42 months).

Panel B of Table 2 reports the family-level variables. There is a 7% probability of a new fund start in a given month, while there is a 5% probability of a fund liquidation. Mixed funds experience especially high turnover with a 16% fund start probability and a 8% probability of fund liquidation. Mutual fund families can shift funds across asset categories by adjusting the fund's asset allocation. There is an 2% unconditional probability of a fund shift across categories. Fund families shift funds up (down), from categories with a small (large) reduction in commissions to categories with a large (small) reduction in commission. Panel B shows that fund families are equally likely to shift funds up and down with a probability of 1% for any type of shift. Families cannot shift funds down into the equity category because it experienced the largest reduction in commissions. Families also cannot shift funds up into the index category with no change in commissions.

2.3 Methodology and Identification

The commissions were significantly reduced as a result of the 2013 reform with the strongest reduction - more than 50% - for equity mutual funds. As different asset categories experienced different reductions, I employ DiD methodologies to estimate the causal effect of commissions on a variety of outcomes. 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. This assumption can be empirically validated. Importantly, my identification strategy does not imply that funds should be similar in the cross-section. For example, funds are allowed to have different clienteles and be owned by different fund families as long as fund outcomes exhibit parallel trends.

I first illustrate the effect of commissions non-parametrically by comparing funds with large commission reductions, such as equity funds, to funds from other asset categories that experienced smaller commission reductions. In this setting, I refer to equity funds as the treatment group and to other funds as the control group. After validating that the outcomes across fund categories are on parallel trends prior to the reform, I estimate cross-sectional differences in outcomes be-

tween the two groups every month using the following specification:

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

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

I next apply a standard fixed effects regression framework. The reduction in commissions represents a continuous treatment that exogenously varies across the five asset categories. 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. I calculate monthly commissions because fund flow data are 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.

Finally, I implement an additional DiD approach that includes binary treatment. While this framework does not directly include full information about the treatment intensity, it can serve as a robustness check. Equity funds are classified as the treatment group as they receive a large treatment and other funds are classified as the control group as they receive a small treatment. This approach leads to the following econometric specification:

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

where y_{itc} is an outcome of interest for fund i at time t in category c, $Equity_i$ equals one for equity funds and is zero otherwise, $Post_t$ equals one if the observation is post-reform (after April 2013), and zero otherwise. γ is a coefficient on the interaction between $Equity_i$ and $Post_t$, which estimates the treatment effect.

Across all the approaches, the standard errors are clustered at the fund level. 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 the five asset categories as five clusters instead would substantially limit the interpretation of statistical inference (Angrist and Pischke (2009)).

3 Effect of Commissions on Expense Ratios and Fund Flows

In this section, I examine how financial adviser commissions affect mutual fund expense ratios and net fund flows. My first hypothesis relates to the effect of commissions on mutual fund expense ratios.

Hypothesis 1 [Price Competition] *Commissions represent a marginal cost from the perspective of mutual fund families. Therefore, a reduction in commissions leads to a reduction in fund expense ratios.*

My next two mutually exclusive hypotheses relate to the effect of commissions on investor demand, as measured by net fund flows.

Hypothesis 2a [Price Competition Effect Dominates] *If Hypothesis 1 is correct, lower commissions increase investor demand through their effect on expense ratios and lead to higher net fund flows.*

Hypothesis 2b [Steering Effect Dominates] *Lower commissions reduce adviser incentives to steer investor towards mutual funds and lead to lower net fund flows.*

3.1 Expense Ratios

Figure 3 presents the expense ratios for equity and non-equity funds over 2011-2015. Panel A shows that the equity funds charged especially high expense ratios 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, the expense ratios of equity funds declined by 0.4%, which roughly reflects the full reduction in commissions of 0.45%. The expense ratios for equity and non-equity funds are on similar trends over 2011-2013, which provides support for the parallel trend assumption. Panel B 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. In addition, the effect of the reform starts to appear in the data exactly when predicted, which provides support for the identification strategy.

Table 3 shows the results of the regressions of expense ratios on commissions. Column (1) presents the results from the baseline specification as implied by equation (2) and confirms the graphical evidence in Figure 3. A one percentage point increase in commissions increases expense ratio by 1.15 percentage points. Figure 3 also shows strong time trend in expense ratios which tend to decrease over time. I incorporate linear time trends at the asset category level to verify that the results are not driven by this gradual decline. The specification with linear category trends is given by:

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

where I augment the specification from equation (2) with α_c, which are fund category dummy variables interacted with a time variable t. Column (2) presents 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 increase in commissions, expense ratios increase by one percentage point. I add a time-varying past performance of the average fund in the asset category as an additional control variable and give the results in column (3). The coefficient on commissions changes only slightly. I next add fund-level time-varying control variables to the regression. While the main coefficient of interest in column (4) does not change materially, the results show that larger, younger funds and funds with good past performance tend to charge lower expense ratio.

In sum, the findings are consistent with Hypothesis 1. 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. Once the commissions are reduced, mutual funds engage in price competition and their expense ratios decline.

3.2 Net Fund Flows

Figure 4 shows the net fund flows into Israeli mutual funds over 2011-2015. I define net flow as a difference between fund sales and redemptions divided by

fund AUM. Panel A shows time variation in net flows across the treatment and the control groups. The 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 May 2013. 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. Panel B confirms that the difference between the treatment and the control groups gets larger after the reform.

Table 4 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 leads to an increase in net investor flows. Column (1) presents the results of the baseline specification which indicates that an increase of one basis point in monthly commissions increases monthly net flow by 0.9% relative to the 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 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 the fund expense ratio in net flows regressions, because expense ratio is an outcome of the natural experiment just like net fund flows. Controlling for endogenous covariates would not allow me to give a casual interpretation to the effect of commissions on net fund flows (Angrist and Pischke (2009)).

In sum, the evidence supports Hypothesis 2a and rejects Hypothesis 2b. Despite that lower commissions weaken the incentives of financial advisers to market the funds, the net fund flows increased significantly following the reform. Thus, the effect of commissions on investor demand through the price competition channel dominates the effect of commissions through the steering channel for the average investor.[8]

[8]In principle, financial advisers may start selling funds more aggressively to increase their AUM in order to compensate themselves for the reduction in commissions. However, this explanation is not consistent with the structure of the reform. In particular, equity funds experienced a large reduction in

3.3 Robustness

In this subsection, I discuss the robustness checks. First, I increase the similarity between the treatment and the control group, matching funds based on covariates such as part performance, AUM, and fund age in May 2013. I implement a propensity score matching procedure using one-to-one nearest neighbor matching without replacement, which generates a significantly smaller sample of 113 equity and 113 non-equity funds with 11,561 fund-month observations for fund expense ratios and 10,821 fund-month observations for fund flows. I next repeat the specifications from Tables 3 and 4 in the matched sample.

Panel A of Table 5 presents the results. Columns (1) and (2) presents the coefficients on commissions for two dependent variables: expense ratios and net fund flows. For brevity, the table presents only the coefficients for the specification with the full set of control variables and linear time trends that corresponds to column (4) of Tables 3 and 4. I report the full set of results in the Appendix, Tables B1 and B2. The main results are robust to the estimation in the matched sample. In the expense ratio regression, the coefficient on commissions remains positive and significant. Similarly, there is a negative and significant coefficient on commissions in the net fund flow regression. These coefficients exhibit economic magnitudes similar their counterparts in Tables 3 and 4, with the coefficient in the expense ratio regression being slightly smaller.

I next estimate the effects of commissions on both flows and expense ratios using the alternative methodology with a treatment dummy. In particular, I estimate the equation (3) which is described in subsection 2.3. In this specification, a treatment dummy equals one if a fund is an equity fund since these funds experienced the largest reduction in commissions. Panel B of Table 5 presents the estimates of the treatment effect for expense ratios and net fund flows. In the expense ratio regression, the coefficient on the interaction between the treatment dummy and a post-reform indicator is negative. This result implies that equity funds reduced their expense ratios the most, following the reform. In the net fund flow regression, the coefficient on the interaction between the treatment dummy and a post-reform indicator is positive, suggesting that equity funds experienced particularly high

commissions while mixed funds experienced a tiny reduction. At the same time, the *levels* of commissions on these two major asset categories became equal following the 2013 reform. Thus, advisers do not face incentives to sell equity funds more aggressively than mixed funds after the reform.

flows relatively to other funds. Both results are consistent with the direct effects of commissions that are estimated in Tables 3 and 4. While Table 5 presents only the coefficients for the specification with the full set of control variables and linear time trends that corresponds to column (4) of Tables 3 and 5, the full set of results is presented in the Appendix, Tables B3 and B4. In sum, the effects of commissions on expense ratios and net fund flows are robust to estimation in the matched sample, as well as to alternative DiD specifications.

3.4 Net Fund Flows For Each Asset Category

I can interpret the DiD results in at least two ways. First, investors can reallocate capital from mutual funds with small reductions in commissions to mutual funds with large reductions in commissions. The reallocation occurs primarily within the mutual fund industry. In this case, there would be an increase in net flows in categories with large reductions in commissions and a reduction in net flows in other categories. Second, investors can 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 DiD estimation does not allow me 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 these explanations, I examine the effect of commissions on net flows for each asset category. I remove time fixed effects from equation (4) and use the following econometric specification:

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

My specification represents a single difference approach and uses only the time variation in commissions within the given fund, while still controlling for the linear time trend. I also exclude index funds from the test since the reform does not introduce any time variation in commissions for this group.

Table 6 shows that commissions reduce net flows for equity funds (column (1)) and mixed funds (column (2)), but do not significantly affect flows for other asset categories (columns (3) and (4)). As none of the mutual fund categories experi-

ence significant net outflows as a result of the reform, the evidence suggests that investors transfer capital from non-mutual fund saving vehicles into mutual funds for the most part.

4 Industry Response to Changes in Commissions

I next examine how mutual funds families benefit from the reform and respond to it. The reduction in commissions generates two opposing effects on mutual fund profitability: it leads to a reduction in expense ratios but it can also increase fund AUM through increased net flows. If the aggregate effect of commissions is positive such that fund fee revenues increase, I would expect fund families to capture additional revenue and to strategically reposition their fund offerings. 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 AUM and fund revenue. I define fund revenue as fund AUM multiplied by the difference between the expense ratio and the commission. Table 7 presents the results from regressing fund AUM and revenue on commissions. Column (1) shows that a reduction of one basis point in monthly commissions leads to an increase of roughly 25 basis points in fund AUM. 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. Columns (4)-(6) show that fund revenues increase as well. 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 on mutual fund family strategic behavior. Fund families can capture additional flows 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:

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

where y_{ftc} is an outcome of interest for fund family f at time t in category c, α_f,α_t, and α_c are family, time and category fixed effects, respectively, and $X_{f,t-1,c}$ is a set of family-level control variables in the previous month, such as a logarithm of fund family assets under management, fund 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 asset category level, such as category past performance and category net fund flows. The standard errors are clustered at the fund family level.

Table 8 presents the effect of commissions on fund starts and fund liquidations. In these specifications, y_{ftc} is dummy variable that equals one if a fund family f introduces or liquidates a fund in category c at time t. Similar 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 effect of commissions declines to 64 basis points after I control for family time-varying characteristics in a given category (column (2)). It increases to 78 basis points after the category past performance and the category net flow are accounted for (column (3)). The results in the columns (4)-(6) show 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 through the opening of new funds in these categories.

4.3 Fund Category Shifts

I next examine the ability of mutual fund families to shift funds across categories. In particular, it would be profitable to move funds "up" - from categories with small reductions in commissions to categories with large reductions in commissions. However, it would not be profitable to move funds across categories in the opposite direction. As categories with large reduction benefited from increased flows and revenues, this strategy represents a revenue-maximizing approach for the fund families.

I formally test this idea utilizing the specifications based on equation (6) 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) of Table 9 report the results for the unconditional probability of moving the fund up or down. 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%. Columns (3) and (4) show that the reduction in commissions in category c led to a significant increase in probability of shifting a fund into category c from any other category with smaller reductions in commissions. In particular, a reduction of one basis point in monthly commissions increases the probability of shifting up by 2.8%. The results in columns (5) and (6) indicate that the reform does not affect the probability of shifting a fund down. In sum, the results imply that fund families strategically shift funds from categories with small reductions in commissions to categories with large reductions to capture additional flows and revenues.

5 The Role of Price Sensitivity

Finally, I explore the heterogeneous effects of the reform across funds by studying the role of investor price sensitivity. My approach is motivated by the work of Choi, Laibson and Madrian (2009), who document that investors vary in their response to information about fees. The variation in price sensitivity has at least two implications for my study of the effects of commissions. First, funds with more price sensitive investors are expected to exhibit a larger increase in fund flows in a response to the reduction in fund expense ratios. Second, fund families may introduce larger reductions to their expense ratios in funds held by price sensitive investors, since these investors are more likely to transfer their capital to competing funds.

5.1 A Measure of Flow-to-Price Sensitivity

I estimate investor price sensitivity at the fund level by designing an approach similar to Gil-Bazo and Ruiz-Verdú (2009), who focus on performance sensitivity estimation. Specifically, I propose the following model for fund flows:

$$Netflow_{it} = \beta_0 + \beta_1 ExpenseRatio_{it} + \beta_1 ExpenseRatio_{it}^2 +$$

$$+\beta_3 ExpenseRatio_{it} \times log(AUM_{i,t-1}) + \beta_4 ExpenseRatio_{it} \times log(FundAge_{i,t-1}) +$$

$$+\beta_5 R_{i,t-1} + \beta_6 R_{c,t-1} + \beta_7 log(AUM_{i,t-1}) + \beta_8 log(FundAge_{i,t-1}) + \gamma_t + \epsilon_{it}, \quad (7)$$

where $Netflow_{it}$ is a net fund flow of fund i in month t, $ExpenseRatio_{it}$ is a fund's expense ratio, $log(AUM_{i,t-1})$ is a natural logarithm of fund's assets under management, $log(FundAge_{i,t-1})$ is a natural logarithm of fund's age, and γ_t are month fixed effects. This specification exhibits a good degree of flexibility for the effect of expense ratios on flows. In particular, I allow for this effect to be non-linear and heterogeneous in fund size and age following the evidence on the determinants of mutual fund expense ratios from Gil-Bazo and Ruiz-Verdú (2009).

I estimate the coefficients from equation (7) using the pre-reform period such that my measure of price sensitivity is not contaminated by potential sorting of investors following the reform. I next compute my measure of flow-to-price sensitivity as the first derivative of conditional expected flow to expense ratio, given the estimated coefficients:

$$S_{it} = \frac{\partial E_{i-1}(Netflow_{it})}{\partial ExpenseRatio_{it}} = \hat{\beta}_1 + 2\hat{\beta}_2 ExpenseRatio_{it} + \hat{\beta}_3 log(AUM_{i,t-1}) +$$

$$+\hat{\beta}_4 log(FundAge_{i,t-1}). \quad (8)$$

Finally, I calculate the average of S_{it} within fund i to produce a fund-level measure of price sensitivity, S_i. The coefficients from the estimation procedure are reported in the Appendix, Table B5.

5.2 Heterogeneous Effects of Commissions

I next examine the implications of price sensitivity for my main results by introducing the interaction of my measure of price sensitivity with commissions into the main specification. To allow for easier interpretation of the regression coefficients, I map S_i into a dummy variable that equals one if a fund-level price sensitivity is above its median. In this regression, the fund fixed effects adsorb the direct influence of price sensitivity on the outcome variables. Table 10 presents the estimation results where columns (1) - (3) present the estimated effects on fund expense ratios. Column (1) shows the baseline specification. The coefficient on the interaction between commissions and a measure of price sensitivity equals to 0.4, statistically significant at the 1% level. This result implies that funds with more price sensitive investors reduced their expense ratios by an additional 0.4 basis points for each basis point of the reduction in commissions, relative to funds with less price sensitive investors. This evidence is robust to including fund-level time varying control variables (column (2)) and category average returns (column (3)).

Columns (4) - (6) present the estimates of regression coefficients when the outcome variable is net fund flows. The estimated coefficient on the interaction between between commissions and a measure of price sensitivity equals to 0.8, statistically significant at the 1% level. This result implies each basis point in monthly

commissions increases monthly net flow by an additional 0.8% for funds with more price sensitive investors, relative to funds with less price sensitive investors. Columns (2) and (3) show that these results do not depend on the introduction of additional control variables. In sum, the evidence confirms that funds with more price sensitive investors experience larger expense ratio cuts together with larger increases in net fund flows.

6 Conclusion

In this paper, I examine the causal effect of ongoing asset-based commissions paid to financial advisers using the 2013 policy experiment in Israel. I highlight two opposing effects of commissions: (1) a price competition effect: high commissions translate in higher expense ratios leading to lower investor demand; (2) a steering effect: financial advisers are expected to market high commission funds resulting in higher investor demand. I find that the price competition affects the demand of the average investor more than than the steering. I also document that mutual fund families respond to changes in investor behavior generated by ongoing commissions and strategically position new and existing funds to pursue revenue-maximizing strategies.

My study has two key implications. First, it emphasizes 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 via price competition. My findings highlight a new channel through which adviser compensation can affect the market and they are important for regulators interested in changing the compensation structure. The evidence suggests that both the price competition effect and the steering effect should be taken in the account when designing such a regulation.

Second, this study highlights the importance of the strategic response to the reform by fund families. The results suggest that providers of financial products are aware how reforms impact investors, and they respond with revenue-maximizing strategies. As a result, a change in financial adviser compensation not only impacts investors but also the entire market structure and the product variety as well.

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Figure 1: 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 2006-2015 period. Detailed definitions of the variables are in Appendix A. Panels A and B illustrate the growth in the number of funds as well as in the total industry AUM. Panel C shows the gradual decline in expense ratios. Equal-weighted expense ratios are obtained by weighting fund-level expense ratios by fund AUM in each month.

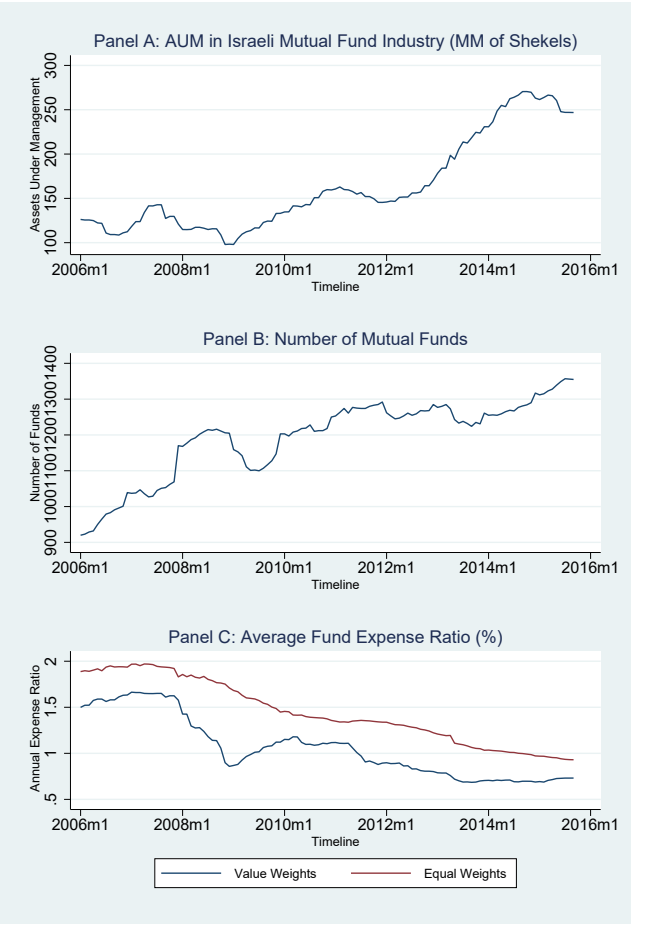

Figure 2: Revenue Sharing between Banks and Fund Families

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. Bank Share represents an average share of commissions in fund expense ratio, equally-weighted across funds.

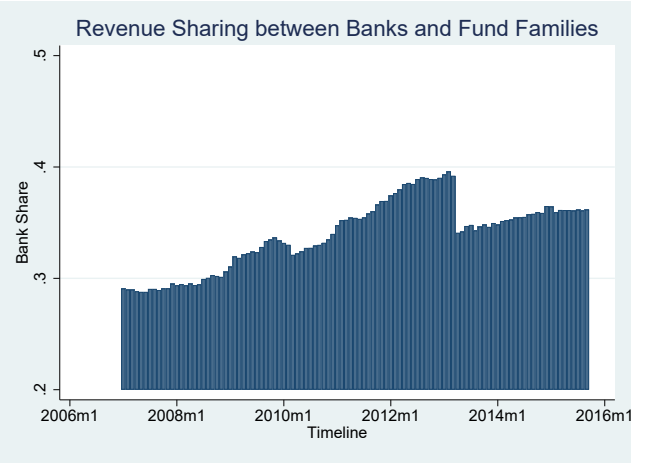

Figure 3: Commissions and Expense Ratios

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

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

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

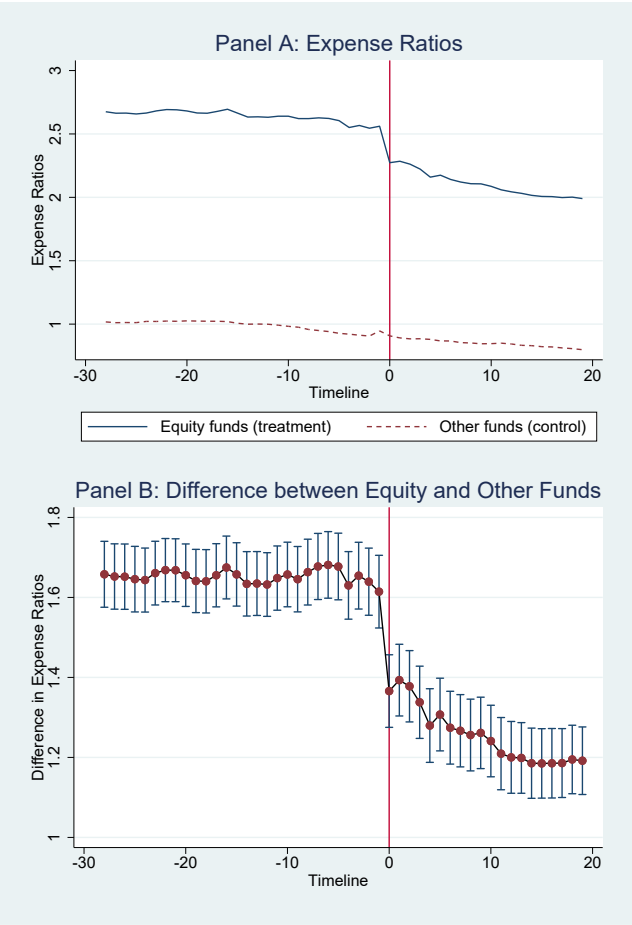

Figure 4: Commissions and Net Fund Flows

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

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

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

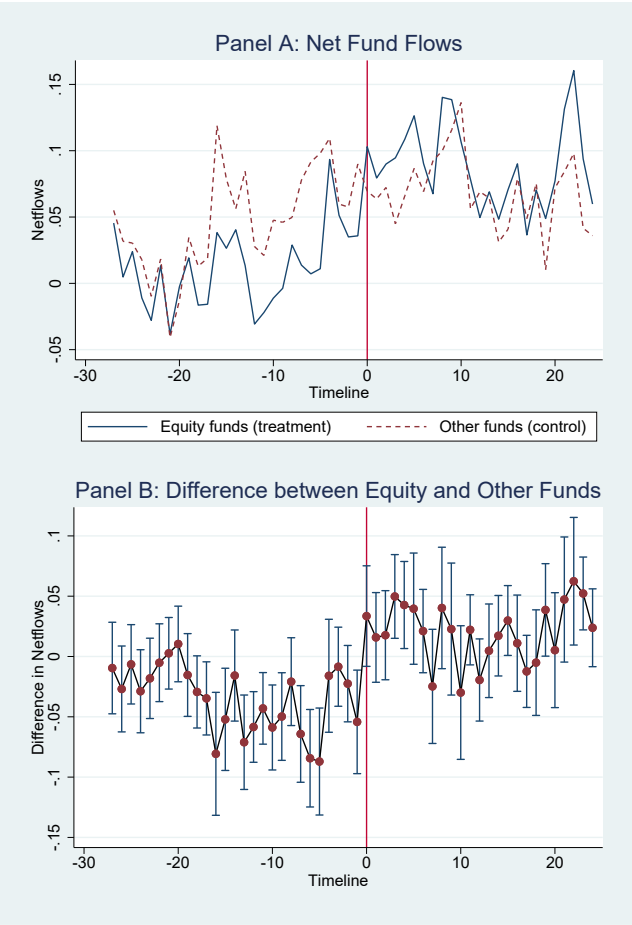

Table 1: Commission Schedule

This table 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 table shows 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%

Table 2: 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 the variables are 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)
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)
AUM (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)	105.86	146.90	101.49	82.06	86.10	42.99
	(103.46)	(117.74)	(102.04)	(70.36)	(69.55)	(41.25)
Observations	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	0.02	0.04	0.03	0.02	0.01	0.01
	(0.27)	(0.25)	(0.33)	0.25)	(0.14)	(0.25)
Shift Up	0.01	0.02	0.01	0.002	0.002	0
	(0.20)	(0.25)	(0.24)	(0.11)	(0.05)	-
Shift Down	0.01	0	0.01	0.01	0.002	0.02
	(0.19)	-	(0.26)	(0.23)	(0.13)	(0.25)
AUM (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)	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	4,296	1,147	1,140	916	669	375

Table 3: The Effect of Commissions on Fund Expense Ratios

This table reports the results from regressing expense ratios on commissions. Detailed definitions of the variables are in Appendix A. Column (1) reports the results of the baseline specification. The results of specifications with additional control variables such as a linear category trend, an average category return, and time-varying fund characteristics, are reported in columns (2)-(4), respectively. *,**, and *** denote statistical significance at the 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 4: The Effect of Commissions on Net Fund Flows

This table reports the results from regressing net fund flows on commissions. Detailed definitions of the variables are in Appendix A. Column (1) reports the results of the baseline specification. The results of specifications with additional control variables such as a linear category trend, an average category return, and time-varying fund characteristics, are reported in columns (2)-(4), respectively. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)
	$NetFlow_{it}$	$NetFlow_{it}$	$NetFlow_{it}$	$NetFlow_{it}$
$Commission_{ct}$	-0.966***	-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 5: Robustness Tests

This table reports the results of robustness tests for the main results. Detailed definitions of the variables are in Appendix A. Panel A 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 AUM, age, and past performance as of May 2013. Panel B reports the results from regressing expense ratios on an indicator variable for the treatment group (equity funds), an indicator variable for the post-reform period, and an interaction of the two indicator variables. Tables B1 - B4 in Appendix B present the detailed results for these tests. *,**, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors clustered at the fund level are in parentheses.

Panel A: Matched Sample	(1)	(2)
	$ExpenseRatio_{it}$	$NetFlow_{it}$
$Commission_{ct}$	0.780***	-0.692**
	(0.130)	(0.319)
Observations	11,561	10,821

Panel B: Treatment Dummy	(1)	(2)
	$ExpenseRatio_{it}$	$NetFlow_{it}$
$Equity_i \times Post_t$	-0.023***	0.019**
	(0.003)	(0.008)
Observations	68,210	68,183

Table 6: 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 the variables are in Appendix A. All the specifications include linear category trends, an average category return and the time-varying fund controls. *,**, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors clustered at the fund level are in parentheses.

	(1)	(2)	(3)	(4)
Asset Category	Equity	Mixed	Bond	Money Market
	$NetFlow_{it}$	$NetFlow_{it}$	$NetFlow_{it}$	$NetFlow_{it}$
$Commission_{ct}$	-1.518***	-0.558**	-0.540	-0.549
	(0.306)	(0.257)	(0.641)	(0.910)
Observations	13,127	39,849	5,099	2,117
R-squared	0.227	0.176	0.296	0.225
Fund fixed effects	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes
Control variables	Yes	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 results of the baseline specification for fund AUM. The results of specifications with additional control variables such as an average category return and time-varying fund characteristics, are reported in columns (2)-(3), respectively. Columns (4)-(6) report the results of similar specifications for fund revenues. *,**, and *** denote statistical significance at the 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) $log(Rev_{it})$	(5) $log(Rev_{it})$	(6) $log(Rev_{it})$
$Commission_{ct}$	-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 the variables are in Appendix A. Column (1) reports the results of the baseline specification for fund starts. The results of specifications with additional control variables such as time-varying family control variables and time-varying category control variables, are reported in columns (2)-(3), respectively. Columns (4)-(6) report the results of similar specifications for fund liquidations. *,**, and *** denote statistical significance at the 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 the variables are in Appendix A. Column (1) reports the baseline specification for unconditional fund shifts into category c, and column (2) reports the results when time-varying category control variables added. Columns (3)-(4) report similar specifications for a probability of being shifted "up" - from a category with a small change in commissions into category c. Columns (5)-(6) report similar specifications for a probability being shifted "down" - from a category with a large change in commissions into category c. *,**, and *** denote statistical significance at the 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

Table 10: The Effect of Price Sensitivity on Response to Change in Commissions

This table reports the results from regressing expense ratios and net fund flows on commissions and fund price sensitivity, and an interaction of these variables. Detailed definitions of the variables are in Appendix A. Column (1) reports the results of the baseline specification with linear category trend. The results of specifications with additional control variables, such as time-varying fund control variables and a category return, are reported in columns (2)-(3), respectively. Columns (4)-(6) repeat the specifications from columns (1)-(3) using net fund flows as an independent variable. Table B5 in Appendix B presents the result from the estimation of fund price sensitivity. *,**, and *** denote statistical significance at the 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) $NetFlow_{it}$	(5) $NetFlow_{it}$	(6) $NetFlow_{it}$
$Commission_{ct}$	0.592***	0.527***	0.527***	-0.799***	-0.846***	-0.812***
	(0.119)	(0.135)	(0.134)	(0.243)	(0.246)	(0.250)
$Commission_{ct} \times S_i$	0.392***	0.398***	0.399***	-0.842***	-0.655***	-0.623***
	(0.116)	(0.139)	(0.139)	(0.290)	(0.222)	(0.224)
$R_{fc,t-1}$		-0.023***	-0.023***		0.789***	1.011***
		(0.005)	(0.005)		(0.066)	(0.084)
$log(AUM_{fc,t-1})$		-0.006***	-0.006***		-0.062***	-0.062***
		(0.000)	(0.000)		(0.003)	(0.003)
$log(FundAge_{fc,t-1})$		0.007***	0.007***		-0.096***	-0.096***
		(0.001)	(0.001)		(0.011)	(0.011)
$R_{c,t-1}$			0.004			-0.900***
			(0.009)			(0.120)
Observations	70,443	68,183	68,183	63,586	63,324	63,324
R-squared	0.945	0.950	0.950	0.189	0.232	0.233
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

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A Variable Definition

Table A1: Definitions of variables

Variable	Description	Source
AUM	Assets under management.	Preadicta
Expense ratio	A fund expense ratio.	Preadicta
Commission	A fund commission paid to financial advisers by mutual fund families for distribution of fund shares.	Preadicta
Funds Age	A fund age in months.	Preadicta
Netflow	A monthly net flow of capital defined as $$Netflow_{it} = \frac{sales_{it} - redemptions_{it}}{AUM_{i,t-1}}$$	Preadicta
Price sensitivity, S_i	An estimate of flow-to-expense ratio sensitivity at the fund level.	
Past month raw fund return ($R_{i,t-1}$)	A fund raw return in the previous month.	Preadicta
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.	Author calculation

Variable	Description	Source
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

B Additional Evidence

Table B1: The Effect of Commissions on Fund Expense Ratios - Matched Sample

his 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 the variables are in Appendix A. Column (1) reports the results of the baseline specification. The results of specifications with additional control variables such as a linear category trend, an average category return, and time-varying fund characteristics, are reported in columns (2)-(4), respectively. *,**, and *** denote statistical significance at the 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) $ExpenseRatio_{it}$
$Commission_{ct}$	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 B2: The Effect of Commissions on Net Fund Flows - Matched Sample

This table reports the results from regressing net fund flows 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 the variables are in Appendix A. Column (1) reports the results of the baseline specification. The results of specifications with additional control variables such as a linear category trend, an average category return, and time-varying fund characteristics, are reported in columns (2)-(4), respectively. *,**, and *** denote statistical significance at the 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

Table B3: 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 the variables are in Appendix A. Column (1) reports the results of the baseline specification. The results of specifications with additional control variables such as a linear category trend, an average category return, and time-varying fund characteristics, are reported in columns (2)-(4), respectively. *,**, and *** denote statistical significance at the 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 B4: 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 the variables are in Appendix A. Column (1) reports the results of the baseline specification. The results of specifications with additional control variables such as a linear category trend, an average category return, and time-varying fund characteristics, are reported in columns (2)-(4), respectively. *,**, and *** denote statistical significance at the 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 B5: Estimation of Flow-to-Expense Ratio Sensitivity

This table reports the results from the estimation of flow-to-expense ratio sensitivity. Detailed definitions of the variables are in Appendix A. The procedure is described in details in Section 5. *,**, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors clustered at the fund level are in parentheses.

	$NetFlow_{it}$
$ExpenseRatio_{it}$	-1.952***
	(0.250)
$ExpenseRatio_{it}^2$	2.636***
	(0.474)
$ExpenseRatio_{it} \times log(AUM_{i,t-1})$	0.084*
	(0.045)
$ExpenseRatio_{it} \times log(FundAge_{i,t-1})$	0.129***
	(0.029)
$R_{i,t-1}$	0.665***
	(0.094)
$log(AUM_{i,t-1})$	-0.042***
	(0.004)
$log(FundAge_{i,t-1})$	-0.041***
	(0.007)
$R_{c,t-1}$	-0.771***
	(0.136)
Observations	32,800
R-squared	0.111
Month fixed effects	Yes