FROM ACCESS TO IMPACT: TEFAS'S EFFECT ON THE TURKISH MUTUAL FUNDS LANDSCAPE

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From Access to Impact: TEFAS's Effect on

the Turkish Mutual Funds Landscape

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DECLARATION OF ORIGINALITY

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ABSTRACT

From Access to Impact: TEFAS's Effect on

the Turkish Mutual Funds Landscape

This study examines the impact of the Turkey Electronic Fund Trading Platform (TEFAS) on the Turkish mutual fund market, focusing on competition, fee structures, and performance dynamics. By enabling investors to access various funds through a single account, TEFAS has streamlined the investment process and reduced barriers to diversification. Using data from January 2011 to June 2019, this research applies competition literature methods to analyze the effects of TEFAS through descriptive analysis, fee versus performance analysis, and competition analysis. The results indicate that TEFAS has reduced fees and has led to more converged fee structures across most fund categories. However, it also increases the concentration for some categories. These findings highlight the importance of regulatory interventions in shaping market dynamics and improving investor outcomes.

ÖZET

Erişimden Etkiye: TEFAS'ın Türk Yatırım Fonları Piyasasına Etkisi

Bu çalışma, rekabet, ücret yapıları ve performans dinamiklerine odaklanarak Türkiye Elektronik Fon Alım Satım Platformu'nun (TEFAS) Türk yatırım fonu piyasası üzerindeki etkisini incelemektedir. TEFAS, yatırımcıların çeşitli fonlara tek bir hesap üzerinden erişmesini sağlayarak yatırım sürecini kolaylaştırdı ve çeşitlendirmenin önündeki engelleri azalttı. Ocak 2011'den Haziran 2019'a kadar olan verileri kullanan bu araştırma, betimsel analiz, ücrete karşı performans analizi ve rekabet analizi aracılığıyla TEFAS'ın etkilerini analiz ediyor. Sonuçlar, TEFAS'ın ücretleri düşürdüğünü ve çoğu fon kategorisinde daha yakınsamış ücret yapılarına yol açtığını, ancak bazı kategoriler için piyasa konsantrasyonun da artığını göstermektedir. Bu bulgular, piyasa dinamiklerini şekillendirmede ve yatırımcı sonuçlarını iyileştirmede düzenleyici müdahalelerin önemini vurgulamaktadır.

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CHAPTER 1

INTRODUCTION

Mutual funds are investment vehicles that pool money from multiple investors to purchase a diversified portfolio of securities, such as stocks, bonds, and other assets. This pooling mechanism allows individual investors to gain access to a broad range of investments, which might be difficult to achieve individually due to high costs and expertise requirements (Reilly & Brown, 2011). The primary benefits of mutual funds include diversification, professional management, liquidity, and economies of scale. Diversification reduces risk by spreading investments across various assets, thus minimizing the impact of any single investment's poor performance (Elton, Gruber, Brown, & Goetzmann, 2009). Furthermore, mutual funds offer liquidity, allowing investors to buy or sell fund shares at the end of each trading day at the fund's net asset value (NAV). The economies of scale achieved through pooling resources lead to lower transaction costs and management fees than individual investments (Reilly & Brown, 2011). These benefits make mutual funds attractive for investors seeking to diversify their portfolios, manage risk, and achieve long-term financial goals.

In Turkey, According to (Gürsoy & Erzurumlu, 2001), entities such as banks, dealers, securities companies, and retirement organizations that meet the Capital Markets Board of Turkey's criteria are eligible to establish mutual funds. The founder of the fund is accountable for the fund's charter and must adhere to the specified ethical principles. Although the fund can be managed by a hired professional manager, the ultimate responsibility rests with the founder. The founder also retains the right to make any changes to the portfolio, provided these changes comply with the rules set forth in the fund's charter.

Previously, to purchase the mentioned mutual funds, investors were required to open an account with each portfolio management company whose funds they wanted to buy. This meant that if an investor wished to invest in funds offered by different firms, they needed to open separate accounts with each of these companies, leading to a cumbersome and fragmented investment process. This structure posed

significant barriers to diversification and increased administrative burdens on investors. However, this situation changed with the introduction of the TEFAS platform.

TEFAS is an electronic fund platform that allows one to compare all funds over a single system and to reach all funds in the market with a single investment account.TEFAS belongs to Takasbank. Takasbank is a central clearing house authorized to conclude cash and securities settlement of shares, debt instruments, foreign capital market instruments, derivative instruments, and precious metals in the existing markets within Borsa Istanbul (Takasbank, n.d.). Takasbank gathers mutual funds in an electronic environment, the investors are experiencing the convenience of realizing fund buying and selling transactions through member organizations from a single platform. Due to Turkey Electronic Fund Trading Platform (TEFAS), investors can choose between hundreds of funds based on their performance and get the opportunity to invest in a more profitable fund. TEFAS offers unique advantages to those who want to save time: Access to all information for all funds in one place, With the instruction to be given to the institution where the account is located, choosing of all funds on the platform, Eliminating the need to open a new account at every institution that sells the fund while receiving the preferred fund, Possibility of getting rid of inter-enterprise transfer costs (TEFAS, n.d.).

The introduction of funds to TEFAS did not happen immediately after the opening of TEFAS. Funds became reachable on the platform in time, but significant migration occurred in the first year. Unfortunately, we don't have the exact joining date of the funds. So we are assuming the TEFAS treatment is effective for every fund after the opening day of TEFAS.

Until now, no study has examined the impact of TEFAS on mutual funds using methods from competition literature. This research aims to fill that gap by applying these analytical methods to assess how TEFAS has influenced the competitive landscape of the Turkish mutual fund market. Additionally, to provide a more extensive understanding, we also explore the fee-performance puzzle within the

Turkish mutual fund market, studying how TEFAS has impacted the relationship between fund fees and performance. By incorporating an external shock to the market, this study adds value to the literature. TEFAS, by removing barriers to buying funds, enables us to approach this question using event studies, such as panel data regressions with treatment dummies. Although we lack a heterogeneous treatment and a non-treated group, we can still examine the effect of this shock on the market.

In the literature review, we discuss previous studies on international mutual funds, focusing on both competition and fee-performance analyses. The data section provides a detailed description of the dataset used in this study. The analysis section is divided into three parts: descriptive analysis, fee versus performance analysis, and competition analysis. Finally, the results section presents the findings of these analyses and offers concluding remarks.

CHAPTER 2

LITERATURE REVIEW

In literature, mutual funds and their relationship with each other are examined deeply. In our case, we focused on three sections in the literature: fee performance relation across funds and competition between funds. Finally, because this is a local study, we examined the regulations of the regulatory body for this specific market.

2.1 Fee-performance relation

The relationship between mutual fund fees and performance is a complex and often counterintuitive area of study. In "When Cheaper is Better: Fee Determination in the Market for Equity Mutual Funds," Gil-Bazo and Ruiz-Verdu (2008) explore this phenomenon, revealing that poorer-performing funds often charge higher fees than their better-performing counterparts. Their model explains this by incorporating the roles of asymmetric information and the presence of unsophisticated investors. Low-quality funds exploit these investors, setting fees at levels that sophisticated investors would typically avoid. Empirical evidence supports this model, indicating that funds with higher fees tend to underperform, which contradicts the standard economic expectation that higher prices reflect higher quality. This paradox highlights the critical need for transparency and investor education in the mutual fund industry.

In another study, "The Relation between Price and Performance in the Mutual Fund Industry," Gil-Bazo and Ruiz-Verdú (2009) examine the surprising trend where equity mutual funds with lower performance charge higher fees. They use a model that incorporates strategic fee-setting by funds targeting different types of investors. The findings suggest that funds with poor performance attract less sophisticated investors who are less sensitive to fees, enabling these funds to charge higher fees despite offering lower returns. This study underscores the importance of investor education and transparency to ensure that investors can make more informed decisions.

Their findings are further reinforced in another paper by the same authors, which delves deeper into the negative relationship between fees and performance across various performance measures and estimation methods. They attribute this to strategic fee-setting by mutual funds that cater to investors with varying degrees of sensitivity to performance. Poorly performing funds tend to attract less sophisticated investors who are less sensitive to performance metrics and therefore charge higher fees. The study also emphasizes the role of better fund governance in aligning fees more closely with performance, suggesting that improvements in governance could help mitigate this issue.

2.2 Competition

The dynamics of competition within the mutual fund industry are crucial to understanding the broader market landscape. Wahal and Wang (2011), in their paper "Competition among Mutual Funds," provide valuable insights into how competition affects mutual funds. Their research highlights the impact of new entrants on existing funds, focusing particularly on the overlap in portfolio holdings as a measure of competitive intensity. They discovered that incumbent funds with significant portfolio overlap with new entrants often engage in price competition by lowering management fees. However, the benefits of reduced management fees are frequently offset by an increase in distribution fees, which limits the overall financial benefit to investors.

Moreover, Wahal and Wang found that incumbent funds with high overlap experience reduced inflows, deteriorating performance, and increased exit rates due to the competitive pressure from new entrants. These trends became more pronounced after the late 1990s, reflecting significant shifts in the competitive landscape of the mutual fund industry. The study emphasizes the complex interplay between competition, fee structures, and fund performance, underscoring the need for a nuanced understanding of these dynamics to foster a more competitive and investor-friendly market environment.

These papers collectively provide a comprehensive understanding of the intricate relationship between fees, performance, and competition in the mutual fund industry. They highlight the critical importance of transparency, investor education, and robust fund governance in improving market outcomes for investors.

2.3 Regulations of SPK

The Turkish regulatory body, the Capital Market Board of Turkey (SPK), announced a communique on mutual funds on July 9, 2013. This document outlines the regulations for the establishment, principles, and operational rules of investment funds, including the issuance of participation shares and public enlightenment requirements (Capital Markets Board of Türkiye, 2013a). After the communique the board also announced a guide established upon the communique. These two documents are the fundamentals of the mutual funds structure in the Turkey (Capital Markets Board of Türkiye, 2013b).

The communique details several updates made over the years, including changes to the scope and definitions relevant to investment funds. It discusses the roles and responsibilities of the fund's creators and management companies.

This regulatory framework ensures that mutual funds are categorized and tracked through their official names, enabling us to obtain information from their names and providing clarity and transparency for investors.

CHAPTER 3

DATA

In this study, we examine the Turkish mutual fund market, focusing on funds available to retail customers. The mutual funds analyzed are categorized based on a specific naming convention mandated by the Turkish regulatory body, the Capital Market Board of Turkey (SPK), as detailed in the communique discussed in the previous section. This convention requires that each fund's name explicitly reflect its main investment area, allowing us to identify competitors within the market.

Mutual funds in Turkey are categorized into seven main types based on their names: Equity, Variable, Money Market, Bond, Private Sector Bond, Commodity, and Eurobond. This naming convention simplifies the process of identifying which funds compete with each other. An algorithm was employed to categorize each fund based on its name, ensuring accurate classification.

The database used in this study contains data from January 2005 to June 2020. For descriptive analysis, all available data were utilized. However, we selected a time-frame from January 2011 to January 2019 for regression analyses. This selection was made to maintain a balanced dataset around the introduction of TEFAS and to exclude the impact of the COVID-19 pandemic on mutual funds.

We excluded funds with a total duration of less than one year to ensure the robustness of our analysis. The dataset includes 465 funds over the specified period. Among these, 79 funds changed their names once, and six funds changed their names twice. We ensured that these funds were accurately categorized following their name changes.

The data includes variables such as price and assets under management (AUM), allowing us to calculate both value changes and participation changes. Additionally, we analyzed fee data, which is expressed as a percentage. Although there is no regulatory mandate on the timing of fee changes, we observed that fee adjustments typically occur annually.

To ensure the robustness of our analysis, we dropped several observations. Specifically, we excluded outlier funds classified as "return-aimed funds" and funds with fewer than 260 observations, as we could not calculate alpha for these funds. This filtering process was crucial to maintain the integrity of our statistical analyses and ensure reliable results.

CHAPTER 4

ANALYSIS

This study is structured into three primary analytical components to comprehensively assess the impact of TEFAS on the Turkish mutual fund market.

First, we will conduct a descriptive analysis to understand the market dynamics and the structural changes within the mutual fund landscape over time. This section will provide a detailed examination of trends, including fund entries and exits, categorization, and overall market share evolution, setting the basis for subsequent analyses.

Second, we will explore the relationship between fees and performance within the Turkish mutual fund market. This analysis aims to identify how introducing TEFAS has influenced this relationship. By examining the alpha represent performance and fee levels across different fund categories, we try to determine whether TEFAS has altered the fee-performance dynamics seen in the literature.

Finally, we will investigate whether there has been a reduction in fee levels and a convergence among competing funds following the introduction of TEFAS. This part of the analysis will employ panel data regressions to evaluate the competitive effects of TEFAS on fee structures. We will analyze changes in the mean and variance of fees, considering factors such as market share and company size, to understand the broader competitive landscape in the post-TEFAS period.

4.1 Descriptive analysis

Descriptive analysis is a crucial part of this study, aiming to understand the market dynamics of the Turkish mutual fund market. One key aspect we investigate is the impact of the introduction of the TEFAS platform on the entry of new mutual funds into the market.

To assess whether the launch of the TEFAS platform constitutes a significant event for our analysis, we examine the number of new fund entrants each month. The

histogram displayed in Figure 1 illustrates the monthly count of new entrants over the study period.

As shown in Figure 1, there is a marked increase in the number of new entrants following the announcement of TEFAS. This sharp rise suggests that the introduction of the platform has had a significant effect on the mutual fund market, serving as a notable event rather than a continuous occurrence.

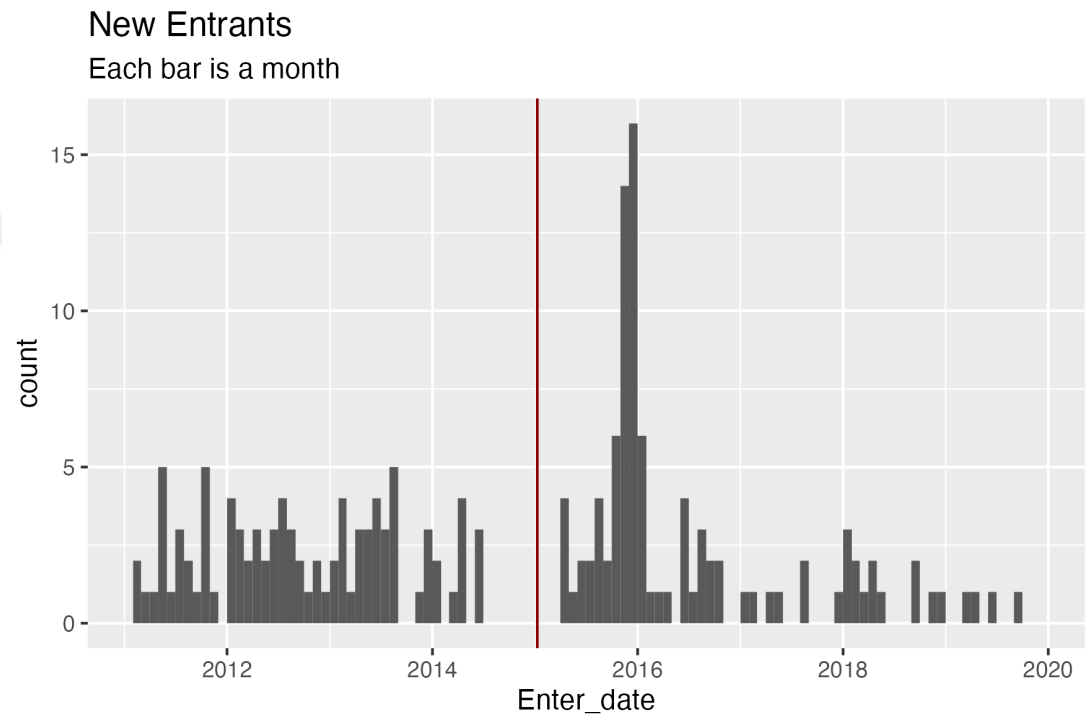

Figure 1. New Entrants to Mutual Fund Market

This observation extends the existing literature by highlighting the impact of TEFAS on market competition. By examining the entrants' effect on competition in this distinct event-based context, rather than as a continuous process, we gain deeper insights into the market dynamics introduced by TEFAS.

Another important aspect of market dynamics to examine is the distribution of funds across different categories over time. The following figure presents the time series of fund amounts with respect to various categories.

The figure 2 shows that variable funds decreased sharply after the introduction of TEFAS. According to sector professionals, this change is attributed to the communique issued by the Capital Market Board of Turkey (Capital Markets Board

of Türkiye, 2013a), which required some funds that were structurally equity funds but labeled as variable funds to change their official names. This resulted in some funds closing and others entering the database under new names. Additionally, we observe a secular trend of decreasing money market funds, with the rate of decrease accelerating after the TEFAS announcement. Categories such as Eurobond, Private Sector Bond, and Commodity funds remained relatively stable throughout the analysis. On the other hand, bond funds showed an increase before introducing TEFAS, likely due to another intervention by the Capital Market Board that directly altered the structure of fund names and indirectly affected the categorization of these funds.

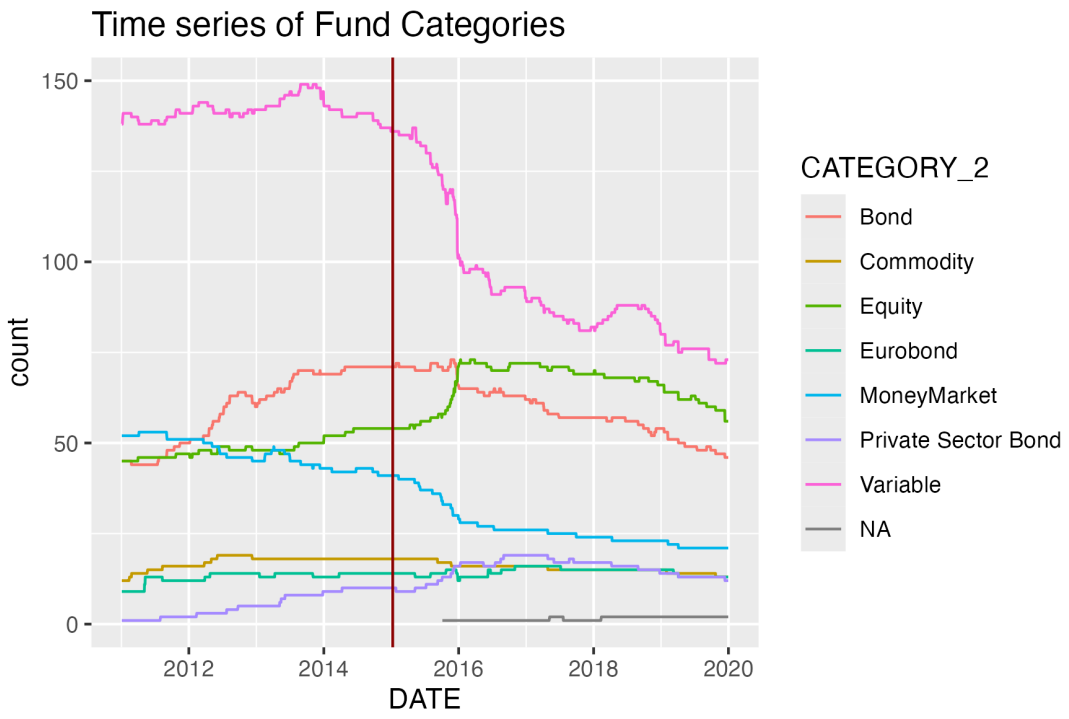

Figure 2. Fund Amounts Through Time

Figure 3 illustrates the market share of different mutual fund categories over time. Examining the four main categories —Bond, Variable, Equity, and Money Market funds—we observe several noteworthy trends. Bond funds increased their market share before the TEFAS introduction by drawing share from Money Market funds. Following the introduction of TEFAS, Equity funds saw a significant increase in their market share. The market share of Variable funds remained relatively stable

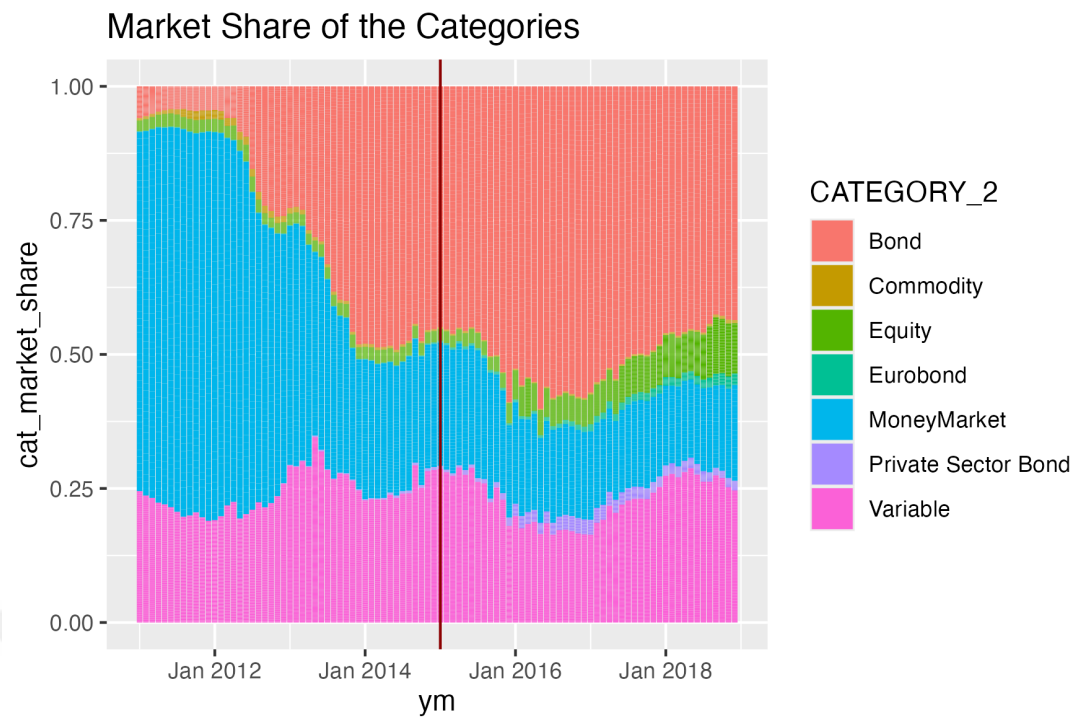

Figure 3. Market Share of the Different Mutual Fund Categories

throughout the period. Smaller categories, including Commodity, Eurobond, and Private Sector Bond funds, experienced slight enlargements in market share following the introduction of TEFAS. This trend is particularly just apparent in Eurobond and Private Sector Bond funds.

4.1.1 Fee convergence in-between categories

Fees of the funds and their convergence can be examined by analyzing the mean and variance of fees over time for the entire market and each specific category. Although the decrease in the mean fee is slight for equity funds can be seen in Figure 4, there is a noticeable reduction in the variance of fees after introducing TEFAS. This indicates a convergence in the fee structure for equity funds over time. As seen in Appendix A, Figure 7, Variable funds already exhibited a decreasing trend in mean fees before the event. After the introduction of TEFAS, this trend appears to have accelerated. Additionally, there is a noticeable decrease in the dispersion of fees, indicating a convergence in fee structures. Money market funds show minimal variance in fees and a sharp decrease in average fee rates, as in Appendix A, Figure 8. Insights from

the sector suggest that this trend is due to caps placed by the Capital Market Board of Turkey, which regulated the fee structure for these funds. While bond funds in Appendix A, Figure 9 exhibit a significant decrease in fee variance, this change is more noticeable visually. However, the average fee rates have remained the same since introducing TEFAS. As shown in Appendix A, Figure 10 The volatility of variance in the fees for private sector bond funds can be attributed to the low number of funds in this category. Despite this, there is a significant reduction in variance over time. The effect of the introduction of TEFAS will be examined further in this study. In Appendix A, Figure 11 Commodity funds follow a relatively stable path in both the mean and variance of fee rates over time. No significant changes were observed in response to the TEFAS event. Lastly in Appendix A, Figure 12, Eurobond funds show a decrease in both mean and variance of fee rates over time. This indicated a convergence in the fee structure for Eurobond funds, with lower average fees and reduced dispersion.

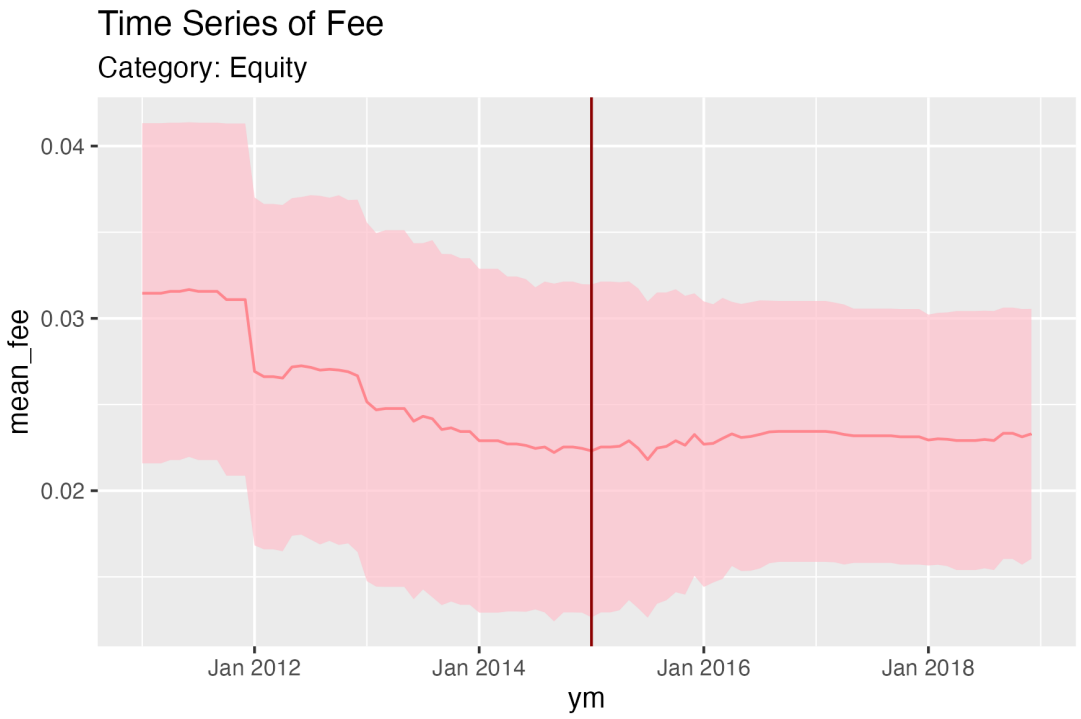

Figure 4. Fees of Equity Funds through Time

4.1.2 Concentration in-between categories

We can examine the time series of concentration indexes to understand competition in the mutual fund market. This study uses the Herfindahl-Hirschman Index (HHI) to observe existing market dynamics. The HHI is calculated as indicated in Rhoades (1993).

$$HHI = \sum_{i=1}^{N} (MS_i)^2$$

$$MS_i = AUM_i / CatAUM$$

In this context, N stands for how many funds are in the category, MS_i is the market share of the fund i, and AUM_i is the assets under management of the fund i. Finally, $CatAUM$ is the total asset under the management of the whole category.

another way to examine market concentration is using the decomposed Herfindahl–Hirschman index. Decomposed HHI tries to identify the change in index whether occurred because of an increase in firm number or due to changes in their market shares. We have done the decomposition parallel to the work of Warren-Boulton (1990), as follows.

$$HHI = \frac{1}{N} + (N-1)\sigma^2$$

$$\sigma^2 = \frac{1}{N-1} \sum_{i=1}^{N} (MS_i - \mu)^2$$

In this context μ stands for $1/N$

For equity, variable, commodity, and eurobond categories, we observe changes in concentration over time. In the larger categories in terms of assets under management, such as equity in Figure 5 and variable funds in Appendix B, Figure 13, the concentration remains relatively low in terms of index values. However, in the smaller categories, precisely commodity in Appendix B, Figure 14 and eurobond funds in Appendix B, Figure 15, we see higher index values, implying greater

concentration. In contrast, for the money market, bond (see Appendix B, Figure 16), and private sector bond categories (see Appendix B, Figure 17), we do not observe significant changes in concentration correlated to introducing the TEFAS platform. Despite this, these categories significantly vary their concentration indexes over time. Finally also in between bond funds, which can be seen in Appendix B, Figure 18, we don't see a change in market concentration. Given the nature of their assets, these categories are highly interrelated, necessitating further examination, which we will undertake in the following sections.

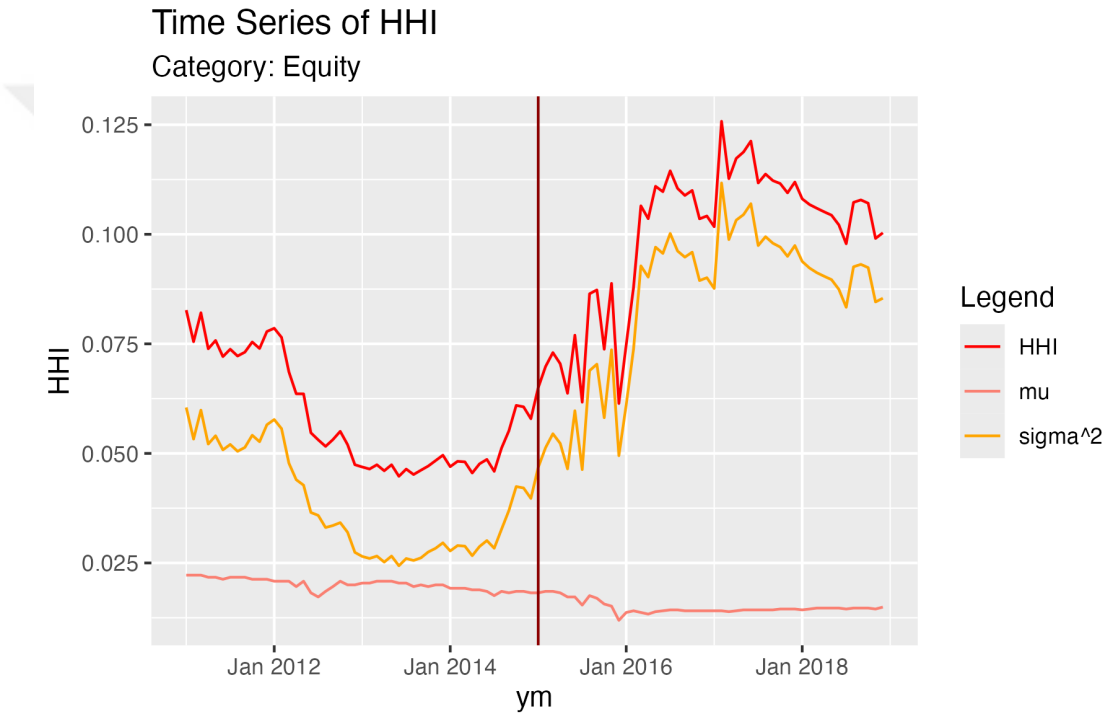

Figure 5. Concentration index for variable funds

4.2 Cheaper is better

In this study main statistic to evaluate performance of funds is alpha of CAPM as Jensen, Black, and Scholes (1972) suggested. To calculate alpha we determine benchmarks for our fund categories as seen in Benchmark Table. We regressed CAPM for window of 1 year in a rolling manner, then run the analysis on yearly basis to prevent too much overlapping data problem.

Table 1. Fund Categories and Their Respective Benchmarks

Category	**Benchmark**
Equity	BIST100
Variable	10% BIST-KYD Government Bonds 91 Days + 65% BIST-KYD Government Bonds All + 25% BIST100
Commodity	BIST-KYD Gold Price Closing
Eurobond	BIST-KYD Public Eurobond USD (TRY)
Private Sector Bond	BIST-KYD Private Sector Bond Variable
Money Market	BIST-KYD Government Bonds 91 Days
Bond	BIST-KYD Government Bonds All

For risk-free rate to calculate excess returns of both market and fund, we used the index "BIST-KYD REPO (BRUT)", which stands for gross repo index published by Borsa Istanbul.

$$\alpha = (R_i - R_f) - \beta * (R_m - R_f)$$

$$\beta = \frac{cov(R_i - R_f, R_m - R_f)}{var(R_m - R_f)}$$

In this context R_i stands for return of the fund i, R_m return of the benchmark, R_f is the risk free interest rate.

To test findings of the literature in the Turkish Mutual fund market emerging market. We are examining the relationship between the mentioned estimated alpha and fee level

In the plots, we are seeing coefficient γ_1 in the following regression in each year. Stars declare significance.

$$\alpha = \gamma_0 + \gamma_1 f$$

Where f is the fee rate of the fund. Because alpha is calculated on daily returns we take fees as daily rates so the coefficient value can make sense.

In this analysis, we are looking for signs of the coefficients and their significancies as Gil-Bazo and Ruiz-Verdu (2008) done.

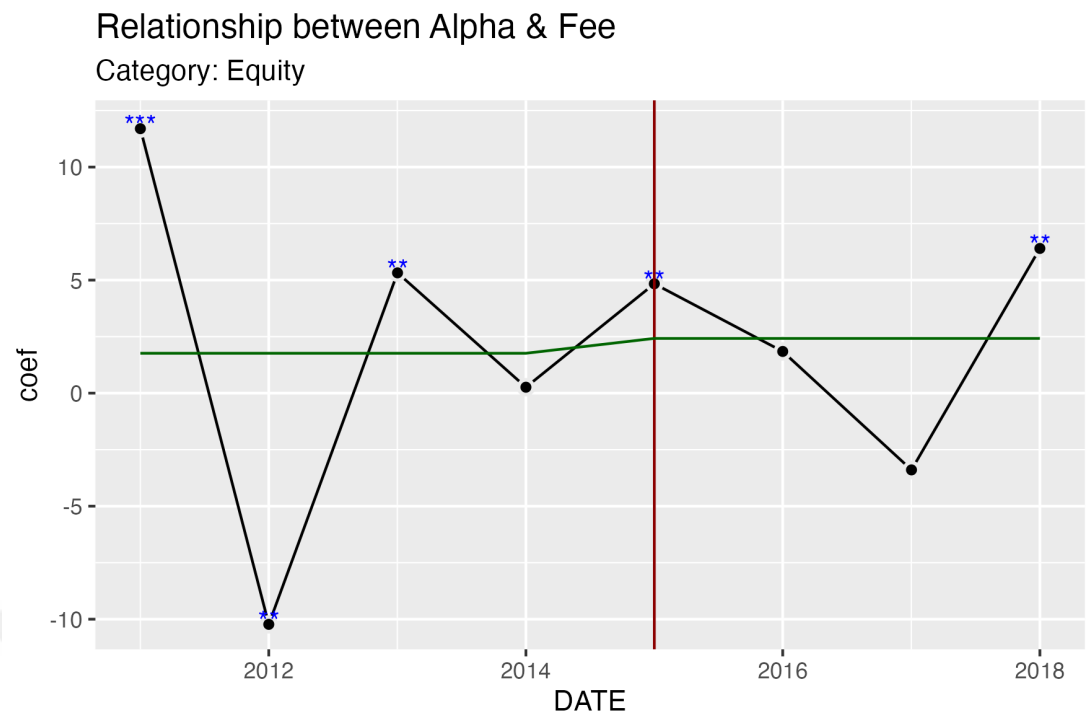

Figure 6. Is cheaper better? category: equity

As can be seen in Figure 6, in the equity category, the relationship between alpha and fee levels is predominantly positive and significant. There is no notable change in the mean coefficient following the introduction of TEFAS.

For variable funds, the relationship is mostly negative and an be seen at Figure 19. It is important to note that the only significant result at the 0.01 level was positive; however, the change around the event was not significant.

For money market funds as in Figure 20, significant results are on the positive side, and due to the high number of positive years, the mean relationship remains positive both before and after the introduction of the TEFAS platform. In the bond funds category, the only noticeable change around the event can be observed as in Figure 21. However, this change may be attributed to the 2012 relationship, which is not significant, indicating that further examination is necessary before drawing conclusions.

Regarding smaller categories, the findings align with existing literature, where poorly performing funds charge higher fees, as noted by Gil-Bazo and Ruiz-Verdú. Eurobond and private sector bond funds exhibit a stable negative relationship

between alpha and fee levels over time as can be seen in Figure 22 and Figure 23. In contrast, commodity funds in Figure 24 show a significant change in the relationship between alpha and fee levels following the introduction of TEFAS.

4.3 Competition

To understand the changes in the competition structure of the Turkish mutual fund market, we conducted two sets of regressions on the seven categories, as detailed in the regression tables.

In the first set of regressions, we included several control variables alongside the treatment effect. These controls were fund performance (represented by alphas calculated in the previous section), company size of the fund, and market share of the fund. Moreover, we included fixed effects for years to isolate the effect of the TEFAS platform from yearly variations. Standard errors were clustered at the fund level to ensure robustness.

To determine the firm size of a fund, we summed the assets under management (AUM) of all funds within a single company. We then applied a k-means clustering algorithm as Forgy (1965) suggested. The algorithm was implemented via R programming language. The algorithm runs with two centers to categorize portfolio management companies into "big" and "small" groups on a daily basis. For yearly calculations, we averaged the daily company size categorizations, resulting in a metric ranging from 0 to 1, representing the size of the fund management company.

The funds' market share was calculated as described in the concentration analysis section of the descriptive analysis. This metric was used to capture the competitive positioning of each fund within the market.

The regression analysis shown in Table 2 provides significant insights into the effects of the TEFAS platform introduction on the competition structure within different Turkish mutual fund market categories. The treatment variable, representing the introduction of TEFAS, is negative and significant at the 0.01 level across all

Table 2. Regressions on Funds' Mean Fee Levels

	Dependent variable:			
	Mean Fee			
	Equity	Variable	MoneyMarket	Bond
	(1)	(2)	(3)	(4)
Treatment	-0.009^{***}	-0.010^{***}	-0.020^{***}	-0.009^{***}
	(0.002)	(0.001)	(0.001)	(0.001)
Firm Size	0.001	-0.002	-0.002	-0.008^{**}
	(0.004)	(0.004)	(0.001)	(0.004)
Market Share	0.039^{***}	-0.082^{***}	0.003	0.007
	(0.011)	(0.028)	(0.002)	(0.005)
Alpha	1.187^{***}	0.913^{***}	-0.012	-1.981^{*}
	(0.415)	(0.228)	(0.294)	(1.171)

	Dependent variable:		
	Mean Fee		
	Private Sector Bond	Commodity	Eurobond
	(1)	(2)	(3)
Treatment	-0.008	-0.008^{***}	-0.015^{***}
	(0.005)	(0.003)	(0.003)
Firm Size	0.005	0.006	0.009
	(0.010)	(0.009)	(0.012)
Market Share	-0.001	-0.004	0.001
	(0.008)	(0.014)	(0.005)
Alpha	-0.931	-1.208^{**}	-2.673
	(1.514)	(0.522)	(1.651)

Note: *p<0.1; **p<0.05; ***p<0.01
Fixed year effects are used

categories except for private sector bonds. This indicates that introducing TEFAS has increased competition by decreasing general fees for funds in each category, with the most substantial declines observed in the money market and Eurobond funds. The variable representing company size does not show significant results in any category, so we cannot draw any conclusions about the impact of company size on fund fees from this analysis.

However, the market share variable reveals interesting dynamics. For equity and money market funds, increased market share and given performance are constant, resulting in higher fees. This suggests that funds with a larger market share can command higher fees in these categories. Conversely, the effect is inverse in the variable funds category, indicating that higher market share is associated with lower fees, likely due to increased competition among variable funds.

Fund performance, represented by alpha, shows a positive relationship with fees for equity and variable funds, holding market share and company size constant. This implies that better-performing funds can charge higher fees. In contrast, the relationship is negative and significant for bond and commodity funds, suggesting that higher fees are associated with lower performance in these categories. Overall, the regression analysis indicates that introducing the TEFAS platform has increased competition in the Turkish mutual fund market, leading to lower fees across most fund categories. The varying impact of company size, market share, and fund performance on fees highlights the nuanced dynamics within different market segments.

In the second set of regressions, we try to estimate the variance of the fees in a year with our treatment which is 1 after 2015-01-09 and 0 before. We used controls of the Herfindahl-Hirschman concentration index and fixed-year effects. To test the significance of coeffcient we clustered the White Heteroskedasticity-consistent standard errors. Again we run the regression in the mentioned configuration for all seven categories.

Table 3. Regressions on Variance Fee of the Funds

	Dependent variable:			
	Variance Fee			
	Equity	Variable	MoneyMarket	Bond
	(1)	(2)	(3)	(4)
treatment	-0.00001^{***}	-0.00000^{***}	-0.00000^{***}	-0.00000^{***}
	(0.00000)	(0.000)	(0.00000)	(0.00000)
HHI	-99.504^{***}	-32.600^{***}	678.409^{***}	-314.177^{***}
	(0.861)	(0.770)	(6.099)	(2.157)

	Dependent variable:		
	Variance Fee		
	Private Sector Bond	Commodity	Eurobond
	(1)	(2)	(3)
treatment	0.00000^{***}	0.00000^{***}	0.00001^{***}
	(0.00000)	(0.00000)	(0.00000)
HHI	-15.426^{***}	-106.499^{***}	-31.644^{***}
	(1.481)	(1.258)	(0.669)

Note: *p<0.1; **p<0.05; ***p<0.01
Fixed year effects are used

The regression analysis shown in Table 3 for variance in fee levels across different mutual fund categories yields insightful results regarding the competitive dynamics following the introduction of the TEFAS platform.

The treatment variable, which represents the introduction of TEFAS, is negative and significant at the 0.01 level for equity, variable, money market, and bond funds. This suggests that introducing TEFAS has led to a decrease in fee variance in these categories, indicating a convergence of fees as competition intensifies. Interestingly, for private sector bond, commodity, and eurobond funds, the treatment variable is positive and significant at the 0.01 level, indicating an increase in fee variance in these categories following the TEFAS introduction.

The Herfindahl-Hirschman Index (HHI), a measure of market concentration, also shows significant results across all categories. For equity, variable, bond, commodity, and eurobond funds, the HHI has a negative and significant coefficient, suggesting that higher market concentration is associated with lower fee variance. This implies that in more concentrated markets, fees tend to converge. Conversely, the HHI coefficient is positive and significant in the money market category, indicating that higher market concentration is associated with higher fee variance. The same positive and significant relationship is observed in the private sector bond category.

Overall, these results highlight the nuanced impact of the TEFAS platform on fee structures within the Turkish mutual fund market. The reduction in fee variance for major categories like equity, variable, money market, and bond funds suggests that increased competition has led to more standardized fee structures. However, the increase in fee variance for private sector bond, commodity, and eurobond funds indicates that these categories may still experience varying competitive pressures or different market dynamics. The relationship between market concentration and fee variance further underscores the complexity of competitive interactions in the mutual fund market.

CHAPTER 5

RESULTS, CONCLUSION AND FUTURE WORK

The descriptive analysis provides an overview of the market dynamics and structural changes within the Turkish mutual fund market over the study period. The introduction of TEFAS led to a significant increase in the number of new mutual fund entrants, highlighting the platform's role in facilitating market access and promoting competition. The categorization of funds based on their names allowed for explicit identification of competitive dynamics within each category. Significant changes were observed in the distribution of funds across categories, particularly in the variable and equity funds. The market share analysis over time revealed trends of increasing dominance in specific categories, such as variable and bond funds, while smaller categories, like commodity and eurobond funds, remained relatively stable. To capture power dynamics, we closely examined the Herfindahl-Hirschman Index and found a slight increase in the market concentration.

The relationship between fees and performance was assessed to understand the impact of TEFAS on fee structures within the Turkish mutual fund market. A positive and significant relationship between alpha (performance) and fees was observed in the equity fund category, indicating that better-performing funds can command higher fees. This relationship remained stable before and after the introduction of TEFAS. For variable funds, the relationship between fees and performance was predominantly negative, suggesting that lower fees are associated with better performance, and this relationship did not significantly change with the introduction of TEFAS. In the case of money market funds, significant positive relationships were found between fees and performance, with higher fees associated with better performance. We can say that we get mixed signals about fee and performance links. Also, no significant result between fee and performance can be seen in pre and post-treatment periods. Further analysis is needed to capture the core relationship hiding behind the noise. Different methods, such as factor models, can be used to obtain alpha.

The impact of TEFAS on competition within the Turkish mutual fund market was evaluated using panel data regressions. The introduction of TEFAS led to a general decrease in fee levels across most fund categories, with the most pronounced reductions observed in the money market and eurobond funds suggesting increased competitive pressure. Significant decreases in fee variance were observed in equity, variable, money market, and bond funds, indicating a convergence in fee structures. Conversely, fee variance increased in private sector bond, commodity, and eurobond funds, suggesting varied competitive dynamics. Higher market share was associated with higher equity and money market funds fees, while the opposite was true for variable funds. The Herfindahl-Hirschman Index (HHI) results showed that higher market concentration generally led to lower fee variance, indicating more standardized fee structures in concentrated markets.

Overall, the results indicate that introducing TEFAS has had a significant impact on the Turkish mutual fund market. Mainly, two effects can be seen: promoting competition, leading to closer fee setups, and increasing market concentration in terms of market share. These results obviously highlight the complexity of market dynamics and the importance of considering specific category characteristics in regulatory and competitive analyses.

In future research, the analysis could be enhanced by examining the relationship between funds and major banks as an alternative to considering company size. This is because major banks have the capability to reach a vast customer base. Another hypothesis worth testing is that funds associated with major banks may not need to lower their fees, as they can already access their customer base without the necessity of a platform like TEFAS.

Additionally, the analysis could be further refined by obtaining data on the dates when funds joined the platform. This would allow for the implementation of a heterogeneous treatment effect analysis of TEFAS. Such an approach would enable a more precise quantification of the platform's impact, bringing the analysis closer to capturing the real-life effects.

APPENDIX A

FEES THROUGH TIME

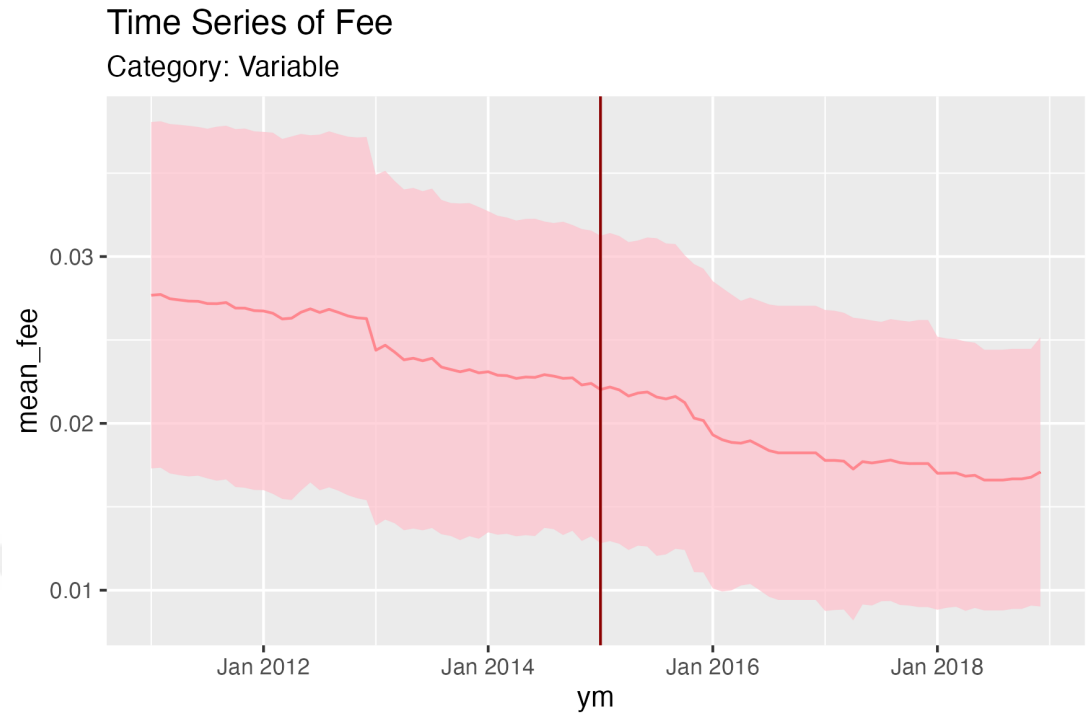

Figure 7. Fees of Variable Funds through Time

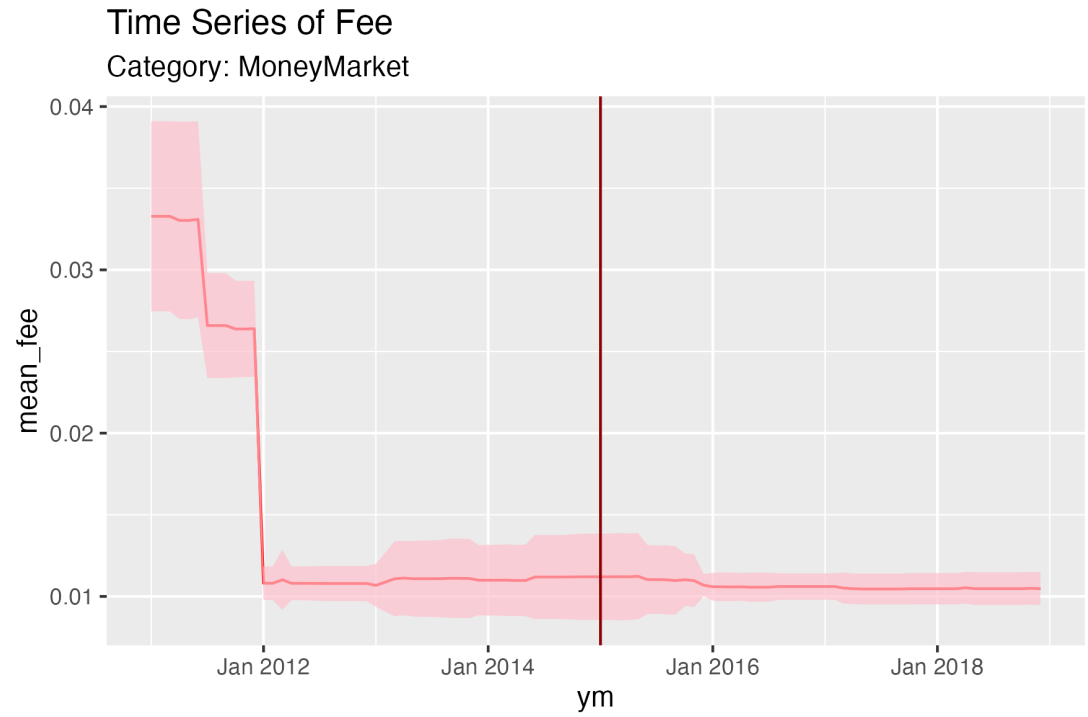

Figure 8. Fees of money market funds through time

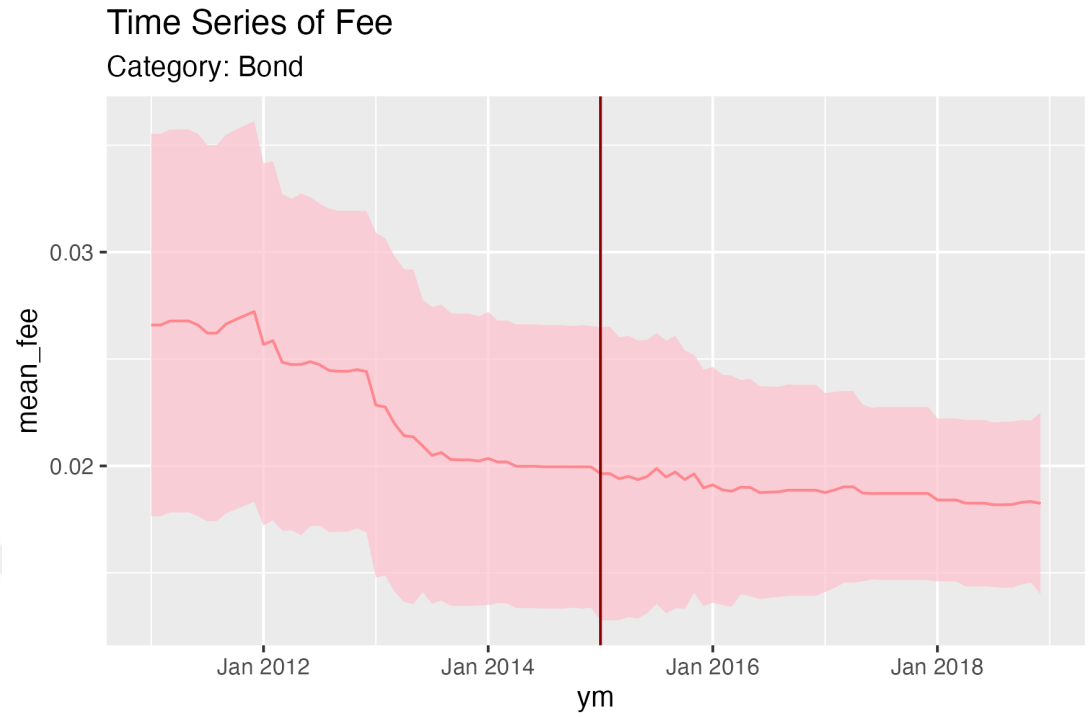

Figure 9. Fees of bond funds through time

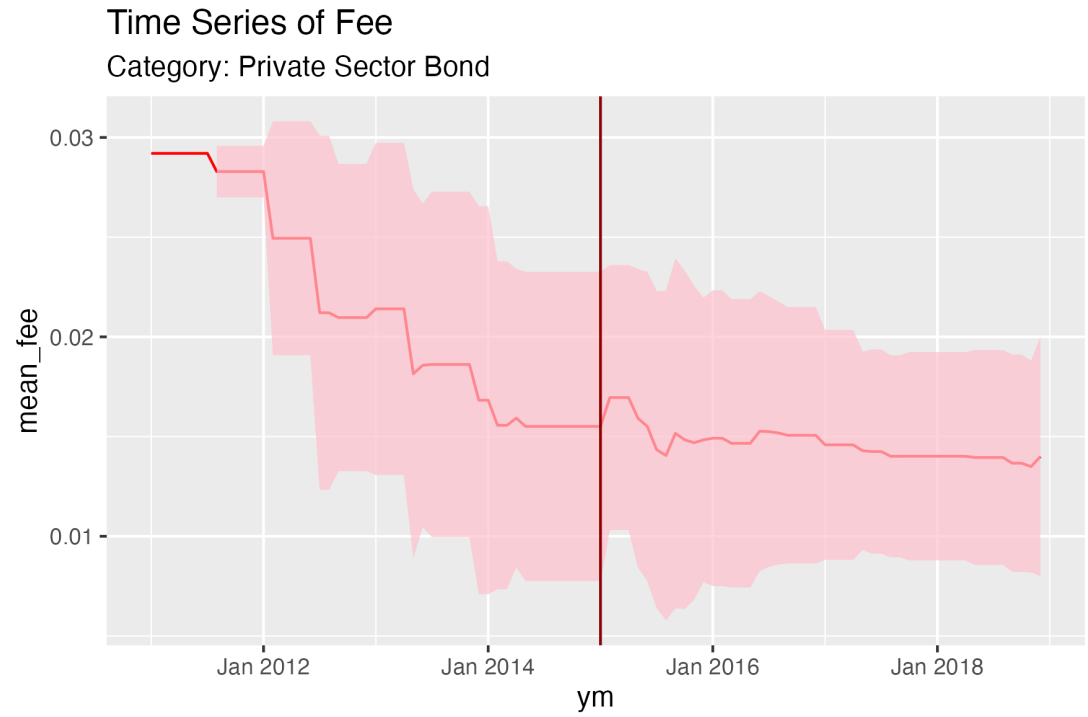

Figure 10. Fees of private sector bond funds through time

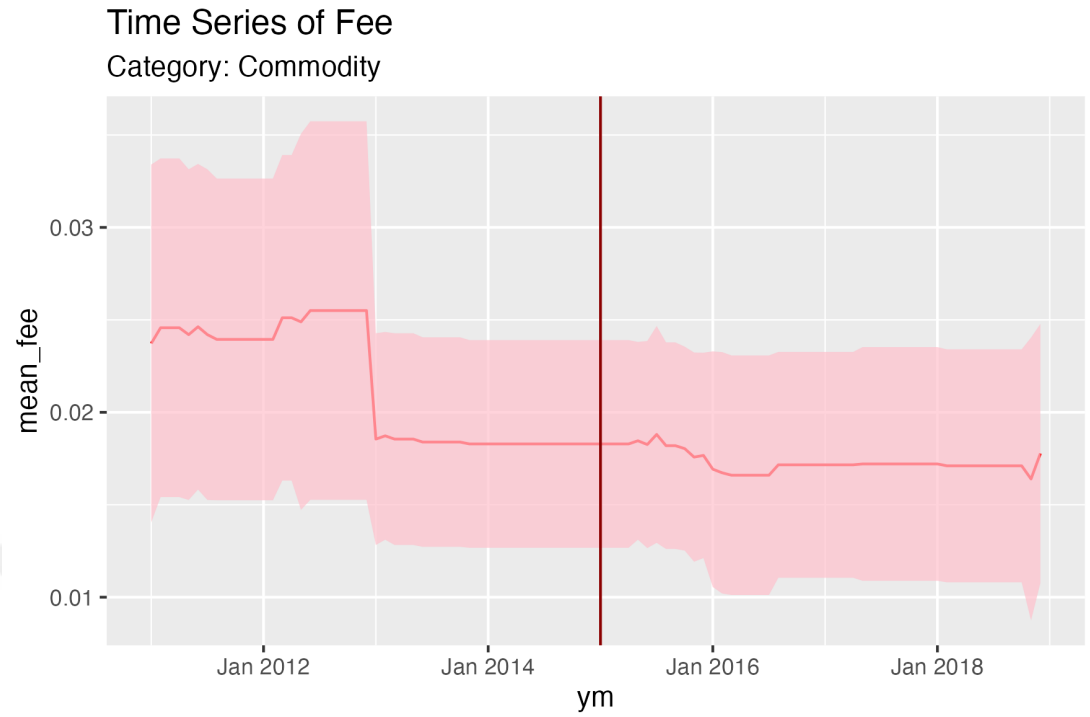

Figure 11. Fees of commodity funds through time

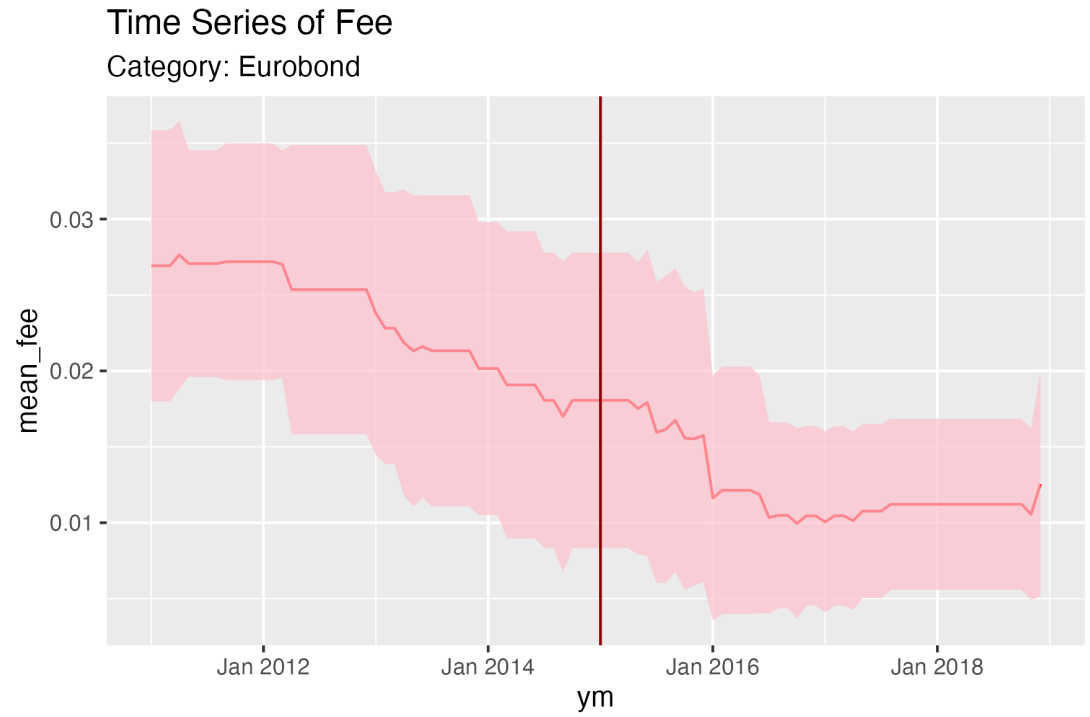

Figure 12. Fees of eurobond funds through time

APPENDIX B

CONCENTRATION INDEXES FOR FUND CATEGORY SUB-MARKETS

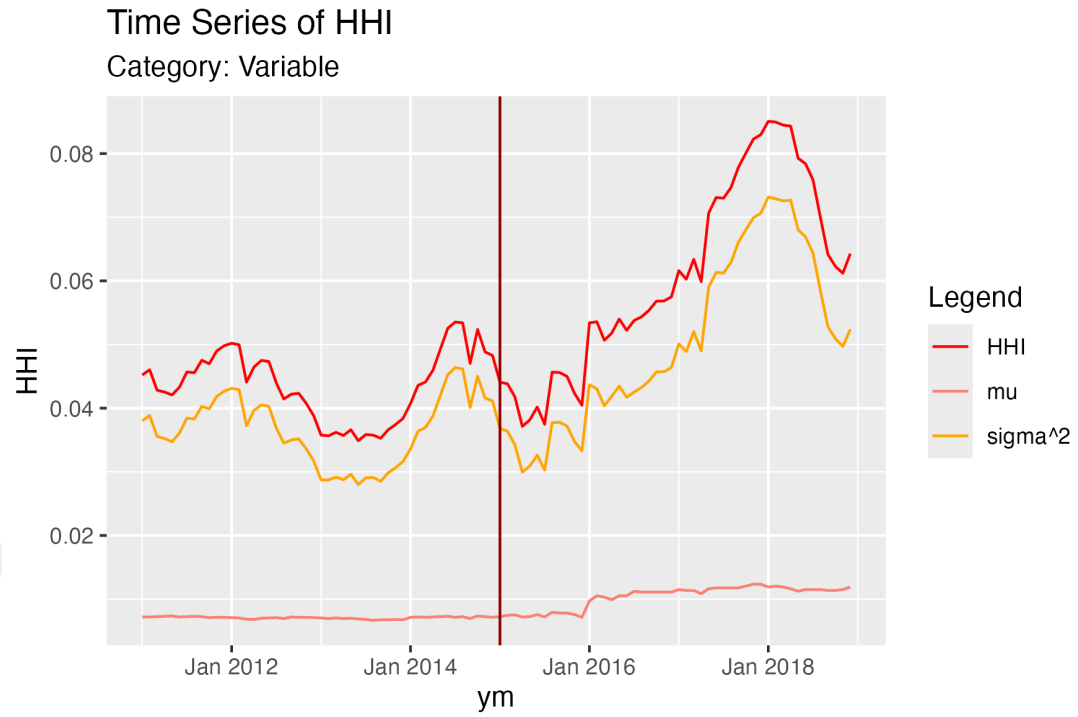

Figure 13. Concentration index for variable funds

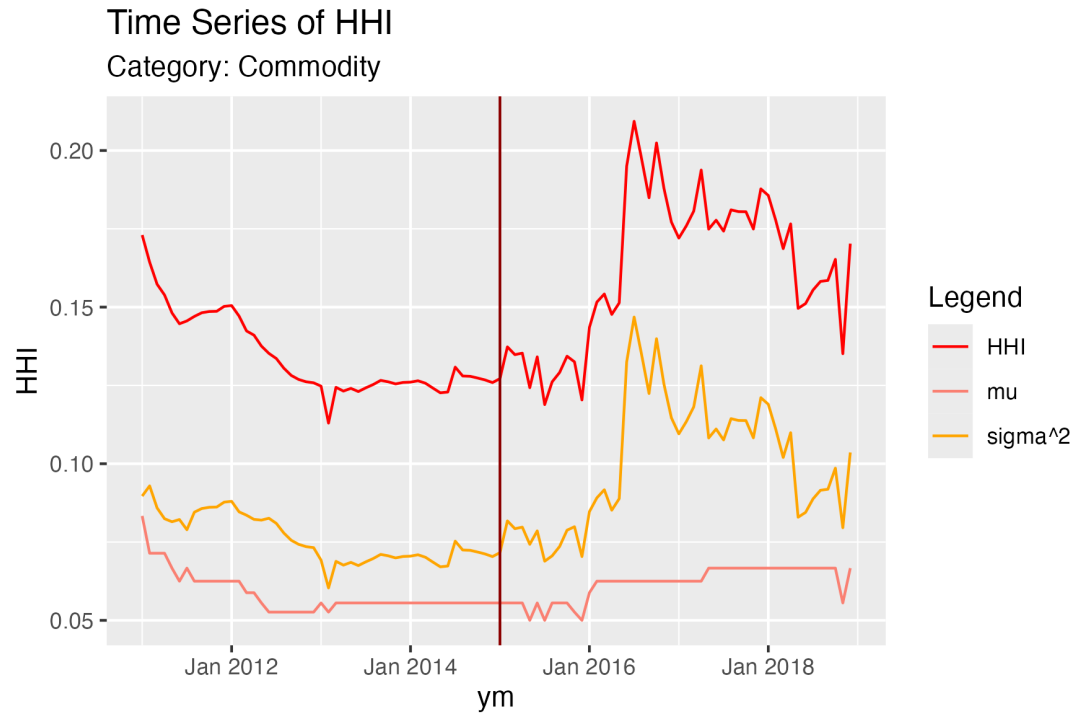

Figure 14. Concentration index for commodity funds

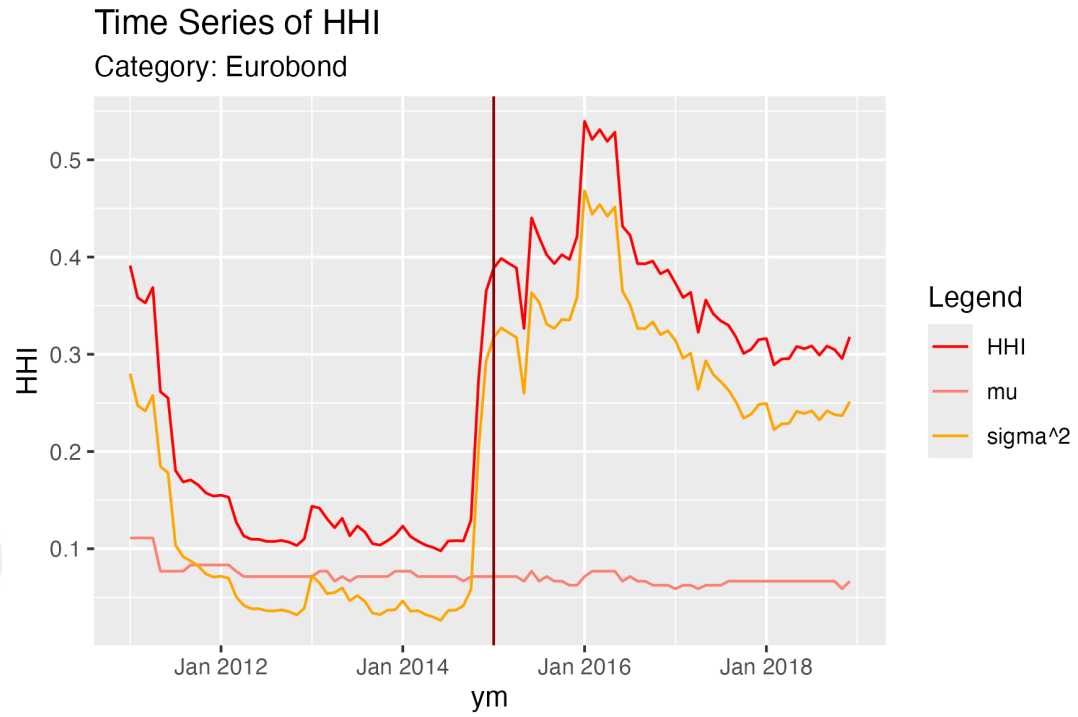

Figure 15. Concentration index for eurobond funds

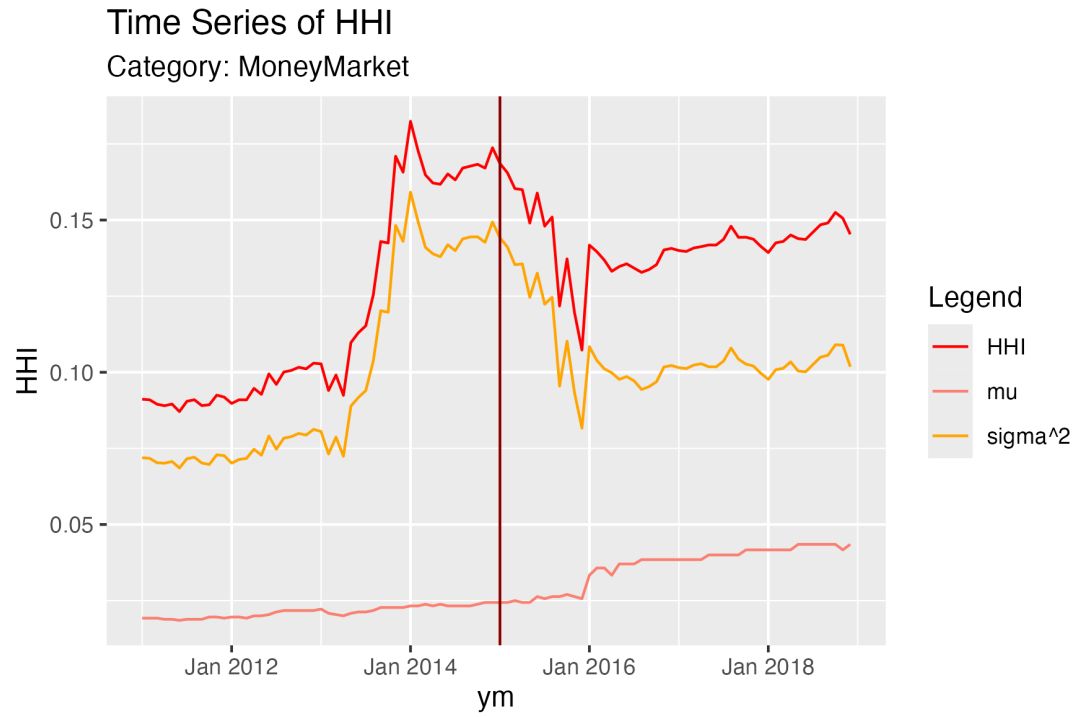

Figure 16. Concentration index for money market funds

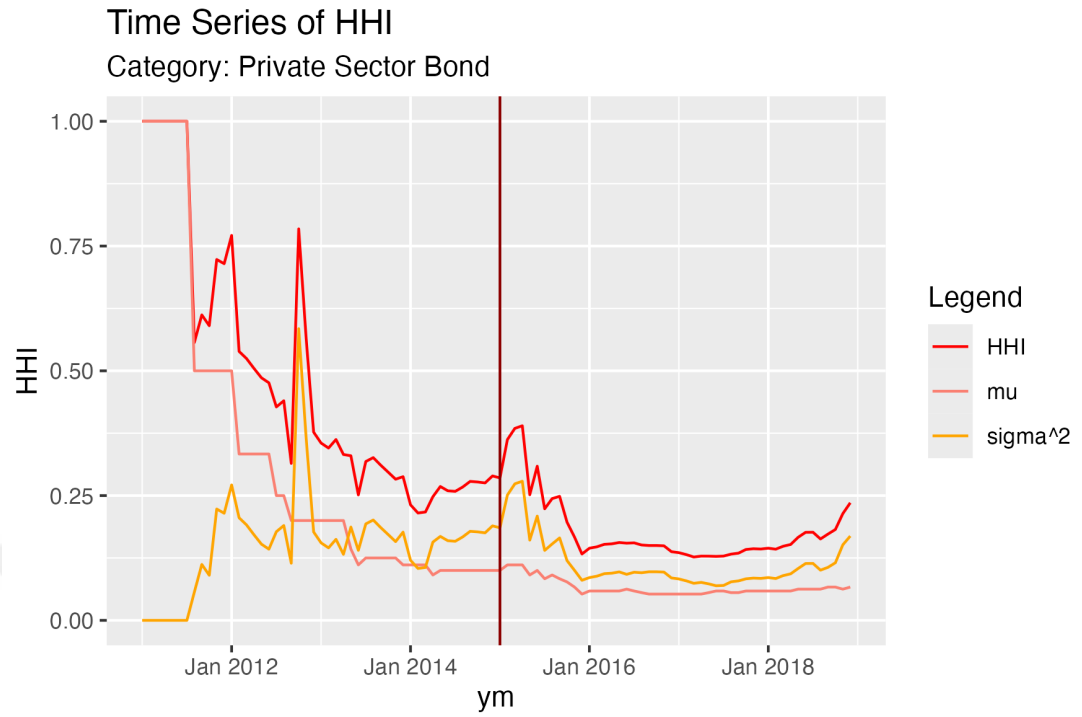

Figure 17. Concentration index for private sector bond funds

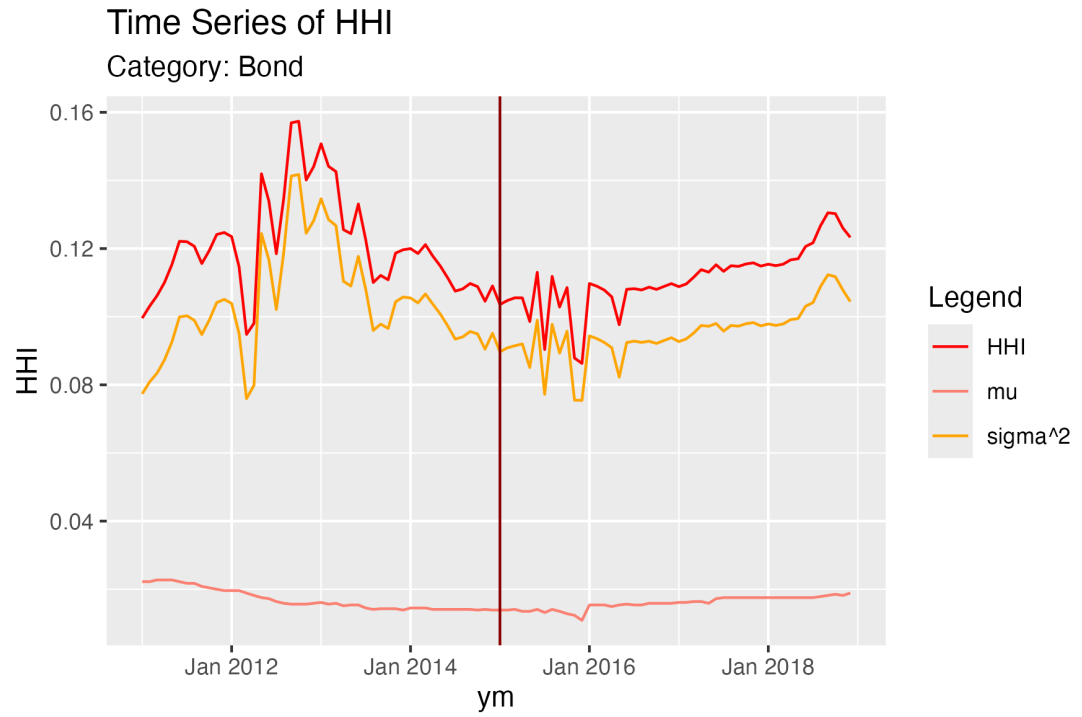

Figure 18. Concentration index for bond funds

APPENDIX C

FEE-PERFORMANCE RELATION OF DIFFERENT FUND CATEGORIES

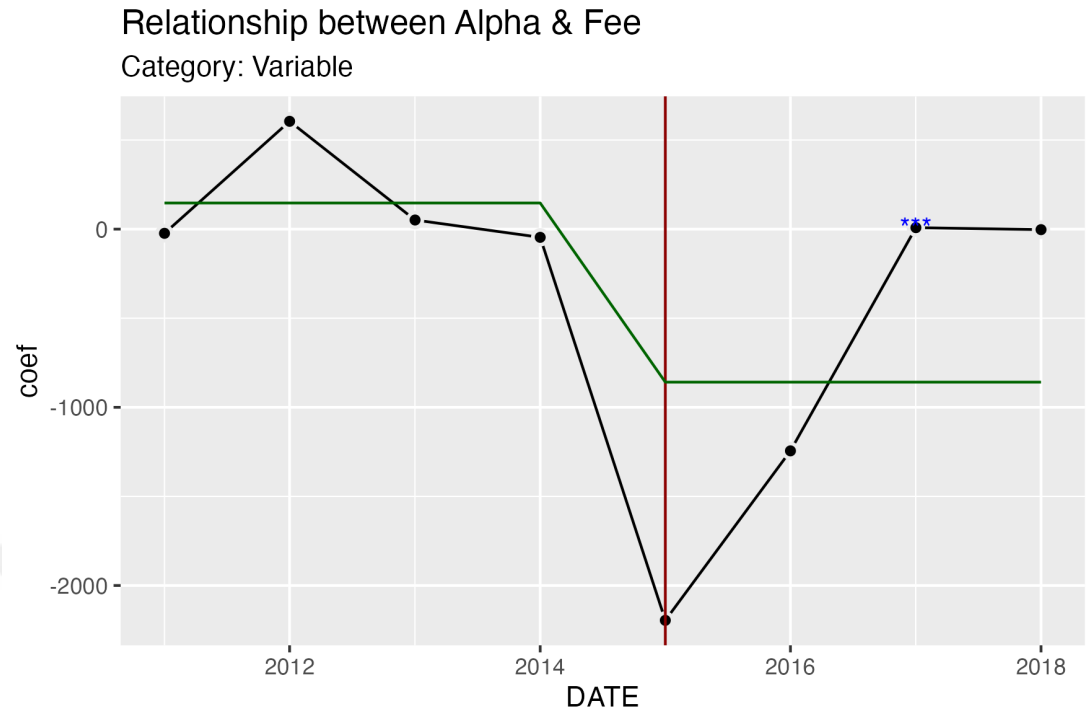

Figure 19. Is cheaper better? category: variable

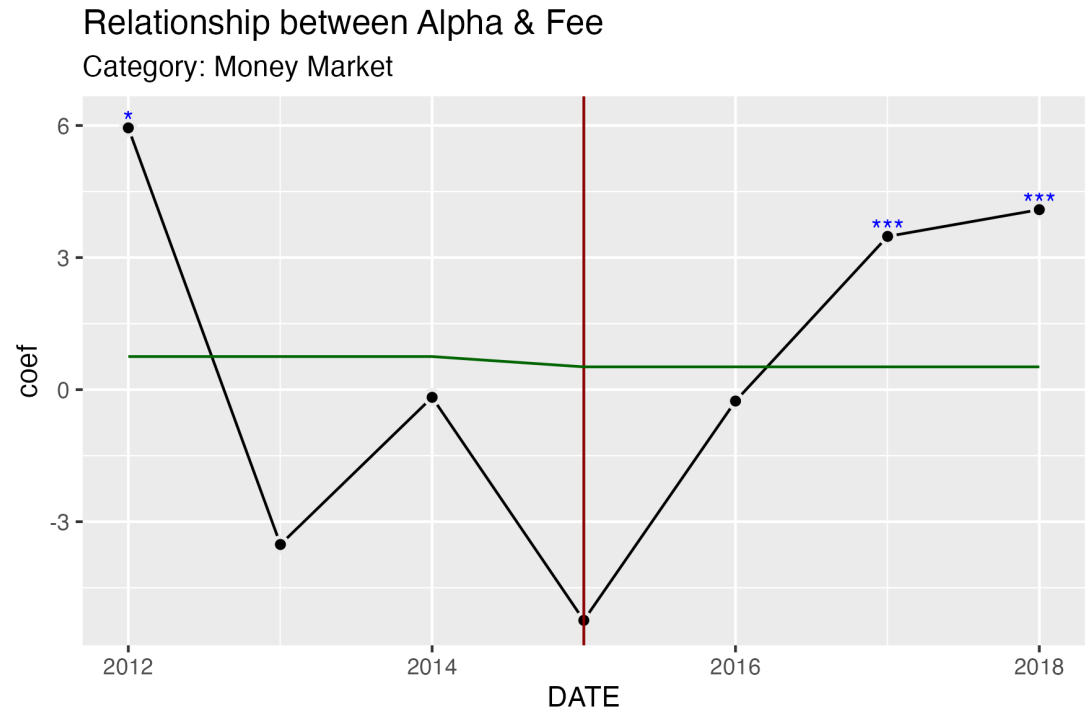

Figure 20. Is cheaper better? category: money market

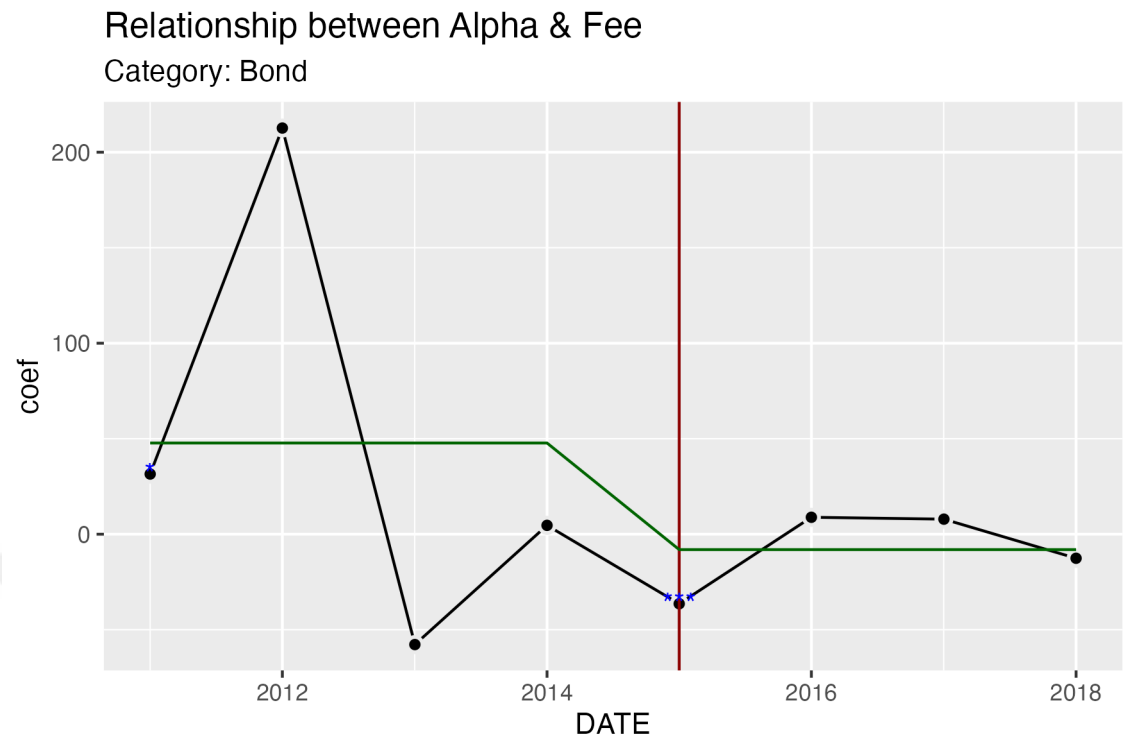

Figure 21. Is cheaper better? category: bond

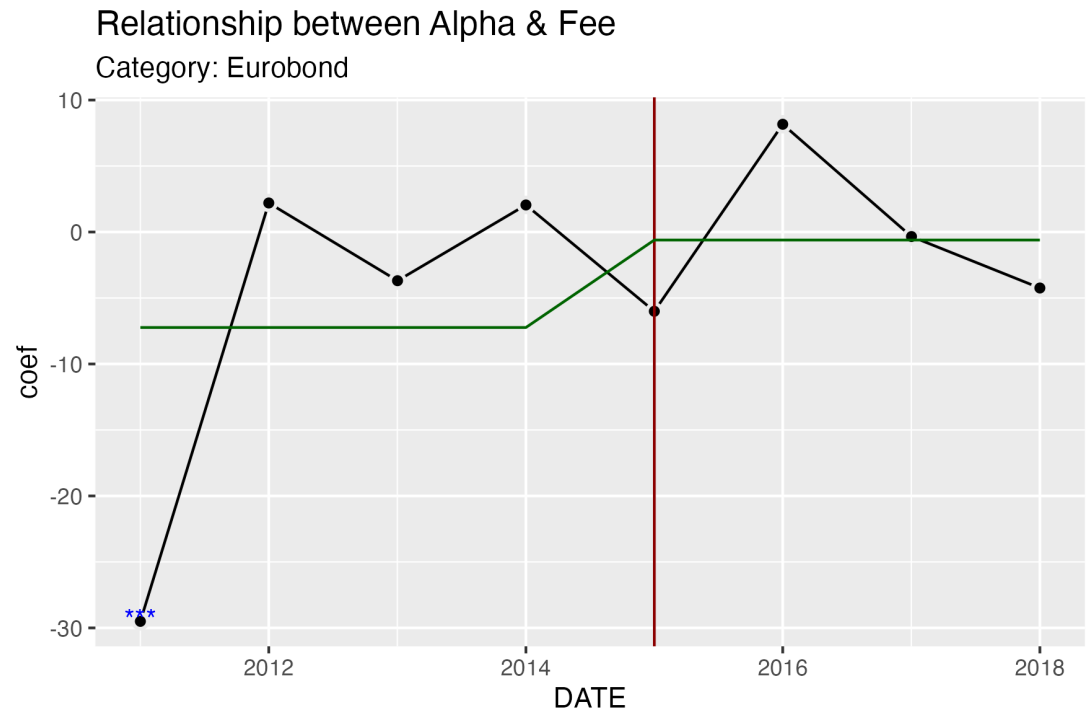

Figure 22. Is cheaper better? category: eurobond

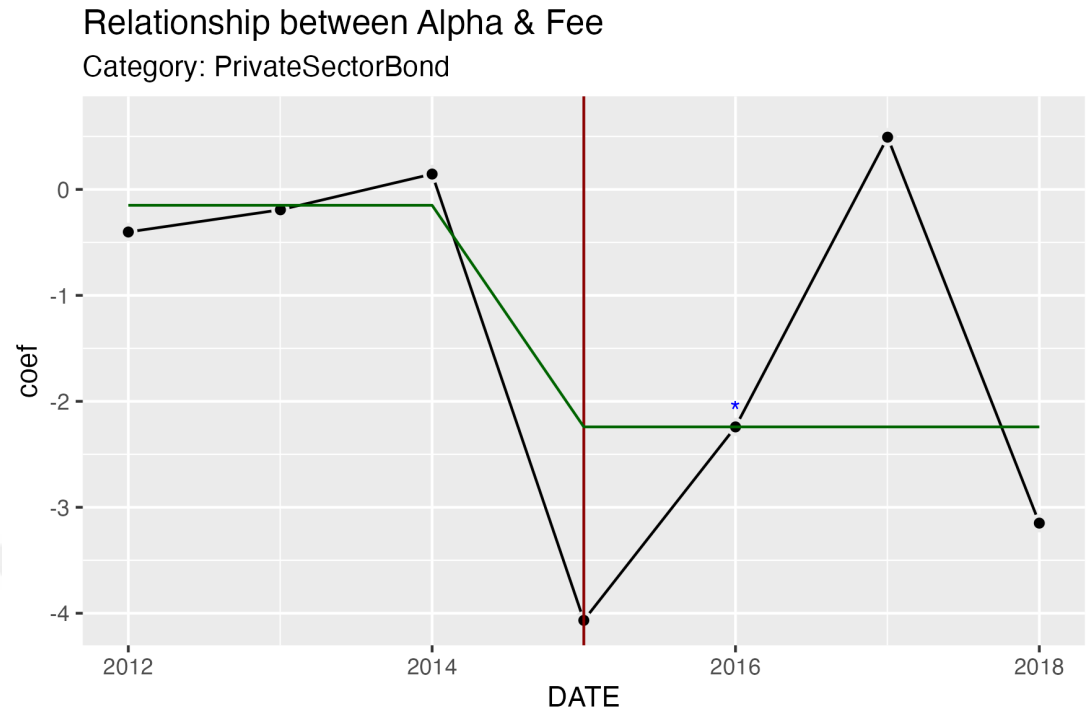

Figure 23. Is cheaper better? category: private sector bond

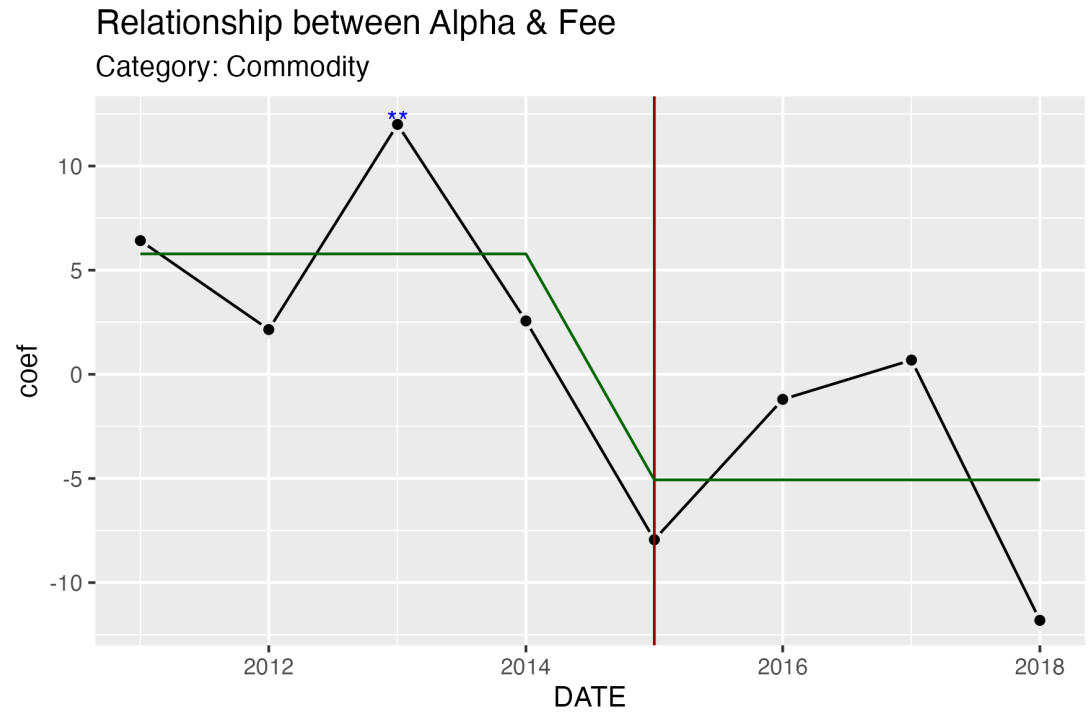

Figure 24. Is cheaper better? category: commodity

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