

**DO TURKISH ASSET MANAGEMENT COMPANIES  
HOLD OVERWEIGHT POSITIONS IN THEIR PARENT  
COMPANIES' SECURITIES FOR THE MUTUAL  
FUNDS UNDER THEIR MANAGEMENT?**

A Thesis

by

Ahmet Yıldız

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Approved by:

---

Professor Atakan Yalçın, Advisor,  
Department of International Finance  
Özyeğin University

---

Asst. Prof. S. Mehmet Özsoy,  
Department of International Finance  
Özyeğin University

---

Associate Prof. Yiğit Atılgan,  
School of Management  
Sabancı University

Date Approved: 30 July 2019

*To my family*



## **ABSTRACT**

Conflict of interest in affiliated mutual funds is widely investigated in the literature. Due to its significant growth in recent years, Turkish mutual fund industry attracts more attention from regulators and investors. I studied whether Turkish asset management companies have a bias to overweight their affiliated stocks and corporate bonds compared to their peers in the funds under their management. A systematic bias has been found for both affiliated stocks and corporate bonds: 0.46% and 3.80% respectively. For affiliated stocks, share funds are the leading category with 4.12% overweight bias and for affiliated corporate bonds money market funds have the highest bias: 9.23%. The study goes further to investigate this bias in fund type categorization level and asset management company type and ends with the analysis whether affiliated mutual funds give price support in times of excessive selling of affiliated stocks in the secondary markets. Empirical results show general market conditions or affiliated securities' specific severe secondary market conditions don't affect the overweight bias. On the other hand, asset management companies' characteristics affect it: local ownership contributes 0.41%, bank affiliation contributes 1.28% and state ownership contributes -1.41% in affiliated stocks. For affiliated corporate bonds, local ownership loses its significance, state ownership contributes -8.73% and bank affiliation contributes 7.74%.

## ÖZET

Bağlantılı yatırım fonlarındaki çıkar çatışması konusu akademik yazında detaylıca incelenmiştir. Son yıllardaki önemli gelişimi nedeniyle, Türk yatırım fonları hem düzenleyicilerin hem de yatırımcıların daha fazla dikkatini çekmeye başlamıştır. Türkiye’deki portföy yönetim şirketlerinin yönetmekte olduğu fonlarda bağlantılı oldukları şirketlerin hisse senedi ve özel sektör borçlanma araçlarını rakiplerine göre daha fazla taşıma eğilimi olup olmadığını inceledim. Ampirik bulgularıma göre hem özel sektör borçlanma araçları için hem de hisse senetleri için sistem genelinde böyle bir eğilim mevcuttur: sırasıyla 0.46% ve 3.80%. Bağlantılı yatırım fonlarında hisse fonları 4.12% ile en yüksek eğilime sahipken, özel sektör tahvillerinde para piyasası fonları 9.23% ile ön plana çıkmaktadır. Çalışmam, bu eğilimin fon tipi seviyesinde ve portföy yönetim şirketi tipi seviyesinde de detaylandırarak devam etmekte ve bağlantılı hisse senetlerinin ikincil piyasalarda aşırı satıldığı zamanlarda bunlarla bağlantılı yatırım fonlarının fiyat desteği verip vermediğinin analiziyle sonlanmaktadır. Ampirik sonuçlar genel piyasa koşulları veya bağlantılı hisse senedine özel kötü ikincil piyasa koşullarının daha fazla taşıma eğilimini etkilemediğini göstermektedir. Ancak, portföy yönetim şirketi özellikleri bu eğilimi etkilemektedir: bağlantılı hisse senetleri fazla taşıma eğilimine yerel sahiplik katkısı 0.41%, banka sahiplik katkısı 1.28% ve devlet sahiplik katkısı -1.41%. Bağlantılı özel sektör tahvilleri fazla taşıma eğiliminde ise yerel sahiplik önemini yitirmekte, devlet sahiplik katkısı -8.73% ve banka sahiplik katkısı 7.74% olmaktadır.

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# **CHAPTER I**

## **INTRODUCTION**

As the Turkish asset management industry has developed dramatically in recent years, it started to attract more attention from regulators and investors. Turkish Capital Markets Association data (Table 1) shows that since the end of 2013 to the end of 2018, both number of Asset Management companies, number of pension and mutual funds, Assets Under Management and the number of investors have increased significantly. Looking at the asset management companies' ownership, 17 out of 49 companies are owned by Turkish banks (Table 2). 17 bank affiliated asset management companies have 91.30 % of Assets Under Management in the sector and 86.19% of Assets Under Management in mutual funds. In addition to bank-affiliated asset management companies, there are also ones that are affiliated with companies operating in non-financial industries which means their owners' holdings are not only limited to those asset management companies. In this study, bank-affiliated mutual funds are defined as the funds managed by an asset management company in which one of the shareholders is a banking institution. Non-bank affiliated mutual funds are managed by an asset management company in which at least one of the shareholders has also ownership in a non-bank business. The mutual funds that have no affiliation with a bank or non-bank company are defined as unaffiliated mutual funds.

Capital Markets Board of Turkey officially classifies investment funds into 10

categories: Debt Instruments Umbrella Fund, Share Umbrella Fund, Precious Metals Umbrella Fund, Fund of Funds Umbrella Fund, Money Market Umbrella Fund, Participation Umbrella Fund, Variable Umbrella Fund, Hedge Umbrella Fund, Capital Guaranteed Umbrella Fund and Capital Protected Umbrella Fund.

Affiliated mutual fund managers have responsibilities to both their investors and their parent companies. In some cases, they may confront conflict of interest and making a decision may favor their parents but hurt their fund investors, vice versa (Mehran & Stulz 2007) [1]. While evaluating a decision to invest fund investors' money in securities of a company affiliated to the asset management company's owners, fund managers may face a conflict of interest. For either supporting the market prices of securities or providing funding, a fund manager may tend to invest in its affiliated companies' securities although it may hurt fund investors' interests (Golez & Marin 2014) [2]. There are strong evidence that bank-affiliated mutual funds hold significantly overweight positions in the securities of their parent companies compared to their peers (Hao & Yan 2012) [3].

In this study, whether Turkish asset management companies favor their parent companies' securities in the mutual funds they manage is studied. Though there are numerous studies about conflict of interest in United States, Spain or other developed country mutual funds, investigating Turkish mutual funds will be a contribution to the literature. Results suggest that Turkish asset management companies hold overweight positions in stocks and corporate bonds affiliated with their owners relative to their peers.

Table 1: Turkish Asset Management Industry Growth

| Turkish Asset Management Industry Growth |              |                      |                     |                 |                   |                  |                                |                               |
|------------------------------------------|--------------|----------------------|---------------------|-----------------|-------------------|------------------|--------------------------------|-------------------------------|
| Date                                     | No. of Firms | No. of Pension Funds | No. of Mutual Funds | Total AUM       | Pension Funds AUM | Mutual Funds AUM | No. of Pension Funds Investors | No. of Mutual Funds Investors |
| 2013/12                                  | 36           | 233                  | 362                 | 64,828,228,626  | 26,648,245,079    | 30,347,842,088   | 233                            | 362                           |
| 2014/03                                  | 36           | 236                  | 365                 | 65,053,738,746  | 28,268,805,704    | 29,138,384,761   | 236                            | 365                           |
| 2014/06                                  | 38           | 239                  | 366                 | 71,559,524,927  | 31,741,654,519    | 32,113,589,512   | 239                            | 366                           |
| 2014/09                                  | 37           | 241                  | 366                 | 74,219,022,562  | 33,499,952,875    | 32,987,697,789   | 241                            | 366                           |
| 2014/12                                  | 38           | 242                  | 356                 | 81,847,645,212  | 37,815,459,053    | 35,234,386,471   | 242                            | 356                           |
| 2015/03                                  | 38           | 244                  | 343                 | 85,895,882,299  | 40,050,797,516    | 36,408,896,112   | 244                            | 343                           |
| 2015/06                                  | 36           | 246                  | 360                 | 91,238,113,924  | 42,530,046,947    | 38,268,347,961   | 246                            | 360                           |
| 2015/09                                  | 37           | 248                  | 378                 | 97,366,406,286  | 44,252,338,594    | 41,533,289,707   | 248                            | 378                           |
| 2015/12                                  | 42           | 250                  | 397                 | 100,995,140,667 | 48,021,738,526    | 40,714,273,965   | 250                            | 397                           |
| 2016/03                                  | 45           | 251                  | 438                 | 104,684,588,328 | 51,844,593,395    | 40,384,011,305   | 251                            | 438                           |
| 2016/06                                  | 45           | 251                  | 436                 | 111,098,583,913 | 54,809,499,580    | 43,602,128,913   | 251                            | 436                           |
| 2016/09                                  | 43           | 262                  | 441                 | 116,568,749,639 | 58,038,986,280    | 45,142,107,700   | 262                            | 441                           |
| 2016/12                                  | 44           | 254                  | 445                 | 122,080,809,723 | 60,510,145,622    | 47,108,878,720   | 254                            | 445                           |
| 2017/03                                  | 46           | 283                  | 449                 | 130,002,514,218 | 65,484,760,453    | 49,785,574,984   | 283                            | 449                           |
| 2017/06                                  | 45           | 292                  | 443                 | 139,930,068,112 | 70,451,742,281    | 52,606,800,084   | 292                            | 443                           |
| 2017/09                                  | 45           | 291                  | 443                 | 147,229,588,644 | 74,090,964,842    | 54,840,357,402   | 291                            | 443                           |
| 2017/12                                  | 48           | 292                  | 462                 | 158,635,372,249 | 79,543,312,353    | 59,286,699,506   | 292                            | 462                           |
| 2018/03                                  | 48           | 403                  | 478                 | 168,597,894,127 | 83,307,989,167    | 64,348,529,271   | 403                            | 478                           |
| 2018/06                                  | 49           | 405                  | 492                 | 167,785,218,206 | 84,337,173,959    | 62,894,441,852   | 405                            | 492                           |
| 2018/09                                  | 48           | 406                  | 503                 | 170,568,248,764 | 90,647,755,061    | 57,874,309,181   | 406                            | 503                           |
| 2018/12                                  | 49           | 407                  | 516                 | 173,416,373,459 | 93,205,732,102    | 56,919,715,674   | 407                            | 516                           |

Source: TCMA

All AUM figures are in TRY

Table 2: Turkish Asset Management Companies' Market Share

| TURKISH ASSET MANAGEMENT COMPANIES' MARKET SHARE BREAKDOWN as of 2018 Year End |                |                  |                    |                           |                  |                                                 |                 |                  |                    |                           |                  |
|--------------------------------------------------------------------------------|----------------|------------------|--------------------|---------------------------|------------------|-------------------------------------------------|-----------------|------------------|--------------------|---------------------------|------------------|
| Company Name                                                                   | Total AUM      | Mutual Funds AUM | Total Market Share | Mutual Funds Market Share | Bank Affiliation | Company Name                                    | Total AUM       | Mutual Funds AUM | Total Market Share | Mutual Funds Market Share | Bank Affiliation |
| 24 GA YRIMENKUL PY A.Ş.                                                        | 58,296,992     | 58,296,992       | 0.03%              | 0.10%                     | -                | KARE PY A.Ş.                                    | 298,334,267     | 295,105,540      | 0.17%              | 0.52%                     | -                |
| ACTUS PY A.Ş.                                                                  | 820,994,895    | 455,093,091      | 0.47%              | 0.80%                     | -                | KT PY A.Ş.                                      | 1,640,533,656   | 814,719,580      | 0.95%              | 1.43%                     | 1                |
| AKFEN GAYRİMENKUL PY A.Ş.                                                      | 35,488,747     | 35,488,747       | 0.02%              | 0.06%                     | -                | LOGOS PY A.Ş.                                   | 47,442,035      | 4,269,198        | 0.03%              | 0.01%                     | -                |
| AK PY A.Ş.                                                                     | 24,746,068,401 | 6,234,911,254    | 14.27%             | 10.95%                    | 1                | MAQASID PY A.Ş.                                 | 1,875,472       | 0                | 0.00%              | 0.00%                     | -                |
| ALBARAKA PY A.Ş.                                                               | 1,631,179,619  | 1,489,849,073    | 0.94%              | 2.62%                     | 1                | MARMARA CAPITAL PY A.Ş.                         | 54,379,985      | 54,379,985       | 0.03%              | 0.10%                     | -                |
| ARZ GAYRİMENKUL VE GİRİŞİM SERMAYESİ PY A.Ş.                                   | 764,412,845    | 764,412,845      | 0.44%              | 1.34%                     | -                | MEKSA PY A.Ş.                                   | 37,991,825      | 22,943,625       | 0.02%              | 0.04%                     | -                |
| ATA PY A.Ş.                                                                    | 255,711,603    | 242,292,447      | 0.15%              | 0.43%                     | -                | METRO PY A.Ş.                                   | 248,966,618     | 0                | 0.14%              | 0.00%                     | -                |
| ATLAS PY A.Ş.                                                                  | 218,182,268    | 73,689,936       | 0.13%              | 0.13%                     | -                | MÜKAFAT PY A.Ş.                                 | 502,950,476     | 372,032,849      | 0.29%              | 0.65%                     | -                |
| AZİMUT PY A.Ş.                                                                 | 4,884,838,993  | 3,080,128,261    | 2.82%              | 5.41%                     | -                | OMURGA GAYRİMENKUL VE GİRİŞİM SERMAYESİ PY A.Ş. | 303,857,133     | 303,857,133      | 0.18%              | 0.53%                     | -                |
| BİZİM PY A.Ş.                                                                  | 10,475,284     | 10,475,284       | 0.01%              | 0.02%                     | -                | OSMANLI PY A.Ş.                                 | 211,702,140     | 200,749,060      | 0.12%              | 0.35%                     | -                |
| DENİZ PY A.Ş.                                                                  | 3,331,260,997  | 2,594,156,777    | 1.92%              | 4.56%                     | 1                | OYAK PY A.Ş.                                    | 812,482,423     | 185,538,775      | 0.47%              | 0.33%                     | -                |
| FERONİA GİRİŞİM SERMAYESİ PY A.Ş.                                              | 72,937,311     | 72,937,311       | 0.04%              | 0.13%                     | -                | PERFORM PY A.Ş.                                 | 254,617,498     | 62,983,538       | 0.15%              | 0.11%                     | -                |
| FİBA PY A.Ş.                                                                   | 1,011,808,783  | 318,310,412      | 0.58%              | 0.56%                     | 1                | QINVEST PORTFÖY YÖNETİMİ A.Ş.                   | 1,383,131,493   | 245,059,477      | 0.80%              | 0.43%                     | -                |
| FOKUS PY A.Ş.                                                                  | 44,233,985     | 15,612,654       | 0.03%              | 0.03%                     | -                | QNB FİNANS PY A.Ş.                              | 1,255,503,441   | 416,764,773      | 0.72%              | 0.73%                     | 1                |
| GARANTİ PY A.Ş.                                                                | 17,982,599,235 | 4,059,696,162    | 10.37%             | 7.13%                     | 1                | RE-PİE GAYRİMENKUL VE GİRİŞİM SERMAYESİ PY A.Ş. | 384,151,358     | 384,151,358      | 0.22%              | 0.67%                     | -                |
| GEDİK PY A.Ş.                                                                  | 76,876,508     | 68,533,485       | 0.04%              | 0.12%                     | -                | STRATEJİ PY A.Ş.                                | 59,544,826      | 59,544,826       | 0.03%              | 0.10%                     | -                |
| GLOBAL MD PY A.Ş.                                                              | 161,055,500    | 54,745,691       | 0.09%              | 0.10%                     | -                | ŞEKER PY A.Ş.                                   | 309,520         | 309,520          | 0.00%              | 0.00%                     | 1                |
| HALK PY A.Ş.                                                                   | 8,371,436,606  | 2,647,578,362    | 4.83%              | 4.65%                     | 1                | TAALERİ PY A.Ş.                                 | 97,637,360      | 35,340,024       | 0.06%              | 0.06%                     | -                |
| HEDEF PY A.Ş.                                                                  | 251,784,095    | 91,363,117       | 0.15%              | 0.16%                     | -                | TACİRLER PY A.Ş.                                | 348,242,807     | 89,541,356       | 0.20%              | 0.16%                     | -                |
| HSBC PY A.Ş.                                                                   | 10,020,955,455 | 1,380,167,819    | 5.78%              | 2.42%                     | 1                | TEB PY A.Ş.                                     | 6,579,334,824   | 2,047,623,061    | 3.79%              | 3.60%                     | 1                |
| ICBC TURKEY PY A.Ş.                                                            | 448,471,266    | 76,986,878       | 0.26%              | 0.14%                     | 1                | ÜNLÜ PY A.Ş.                                    | 245,165,664     | 160,119,427      | 0.14%              | 0.28%                     | -                |
| ING PY A.Ş.                                                                    | 3,477,389,773  | 109,483,071      | 2.01%              | 0.19%                     | 1                | VAKİF PY A.Ş.                                   | 7,829,840,872   | 1,742,724,138    | 4.52%              | 3.06%                     | 1                |
| İSTANBUL PY A.Ş.                                                               | 2,131,286,714  | 359,682,250      | 1.23%              | 0.63%                     | -                | YAPI KREDİ PY A.Ş.                              | 19,468,486,527  | 7,538,770,594    | 11.23%             | 13.24%                    | 1                |
| İŞ PY A.Ş.                                                                     | 32,959,757,911 | 12,771,511,605   | 19.01%             | 22.44%                    | 1                | ZİRAAT PY A.Ş.                                  | 17,581,176,653  | 4,816,573,513    | 10.14%             | 8.46%                     | 1                |
| KALENDER GAYRİMENKUL PY A.Ş.                                                   | 1,210,800      | 1,210,800        | 0.00%              | 0.00%                     | -                | Total                                           | 173,416,373,459 | 56,919,715,674   | 100.00%            | 100.00%                   |                  |

## CHAPTER II

### BACKGROUND INFORMATION

#### *2.1 Turkish Mutual Funds, Affiliation and Regulations*

Main regulatory body for Turkish mutual funds is Capital Markets Board. According to CMB Mutual Funds Communiqués, there is no regulation about the asset management companies' investments in their affiliated companies' securities. However, there are some limitations on single security investment and issuer specific investable amounts. For instance, mutual funds are not allowed to invest more than 5% of their Total Net Assets to a single corporate bond and summation of the corporate bonds holdings issued by same issuer cannot exceed 10% of TNA. Total holdings of corporate bonds issued by same issuer and its subsidiaries are limited up to 20% of fund TNA.

With the aim of transparency, mutual funds disclose their daily returns at the end of each working day and detailed fund holdings data are published at the end of each month on Public Disclosure Platform. The detailed mutual fund holdings data used in this study is acquired from Turkish data provider RasyoNet which gathers, compiles and distributes data about Turkish mutual and pension funds.

Considering their asset management company's ownership structure, mutual funds are categorized as affiliated and unaffiliated. If one of the shareholders of the asset management company has ownership in another company which has publicly tradable stocks or corporate bonds that it can invest fund investors' money, funds under the

management of that asset management company are classified as affiliated funds. If there is no single security that meets aforementioned affiliation criteria, then those funds are classified as unaffiliated. Affiliated funds are divided into 2 groups: bank-affiliated and non-bank affiliated. If there is a bank ownership affiliation in any of the shareholders of an asset management company, funds managed by that asset management company are classified as bank-affiliated funds. If there are no bank affiliation among the shareholders of an asset management company but if there are affiliation with business activities other than banking, funds under management of that asset management company are classified as non-bank affiliated funds (Table3).

Asset management companies with at least one common shareholder are considered as single merged asset management group. There are 3 asset management groups with 2 separate asset management companies each under those groups (Table4).

For the period January 2015 to September 2017, among 299 publicly tradable listed stocks at Borsa Istanbul Stock Exchange, 59 of them are affiliated with Turkish asset management companies. For the same period, 3256 of the corporate bonds among 4871 are affiliated with Turkish asset management companies (Table5).

Affiliation overweighting is studied for each fund, on asset management company basis and fund type basis. 2 different fund type classifications were used which were gathered from again Turkish data provider RasyoNet, in line with CMB definitions. Fund Type 1 categorization is more generalized with 10 fund types and Fund Type 2 categorization is more detailed with 27 fund type categories (Table6 & Table7).

| Asset Management Company Group | Bank Affiliation | Any Affiliation Stocks | Any Affiliation Corporate Bonds |
|--------------------------------|------------------|------------------------|---------------------------------|
| AK PYŞ                         | 1                | 1                      | 1                               |
| ALKHAIR PYŞ                    | 0                | 0                      | 0                               |
| ASHMORE PYŞ                    | 0                | 0                      | 0                               |
| ATA PYŞ                        | 0                | 1                      | 0                               |
| ATLAS PYŞ                      | 0                | 1                      | 1                               |
| AZİMUT PYŞ                     | 0                | 0                      | 0                               |
| BİZİM PYŞ                      | 0                | 0                      | 0                               |
| BURGAN PYŞ                     | 1                | 0                      | 1                               |
| DENİZ PYŞ                      | 1                | 1                      | 1                               |
| FİBA PYŞ                       | 1                | 0                      | 1                               |
| FINANS PYŞ                     | 1                | 1                      | 1                               |
| FOKUS PYŞ                      | 0                | 0                      | 0                               |
| GARANTİ PYŞ                    | 1                | 1                      | 1                               |
| GEDİK PYŞ                      | 0                | 1                      | 1                               |
| HALK PYŞ                       | 1                | 0                      | 0                               |
| HSBC PYŞ                       | 1                | 0                      | 0                               |
| ICBC PYŞ                       | 1                | 1                      | 0                               |
| ING PYŞ                        | 1                | 0                      | 1                               |
| İŞ PYŞ                         | 1                | 1                      | 1                               |
| ISTANBUL PYŞ                   | 0                | 0                      | 0                               |
| KT PYŞ                         | 1                | 0                      | 1                               |
| KUTMAN PYŞ                     | 0                | 1                      | 1                               |
| LOGOS PYŞ                      | 0                | 0                      | 0                               |
| MÜKAFAAT PYŞ                   | 0                | 0                      | 1                               |
| OSMANLI PYŞ                    | 0                | 0                      | 0                               |
| OYAKK PYŞ                      | 0                | 0                      | 1                               |
| PERFORM PYŞ                    | 0                | 0                      | 0                               |
| QINVEST PYŞ                    | 0                | 0                      | 1                               |
| ŞEKER PYŞ                      | 1                | 1                      | 1                               |
| STRATEJİ PYŞ                   | 0                | 0                      | 0                               |
| TAALERİ PYŞ                    | 0                | 0                      | 0                               |
| TACİRLER PYŞ                   | 0                | 0                      | 0                               |
| TEB PYŞ                        | 1                | 0                      | 1                               |
| TROYA PYŞ                      | 0                | 0                      | 0                               |
| ÜNLÜ PYŞ                       | 0                | 0                      | 1                               |
| VAKIF PYŞ                      | 1                | 1                      | 1                               |
| YAPI PYŞ                       | 1                | 1                      | 1                               |
| ZİRAAT PYŞ                     | 1                | 0                      | 1                               |
| MEKSA PYŞ                      | 0                | 0                      | 1                               |
| NOTUS PYŞ                      | 0                | 0                      | 0                               |
| TURKISH PYŞ                    | 1                | 0                      | 1                               |

**Table 3: Affiliation of Turkish Asset Management Companies**

| Asset Management<br>Company Group | Number of Related AMs<br>in the Group |
|-----------------------------------|---------------------------------------|
| AK PYŞ                            | 1                                     |
| ALKHAIR PYŞ                       | 1                                     |
| ASHMORE PYŞ                       | 1                                     |
| ATA PYŞ                           | 1                                     |
| ATLAS PYŞ                         | 1                                     |
| AZİMUT PYŞ                        | 1                                     |
| BİZİM PYŞ                         | 1                                     |
| BURGAN PYŞ                        | 1                                     |
| DENİZ PYŞ                         | 1                                     |
| FİBA PYŞ                          | 1                                     |
| FİNANS PYŞ                        | 1                                     |
| FOKUS PYŞ                         | 1                                     |
| GARANTİ PYŞ                       | 1                                     |
| GEDİK PYŞ                         | 1                                     |
| HALK PYŞ                          | 1                                     |
| HSBC PYŞ                          | 1                                     |
| ICBC PYŞ                          | 1                                     |
| ING PYŞ                           | 1                                     |
| İŞ PYŞ                            | 2*                                    |
| İSTANBUL PYŞ                      | 1                                     |
| KT PYŞ                            | 1                                     |
| KUTMAN PYŞ                        | 2*                                    |
| LOGOS PYŞ                         | 1                                     |
| MÜKAFAAT PYŞ                      | 1                                     |
| OSMANLI PYŞ                       | 1                                     |
| OYAKK PYŞ                         | 1                                     |
| PERFORM PYŞ                       | 1                                     |
| QINVEST PYŞ                       | 1                                     |
| ŞEKER PYŞ                         | 1                                     |
| STRATEJİ PYŞ                      | 1                                     |
| TAALERİ PYŞ                       | 1                                     |
| TACİRLER PYŞ                      | 1                                     |
| TEB PYŞ                           | 1                                     |
| TROYA PYŞ                         | 1                                     |
| ÜNLÜ PYŞ                          | 1                                     |
| VAKIF PYŞ                         | 1                                     |
| YAPI PYŞ                          | 2*                                    |
| ZİRAAT PYŞ                        | 1                                     |
| MEKSA PYŞ                         | 1                                     |
| NOTUS PYŞ                         | 1                                     |
| TURKISH PYŞ                       | 1                                     |

**Table 4: Asset Management Groups**

| Asset Management Company Group | Number of Affiliated Stock | Number of Affiliated Corporate Bonds |
|--------------------------------|----------------------------|--------------------------------------|
| AK PYŞ                         | 12                         | 417                                  |
| ALKHAIR PYŞ                    | 0                          | 0                                    |
| ASHMORE PYŞ                    | 0                          | 0                                    |
| ATA PYŞ                        | 1                          | 0                                    |
| ATLAS PYŞ                      | 1                          | 21                                   |
| AZİMUT PYŞ                     | 0                          | 0                                    |
| BİZİM PYŞ                      | 0                          | 0                                    |
| BURGAN PYŞ                     | 0                          | 3                                    |
| DENİZ PYŞ                      | 1                          | 200                                  |
| FİBA PYŞ                       | 0                          | 64                                   |
| FİNANS PYŞ                     | 1                          | 149                                  |
| FOKUS PYŞ                      | 0                          | 0                                    |
| GARANTİ PYŞ                    | 4                          | 370                                  |
| GEDİK PYŞ                      | 1                          | 16                                   |
| HALK PYŞ                       | 0                          | 0                                    |
| HSBC PYŞ                       | 0                          | 0                                    |
| ICBC PYŞ                       | 1                          | 0                                    |
| ING PYŞ                        | 0                          | 16                                   |
| İŞ PYŞ                         | 14                         | 634                                  |
| İSTANBUL PYŞ                   | 0                          | 0                                    |
| KT PYŞ                         | 0                          | 44                                   |
| KUTMAN PYŞ                     | 2                          | 13                                   |
| LOGOS PYŞ                      | 0                          | 0                                    |
| MÜKAFAAT PYŞ                   | 0                          | 310                                  |
| OSMANLI PYŞ                    | 0                          | 0                                    |
| OYAKK PYŞ                      | 0                          | 12                                   |
| PERFORM PYŞ                    | 0                          | 0                                    |
| QINVEST PYŞ                    | 0                          | 9                                    |
| ŞEKER PYŞ                      | 1                          | 46                                   |
| STRATEJİ PYŞ                   | 0                          | 0                                    |
| TAALERİ PYŞ                    | 0                          | 0                                    |
| TACİRLER PYŞ                   | 0                          | 0                                    |
| TEB PYŞ                        | 0                          | 39                                   |
| TROYA PYŞ                      | 0                          | 0                                    |
| ÜNLÜ PYŞ                       | 0                          | 2                                    |
| VAKIF PYŞ                      | 4                          | 302                                  |
| YAPI PYŞ                       | 13                         | 410                                  |
| ZİRAAT PYŞ                     | 0                          | 156                                  |
| MEKSA PYŞ                      | 0                          | 1                                    |
| NOTUS PYŞ                      | 0                          | 0                                    |
| TURKISH PYŞ                    | 0                          | 22                                   |
| <b>Total</b>                   | <b>56</b>                  | <b>3256</b>                          |

**Table 5: Affiliated Securities**

| <b>FUND CLASSIFICATION 1</b> |                        |
|------------------------------|------------------------|
| <b>Fund Class</b>            | <b>Number of Funds</b> |
| Alternative                  | 79                     |
| Debt Instruments             | 109                    |
| Exchange Traded Funds        | 9                      |
| Fund of Funds                | 14                     |
| Mixed & Variable             | 115                    |
| Money Market                 | 29                     |
| Other                        | 2                      |
| Participation                | 35                     |
| Precious Metals              | 11                     |
| Share                        | 76                     |
| <b>Total</b>                 | <b>479</b>             |

**Table 6: Fund Type 1 Categorization**

| <b>FUND CLASSIFICATION 2</b>                     |                        |
|--------------------------------------------------|------------------------|
| <b>Fund Class</b>                                | <b>Number of Funds</b> |
| Alternative-Guaranteed and Protected             | 22                     |
| Alternative-Hedge                                | 55                     |
| Alternative-Real Estate                          | 1                      |
| Alternative-Venture Capital                      | 1                      |
| Debt Instruments-Foreign Debt Instruments        | 3                      |
| Debt Instruments-Government Debt Instruments     | 10                     |
| Debt Instruments-Government Eurobond             | 13                     |
| Debt Instruments-Long Term                       | 8                      |
| Debt Instruments-Medium Term                     | 16                     |
| Debt Instruments-Private Sector Debt Instruments | 20                     |
| Debt Instruments-Short Term                      | 29                     |
| Fund of Funds - Commodity Foreign                | 3                      |
| Fund of Funds - Foreign                          | 5                      |
| Fund of Funds - Others                           | 6                      |
| Mixed & Variable-Mixed                           | 9                      |
| Mixed & Variable-Variable                        | 106                    |
| Other                                            | 40                     |
| Other Debt Instruments                           | 10                     |
| Participation- Lease Certificates (FX)           | 2                      |
| Participation- Lease Certificates (TL)           | 15                     |
| Participation-Gold                               | 3                      |
| Participation-Other                              | 8                      |
| Participation-Share                              | 7                      |
| Precious Metals-Gold                             | 11                     |
| Share-Foreign Share                              | 8                      |
| Share-Index Share                                | 20                     |
| Share-Share                                      | 48                     |
| <b>Total</b>                                     | <b>479</b>             |

**Table 7: Fund Type 2 Categorization**

## ***2.2 Related Literature***

The conflict of interest in financial conglomerates is widely investigated at developed economies. Since the Global Financial Crisis 2008, governments and regulators increased their oversight on financial institutions. This gave result to the rising interest of academia in conflict of interest.

(Mehran & Stulz, 2007) characterize contemporary conflict of interest situations in broad financial institutions with economics perspective and review the up to that date empirical studies about the topic [1]. (Massa, 2003) first examines the asset management companies' differentiation among fund families and documents this strategy's negative performance effects [4]. (Gaspar, Massa & Matos 2006) study the conflict of interest in asset management companies. They specifically investigate performance differences among mutual fund families and analyze whether it is intentional and result of a family strategy at the expense of mutual fund investors' interests [5].

(Cohen & Schmidt, 2009) and (Pool, Sialm and Stefanescu, 2013) examine trustees of US 401(k) plans and show sponsor company securities overweight bias due to the affiliation [6][7].

(Gomez-Bezares & Przychodzen, 2018) study the bank affiliated mutual fund managers' tendency to buy parent stocks and reveal the motives behind this bias [8]. (Ferreira, Matos & Pires, 2018) analyze the performance difference between commercial banking group affiliated equity mutual funds and unaffiliated ones. They document the underperformance of affiliated funds and the reason as holding overweight positions in parent banking group stocks [9].

There are various studies about the affiliated mutual funds' reason behind favoring

their parent company securities. (Hong, Wang & Yu, 2008), (Gropp, Vesala & Vulpes, 2002) and (Sialm & Tham, 2011) show one of the reasons as price support for the parent company securities [10] [11] [12]. (Golez & Marin, 2015) present empirical evidence about the price support of Spanish bank affiliated mutual funds [2]. On the other hand, (Gil-Bazo, Hoffmann & Mayordomo, 2016) and (Ritter & Zhang, 2007) examine the funding support motive at bond issuance of parent companies and stock initial public offerings that are underwritten by the affiliated banks, respectively [13] [14].

(Hao & Yan, 2012) study US mutual funds' performance, identify the performance deviation of bank-affiliated mutual funds and their overweight bias in parent company securities. They examined that despite conflict of interest whether information asymmetry advantage due to affiliation benefits fund investor. However, their empirical results reveal conflict of interest's detrimental effects overshadow the benefits stemming from information asymmetry [3].

As far as we see, there is no thorough empirical study about the Turkish asset management companies' tendency to hold overweight positions in the securities they are affiliated with for the mutual funds under their management. This study's target is to contribute to the literature, fill this gap and set ground for future works.

## CHAPTER III

### DATA AND METHODOLOGY

#### *3.1 Data*

This study is based on month end mutual fund holdings disclosures provided by Turkish financial data provider RasyoNet. Due to the Capital Markets Board of Turkey regulations, all mutual funds have to disclose their holding details at the end of each month at Public Disclosure Platform of Central Securities Depository of Turkey. RasyoNet accumulates, compiles and provides these data in an orderly format. I studied the aforementioned data for the time period between January 2015 and September 2017. In the excel file obtained from RasyoNet, for each month and for each mutual fund ISIN/name of the securities and their portfolio value to the total fund portfolio value ratio is provided. From RatesExpert application of RasyoNet, total stocks and corporate bond holdings portfolio values to the total fund portfolio value are acquired for the end of each month and each fund. Asset management company names of the funds and 2 different fund type categorizations are again downloaded from RatesExpert. Looking at the corporate websites and Public Disclosure Platform, ownership of the asset management companies are analyzed and if there is any common shareholder, those asset management companies are merged in synthetic asset management groups. Issuer names and the issuer's ownership structure of Stocks and corporate bonds that mutual funds can invest are publicly available at BorsaIstanbul Stock Exchange and Central Securities Depository. By analyzing and comparing the ownership structures of the

asset management companies and the investable securities, affiliated securities for each asset management company are determined.

### ***3.2 Methodology and Hypotheses***

By combining the RasyoNet excel, RatesExpert and Public Disclosure Platform data, the initial panel data consists of fund name, time, affiliated stocks portfolio value to total fund portfolio value ratio, affiliated corporate bonds portfolio value to total fund portfolio value ratio, total stocks portfolio value to total fund portfolio value ratio, total corporate bonds portfolio value to total fund portfolio value ratio, affiliated stocks portfolio value to total stocks portfolio value with respect to each asset management companies' affiliated stocks, affiliated corporate bonds portfolio value to total corporate bonds portfolio value with respect to each asset management companies' affiliated corporate bonds, fund type in terms of Fund Type 1 classification' fund type in terms of Fund Type 2 classification and the name of the asset management group. Definitions and equations for these calculations are as follows:

***$t = 1 \text{ to } 33, t \text{ as time} \ \& \ AM = 1 \text{ to } 41, AM \text{ as asset management group}$***

All Parent Stocks% means Fund X's AM (j) affiliated stocks' portfolio value to total fund portfolio value at t (i). Own parent stocks% means Fund X's only own AM affiliated stocks' portfolio value to total fund portfolio value at t (i). Total stocks% means Fund X's stocks' portfolio value to total fund portfolio value.

*Parent StocksOverWeight<sub>t(i)</sub>(x)*

$$= \frac{\text{Own Parent Stocks}\%_{t(i)}(x)}{\text{Total Stocks}\%_{t(i)}(x)} - \text{average} \frac{\text{All Parent Stocks}\%_{t(i),AM(j)}(x)}{\text{Total Stocks}\%_{t(i)}(x)}$$

Where  $AM(j)$  = AM of fund X

### **Equation 1 – Parent Stocks OverWeight Formula**

In the second part of the equation, only fund X's peers are taken into consideration. Fund X and the funds managed by the same asset management company of X are excluded.

*AM Parent StocksOverWeight<sub>t(i),AM(j)}</sub>(x):*

Average *Parent StocksOverWeight<sub>t(i)</sub>(x)* for the all funds managed by AM(j)

### **Equation 2 – AM Parent Stocks Overweight Formula**

Above definitions and calculations are also done for corporate bonds analysis as the following: All ParentC.Bonds% means Fund X's AM (j) affiliated corporate bonds' portfolio value to total fund portfolio value at t (i). Own parent C.Bonds% means Fund X's only own AM affiliated corporate bonds' portfolio value to total fund portfolio value at t (i). Total C.Bonds% means Fund X's corporate bonds' portfolio value to total fund portfolio value.

$Parent\ C.BondsOverWeight_{t(i)}(x) =$

$$\frac{Own\ Parent\ C.Bonds\%_{t(i)}(x)}{Total\ C.Bonds\%_{t(i)}(x)} - \frac{All\ Parent\ Stocks\%_{t(i),AM(j)}(x)}{Total\ Stocks\%_{t(i)}(x)}$$

Where  $AM(j) =$  AM of fund X

### Equation 3 – Parent C.Bonds OverWeight Formula

$AM\ ParentC.BondsOverWeight_{t(i),AM(j)}(x):$

Average  $Parent\ C.BondsOverWeight_{t(i)}(x)$  for the all funds managed by  $AM(j)$

### Equation 4 – AM Parent C.Bonds Overweight Formula

For each asset management group,  $AMParentStocksOverweight$  and  $AMParentC.BondsOverweight$  variables are analyzed, namely 33 time observations for 41 asset management groups. The following hypotheses are tested:

$$AM\ ParentStocksOverWeight_{t(i),AM(j)}(x) = \beta_{0,AM(j)} + \epsilon \quad \textbf{(Hypotheses 1)}$$

$$AM\ ParentC.BondsOverWeight_{t(i),AM(j)}(x) = \beta_{0,AM(j)} + \epsilon \quad \textbf{(Hypotheses 2)}$$

where  $H0_{AM(j)}: \mu = 0$  and  $H1_{AM(j)}: \mu > 0$

Both above hypotheses and linear model fitting by OLS estimation are done. If  $H0_{AM(j)}$  of an asset management group is rejected, we can conclude that we can reject  $AM(j)$  doesn't have a bias to overweight its parent company stocks / corporate bonds compared to its peers with  $\alpha$  significance level.

Then to find out a systematic answer whether Turkish asset management industry has a bias to overweight their company stocks / corporate bonds, I get the

average of all AMParentStocksOverweight and AMParentC.BondsOverweight for each time observation. Additionally, rather than taking average of all asset management companies for each time, pooled OLS analysis is also applied.

$$\frac{\sum_{j=1:41} AM\ ParentStocksOverWeight_{t(i),AM(j)}}{41} \quad (x)=\beta_0 + \epsilon \quad \textbf{(Hypothesis 3)}$$

$$\frac{\sum_{j=1:41} AM\ ParentC.BondsOverWeight_{t(i),AM(j)}}{41} \quad (x)=\beta_0 + \epsilon \quad \textbf{(Hypothesis 4)}$$

where  $H0: \mu = 0$  and  $H1: \mu > 0$

## CHAPTER IV

### RESULTS AND CONCLUSION

#### *4.1 Results*

The hypothesis testing for (Hypotheses 1) for 13 asset management groups that have affiliated stocks suggests that 6 of them have a bias to differentiate the weight of their affiliated stocks holdings among their total stock holdings compared to their 40 peers each in the funds under their management. As seen in the Table 8, 6 asset management groups have a significant overweight bias with 2.58% on average. Testing whether there is systematic bias to overweight affiliated stocks in Turkish asset management industry (Hypothesis 3) shows that with 5% significance level we can reject the hypothesis that Turkish asset management industry doesn't have a bias to overweight their affiliated stocks (Table 9). Systemic stocks overweight bias is 0.46%. Testing the same hypothesis with pooled OLS instead of averages also results in same decision (Table 10).

There are 23 asset management groups that have affiliated corporate bonds in the funds' investment universe. Results for equation (Hypotheses 2) asserts that 17 of them have an overweight bias. Average overweight bias is much higher than those of stocks with 8.23% (Table 11). On systemic level, there is an overweight bias of 3.80% (Hypothesis 4) (Table 12). Applying pooled OLS instead of using averages also confirms it (Table 13). Affiliated stocks and corporate bond overweight distributions can be seen at Figure 1 & Figure 2.

Table 8 – Affiliated Stocks Overweight Hypotheses Results

| Affiliated Stocks Overweight Hypotheses Results |            |            |            |             |               |              |                    |
|-------------------------------------------------|------------|------------|------------|-------------|---------------|--------------|--------------------|
|                                                 | AK PY\$    | ATA PY\$   | ATLAS PY\$ | DENİZ PY\$  | FİNANS PY\$   | GARANTİ PY\$ |                    |
| Mean                                            | 1.85%      | 0.16%      | -0.29%     | -0.05%      | -0.02%        | 2.40%        |                    |
| Standard Deviation                              | 4.03%      | 0.45%      | 0.51%      | 0.13%       | 0.07%         | 2.99%        |                    |
| Min                                             | -2.87%     | 0.00%      | -1.47%     | -0.70%      | -0.34%        | -3.29%       |                    |
| Max                                             | 13.95%     | 1.60%      | -0.03%     | 0.00%       | 0.00%         | 7.25%        |                    |
|                                                 |            |            |            |             |               |              |                    |
| Intercept                                       | 1.85%      | 0.16%      | -0.29%     | -0.05%      | -0.02%        | 2.40%        |                    |
| pvalue                                          | 0.014215 * | 0.0572     | 0.017318 * | 0.034215 *  | 0.1244        | 0.0000813 *  |                    |
| tStat                                           | 2.6033     | 1.9808     | -2.6072    | -2.2187     | -1.5809       | 4.5564       |                    |
| Observations                                    | 32         | 31         | 21         | 32          | 32            | 32           |                    |
| h                                               | 1          | 1          | 0          | 0           | 0             | 1            |                    |
| p                                               | 0.0070     | 0.0284     | 0.9916     | 0.9830      | 0.9380        | 0.0000       |                    |
|                                                 | GEDİK PY\$ | ICBC PY\$  | İŞ PY\$    | KUTMAN PY\$ | ŞEKER PY\$    | VAKIF PY\$   | YAPI PY\$          |
| Mean                                            | -0.07%     | -0.01%     | 3.68%      | 0.39%       | -0.04%        | 0.04%        | 7.00%              |
| Standard Deviation                              | 0.14%      | 0.03%      | 12.24%     | 0.50%       | 0.03%         | 2.89%        | 3.62%              |
| Min                                             | -0.51%     | -0.10%     | -62.11%    | -0.53%      | -0.17%        | -2.04%       | -1.23%             |
| Max                                             | 0.02%      | 0.00%      | 14.29%     | 1.29%       | -0.01%        | 12.92%       | 15.29%             |
|                                                 |            |            |            |             |               |              |                    |
| Intercept                                       | -0.07%     | -0.01%     | 3.68%      | 0.39%       | -0.04%        | 0.04%        | 7.00%              |
| pvalue                                          | 0.014452 * | 0.006807 * | 0.0996     | 0.000128 *  | 0.000000138 * | 0.9346       | 0.00000000000524 * |
| tStat                                           | -2.6018    | -2.9220    | 1.6996     | 4.3928      | -6.8360       | 0.0828       | 10.9551            |
| Observations                                    | 31         | 30         | 32         | 32          | 32            | 32           | 32                 |
| h                                               | 0          | 0          | 1          | 1           | 0             | 0            | 1                  |
| p value                                         | 0.9929     | 0.9967     | 0.0496     | 0.0001      | 1.0000        | 0.4673       | 0.0000             |

| Summary Statistics        |          |
|---------------------------|----------|
|                           | All Ams  |
| <b>Mean</b>               | 0.46%    |
| <b>Standard Deviation</b> | 0.41%    |
| <b>Min</b>                | -1.45%   |
| <b>Max</b>                | 1.08%    |
|                           |          |
| <b>Intercept</b>          | 0.46%    |
| <b>pvalue</b>             | 5.65E-07 |
| <b>tStat</b>              | 6.32E+00 |
| <b>Observations</b>       | 32       |
| <b>h</b>                  | 1        |
| <b>p</b>                  | 4.9E-07  |

**Table 9 – Systemic Affiliated Stocks Overweight Hypothesis Results**

| Summary Statistics        |          |
|---------------------------|----------|
|                           | All Ams  |
| <b>Mean</b>               | 0.46%    |
| <b>Standard Deviation</b> | 0.41%    |
| <b>Min</b>                | -1.45%   |
| <b>Max</b>                | 1.08%    |
|                           |          |
| <b>Intercept</b>          | 0.46%    |
| <b>pvalue</b>             | 1.07E-07 |
| <b>tStat</b>              | 5.35E+00 |
| <b>Observations</b>       | 1063     |
| <b>h</b>                  | 1        |
| <b>p</b>                  | 5.4E-08  |

**Table 10 – Systemic Affiliated Stocks Overweight Hypothesis Pooled OLS**

| Summary Statistics |          |
|--------------------|----------|
|                    | All Ams  |
| Mean               | 3.80%    |
| Standard Deviation | 1.88%    |
| Min                | -0.50%   |
| Max                | 7.03%    |
|                    |          |
| Intercept          | 3.80%    |
| pvalue             | 1.81E-12 |
| tStat              | 11.44376 |
| Observations       | 32       |
| h                  | 1        |
| p                  | 1.16E-12 |

**Table 12 – Systemic Affiliated C. Bonds Overweight Hypothesis Results**

| Summary Statistics |             |
|--------------------|-------------|
|                    | All Ams     |
| Mean               | 3.80%       |
| Standard Deviation | 1.88%       |
| Min                | -0.50%      |
| Max                | 7.03%       |
|                    |             |
| Intercept          | 3.7629%     |
| pvalue             | 7.19E-33    |
| tStat              | 12.37067369 |
| Observations       | 1031        |
| h                  | 1           |
| p                  | 3.57589E-33 |

**Table 13 – Systemic Affiliated C. Bonds Overweight Hypothesis Pooled OLS**

Table 11 - Affiliated C. Bonds Overweight Hypotheses Results

| Affiliated Corporate Bonds Overweight Hypotheses Results |          |          |          |          |          |           |          |          |          |         |             |         |
|----------------------------------------------------------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|---------|-------------|---------|
|                                                          | AK PYŞ   | ATLAS PY | BURGAN I | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ  | GEDİK PY | ING PYŞ  | İŞ PYŞ  | KT PYŞ      | KUTMAN  |
| Mean                                                     | 12.31%   | 1.63%    | 10.46%   | 9.65%    | 4.02%    | 11.42%    | 3.14%    | 4.75%    | 7.29%    | 4.63%   | 18.53%      | -0.81%  |
| Standard Deviation                                       | 8.12%    | 2.30%    | 5.40%    | 3.78%    | 4.95%    | 4.64%     | 2.10%    | 4.65%    | 8.38%    | 1.93%   | 38.68%      | 3.51%   |
| Min                                                      | 1.14%    | -2.82%   | 0.00%    | 3.00%    | -1.43%   | -2.19%    | -0.77%   | -0.15%   | 0.00%    | -0.59%  | -39.59%     | -11.51% |
| Max                                                      | 28.03%   | 8.28%    | 16.86%   | 20.21%   | 15.02%   | 21.19%    | 7.99%    | 16.68%   | 21.18%   | 7.46%   | 77.99%      | 5.02%   |
|                                                          |          |          |          |          |          |           |          |          |          |         |             |         |
| Intercept                                                | 12.31%   | 1.63%    | 10.46%   | 9.65%    | 4.02%    | 11.42%    | 3.14%    | 4.75%    | 7.29%    | 4.63%   | 18.53%      | -0.81%  |
| pvalue                                                   | 1E-09    | 4E-03    | 3E-10    | 5E-15    | 1E-04    | 1E-14     | 2E-09    | 4E-06    | 3E-05    | 2E-14   | 8E-02       | 3E-01   |
| tStat                                                    | 9E+00    | 3E+00    | 1E+01    | 1E+01    | 4E+00    | 1E+01     | 8E+00    | 6E+00    | 5E+00    | 1E+01   | 2E+00       | -1E+00  |
| Observations                                             | 32       | 21       | 27       | 32       | 30       | 32        | 32       | 31       | 32       | 32      | 16          | 20      |
| h                                                        | 1        | 1        | 1        | 1        | 1        | 1         | 1        | 1        | 1        | 1       | 1           | 0       |
| p                                                        | 5E-10    | 2E-03    | 9E-11    | 1E-15    | 6E-05    | 3E-15     | 7E-10    | 2E-06    | 1E-05    | 7E-15   | 4E-02       | 8E-01   |
|                                                          | MÜKAFAAT | OYAKK P  | QINVEST  | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PY | YAPI PYŞ | ZİRAAT P | MEKSA P | TURKISH PYŞ |         |
| Mean                                                     | NaN      | 3.11%    | 0.00%    | 27.24%   | 5.35%    | 0.67%     | 4.65%    | 11.05%   | -6.26%   | 0.00%   | -0.19%      |         |
| Standard Deviation                                       | NaN      | 5.82%    | 0.00%    | 19.83%   | 7.45%    | 1.20%     | 5.15%    | 4.30%    | 18.60%   | 0.00%   | 0.17%       |         |
| Min                                                      | NaN      | -2.06%   | 0.00%    | -0.83%   | -0.03%   | 0.00%     | -1.74%   | 4.35%    | -80.32%  | 0.00%   | -0.42%      |         |
| Max                                                      | NaN      | 15.29%   | 0.00%    | 67.46%   | 23.56%   | 3.95%     | 17.42%   | 19.88%   | -0.11%   | 0.00%   | 0.13%       |         |
|                                                          |          |          |          |          |          |           |          |          |          |         |             |         |
| Intercept                                                | NaN      | 3.11%    | 0.00%    | 27.24%   | 5.35%    | 0.67%     | 4.65%    | 11.05%   | -6.26%   | 0.00%   | -0.19%      |         |
| pvalue                                                   | NaN      | 0.0051   | NaN      | 0.0000   | 0.0003   | 0.0035    | 0.0000   | 0.0000   | 0.0666   | NaN     | 0.0189      |         |
| tStat                                                    | NaN      | 3.0243   | NaN      | 7.7736   | 4.0617   | 3.1654    | 5.1174   | 14.5359  | -1.9036  | NaN     | -3.1859     |         |
| Observations                                             | NaN      | 32.0000  | 31.0000  | 32.0000  | 32.0000  | 32.0000   | 32.0000  | 32.0000  | 32.0000  | 8.0000  | 8.0000      |         |
| h                                                        | NaN      | 1        | NaN      | 1        | 1        | 1         | 1        | 1        | 0        | NaN     | 0           |         |
| p                                                        | NaN      | 2.5E-03  | NaN      | 4.5E-09  | 1.5E-04  | 1.7E-03   | 7.7E-06  | 1.1E-15  | 9.7E-01  | NaN     | 9.9E-01     |         |

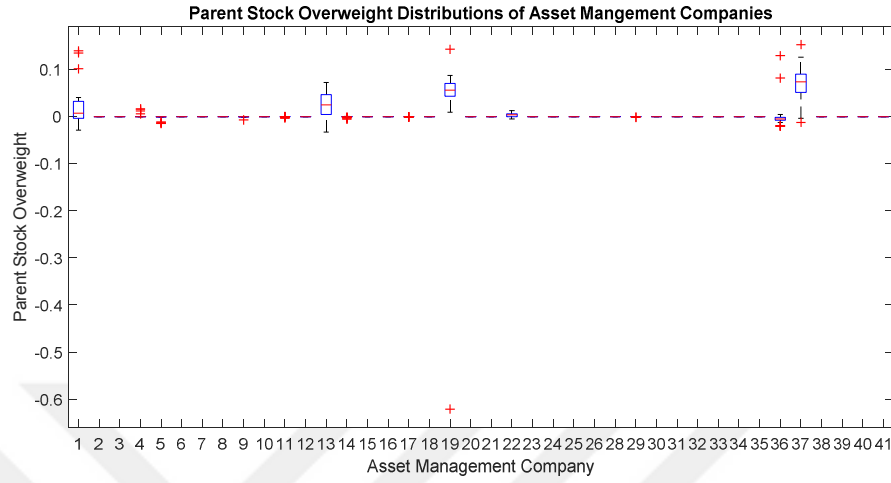


**Figure 1- Affiliated Stocks Overweight Distributions**

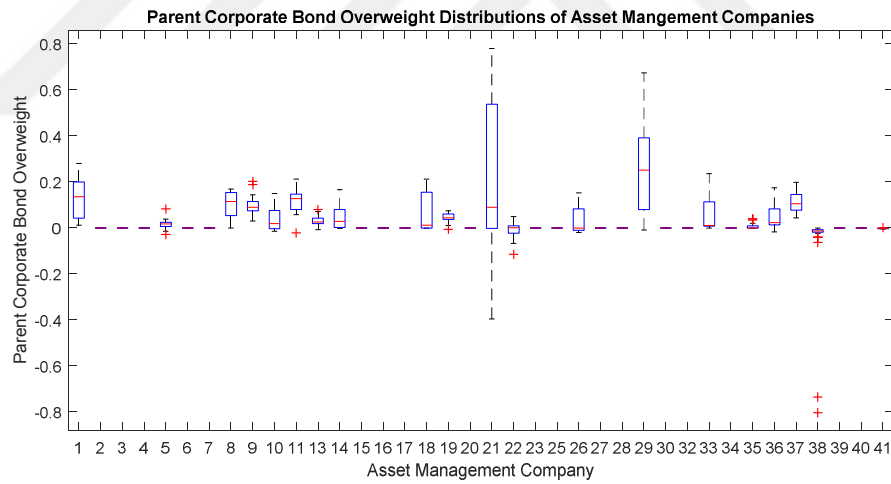


**Figure 2- Affiliated C.Bonds Overweight Distributions**

## ***4.2 Robustness and Adjustments***

### **4.2.1 Fund Type Categorization Analysis**

In order to determine whether fund type categorizations affect the overweight bias for affiliated stocks and corporate bonds, above analyses are extended to Fund Type 1 and Fund Type 2 classifications.

$FT1 = 1 \text{ to } 27, FT1 \text{ as fund type wrt Fund Type 1 categorization}$

$FT2 = 1 \text{ to } 27, FT2 \text{ as fund type wrt Fund Type 1 categorization}$

$FT1 \text{ Parent StocksOverWeight}_{t(i)}(x) =$

$$\frac{\text{Own Parent Stocks}\%_{t(i)}(x)}{\text{Total Stocks}\%_{t(i)}(x)} - \text{average} \frac{\text{All Parent Stocks}\%_{t(i),AM(j)}(x)}{\text{Total Stocks}\%_{t(i)}(x)}$$

where  $AM(j) = AM \text{ of } X \text{ \& } FT1(x) = FT1 \text{ of } X$

#### **Equation 5 –Same FT1 Parent Stocks OverWeight Formula**

$FT2 \text{ Parent StocksOverWeight}_{t(i)}(x) =$

$$\frac{\text{Own Parent Stocks}\%_{t(i)}(x)}{\text{Total Stocks}\%_{t(i)}(x)} - \text{average} \frac{\text{All Parent Stocks}\%_{t(i),AM(j)}(x)}{\text{Total Stocks}\%_{t(i)}(x)}$$

where  $AM(j) = AM \text{ of } X \text{ \& } FT2(x) = FT2 \text{ of } X$

#### **Equation 6 –Same FT2 Parent Stocks OverWeight Formula**

In the second parts of the equations, only fund X's peers in the same fund type categorization are taken into consideration. Fund X and the funds managed by the same asset management company of X are excluded.

$AM \text{ FT1 Parent StocksOverWeight}_{t(i),AM(j),FT1(k)}(x):$

Average  $FT1 \text{ Parent StocksOverWeight}_{t(i)}(x)$

#### **Equation 7 – Same AM Same FT1 Avg Parent Stocks OverWeight Formula**

$AM \text{ FT2 Parent StocksOverWeight}_{t(i),AM(j),FT2(k)}(x):$

Average  $FT2 \text{ Parent StocksOverWeight}_{t(i)}(x)$

#### **Equation 8 – Same AM Same FT2 Avg Parent Stocks OverWeight Formula**

Same calculations are done for affiliated corporate bonds overweight bias analysis as the following:

$$FT1 \text{ Parent C. BondsOverWeight}_{t(i)}(x) =$$

$$\frac{\text{Own Parent C. Bonds}\%_{t(i)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)} - \text{average} \frac{\text{All Parent C. Bonds}\%_{t(i),AM(j)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)}$$

where  $AM(j) = AM \text{ of } X$  &  $FT1(x) = FT1 \text{ of } X$

#### **Equation 9 –Same FT1 Parent C.Bonds OverWeight Formula**

$$FT2 \text{ Parent C. BondsOverWeight}_{t(i)}(x) =$$

$$\frac{\text{Own Parent C. Bonds}\%_{t(i)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)} - \text{average} \frac{\text{All Parent C. Bonds}\%_{t(i),AM(j)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)}$$

where  $AM(j) = AM \text{ of } X$  &  $FT2(x) = FT2 \text{ of } X$

#### **Equation 10 –Same FT2 Parent C.Bonds OverWeight Formula**

$$AM \text{ FT1 Parent C. BondsOverWeight}_{t(i),AM(j),FT1(k)}(x):$$

$$\text{Average } FT1 \text{ Parent C. BondsOverWeight}_{t(i)}(x)$$

#### **Equation 11 – Same AM Same FT1 Avg Parent C.Bonds OverWeight Formula**

$$AM \text{ FT2 Parent C. BondsOverWeight}_{t(i),AM(j),FT2(k)}(x):$$

$$\text{Average } FT2 \text{ Parent C. BondsOverWeight}_{t(i)}(x)$$

#### **Equation 12 – Same AM Same FT2 Avg Parent C.Bonds OverWeight Formula**

(Equation 7) results show according to Fund Type 1 categorization, Share Funds have statistical significance (Table 14). Share funds of 6 among 13 asset management companies that have affiliated stocks have overweight bias with 5% significance level.

In terms of the more detail fund categorization (Equation 8), Mixed & Variable – Variable and Share – Share funds show clear results (Table 15 & Table 16). 2 asset management groups have overweight bias in their Mixed & Variable – Variable funds. Number of asset management groups that have affiliated stocks overweighting in Share-Share funds is 5.

| Share Funds Stocks OW Bias |          |          |          |          |           |          |          |          |          |          |          |          |          |
|----------------------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|
|                            | AK PYŞ   | ATA PYŞ  | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ  | GEDİK P  | ICBC PYŞ | İŞ PYŞ   | KUTMAN   | ŞEKER PY | VAKIF PY | YAPI PYŞ |
| Mean                       | 3.52%    | 0.24%    | -0.14%   | 0.00%    | 0.00%     | 0.82%    | 0.00%    | -0.02%   | 10.62%   | 0.13%    | -0.07%   | -0.21%   | 9.40%    |
| Standard                   | 4.26%    | 0.67%    | 0.05%    | 0.00%    | 0.00%     | 2.42%    | 0.01%    | 0.05%    | 1.71%    | 0.40%    | 0.04%    | 0.42%    | 4.86%    |
| Min                        | -1.89%   | 0.00%    | -0.26%   | 0.00%    | -0.02%    | -4.83%   | 0.00%    | -0.17%   | 2.02%    | -0.35%   | -0.16%   | -2.04%   | -0.28%   |
| Max                        | 24.24%   | 2.41%    | -0.08%   | 0.00%    | 0.00%     | 3.34%    | 0.03%    | 0.00%    | 12.48%   | 1.15%    | -0.02%   | 0.24%    | 16.98%   |
| Intercept                  | 3.52%    | 0.24%    | -0.14%   | 0.00%    | 0.00%     | 0.82%    | 0.00%    | -0.02%   | 10.62%   | 0.13%    | -0.07%   | -0.21%   | 9.40%    |
| pvalue                     | 5.8E-05  | 5.7E-02  | 2.1E-10  | 1.2E-02  | 4.6E-02   | 6.5E-02  | 1.3E-01  | 1.2E-02  | 6.7E-26  | 8.4E-02  | 3.6E-11  | 7.3E-03  | 5.4E-12  |
| tStat                      | 4.7E+00  | 2.0E+00  | -1.2E+01 | -2.7E+00 | -2.1E+00  | 1.9E+00  | 1.6E+00  | -2.7E+00 | 3.5E+01  | 1.8E+00  | -1.0E+01 | -2.9E+00 | 1.1E+01  |
| Observati                  | 32       | 31       | 21       | 32       | 32        | 32       | 30       | 29       | 32       | 32       | 32       | 32       | 32       |
| h                          | 1        | 1        | 0        | 0        | 0         | 1        | 0        | 0        | 1        | 1        | 0        | 0        | 1        |
| p                          | 2.70E-05 | 2.84E-02 | 1.00E+00 | 9.94E-01 | 9.77E-01  | 3.23E-02 | 6.48E-02 | 9.94E-01 | 8.31E-27 | 4.20E-02 | 1.00E+00 | 9.96E-01 | 1.78E-12 |

**Table 14: Share Funds Affiliated Stocks OW Bias Results**

| Mixed & Variable-Variable Funds Stocks OW Bias |         |         |          |          |            |           |         |          |         |        |          |          |          |
|------------------------------------------------|---------|---------|----------|----------|------------|-----------|---------|----------|---------|--------|----------|----------|----------|
|                                                | AK PYŞ  | ATA PYŞ | ATLAS PY | DENİZ PY | FINANS PYŞ | GARANTİ P | GEDİK P | ICBC PYŞ | İŞ PYŞ  | KUTMAN | ŞEKER PY | VAKIF PY | YAPI PYŞ |
| Mean                                           | -3.29%  | NaN     | NaN      | -0.08%   | -0.04%     | -0.06%    | NaN     | -0.01%   | -1.15%  | 0.73%  | -0.01%   | -0.16%   | 3.62%    |
| Standard                                       | 6.18%   | NaN     | NaN      | 0.30%    | 0.16%      | 4.01%     | NaN     | 0.03%    | 6.88%   | 0.93%  | 0.02%    | 4.28%    | 6.88%    |
| Min                                            | -9.94%  | NaN     | NaN      | -1.73%   | -0.83%     | -7.24%    | NaN     | -0.09%   | -12.08% | -0.98% | -0.08%   | -4.10%   | -7.41%   |
| Max                                            | 22.83%  | NaN     | NaN      | 0.00%    | 0.00%      | 4.64%     | NaN     | 0.00%    | 30.14%  | 1.93%  | 0.00%    | 19.35%   | 23.47%   |
| Intercept                                      | -3.29%  | NaN     | NaN      | -0.08%   | -0.04%     | -0.06%    | NaN     | -0.01%   | -1.15%  | 0.73%  | -0.01%   | -0.16%   | 3.62%    |
| pvalue                                         | 0.0052  | NaN     | NaN      | 0.1304   | 0.1307     | 0.9341    | NaN     | 0.0057   | 0.3517  | 0.0001 | 0.0033   | 0.8332   | 0.0057   |
| tStat                                          | -3.0107 | NaN     | NaN      | -1.5552  | -1.5539    | -0.0833   | NaN     | -2.9942  | -0.9460 | 4.4480 | -3.1981  | -0.2124  | 2.9784   |
| Observati                                      | 32      | NaN     | NaN      | 32       | 32         | 32        | NaN     | 30       | 32      | 32     | 32       | 32       | 32       |
| h                                              | 0       | NaN     | NaN      | 0        | 0          | 0         | NaN     | 0        | 0       | 1      | 0        | 0        | 1        |
| p                                              | 0.9974  | NaN     | NaN      | 0.9350   | 0.9348     | 0.5329    | NaN     | 0.9972   | 0.8243  | 0.0001 | 0.9984   | 0.5834   | 0.0028   |

**Table 15: Mixed&Variable-Variable Funds Affiliated Stocks OW Bias Results**

| Share-Share Funds Stocks OW Bias |        |         |          |          |            |           |         |          |        |        |          |          |          |
|----------------------------------|--------|---------|----------|----------|------------|-----------|---------|----------|--------|--------|----------|----------|----------|
|                                  | AK PYŞ | ATA PYŞ | ATLAS PY | DENİZ PY | FINANS PYŞ | GARANTİ P | GEDİK P | ICBC PYŞ | İŞ PYŞ | KUTMAN | SEKER PY | VAKIF PY | YAPI PYŞ |
| Mean                             | 4.59%  | 0.24%   | -0.20%   | 0.00%    | 0.00%      | 1.56%     | 0.00%   | -0.03%   | 2.21%  | 0.08%  | -0.08%   | NaN      | 12.87%   |
| Standard                         | 14.71% | 0.67%   | 0.08%    | 0.00%    | 0.00%      | 1.45%     | 0.01%   | 0.06%    | 1.64%  | 0.42%  | 0.06%    | NaN      | 7.99%    |
| Min                              | -2.70% | 0.00%   | -0.38%   | 0.00%    | 0.00%      | -1.35%    | 0.00%   | -0.23%   | -0.32% | -0.51% | -0.22%   | NaN      | -1.03%   |
| Max                              | 84.13% | 2.41%   | -0.11%   | 0.00%    | 0.00%      | 3.49%     | 0.03%   | 0.00%    | 5.67%  | 1.10%  | 0.00%    | NaN      | 21.68%   |
| Intercept                        | 4.59%  | 0.24%   | -0.20%   | 0.00%    | 0.00%      | 1.56%     | 0.00%   | -0.03%   | 2.21%  | 0.08%  | -0.08%   | NaN      | 12.87%   |
| pvalue                           | 0.0881 | 0.0572  | 0.0000   | NaN      | 0.0000     | 0.0000    | 0.1300  | 0.0236   | 0.0000 | 0.2651 | 0.0000   | NaN      | 0.0000   |
| tStat                            | 1.7629 | 1.9808  | -11.6931 | NaN      | -7.2470    | 6.1110    | 1.5599  | -2.4000  | 7.5847 | 1.1357 | -6.9194  | NaN      | 9.1139   |
| Observat                         | 32     | 31      | 21       | 32       | 32         | 32        | 30      | 29       | 32     | 32     | 32       | NaN      | 32       |
| h                                | 1      | 1       | 0        | NaN      | 0          | 1         | 0       | 0        | 1      | 0      | 0        | NaN      | 1        |
| p                                | 0.0439 | 0.0284  | 1.0000   | NaN      | 1.0000     | 0.0000    | 0.0648  | 0.9884   | 0.0000 | 0.1324 | 1.0000   | NaN      | 0.0000   |

**Table 16: Share-Share Funds Affiliated Stocks OW Bias Results**

Test results for (Equation 11) and (Equation 12) are as follows: for the Debt Instruments Funds in Type1 categorization, 13 asset management groups have overweight bias (Table 17). For the Mixed & Variable Funds in Type1 categorization, 16 asset management groups have overweight bias (Table 18). Besides, in Money Market funds, 8 asset management groups have overweight bias (Table 19). In Type 2 categorization, For Debt Instruments – Private Sector Debt Instruments Funds 7 asset management groups have overweight bias (Table 20). For Short Term Debt Instruments funds, 12 groups have overweight bias and 1 group has underweight bias.

| Debt Instruments Funds Affiliated C.Bonds OW Bias |          |          |         |          |          |           |           |           |          |          |             |           |
|---------------------------------------------------|----------|----------|---------|----------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                                                   | AK PYŞ   | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean                                              | 3.66%    | 5.41%    | 10.43%  | 10.82%   | 1.89%    | 8.62%     | 3.17%     | 4.47%     | -0.22%   | 4.59%    | NaN         | 0.05%     |
| Standard Deviation                                | 2.90%    | 0.00%    | 5.38%   | 5.92%    | 4.57%    | 4.58%     | 3.51%     | 4.12%     | 0.28%    | 1.84%    | NaN         | 2.90%     |
| Min                                               | 0.24%    | 5.41%    | 0.00%   | 1.20%    | -3.95%   | -3.08%    | -0.72%    | -0.20%    | -0.83%   | -0.41%   | NaN         | -2.12%    |
| Max                                               | 10.73%   | 5.41%    | 16.81%  | 34.96%   | 9.12%    | 22.97%    | 13.43%    | 15.78%    | 0.00%    | 8.13%    | NaN         | 8.65%     |
| Intercept                                         | 3.66%    | 5.41%    | 10.43%  | 10.82%   | 1.89%    | 8.62%     | 3.17%     | 4.47%     | -0.22%   | 4.59%    | NaN         | 0.05%     |
| pvalue                                            | 6.1E-08  | NaN      | 2.8E-10 | 2.1E-11  | 3.2E-02  | 1.0E-11   | 1.7E-05   | 1.4E-06   | 1.0E-04  | 8.1E-15  | NaN         | 9.4E-01   |
| tStat                                             | 7.1E+00  | Inf      | 1.0E+01 | 1.0E+01  | 2.3E+00  | 1.1E+01   | 5.1E+00   | 6.0E+00   | -4.5E+00 | 1.4E+01  | NaN         | 8.2E-02   |
| Observations                                      | 32       | 1        | 27      | 32       | 30       | 32        | 32        | 31        | 32       | 32       | NaN         | 20        |
| h                                                 | 1        | NaN      | 1       | 1        | 1        | 1         | 1         | 1         | 0        | 1        | NaN         | 0         |
| p                                                 | 0.0000   | NaN      | 0.0000  | 0.0000   | 0.0158   | 0.0000    | 0.0000    | 0.0000    | 1.0000   | 0.0000   | NaN         | 0.4679    |
|                                                   | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean                                              | NaN      | 3.48%    | NaN     | 23.26%   | 3.47%    | NaN       | 2.24%     | 8.68%     | -0.04%   | NaN      | -0.20%      |           |
| Standard Deviation                                | NaN      | 5.26%    | NaN     | 17.47%   | 5.12%    | NaN       | 2.66%     | 3.22%     | 1.17%    | NaN      | 0.13%       |           |
| Min                                               | NaN      | -1.02%   | NaN     | -1.12%   | -0.32%   | NaN       | -3.71%    | 3.44%     | -3.77%   | NaN      | -0.44%      |           |
| Max                                               | NaN      | 17.36%   | NaN     | 66.97%   | 16.90%   | NaN       | 6.63%     | 15.93%    | 1.93%    | NaN      | -0.07%      |           |
| Intercept                                         | NaN      | 3.48%    | NaN     | 23.26%   | 3.47%    | NaN       | 2.24%     | 8.68%     | -0.04%   | NaN      | -0.20%      |           |
| pvalue                                            | NaN      | 0.0008   | NaN     | 0.0000   | 0.0006   | NaN       | 0.0000    | 0.0000    | 0.8364   | NaN      | 0.0052      |           |
| tStat                                             | NaN      | 3.7377   | NaN     | 7.5309   | 3.8322   | NaN       | 4.7625    | 15.2350   | -0.2083  | NaN      | -4.2745     |           |
| Observations                                      | NaN      | 32       | NaN     | 32       | 32       | NaN       | 32        | 32        | 32       | NaN      | 8           |           |
| h                                                 | NaN      | 1        | NaN     | 1        | 1        | NaN       | 1         | 1         | 0        | NaN      | 0           |           |
| p                                                 | NaN      | 0.0004   | NaN     | 0.0000   | 0.0003   | NaN       | 0.0000    | 0.0000    | 0.5818   | NaN      | 0.9982      |           |

**Table 17: Debt Inst. Funds Affiliated C.Bonds OW Bias**

| Mixed&Variable Funds Affiliated C.Bonds OW Bias |          |          |         |          |          |           |           |           |          |          |             |           |
|-------------------------------------------------|----------|----------|---------|----------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                                                 | AK PYŞ   | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean                                            | 1.73%    | 4.95%    | NaN     | 7.39%    | 2.39%    | 18.61%    | 3.18%     | 5.47%     | 13.43%   | 10.54%   | NaN         | 3.38%     |
| Standard Deviation                              | 2.68%    | 3.38%    | NaN     | 5.07%    | 4.03%    | 9.74%     | 2.92%     | 6.86%     | 16.14%   | 3.61%    | NaN         | 1.90%     |
| Min                                             | -1.96%   | -1.13%   | NaN     | 2.19%    | -1.54%   | 0.43%     | -1.77%    | -0.23%    | 0.00%    | 2.43%    | NaN         | 1.45%     |
| Max                                             | 7.87%    | 8.94%    | NaN     | 23.55%   | 14.89%   | 38.46%    | 9.38%     | 18.48%    | 42.60%   | 16.40%   | NaN         | 6.98%     |
| Intercept                                       | 1.73%    | 4.95%    | NaN     | 7.39%    | 2.39%    | 18.61%    | 3.18%     | 5.47%     | 13.43%   | 10.54%   | NaN         | 3.38%     |
| pvalue                                          | 0.0010   | 0.0000   | NaN     | 0.0000   | 0.0030   | 0.0000    | 0.0000    | 0.0001    | 0.0001   | 0.0000   | NaN         | 0.0001    |
| tStat                                           | 3.6503   | 6.5443   | NaN     | 8.2416   | 3.2458   | 10.8079   | 6.1408    | 4.4382    | 4.7057   | 16.5015  | NaN         | 6.1725    |
| Observations                                    | 32       | 20       | NaN     | 32       | 30       | 32        | 32        | 31        | 32       | 32       | NaN         | 12        |
| h                                               | 1        | 1        | NaN     | 1        | 1        | 1         | 1         | 1         | 1        | 1        | NaN         | 1         |
| p                                               | 0.0005   | 0.0000   | NaN     | 0.0000   | 0.0015   | 0.0000    | 0.0000    | 0.0001    | 0.0000   | 0.0000   | NaN         | 0.0000    |
|                                                 | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean                                            | NaN      | 2.65%    | 0.00%   | 28.85%   | 7.09%    | 0.21%     | 5.67%     | 13.64%    | -1.84%   | 0.00%    | NaN         |           |
| Standard Deviation                              | NaN      | 6.65%    | 0.00%   | 37.68%   | 10.07%   | 0.46%     | 7.88%     | 5.01%     | 1.56%    | 0.00%    | NaN         |           |
| Min                                             | NaN      | -2.42%   | 0.00%   | -1.03%   | -0.21%   | 0.00%     | -1.08%    | 5.70%     | -9.66%   | 0.00%    | NaN         |           |
| Max                                             | NaN      | 18.35%   | 0.00%   | 99.31%   | 32.92%   | 1.72%     | 28.48%    | 23.13%    | -0.48%   | 0.00%    | NaN         |           |
| Intercept                                       | NaN      | 2.65%    | 0.00%   | 28.85%   | 7.09%    | 0.21%     | 5.67%     | 13.64%    | -1.84%   | 0.00%    | NaN         |           |
| pvalue                                          | NaN      | 0.0314   | NaN     | 0.0109   | 0.0004   | 0.0166    | 0.0003    | 0.0000    | 0.0000   | NaN      | NaN         |           |
| tStat                                           | NaN      | 2.2581   | NaN     | 2.9654   | 3.9806   | 2.5371    | 4.0737    | 15.3981   | -6.6539  | NaN      | NaN         |           |
| Observations                                    | NaN      | 32       | 31      | 15       | 32       | 32        | 32        | 32        | 32       | 8        | NaN         |           |
| h                                               | NaN      | 1        | NaN     | 1        | 1        | 1         | 1         | 1         | 0        | NaN      | NaN         |           |
| p                                               | NaN      | 0.0156   | NaN     | 0.0051   | 0.0002   | 0.0082    | 0.0001    | 0.0000    | 1.0000   | NaN      | NaN         |           |

**Table 18: Mixed&Variable Funds Affiliated C.Bonds OW Bias**

| Money Market Funds Affiliated C.Bonds OW Bias |         |          |          |            |           |           |            |            |          |          |              |           |
|-----------------------------------------------|---------|----------|----------|------------|-----------|-----------|------------|------------|----------|----------|--------------|-----------|
|                                               | AK PY\$ | ATLAS PY | BURGAN P | DENİZ PY\$ | FİBA PY\$ | FİNANS PY | GARANTİ P  | GEDİK PY\$ | İNG PY\$ | İŞ PY\$  | KT PY\$      | KUTMAN PY |
| Mean                                          | 13.03%  | NaN      | NaN      | 15.75%     | 9.82%     | 7.49%     | 7.18%      | NaN        | 5.96%    | -2.49%   | NaN          | -13.79%   |
| Standard Deviation                            | 18.09%  | NaN      | NaN      | 7.93%      | 13.72%    | 12.12%    | 6.11%      | NaN        | 6.43%    | 6.90%    | NaN          | 33.00%    |
| Min                                           | -3.19%  | NaN      | NaN      | 1.44%      | -4.56%    | -6.70%    | -3.35%     | NaN        | 0.00%    | -12.01%  | NaN          | -102.62%  |
| Max                                           | 86.79%  | NaN      | NaN      | 33.55%     | 40.82%    | 44.05%    | 21.80%     | NaN        | 19.11%   | 12.07%   | NaN          | 3.96%     |
| Intercept                                     | 13.03%  | NaN      | NaN      | 15.75%     | 9.82%     | 7.49%     | 7.18%      | NaN        | 5.96%    | -2.49%   | NaN          | -13.79%   |
| pvalue                                        | 0.0003  | NaN      | NaN      | 0.0000     | 0.0005    | 0.0015    | 0.0000     | NaN        | 0.0000   | 0.1863   | NaN          | 0.1991    |
| tStat                                         | 4.0740  | NaN      | NaN      | 11.2371    | 3.9209    | 3.4960    | 6.6434     | NaN        | 5.2409   | -1.3953  | NaN          | -1.3861   |
| Observations                                  | 32      | NaN      | NaN      | 32         | 30        | 32        | 32         | NaN        | 32       | 15       | NaN          | 11        |
| h                                             | 1       | NaN      | NaN      | 1          | 1         | 1         | 1          | NaN        | 1        | 0        | NaN          | 0         |
| p                                             | 0.0001  | NaN      | NaN      | 0.0000     | 0.0002    | 0.0007    | 0.0000     | NaN        | 0.0000   | 0.9077   | NaN          | 0.9021    |
|                                               | MÜKAFAT | OYAKK P  | QINVEST  | ŞEKER PY\$ | TEB PY\$  | ÜNLÜ PY\$ | VAKIF PY\$ | YAPI PY\$  | ZİRAAT P | MEKSA PY | TURKISH PY\$ |           |
| Mean                                          | NaN     | NaN      | 0.00%    | NaN        | 1.01%     | NaN       | 6.24%      | 6.35%      | -5.89%   | NaN      | 0.05%        |           |
| Standard Deviation                            | NaN     | NaN      | 0.00%    | NaN        | 3.08%     | NaN       | 4.82%      | 12.78%     | 2.61%    | NaN      | 0.48%        |           |
| Min                                           | NaN     | NaN      | 0.00%    | NaN        | -2.86%    | NaN       | 1.35%      | -2.46%     | -11.45%  | NaN      | -0.49%       |           |
| Max                                           | NaN     | NaN      | 0.00%    | NaN        | 9.95%     | NaN       | 17.05%     | 53.07%     | -0.80%   | NaN      | 0.55%        |           |
| Intercept                                     | NaN     | NaN      | 0.00%    | NaN        | 1.01%     | NaN       | 6.24%      | 6.35%      | -5.89%   | NaN      | 0.05%        |           |
| pvalue                                        | NaN     | NaN      | NaN      | NaN        | 0.1720    | NaN       | 0.0000     | 0.0086     | 0.0000   | NaN      | 0.8476       |           |
| tStat                                         | NaN     | NaN      | NaN      | NaN        | 1.4261    | NaN       | 7.3220     | 2.8118     | -12.7713 | NaN      | 0.2180       |           |
| Observations                                  | NaN     | NaN      | 26       | NaN        | 19        | NaN       | 32         | 32         | 32       | NaN      | 4            |           |
| h                                             | NaN     | NaN      | NaN      | NaN        | 0         | NaN       | 1          | 1          | 0        | NaN      | 0            |           |
| p                                             | NaN     | NaN      | NaN      | NaN        | 0.0855    | NaN       | 0.0000     | 0.0042     | 1.0000   | NaN      | 0.4207       |           |

**Table 19: Money Market Funds Affiliated C.Bonds OW Bias**

| Debt Instruments-Private Sector Debt Instruments Funds Affiliated C.Bonds OW Bias |         |          |          |            |           |           |            |            |           |          |              |             |
|-----------------------------------------------------------------------------------|---------|----------|----------|------------|-----------|-----------|------------|------------|-----------|----------|--------------|-------------|
|                                                                                   | AK PY\$ | ATLAS PY | BURGAN P | DENİZ PY\$ | FİBA PY\$ | FİNANS PY | GARANTİ P  | GEDİK PY\$ | İNG PY\$  | İŞ PY\$  | KT PY\$      | KUTMAN PY\$ |
| Mean                                                                              | 4.42%   | 5.15%    | NaN      | 14.08%     | NaN       | 6.50%     | 1.82%      | NaN        | NaN       | 3.46%    | NaN          | NaN         |
| Standard                                                                          | 1.63%   | 0.00%    | NaN      | 5.11%      | NaN       | 3.64%     | 3.05%      | NaN        | NaN       | 2.54%    | NaN          | NaN         |
| Min                                                                               | 1.08%   | 5.15%    | NaN      | 3.69%      | NaN       | -1.39%    | -1.72%     | NaN        | NaN       | 0.12%    | NaN          | NaN         |
| Max                                                                               | 7.24%   | 5.15%    | NaN      | 25.03%     | NaN       | 13.85%    | 7.02%      | NaN        | NaN       | 10.68%   | NaN          | NaN         |
| Intercept                                                                         | 4.42%   | 5.15%    | NaN      | 14.08%     | NaN       | 6.50%     | 1.82%      | NaN        | NaN       | 3.46%    | NaN          | NaN         |
| pvalue                                                                            | 1E-15   | NaN      | NaN      | 6E-16      | NaN       | 4E-11     | 2E-03      | NaN        | NaN       | 1E-08    | NaN          | NaN         |
| tStat                                                                             | 2E+01   | Inf      | NaN      | 2E+01      | NaN       | 1E+01     | 3E+00      | NaN        | NaN       | 8E+00    | NaN          | NaN         |
| Observati                                                                         | 32      | 1        | NaN      | 32         | NaN       | 32        | 32         | NaN        | NaN       | 32       | NaN          | NaN         |
| h                                                                                 | 1       | NaN      | NaN      | 1          | NaN       | 1         | 1          | NaN        | NaN       | 1        | NaN          | NaN         |
| p                                                                                 | 3E-16   | NaN      | NaN      | 2E-16      | NaN       | 1E-11     | 1E-03      | NaN        | NaN       | 5E-09    | NaN          | NaN         |
|                                                                                   | MÜKAFAT | OYAKK P  | QINVEST  | ŞEKER PY\$ | TEB PY\$  | ÜNLÜ PY\$ | VAKIF PY\$ | YAPI PY\$  | ZİRAAT PY | MEKSA PY | TURKISH PY\$ |             |
| Mean                                                                              | NaN     | NaN      | NaN      | NaN        | 2.97%     | NaN       | NaN        | 2.90%      | -0.82%    | NaN      | NaN          |             |
| Standard                                                                          | NaN     | NaN      | NaN      | NaN        | 2.75%     | NaN       | NaN        | 2.41%      | 0.76%     | NaN      | NaN          |             |
| Min                                                                               | NaN     | NaN      | NaN      | NaN        | -0.11%    | NaN       | NaN        | -3.19%     | -1.74%    | NaN      | NaN          |             |
| Max                                                                               | NaN     | NaN      | NaN      | NaN        | 10.16%    | NaN       | NaN        | 6.61%      | 0.67%     | NaN      | NaN          |             |
| Intercept                                                                         | NaN     | NaN      | NaN      | NaN        | 2.97%     | NaN       | NaN        | 2.90%      | -0.82%    | NaN      | NaN          |             |
| pvalue                                                                            | NaN     | NaN      | NaN      | NaN        | 1E-06     | NaN       | NaN        | 2E-07      | 1E-06     | NaN      | NaN          |             |
| tStat                                                                             | NaN     | NaN      | NaN      | NaN        | 6E+00     | NaN       | NaN        | 7E+00      | -6E+00    | NaN      | NaN          |             |
| Observati                                                                         | NaN     | NaN      | NaN      | NaN        | 32        | NaN       | NaN        | 32         | 32        | NaN      | NaN          |             |
| h                                                                                 | NaN     | NaN      | NaN      | NaN        | 1         | NaN       | NaN        | 1          | 0         | NaN      | NaN          |             |
| p                                                                                 | NaN     | NaN      | NaN      | NaN        | 4E-07     | NaN       | NaN        | 6E-08      | 1E+00     | NaN      | NaN          |             |

**Table 20: Private Sector Debt Instruments Funds Affiliated C.Bonds OW Bias**

#### 4.2.2 Bear Bull Market Analysis

To investigate whether overweight bias changes in time and is affected by market conditions, a categorical variable is introduced: Bull Market Indicator. In affiliated stocks overweight bias analysis, Bull Market Indicator takes value of 1 if BorsaIstanbul Stock Exchange XU100 index's corresponding monthly return is higher than the mean of all 33 monthly returns. Otherwise, it takes value of 0. In affiliated corporate bonds overweight bias analysis, instead of XU100 index, KYDTUM index is used, which calculates total return of Turkish government bonds. It is calculated and published by BorsaIstanbul; and is used as official benchmark bond index for Turkish mutual and pension funds.

$$AM\ ParentStocksOverWeight_{t(i),AM(j)}(x) = \beta_{0,AM(j),t} + \beta_{1,AM(j),t} * Bull_{AM(j),t} + \epsilon$$

**(Hypotheses 5)**

$$\frac{\sum_{j=1:41} AM\ ParentStocksOverWeight_{t(i),AM(j)}}{41} (x) = \beta_0 + \beta_1 * Bull + \epsilon$$

**(Hypothesis 6)**

$$AM\ ParentC.BondsOverWeight_{t(i),AM(j)}(x) = \beta_{0,AM(j),t} + \beta_{1,AM(j),t} * Bull_{AM(j),t} + \epsilon$$

**(Hypotheses 7)**

$$\frac{\sum_{j=1:41} AM\ ParentC.BondsOverWeight_{t(i),AM(j)}}{41} (x) = \beta_0 + \beta_1 * Bull + \epsilon$$

**(Hypothesis 8)**

Results of pooled OLS analyses show that bull or bear market conditions don't have a statistically significant effect on the systemic affiliated stocks and corporate

bonds overweight biases (Table 21 & Table 22). In affiliated stocks overweight bias analysis, only 1 out of 13 asset management companies has a statistically significant negative bull market indicator coefficient which suggests in bull market conditions it tends to underweight its affiliated stocks (Table 23). In corporate bonds analysis, 1 out of 20 asset management companies has a tendency to underweight its affiliated corporate bonds in bull market conditions (Table 24).

| Systemic Affiliated Stocks OW Bias in Bull Market |         |
|---------------------------------------------------|---------|
| Intercept                                         | 0.49%   |
| Bull Market Coefficient                           | -0.05%  |
| Intercept pvalue                                  | 0.0003  |
| Bull Market Coefficient pvalue                    | 0.7651  |
| Intercept tstat                                   | 3.6175  |
| Bull Market Coefficient tstat                     | -0.2989 |
| Number of Observations                            | 1063    |

**Table 21: Systemic Affiliated Stocks OW Bias in Bull Market**

| Systemic Affiliated C.Bonds OW Bias in Bull Market |         |
|----------------------------------------------------|---------|
| Intercept                                          | 4.13%   |
| Bull Market Coefficient                            | -0.73%  |
| Intercept pvalue                                   | 0.0000  |
| Bull Market Coefficient pvalue                     | 0.2284  |
| Intercept tstat                                    | 9.5592  |
| Bull Market Coefficient tstat                      | -1.2051 |
| Number of Observations                             | 1031    |

**Table 22: Systemic Affiliated C.Bonds OW Bias in Bull Market**

| Asset Management Companies' Affiliated Stocks OW Bias in Bull Market |         |         |         |         |         |        |         |         |         |        |         |         |          |
|----------------------------------------------------------------------|---------|---------|---------|---------|---------|--------|---------|---------|---------|--------|---------|---------|----------|
|                                                                      | AK PYS  | ATA PYS | ATLAS P | DENİZ P | FINANS  | GARANT | GEDİK P | ICBC PY | İŞ PYS  | KUTMAN | SEKER P | VAKIF P | YAPI PYS |
| Intercept                                                            | 2.20%   | 0.26%   | -0.05%  | -0.02%  | 0.00%   | 1.88%  | -0.10%  | 0.00%   | 4.97%   | 0.19%  | -0.04%  | -0.77%  | 7.41%    |
| Bull Market Coefficient                                              | -0.59%  | -0.17%  | -0.34%  | -0.05%  | -0.02%  | 0.89%  | 0.05%   | -0.02%  | -2.17%  | 0.33%  | -0.01%  | 1.37%   | -0.69%   |
| Intercept pvalue                                                     | 0.0613  | 0.0470  | 0.8048  | 0.5737  | 0.7941  | 0.0320 | 0.0215  | 0.9614  | 0.1591  | 0.1663 | 0.0005  | 0.3382  | 0.0000   |
| Bull Market Coefficient pvalue                                       | 0.6902  | 0.3069  | 0.1814  | 0.2791  | 0.3428  | 0.4158 | 0.3075  | 0.0173  | 0.6296  | 0.0606 | 0.6246  | 0.1929  | 0.6038   |
| Intercept tstat                                                      | 1.9469  | 2.0776  | -0.2508 | -0.5691 | -0.2634 | 2.2531 | -2.4346 | -0.0488 | 1.4454  | 1.4197 | -3.9226 | -0.9737 | 7.3048   |
| Bull Market Coefficient tstat                                        | -0.4026 | -1.0408 | -1.3902 | -1.1031 | -0.9643 | 0.8256 | 1.0393  | -2.5367 | -0.4874 | 1.9523 | -0.4945 | 1.3330  | -0.5247  |
| Number of Observations                                               | 32      | 31      | 21      | 32      | 32      | 32     | 31      | 30      | 32      | 32     | 32      | 32      | 32       |

**Table 23: Affiliated Stocks OW Bias in Bull Market**

| Affiliated C.Bonds OW Bias in Bull Market |         |         |         |         |          |         |         |         |         |             |
|-------------------------------------------|---------|---------|---------|---------|----------|---------|---------|---------|---------|-------------|
|                                           | AK PYŞ  | ATLAS P | BURGAN  | DENİZ P | FİBA PYŞ | FİNANS  | GARANTİ | GEDİK P | İNG PYŞ | İŞ PYŞ      |
| Intercept                                 | 11.16%  | 2.09%   | 10.70%  | 9.55%   | 2.62%    | 10.83%  | 3.11%   | 4.58%   | 9.55%   | 5.23%       |
| Bull Market Coefficient                   | 2.32%   | -0.80%  | -0.55%  | 0.20%   | 2.80%    | 1.19%   | 0.06%   | 0.33%   | -4.52%  | -1.21%      |
| Intercept pvalue                          | 0.0000  | 0.0148  | 0.0000  | 0.0000  | 0.0448   | 0.0000  | 0.0000  | 0.0008  | 0.0001  | 0.0000      |
| Bull Market Coefficient pvalue            | 0.4293  | 0.4441  | 0.7990  | 0.8821  | 0.1238   | 0.4766  | 0.9325  | 0.8475  | 0.1292  | 0.0745      |
| Intercept tstat                           | 5.4625  | 2.6957  | 7.5360  | 9.9298  | 2.1040   | 9.2621  | 5.8271  | 3.7528  | 4.6667  | 11.2896     |
| Bull Market Coefficient tstat             | 0.8015  | -0.7826 | -0.2575 | 0.1496  | 1.5884   | 0.7211  | 0.0855  | 0.1941  | -1.5617 | -1.8500     |
| Number of Observations                    | 32      | 21      | 27      | 32      | 30       | 32      | 32      | 31      | 32      | 32          |
|                                           | KT PYŞ  | KUTMAN  | OYAKK   | ŞEKER P | TEB PYŞ  | ÜNLÜ PY | VAKIF P | YAPI PY | ZİRAAT  | TURKISH PYŞ |
| Intercept                                 | 27.92%  | 0.08%   | 4.45%   | 28.94%  | 7.89%    | 1.02%   | 6.57%   | 9.96%   | -6.65%  | -0.17%      |
| Bull Market Coefficient                   | -16.71% | -1.38%  | -2.67%  | -3.39%  | -5.08%   | -0.70%  | -3.84%  | 2.19%   | 0.77%   | -0.09%      |
| Intercept pvalue                          | 0.0809  | 0.9502  | 0.0044  | 0.0000  | 0.0001   | 0.0015  | 0.0000  | 0.0000  | 0.1702  | 0.0682      |
| Bull Market Coefficient pvalue            | 0.4111  | 0.4171  | 0.1995  | 0.6366  | 0.0523   | 0.0999  | 0.0329  | 0.1530  | 0.9085  | 0.5451      |
| Intercept tstat                           | 1.8924  | 0.0634  | 3.0916  | 5.7655  | 4.4432   | 3.5072  | 5.4306  | 9.4302  | -1.4065 | -2.3181     |
| Bull Market Coefficient tstat             | -0.8492 | -0.8317 | -1.3128 | -0.4775 | -2.0239  | -1.6996 | -2.2408 | 1.4674  | 0.1159  | -0.6488     |
| Number of Observations                    | 16      | 20      | 32      | 32      | 32       | 32      | 32      | 32      | 32      | 8           |

**Table 24: Affiliated C.Bonds OW Bias in Bull Market**

#### 4.2.3 Asset Management Company Specifications Analysis

In order to determine whether there are any factors affecting asset management companies' affiliated stocks and corporate bonds overweight bias, I studied the ownership of the companies. 3 categorical variables are defined: StatePrivate, LocalForeign and BankAffiliation. These variables take value of 1 if the the owner of the asset management company is state, local and bank respectively. Otherwise, they take the value of 0. Hypotheses that whether these categorical variables have statistically significant effect on affiliated securities are tested for both each variable separately and together.

$$AM\ ParentStocksOverWeight_{t(i)}(x) = \beta_{0,t} + \beta_{1,t} * State_{AM(x),t} + \epsilon$$

$$AM\ ParentStocksOverWeight_{t(i)}(x) = \beta_{0,t} + \beta_{1,t} * Local_{AM(x),t} + \epsilon$$

$$AM\ ParentStocksOverWeight_{t(i)}(x) = \beta_{0,t} + \beta_{1,t} * BankAff_{AM(x),t} + \epsilon$$

$$AM\ ParentStocksOverWeight_{t(i)}(x) = \beta_{0,t} + \beta_{1,t} * State_{AM(x),t} + \beta_{2,t} * Local_{AM(x),t} + \beta_{3,t} * BankAff_{AM(x),t} + \epsilon$$

### (Hypotheses 9)

In affiliated stocks overweight bias analyses, analyzing the above three variables separately shows that only bank affiliation has a statistically significant positive effect on overweight bias: 0.89%. However, taking all variables into consideration in one equation shows all three variables have statistically significant effect: local ownership contributes 0.41%, bank affiliation contributes 1.28% to overweight bias and state ownership has an opposite sign: -1.41% (Table 25).

On the other hand, for corporate bonds all 3 categorical variables has a statistically significant effect on overweight bias when studied separately: state ownership (-4.74%) and local ownership (-5.01%) suggest underweight bias but bank affiliation suggests overweight bias (6.31%). If all analyzed together, local ownership loses its significance and state ownership suggests underweight bias with -8.73% and bank affiliation suggests overweight bias with 7.74% (Table 26).

| Asset Management Company Ownership Categorical Variables in Stocks OW |         |                                 |         |                                 |         |                             |        |
|-----------------------------------------------------------------------|---------|---------------------------------|---------|---------------------------------|---------|-----------------------------|--------|
| Intercept                                                             | 0.46%   | Intercept                       | 0.50%   | Intercept                       | 0.60%   | Intercept                   | 0.02%  |
| Intercept pvalue                                                      | 0.0000  | StatePrivate Coefficient        | -0.49%  | LocalForeign Coefficient        | -0.27%  | Bank Aff Coefficient        | 0.89%  |
| Intercept tsat                                                        | 5.3511  | Intercept pvalue                | 0.0000  | Intercept pvalue                | 0.0000  | Intercept pvalue            | 0.8856 |
| Number of Observations                                                | 1063    | StatePrivate Coefficient pvalue | 0.1023  | LocalForeign Coefficient pvalue | 0.1114  | Bank Aff Coefficient pvalue | 0.0000 |
|                                                                       |         | Intercept tsat                  | 5.5992  | Intercept tsat                  | 4.8163  | Intercept tsat              | 0.1439 |
|                                                                       |         | StatePrivate Coefficient tsat   | -1.6353 | LocalForeign Coefficient tsat   | -1.5934 | Bank Aff Coefficient tsat   | 5.2597 |
|                                                                       |         | Number of Observations          | 1063    | Number of Observations          | 1063    | Number of Observations      | 1063   |
|                                                                       |         |                                 |         |                                 |         |                             |        |
| Intercept                                                             | 0.60%   | Intercept                       | -0.28%  |                                 |         |                             |        |
| StatePrivate Coefficient                                              | -0.38%  | StatePrivate Coefficient        | -1.41%  |                                 |         |                             |        |
| LocalForeign Coefficient                                              | -0.21%  | LocalForeign Coefficient        | 0.41%   |                                 |         |                             |        |
| Intercept pvalue                                                      | 0.0000  | Bank Aff Coefficient            | 1.28%   |                                 |         |                             |        |
| StatePrivate Coefficient pvalue                                       | 0.2222  | Intercept pvalue                | 0.1357  |                                 |         |                             |        |
| LocalForeign Coefficient pvalue                                       | 0.2443  | StatePrivate Coefficient pvalue | 0.0000  |                                 |         |                             |        |
| Intercept tsat                                                        | 4.8175  | LocalForeign Coefficient pvalue | 0.0396  |                                 |         |                             |        |
| StatePrivate Coefficient tsat                                         | -1.2214 | Bank Aff Coefficient pvalue     | 0.0000  |                                 |         |                             |        |
| LocalForeign Coefficient tsat                                         | -1.1650 | Intercept tsat                  | -1.4933 |                                 |         |                             |        |
| Number of Observations                                                | 1063    | StatePrivate Coefficient tsat   | -4.0824 |                                 |         |                             |        |
|                                                                       |         | LocalForeign Coefficient tsat   | 2.0606  |                                 |         |                             |        |
|                                                                       |         | Bank Aff Coefficient tsat       | 6.3706  |                                 |         |                             |        |
|                                                                       |         | Number of Observations          | 1063    |                                 |         |                             |        |

**Table 25: AM Ownership in Affiliated Stocks OW**

| Asset Management Company Ownership Categorical Variables in C.Bonds OW |         |                                 |         |                                 |         |                             |         |
|------------------------------------------------------------------------|---------|---------------------------------|---------|---------------------------------|---------|-----------------------------|---------|
| Intercept                                                              | 3.76%   | Intercept                       | 4.20%   | Intercept                       | 6.57%   | Intercept                   | 0.56%   |
| Intercept pvalue                                                       | 0.0000  | StatePrivate Coefficient        | -4.74%  | LocalForeign Coefficient        | -5.01%  | Bank Aff Coefficient        | 6.31%   |
| Intercept tsat                                                         | 12.3707 | Intercept pvalue                | 0.0000  | Intercept pvalue                | 0.0000  | Intercept pvalue            | 0.1699  |
| Number of Observations                                                 | 1031    | StatePrivate Coefficient pvalue | 0.0000  | LocalForeign Coefficient pvalue | 0.0000  | Bank Aff Coefficient pvalue | 0.0000  |
|                                                                        |         | Intercept tsat                  | 13.2887 | Intercept tsat                  | 14.8111 | Intercept tsat              | 1.3736  |
|                                                                        |         | StatePrivate Coefficient tsat   | -4.5709 | LocalForeign Coefficient tsat   | -8.4558 | Bank Aff Coefficient tsat   | 10.9477 |
|                                                                        |         | Number of Observations          | 1031    | Number of Observations          | 1031    | Number of Observations      | 1031    |
|                                                                        |         |                                 |         |                                 |         |                             |         |
| Intercept                                                              | 6.57%   | Intercept                       | 0.89%   |                                 |         |                             |         |
| StatePrivate Coefficient                                               | -2.51%  | StatePrivate Coefficient        | -8.73%  |                                 |         |                             |         |
| LocalForeign Coefficient                                               | -4.60%  | LocalForeign Coefficient        | -0.43%  |                                 |         |                             |         |
| Intercept pvalue                                                       | 0.0000  | Bank Aff Coefficient            | 7.74%   |                                 |         |                             |         |
| StatePrivate Coefficient pvalue                                        | 0.0175  | Intercept pvalue                | 0.1761  |                                 |         |                             |         |
| LocalForeign Coefficient pvalue                                        | 0.0000  | StatePrivate Coefficient pvalue | 0.0000  |                                 |         |                             |         |
| Intercept tsat                                                         | 14.8446 | LocalForeign Coefficient pvalue | 0.5331  |                                 |         |                             |         |
| StatePrivate Coefficient tsat                                          | -2.3796 | Bank Aff Coefficient pvalue     | 0.0000  |                                 |         |                             |         |
| LocalForeign Coefficient tsat                                          | -7.4491 | Intercept tsat                  | 1.3539  |                                 |         |                             |         |
| Number of Observations                                                 | 1031    | StatePrivate Coefficient tsat   | -7.6463 |                                 |         |                             |         |
|                                                                        |         | LocalForeign Coefficient tsat   | -0.6236 |                                 |         |                             |         |
|                                                                        |         | Bank Aff Coefficient tsat       | 11.1348 |                                 |         |                             |         |
|                                                                        |         | Number of Observations          | 1031    |                                 |         |                             |         |

**Table 26: AM Ownership in Affiliated C.Bonds OW**

#### **4.2.4 Price Support Analysis**

To determine whether overweight bias of affiliated mutual funds are non-conjectural or affected by conjectural changes, Price Support dummy variable is introduced. By this analysis, whether affiliated mutual funds tend to overweight their affiliated stocks when they are sold more than market to support their prices in secondary markets is investigated. Monthly fund holding data from January 2015 to September 2017 are analyzed. Price Support dummy variable takes value of zero unless below conditions are met. 6 different cut-off points for Price Support dummy variable are tested:

- Market Excess Return of Affiliated Stock < -1 z-score
- Market Excess Return of Affiliated Stock < -0.66 z-score
- Market Excess Return of Affiliated Stock < -2 z-score
- Market Excess Return of Affiliated Stock < 0
- Market Excess Return of Affiliated Stock < -1.00%
- Market Excess Return of Affiliated Stock < -2.00%

Market Excess Return of Affiliated Stock means monthly return of the affiliated stock less monthly XU100 Index return. Z-scores are calculated based on the January 2015 to September 2017 monthly market excess returns.

$$AM\text{ AffiliatedStockOverWeight}_{t(i)}(x) = \beta_{0,t} + \beta_{1,t} * PriceSupport_{AM(x),t} + \epsilon$$

**(Hypothesis 10)**

For each fund and for 56 affiliated stocks, applying dummy cut-off, 1777 observation points are studied (pooled OLS).

| Price Support Analysis Results   |                 |                    |                 |          |            |            |
|----------------------------------|-----------------|--------------------|-----------------|----------|------------|------------|
| Price Support Criteria           | Excess <-1sigma | Excess <-0.66sigma | Excess <-2sigma | Excess<0 | Excess<-1% | Excess<-2% |
| Intercept                        | 0.2736%         | 0.2585%            | 0.2780%         | 0.3006%  | 0.2939%    | 0.2936%    |
| Price Support Coefficient        | -0.0084%        | 0.0597%            | -0.3091%        | -0.0544% | -0.0481%   | -0.0558%   |
| Intercept pvalue                 | 0.0000          | 0.0000             | 0.0000          | 0.0000   | 0.0000     | 0.0000     |
| Price Support Coefficient pvalue | 0.9532          | 0.6029             | 0.3982          | 0.5762   | 0.6233     | 0.5780     |
| Intercept tstat                  | 5.2380          | 4.6475             | 5.6639          | 4.2916   | 4.5014     | 4.7603     |
| Price Support Coefficient tstat  | - 0.0587        | 0.5203             | - 0.8450        | - 0.5590 | - 0.4912   | - 0.5564   |
| Number of Observations           | 1777            | 1777               | 1777            | 1777     | 1777       | 1777       |

**Table 27: Price Support Analysis for Affiliated Stocks**

In none of the 6 different cut-offs for dummy variable definition, Price Support dummy variable has statistical significance (Table 27). Therefore, we cannot conclude that affiliated mutual funds hold overweight positions in their affiliated stocks in times of excessive selling compared to market in those stocks. Their overweight bias is not determined by unfavorable market conditions in the affiliated stocks.

### 4.3 Conclusion

Results of my empiric study show that compared to their peers Turkish asset management companies systemically have overweight bias for both the stocks and corporate bonds they are affiliated with. For affiliated corporate bonds, this bias is significantly higher than affiliated stocks. In terms of affiliated stocks overweighting, as expected, share funds and mixed & variable funds are the funds this bias is observed. Additionally, in terms of affiliated corporate bond overweighting, short term debt

instruments funds, private sector debt instrument funds and variable funds are the ones bias is significantly observed. General market conditions don't have an effect on systemic affiliated stocks and corporate bonds overweight bias but ownership structure does. Bank affiliation of an asset management company results in significant overweight bias in both affiliated stocks and corporate bonds. However, state ownership and local ownership results in underweight bias for affiliated corporate bonds only. One of the possible motives behind the overweight bias is also examined for affiliated stocks. It is revealed that Turkish asset management companies systematically don't act as a price supporter when those affiliated stocks are in severely negative market conditions.

This study will contribute to the literature about conflict of interest in affiliated Turkish mutual funds. Also, it will be a basis for future work to investigate whether this overweight bias hurt fund investors and to determine the motives behind overweighting bias.

## **APPENDIX A**

### **SOME ANCILLARY STUFF**



$t = 1 \text{ to } 33, t \text{ as time}$

$AM = 1 \text{ to } 41, AM \text{ as asset management group}$

$FT1 = 1 \text{ to } , FT1 \text{ as fund type wrt Fund Type 1 categorization}$

$FT2 = 1 \text{ to } 27, FT2 \text{ as fund type wrt Fund Type 1 categorization}$

**All Parent Stocks** $\%_{0_{t(i)}, AM(j)}(x)$ : Fund X's AM(j) affiliated stocks' portfolio

value to total fund portfolio value at  $t(i)$

**Total Stocks** $\%_{t(i)}(x)$ : Fund X's stocks' portfolio value to total fund

portfolio value

**Own Parent Stocks** $\%_{0_{t(i)}}(x)$ : Fund X's only own AM affiliated stocks'

portfolio value to total fund portfolio value at  $t(i)$

**Own Parent Stocks to Total Stocks** $\%_{0_{t(i)}}(x)$

$$= \frac{\text{Own Parent Stocks}\%_{0_{t(i)}}(x)}{\text{Total Stocks}\%_{0_{t(i)}}(x)}$$

**Peers Parent Stocks to Total Stocks** $\%_{0_{t(i)}}(x)$ : Fund X's peers'

(excluding the fund itself

and the funds managed by the same AM of  $x$ )

average  $\frac{\text{All Parent Stocks}\%_{0_{t(i)}, AM(j)}(x)}{\text{Total Stocks}\%_{0_{t(i)}}(x)}$

where  $AM(j) = AM \text{ of } X$

**FT1 Peers Parent Stocks to Total Stocks** $\%_{0_{t(i)}}(x)$ : Fund X's peers'

( excluding the

fund itself and the funds managed by the same AM of  $x$ )

( and same FT1 type of  $x$ )

$$\text{average } \frac{\text{All Parent Stocks}_{0_{t(i),AM(j)}}(x)}{\text{Total Stocks}_{0_{t(i)}}(x)}$$

where  $AM(j) = AM \text{ of } X$  &  $FT1(x) = FT1 \text{ of } X$

**FT2 Peers Parent Stocks to Total Stocks** $_{0_{t(i)}}(x)$ : Fund  $X$ 's peers'

( excluding the

fund itself and the funds managed by the same AM of  $x$ )

( and same FT2 type of  $x$ )

$$\text{average } \frac{\text{All Parent Stocks}_{0_{t(i),AM(j)}}(x)}{\text{Total Stocks}_{0_{t(i)}}(x)}$$

where  $AM(j) = AM \text{ of } X$  &  $FT2(x) = FT2 \text{ of } X$

**Parent StocksOverWeight** $_{t(i)}(x)$

= **Own Parent Stocks to Total Stocks** $_{0_{t(i)}}(x)$

– **Peers Parent Stocks to Total Stocks** $_{0_{t(i)}}(x)$

**FT1 Parent StocksOverWeight** $_{t(i)}(x)$

= **Own Parent Stocks to Total Stocks** $_{0_{t(i)}}(x)$

– **FT1 Peers Parent Stocks to Total Stocks** $_{0_{t(i)}}(x)$

$$\begin{aligned}
& \textbf{FT2 Parent StocksOverWeight}_{t(i)}(x) = \\
& \textbf{Own Parent Stocks to Total Stocks}\%_{t(i)}(x) - \\
& \textbf{FT2 Peers Parent Stocks to Total Stocks}\%_{t(i)}(x)
\end{aligned}$$

$$\textbf{AM Parent StocksOverWeight}_{t(i),AM(j)}(x):$$

Average *Parent StocksOverWeight*<sub>t(i)</sub>(x) for the all funds managed by AM(j)

$$\textbf{AM FT1 Parent StocksOverWeight}_{t(i),AM(j),FT1(k)}(x):$$

Average *FT1 Parent StocksOverWeight*<sub>t(i)</sub>(x)  
for the all funds managed by AM(j) & fund type FT1(k)

$$\textbf{AM FT2 Parent StocksOverWeight}_{t(i),AM(j),FT2(k)}(x):$$

Average *FT2 Parent StocksOverWeight*<sub>t(i)</sub>(x)  
for the all funds managed by AM(j) & fund type FT2(k)

$$\textbf{All Parent C. Bonds}\%_{t(i),AM(j)}(x): \text{Fund X's AM(j) affilated}$$

*corporatebonds' portfolio value to total fund portfolio value at t(i)*

$$\textbf{Total C. Bonds}\%_{t(i)}(x): \text{Fund X's c.bonds' portfolio value to total fund}$$

*portfolio value*

$$\textbf{Own Parent C. Bonds}\%_{t(i)}(x): \text{Fund X's only own AM affilated c.bondss'}$$

*portfolio value to total fund portfolio value at t(i)*

**Own Parent C. Bonds to Total C. Bonds** $\%_{t(i)}(x)$

$$= \frac{\text{Own Parent C. Bonds}\%_{t(i)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)}$$

**Peers Parent C. Bonds to Total C. Bonds** $\%_{t(i)}(x)$ : Fund X's peers'

(excluding the fund itself and the funds managed by the same AM of x)

$$\text{average } \frac{\text{All Parent Stocks}\%_{t(i),AM(j)}(x)}{\text{Total Stocks}\%_{t(i)}(x)} \text{ where } AM(j) = \text{AM of } X$$

**FT1 Peers Parent C. Bonds to Total C. Bonds** $\%_{t(i)}(x)$ : Fund X's peers'

(excluding the fund itself and the funds managed by the same AM of x)

(and same FT1 type of x)

$$\text{average } \frac{\text{All Parent C. Bonds}\%_{t(i),AM(j)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)}$$

where  $AM(j) = \text{AM of } X$  &  $FT1(x) = \text{FT1 of } X$

**FT2 Peers Parent C. Bonds to Total C. Bonds** $\%_{t(i)}(x)$ : Fund X's peers'

(excluding

the fund itself and the funds managed by the same AM of x)

(and same FT2 type of x)

$$\text{average } \frac{\text{All Parent C. Bonds}\%_{t(i),AM(j)}(x)}{\text{Total C. Bonds}\%_{t(i)}(x)}$$

where  $AM(j) = \text{AM of } X$  &  $FT2(x) = \text{FT2 of } X$

**Parent C. BondsOverWeight** $_{t(i)}(x) =$

**Own Parent C. Bonds to Total C. Bonds** $\%_{t(i)}(x) -$

**Peers Parent C. Bonds to Total C. Bonds** $\%_{t(i)}(x)$

$$\begin{aligned}
& \mathbf{FT1\ Parent\ C.\ BondsOverWeight}_{t(i)}(x) = \\
& \mathbf{Own\ Parent\ C.\ Bonds\ to\ Total\ C.\ Bonds\%}_{t(i)}(x) - \\
& \mathbf{FT1\ Peers\ Parent\ C.\ Bonds\ to\ Total\ C.\ Bonds\%}_{t(i)}(x)
\end{aligned}$$

$$\begin{aligned}
& \mathbf{FT2\ Parent\ C.\ BondsOverWeight}_{t(i)}(x) = \\
& \mathbf{Own\ Parent\ C.\ Bonds\ to\ Total\ C.\ Bonds\%}_{t(i)}(x) - \\
& \mathbf{FT2\ Peers\ Parent\ C.\ Bonds\ to\ Total\ C.\ Bonds\%}_{t(i)}(x)
\end{aligned}$$

$$\begin{aligned}
& \mathbf{AM\ Parent\ C.\ BondsOverWeight}_{t(i),AM(j)}(x): \\
& \text{Average } \mathbf{Parent\ C.\ BondsOverWeight}_{t(i)}(x) \text{ for the all funds managed by AM(j)}
\end{aligned}$$

$$\begin{aligned}
& \mathbf{AM\ FT1\ Parent\ C.\ BondsOverWeight}_{t(i),AM(j),FT1(k)}(x): \\
& \text{Average } \mathbf{FT1\ Parent\ C.\ BondsOverWeight}_{t(i)}(x) \\
& \text{for the all funds managed by AM(j) \& fund type FT1(k)}
\end{aligned}$$

**AM FT2 Parent C. BondsOverWeight<sub>t(i),AM(j),FT2(k)</sub>(x):**

Average FT2 Parent C. BondsOverWeight<sub>t(i)</sub>(x)

for the all funds managed by AM(j) & fund type FT2(k)

### FT1 Affiliated Stocks OW Results

| Alternative Funds |          |          |          |          |           |          |         |           |         |        |            |          |           |
|-------------------|----------|----------|----------|----------|-----------|----------|---------|-----------|---------|--------|------------|----------|-----------|
|                   | AK PY\$  | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ  | GEDİK P | ICBC PY\$ | İŞ PY\$ | KUTMAN | ŞEKER PY\$ | VAKİF PY | YAPI PY\$ |
| Mean              | 0.31%    | NaN      | NaN      | 0.00%    | NaN       | 5.30%    | NaN     | NaN       | NaN     | NaN    | 0.00%      | NaN      | -0.71%    |
| Standard          | 25.86%   | NaN      | NaN      | 0.00%    | NaN       | 10.24%   | NaN     | NaN       | NaN     | NaN    | 0.00%      | NaN      | 12.58%    |
| Min               | -15.14%  | NaN      | NaN      | 0.00%    | NaN       | -14.92%  | NaN     | NaN       | NaN     | NaN    | 0.00%      | NaN      | -18.51%   |
| Max               | 79.15%   | NaN      | NaN      | 0.00%    | NaN       | 27.46%   | NaN     | NaN       | NaN     | NaN    | 0.00%      | NaN      | 20.25%    |
| Intercept         | 0.31%    | NaN      | NaN      | 0.00%    | NaN       | 5.30%    | NaN     | NaN       | NaN     | NaN    | 0.00%      | NaN      | -0.71%    |
| pvalue            | 9.7E-01  | NaN      | NaN      | NaN      | NaN       | 6.4E-03  | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 8.2E-01   |
| tStat             | 4.3E-02  | NaN      | NaN      | NaN      | NaN       | 2.9E+00  | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | -2.3E-01  |
| Observati         | 13       | NaN      | NaN      | 10       | NaN       | 32       | NaN     | NaN       | NaN     | NaN    | 5          | NaN      | 17        |
| h                 | 0        | NaN      | NaN      | NaN      | NaN       | 1        | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 0         |
| p                 | 4.83E-01 | NaN      | NaN      | NaN      | NaN       | 3.15E-03 | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 5.91E-01  |

| Debt Instruments Funds |         |          |          |          |           |          |         |           |         |        |            |          |           |
|------------------------|---------|----------|----------|----------|-----------|----------|---------|-----------|---------|--------|------------|----------|-----------|
|                        | AK PY\$ | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ  | GEDİK P | ICBC PY\$ | İŞ PY\$ | KUTMAN | ŞEKER PY\$ | VAKİF PY | YAPI PY\$ |
| Mean                   | NaN     | NaN      | NaN      | 0.00%    | 0.00%     | 8.66%    | 0.00%   | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Standard               | NaN     | NaN      | NaN      | 0.00%    | 0.00%     | 2.02%    | 0.00%   | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Min                    | NaN     | NaN      | NaN      | 0.00%    | 0.00%     | 6.90%    | 0.00%   | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Max                    | NaN     | NaN      | NaN      | 0.00%    | 0.00%     | 10.67%   | 0.00%   | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Intercept              | NaN     | NaN      | NaN      | 0.00%    | 0.00%     | 8.66%    | 0.00%   | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| pvalue                 | NaN     | NaN      | NaN      | NaN      | NaN       | 1.3E-02  | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| tStat                  | NaN     | NaN      | NaN      | NaN      | NaN       | 8.6E+00  | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Observati              | NaN     | NaN      | NaN      | 5        | 19        | 4        | 6       | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| h                      | NaN     | NaN      | NaN      | NaN      | NaN       | 1        | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| p                      | NaN     | NaN      | NaN      | NaN      | NaN       | 1.67E-03 | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |

| Exchange Traded Funds |         |          |          |          |           |         |         |           |         |        |            |          |           |
|-----------------------|---------|----------|----------|----------|-----------|---------|---------|-----------|---------|--------|------------|----------|-----------|
|                       | AK PY\$ | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ | GEDİK P | ICBC PY\$ | İŞ PY\$ | KUTMAN | ŞEKER PY\$ | VAKİF PY | YAPI PY\$ |
| Mean                  | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Standard              | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Min                   | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Max                   | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Intercept             | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| pvalue                | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| tStat                 | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Observati             | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| h                     | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| p                     | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |

| Fund of Funds |         |          |          |          |           |         |         |           |         |        |            |          |           |
|---------------|---------|----------|----------|----------|-----------|---------|---------|-----------|---------|--------|------------|----------|-----------|
|               | AK PY\$ | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ | GEDİK P | ICBC PY\$ | İŞ PY\$ | KUTMAN | ŞEKER PY\$ | VAKIF PY | YAPI PY\$ |
| Mean          | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 12.16%    |
| Standard      | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 19.33%    |
| Min           | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | -10.03%   |
| Max           | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 49.98%    |
| Intercept     | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 12.16%    |
| pvalue        | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 1.7E-02   |
| tStat         | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 2.7E+00   |
| Observati     | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 18        |
| h             | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 1         |
| p             | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | 8.09E-03  |

| Mixed & Variable Funds |          |          |          |          |           |          |         |           |          |          |            |          |           |
|------------------------|----------|----------|----------|----------|-----------|----------|---------|-----------|----------|----------|------------|----------|-----------|
|                        | AK PY\$  | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ  | GEDİK P | ICBC PY\$ | İŞ PY\$  | KUTMAN   | ŞEKER PY\$ | VAKIF PY | YAPI PY\$ |
| Mean                   | -3.15%   | 0.00%    | NaN      | -0.11%   | -0.04%    | 0.45%    | 0.00%   | -0.01%    | -0.50%   | 0.74%    | -0.01%     | -0.12%   | 4.40%     |
| Standard               | 6.21%    | 0.00%    | NaN      | 0.29%    | 0.14%     | 3.74%    | 0.00%   | 0.02%     | 5.24%    | 0.91%    | 0.02%      | 4.26%    | 6.12%     |
| Min                    | -9.56%   | 0.00%    | NaN      | -1.56%   | -0.74%    | -6.48%   | 0.00%   | -0.08%    | -12.63%  | -0.89%   | -0.07%     | -3.75%   | -5.06%    |
| Max                    | 23.02%   | 0.00%    | NaN      | 0.00%    | 0.00%     | 4.74%    | 0.00%   | 0.00%     | 22.08%   | 1.93%    | 0.00%      | 19.40%   | 22.44%    |
| Intercept              | -3.15%   | 0.00%    | NaN      | -0.11%   | -0.04%    | 0.45%    | 0.00%   | -0.01%    | -0.50%   | 0.74%    | -0.01%     | -0.12%   | 4.40%     |
| pvalue                 | 7.5E-03  | NaN      | NaN      | 3.0E-02  | 1.3E-01   | 5.0E-01  | NaN     | 5.7E-03   | 5.9E-01  | 7.2E-05  | 2.3E-03    | 8.8E-01  | 3.2E-04   |
| tStat                  | -2.9E+00 | NaN      | NaN      | -2.3E+00 | -1.5E+00  | 6.8E-01  | NaN     | -3.0E+00  | -5.4E-01 | 4.6E+00  | -3.3E+00   | -1.6E-01 | 4.1E+00   |
| Observati              | 32       | 31       | NaN      | 32       | 32        | 32       | 31      | 30        | 32       | 32       | 32         | 32       | 32        |
| h                      | 0        | NaN      | NaN      | 0        | 0         | 0        | NaN     | 0         | 0        | 1        | 0          | 0        | 1         |
| p                      | 9.96E-01 | NaN      | NaN      | 9.85E-01 | 9.34E-01  | 2.52E-01 | NaN     | 9.97E-01  | 7.04E-01 | 3.38E-05 | 9.99E-01   | 5.61E-01 | 1.53E-04  |

| Money Market Funds |         |          |          |          |           |         |         |           |         |        |            |          |           |
|--------------------|---------|----------|----------|----------|-----------|---------|---------|-----------|---------|--------|------------|----------|-----------|
|                    | AK PY\$ | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ | GEDİK P | ICBC PY\$ | İŞ PY\$ | KUTMAN | ŞEKER PY\$ | VAKIF PY | YAPI PY\$ |
| Mean               | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Standard           | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Min                | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Max                | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Intercept          | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| pvalue             | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| tStat              | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Observati          | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| h                  | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| p                  | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |

| Other Funds |         |          |          |          |           |         |         |           |         |        |            |          |           |
|-------------|---------|----------|----------|----------|-----------|---------|---------|-----------|---------|--------|------------|----------|-----------|
|             | AK PY\$ | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ | GEDİK P | ICBC PY\$ | İŞ PY\$ | KUTMAN | ŞEKER PY\$ | VAKIF PY | YAPI PY\$ |
| Mean        | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Standard    | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Min         | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Max         | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Intercept   | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| pvalue      | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| tStat       | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| Observati   | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| h           | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |
| p           | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | NaN     | NaN    | NaN        | NaN      | NaN       |

| Participation Funds |         |          |          |          |           |         |         |           |          |        |            |          |           |
|---------------------|---------|----------|----------|----------|-----------|---------|---------|-----------|----------|--------|------------|----------|-----------|
|                     | AK PY\$ | ATA PY\$ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ | GEDİK P | ICBC PY\$ | İŞ PY\$  | KUTMAN | ŞEKER PY\$ | VAKIF PY | YAPI PY\$ |
| Mean                | NaN     | NaN      | NaN      | NaN      | NaN       | 0.00%   | NaN     | NaN       | 0.73%    | NaN    | NaN        | -0.27%   | NaN       |
| Standard            | NaN     | NaN      | NaN      | NaN      | NaN       | 0.00%   | NaN     | NaN       | 3.69%    | NaN    | NaN        | 0.25%    | NaN       |
| Min                 | NaN     | NaN      | NaN      | NaN      | NaN       | 0.00%   | NaN     | NaN       | -7.01%   | NaN    | NaN        | -0.76%   | NaN       |
| Max                 | NaN     | NaN      | NaN      | NaN      | NaN       | 0.00%   | NaN     | NaN       | 5.87%    | NaN    | NaN        | -0.07%   | NaN       |
| Intercept           | NaN     | NaN      | NaN      | NaN      | NaN       | 0.00%   | NaN     | NaN       | 0.73%    | NaN    | NaN        | -0.27%   | NaN       |
| pvalue              | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | 3.8E-01  | NaN    | NaN        | 5.7E-02  | NaN       |
| tStat               | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | 9.1E-01  | NaN    | NaN        | -2.7E+00 | NaN       |
| Observati           | NaN     | NaN      | NaN      | NaN      | NaN       | 2       | NaN     | NaN       | 21       | NaN    | NaN        | 6        | NaN       |
| h                   | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | 0        | NaN    | NaN        | 0        | NaN       |
| p                   | NaN     | NaN      | NaN      | NaN      | NaN       | NaN     | NaN     | NaN       | 1.88E-01 | NaN    | NaN        | 9.77E-01 | NaN       |

| Precious Metals Funds |        |         |          |          |           |            |          |          |        |        |           |          |          |
|-----------------------|--------|---------|----------|----------|-----------|------------|----------|----------|--------|--------|-----------|----------|----------|
|                       | AK PYŞ | ATA PYŞ | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ PY | GEDİK PY | ICBC PYŞ | İŞ PYŞ | KUTMAN | ŞEKER PYŞ | VAKIF PY | YAPI PYŞ |
| Mean                  | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | 0.00%  | NaN    | NaN       | NaN      | 0.00%    |
| Standard Deviation    | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | 0.00%  | NaN    | NaN       | NaN      | 0.00%    |
| Min                   | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | 0.00%  | NaN    | NaN       | NaN      | 0.00%    |
| Max                   | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | 0.00%  | NaN    | NaN       | NaN      | 0.00%    |
| Intercept             | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | 0.00%  | NaN    | NaN       | NaN      | 0.00%    |
| pvalue                | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | NaN    | NaN    | NaN       | NaN      | NaN      |
| tStat                 | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | NaN    | NaN    | NaN       | NaN      | NaN      |
| Observations          | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | 3      | NaN    | NaN       | NaN      | 2        |
| h                     | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | NaN    | NaN    | NaN       | NaN      | NaN      |
| p                     | NaN    | NaN     | NaN      | NaN      | NaN       | NaN        | NaN      | NaN      | NaN    | NaN    | NaN       | NaN      | NaN      |

| Share Funds Stocks OW Bias |          |          |          |          |           |            |          |          |          |          |           |          |          |
|----------------------------|----------|----------|----------|----------|-----------|------------|----------|----------|----------|----------|-----------|----------|----------|
|                            | AK PYŞ   | ATA PYŞ  | ATLAS PY | DENİZ PY | FINANS PY | GARANTİ PY | GEDİK PY | ICBC PYŞ | İŞ PYŞ   | KUTMAN   | ŞEKER PYŞ | VAKIF PY | YAPI PYŞ |
| Mean                       | 3.52%    | 0.24%    | -0.14%   | 0.00%    | 0.00%     | 0.82%      | 0.00%    | -0.02%   | 10.62%   | 0.13%    | -0.07%    | -0.21%   | 9.40%    |
| Standard Deviation         | 4.26%    | 0.67%    | 0.05%    | 0.00%    | 0.00%     | 2.42%      | 0.01%    | 0.05%    | 1.71%    | 0.40%    | 0.04%     | 0.42%    | 4.86%    |
| Min                        | -1.89%   | 0.00%    | -0.26%   | 0.00%    | -0.02%    | -4.83%     | 0.00%    | -0.17%   | 2.02%    | -0.35%   | -0.16%    | -2.04%   | -0.28%   |
| Max                        | 24.24%   | 2.41%    | -0.08%   | 0.00%    | 0.00%     | 3.34%      | 0.03%    | 0.00%    | 12.48%   | 1.15%    | -0.02%    | 0.24%    | 16.98%   |
| Intercept                  | 3.52%    | 0.24%    | -0.14%   | 0.00%    | 0.00%     | 0.82%      | 0.00%    | -0.02%   | 10.62%   | 0.13%    | -0.07%    | -0.21%   | 9.40%    |
| pvalue                     | 5.8E-05  | 5.7E-02  | 2.1E-10  | 1.2E-02  | 4.6E-02   | 6.5E-02    | 1.3E-01  | 1.2E-02  | 6.7E-26  | 8.4E-02  | 3.6E-11   | 7.3E-03  | 5.4E-12  |
| tStat                      | 4.7E+00  | 2.0E+00  | -1.2E+01 | -2.7E+00 | -2.1E+00  | 1.9E+00    | 1.6E+00  | -2.7E+00 | 3.5E+01  | 1.8E+00  | -1.0E+01  | -2.9E+00 | 1.1E+01  |
| Observations               | 32       | 31       | 21       | 32       | 32        | 32         | 30       | 29       | 32       | 32       | 32        | 32       | 32       |
| h                          | 1        | 1        | 0        | 0        | 0         | 1          | 0        | 0        | 1        | 1        | 0         | 0        | 1        |
| p                          | 2.70E-05 | 2.84E-02 | 1.00E+00 | 9.94E-01 | 9.77E-01  | 3.23E-02   | 6.48E-02 | 9.94E-01 | 8.31E-27 | 4.20E-02 | 1.00E+00  | 9.96E-01 | 1.78E-12 |

## FT1 Affiliated Corporate Bonds OW Results

| Alternative Funds  |            |          |            |          |          |           |            |           |           |          |             |           |  |
|--------------------|------------|----------|------------|----------|----------|-----------|------------|-----------|-----------|----------|-------------|-----------|--|
|                    | AK PYŞ     | ATLAS PY | BURGAN PY  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ PY | GEDİK PYŞ | İNG PYŞ   | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |  |
| Mean               | 58.50%     | -2.12%   | NaN        | 5.22%    | NaN      | 0.51%     | -2.93%     | NaN       | NaN       | NaN      | 42.74%      | -4.09%    |  |
| Standard Deviation | 28.48%     | 0.52%    | NaN        | 9.70%    | NaN      | 5.81%     | 9.17%      | NaN       | NaN       | NaN      | 25.38%      | 1.11%     |  |
| Min                | -2.05%     | -2.93%   | NaN        | -0.63%   | NaN      | -3.13%    | -26.37%    | NaN       | NaN       | NaN      | 7.50%       | -5.34%    |  |
| Max                | 98.95%     | -1.56%   | NaN        | 44.21%   | NaN      | 21.99%    | 19.72%     | NaN       | NaN       | NaN      | 78.00%      | -3.22%    |  |
| Intercept          | 58.50%     | -2.12%   | NaN        | 5.22%    | NaN      | 0.51%     | -2.93%     | NaN       | NaN       | NaN      | 42.74%      | -4.09%    |  |
| pvalue             | 0.0000     | 0.0000   | NaN        | 0.0064   | NaN      | 0.7285    | 0.0805     | NaN       | NaN       | NaN      | 0.0003      | 0.0984    |  |
| tStat              | 8.2158     | -11.5345 | NaN        | 2.9485   | NaN      | 0.3542    | -1.8086    | NaN       | NaN       | NaN      | 5.5859      | -6.4167   |  |
| Observations       | 16         | 8        | NaN        | 30       | NaN      | 16        | 32         | NaN       | NaN       | NaN      | 11          | 3         |  |
| h                  | 1          | 0        | NaN        | 1        | NaN      | 0         | 0          | NaN       | NaN       | NaN      | 1           | 0         |  |
| p                  | 0.0000     | 1.0000   | NaN        | 0.0031   | NaN      | 0.3641    | 0.9599     | NaN       | NaN       | NaN      | 0.0001      | 0.9883    |  |
|                    | MÜKAFAA PY | OYAKK PY | QINVEST PY | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ  | YAPI PYŞ  | ZİRAAT PY | MEKSA PY | TURKISH PYŞ |           |  |
| Mean               | NaN        | 8.47%    | NaN        | 74.10%   | 0.00%    | 1.29%     | NaN        | 22.77%    | NaN       | NaN      | NaN         |           |  |
| Standard Deviation | NaN        | 15.53%   | NaN        | 15.05%   | 0.00%    | 2.75%     | NaN        | 26.63%    | NaN       | NaN      | NaN         |           |  |
| Min                | NaN        | -0.98%   | NaN        | 48.68%   | 0.00%    | 0.00%     | NaN        | -11.93%   | NaN       | NaN      | NaN         |           |  |
| Max                | NaN        | 26.39%   | NaN        | 85.55%   | 0.00%    | 7.92%     | NaN        | 93.56%    | NaN       | NaN      | NaN         |           |  |
| Intercept          | NaN        | 8.47%    | NaN        | 74.10%   | 0.00%    | 1.29%     | NaN        | 22.77%    | NaN       | NaN      | NaN         |           |  |
| pvalue             | NaN        | 0.5180   | NaN        | 0.0016   | NaN      | 0.0125    | NaN        | 0.0000    | NaN       | NaN      | NaN         |           |  |
| tStat              | NaN        | 0.9449   | NaN        | 11.0119  | NaN      | 2.6581    | NaN        | 4.8362    | NaN       | NaN      | NaN         |           |  |
| Observations       | NaN        | 3        | NaN        | 5        | 13       | 32        | NaN        | 32        | NaN       | NaN      | NaN         |           |  |
| h                  | NaN        | 0        | NaN        | 1        | NaN      | 1         | NaN        | 1         | NaN       | NaN      | NaN         |           |  |
| p                  | NaN        | 0.2222   | NaN        | 0.0002   | NaN      | 0.0062    | NaN        | 0.0000    | NaN       | NaN      | NaN         |           |  |

| Debt Instruments Funds Affiliated C.Bonds OW Bias |          |          |         |          |          |           |           |           |          |          |             |           |
|---------------------------------------------------|----------|----------|---------|----------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                                                   | AK PYŞ   | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean                                              | 3.66%    | 5.41%    | 10.43%  | 10.82%   | 1.89%    | 8.62%     | 3.17%     | 4.47%     | -0.22%   | 4.59%    | NaN         | 0.05%     |
| Standard Deviation                                | 2.90%    | 0.00%    | 5.38%   | 5.92%    | 4.57%    | 4.58%     | 3.51%     | 4.12%     | 0.28%    | 1.84%    | NaN         | 2.90%     |
| Min                                               | 0.24%    | 5.41%    | 0.00%   | 1.20%    | -3.95%   | -3.08%    | -0.72%    | -0.20%    | -0.83%   | -0.41%   | NaN         | -2.12%    |
| Max                                               | 10.73%   | 5.41%    | 16.81%  | 34.96%   | 9.12%    | 22.97%    | 13.43%    | 15.78%    | 0.00%    | 8.13%    | NaN         | 8.65%     |
| Intercept                                         | 3.66%    | 5.41%    | 10.43%  | 10.82%   | 1.89%    | 8.62%     | 3.17%     | 4.47%     | -0.22%   | 4.59%    | NaN         | 0.05%     |
| pvalue                                            | 0.0000   | NaN      | 0.0000  | 0.0000   | 0.0319   | 0.0000    | 0.0000    | 0.0000    | 0.0001   | 0.0000   | NaN         | 0.9359    |
| tStat                                             | 7.1396   | Inf      | 10.0666 | 10.3314  | 2.2590   | 10.6506   | 5.1186    | 6.0383    | - 4.4757 | 14.1523  | NaN         | 0.0815    |
| Observations                                      | 32       | 1        | 27      | 32       | 30       | 32        | 32        | 31        | 32       | 32       | NaN         | 20        |
| h                                                 | 1        | NaN      | 1       | 1        | 1        | 1         | 1         | 1         | 0        | 1        | NaN         | 0         |
| p                                                 | 0.0000   | NaN      | 0.0000  | 0.0000   | 0.0158   | 0.0000    | 0.0000    | 0.0000    | 1.0000   | 0.0000   | NaN         | 0.4679    |
|                                                   | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean                                              | NaN      | 3.48%    | NaN     | 23.26%   | 3.47%    | NaN       | 2.24%     | 8.68%     | -0.04%   | NaN      | -0.20%      |           |
| Standard Deviation                                | NaN      | 5.26%    | NaN     | 17.47%   | 5.12%    | NaN       | 2.66%     | 3.22%     | 1.17%    | NaN      | 0.13%       |           |
| Min                                               | NaN      | -1.02%   | NaN     | -1.12%   | -0.32%   | NaN       | -3.71%    | 3.44%     | -3.77%   | NaN      | -0.44%      |           |
| Max                                               | NaN      | 17.36%   | NaN     | 66.97%   | 16.90%   | NaN       | 6.63%     | 15.93%    | 1.93%    | NaN      | -0.07%      |           |
| Intercept                                         | NaN      | 3.48%    | NaN     | 23.26%   | 3.47%    | NaN       | 2.24%     | 8.68%     | -0.04%   | NaN      | -0.20%      |           |
| pvalue                                            | NaN      | 0.0008   | NaN     | 0.0000   | 0.0006   | NaN       | 0.0000    | 0.0000    | 0.8364   | NaN      | 0.0052      |           |
| tStat                                             | NaN      | 3.7377   | NaN     | 7.5309   | 3.8322   | NaN       | 4.7625    | 15.2350   | - 0.2083 | NaN      | - 4.2745    |           |
| Observations                                      | NaN      | 32       | NaN     | 32       | 32       | NaN       | 32        | 32        | 32       | NaN      | 8           |           |
| h                                                 | NaN      | 1        | NaN     | 1        | 1        | NaN       | 1         | 1         | 0        | NaN      | 0           |           |
| p                                                 | NaN      | 0.0004   | NaN     | 0.0000   | 0.0003   | NaN       | 0.0000    | 0.0000    | 0.5818   | NaN      | 0.9982      |           |

| Exchange Traded Funds |          |          |         |          |          |           |           |           |          |          |             |           |
|-----------------------|----------|----------|---------|----------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                       | AK PYŞ   | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Standard Deviation    | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Min                   | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Max                   | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Intercept             | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| pvalue                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| tStat                 | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Observations          | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| h                     | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| p                     | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
|                       | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Standard Deviation    | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Min                   | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Max                   | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Intercept             | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| pvalue                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| tStat                 | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Observations          | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| h                     | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| p                     | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |

| Fund of Funds      |          |          |         |          |          |           |           |           |          |          |             |           |
|--------------------|----------|----------|---------|----------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                    | AK PYŞ   | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTİ P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean               | 0.00%    | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Standard Deviation | 0.00%    | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Min                | 0.00%    | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Max                | 0.00%    | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Intercept          | 0.00%    | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| pvalue             | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| tStat              | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Observations       | 1        | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| h                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| p                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
|                    | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean               | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | 0.00%     | NaN      | NaN      | NaN         |           |
| Standard Deviation | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | 0.00%     | NaN      | NaN      | NaN         |           |
| Min                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | 0.00%     | NaN      | NaN      | NaN         |           |
| Max                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | 0.00%     | NaN      | NaN      | NaN         |           |
| Intercept          | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | 0.00%     | NaN      | NaN      | NaN         |           |
| pvalue             | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| tStat              | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Observations       | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | 3         | NaN      | NaN      | NaN         |           |
| h                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| p                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |

| Mixed&Variable Funds Affiliated C.Bonds OW Bias |          |          |         |          |           |           |            |            |          |          |              |           |
|-------------------------------------------------|----------|----------|---------|----------|-----------|-----------|------------|------------|----------|----------|--------------|-----------|
|                                                 | AK PY\$  | ATLAS PY | BURGAN  | DENİZ PY | FİBA PY\$ | FINANS PY | GARANTİ P  | GEDİK PY\$ | İNG PY\$ | İŞ PY\$  | KT PY\$      | KUTMAN PY |
| Mean                                            | 1.73%    | 4.95%    | NaN     | 7.39%    | 2.39%     | 18.61%    | 3.18%      | 5.47%      | 13.43%   | 10.54%   | NaN          | 3.38%     |
| Standard Deviation                              | 2.68%    | 3.38%    | NaN     | 5.07%    | 4.03%     | 9.74%     | 2.92%      | 6.86%      | 16.14%   | 3.61%    | NaN          | 1.90%     |
| Min                                             | -1.96%   | -1.13%   | NaN     | 2.19%    | -1.54%    | 0.43%     | -1.77%     | -0.23%     | 0.00%    | 2.43%    | NaN          | 1.45%     |
| Max                                             | 7.87%    | 8.94%    | NaN     | 23.55%   | 14.89%    | 38.46%    | 9.38%      | 18.48%     | 42.60%   | 16.40%   | NaN          | 6.98%     |
| Intercept                                       | 1.73%    | 4.95%    | NaN     | 7.39%    | 2.39%     | 18.61%    | 3.18%      | 5.47%      | 13.43%   | 10.54%   | NaN          | 3.38%     |
| pvalue                                          | 0.0010   | 0.0000   | NaN     | 0.0000   | 0.0030    | 0.0000    | 0.0000     | 0.0001     | 0.0001   | 0.0000   | NaN          | 0.0001    |
| tStat                                           | 3.6503   | 6.5443   | NaN     | 8.2416   | 3.2458    | 10.8079   | 6.1408     | 4.4382     | 4.7057   | 16.5015  | NaN          | 6.1725    |
| Observations                                    | 32       | 20       | NaN     | 32       | 30        | 32        | 32         | 31         | 32       | 32       | NaN          | 12        |
| h                                               | 1        | 1        | NaN     | 1        | 1         | 1         | 1          | 1          | 1        | 1        | NaN          | 1         |
| p                                               | 0.0005   | 0.0000   | NaN     | 0.0000   | 0.0015    | 0.0000    | 0.0000     | 0.0001     | 0.0000   | 0.0000   | NaN          | 0.0000    |
|                                                 | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PY\$  | ÜNLÜ PY\$ | VAKİF PY\$ | YAPI PY\$  | ZİRAAT P | MEKSA PY | TURKISH PY\$ |           |
| Mean                                            | NaN      | 2.65%    | 0.00%   | 28.85%   | 7.09%     | 0.21%     | 5.67%      | 13.64%     | -1.84%   | 0.00%    | NaN          |           |
| Standard Deviation                              | NaN      | 6.65%    | 0.00%   | 37.68%   | 10.07%    | 0.46%     | 7.88%      | 5.01%      | 1.56%    | 0.00%    | NaN          |           |
| Min                                             | NaN      | -2.42%   | 0.00%   | -1.03%   | -0.21%    | 0.00%     | -1.08%     | 5.70%      | -9.66%   | 0.00%    | NaN          |           |
| Max                                             | NaN      | 18.35%   | 0.00%   | 99.31%   | 32.92%    | 1.72%     | 28.48%     | 23.13%     | -0.48%   | 0.00%    | NaN          |           |
| Intercept                                       | NaN      | 2.65%    | 0.00%   | 28.85%   | 7.09%     | 0.21%     | 5.67%      | 13.64%     | -1.84%   | 0.00%    | NaN          |           |
| pvalue                                          | NaN      | 0.0314   | NaN     | 0.0109   | 0.0004    | 0.0166    | 0.0003     | 0.0000     | 0.0000   | NaN      | NaN          |           |
| tStat                                           | NaN      | 2.2581   | NaN     | 2.9654   | 3.9806    | 2.5371    | 4.0737     | 15.3981    | - 6.6539 | NaN      | NaN          |           |
| Observations                                    | NaN      | 32       | 31      | 15       | 32        | 32        | 32         | 32         | 32       | 8        | NaN          |           |
| h                                               | NaN      | 1        | NaN     | 1        | 1         | 1         | 1          | 1          | 0        | NaN      | NaN          |           |
| p                                               | NaN      | 0.0156   | NaN     | 0.0051   | 0.0002    | 0.0082    | 0.0001     | 0.0000     | 1.0000   | NaN      | NaN          |           |

| Money Market Funds Affiliated C.Bonds OW Bias |          |          |         |          |           |           |            |            |           |          |              |           |
|-----------------------------------------------|----------|----------|---------|----------|-----------|-----------|------------|------------|-----------|----------|--------------|-----------|
|                                               | AK PY\$  | ATLAS PY | BURGAN  | DENİZ PY | FİBA PY\$ | FINANS PY | GARANTİ P  | GEDİK PY\$ | İNG PY\$  | İŞ PY\$  | KT PY\$      | KUTMAN PY |
| Mean                                          | 13.03%   | NaN      | NaN     | 15.75%   | 9.82%     | 7.49%     | 7.18%      | NaN        | 5.96%     | -2.49%   | NaN          | -13.79%   |
| Standard Deviation                            | 18.09%   | NaN      | NaN     | 7.93%    | 13.72%    | 12.12%    | 6.11%      | NaN        | 6.43%     | 6.90%    | NaN          | 33.00%    |
| Min                                           | -3.19%   | NaN      | NaN     | 1.44%    | -4.56%    | -6.70%    | -3.35%     | NaN        | 0.00%     | -12.01%  | NaN          | -102.62%  |
| Max                                           | 86.79%   | NaN      | NaN     | 33.55%   | 40.82%    | 44.05%    | 21.80%     | NaN        | 19.11%    | 12.07%   | NaN          | 3.96%     |
| Intercept                                     | 13.03%   | NaN      | NaN     | 15.75%   | 9.82%     | 7.49%     | 7.18%      | NaN        | 5.96%     | -2.49%   | NaN          | -13.79%   |
| pvalue                                        | 0.0003   | NaN      | NaN     | 0.0000   | 0.0005    | 0.0015    | 0.0000     | NaN        | 0.0000    | 0.1863   | NaN          | 0.1991    |
| tStat                                         | 4.0740   | NaN      | NaN     | 11.2371  | 3.9209    | 3.4960    | 6.6434     | NaN        | 5.2409    | - 1.3953 | NaN          | - 1.3861  |
| Observations                                  | 32       | NaN      | NaN     | 32       | 30        | 32        | 32         | NaN        | 32        | 15       | NaN          | 11        |
| h                                             | 1        | NaN      | NaN     | 1        | 1         | 1         | 1          | NaN        | 1         | 0        | NaN          | 0         |
| p                                             | 0.0001   | NaN      | NaN     | 0.0000   | 0.0002    | 0.0007    | 0.0000     | NaN        | 0.0000    | 0.9077   | NaN          | 0.9021    |
|                                               | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PY\$  | ÜNLÜ PY\$ | VAKİF PY\$ | YAPI PY\$  | ZİRAAT P  | MEKSA PY | TURKISH PY\$ |           |
| Mean                                          | NaN      | NaN      | 0.00%   | NaN      | 1.01%     | NaN       | 6.24%      | 6.35%      | -5.89%    | NaN      | 0.05%        |           |
| Standard Deviation                            | NaN      | NaN      | 0.00%   | NaN      | 3.08%     | NaN       | 4.82%      | 12.78%     | 2.61%     | NaN      | 0.48%        |           |
| Min                                           | NaN      | NaN      | 0.00%   | NaN      | -2.86%    | NaN       | 1.35%      | -2.46%     | -11.45%   | NaN      | -0.49%       |           |
| Max                                           | NaN      | NaN      | 0.00%   | NaN      | 9.95%     | NaN       | 17.05%     | 53.07%     | -0.80%    | NaN      | 0.55%        |           |
| Intercept                                     | NaN      | NaN      | 0.00%   | NaN      | 1.01%     | NaN       | 6.24%      | 6.35%      | -5.89%    | NaN      | 0.05%        |           |
| pvalue                                        | NaN      | NaN      | NaN     | NaN      | 0.1720    | NaN       | 0.0000     | 0.0086     | 0.0000    | NaN      | 0.8476       |           |
| tStat                                         | NaN      | NaN      | NaN     | NaN      | 1.4261    | NaN       | 7.3220     | 2.8118     | - 12.7713 | NaN      | 0.2180       |           |
| Observations                                  | NaN      | NaN      | 26      | NaN      | 19        | NaN       | 32         | 32         | 32        | NaN      | 4            |           |
| h                                             | NaN      | NaN      | NaN     | NaN      | 0         | NaN       | 1          | 1          | 0         | NaN      | 0            |           |
| p                                             | NaN      | NaN      | NaN     | NaN      | 0.0855    | NaN       | 0.0000     | 0.0042     | 1.0000    | NaN      | 0.4207       |           |

| Other              |          |          |         |          |           |           |            |            |          |          |              |           |
|--------------------|----------|----------|---------|----------|-----------|-----------|------------|------------|----------|----------|--------------|-----------|
|                    | AK PY\$  | ATLAS PY | BURGAN  | DENİZ PY | FİBA PY\$ | FINANS PY | GARANTİ P  | GEDİK PY\$ | İNG PY\$ | İŞ PY\$  | KT PY\$      | KUTMAN PY |
| Mean               | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| Standard Deviation | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| Min                | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| Max                | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| Intercept          | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| pvalue             | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| tStat              | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| Observations       | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| h                  | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
| p                  | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          | NaN       |
|                    | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PY\$  | ÜNLÜ PY\$ | VAKİF PY\$ | YAPI PY\$  | ZİRAAT P | MEKSA PY | TURKISH PY\$ |           |
| Mean               | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| Standard Deviation | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| Min                | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| Max                | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| Intercept          | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| pvalue             | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| tStat              | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| Observations       | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| h                  | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |
| p                  | NaN      | NaN      | NaN     | NaN      | NaN       | NaN       | NaN        | NaN        | NaN      | NaN      | NaN          |           |

| Participation      |              |          |         |          |          |           |              |           |          |           |             |           |
|--------------------|--------------|----------|---------|----------|----------|-----------|--------------|-----------|----------|-----------|-------------|-----------|
|                    | AK PYŞ       | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTI P    | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ    | KT PYŞ      | KUTMAN PY |
| Mean               | -0.17%       | NaN      | NaN     | NaN      | NaN      | NaN       | -0.43%       | NaN       | NaN      | 0.65%     | -9.24%      | NaN       |
| Standard Deviation | 0.32%        | NaN      | NaN     | NaN      | NaN      | NaN       | 0.77%        | NaN       | NaN      | 1.21%     | 40.07%      | NaN       |
| Min                | -1.00%       | NaN      | NaN     | NaN      | NaN      | NaN       | -2.69%       | NaN       | NaN      | 0.00%     | -84.19%     | NaN       |
| Max                | 0.00%        | NaN      | NaN     | NaN      | NaN      | NaN       | 0.00%        | NaN       | NaN      | 3.38%     | 37.76%      | NaN       |
| Intercept          | -0.17%       | NaN      | NaN     | NaN      | NaN      | NaN       | -0.43%       | NaN       | NaN      | 0.65%     | -9.24%      | NaN       |
| pvalue             | 5.65E-02     | NaN      | NaN     | NaN      | NaN      | NaN       | 0.048681015  | NaN       | NaN      | 0.0242783 | 0.6024138   | NaN       |
| tStat              | -2.093184741 | NaN      | NaN     | NaN      | NaN      | NaN       | -2.174978248 | NaN       | NaN      | 2.4474462 | -0.5647453  | NaN       |
| Observations       | 15           | NaN      | NaN     | NaN      | NaN      | NaN       | 15           | NaN       | NaN      | 21        | 6           | NaN       |
| h                  | 0            | NaN      | NaN     | NaN      | NaN      | NaN       | 0            | NaN       | NaN      | 1         | 0           | NaN       |
| p                  | 0.972488892  | NaN      | NaN     | NaN      | NaN      | NaN       | 0.97636875   | NaN       | NaN      | 0.0118727 | 0.701679    | NaN       |
|                    | MÜKAFAAT     | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ    | YAPI PYŞ  | ZİRAAT P | MEKSA PY  | TURKISH PYŞ |           |
| Mean               | NaN          | NaN      | 0.0000% | NaN      | NaN      | NaN       | 0.0000%      | NaN       | NaN      | NaN       | NaN         |           |
| Standard Deviation | NaN          | NaN      | 0.0000% | NaN      | NaN      | NaN       | 0.0000%      | NaN       | NaN      | NaN       | NaN         |           |
| Min                | NaN          | NaN      | 0.0000% | NaN      | NaN      | NaN       | 0.0000%      | NaN       | NaN      | NaN       | NaN         |           |
| Max                | NaN          | NaN      | 0.0000% | NaN      | NaN      | NaN       | 0.0000%      | NaN       | NaN      | NaN       | NaN         |           |
| Intercept          | NaN          | NaN      | 0.0000% | NaN      | NaN      | NaN       | 0.0000%      | NaN       | NaN      | NaN       | NaN         |           |
| pvalue             | NaN          | NaN      | NaN     | NaN      | NaN      | NaN       | NaN          | NaN       | NaN      | NaN       | NaN         |           |
| tStat              | NaN          | NaN      | NaN     | NaN      | NaN      | NaN       | NaN          | NaN       | NaN      | NaN       | NaN         |           |
| Observations       | NaN          | NaN      | 11      | NaN      | NaN      | NaN       | 6            | NaN       | NaN      | NaN       | NaN         |           |
| h                  | NaN          | NaN      | NaN     | NaN      | NaN      | NaN       | NaN          | NaN       | NaN      | NaN       | NaN         |           |
| p                  | NaN          | NaN      | NaN     | NaN      | NaN      | NaN       | NaN          | NaN       | NaN      | NaN       | NaN         |           |

| Precious Metals    |          |          |         |          |          |           |           |           |          |          |             |           |
|--------------------|----------|----------|---------|----------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                    | AK PYŞ   | ATLAS PY | BURGAN  | DENİZ PY | FİBA PYŞ | FINANS PY | GARANTI P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean               | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Standard Deviation | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Min                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Max                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Intercept          | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| pvalue             | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| tStat              | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Observations       | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| h                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| p                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
|                    | MÜKAFAAT | OYAKK P  | QINVEST | ŞEKER PY | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean               | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Standard Deviation | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Min                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Max                | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Intercept          | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| pvalue             | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| tStat              | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Observations       | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| h                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| p                  | NaN      | NaN      | NaN     | NaN      | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |

| Share              |          |           |         |            |          |           |           |           |          |          |             |           |
|--------------------|----------|-----------|---------|------------|----------|-----------|-----------|-----------|----------|----------|-------------|-----------|
|                    | AK PYŞ   | ATLAS PY  | BURGAN  | DENİZ PY   | FİBA PYŞ | FINANS PY | GARANTI P | GEDİK PYŞ | İNG PYŞ  | İŞ PYŞ   | KT PYŞ      | KUTMAN PY |
| Mean               | NaN      | -9.3455%  | NaN     | -6.1107%   | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | 0.0000%   |
| Standard Deviation | NaN      | 31.3452%  | NaN     | 5.8125%    | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | 0.0000%   |
| Min                | NaN      | #####     | NaN     | -12.0326%  | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | 0.0000%   |
| Max                | NaN      | 0.0000%   | NaN     | 0.0000%    | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | 0.0000%   |
| Intercept          | NaN      | -9.3455%  | NaN     | -6.1107%   | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | 0.0000%   |
| pvalue             | NaN      | 2.53E-01  | NaN     | 0.1002351  | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| tStat              | NaN      | -1.192587 | NaN     | -2.3507769 | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| Observations       | NaN      | 16        | NaN     | 5          | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | 3         |
| h                  | NaN      | 0         | NaN     | 0          | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
| p                  | NaN      | 0.8742221 | NaN     | 0.9607756  | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         | NaN       |
|                    | MÜKAFAAT | OYAKK P   | QINVEST | ŞEKER PY   | TEB PYŞ  | ÜNLÜ PYŞ  | VAKIF PYŞ | YAPI PYŞ  | ZİRAAT P | MEKSA PY | TURKISH PYŞ |           |
| Mean               | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | 0.0000%   | 0.0000%   | 0.0000%  | NaN      | NaN         |           |
| Standard Deviation | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | 0.0000%   | 0.0000%   | 0.0000%  | NaN      | NaN         |           |
| Min                | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | 0.0000%   | 0.0000%   | 0.0000%  | NaN      | NaN         |           |
| Max                | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | 0.0000%   | 0.0000%   | 0.0000%  | NaN      | NaN         |           |
| Intercept          | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | 0.0000%   | 0.0000%   | 0.0000%  | NaN      | NaN         |           |
| pvalue             | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| tStat              | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| Observations       | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | 19        | 29        | 8        | NaN      | NaN         |           |
| h                  | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |
| p                  | NaN      | NaN       | NaN     | NaN        | NaN      | NaN       | NaN       | NaN       | NaN      | NaN      | NaN         |           |

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## **VITA**

### **Ahmet Yıldız**

#### **EDUCATION**

Master of Arts Student in Financial Engineering and Risk Management Özyeğin University, September 2015 – Present. Thesis Title: “Do Turkish Asset Management Companies Hold Overweight Positions in Their Parent Companies’ Securities for the Mutual Funds Under Their Management?”

Bachelor of Science (June 2008) in Electrical & Electronics Engineering, Boğaziçi University, Istanbul, Turkey.

#### **PROFESSIONAL EXPERIENCE**

Feb 18 – Present Garanti BBVA International N.V., Amsterdam, The Netherlands. Treasury, Fixed Income & Credit Derivatives Trading Desk, Senior Trader

May 17 – Feb 18 AK Asset Management, Istanbul, Turkey. Discretionary Portfolio Management, Senior Multi Asset Portfolio Manager

June 15 – May 17 HSBC Asset Management, Istanbul, Turkey. Fixed Income Pension & Mutual Funds, Senior FI Portfolio Manager

Aug 08 – June 15 T. Garanti Bank, Istanbul, Turkey. Treasury, Fixed Income Trading Desk, Senior Trader