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

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September 2020

Abstract

Do limitations on commissions paid to financial advisers reduce prices of financial products and stimulate investment? I examine this question 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.

Keywords: Financial Advice; Financial Regulation; Mutual Funds
JEL Classification: G23, G24, G28, G53

*For helpful comments, I thank Jenna Anders, Malcolm Baker, Azi Ben-Rephael, Nittai Bergman, Kirill Borusyak, Serdar Dinc, Anastassia Fedyk, Robin Greenwood, Oliver Hart, James Hodson, Eugene Kandel, Owen Lamont, Josh Lerner, Evgeny Mugerman, Darius Palia, Thomas Powers, Michael Reher, Andrei Shleifer, Tanya Sokolinski, Jeremy Stein, and Yishay Yafeh, as well as seminar participants at Harvard Business School, Harvard Economics Department and Rutgers.

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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 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 investment in financial products?

[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 Guiso, Pozzi, Tsoy, Gambacorta and Mistrulli (2018) 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).

Despite the vast popularity of commission limitations around the would, 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 almost only 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. Overall, the Israeli setting is comparable to the 12b-1 fee segment of the U.S. mutual fund market where brokers are compensated through the 12b-1 fees, and where the caps on these fees are set by the Financial Industry Regulatory Authority (FINRA).

Unlike in the U.S., where the caps on commissions are uniform across all the funds, 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 comparing 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 test two complementary hypotheses on the effects of commissions: one hypothesis for mutual fund expense ratios and another for investor asset allocation. First, the reduction in commissions represents a reduction in marginal costs of

fund distribution from the perspective of mutual fund families. The basic economic theory suggests that a reduction in marginal costs translates into a reduction in prices. The degree of pass-through of costs to prices depends on market competition: when competition is more intense, consumers (fund investors) receive a larger fraction of a cost reduction in a form of lower expense ratios. Furthermore, price-taking consumers should respond to a decline in expense ratios and invest additional capital in mutual funds. Overall, the reform is expected to reduce fund expense ratios and to increase fund flows, the proxy for investor demand.

My main results provide consistent support for these hypotheses. 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 0.9 basis points, suggesting that the reduction was almost 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 the average monthly net flow into equity funds prior to the reform equals 4.3 percentage points. My findings thus 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 main 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. My 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.[5] 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 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)).[6]

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 post-reform experience different increases in flows, suggest-

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

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

ing 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 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 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 entry decisions.

I conclude by discussing the external validity of my results. I first describe the basic conditions for my results to be generalized across other markets. In particular, the markets should be comparable in terms of effectiveness of commission limitations, intensity of market competition and correlations between commissions and prices. To illustrate the application of these conditions, I draw a comparison between the Israeli mutual fund market and the 12b-1 fee segment of the U.S. mutual fund market. I find that the markets are similar along the relevant dimensions, suggesting that the conclusions of this study can fit the discussions on regulation of the 12b-1 fees in the U.S. The results can also be generalized to other countries and markets where the above-mentioned conditions are likely to hold.

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 related work, 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. The evidence on how the response varies with price sensitivity is also related to the literature on different reactions to fees among investors (Choi, Laibson and Madrian (2009), Sun (2019)).[7]

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 and Zweig (1990) do not find any significant relationship.[9] 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 fund family strategic behavior in Section 6. The external validity is discussed in Section 7, and the concluding remarks are in Section 8.

[7] My findings are also consistent with the theoretical model presented by Stoughton, Wu and Zechner (2011) where commissions are associated with increased management fees.

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

[9] See, also, Boyson (2019) on conflicts of interests among dual-registered investment advisers.

2 Institutional Background and Dataset

In this section, I describe the Israeli mutual fund market and the market for financial advice. I discuss the specifics of the 2013 reform, give detailed information on the mutual fund and banking sectors, and present summary statistics of the main dataset.

2.1 Historical Background on the Market For Financial Advice in Israel

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

Over the period of 2007-2013, the markets for financial advice and asset management went through a number of structural changes. In 2007, the Israeli Parliament passed the major reform in response to the Bahar Committee Recommendations. The new regulations - known collectively as the Bahar reform - required a full separation between financial advice and asset management, and banks had to divest either their asset management businesses or their advisory businesses. Banks decided to divest their mutual and pension funds, while keeping control over the business of financial advice. As a result, the market for distribution of mutual fund shares remained bank-centered. As of 2013, the Israeli financial advisory industry employed approximately 4,000 financial advisers, licensed by the Israel Securities Authority, with the vast majority being bank employees.[10] To further reduce the conflicts of interest, the Israeli law prohibits banks from compensating financial advisers based on sales that advisers generate.

Furthermore, the 2007 Bahar reform introduced a schedule of ongoing commissions that mutual fund companies had to pay to banks for distributing fund shares. The commission is based on a holding period and is independent of the number of transactions that investors conduct. For example, if an annual commission to

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

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 initial 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? When financial advice was separated from asset management in 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 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 concluded that a further reduction in expense ratios can be accelerated through a reduction in the marginal costs of distribution in the form of commissions. The regulator was also seeking to bring banks back to obtaining 30% of the revenue as in the initial 2007 arrangement. In November 2012, the Israel Securities Authority introduced a bill to Knesset proposing to reduce the commissions. The legislature immediately faced opposition from the banks but it was finally approved by Knesset in March 2013 and fully implemented in May 2013.

2.3 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%.[11] Following the 2007 Bahar reform, banks remained the major distributors of mutual fund shares. 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 3 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.

Panel B of Figure 3 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 does 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, as I show below, the especially strong growth among active equity funds.

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

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 3 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 A1 in the Appendix shows that the dynamics of revenues from commissions in the cross-section of banks are very similar to the aggregate results.

2.4 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.[12] 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 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)).[13] 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.[14] Panel A reports the fund-level variables. The net monthly fund flow into the average Israeli mutual

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

[13] 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.

[14] 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.

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) 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).

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 attributed 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), 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 main 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 matching procedure using one-to-one nearest neighbor matching without replacement with a minimum distance (caliper) of 5%. 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 which I further substantiate in Section 4.1 through the additional tests. 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 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 return over the last 6 months $R_{i,t-1}^{6\,months}$ and the fund's 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 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 4 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 4 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.

Panel B of Figure 4 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.

Figures 5 present the results from the sample of equity funds and from the matched sample. Overall, the results from the smaller samples with more ex ante comparable treatment and control groups are very similar to the results from the full sample. Panels A and C show that the outcomes for actively-managed equity funds and equity index funds move together prior the reform and significantly diverge immediately after the reform. Panels B and D show the analogous effects of the reform in the matched sample, suggesting that the parallel trend assumption remains plausible in this setting as well.

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. Figures 4 and 5 also clearly show 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:

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

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 4.5.

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 slow-moving unobservable fund-level (and asset-class level) factors potentially affecting the outcomes such as, for example, the composition of fund investors. 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

Table 3 presents the results for expense ratios. Columns (1)-(4) show the results from the full sample. 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 4. Since Panel A of Figure 4 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 0.9 basis points. In other words, a sizable fraction of the 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 40 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)).

I next repeat the specifications in the sample of equity funds where equity index funds serve as a control group, and give the results in columns (5)-(8). The estimates of the regulation effect remain very similar, being in the range of 38-41 basis points. Finally, I estimate the same specifications in the matched sample. The results in columns (9)-(12) are consistent with Figure 5, showing that the estimates of the treatment effect from the matched sample are highly comparable to the estimates from the other samples. The effects of the control variables in these

specifications are much less pronounced, suggesting that the matching procedure creates reasonably balanced treatment and control groups.

3.2.3 Results on Net Fund Flows

Table 4 presents the results for net fund flows. I give the results from the full sample in columns (1)-(4). Overall, the evidence is again in line with Figure 4, 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 (1)). The effect is economically significant since the 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 (2), the magnitude of the effect is unchanged. This effect also remains similar when adding the fund-level control variables (column (3)), and the family and category performance (column (4)).[15]

The results in Table 4 additionally show that smaller funds and funds with good past performance have higher flows, consistent with the U.S. evidence from Sirri and Tufano (1998). The funds with the highest returns (top 20%) experience additional flows, while the funds with the lowest (bottom 20%) returns have lower flows, suggesting that the flow-performance relation is non-linear as in Sirri and Tufano (1998) and Del Guercio and Reuter (2014). The performance of the fund family is associated with higher fund-level flows, consistent with the "star" effect (Nanda, Wang and Zheng (2004)). Lastly, funds in categories with good past performance also tend to have higher flows, in line with the asset category's sentiment effects (Frazzini and Lamont (2008), Ben-Rephael, Kandel and Wohl (2012)).

The results from the sample of equity funds and from the matched sample are highly comparable to the results from the full sample. The estimates from the sample of equity funds in columns (5)-(8) suggest that the effect of the reduction in commissions on fund flows is in the range of 2.4-2.8 percentage points. The results from the matched sample in columns (9)-(12) are again in line with Figure 5. The

[15] 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 to give a casual interpretation to the effect of regulation on net fund flows (Angrist and Pischke (2009)).

estimate of the treatment effect varies between 2.5 and 2.8 percentage points, on a par with the baseline results.

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

4 Internal Validity and Robustness

In this section, I discuss the internal validity of my results and present multiple robustness checks. I show that the results are robust to the choice of DiD approach, the choice of control group, the inclusion of non-linear time trends in outcomes, the time variation in fund family-specific unobservables, and multiple alternative approaches to clustering of standard errors. 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 Parallel Trends and Timing of the Effect

I first 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 4 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:

$$y_{itc} = \psi_i + \psi_t + \sum_{m \neq January\,2011} (\gamma_m \times Active\,Equity_i \times 1_{t=m}) + zX_{i,t-1,c} + u_{itc}, \quad (4)$$

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 5 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 5.2.

4.2 Each Asset Category as a Control Group

I also estimate the baseline specification using each asset category separately as a control group. Panel A of Table 6 shows that that the results on expense ratios continue to hold, and they are consistent with a sizable 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.

4.3 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 4 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 6 shows that the results are robust to this non-linear time trend, and the magnitude of the treatment effects remains unchanged.

4.4 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 6 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.

4.5 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 fam-

ily and month. Panel C of Table 6 shows that the results are robust to different clustering methods, and the estimates of the treatment effect remain statistically significant.

4.6 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:

$$y_{itc} = \alpha_i + \alpha_t + \phi Commission_{tc} + mX_{i,t-1,c} + e_{itc}, \tag{5}$$

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 7 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 approximately 0.9 (columns (2) and (3)). This finding suggests that for each basis point reduction in commissions, expense ratios decline by 0.9 basis points, 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 4.

4.7 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 mostly represent the reform-driven outflows from other funds. In this case, the DiD approach can result into 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 ETFs, 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:

$$y_{it} = \alpha_i + \phi Post_t + mX_{i,t-1} + e_{it}. \tag{6}$$

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

The results in Table 8 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.

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 other DiD research designs, the alternative control groups, the multiple alternative regression specifications, various clustering approaches, and these effects are unlikely to be overestimated.

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, 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)). Finally, financial advisers could have doubled down on marketing efforts to preserve their revenues from commissions and sell active equity funds more aggressively. I show that my results are most consistent with investor response to price competition, and are less likely to be driven by media coverage or adviser sales efforts.

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:

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

$$+\theta\left(Expense\,Ratio_{it} \times X_{i,t-1}\right) + \gamma X_{i,t-1} + \gamma_t + \epsilon_{it}, \tag{7}$$

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 (7) using the pre-reform period. The detailed information on these coefficients is reported in Table A6 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:

$$S_{it} = \frac{\partial E_{it}(Netflow_{it}|X_{i,t-1})}{\partial Expense\,Ratio_{it}} = \hat{\beta} + 2\hat{\gamma} Expense\,Ratio_{it} + \hat{\theta} X_{i,t-1}. \tag{8}$$

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 the interactions of my measure of price sensitivity into the main specification and give the results in Table 9. 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.[16] The results 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

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

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 Long-term and Short-term Effects

I next 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 (4) from Section 4.1), 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 (4).

The results in Table 10 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)).

5.3 The Role of Marketing Efforts by Advisers

Finally, I 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.

Furthermore, the incentive-based interpretation is not fully in line with the evidence presented in this paper. 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 6 shows that equity funds experience significantly larger flows, suggesting that the increase in flows is driven by factors other than marketing efforts.[17]

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 as well as by

[17] 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 Table 10 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.

further results on the long-term effects, and on the limited role of adviser sales efforts.

6 Effects on Fund Starts and Liquidations

Lastly, I examine the effects of the reform 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, increase (see Table A7 in the Appendix). As the treated asset category becomes 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 in categories that experience increased net flows, or by liquidating funds in categories that experienced reduced net flows.

I follow the methodology developed by Khorana and Servaes (1999) and conduct my analysis at the fund family level. My main specification is based on a linear probability regression model and is given by:

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

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 11 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 in categories with large reductions in commissions through the opening of new funds in these categories.

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 can be generalized to other markets with similar institutional environments where 1) adviser commissions are limited by law or self-regulation, and these limitations are effective; 2) the market is comparably competitive; and 3) commissions are associated with increased prices of financial products. To illustrate these points, I draw a comparison between the Israeli mutual fund market and the 12b-1 fee segment of the U.S. mutual fund market. I choose the 12b-1 segment as an example since this market is relatively well-studied and is a subject of frequent discussions about regulating fund sales charges. The similar logic can be applied if one considers generalization of the results to other markets.

7.1 Comparison to the 12b-1 Fee Segment of the U.S. Mutual Fund Market

In the United States, mutual fund shares are marketed to retail investors either directly or via brokers (Del Guercio and Reuter (2014)). Funds have multiple share classes and, typically, classes C and B are sold through brokers. Many of these funds charge the 12b-1 distribution fees, which mostly represent an ongoing compensation of brokers, similar to the commissions payed in Israel to bank financial advisers. While the 12b-1 fees are not fully mandated by the government as in Israel, the cap on the 12b-1 fees is regulated by the Financial Industry Regulatory

Authority (FINRA). The FINRA allows 25 basis points to be paid out for marketing and service fees, and provides a cap of 75 basis points to be paid to brokers for fund distribution. This in effect creates a 1% cap on the 12b-1 fees with the maximum possible ongoing commission of 75 basis points.

I compare the 12b-1 segment of the U.S. mutual fund market to the Israel mutual fund industry along a number of dimensions. The data on the U.S. mutual funds comes from the CRSP Mutual Fund Database. Panel A of Figure 6 highlights the importance of the 12b-1 fees in the U.S, showing that approximately 60% of all the U.S. funds have at least one share class with the 12b-1 fees.[18] Moreover, nearly 50% of the funds with the 12b-1 fees set these fees at the maximum of 100 basis points (Panel B). This finding suggests that the FINRA's cap is effective in constraining the distribution fees charged by many funds, analogous to how the regulations in Israel impose constraints on adviser commissions.

The levels of competition across the markets are also highly comparable. Similarly to the U.S., the Israeli mutual fund industry exhibits a high level of concentration among the largest asset managers. Panel A of Figure 7 shows that the five largest mutual fund families managed 67% of the industry AUM in Israel and 61% of the 12b-1 segment AUM in the U.S. in 2013. The Herfindahl-Hirschman index (HHI) across fund families (based on fund family AUM) and the average expense ratios are also very similar (Panels B and C).

I next compare the relation between commissions and fund expense ratios in Israel and in the U.S. The binned scatter plot in Panel A of Figure 8 presents the results for the U.S., showing that the 12b-1fees are strongly positively correlated with the expense ratios. The effects of commissions are highly similar in Israel (Panel B), suggesting that that higher broker distribution payments are associated with increased prices of financial products in both markets.

In sum, the comparison illustrates how the logic of external validity can be applied, showing that the markets are similar along the dimensions of cap effects, competition, and correlations between commissions and prices. The comparison also suggests that the results of this study can be relevant for the discussions on regulation of the 12b-1 fees in the U.S.[19]

[18] 71% of the funds with the 12b-1 fees charge fee larger than 25 basis points, indicating that most of these funds use the 12b-1 fees to compensate brokers. Funds with the 12b-1 fees less than 25 basis points also may use these fees to pay for fund distribution.

[19] If the 12b-1 fees create strong incentives to sell funds for financial advisers in the U.S, the reduction

8 Conclusion

Using the 2013 reform in Israel, I examine the causal effect 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. I also show that mutual fund families respond to changes in investor behavior generated by the reform and strategically position new funds to pursue revenue-maximizing strategies.

My study has two key implications. First, it emphasizes the relation between commissions and expense ratios via price competition, showing that this relation can represent a major channel through which adviser compensation affects markets for financial products. The results in this paper fit the ongoing debate on regulation of commission-based advice, and are important for discussions of imposing limits on adviser commissions.

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

in these fees may be further accompanied by increased sales efforts as discussed in Section 5.3. This effect may come on the top of the effects of expense ratio cuts, documented in this paper.

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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.

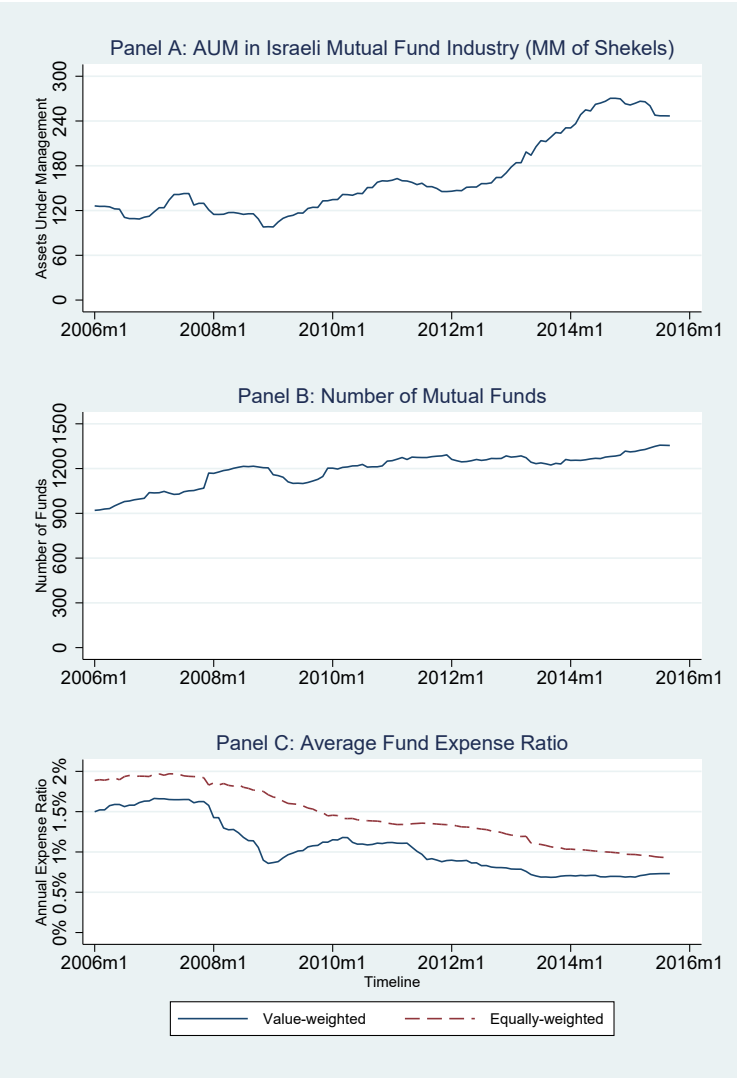

Figure 2: The Revenue Sharing between Banks and Fund Families

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.

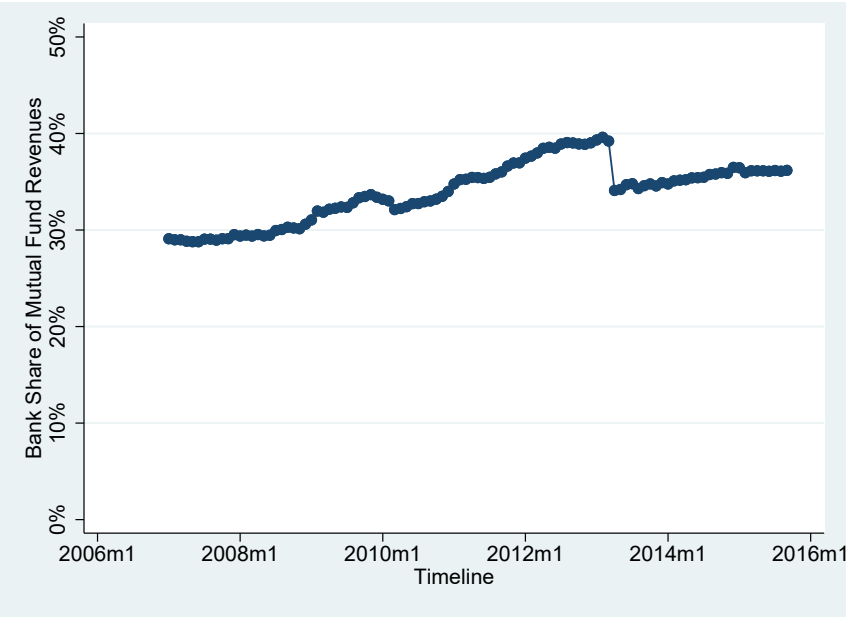

Figure 3: The Revenues from Commissions in the Banking Sector

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.

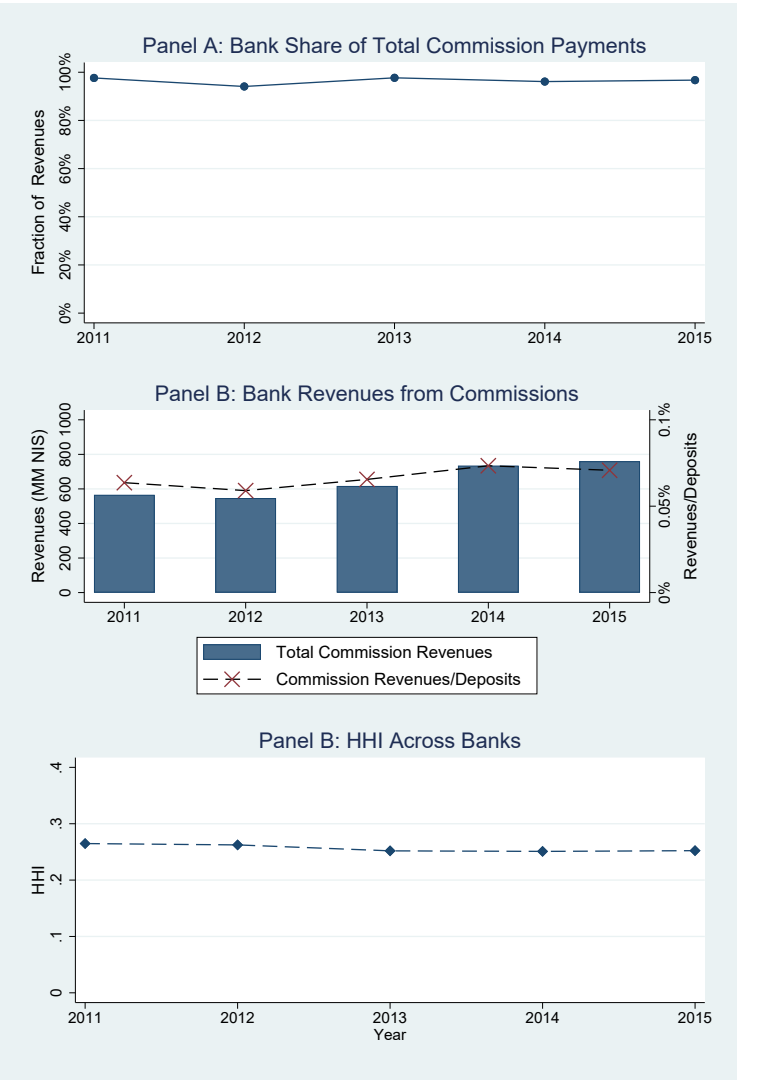

Figure 4: The Effect of Regulation on Expense Ratios and Net Fund Flows: Full Sample

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.

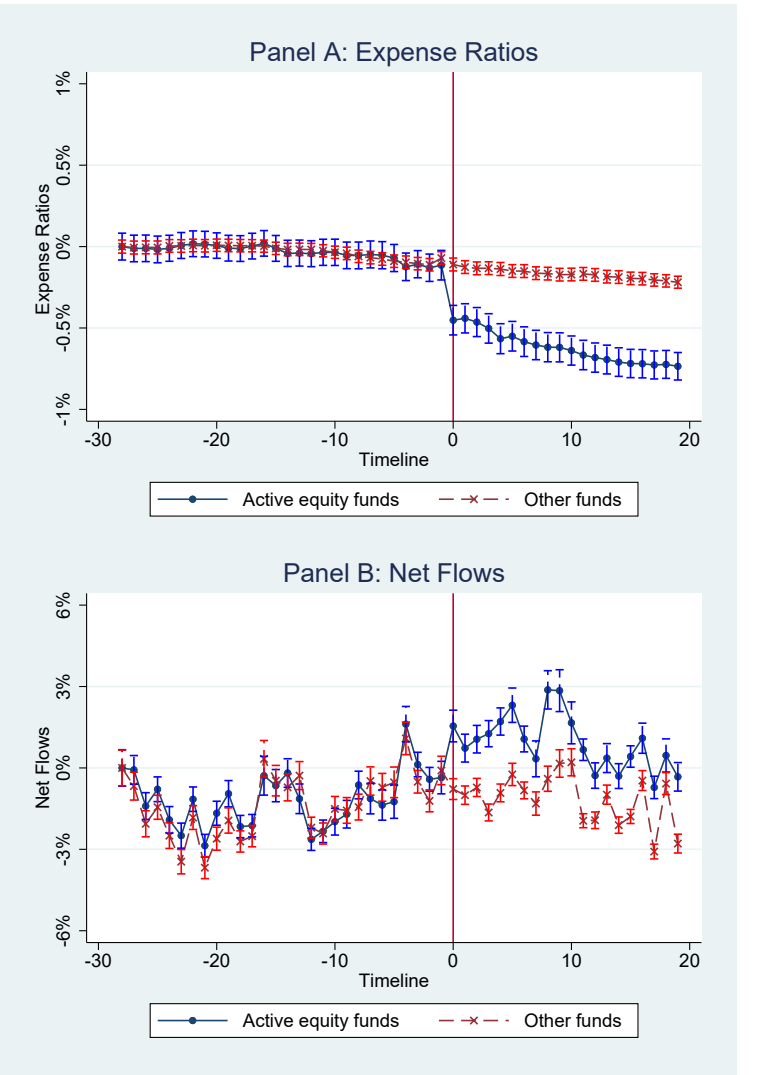

Figure 5: The Effect of Regulation on Expense Ratios and Net Fund Flows: Alternative Samples

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.

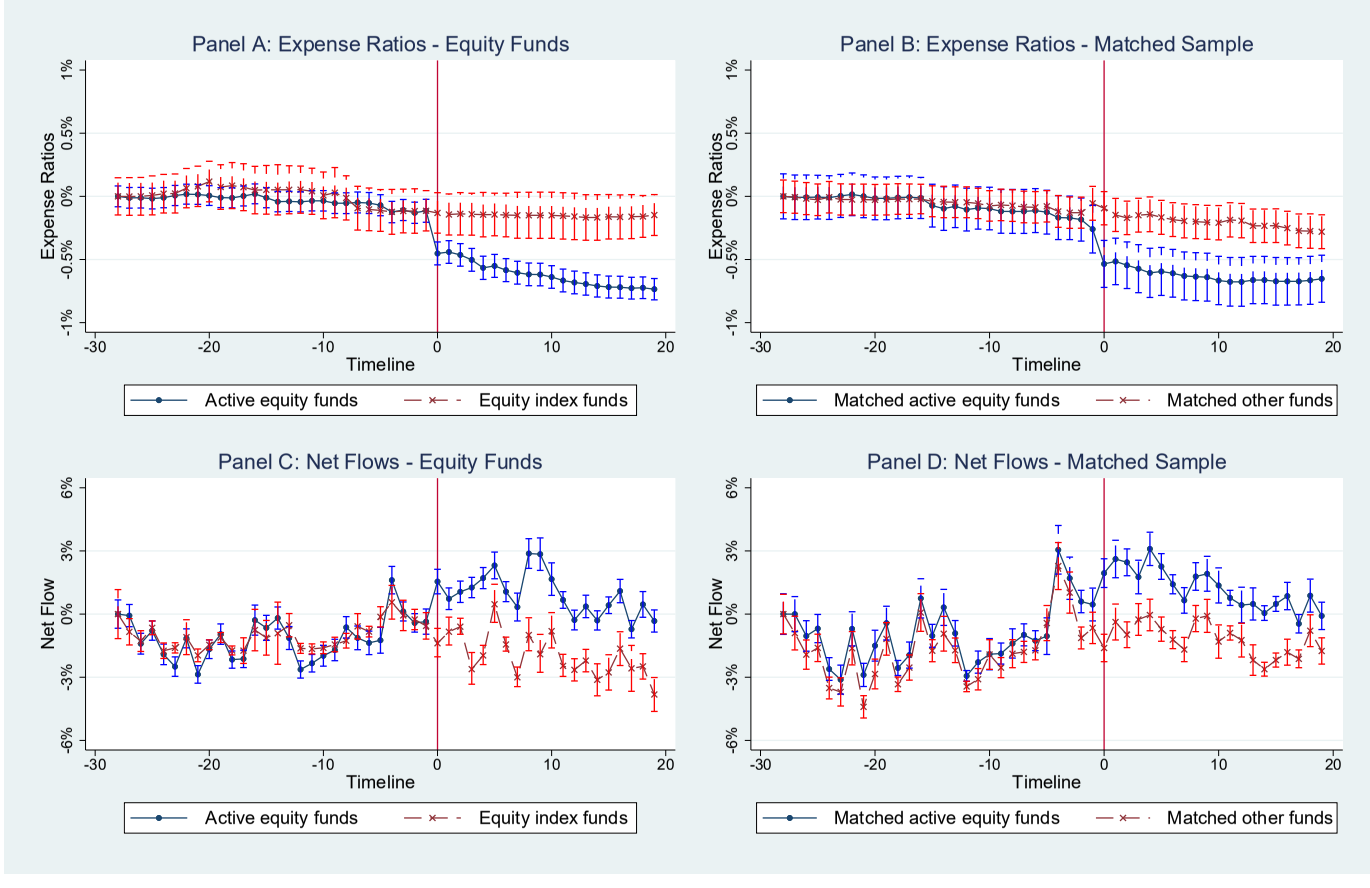

Figure 6: The 12b-1 fee Segment of the U.S. Mutual Fund Market

This figure presents the information on the 12b-1 fee segment of the U.S. mutual fund market over 2011-2015. Panel A shows the ratio of the number of funds with the 12b-1 fees to the total number of funds. Panel B shows the ratio of the number of funds with the 12b-1 fees of 1% to the number of funds with the 12b-1 fees.

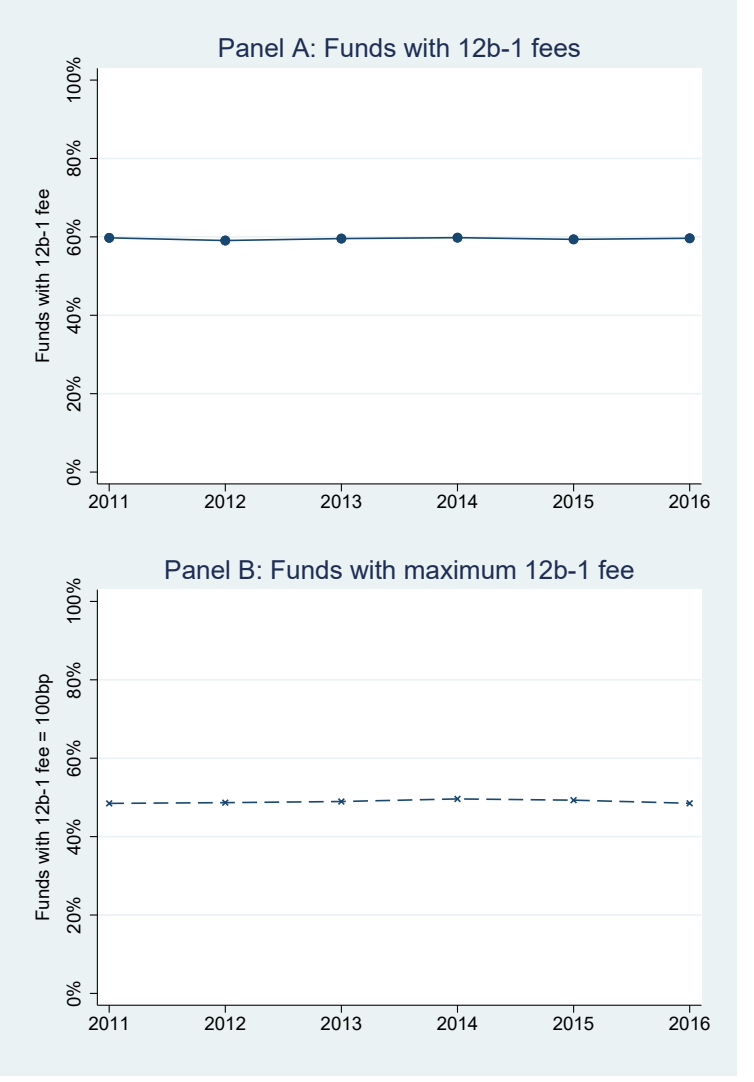

Figure 7: Competition and Expense Ratios in the U.S. and in Israel

This figure presents the comparative information on the 12b-1 segment of the U.S. mutual fund market and the Israeli mutual fund market. Panel A shows the fraction of total assets under management managed by the 5 largest mutual fund families. Panel B shows the time-series of the Herfindahl-Hirschman HHI index (HHI) for assets under management across all the fund families. Panel C shows the value-weighted expense ratios.

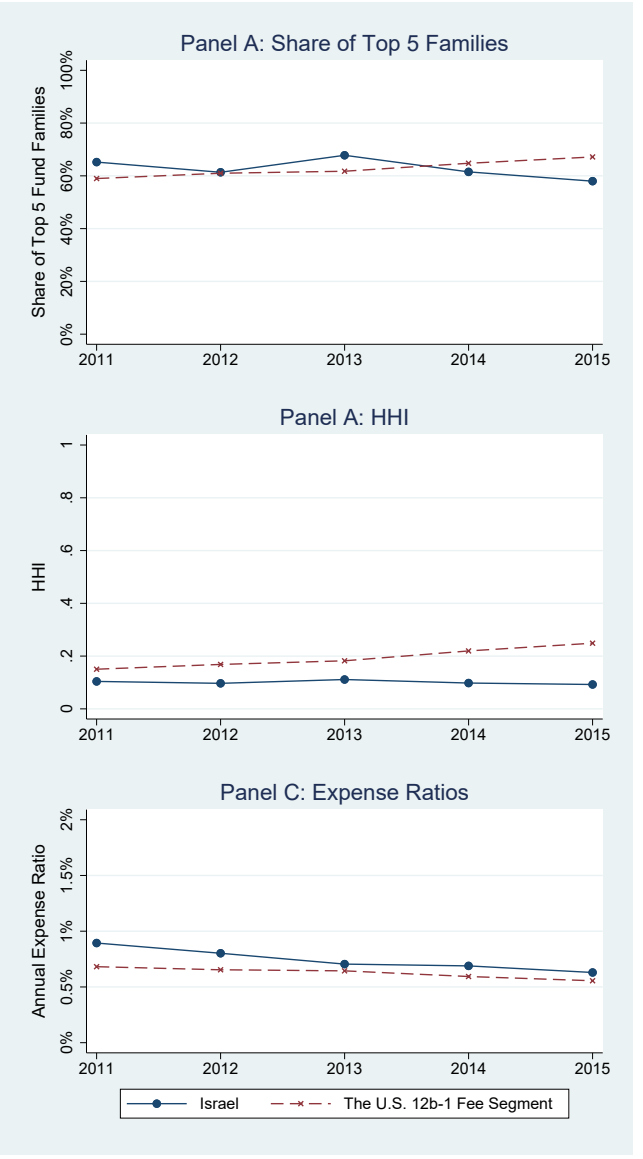

Figure 8: The Relation between Expense Ratios and Ongoing Adviser Compensation in the U.S. and in Israel

This figure presents the relations between mutual fund expense ratios and ongoing adviser compensation in the U.S. and in Israel. Panel A shows the binned scatter plot of the 12b-1 fees and the expense ratios in the U.S. Panel B shows the binned scatter plot of the commissions and the expense ratios in Israel. Each plot groups fund-month observations in 10 bins.

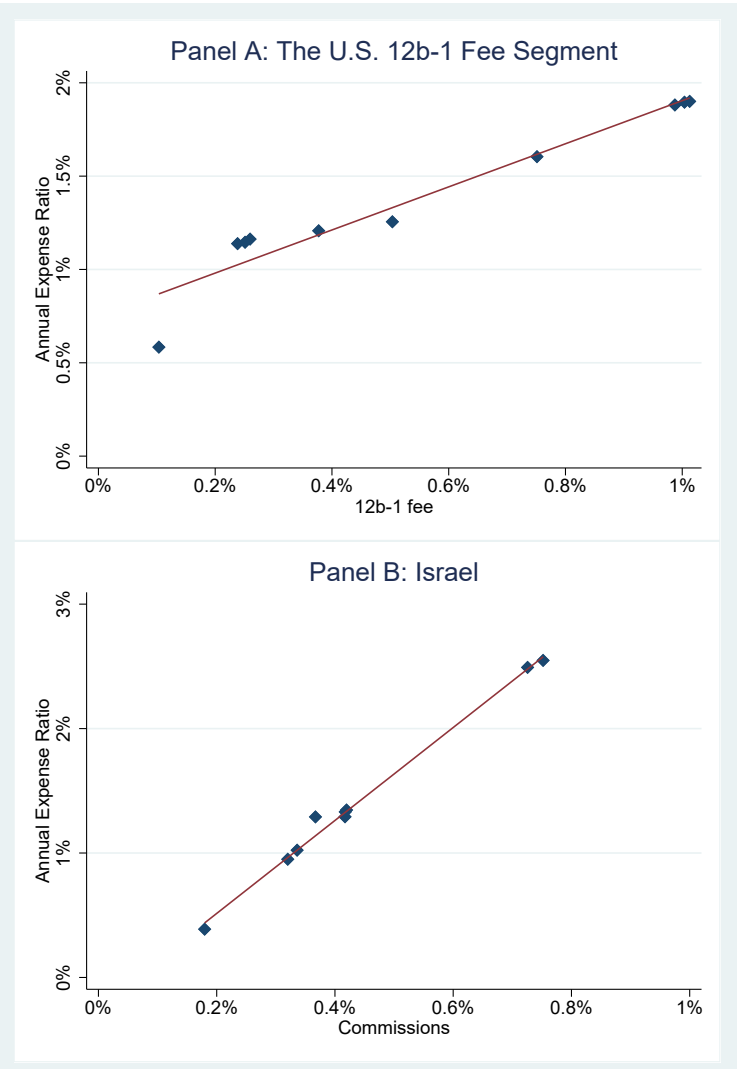

Table 1: Commission Schedule

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 the 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 return over the past 12 months, $R^{6\,months}$ is the fund's return over the past 6 months, and $R^{1\,month}$ is the fund's 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 Regulation on Fund Expense Ratios

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 three control groups: 1) all funds from other asset categories; 2) equity index funds; 3) 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 return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's return over the past 6 months, and $R_{i,t-1}^{1\,month}$ is the fund's 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)	(9)	(10)	(11)	(12)
	$y = Expense\ Ratio_{it}$											
Control Group:	Other Asset Categories (All Funds)				Equity Index Funds				Other Asset Categories (Matched Sample)			
$Active\ Equity_i \times Post_t$	-0.426***	-0.403***	-0.412***	-0.408***	-0.381***	-0.396***	-0.404***	-0.413***	-0.402***	-0.386***	-0.384***	-0.406***
	(0.036)	(0.035)	(0.036)	(0.036)	(0.070)	(0.054)	(0.059)	(0.060)	(0.062)	(0.054)	(0.060)	(0.054)
$log(AUM_{i,t-1})$			-0.027***	-0.027***			-0.059*	-0.059*			-0.061	-0.060
			(0.005)	(0.005)			(0.030)	(0.030)			(0.046)	(0.042)
$log(FundAge_{i,t-1})$			0.157***	0.158***			0.310***	0.306***			0.016	0.037
			(0.028)	(0.028)			(0.108)	(0.106)			(0.137)	(0.131)
$\sigma_{i,t-1}$			3.195***	3.141***			3.097**	3.131**			2.408	2.285
			(0.815)	(0.811)			(1.444)	(1.440)			(2.575)	(2.473)
$R_{i,t-1}^{12\,months}$			-0.061	-0.034			0.085	0.206			0.201	0.315
			(0.071)	(0.087)			(0.133)	(0.133)			(0.152)	(0.176)
$R_{i,t-1}^{6\,months}$			0.212***	0.212***			0.205**	0.202**			0.378	0.375
			(0.075)	(0.073)			(0.093)	(0.088)			(0.277)	(0.274)
$R_{i,t-1}^{1\,month}$			0.173*	0.170*			0.103	0.107			0.106	0.099
			(0.101)	(0.099)			(0.117)	(0.104)			(0.130)	(0.124)
(0,1) Top 20%			0.015**	0.012*			0.051***	0.050**			0.029	0.029
			(0.006)	(0.006)			(0.018)	(0.024)			(0.018)	(0.020)
(0,1) Bottom 20%			0.002	-0.001			-0.061	-0.062			-0.012	-0.016
			(0.007)	(0.007)			(0.111)	(0.112)			(0.024)	(0.023)
$R_{f,t-1}$				0.333				0.182				-0.045
				(0.243)				(0.563)				(0.641)
$R_{c,t-1}$				-0.108				0.355				0.200
				(0.091)				(0.269)				(0.195)
Observations	72,724	70,443	64,167	64,167	14,375	14,375	13,519	13,519	12,177	11,811	11,321	11,321
R-squared	0.924	0.937	0.940	0.940	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	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table 4: The Effect of Regulation on Net Fund Flows

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) all funds from other asset categories; 2) equity index funds; 3) 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 return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's return over the past 6 months, and $R_{i,t-1}^{1\,months}$ is the fund's 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)	(9)	(10)	(11)	(12)
	$y = Net\ Flow_{it}$											
Control Group:	Other Asset Categories (All Funds)				Equity Index Funds				Other Asset Categories (Matched Sample)			
$Active\ Equity_i \times Post_t$	0.024***	0.023***	0.022***	0.022***	0.025**	0.024**	0.028**	0.026**	0.028**	0.025**	0.027**	0.025**
	(0.007)	(0.008)	(0.007)	(0.008)	(0.011)	(0.012)	(0.013)	(0.013)	(0.013)	(0.012)	(0.013)	(0.012)
$log(AUM_{i,t-1})$			-0.063***	-0.063***			-0.061***	-0.061***			-0.050*	-0.050
			(0.005)	(0.005)			(0.008)	(0.008)			(0.030)	(0.035)
$log(FundAge_{i,t-1})$			-0.013	-0.014			-0.011	-0.011			0.011	0.008
			(0.017)	(0.017)			(0.028)	(0.029)			(0.045)	(0.046)
$\sigma_{i,t-1}$			0.417	0.403			-0.522	-0.529			0.400	0.434
			(0.396)	(0.396)			(0.446)	(0.449)			(0.768)	(0.764)
$R_{i,t-1}^{12\,months}$			0.315***	0.342***			0.215**	0.211**			-0.090	-0.052
			(0.043)	(0.047)			(0.044)	(0.045)			(0.061)	(0.073)
$R_{i,t-1}^{6\,months}$			0.207**	0.194*			0.175***	0.175***			0.273	0.272
			(0.102)	(0.107)			(0.053)	(0.054)			(0.175)	(0.173)
$R_{i,t-1}^{1\,month}$			0.389***	0.386***			0.464***	0.464***			0.426*	0.414
			(0.064)	(0.065)			(0.101)	(0.101)			(0.244)	(0.255)
(0,1) Top 20%			0.060***	0.061***			0.029***	0.028***			0.055	0.049
			(0.006)	(0.006)			(0.008)	(0.008)			(0.038)	(0.033)
(0,1) Bottom 20%			-0.021***	-0.022***			-0.009	-0.008			-0.026	-0.021
			(0.006)	(0.006)			(0.007)	(0.007)			(0.022)	(0.022)
$R_{f,t-1}$				0.294***				0.202**				0.296
				(0.098)				(0.082)				(0229)
$R_{c,t-1}$				0.149**				0.205**				0.233
				(0.058)				(0.094)				(0.210)
Observations	64,782	64,782	60,030	60,030	13,189	13,189	12,588	12,588	12,177	11,811	11,321	11,321
R-squared	0.168	0.170	0.179	0.180	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	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend by category	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table 5: The Estimation of Regulation Effects 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 6: Robustness Tests

This table reports the results of robustness tests, using the specifications from column (4) of Tables 3 and 4. 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 A2 - A5 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 A2
	(0.036)	(0.011)	
Active bond funds	-0.423***	0.024**	Table A2
	(0.043)	(0.010)	
Active money market funds	-0.469***	0.028**	Table A2
	(0.047)	(0.012)	
All index funds	-0.420***	0.024**	Table A2
	(0.058)	(0.012)	
Panel B: Alternative Specifications			
Quadratic category time trend	-0.417***	0.027**	Table A3
	(0.025)	(0.013)	
Family * Month fixed effects	-0.408***	0.024**	Table A4
	(0.033)	(0.012)	
Panel C: Alternative Clustering			
Fund	-0.408***	0.022***	Table A5
	(0.032)	(0.008)	
Fund family	-0.408***	0.022***	Table A5
	(0.032)	(0.008)	
Fund family and month	-0.408***	0.022**	Table A5
	(0.040)	(0.010)	

Table 7: The Estimation of Regulation Effects 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 return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's return over the past 6 months, and $R_{i,t-1}^{1\,month}$ is the fund's 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 8: The Effect of Regulation 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 9: The Effect of Price Sensitivity on Response to Regulation

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 A6 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 double-clustered by fund and month are in parentheses.

	(1)	(2)	(3)
	$y = Net\ Flow_{it}$		
$Active\ Equity_i \times Post_t \times S_i$	0.008***	0.007**	0.007**
	(0.003)	(0.003)	(0.003)
$Active\ Equity_i \times Post_t$	0.019***	0.021**	0.020**
	(0.007)	(0.009)	(0.009)
$Post_t \times S_i$	-0.007	-0.004	-0.006
	(0.013)	(0.013)	(0.012)
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 10: The Time-varying Effects of Regulation 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

Table 11: The Effect of Regulation 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 return over the past 12 months, $R^{6\,months}_{fc,t-1}$ is the fund's return over the past 6 months, and $R^{1\,month}_{fc,t-1}$ is the fund's 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

A Additional Results

Figure A1: 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.

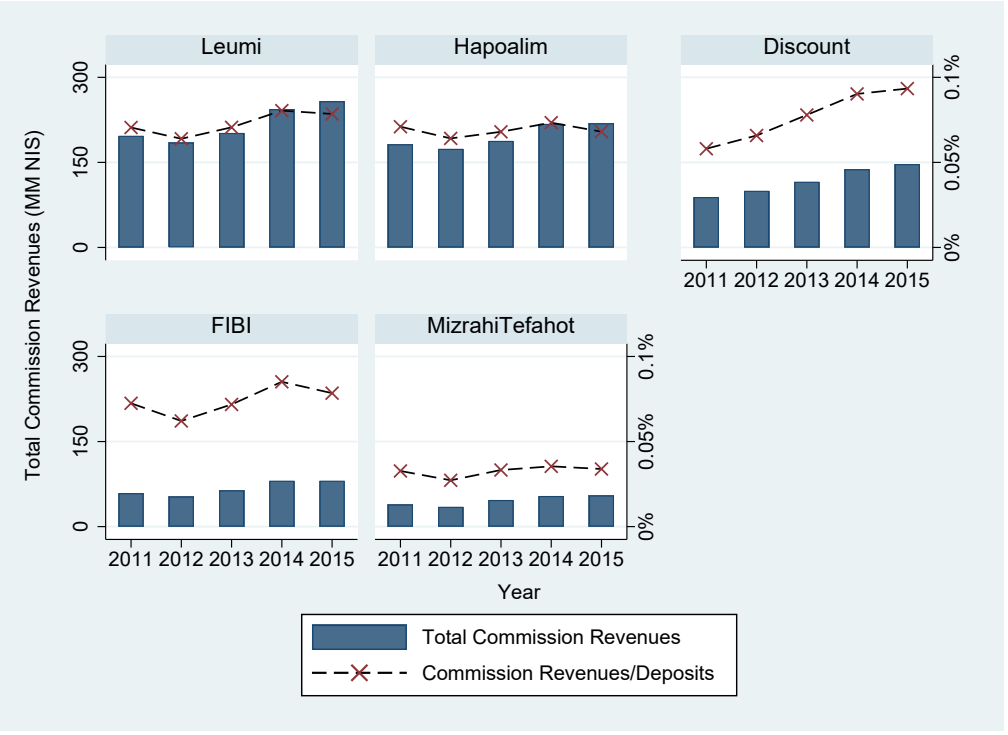

Table A1: The 10 Largest Mutual Fund Families in Israel as of 2013

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: 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 A3: 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 A4: 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 * 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 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 A6: 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 return over the past 12 months, $R^{medium}_{i,t-1}$ is the fund's return over the past 6 months, and $R^{short}_{i,t-1}$ is the fund's 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

Table A7: The Effect of Regulation on Fund AUM and Revenues

This table reports the results from regressing fund AUM and fund 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. $log(AUM_{it})$ is the natural logarithm of the fund's total net assets. $log(Revenue_{it})$ 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 return over the past 12 months, $R_{i,t-1}^{6\,months}$ is the fund's return over the past 6 months, and $R_{i,t-1}^{1\,month}$ is the fund's 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)
	$y = log(Revenue_{it})$			$y = log(AUM_{it})$		
$Active\,Equity_i \times Post_t$	0.177**	0.157*	0.162**	0.248***	0.235***	0.283***
	(0.081)	(0.079)	(0.080)	(0.083)	(0.082)	(0.086)
$log(FundAge_{i,t-1})$		1.590***	1.596***		1.613***	1.621***
		(0.118)	(0.116)		(0.119)	(0.117)
$\sigma_{i,t-1}$		-9.388***	-8.206***		-13.550***	-12.705***
		(2.399)	(2.364)		(2.416)	(2.365)
$R_{i,t-1}^{12\,months}$		1.338***	0.660***		1.572***	0.518**
		(0.218)	(0.241)		(0.230)	(0.237)
$R_{i,t-1}^{6\,months}$			0.404			0.151
			(0.260)			(0.281)
$R_{i,t-1}^{1\,month}$			1.042**			0.901*
			(0.437)			(0.460)
(0,1) Top 20%			0.127***			0.173***
			(0.030)			(0.031)
(0,1) Bottom 20%			-0.272***			-0.301***
			(0.029)			(0.031)
$R_{f,t-1}$			0.904*			0.309
			(0.534)			(0.537)
$R_{c,t-1}$			0.203			0.109
			(0.261)			(0.276)
Observations	68,167	61,017	61,017	72,555	64,167	64,167
R-squared	0.769	0.806	0.809	0.689	0.758	0.763
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