Regulating Commission-Based Financial Advice: Evidence from a Natural Experiment

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Abstract

Do limitations on commissions paid to financial advisers reduce prices of financial products and stimulate investment? I examine these questions by estimating the causal effects of regulating commissions for mutual fund distribution. I exploit the unique institutional setting in Israel and the 2013 policy change when the government reduced commissions differently for different fund types. The reform led to a major decline in fund expense ratios and a consequent increase in fund flows. Funds with price-sensitive investors experienced a 35% larger inflows. I interpret these results as investor response to price competition fostered by a reduction in distribution costs.

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1 Introduction

Commission-based financial advice, based on indirect compensation of advisers by providers of financial products, remains highly controversial. Commissions directly increase costs of asset management for investors, leading to higher fees on financial products (Del Guercio and Reuter (2014), Bergstresser, Chalmers and Tufano (2009)), consequent low net-of-fee performance (French (2008), Fama and French (2010)) and reduced investment.[1] Additionally, commissions may result in biased advice, since they create incentives for financial advisers to recommend high-commission products.[2] The concerns over the effects of commissions, enhanced by the financial crisis of 2007-2009, led policy makers around the world to implement a variety of regulatory actions over the last decade. The major policy approach was to significantly limit or to completely abolish adviser commissions (e.g. Australia, Canada, the Netherlands, India and the U.K.).[3] In the United States, the regulators have been debating on whether to follow the other countries by considering similar limitations or to impose fiduciary duty on all the financial advisers.[4]

These recent trends invite a number of policy-relevant questions. Can government intervention reduce costs of asset management though regulating adviser commissions? How does such an intervention affect prices and investment in financial products? A priori, the effects of commission caps are hard to predict since they depend on market competition and on price-sensitivity of investors. Economically, a reduction in commissions represents a reduction in marginal costs

[1] See also Ferris and Chance (1987) and Walsh (2004) for the early evidence on the effects of mutual fund distribution fees (the 12b-1 fees) on expense ratios in the U.S. Barber, Odean and Zheng (2005), Ivković and Weisbenner (2009), Khorana and Servaes (2011), Edelen, Evans and Kadlec (2012), and Sialm, Starks and Zhang (2015) find that high mutual fund expense ratios are associated with reduced investor flows.

[2] Hackethal, Haliassos and Jappelli (2012), Christoffersen, Evans and Musto (2013), Anagol, Cole and Sarkar (2017a), Hoechle, Ruenzi, Schaub and Schmid (2018) and Egan (2019) show that advisers are more likely to recommend high-commission products.. For theoretical studies see, for example, Inderst and Ottaviani (2012a) and Inderst and Ottaviani (2012b). 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 employ advisers with misconduct records. See also **?** for the evidence from mortgage markets.

[3] India introduced a ban on entry loads on mutual funds in 2009. The U.K. implemented a ban on commissions paid to independent financial advisers at the end of 2012, and Australia implemented a similar ban in 2013. Professional financial advisers in the Netherlands are prohibited from accepting commissions from product providers since 2013, while Canada banned trailing commissions on mutual funds in 2019.

[4] In 2010, the U.S. Security and Exchange Commission (SEC) proposed a rule to limit mutual fund sales charges (www.sec.gov/news/press/2010/2010-126.htm). For a discussion of costs and benefits of fiduciary duty, see, for example, Bhattacharya, Illanes and Padi (2020).

of fund distribution from the perspective of providers of financial products. However, the magnitude of subsequent price declines is unclear, since the degree of pass-through of costs to prices is determined by market competition. In a highly competitive environment, investors receive a larger fraction of a cost reduction in a form of lower prices. If the competition is low, the reduction is absorbed by the product providers with little effect on consumer prices. Additionally, even if a regulation results in a decline in prices, it is unclear whether investors will respond to it, given the direct evidence on low sensitivity of investors to fees on financial products.[5]

Despite the vast popularity of commission limitations around the world, these questions received very little attention since tracing causal effects of regulations is challenging. The key contribution of this paper is to overcome this challenge by taking advantage of the unique structure of the Israeli mutual fund market. In 2013, the Israeli government introduced new limitations on adviser commissions with an exogenous variation across different fund types. Exploiting this heterogeneity in the policy change, I estimate the causal effects of regulating commissions on prices of financial products (fund expense ratios) as well as on investor asset allocation toward mutual funds.

The Israeli market offers a good laboratory to study the effect of commissions due to a number of reasons. It features 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 represent the major distribution channel, selling approximately 97% of fund shares. Mutual fund families pay government-mandated commissions to banks on an ongoing basis to compensate banks for their distribution of shares. The Israeli government sets different levels of commissions across the five broad asset categories. These categories include: actively-managed equity funds, mixed (balanced) funds, bond funds, money market funds, and all the index funds from a variety of asset classes as a separate category. In May 2013, the government revised the schedule of commissions, introducing a major reduction for actively-managed equity funds and much smaller reductions for other categories. I exploit this natural experiment and design multiple difference-in-differences (DiD) methodologies which are based on compar-

[5]See, for example, Barber, Odean and Zheng (2005), Choi, Laibson and Madrian (2009), Gil-Bazo and Ruiz-Verdú (2009) and **?**.

ing actively-managed equity funds to various control groups around the reform. The DiD designs combined with the exogenous policy change allow me to estimate the effects of commissions and to provide a causal interpretation of the findings.

I find that reducing caps on commissions significantly reduces prices, which causes consumers to invest additional capital in mutual funds. First, the reduction in commissions led to a sharp decline in mutual fund expense ratios. For each basis point decline in commissions, fund families reduced expense ratios by approximately one basis point, suggesting that the reduction was fully passed through to investors in form of lower expense ratios. Second, the reform in Israel generated an increase in net fund flows: the average actively-managed equity fund grows by 2.4 percentage points per month faster after the reform relative to the control group. The effect is economically significant since the average monthly net flow into equity funds prior to the reform equals 4.3 percentage points. As a result, the reform broke the declining trend in the market share of active equity funds, such that their market share actually increased by around 40% over the two years after the reform. These findings demonstrate that the reduction in commissions has a first-order effect on price competition among mutual funds which results in increased investment by fund investors.

I next address the internal validity of my results. In my tests, I compare my treatment group, actively-managed equity funds, to three different control groups: all funds from other asset categories, equity index funds only and the matched sample from other asset categories. My key identifying assumption is that in the absence of the 2013 reform, the outcomes for the treatment and control groups would have remained on the same trajectory, exhibiting "parallel trends". I empirically validate this assumption across all the control groups by presenting the graphical evidence and by estimating the effects of the reform dynamically, month-by-month. In particular, I show how the outcomes for actively-managed equity funds and control funds behave in a similar way prior to the reform, and how they sharply diverge immediately after the reform. These results are also robust to the return chasing driven by variation in market sentiment across asset classes (Frazzini and Lamont (2008), Ben-Rephael, Kandel and Wohl (2012)), the unobserved time variation in fund family policies such as fund pricing and advertising (Reuter and Zitzewitz

(2006), Cronqvist (2006), Gallaher, Kaniel and Starks (2015)), and an alternative DiD approach with variable treatment intensity.

I next examine two potential mechanisms behind increased flows: reallocation across different asset categories within the mutual fund industry, and reallocation between mutual funds and other investment vehicles.[6] If the reform-induced flows into actively-managed equity funds are mostly the reform-induced outflows from other funds, the DiD approach would lead to an overestimation of the regulation's effects. Using a single difference approach for each asset category, I show 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, mitigating the overestimation concerns.

There are three ways to interpret the increase in flows: response by investors to the reduction in expense ratios; response by investors to the media coverage of the reform (Cronqvist and Thaler (2004)); and increased marketing efforts by financial advisers to preserve revenues from commissions. I develop a number of tests to distinguish between the interpretations and obtain results which are most consistent with investor reaction to the expense ratio cuts. First, I create a measure of price sensitivity and directly show that funds with more price-sensitive investors experience 35% larger inflows. I also find that funds continue to experience increased flows a few months after the reform, inconsistent with the effect of media coverage on investor demand which is typically short-lived and driven by the most recent news (Solomon, Soltes and Sosyura (2014)).[7]

Furthermore, my results are unlikely to be explained by financial advisers' marketing efforts. The regulations of financial advisory compensation in Israel forbid paying bonuses to advisers based on individual sales, significantly mitigating the conflicts of interests. This feature of the Israeli institutional setting additionally helps isolate the price-driven effect of commissions on investor demand, as opposed to the effect of adviser sales efforts. In terms of evidence, the simplest version of the marketing interpretation implies that advisers are indifferent when selling funds with equal commissions. However, I find that the funds with the same levels of commissions

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

[7] For further evidence on short-lived effects of media on financial markets, see, for example, Peress (2014) and Tetlock, Saar-Tsechansky and Macskassy (2008).

post-reform experience different increases in flows, suggesting that the increase in flows is driven by factors other than marketing efforts.

I next examine the effects of the regulation on profitability of asset management and financial advice, as well as on non-price competition among fund families. I show that the reduction in commissions leads to an increase in fund revenues, consistent with the increase in fund flows. I also find that the reform is associated with an increase in total commission revenues. This suggests that the effects of increased assets under management are stronger than the effects of lower percentage commissions such that financial advice ultimately becomes more profitable. Additionally, I document that fund families open new funds in the categories with reduced commissions, in line with revenue-maximizing behavior. These results indicate that the regulation of adviser compensation can further affect market structure through its effects on fund entry decisions.

I conclude by discussing the external validity of my results. Since the conclusions of this study rely on the institutional design of the Israeli market, they should be interpreted with caution when generalized to other markets. The Israeli setting exhibits several features which can make the results less or more applicable to other markets, depending on the presence of these features. In particular, all the funds are sold through the same distribution channel, the commissions are fully mandated by the government, and the reform only includes a modest reduction in commissions. I discuss how these features can affect the results, and draw a comparison between the Israeli mutual fund market and other markets.

1.1 Related Literature

The primary contribution of this paper is to examine the causal effect of regulation of financial adviser commissions. The existing evidence on the effects of such regulations in developed economies is very limited. Anagol, Marisetty, Sane and Venugopal (2017b) examine a policy change in India, studying the effects of one-time sales loads, a different form of broker compensation in the mutual fund industry. They find no evidence that the reduction in sales loads affects fund flows. In a complementary work, Cookson, Jenkinson, Jones and Martinez (2021) examine the effects of the Retail Distribution Review in the U.K. where commission-sharing arrangements

between asset managers and investment platforms were banned. They document a reduction in costs to investors in form of fund fees and charges following the new regulations. Robles-Garcia (2019) provides a structural estimation of potential effects from commission regulations in the context of the U.K. mortgage markets.

By examining the impact of the policy change, I provide new direct evidence on the effects of commissions on price competition and on investor response to it. My results are consistent with the evidence on the differences in expense ratios between broker-sold and direct-sold funds (Bergstresser, Chalmers and Tufano (2009), Del Guercio, Reuter and Tkac (2010), and Del Guercio and Reuter (2014)). Unlike that work, I focus on the effects of regulation and exploit a natural experiment that allows me to simultaneously estimate the causal effect of commissions on expense ratios and the subsequent response by investors within a given financial product. This study also complements the existing work on the effects of fees on investor demand (Barber, Odean and Zheng (2005), Khorana and Servaes (2011) and Cremers, Ferreira, Matos and Starks (2016)) by providing direct, quasi-experimental evidence on the effects of mutual fund expense ratios on fund flows. The evidence on how the effect varies with price sensitivity fits the literature on different reactions to fees among investors (Choi, Laibson and Madrian (2009), **?**).

Furthermore, this paper contributes to the literature on exit and entry decisions in mutual fund industry. It provides a novel link between adviser compensation and non-price competition, 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.[8] I extend this literature by highlighting the role of adviser compensation as an important driving factor of fund entry decisions.

A number of studies examines the conflicts of interest between mutual fund investors and brokers. Sirri and Tufano (1998), Walsh (2004), Barber, Odean and Zheng (2005), Bergstresser, Chalmers and Tufano (2009), Christoffersen, Evans and Musto (2013), and Kalcheva and McLemore (2019) find that higher broker compensation is associated with increased fund flows, while Trzcinka

[8]See, also, Massa (2003) and Hortaçsu and Syverson (2004) for evidence on the determinants of product differentiation in mutual fund industry.

and Zweig (1990) do not find any significant relationship.[9] In a recent work, Chalmers and Reuter (2020) show that brokers help retirement investors to take risk but they recommend high-commission products. As a result, investors earn lower after-fee returns and Sharpe ratios relative to what they could have earned if they invested in the target date funds. I complement this work by examining the impact of government intervention in adviser compensation and by emphasizing the effects of consequent price competition on fund flows, as opposed to the effects of broker incentives.

The rest of the paper is organized as follows. In Section 2, I describe the Israeli mutual fund market and the dataset. In Section 3, I present the main results on the effect of regulation on expense ratios and fund flows, and in Section 4 I discuss the internal validity of these results. I examine potential interpretations of my results in Section 5, and study the effects on profitability of asset management and financial advice, as well as fund entry decisions in Section 6. The external validity is discussed in Section 7, and the concluding remarks are in Section 8.

2 Institutional Background and Dataset

In this section, I describe the market for financial advice and distribution of fund shares, highlighting the role of the commissions. I also discuss the specifics of the 2013 reform and present summary statistics of the main dataset.

2.1 The Market For Financial Advice and Fund Distribution in Israel

The market for financial advice and distribution of mutual fund shares is 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.[10] To further reduce the conflicts of interest, the Israeli law prohibits banks from compensating financial

[9] See, also, Boyson (2019) on conflicts of interests among dual-registered investment advisers. In the Israeli context, Haziza and Kalay (2020) examine how investors give their consent to fund managers to receive a rebates from brokers who execute fund trades.

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

advisers based on sales that advisers generate. Section B.1 of Appendix B provides additional information on the Israeli bank market structure.

Furthermore, there is a schedule of ongoing commissions that mutual fund companies have 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 the bank is 0.8% and an 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.

2.2 The 2013 Revision of Financial Adviser Commissions

In May 2013, the Israeli government revised the schedule of commissions. This revision represents a policy change which I use to study the effect of commissions. In particular, the government introduced significant reductions for actively-managed equity mutual funds, smaller reductions for other actively-managed funds, and no reductions for all the index funds from all the asset classes. Table 1 presents the details of the May 2013 revision together with the government-defined asset categories which I use throughout the study. Before May 2013, actively-managed 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 actively-managed bond and mixed funds, the commissions declined by 0.05%, and money market funds received a reduction of only 0.025%. All the index funds from all the asset classes 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? Since 2007, banks demanded 30% of the fund revenues to be compensated for distributing fund shares (Koffman (2012)). As a result, in asset classes with higher expense ratios, such as actively-managed

equities, the commissions were initially set at the higher level. However, the mutual fund industry was gradually becoming more competitive over the 2007-2012 period. Panels A and B of Figure 1 show that the mutual fund industry assets under management (AUM) and the number of funds offered to investors grew significantly. At the same period, the mutual fund expense ratios substantially declined (Panel C). Since the commissions remained at the same level, banks' share of revenue increased considerably between 2007-2012. Figure 2 illustrates this trend, showing 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, however, was seeking to bring banks back to obtaining 30% of the revenue. The regulator also believed that a reduction in the marginal costs of distribution in the form of commissions may reduce expense ratios and bring savings to consumers if the market was sufficiently competitive. In November 2012, the Israel Securities Authority introduced a bill to Knesset proposing to reduce the commissions. The bill immediately faced opposition from the banks but it was finally approved by Knesset in March 2013 and fully implemented in May 2013. Banks strongly opposed the reform since they were concerned about the immediate reduction in commission revenues and did not anticipate the increase in industry size. To quote the 2015 article in one of the leading Israeli financial outlets, Calcalist, "The commissions were reduced in 2013 despite the warnings of the banks that such a reduction will cause a 120 million shekel decrease in revenue."

2.3 Dataset and Summary Statistics

I use a 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.[11] The dataset contains the entire universe of Israeli mutual funds between 2011 and 2015 with the reform going into effect in May 2013. The dataset includes detailed, monthly-updated information on fund characteristics, such as returns, purchases, redemptions, commissions, expense ratios, fund age, AUM and asset

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

holdings. The fund's monthly net flow is defined as the difference between the share purchases and redemptions in the given month, divided by the fund's AUM in the beginning of the month (Ivković and Weisbenner (2009)).[12] 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.

Table 2 presents the summary statistics for 1,470 funds and 72,556 fund-month observations across the asset categories described in Table 1.[13] 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 all the index funds enjoying the highest flows over the sample period. The average fund charges an annualized expense ratio of 1.2%. The actively-managed 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. Actively-managed equity funds are smaller (50M Shekels), active 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 short-term (monthly) gross return of 0.2%. The average monthly return $R^{1\,month}$ declines across categories when the proportion of debt instruments in mutual fund assets increases: mixed funds delivered 0.2% per month, bond funds generated 0.12% per month, and money market funds returned 0.05%. The average fund is 105 months (8.75 years) old, with actively-managed equity funds being the oldest investment category (146 months) and index funds being the youngest (42 months).

[12] As highlighted by Ivković and Weisbenner (2009), this measure of investor flows is highly precise since it directly relies on the information about sales and redemptions. When the data on sales and redemptions is unavailable, many studies use the indirect definition of flows given by $\frac{AUM_{i,t}-AUM_{i,t-1}(1+R_{i,t})}{AUM_{i,t-1}}$, inferring the net amount of new assets delegated by investors from the information on fund AUM and returns.

[13] I categorize funds into asset categories using the data on their asset holdings and the information from Table 1. While I directly observe commissions in the fund-level data, I cannot fully rely on this information since funds with the same commissions may belong to different categories (for example, equity funds and mixed funds after the reform). I compare the classification obtained from the asset holdings to the one based on the commissions, and remove observations if these classifications do not match.

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. Table A1 in the Appendix presents the list of the largest fund families in Israel and their market shares in 2013.

3 Effects of Regulation on Expense Ratios and Fund Flows

In this section, I examine how the reform affected expense ratios and fund flows. I first discuss my identification strategy and provide the baseline graphical evidence in favor of the key identifying assumptions. I next describe the methodology for DiD regression tests and show how the reform led to a decline in expense ratios and an increase in net fund flows.

3.1 Identification and Parallel Trends: Graphical Evidence

What would be an ideal experiment to examine the effects of commission reduction? In a true experiment, similar funds would be randomly allocated to a treatment group with reduced commissions and a control group with unchanged commissions. In my empirical setting, the reduction in commissions represents a quasi-experiment: a specific group of "treated" funds (active equity) experiences a major, 50% reduction in commissions compared to all the other funds (active mixed, bond and money market funds, and all the index funds). Exploiting this heterogeneity in policy implementation, I construct multiple control groups using funds from other asset categories. The validity of a control group can be empirically evaluated by a visual comparison of *trends* in outcome variables. In particular, a causal interpretation of my DiD results hinges on the key identifying assumption that the outcomes for the treated and control funds would have maintained "parallel trends", remaining on the same trajectory absent the 2013 reform. In the section below, I empirically examine this assumption and present supportive graphical evidence.

Importantly, the parallel trend assumption does not require funds to be perfectly identical. A sizable fraction of time-variation in expense ratios and flows across asset categories can be at-

tributed to differences in fund performance, volatility, performance of asset categories and fund families, as well as fund characteristics such as size and age (Sirri and Tufano (1998), Gil-Bazo and Ruiz-Verdú (2009)). These observable time-varying factors can be directly controlled for in the tests of the parallel trend assumption and in the further regression tests. In Section 3.2.1, I also show that if funds differ in unobservable *time-invariant* characteristics (for example, consistently having different investor clienteles or exhibiting persistent pre-reform differences in expense ratios), the parallel trend assumption is not violated. Only unobservable *time-varying* factors which may interfere with outcome *dynamics* across the treated and control funds, are likely to be a source of omitted variables bias.

3.1.1 Choice of Control Group

In my tests, I use three different approaches to determine treatment and control groups. I first define all 261 actively-managed equity funds as a treatment group and all 1,209 funds from other asset categories in Table 1 as a control group. This "full-sample" approach involves all the observations and allows to improve statistical power of my tests, increasing the likelihood of detecting the true effect of the regulation and also reducing the likelihood of obtaining false positive results.

In my second approach, I use only 109 equity index funds as a control group. Since all the index funds were not affected by the regulation, comparing actively-managed equity funds and equity index funds allows to estimate the effects of the reform while controlling for asset class. This "equity-only" approach makes treatment and control groups more likely to be ex ante comparable at the cost of reduced statistical power.

In my third approach, I generate treatment and control groups using a matching procedure. In particular, I match actively-managed equity funds to funds from other four asset categories based on the values of control variables (described below) as of April 2013, just before the May 2013 reform. I implement a propensity score procedure, matching each treated fund to a single "nearest neighbor" from the control group without replacement. I impose a standard restriction of 0.2 standard deviations on the maximum tolerated distance in propensity scores (caliper) between

treatment and control funds. This procedure generates a sample of 157 actively-managed equity funds and 157 other funds, creating treatment and control groups which are more comparable based on the pre-reform values of control variables.

3.1.2 Methodology

To empirically assess the plausibility of the parallel trend assumption, I start with a visual comparison of the outcomes dynamics across funds.[14] I follow the approach below for each combination of treatment and control groups. I first estimate cross-sectional regressions separately for actively-managed equity funds and control funds over the sample period prior to the reform using the specification of the form:

$$y_{ift} = \alpha + \beta X_{if,t-1} + \phi_f + \epsilon_{ift}, \tag{1}$$

where y_{ift} is an outcome of interest for fund i at time t in fund family f, $X_{if,t-1}$ is a set of control variables based on the previous month as described below, and ϕ_f are fund family fixed effects. I next calculate the residual value of the outcome as a difference between the original value and the predicted value from the estimation in the first step. The residual values can be interpreted as the abnormal outcome values, relative to the values implied by fund characteristics. I finally calculate the means and the standard errors of the residual outcomes separately for the treatment and control groups in each month, and plot the results to provide a first check of the parallel trend assumption.

I use three main groups of control variables. First, I include the baseline variables such as the fund's gross return over the past 12 months ($R_{i,t-1}^{12\,months}$), the logarithm of the fund's AUM, the logarithm of the fund's age, and the standard deviation of the fund's monthly return over the past 12 months (Sirri and Tufano (1998), Gil-Bazo and Ruiz-Verdú (2009)). I also incorporate additional performance variables such as the fund's gross return over the last 6 months $R_{i,t-1}^{6\,months}$ and the fund's gross return over the past month $R_{i,t-1}^{1\,month}$. The average within-fund correlation coefficient equals: 1) 25.2% between $R_{i,t-1}^{1\,month}$ and $R_{i,t-1}^{12\,months}$; 2) 49.4% between $R_{i,t-1}^{6\,months}$ and $R_{i,t-1}^{12\,months}$; and

[14] In Appendix Section B.2.1, I further substantiate this comparison through the additional tests.

3) 38.1% between $R_{i,t-1}^{1\,month}$ and $R_{i,t-1}^{6\,months}$. Since the performance variables are far from being perfectly correlated, in most specifications I incorporate all the variables to fully capture fund past performance as observed by market participants at different horizons.

I further add the indicator variable which equals one if the fund's performance is at the top 20% of the funds in the same asset category, and the indicator variable which equals one if the fund's performance is at the bottom 20%. The indicator variables help capture the convexity of the flow-performance relationship in the tests on fund flows (Sirri and Tufano (1998), Del Guercio and Reuter (2014)). I add the value-weighted average return of all the funds in the asset category over the past 12 months as an additional control variable. It helps account for the effects of variation in market sentiment on fund flows which can be driven by the past performance of the asset class as a whole (Frazzini and Lamont (2008), Ben-Rephael, Kandel and Wohl (2012)). Finally, I include the value-weighted average return of all the funds in the fund family over the past 12 months to capture the effect of family-level performance on fund-level flows, described as the "star" phenomenon in Nanda, Wang and Zheng (2004). The inclusion of a variety of control variables helps ensure that funds in different asset categories are more comparable, as well as to improve the precision of the estimates (Angrist and Pischke (2009)).

3.1.3 Results

Figure 3 presents the results for expense ratios (Panel A) and net fund flows (Panel B) from the full sample. To precisely trace the full time-variation over the sample period, I rescale variables such that the outcomes for the treatment and control groups start at zero in the beginning of the sample period. Overall, Figure 3 provides strong support for the parallel trend assumption. Panel A shows that the abnormal expense ratios for actively-managed equity funds and other funds move together prior to the reform, suggesting that all the other funds combined represent a reasonable control group after conditioning on observables. Immediately after the introduction of the new regulations in May 2013, the expense ratios of equity funds strikingly and immediately decline. The 95% confidence intervals indicate that the difference between the treatment and control

groups becomes statistically significant only after the reform.[15]

Panel B of Figure 3 presents the results for net fund flows. As expected, the residual net flows are significantly more volatile relative to the residual expense ratios which are highly persistent. At the same time, the net flows for actively-managed equity funds and other funds are on the same trajectory prior to the reform, consistent with the parallel trend assumption. The absence of significant differences in the conditional flows prior to the shock again suggests that other funds can be a plausible control group, after accounting for observable variation in common driving factors behind fund flows. Once the reform goes into effect, the net flows for actively-managed equity funds increase significantly. The average equity fund starts to grow faster than the average fund from the control group over the first few months after the reform, then the effect subsides, and the difference between the groups slightly shrinks while still remaining statistically significant. Appendix Figure A2 presents the results from the sample of equity funds and from the matched sample, showing very similar results.

In sum, the graphical results for expense ratios and net fund flows support the key identifying assumption, providing validity evidence to the choice of treatment and control groups. Figure 3 also clearly shows the exact timing of the regulation effects on both expense ratio and fund flows. Additionally, the evidence reveals that the choice of control group does not materially affect these results, suggesting that all the approaches can be plausibly valid.

3.2 DiD Regression Tests

3.2.1 Methodology

I begin my regression analysis using a baseline DiD approach with a binary treatment indicator in the following econometric specification:

$$y_{itc} = \psi_i + \psi_t + \gamma \left(Active\,Equity_i \times Post_t \right) + zX_{i,t-1,c} + u_{itc}, \tag{2}$$

[15]The abnormal expense ratios are net of the pre-reform expense ratios, which are captured by the estimate of the slope α in Equation (1). Therefore, the persistent differences in the pre-reform expense ratios across the treatment and control groups cannot account for the dynamic pattern presented in Figure 3.

where y_{itc} is an outcome of interest for fund i at time t in category c, $Active\ Equity_i$ equals one for actively-managed equity funds and is zero otherwise, $Post_t$ equals one if the observation is post-reform (after April 2013), and zero otherwise, ψ_i and ψ_t are fund and month fixed effects, and γ is a coefficient on the interaction between $Active\ Equity_i$ and $Post_t$, which estimates the treatment effect. The standard errors are double-clustered by fund and month to account for cross-sectional and time-series correlations in error terms (Bertrand, Duflo and Mullainathan (2004)). I explore the robustness of my results to various clustering approaches in Section 4.4.

For this specification, the parallel trend assumption implies that:

$$E(Active\ Equity_i \times Post_t \times u_{itc} | X_{i,t-1,c}, \psi_i, \psi_t) = 0. \tag{3}$$

Equation (3) states that the reform does not coincide with other short-term factors that affect the outcome variables. The conditioning arguments make clear that this assumption is conditional on a time fixed effect ψ_t which absorbs fluctuations in the overall demand for mutual funds and other financial products. The conditioning on a fund fixed effect ψ_t helps adsorb all the slow-moving unobservable and observable fund-level (and asset-class level) factors potentially affecting the outcomes such as, for example, the composition of fund investors or the *levels* of expense ratios. If active equity funds differ along other observable dimensions that make them more or less responsive to the reform, these effects are absorbed by including a set of control variables $X_{i,t-1,c}$.

3.2.2 Results on Expense Ratios

Columns (1)-(4) of Table 3 report the results for expense ratios. The estimate from the baseline specification in column (1) suggests that the reform leads to a 42 basis points decline in expense ratios of active equity funds relative to the control group, in line with the graphical evidence from Figure 3. Since Panel A of Figure 3 shows strong declining time trend in expense ratios, I additionally control for category-specific linear time trend, introducing the interaction of the treatment category indicator variable $Active\ Equity_i$ with the time variable t. The treatment effect remains stable at the level of 40 basis points (column (2)). Since the relative reduction in commissions for

the treated funds roughly equals 40-45 basis points (Table 1), the results suggest that for each basis point decline in commissions, expense ratios decline by approximately one basis point. In other words, almost the entire reduction in commissions was passed through to investors in form of lower expense ratios, suggesting that the mutual fund market is highly competitive.

I next add the baseline control variables and give the results in column (3). The estimate of the treatment effect remains stable at the level of 41 basis points. Smaller and older funds as well as funds with more volatile returns charge higher expense ratios, consistent with the evidence from the U.S. market (Gil-Bazo and Ruiz-Verdú (2009)). Funds with good past performance as well as the funds with the highest returns (top 20%) also tend to charge higher expense ratios. Controlling for the family and category performance does not substantially affect the magnitude of the treatment effect (column (4)).

3.2.3 Results on Net Fund Flows

Columns (5)-(8) show the results on net fund flows. Overall, the evidence is again in line with Figure 3, indicating that the reduction in commission leads to increased net fund flows. The estimate of the treatment effect equals 0.024, suggesting that the average actively-managed equity fund experiences an increase of 2.4 percentage points in net flows after the reform relative to the control group (column (5)). The effect is economically significant since the average monthly net flow into active equity funds prior to the reform equals 4.3 percentage points. When I control for the time trends in column (6), the magnitude of the effect is unchanged. This effect also remains similar when adding the fund-level control variables (column (7)), and the family and category performance (column (8)).[16]

In sum, the regression results provide consistent evidence on the effects of the regulation on expense ratios and fund flows. 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 by the regulator, expense ratios immediately drop and stay at the new,

[16] I cannot control for expense ratios in the net flow regressions, because expense ratio is an outcome of the natural experiment just like net fund flows. Controlling for other outcomes would give a rise to the well-known "bad control" problem and would not allow me to give a casual interpretation to the effect of regulation on net fund flows (Angrist and Pischke (2009)).

lower level. The decline in expense ratios is accompanied by the increase in net fund flows.

Additionally, the effects of the control variables in flow regressions are consistent with the U.S. evidence. Smaller funds and funds with good past performance have higher flows as in Sirri and Tufano (1998). The top performers experience additional flows, while the bottom performers have lower flows, suggesting that the flow-performance relation is non-linear (Sirri and Tufano (1998), Del Guercio and Reuter (2014)). Funds of the top performing fund families have higher flows (Nanda, Wang and Zheng (2004)). Funds in categories with good past performance also have higher flows, in line with the sentiment effects (Frazzini and Lamont (2008), Ben-Rephael, Kandel and Wohl (2012)).

Appendix Tables A2 and A3 show very similar results in the sample of equity funds (where equity index funds serve as a control group) and in the matched sample. I also show that the regulation materially affected the overall trend in the market share of active equity funds. Appendix Figure A1 shows that the reduction in commissions broke the declining trend, such that the market share grew by approximately 40% (from nearly 5 percentage points to 7 percentage points) over the two years after the reform.

4 Internal Validity and Robustness

In this section, I discuss the internal validity of my results and present main robustness checks. I show that the results are robust to the choice of control group, the inclusion of non-linear time trends in outcomes, the time variation in fund family-specific unobservables, multiple alternative approaches to clustering of standard errors, and the choice of DiD approach. I also demonstrate that my approach is unlikely to overestimate the effects of the reform due to flows between asset categories. Unless stated otherwise, I estimate the effects from the full sample in all the remaining tests. Given the combined evidence in Section 3, this approach yields very similar results relative to other control groups, while allowing for increased statistical power.

4.1 Each Asset Category as a Control Group

I estimate the baseline specification using each asset category separately as a control group. Panel A of Table 4 shows that the results on expense ratios continue to hold, and they are consistent with a similar pass-through of commissions into expense ratios as documented in Table 3. The results on net fund flows also remain robust since the estimate of the treatment effect is positive and statistically significant in all the cases, and its magnitude varies across the control groups only slightly.

4.2 Non-linear Time Trend

I next explore the robustness of the results to more nuanced time-variations in outcomes, starting with alternative time trends. While my specifications incorporate category-specific linear time trends, the variation in outcomes is not necessarily linear in time variable t. For example, Panel B of Figure 3 shows that the time-variation in net fund flows is non-linear. To address this concern, I incorporate quadratic time trends in the regression specification. Panel B of Table 4 shows that the results are robust to this non-linear time trend, and the magnitude of the treatment effects remains unchanged.

4.3 The Time-variation in Fund Family Policies

Furthermore, fund expense ratios and net fund flows can depend on various fund family-specific policies which include, but are not limited to, advertising policy (Gallaher, Kaniel and Starks (2015)), strategic allocation of performance (Gaspar, Massa and Matos (2006)), and portfolio manager compensation policy (Ibert, Kaniel, Van Nieuwerburgh and Vestman (2018)). These policies may vary over time across funds in different asset categories and, therefore, be confounding factors for my results.

To capture the unobserved time-variation in family-specific factors, I augment my specification with the interaction between a month fixed effect and a fund family fixed effect. Panel B of Table 4 shows that the magnitude of the treatment effect and its statistical significance remain similar to

the baseline, suggesting that the results are not confounded by the time-variation in fund family-specific unobservables.

4.4 Clustering of Standard Errors

I next discuss the robustness of my results to different clustering approaches. Since the outcomes can be correlated cross-sectionally or over time, the statistical significance of the DiD estimates may become sensitive to how the standard errors are clustered (Bertrand, Duflo and Mullainathan (2004), Angrist and Pischke (2009)). To address this concern, I estimate the baseline specification clustering standard errors in three additional ways: 1) by fund; 2) by fund family; and 3) by fund family and month. Panel C of Table 4 shows that the results are robust to different clustering methods, and the estimates of the treatment effect remain statistically significant.

4.5 DiD Design with Variable Treatment Intensity

I next apply a standard fixed effects regression framework to complement the baseline non-parametric DiD approach. Since the reduction in commissions represents a continuous treatment that exogenously varies across the five asset categories, I use the econometric specification of the form:

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

where y_{itc} is an outcome of interest for fund i at time t in category c, $Commission_{tc}$ is a commission in category c, $\alpha_i$and α_t are fund and time fixed effects. I calculate monthly commissions because the fund flow data are at the monthly level, and multiply them by minus one such that the coefficient ϕ can be interpreted as the effect of commission *reduction*. I also compute and use monthly expense ratios to fit the data on monthly commissions in the expense ratio regressions. In this framework, funds in different categories experienced continuous treatment with different levels of intensity, and the effects of the regulation are estimated by employing the exogenous variation in the continuous variable $Commission_{tc}$.

The results in Table 5 are highly consistent with the findings from the baseline binary treatment specification. A one percentage point reduction in commissions reduces expense ratios by 1.15 percentage points (column (1)). After adding the time trend and control variables, the coefficient on commissions becomes 0.988 (columns (2) and (3)). This finding suggests that for each basis point reduction in commissions, expense ratios decline by one basis point, in line with the baseline results.

The results on flows show that an increase of one basis point in monthly commissions increases a monthly net flow by nearly 1 percentage point (column (4)). The magnitude of the effect slightly declines to 0.9 when I add more control variables (columns (5) and (6)). Consequently, a relative reduction of 40 basis points in the annual commission would translate into a reduction of approximately 3.3 $(40/12)$ basis points in the monthly commission, and a 2.9 (3.3×0.9) percentage points increase in flows, on a par with the estimates from Table 3.

4.6 The Role of Flows between the Treatment and Control Groups

My final concern is that the effects of the reform on net flows may be overestimated due to reallocation of capital between the treatment and control groups. For example, the reform-driven inflows into active equity funds can come from the reform-driven outflows from other funds. In this case, the DiD approach can lead to overestimated (while still causal) effects, since it relies on comparing the differences in flows between the categories. Importantly, the concern is that the reform itself generates an abnormal reallocation of capital from the control group to the treatment group. For example, continuous reallocation of capital between the asset categories does not interfere with my results as long as it is unaffected by the reform.

To address this concern, I examine the effect of the reform on net flows separately for each asset category. If investors reallocate funds between the groups, we expect to observe a reduction on net flows for funds from asset categories other than actively-managed equities. Alternatively, if investors transfer capital to mutual funds from their other investments such as exchange-traded products, individual securities or cash, we expect to observe no reduction in flows for these funds. The DiD estimation does not allow to distinguish between the competing mechanisms as in both

cases the reform-driven difference in net flows between actively-managed equity funds and other funds is positive.

I drop time fixed effects from Equation 2 and estimate the following econometric specification separately for each asset category:

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

This specification represents a single difference approach and uses only the time variation in commissions within the given fund, making it possible to distinguish between the asset categories.

The results in Table 6 show that none of the mutual fund asset categories experiences net outflows as a result of the reform. Columns (1) and (2) report that flows into actively-managed mixed funds also increase after the reform, albeit much weaker than for actively-managed equity funds, while flows into the funds from the remaining asset categories are unaffected (columns (3) - (5)). Overall, the evidence suggests that investors transfer capital from non-mutual fund investments into mutual funds for the most part. This finding helps alleviate the overestimation concerns, suggesting that the reform does not result in any abnormal reallocation of capital between the treatment and control groups.[17]

In sum, the battery of robustness checks in Section 4 provides consistent evidence on the internal validity of my results. The effects of the new regulations are robust to the DiD design with continuous treatment, the alternative control groups, the multiple alternative regression specifications, various clustering approaches, and these effects are unlikely to be overestimated. Furthermore, I show in the Appendix that the results are robust to the alternative dynamic DiD research design (see Section B.2.1).

[17] One possibility is that the higher flows into active equity funds come from other pooled investment vehicles such as index-linked exchange-traded products. At the time of the reform, the index-linked exchange-traded products in Israel were designed as ETNs (Exchange-Traded Notes). To address this possibility, I obtain data on aggregate monthly net ETN flows from the official website of the Bank of Israel. Appendix Figure A3 shows no strong evidence of abnormally large and persistent outflows from equity ETNs following the reform. This may suggest that flows into active equity funds come from other investments such as individual stocks or bank deposits.

5 The Role of Investor Reaction to Price Competition

In this section, I discuss three basic interpretations of my results. First, the increase in flows can represent the reaction of mutual fund investors to the reduction in expense ratios. Second, financial advisers could have doubled down on marketing efforts to preserve their revenues from commissions and sell active equity funds more aggressively. Finally, investors could have increased their allocation to actively-managed equity funds due to the media coverage of the new regulation and of equity funds in particular (Cronqvist and Thaler (2004); Cronqvist (2006)). I show that my results are most consistent with investor response to price competition, and are less likely to be driven by adviser sales efforts or media coverage.

5.1 Heterogeneous Effects by Price Sensitivity

To directly examine the role of investor response to the expense ratio cuts, I study the heterogeneous effects of the reform across funds based on 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 expense ratios. If the increase in fund flows is driven by investor reaction to the reduction in prices, the funds with more price-sensitive investors are expected to exhibit a larger increase in flows.

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:

$$Netflow_{it} = \alpha + \beta Expense\,Ratio_{it} + \gamma Expense\,Ratio_{it}^2 +$$

$$+\theta\left(Expense\,Ratio_{it} \times X_{i,t-1}\right) + \gamma X_{i,t-1} + \gamma_t + \epsilon_{it}, \tag{6}$$

where $Netflow_{it}$ is a net fund flow of fund i in month t, $ExpenseRatio_{it}$ is the fund's expense ratio, $X_{i,t-1,c}$ is the set of the control variables from the main specification, and γ_t are month fixed

effects. As in Gil-Bazo and Ruiz-Verdú (2009), 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 a variety of control variables.

I estimate the coefficients from equation (6) using the pre-reform period. The detailed information on these coefficients is reported in Table A8 of the Appendix. 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:

$$S_{it} = \frac{\partial E_{it}(Netflow_{it}|X_{i,t-1})}{\partial Expense\,Ratio_{it}} = \hat{\beta} + 2\hat{\gamma} Expense\,Ratio_{it} + \hat{\theta} X_{i,t-1}. \tag{7}$$

I calculate the average of S_{it} within fund i to produce a fund-level measure of price sensitivity, S_i. To allow for easier interpretation of the regression coefficients, I map S_i into the indicator variable that equals one if the fund-level price sensitivity is above the median.

I next introduce interactions of S_i with $Post_t$ and $Active\,Equity_i \times Post_t$ into my main specification, obtaining the following regression model:

$$y_{itc} = \psi_i + \psi_t + \gamma\left(Active\,Equity_i \times Post_t\right) + \delta\left(Active\,Equity_i \times Post_t \times S_i\right) +$$

$$+\beta\left(Post_t \times S_i\right) + zX_{i,t-1,c} + u_{itc}. \tag{8}$$

The coefficient on $Active\,Equity_i \times Post_t$ is now interpreted as the estimate of the regulation effect on funds with less price-sensitive investors, while the coefficient on $Active\,Equity_i \times Post_t \times S_i$ relates to funds with more price-sensitive investors.[18]

In this procedure, price sensitivity is first estimated and then used as a regressor. As a result, the procedure may produce standard errors which are too small (Murphy and Topel (1985)). To mitigate this issue, I obtain standard errors by bootstrapping the entire procedure as follows. First, I draw a random sample with replacement from my full sample. To account for the panel nature of the data, I randomly draw entire fund panels rather than individual observations, such that the

[18] In this regression, the fund fixed effects adsorb the direct influence of price sensitivity on the outcome variables.

number of fund panels in the random sample equals the number of fund panels in the full sample. I next estimate equation (6), calculate S_i as in equation (7), and estimate equation (8). I repeat this procedure 10,000 times, obtaining the empirical distributions of the coefficients in equation (8). I then use these empirical distributions to construct standard errors for statistical inference.

The results in Table 7 show that price sensitivity matters, consistent with investor response to price competition. The treated funds with more price-sensitive investors experience an additional 0.7 percentage point increase in flows relative to the treated funds with less price-sensitive investors. Overall, the effect on funds with price-sensitive investors is 35% larger (0.007/0.020), in line with the differential reaction to the expense ratio cuts.

5.2 The Role of Marketing Efforts by Advisers

I next discuss the role of financial adviser sales efforts. In principle, advisers may start selling actively-managed equity funds more aggressively, compensating themselves for the reduction in commissions by increased AUM. This interpretation, however, requires that banks provide their financial advisers with strong incentives to generate revenues from commissions, which is unlikely to be the case in Israel after the 2007 Bahar reform. In particular, the law prohibits any compensation to financial advisers which is based on the adviser's sales of financial products. While my detailed discussions with industry practitioners and regulators in Israel reveal that bank-employed advisers still may receive bonuses based on the overall performance of the entire branch, these bonuses are only remotely related to sales of mutual fund shares. As a result, adviser compensation is only weakly linked to commission revenues that they collect.

In terms of formal evidence, the incentive-based interpretation is also inconsistent with my results. In its simplest form, this view implies that advisers are indifferent between selling funds with equal commissions. For example, Table 1 shows that the commissions on active equity funds became equal to those on active mixed funds after the 2013 reform. According to the basic version of the incentive-based view, there is no reason for advisers to sell equity funds more aggressively than mixed funds after the reform. However, the direct comparison between active equity and mixed funds in Table 4 shows that equity funds experience significantly larger flows, suggesting

that the increase in flows is driven by factors other than marketing efforts.[19]

In sum, the additional evidence in Section 5 shows that the results on flows are most consistent with investor response to price competition. This interpretation is supported by the direct evidence on the role of price sensitivity, and on the limited role of adviser sales efforts. In the Appendix, I also examine the difference between the long-term and short-term effects of the reform to understand whether the investors respond to the media coverage of the new regulation (see Section B.2.2). Briefly, I find that funds continue to experience increased flows a few months after the reform. This is inconsistent with the effect of media coverage on investor demand which is typically short-lived and driven by the most recent news (Solomon, Soltes and Sosyura (2014))

6 Effects on Profitability and Market Structure

6.1 Profitability of Asset Management and Financial Advice

Lastly, I examine the effects of the reform on profitability of asset management, financial advice as well as on fund offerings. Since the reform increases fund flows and reduces expense ratios proportionally to the reduction in commissions, the mutual fund revenues, fund AUM multiplied by the difference between the expense ratio and the commission, are expected to increase. It is less clear what happens with the banks' commission revenues from financial advice (fund AUM multiplied by the commission) since while the commissions decline, fund AUM grow due to additional flows.

I estimate the effects of the reform on fund revenues and commission revenues using the same binary DiD approach. The results in Table 8 show that the reform leads to an increase of 16% in fund revenues (column (3)) and an increase of 7% in commission revenues (column (6)). These results suggest that both fund families and banks benefit from the reform due to increased fund AUM, and banks generate higher total commission revenues despite the reduction in commis-

[19] One can still argue that media coverage of the especially large reductions for equity funds could have made it easier for financial advisers to sell these funds to investors. However, the evidence on the long-term effects of the reform in Appendix Table B2 sets a higher hurdle for this explanation. Specifically, one also needs to explain how effects from the combination of the incentive-based channel and the media coverage channel remain long-lived, especially given that financial adviser compensation only weakly depends on fund sales.

sions. The combined evidence implies that the reform is associated not only with low prices for investors, but also with increased profitability of both asset management and financial advice.

6.2 Fund Starts and Liquidations

Since Table 8 shows that active equity funds become more profitable, we can expect fund families to capture additional revenue, strategically repositioning their fund offerings. Specifically, fund families can capture additional flows by opening new funds, or by not liquidating funds if they previously planned to do so.

To address this possibility, 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:

$$y_{fct} = \alpha_f + \alpha_t + \beta Active\,Equity_c + \lambda\left(Active\,Equity_c \times Post_t\right) + \beta X_{fc,t-1} + \epsilon_{fct}, \tag{9}$$

where y_{fct} is an outcome of interest for fund family f at time t in category c, α_f and α_t are family and time fixed effects, respectively, and $X_{fc,t-1}$ is the set of the control variables from the main specification, which are calculated at the fund family-level as the AUM-weighted averages of the fund-level variables for fund family f at time $t-1$ in category c. The standard errors are double-clustered by fund family and month.

Table 9 presents the effects of the reform on fund starts and 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. Column (1) shows that the reform increases the probability of a new fund offering by 4.7 percentage points. The effect of commissions remains similar after I control for the family's time-varying characteristics in a given category (column (2)) as well as the category's past performance and net flows (column (3)). Consistent with the U.S. evidence from Khorana and Servaes (1999), fund families in Israel open new funds following periods of good performance of the entire fund family. The results in the columns (4)-(6) also show that the reform did not change the probability of fund liquidation. While the coefficients are negative, suggesting that families are less likely to liquidate funds following the reduction in commissions, they are not statistically

significant at the conventional levels. In sum, the evidence suggests that mutual fund families capture additional flows through the opening of new funds.

7 External Validity

In this section, I close by discussing the external validity of my results. Since the conclusions of this study rely on the institutional design of the Israeli mutual fund market, they should be interpreted with caution when generalizing to other markets. The Israeli setting has several key features which are important for the results in this study. First, it exhibits little market segmentation since both sophisticated and non-sophisticated investors purchase funds via the same channel (a bank). This feature is central for understanding how investors may respond to the reduction in expense ratios, and it can make the results less applicable to highly segmented markets. For example, sophisticated investors in the U.S typically purchase funds through direct channels while non-sophisticated investors buy fund shares via brokers (Del Guercio and Reuter (2014)). Since non-sophisticated investors are less price-sensitive, it is unclear how they would respond to a reduction in expense ratio if it is driven by a similar regulation.

Second, the adviser commissions in Israel are limited by law and are not determined by market forces. This feature ensures that the fund distributors (banks) reduce the commissions in a response to the regulation. This is not necessarily the case in other markets. For example, the 12b-1 fees in the U.S. mutual market are not fully mandated by the government, and the Financial Industry Regulatory Authority (FINRA) only provides a cap of 100 basis points.[20] Many mutual funds charge less than the cap, making the 12b-1 fees to be market-driven at this range. In this setting, modest cap reductions can be less effective since they are less likely to affect the equilibrium level of 12b-1 fees.

Finally, the reform in Israel is characterized by modest and uneven reduction in commissions across different mutual funds. In some other markets, the governments implemented much more

[20]The FINRA allows 25 basis points to be paid out for shareholder service fees, and provides a cap of 75 basis points to be paid to brokers for fund marketing and distribution. This in effect creates a 100 basis points cap on the 12b-1 fees with the maximum possible ongoing commission of 75 basis points. No-load mutual funds are allowed to charge up to 25 basis points, while load funds are allowed to charge up to 100 basis points.

radical regulations such as complete bans on commissions for distribution of financial products. One such example is the Retail Distribution Review regulations in the U.K. which banned revenue-sharing arrangement between asset managers and distribution channels. The implication of the results of my study to understating the effects of more restrictive regulations are less clear. For example, such a dramatic limitation on broker compensation may increase investor search costs for financial products, ultimately reducing their welfare (Robles-Garcia (2019)).

In sum, the results of this study can be generalized to other markets where investors are price-sensitive, and commission regulations are effective in reducing the equilibrium level of commissions. In this environment, market competition can increase investment by driving down fees on financial products.

8 Conclusion

Using the 2013 reform in Israel, I examine the causal effects of regulation of ongoing asset-based commissions paid to financial advisers. I document two main effects of the regulation: (1) the price competition effect on the supply side: lower commissions translate in lower expense ratios; and (2) the price response effect on the demand side: investor flows increase following the reform.

My study has two key implications. First, high distribution commissions can be an important barrier to investment in financial products since they lead to inflated prices. Commission limitations by regulators can reduce this barrier due to the reduction in costs to product providers and the effects of market competition. A modest reduction in commissions ensures that financial advice remains compensated, while investors pay lower fees and invest more in financial products.

Second, these regulations can ultimately benefit other market participants as well. In the long run, fund families collect higher fee revenue and financial advisers generate higher commission revenue, despite the reduction in percentage fees and commissions. Thus, commission limitations can improve profitability of asset management and financial advice by leading to cumulative gains in assets under management.

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Figure 1: The Evolution of the Israeli Mutual Fund Industry

This figure presents the information on the Israeli mutual fund market over the 2006-2015 period. Panels A and B illustrate the growth in the total industry AUM as well as in the number of funds. Panel C shows the gradual decline in expense ratios. Value-weighted expense ratios are obtained by weighting fund-level expense ratios by fund AUM in each month.

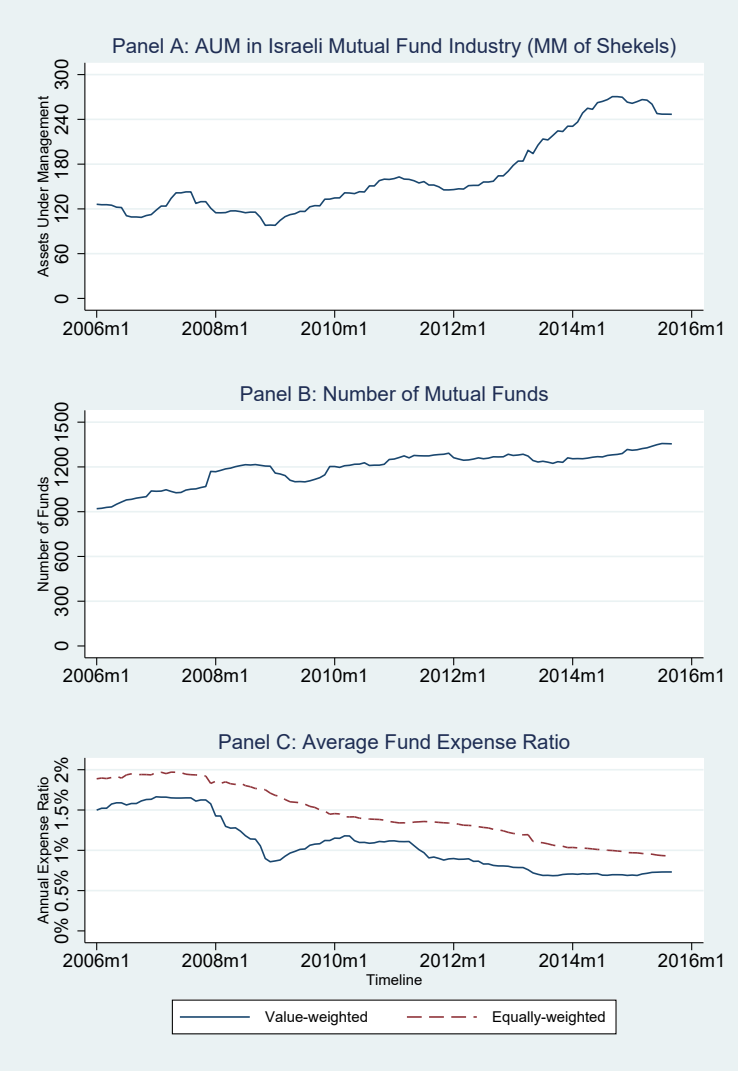


Figure 2: The Revenue Sharing between Banks and Fund Families

This figure presents the time-series of the average share of fund revenues claimed by banks through commissions. *Bank Share* represents an average ratio of commissions to fund expense ratio, equally-weighted across funds in each month.

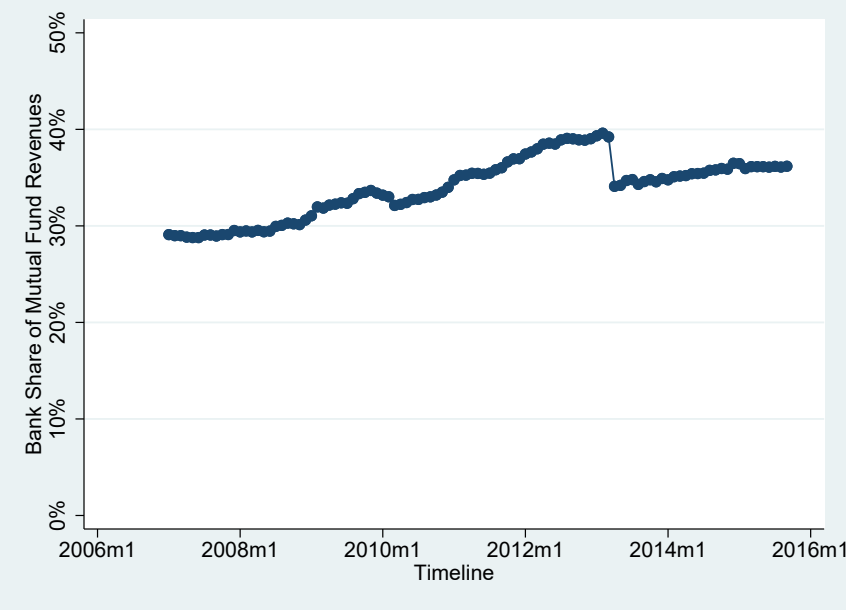


Figure 3: The Effect of Commissions on Expense Ratios and Net Fund Flows: Full Sample

This figure presents the time-series of average expense ratios and net fund flows across the treatment and control groups in the full sample. The treatment group is actively-managed equity funds, and the control group consists of funds from the other four asset categories in Table 1. The variables are rescaled such that the outcomes for both groups start at zero in the beginning of the sample period. The reform goes into effect at time 0. The 95% confidence intervals are reported. See Section 3.1.2 for additional details on the estimation procedure.

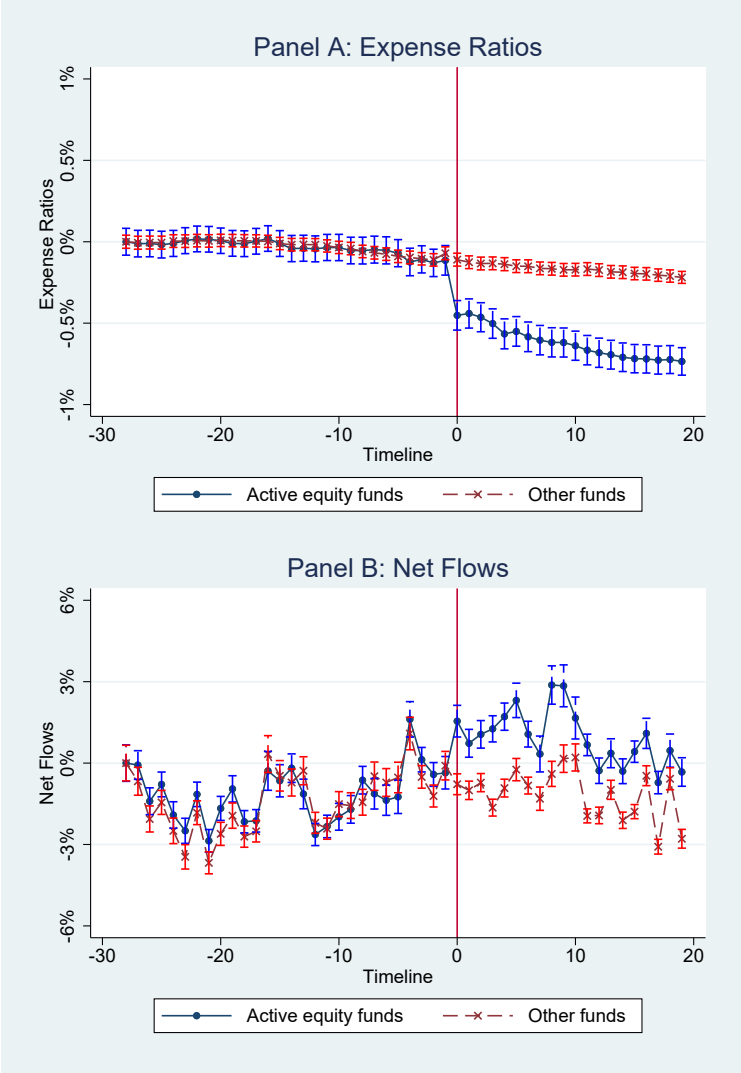


Table 1: Commission Schedule

This table presents the schedule of commissions that mutual fund companies 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 the asset categories, and reports the magnitudes of the changes.

Category Name	Description	Before May 2013	After May 2013	Absolute Magnitude	Relative Magnitude
Actively-Managed Equity	Invest more than 50% in equities	0.8%	0.35%	-0.45%	-56.3%
Actively-Managed Mixed	Residual category	0.4%	0.35%	-0.05%	-12.5%
Actively-Managed 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%
Actively-Managed Money Market	Invest into short-term debt securities	0.125%	0.1%	-0.025%	-20%
All Index Funds	Passive funds, track market indices	0%	0%	0%	0%

Table 2: Summary Statistics

This table reports summary statistics for the sample of monthly observations over the period of 2011-2015 at the fund level (Panel A) and the fund family-category-level (Panel B) across the five asset categories as defined in Table 1. *Net Flow* is the monthly net fund flow. *Commission* is the annualized commission from Table 1. *Expense Ratio* is the annual expense ratio. *AUM* is the fund's total net assets. *Fund Age* is the fund's age in months. $R^{12\,months}$ is the fund's gross return over the past 12 months, $R^{6\,months}$ is the fund's gross return over the past 6 months, and $R^{1\,month}$ is the fund's gross return over the past month. σ is the standard deviation of the monthly returns over 12 months. *Start* indicator equals one if the family opens a new fund in the given category. *Liquidation* indicator equals one if the family liquidates a fund in the given category. The remaining family-category-level variables are calculated as the AUM-weighted averages of the fund-level variables.

Panel A: Fund-level	All	Active Equity	Active Mixed	Active Bond	Active Money Market	Index
Net Flow	0.05	0.05	0.06	0.03	0.08	0.09
	(0.28)	(0.22)	(0.27)	(0.28)	(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)
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)
$R^{12\,months}$ (%)	3.63	4.51	3.72	1.54	0.60	4.52
	(8.57)	(14.81)	(6.07)	(3.23)	(2.51)	(6.58)
$R^{6\,months}$(%)	1.74	2.52	1.70	0.74	0.40	2.08
	(6.13)	(10.95)	(4.10)	(2.08)	(1.71)	(4.62)
$R^{1\,month}$ (%)	0.20	0.22	0.20	0.12	0.05	0.23
	(2.32)	(4.16)	(1.59)	(0.62)	(1.13)	(1.84)
σ (of $R^{1\,month}$ over 12 months, %)	1.74	4.05	1.23	0.41	0.11	1.39
	(1.64)	(1.56)	(0.99)	(0.60)	(0.11)	(1.21)
Observations	72,556	14,464	44,053	5,676	2,375	3,729

Table 2: Summary Statistics (continued)

Panel B: Family-category-level	All	Active Equity	Active Mixed	Active Bond	Active 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)
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)
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)
$R^{12\,months}$ (%)	3.27	5.07	3.65	1.51	0.71	4.02
	(1.64)	(11.34)	(3.47)	(1.89)	(1.02)	(5.00)
$R^{6\,months}$(%)	1.60	2.72	1.19	0.68	0.40	1.80
	(5.05)	(8.89)	(2.47)	(1.59)	(0.84)	(3.84)
$R^{1\,month}$ (%)	0.18	0.19	0.23	0.11	0.05	0.19
	(1.85)	(3.24)	(1.06)	(0.39)	(0.16)	(1.45)
σ (of $R^{1\,month}$ over 12 months, %)	1.72	3.90	1.34	0.42	0.39	1.41
	(1.56)	(2.99)	(0.62)	(0.39)	(0.26)	(0.96)
Observations	4,296	1,147	1,140	916	669	375

Table 3: The Effect of Commissions on Fund Expense Ratios and Net Fund Flows

This table reports the results from regressing expense ratios and net fund flows on the interaction between two indicator variables. *Active Equity*$_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. $Expense\ Ratio_{it}$ is the annual expense ratio. $Net\ Flow_{it}$ is the monthly net fund flow. $log(AUM_{i,t-1})$ is the natural logarithm of the fund's total net assets. $log(FundAge_{i,t-1})$ is the natural logarithm of the fund's age in months. $R_{i,t-1}^{12\ months}$ is the fund's gross return over the past 12 months, $R_{i,t-1}^{6\ months}$ is the fund's gross return over the past 6 months, and $R_{i,t-1}^{1\ month}$ is the fund's gross return of the past month. $\sigma_{i,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* indicator equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* indicator equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$y = Expense\ Ratio_{it}$				$y = Net\ Flow_{it}$			
$Active\ Equity_i \times Post_t$	-0.426***	-0.403***	-0.412***	-0.408***	0.024***	0.023***	0.022***	0.022***
	(0.036)	(0.035)	(0.036)	(0.036)	(0.007)	(0.008)	(0.007)	(0.008)
$log(AUM_{i,t-1})$			-0.027***	-0.027***			-0.063***	-0.063***
			(0.005)	(0.005)			(0.005)	(0.005)
$log(FundAge_{i,t-1})$			0.157***	0.158***			-0.013	-0.014
			(0.028)	(0.028)			(0.017)	(0.017)
$\sigma_{i,t-1}$			3.195***	3.141***			0.417	0.403
			(0.815)	(0.811)			(0.396)	(0.396)
$R_{i,t-1}^{12\ months}$			-0.061	-0.034			0.315***	0.342***
			(0.071)	(0.087)			(0.043)	(0.047)
$R_{i,t-1}^{6\ months}$			0.212***	0.212***			0.207**	0.194*
			(0.075)	(0.073)			(0.102)	(0.107)
$R_{i,t-1}^{1\ month}$			0.173*	0.170*			0.389***	0.386***
			(0.101)	(0.099)			(0.064)	(0.065)
(0,1) Top 20%			0.015**	0.012*			0.060***	0.061***
			(0.006)	(0.006)			(0.006)	(0.006)
(0,1) Bottom 20%			0.002	-0.001			-0.021***	-0.022***
			(0.007)	(0.007)			(0.006)	(0.006)
$R_{f,t-1}$				0.333				0.294***
				(0.243)				(0.098)
$R_{c,t-1}$				-0.108				0.149**
				(0.091)				(0.058)
Observations	72,724	70,443	64,167	64,167	64,782	64,782	60,030	60,030
R-squared	0.924	0.937	0.940	0.940	0.168	0.170	0.179	0.180
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table 4: Robustness Tests

This table reports the results of robustness tests, using the specifications from column (4) and (8) of Table 3. The table reports only the coefficients on the interaction between two indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. Tables A4 - A7 in the Appendix present the detailed results for all the tests. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. Panel A reports the results from the specifications with each asset category as a control group. Panel B reports the results from the alternative specifications with additional control variables. Panel C reports the results from the specifications with alternative clustering of standard errors. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. In Panels A and B, standard errors double-clustered by fund and month are in parentheses.

Coefficient on $Active\ Equity_i \times Post_t$			
	(1)	(2)	(3)
	$y = Expense\ Ratio_{it}$	$y = Net\ Flow_{it}$	Full Results in Appendix
Panel A: Each Category as a Control Group			
Active mixed funds	-0.383***	0.025**	Table A4
	(0.036)	(0.011)	
Active bond funds	-0.423***	0.024**	Table A4
	(0.043)	(0.010)	
Active money market funds	-0.469***	0.028**	Table A4
	(0.047)	(0.012)	
All index funds	-0.420***	0.024**	Table A4
	(0.058)	(0.012)	
Panel B: Alternative Specifications			
Quadratic category time trend	-0.417***	0.027**	Table A5
	(0.025)	(0.013)	
Fund family × Month fixed effects	-0.408***	0.024**	Table A6
	(0.033)	(0.012)	
Panel C: Alternative Clustering			
Fund	-0.408***	0.022***	Table A7
	(0.032)	(0.008)	
Fund family	-0.408***	0.022***	Table A7
	(0.032)	(0.008)	
Fund family and month	-0.408***	0.022**	Table A7
	(0.040)	(0.010)	

Table 5: The Estimation of Commissions Effect by DiD with Variable Treatment Intensity

This table reports the results from regressing expense ratios on commissions. $Commission_{ct}$ is the monthly commission (the annual commission from Table 1 divided by 12) multiplied by minus one. $Expense\ Ratio_{it}$ is the monthly expense ratio. $Net\ Flow_{it}$ is the monthly net fund flow. $log(AUM_{i,t-1})$ is the natural logarithm of the fund's total net assets. $log(FundAge_{i,t-1})$ is the natural logarithm of the fund's age in months. $R_{i,t-1}^{12\,months}$ is the fund's gross return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's gross return over the past 6 months, and $R_{i,t-1}^{1\,month}$ is the fund's gross return of the past month. $\sigma_{i,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* indicator equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* indicator equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Expense\ Ratio_{it}$			$y = Net\ Flow_{it}$		
$Commission_{ct}$	-1.146***	-0.962***	-0.988***	1.009***	0.941***	0.931***
	(0.087)	(0.088)	(0.090)	(0.329)	(0.345)	(0.351)
$log(AUM_{i,t-1})$		-0.002***	-0.002***		-0.061***	-0.063***
		(0.000)	(0.000)		(0.005)	(0.005)
$log(FundAge_{i,t-1})$		0.012***	0.012***		-0.022	-0.014
		(0.002)	(0.002)		(0.018)	(0.017)
$\sigma_{i,t-1}$		0.224***	0.242***		0.750*	0.367
		(0.067)	(0.069)		(0.412)	(0.406)
$R_{i,t-1}^{12\,months}$		0.009*	-0.002		0.298***	0.310***
		(0.005)	(0.007)		(0.034)	(0.047)
$R_{i,t-1}^{6\,months}$			0.016***			0.185**
			(0.006)			(0.095)
$R_{i,t-1}^{1\,month}$			0.018**			0.303***
			(0.008)			(0.107)
(0,1) Top 20%			0.001**			0.061***
			(0.000)			(0.006)
(0,1) Bottom 20%			-0.000			-0.022***
			(0.001)			(0.006)
$R_{f,t-1}$			0.031			0.234**
			(0.021)			(0.098)
$R_{c,t-1}$			-0.008			0.167**
			(0.008)			(0.069)
Observations	72,724	70,443	64,167	64,782	64,782	60,030
R-squared	0.934	0.938	0.940	0.168	0.170	0.179
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	No	Yes	Yes

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 $Post_t$ indicator which equals one for all the months after April 2013. The results are reported separately for each asset category from Table 1. $Net\ Flow_{it}$ is the monthly net fund flow. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)
	$y = Net\ Flow_{it}$				
Asset Category:	Active Equity	Active Mixed	Active Bond	Active Money Market	Index
$Post_t$	0.030***	0.005**	0.006	0.002	0.006
	(0.009)	(0.002)	(0.015)	(0.016)	(0.038)
Observations	13,451	40,739	5,194	2,176	3,193
R-squared	0.157	0.172	0.112	0.167	0.287
Fund fixed effects	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes

Table 7: The Effect of Price Sensitivity on Response to Change in Commissions

This table reports the results from regressing net fund flows on the interactions between multiple indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. $Net\ Flow_{it}$ is the monthly net fund flow. S_i indicator equals one if the price sensitivity of the fund's investors is above the median. Table A8 in the Appendix presents the results from the estimation of fund price sensitivity, and Section 5.1 describes the details of the estimation procedure. *,**, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are bootstrapped using the methodology described in Section 5.1.

	(1)	(2)	(3)
	$y = Net\ Flow_{it}$		
$Active\ Equity_i \times Post_t \times S_i$	0.008**	0.007**	0.007**
	(0.004)	(0.003)	(0.003)
$Active\ Equity_i \times Post_t$	0.019**	0.021**	0.020**
	(0.008)	(0.010)	(0.009)
$Post_t \times S_i$	-0.007	-0.004	-0.006
	(0.015)	(0.015)	(0.013)
Observations	64,782	64,782	60,030
R-squared	0.168	0.170	0.175
Fund fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
Time trend by category	No	Yes	Yes
Control variables	No	No	Yes

Table 8: The Effect of Commissions on Fund Revenue and Commission Revenue

This table reports the results from regressing fund revenue and commission revenue on the interaction between two indicator variables. *Active Equity*$_i$ indicator equals one if the fund is an actively-managed equity fund, and *Post*$_t$ indicator equals one for all the months after April 2013. $log(Commission\ Revenue_{it})$ is the natural logarithm of the fund's commission revenue defined as the fund's AUM multiplied by the commission. $log(Revenue_{it})$ is the natural logarithm of the fund's revenue defined as the fund's AUM multiplied by the difference between the fund's expense ratio and the commission. $log(FundAge_{i,t-1})$ is the natural logarithm of the fund's age in months. $R_{i,t-1}^{12\ months}$ is the fund's gross return over the past 12 months, $R_{i,t-1}^{6\ months}$ is the fund's gross return over the past 6 months, and $R_{i,t-1}^{1\ month}$ is the fund's gross return of the past month. $\sigma_{i,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* indicator equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* indicator equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = log(Fund\ Revenue_{it})$			$y = log(Commission\ Revenue_{it})$		
Active Equity$_i \times$ *Post*$_t$	0.177**	0.157*	0.162**	0.079***	0.091***	0.072***
	(0.081)	(0.079)	(0.080)	(0.094)	(0.093)	(0.110)
$log(FundAge_{i,t-1})$		1.590***	1.596***		1.453***	1.458***
		(0.118)	(0.116)		(0.125)	(0.123)
$\sigma_{i,t-1}$		-9.388***	-8.206***		-12.285***	-10.838***
		(2.399)	(2.364)		(2.398)	(2.395)
$R_{i,t-1}^{12\ months}$		1.338***	0.660***		1.714***	0.874***
		(0.218)	(0.241)		(0.217)	(0.249)
$R_{i,t-1}^{6\ months}$			0.404			-0.197
			(0.260)			(0.298)
$R_{i,t-1}^{1\ month}$			1.042**			1.042**
			(0.437)			(0.445)
(0,1) Top 20%			0.127***			0.138***
			(0.030)			(0.033)
(0,1) Bottom 20%			-0.272***			-0.280***
			(0.029)			(0.032)
$R_{f,t-1}$			0.904*			0.345
			(0.534)			(0.563)
$R_{c,t-1}$			0.203			0.646*
			(0.261)			(0.365)
Observations	68,167	61,017	61,017	68,738	61,032	61,032
R-squared	0.769	0.806	0.809	0.681	0.738	0.743
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trends by category	No	Yes	Yes	No	Yes	Yes

Table 9: The Effect of Commissions on Fund Starts and Liquidations

This table reports the results from regressing fund start and liquidation variables on the interaction between two indicator variables. $Active\ Equity_c$ indicator equals one if the asset category is actively-managed equities, and $Post_t$ indicator equals one for all the months after April 2013. $Start_{fct}$ ($Liquidation_{fct}$) indicator equals one if the family opens (liquidates) a fund in the given category. $log(AUM_{fc,t-1})$ is the natural logarithm of the family's total net assets. The remaining family-category-level variables are calculated as the AUM-weighted averages of the fund-level variables within each category. $log(FundAge_{fc,t-1})$ is the natural logarithm of the fund's age in months. $R^{12\,months}_{fc,t-1}$ is the fund's gross return over the past 12 months, $R^{6\,months}_{fc,t-1}$ is the fund's gross return over the past 6 months, and $R^{1\,month}_{fc,t-1}$ is the fund's gross return over the past month. $\sigma_{fc,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* is the indicator which equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* is the indicator which equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund family and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Start_{fct}$			$y = Liquidation_{fct}$		
$Active\ Equity_c \times Post_t$	0.047***	0.045***	0.051**	-0.010	-0.014	-0.010
	(0.009)	(0.010)	(0.023)	(0.014)	(0.014)	(0.013)
$log(AUM_{fc,t-1})$		0.005**	0.009***		0.002	0.003
		(0.002)	(0.002)		(0.001)	(0.006)
$log(FundAge_{fc,t-1})$		-0.041**	-0.039**		-0.001	0.002
		(0.020)	(0.018)		(0.001)	(0.001)
$\sigma_{fc,t-1}$		-0.998***	-0.843***		-0.856***	-0.628**
		(0.219)	(0.217)		(0.234)	(0.279)
$R^{12\,months}_{fc,t-1}$		0.199***	0.163***		0.141	0.118
		(0.043)	(0.056)		(0.121)	(0.132)
$R^{6\,months}_{fc,t-1}$			0.109**			0.061
			(0.044)			(0.104)
$R^{1\,month}_{fc,t-1}$			-0.095			0.138
			(0.162)			(0.212)
(0,1) Top 20%			0.056***			-0.024
			(0.010)			(0.042)
(0,1) Bottom 20%			-0.010**			0.013
			(0.004)			(0.020)
$R_{f,t-1}$			0.656**			0.209
			(0.313)			(0.318)
$R_{c,t-1}$			0.244***			-0.063
			(0.055)			(0.141)
Observations	4,247	4,174	4,174	4,247	4,174	4,174
R-squared	0.131	0.139	0.142	0.081	0.082	0.082
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund family fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	No	Yes	Yes

Online Appendix to "Regulating Commission-Based Financial Advice: Evidence from a Natural Experiment"

Stanislav Sokolinski
September 2021

A Additional Results

Figure A1: The Market Shares across Fund Categories

This figure presents the time-series of market share of active equity funds (the treatment group) and other funds (the control group) around the reform. The reform goes into effect at time 0.

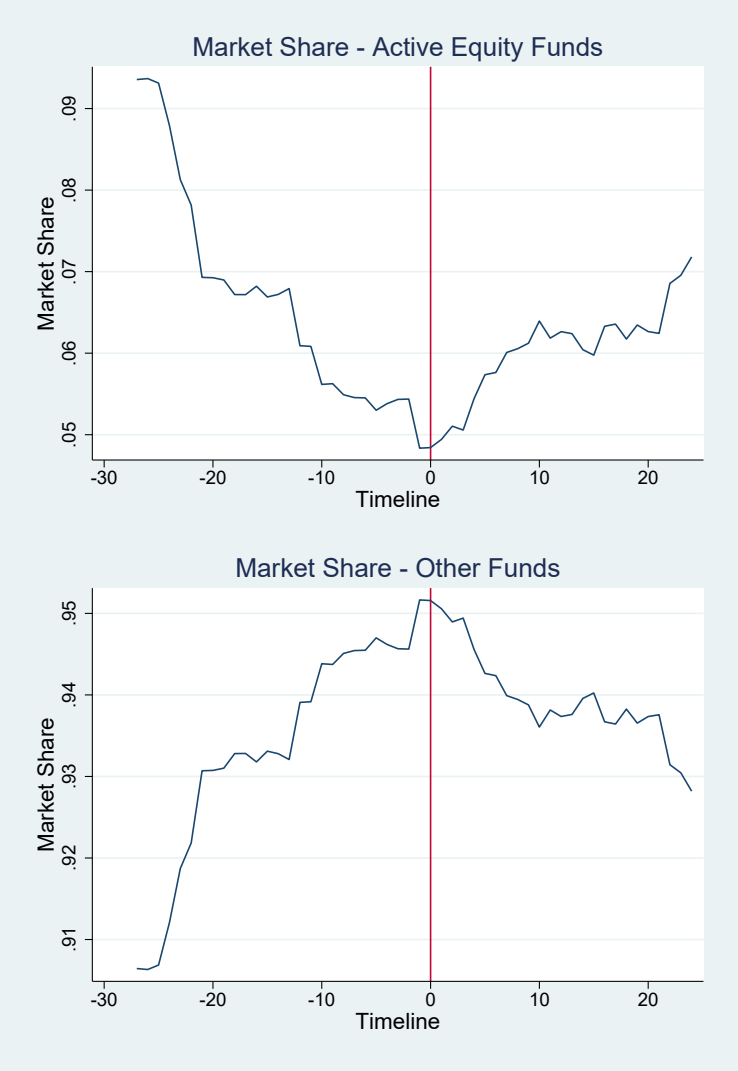


Figure A2: The Effect of Commissions on Expense Ratios and Net Fund Flows: Alternative Samples

This figure presents the time-series of average expense ratios and net fund flows across the treatment and control groups. In Panels A and C, the treatment group is actively-managed equity funds, and the control group consists of equity index funds. In Panels B and D, the treatment group is 157 actively-managed equity funds, and the control group consists of 157 funds from other asset categories in Table 1. The 157 fund-pairs are matched on fund characteristics as of April 2013. In all the panels, the variables are rescaled such that the outcomes for both groups start at zero in the beginning of the sample period. The reform goes into effect at time 0. The 95% confidence intervals are reported. See Section 3.1.2 for additional details on the estimation procedure.

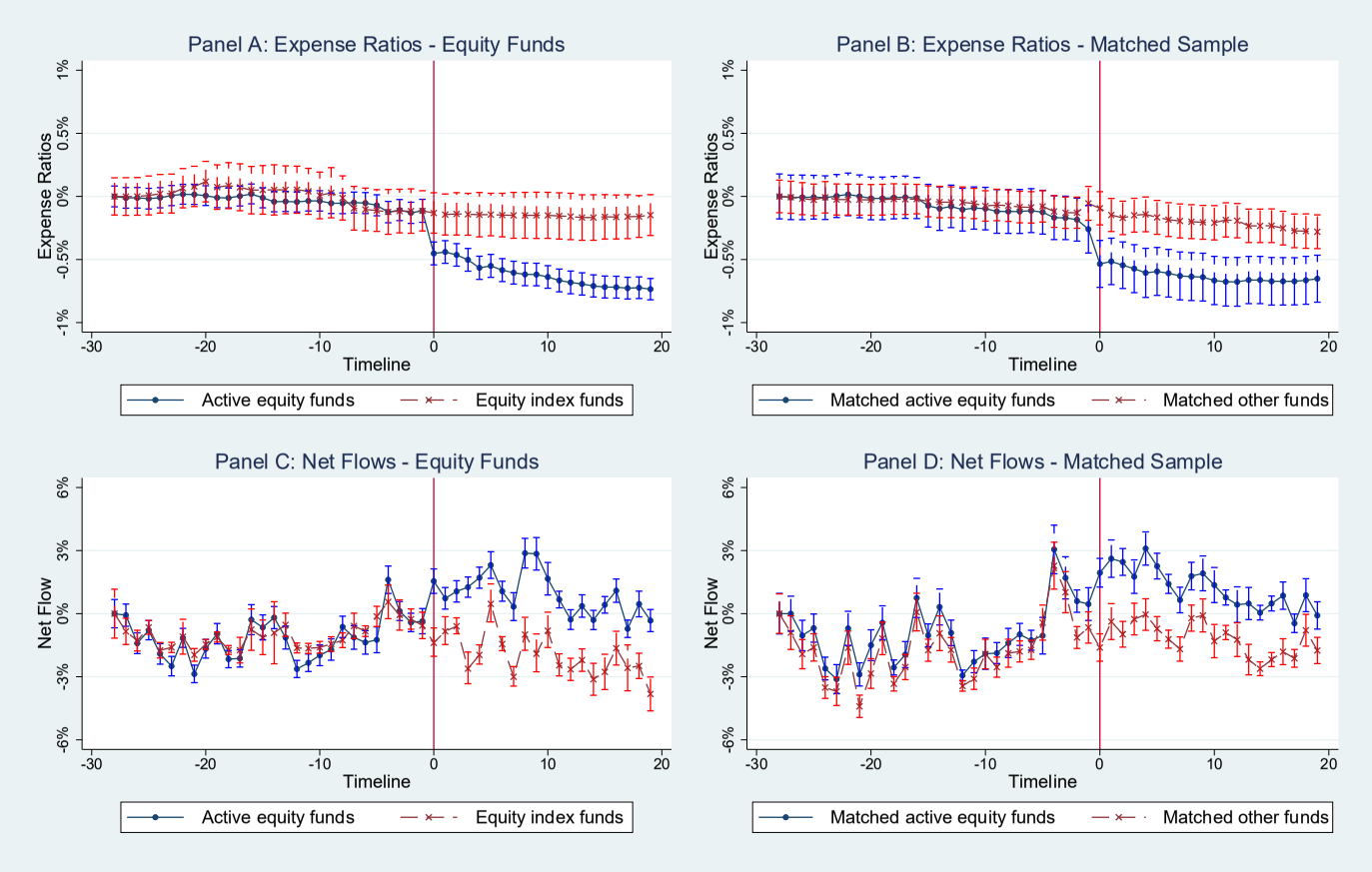


Figure A3: Aggregate Equity ETN Flows

This figure presents the monthly aggregate equity ETN net flows in Israel. Inverse (short) ETNs are excluded. The reform goes into effect at time 0.

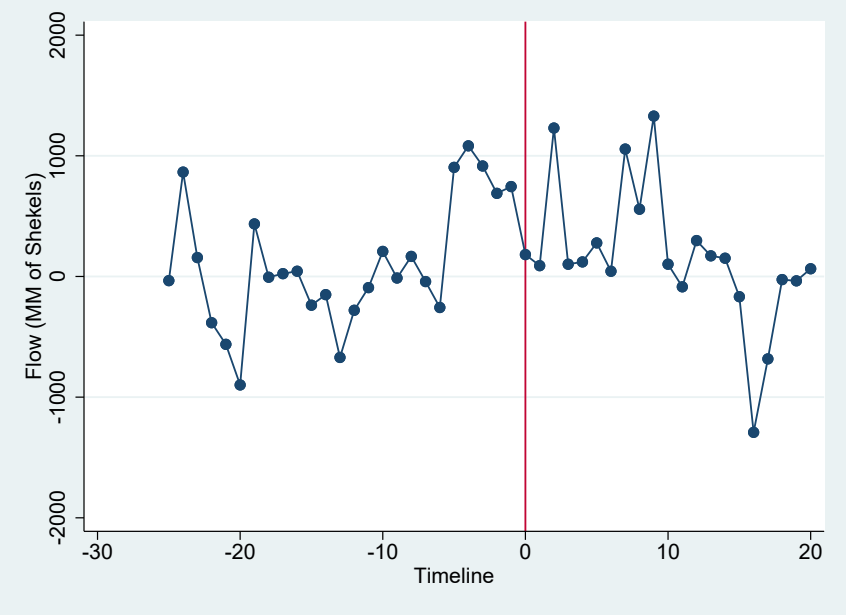


Table A1: The 10 Largest Mutual Fund Families in Israel as of 2013

This table reports the list of the 10 largest mutual fund families in Israel, as measured by their assets under management in 2013. *Market Share* is the ratio of the fund family AUM to the total mutual fund market AUM.

	Fund Family Name	Market Share
1	Meitav Dash	18.0%
2	Psagot	15.4%
3	Harel	14.2%
4	Migdal	10.6%
5	Excellence	9.4%
6	Altshuler-Shaham	7.4%
7	Yelin-Lapidot	5.8%
8	IBI	4.5%
9	Menora Mivtachim	4.4%
10	Ayalon	2.1%

Table A2: The Effect of Commissions on Fund Expense Ratios: Other Control Groups

This table reports the results from regressing expense ratios on the interaction between two indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. The results are reported across two control groups: 1) equity index funds; 2) matched sample from other asset categories (see Section 3.1.1). $Expense\ Ratio_{it}$ is the annual expense ratio. $log(AUM_{i,t-1})$ is the natural logarithm of the fund's total net assets. $log(FundAge_{i,t-1})$ is the natural logarithm of the fund's age in months. $R_{i,t-1}^{12\,months}$ is the fund's gross return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's gross return over the past 6 months, and $R_{i,t-1}^{1\,month}$ is the fund's gross return of the past month. $\sigma_{i,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* indicator equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* indicator equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control Group:	Equity Index Funds				Matched Sample			
$Active\ Equity_i \times Post_t$	-0.381***	-0.396***	-0.404***	-0.413***	-0.402***	-0.386***	-0.384***	-0.406***
	(0.070)	(0.054)	(0.059)	(0.060)	(0.062)	(0.054)	(0.060)	(0.054)
$log(AUM_{i,t-1})$			-0.059*	-0.059*			-0.061	-0.060
			(0.030)	(0.030)			(0.046)	(0.042)
$log(FundAge_{i,t-1})$			0.310***	0.306***			0.016	0.037
			(0.108)	(0.106)			(0.137)	(0.131)
$\sigma_{i,t-1}$			3.097**	3.131**			2.408	2.285
			(1.444)	(1.440)			(2.575)	(2.473)
$R_{i,t-1}^{12\,months}$			0.085	0.206			0.201	0.315
			(0.133)	(0.133)			(0.152)	(0.176)
$R_{i,t-1}^{6\,months}$			0.205**	0.202**			0.378	0.375
			(0.093)	(0.088)			(0.277)	(0.274)
$R_{i,t-1}^{1\,month}$			0.103	0.107			0.106	0.099
			(0.117)	(0.104)			(0.130)	(0.124)
(0,1) Top 20%			0.051***	0.050**			0.029	0.029
			(0.018)	(0.024)			(0.018)	(0.020)
(0,1) Bottom 20%			-0.061	-0.062			-0.012	-0.016
			(0.111)	(0.112)			(0.024)	(0.023)
$R_{f,t-1}$				0.182				-0.045
				(0.563)				(0.641)
$R_{c,t-1}$				0.355				0.200
				(0.269)				(0.195)
Observations	14,375	14,375	13,519	13,519	12,177	11,811	11,321	11,321
R-squared	0.897	0.898	0.890	0.890	0.890	0.904	0.912	0.912
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table A3: The Effect of Commissions on Net Fund Flows: Other Control Groups

This table reports the results from regressing net fund flows on the interaction between two indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. The results are reported across three control groups: 1) equity index funds; 2) matched sample from other asset categories (see Section 3.1.1). $Net\ Flow_{it}$ is the monthly net fund flow. $log(AUM_{i,t-1})$ is the natural logarithm of the fund's total net assets. $log(FundAge_{i,t-1})$ is the natural logarithm of the fund's age in months. $R_{i,t-1}^{12\,months}$ is the fund's gross return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's gross return over the past 6 months, and $R_{i,t-1}^{1\,months}$ is the fund's gross return of the past month. $\sigma_{i,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* indicator equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* indicator equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control Group:	Equity Index Funds				Matched Sample			
$Active\ Equity_i \times Post_t$	0.025**	0.024**	0.028**	0.026**	0.028**	0.025**	0.027**	0.025**
	(0.011)	(0.012)	(0.013)	(0.013)	(0.013)	(0.012)	(0.013)	(0.012)
$log(AUM_{i,t-1})$			-0.061***	-0.061***			-0.050*	-0.050
			(0.008)	(0.008)			(0.030)	(0.035)
$log(FundAge_{i,t-1})$			-0.011	-0.011			0.011	0.008
			(0.028)	(0.029)			(0.045)	(0.046)
$\sigma_{i,t-1}$			-0.522	-0.529			0.400	0.434
			(0.446)	(0.449)			(0.768)	(0.764)
$R_{i,t-1}^{12\,months}$			0.215**	0.211**			-0.090	-0.052
			(0.044)	(0.045)			(0.061)	(0.073)
$R_{i,t-1}^{6\,months}$			0.175***	0.175***			0.273	0.272
			(0.053)	(0.054)			(0.175)	(0.173)
$R_{i,t-1}^{1\,month}$			0.464***	0.464***			0.426*	0.414
			(0.101)	(0.101)			(0.244)	(0.255)
(0,1) Top 20%			0.029***	0.028***			0.055	0.049
			(0.008)	(0.008)			(0.038)	(0.033)
(0,1) Bottom 20%			-0.009	-0.008			-0.026	-0.021
			(0.007)	(0.007)			(0.022)	(0.022)
$R_{f,t-1}$				0.202**				0.296
				(0.082)				(0229)
$R_{c,t-1}$				0.205**				0.233
				(0.094)				(0.210)
Observations	13,189	13,189	12,588	12,588	12,177	11,811	11,321	11,321
R-squared	0.172	0.172	0.183	0.183	0.136	0.139	0.152	0.153
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table A4: Robustness to Alternative Control Groups: Each Asset Category Separately

This table reports the results from regressing expense ratios and net fund flows on the interaction between two indicator variables from four separate tests with each of the categories in Table 1 as a control group. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Expense\ Ratio_{it}$			$y = Net\ Flow_{it}$		
Panel A: Active Mixed Funds						
$Active\ Equity_i \times Post_t$	-0.378***	-0.412***	-0.383***	0.023**	0.022**	0.025**
	(0.034)	(0.035)	(0.036)	(0.010)	(0.011)	(0.011)
Observations	58,619	58,619	53,604	54,208	54,208	50,401
R-squared	0.918	0.927	0.930	0.184	0.184	0.191
Panel B: Active Bond Funds						
$Active\ Equity_i \times Post_t$	-0.446***	-0.485***	-0.423***	0.031***	0.027***	0.024**
	(0.046)	(0.039)	(0.043)	(0.012)	(0.010)	(0.010)
Observations	20,153	20,153	18,895	18,647	18,647	17,682
R-squared	0.932	0.940	0.949	0.147	0.150	0.223
Panel C: Active Money Market Funds						
$Active\ Equity_i \times Post_t$	-0.444***	-0.477***	-0.469***	0.022**	0.023**	0.028**
	(0.038)	(0.037)	(0.047)	(0.010)	(0.011)	(0.012)
Observations	16,840	16,840	15,821	15,627	15,627	14,865
R-squared	0.927	0.928	0.935	0.180	0.182	0.210
Panel D: All Index Funds						
$Active\ Equity_i \times Post_t$	-0.428***	-0.423***	-0.420***	0.022**	0.028***	0.024**
	(0.070)	(0.045)	(0.058)	(0.010)	(0.011)	(0.012)
Observations	18,217	18,217	16,668	16,644	16,644	15,513
R-squared	0.933	0.939	0.944	0.223	0.224	0.288
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	No	Yes	Yes
Control variables	No	No	Yes	No	No	Yes

Table A5: Robustness to Non-linear Time Trend

This table reports the results from regressing expense ratios and net fund flows on the interaction between two indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. The specifications include quadratic time trends interacted with the indicator for equity funds $Equity_i$. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Expense\ Ratio_{it}$			$y = Net\ Flow_{it}$		
$Active\ Equity_i \times Post_t$	-0.406***	-0.380***	-0.417***	0.028***	0.024**	0.027**
	(0.036)	(0.027)	(0.025)	(0.009)	(0.011)	(0.013)
Observations	72,724	70,443	64,167	64,782	64,782	60,030
R-squared	0.924	0.938	0.941	0.168	0.171	0.173
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Quadratic time trend	No	Yes	Yes	No	Yes	Yes
Control variables	No	No	Yes	No	No	Yes

Table A6: Robustness to Time-varying Fund Family Policies

This table reports the results from regressing expense ratios and net fund flows on the interaction between two indicator variables. The specifications include the interactions between fund family fixed effects and month fixed effects. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Expense\ Ratio_{it}$			$y = Net\ Flow_{it}$		
$Active\ Equity_i \times Post_t$	-0.405***	-0.415***	-0.408***	0.028***	0.029***	0.024**
	(0.034)	(0.033)	(0.033)	(0.009)	(0.010)	(0.012)
Observations	72,710	70,425	64,146	64,768	64,768	60,016
R-squared	0.929	0.942	0.945	0.191	0.192	0.199
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund family $\times$ Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	No	Yes	Yes
Control variables	No	No	Yes	No	No	Yes

Table A7: Robustness to Clustering Approaches

This table reports the results from regressing expense ratios and net fund flows on the interaction between two indicator variables. Standard errors are clustered by fund, by fund family or by fund family and month. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $Post_t$ indicator equals one for all the months after April 2013. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Expense\ Ratio_{it}$			$y = Net\ Flow_{it}$		
Clustering By:	Fund	Fund Family	Fund Family and Month	Fund	Fund Family	Fund Family and Month
$Active\ Equity_i \times Post_t$	-0.408***	-0.408***	-0.408***	0.022***	0.022***	0.022**
	(0.032)	(0.032)	(0.040)	(0.008)	(0.008)	(0.010)
Observations	64,167	64,167	64,167	60,030	60,030	60,030
R-squared	0.937	0.937	0.937	0.170	0.170	0.170
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes

Table A8: The Estimation of Flow-to-Expense Ratio Sensitivity

This table reports the results from the estimation of flow-to-expense ratio sensitivity. The procedure is described in details in Section 5.1. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. $log(AUM_{i,t-1})$ is the natural logarithm of the fund's total net assets. $log(FundAge_{i,t-1})$ is the natural logarithm of the fund's age in months. $R^{long}_{i,t-1}$ is the fund's gross return over the past 12 months, $R^{medium}_{i,t-1}$ is the fund's gross return over the past 6 months, and $R^{short}_{i,t-1}$ is the fund's gross return over the past month. $\sigma_{i,t-1}$ is the standard deviation of monthly returns over the past 12 months. *(0,1) Top 20%* indicator equals one if the fund's return over the past 12 months is in the top quintile among the funds in the same asset category. *(0,1) Bottom 20%* indicator equals one if the fund's return over the past 12 months is in the bottom quintile among the funds in the same asset category. $R_{f,t-1}$ is the AUM-weighted average return of all the funds in the fund family over the past 12 months. $R_{c,t-1}$ is the AUM-weighted average return of all the funds in the asset category over the past 12 months. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	$y = Net\ Flow_{it}$
$Expense\ Ratio_{it}$	-0.149***
	(0.019)
$Expense\ Ratio^2_{it}$	0.017***
	(0.004)
$Expense\ Ratio_{it} \times log(AUM_{fc,t-1})$	0.011***
	(0.002)
$Expense\ Ratio_{it} \times log(FundAge_{fc,t-1})$	0.003
	(0.004)
$Expense\ Ratio_{it} \times \sigma_{fc,t-1}$	0.317
	(0.209)
$Expense\ Ratio_{it} \times R^{long}_{fc,t-1}$	-0.167***
	(0.057)
$Expense\ Ratio_{it} \times R^{medium}_{fc,t-1}$	-0.025***
	(0.007)
$Expense\ Ratio_{it} \times R^{short}_{fc,t-1}$	-0.003
	(0.007)
$Expense\ Ratio_{it} \times$ *(0,1) Top 20%*	-0.462***
	(0.070)
$Expense\ Ratio_{it} \times$ *(0,1) Bottom 20%*	0.160***
	(0.045)
$Expense\ Ratio_{it} \times R_{f,t-1}$	0.032
	(0.092)
$Expense\ Ratio_{it} \times R_{c,t-1}$	0.117*
	(0.067)
Observations	31,896
R-squared	0.093
Month fixed effects	Yes
Control variables	Yes

B Additional Background Information and Robustness Checks

B.1 Israeli Banks as the Main Distributors of Mutual Fund Shares

The Israeli banking system consists of 14 banking corporations. The system is quite concentrated with the top 5 banks owning 95% of the banking system's assets, and the top 2 banks owning 60%.[21] To illustrate the importance of banks for fund distribution, I collect the data on total commission revenues from the financial statements of the 5 major banks. I next calculate a ratio of the aggregate banks' commission revenues to the total commission payments calculated from the mutual fund industry data. The results in Panel A of Figure B1 show that 97% of the total commission payments go to the banks, and there are no changes around the 2013 reform. Consistent with Koffman (2012), this finding confirms the almost complete dominance of banks in the market for distribution of fund shares. Furthermore, this market does not exhibit any substantial segmentation since all the funds from all the fund families and asset categories are available in any bank.

Panel B of Figure B1 presents the time-series of the aggregate commission revenues as well as the ratio of commission revenues to total deposits. The revenues from commissions are steadily increasing, reflecting the growth of the mutual fund industry while the ratio of commissions to deposits remains fairly stable. Both variables do not exhibit any strong fluctuations around the 2013 reform. These results suggests that the aggregate commission revenues were largely unaffected by the reform due to the overall growth of the mutual fund industry's AUM and the especially strong growth among active equity funds.

When I examine the competition in selling fund shares among the banks, I also find that it also remains stable over this time period. Panel C of Figure B1 shows that the Herfindahl-Hirschman index (HHI) for revenues from commissions across the banks does not significantly vary over time, staying at the level close to 27%. Figure B2 shows that the dynamics of revenues from commissions in the cross-section of banks are very similar to the aggregate results.

[21] See the Annual Banking Survey 2015, Banking Supervision Department, Bank of Israel.

Figure B1: The Revenues from Commissions in the Banking Sector

This figure presents the information on the revenues from commissions among the 5 largest banks in Israel in 2011-2015. Panel A shows the ratio of the total commission revenues from the banks' financial statements to all the commission payments calculated from the mutual fund data. Panel B shows the time-series of the aggregate revenues from commissions and the ratio of revenues from commissions to total deposits. Panel C reports the time-series of the Herfindahl-Hirschman index (HHI) for the revenues from commissions across the banks.

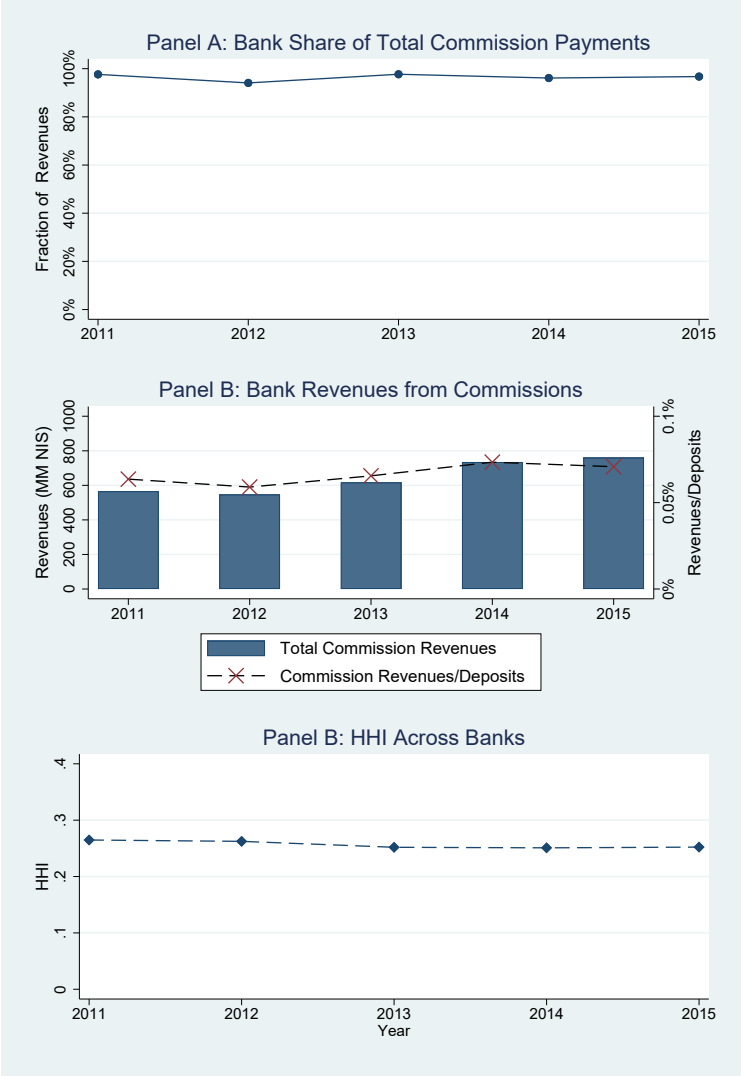
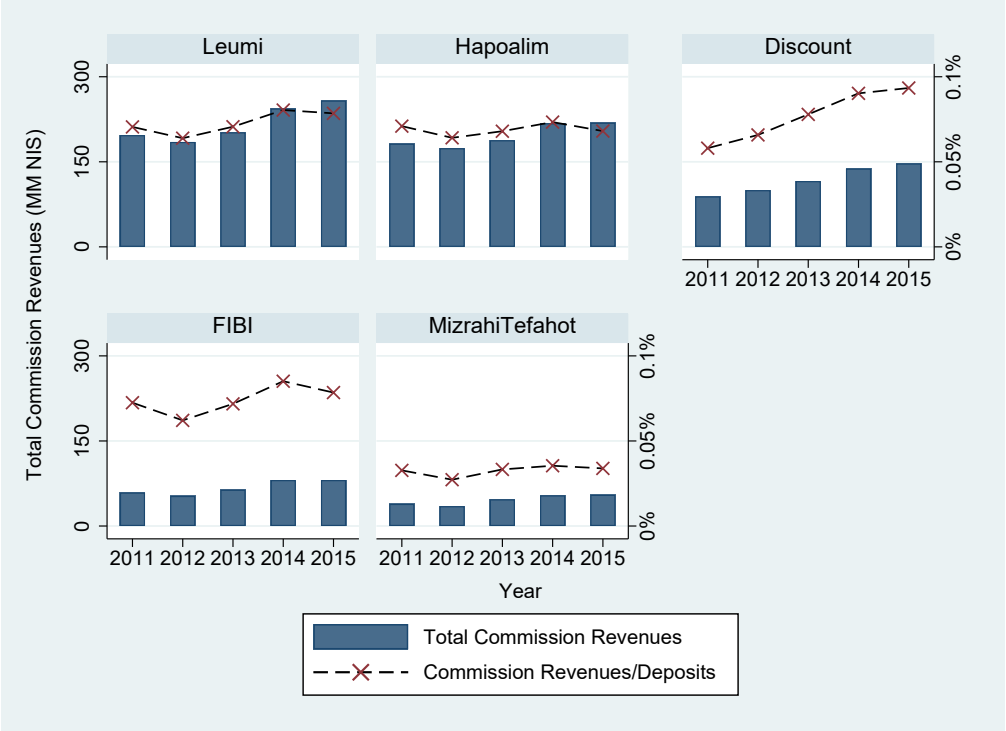


Figure B2: The Revenues from Commissions Across Banks

This figure presents the information on the revenues from commissions separately for each of the 5 largest banks in Israel in 2011-2015. The figure shows the time-series of the aggregate commissions revenues and the ratio of revenues from commissions to total deposits for banks Leumi, Hapoalim, Discount, FIBI and Mizrahi Tefahot.



B.2 Additional Robustness Checks

B.2.1 Parallel Trends and Timing of the Effect

In this section, I examine the effects of the new regulations in a dynamic DiD setting. Since my identification strategy is based on the reform going into effect in May 2013, I verify that the effects on the outcomes start to appear in the data exactly around this date. While Figure 3 presents the baseline supportive evidence by visually comparing the funds cross-sectionally in each month, I develop more rigorous tests by evaluating the dynamic effects within funds. In particular, I examine the effects of the new regulations using the specification of the form:

$$y_{itc} = \psi_i + \psi_t + \sum_{m \neq January\,2011} (\gamma_m \times Active\,Equity_i \times 1_{t=m}) + zX_{i,t-1,c} + u_{itc}, \tag{B1}$$

where γ_m are coefficients on the treatment indicator, $Active\,Equity_i$, that vary non-parametrically by event time. I omit the first sample month (January 2011) indicators from the specification so the γ_m's can be interpreted relative to this baseline period. In particular, these coefficients represent the difference in outcomes between actively-managed equity funds and other funds in each month relative to January 2011.

Table B1 presents the results. For brevity, I report the estimates for the six months prior to the reform ($t < 0$) and the six months after the reform ($t \geq 0$). Overall, the dynamic DiD estimation within funds provides strong support for the parallel trend assumption and shows the precise timing of the reform's effects. The results in columns (1)-(3) show that in each month prior to the reform, the difference in expense ratios between actively-managed equity funds and other funds is economically small and statistically insignificant. When the new regulations go into effect, the difference increases to around 40 basis points, statistically significant at the 1% level, and remains stable in the post-reform period. The findings on net flows are also in line with the baseline results. While the difference in flows is statistically indistinguishable from zero prior to the reform, it increases immediately post-reform and stays at the new level (columns (4)-(6)). I further discuss the comparison of the short-term and long-term effects of the regulation in Section B.2.2.

B.2.2 Long-term and Short-term Effects

In this section, I explore the role of media coverage, examining the difference between the long-term and short-term effects of the reform. These tests build on the ample evidence of media coverage effects on financial markets which shows that these effects are short-lived (Peress (2014), Tetlock, Saar-Tsechansky and Macskassy (2008)). In the context of mutual fund investors, Solomon, Soltes and Sosyura (2014) find that the effects of media coverage on fund flows are largely driven by the most recent news. Consequently, if the effects of the reform remain after the initial short-term period, they are less likely to be solely driven by the early media coverage around the reform.

To conduct this analysis, I estimate a dynamic DiD specification (Equation (B1) from Section B.2.1), pooling the treatment effects across sets of consecutive months in the post-reform period. In particular, I replace the month-specific dummies $1_{t=m}$ in the post-reform period with the three coefficients: 1_{0-5}, which pools over months $t \in [0, 5]$, 1_{6-11}, which pools over months $t \in [6, 11]$, and 1_{12-17}, which pools over months $t \in [12, 17]$. This specification allows to compare the effects of the regulation over the three subsequent periods of six months. Other than the introduction of the pooled coefficients, the specification is identical to that in Equation (B1).

The results in Table B2 suggest that the impact of the reform still remains after the initial period of few months. The effect of the regulation over the first half-year is similar to the effect over the second half-year. The magnitude becomes 30% $(1 - 0.016/0.023)$ smaller over the third half-year, suggesting that the effects gradually disappear. At the same time, the p-values from the tests of differences between the coefficients suggest that these differences are statistically indistinguishable from zero. While this evidence does not fully rule out the boosting effect of the media coverage immediately around the reform, the results on the long-term effects suggest that the increase in flows is unlikely to be solely attributed to the reaction to media. The evidence on the slow adjustment is also in line with individual investor tendency to maintain the same portfolio for long periods of time and rebalance it very infrequently (Kim, Maurer and Mitchell (2016), Van Rooij, Lusardi and Alessie (2011)).

Table B1: The Estimation of Commissions Effect by Dynamic DiD Approach

This table reports the results from regressing expense ratios and net fund flows on the series of interactions between two indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund, and $1_{t=m}$ indicator equals one for each month m. $m = 0$ indicates May 2013, and January 2011 is omitted from the specification serving as a baseline period. The table reports coefficients for the six months before and the six months after the May 2013 reform. $Net\ Flow_{it}$ is the monthly net fund flow. $Expense\ Ratio_{it}$ is the annual expense ratio. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	$y = Expense\ Ratio_{it}$			$y = Net\ Flow_{it}$		
Pre-reform:						
$Active\ Equity_i \times 1_{t=-6}$	-0.013	-0.014	-0.022	-0.011	-0.016	0.023
	(0.018)	(0.018)	(0.026)	(0.010)	(0.010)	(0.023)
$Active\ Equity_i \times 1_{t=-5}$	-0.011	-0.015	-0.021	-0.015	-0.012	0.029
	(0.018)	(0.019)	(0.023)	(0.012)	(0.012)	(0.018)
$Active\ Equity_i \times 1_{t=-4}$	-0.021	-0.014	-0.015	0.014	0.013	0.021
	(0.021)	(0.022)	(0.026)	(0.012)	(0.012)	(0.020)
$Active\ Equity_i \times 1_{t=-3}$	-0.019	-0.014	-0.013	0.017	0.014	0.018
	(0.022)	(0.023)	(0.027)	(0.011)	(0.011)	(0.018)
$Active\ Equity_i \times 1_{t=-2}$	-0.018	-0.021	-0.014	0.013	0.014	0.016
	(0.022)	(0.023)	(0.026)	(0.009)	(0.009)	(0.015)
$Active\ Equity_i \times 1_{t=-1}$	-0.016	-0.022	-0.016	0.015	0.019	0.014
	(0.023)	(0.024)	(0.029)	(0.011)	(0.011)	(0.017)
Post-reform:						
$Active\ Equity_i \times 1_{t=0}$	-0.406***	-0.396***	-0.398***	0.023***	0.026***	0.025***
	(0.024)	(0.024)	(0.031)	(0.007)	(0.007)	(0.008)
$Active\ Equity_i \times 1_{t=1}$	-0.390***	-0.391***	-0.398***	0.027***	0.021***	0.023***
	(0.024)	(0.024)	(0.030)	(0.007)	(0.007)	(0.008)
$Active\ Equity_i \times 1_{t=2}$	-0.395***	-0.407***	-0.395***	0.025***	0.024***	0.022**
	(0.024)	(0.025)	(0.032)	(0.007)	(0.009)	(0.009)
$Active\ Equity_i \times 1_{t=3}$	-0.394***	-0.418***	-0.398***	0.023***	0.027***	0.028***
	(0.027)	(0.028)	(0.035)	(0.008)	(0.010)	(0.010)
$Active\ Equity_i \times 1_{t=4}$	-0.418***	-0.423***	-0.413***	0.024***	0.022**	0.023**
	(0.029)	(0.030)	(0.037)	(0.008)	(0.011)	(0.011)
$Active\ Equity_i \times 1_{t=5}$	-0.410***	-0.427***	-0.391***	0.026**	0.021**	0.027**
	(0.029)	(0.030)	(0.036)	(0.011)	(0.010)	(0.012)
Observations	72,724	70,443	64,167	64,782	64,782	60,030
R-squared	0.921	0.930	0.937	0.168	0.169	0.179
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	No	Yes	Yes
Control variables	No	No	Yes	No	No	Yes

Table B2: The Time-varying Effects of Commissions on Net Fund Flows

This table reports the results from regressing expense ratios and net fund flows on the series of interactions between two indicator variables. $Active\ Equity_i$ indicator equals one if the fund is an actively-managed equity fund. The rest of the time indicators pool over the three different six-month periods after the May 2013 reform: 1_{0-5} pools over months $t \in [0, 5]$, 1_{6-11} pools over months $t \in [6, 11]$, and 1_{12-17}, pools over months $t \in [12, 17]$. January 2011 is omitted from the specification serving as a baseline period. $Net\ Flow_{it}$ is the monthly net fund flow. The p-values of the tests for differences between coefficients are reported. *,**, and *** denote statistical significance at the 10%, 5% , and 1% levels, respectively. Standard errors double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)
	$y = Net\ Flow_{it}$		
$Active\ Equity_i \times 1_{0-5}$	0.025***	0.027***	0.024**
	(0.009)	(0.010)	(0.010)
$Active\ Equity_i \times 1_{6-11}$	0.023***	0.024**	0.023**
	(0.009)	(0.010)	(0.011)
$Active\ Equity_i \times 1_{12-17}$	0.016**	0.017**	0.016**
	(0.008)	(0.008)	(0.008)
P-value of tests for differences between coefficients			
$H_0 : Active\ Equity_i \times 1_{0-5} = Active\ Equity_i \times 1_{6-11}$	0.875	0.832	0.946
$H_0 : Active\ Equity_i \times 1_{0-5} = Active\ Equity_i \times 1_{12-17}$	0.455	0.482	0.510
$H_0 : Active\ Equity_i \times 1_{6-11} = Active\ Equity_i \times 1_{12-17}$	0.561	0.639	0.611
Observations	64,782	64,782	60,030
R-squared	0.168	0.170	0.175
Fund fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
Time trend by category	No	Yes	Yes
Control variables	No	No	Yes