A STUDY ON TURKISH MUTUAL FUNDS: VALUE CREATION, PERFORMANCE PERSISTANCE AND SURVIVORSHIP BIAS OF ACTIVELY MANAGED TURKISH EQUITY MUTUAL FUNDS AND THE SUPPLEMENTARY VALUE OF SELL-SIDE RESEARCH TO MUTUAL FUND MANAGEMENT, 2000-2007

ELİF ALTUĞ

BOĞAZİÇİ UNIVERSITY

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A STUDY ON TURKISH MUTUAL FUNDS: VALUE CREATION, PERFORMANCE PERSISTANCE AND SURVIVORSHIP BIAS OF ACTIVELY MANAGED TURKISH EQUITY MUTUAL FUNDS AND THE SUPPLEMENTARY VALUE OF SELL-SIDE RESEARCH TO MUTUAL FUND MANAGEMENT, 2000-2007

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Elif Altuğ

Boğaziçi University

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Dissertation Abstract

Elif Altuğ, "A Study on Turkish Mutual Funds:

Value Creation, Performance Persistence and Survivorship Bias of Actively

Managed Turkish Equity Mutual Funds and the Supplementary Value of Sell-Side

Research to Mutual Fund Management, 2000-2007"

This study examines the value creation for investors in actively managed Turkish equity mutual funds during the eight year period between 2000 and 2007 using weekly returns. In the first and primary stage of this study, a survivorship free database is constructed and survivorship bias is calculated for different fund classes using raw fund returns, risk-adjusted fund returns, equal-weighted and size-weighted raw and risk-adjusted fund class portfolio returns. Then value creation by fund managers is evaluated using Jensen's alpha equation for not only individual fund returns but also equal-weighted and size weighted fund portfolio returns. In addition, persistence tests are executed using parametric and nonparametric approaches. In the second and supplementary stage of this study, value creation for asset managers by analyst research is evaluated using qualitative research methods.

Survivorship bias is calculated as 0.23%-1.53% for variable funds, 0.58%-6.58% for equity funds and 0.45%-3.49% for balanced funds. The magnitude of survivorship bias is higher than developed countries and the highest bias is in equity fund class. The average value of alphas calculated using different methodologies are found to be mostly negative indicating that on average funds earned less per year than they should have earned given their level of systematic risk during the study period. When fund class portfolio returns are used, there are barely positive alphas for size-weighted equity (0.08%) and size-weighted balanced fund (0.03%) returns showing that large sized equity and balanced funds perform better than fund indices. In persistence analyses, all three fund classes are found to be persistent in the short-term and the source of persistence is persistent winners. Variable funds are significantly persistent for quarterly, annual and bi-annual periods. Equity funds are significantly persistent only for quarterly periods. Balanced funds are significantly persistent for quarterly and bi-annual periods but not for annual periods. As for the value of analyst research, it is found that buy-side professionals value sell-side research higher as long as it is well-regulated, independent and freed from motivational issues. Surprisingly, Analysis Dimension which is the first and foremost aspiration of research process is the last one in rank order showing that asset managers in Turkey do not grant value to sell-side research at face value, but selectively appreciate certain elements of it.

All in all, there is partial and limited value creation in equity mutual funds in Turkey again with little supplemental value from equity research.

Tez Özeti

"Türk Yatırım Fonları Üzerine Bir Çalışma:
Aktif Yönetilen A Tipi Fonların Yarattığı Değer, Performans Devamlılığı ve
Fonların Hayatta Kalanlara Bağlı Yanlılığı ile Analist Tavsiyelerinin Yatırım Fonları
Yönetimine Yarattığı Katkı: 2000-2007"

Bu çalışma, aktif yönetilen A Tipi fonların 2000 ile 2007 arasındaki 8 yıllık dönemde IMKB-100 ve çeşitli fon sınıfı endekslerine gore getirilerini incelemektedir. İlk aşamada, kapanan ve değişen fonlar da dikkate alınarak tüm A Tipi Değişken, Hisse ve Karma fonları içeren bir data seti oluşturulmuş ve fon sınıfı bazında, hem tekil fonların hem de fon portföylerinin ham getirileri ve Jensen's Alfa değerleri kullanılarak yaşayan fonlara bağlı yanlılık rakamları hesaplanmıştır. Aynı zamanda Jensen's Alfa değerleri kullanılarak fonların IMKB-100 ve çeşitli fon sınıfı endekslerine göre değer yaratıp yaratmadıkları incelenmiştir. Ayrıca fonların performanslarının bir önceki dönemden bir sonraki döneme devamlılık gösterip göstermedikleri parametrik ve parametrik olmayan yöntemler kullanılarak incelenmiştir. Ayrıca değer yaratma anlamında, araştırma hizmetlerinin fon performansında nasıl bir katkı yaptıkları niteliksel metodlar kullanılarak ölçülmeye çalışılmıştır.

Bahsedilen metodlarla yaşayan fonlara bağlı yanlılık değerleri A Tipi Değişken fonlar için 0.23%-1.53%, Hisse fonlar için 0.58%-6.58% ve Karma fonlar için 0.45%-3.49% olarak hesaplanmıştır. Yanlılığın boyutunun gelişmiş piyasalara göre daha yüksek ve en yüksek yanlılığın da Hisse fonlar için olduğu görülmüştür. Ayrıca değişik yöntemlerle fon sınıfı bazında hesaplanan ortalama alfa değerleri çoğunlukla negatif olmuştur. Sadece, fonların piyasa büyüklüğü ile ağırlıklandırılarak hesaplanan Hisse ve Karma fon portföy getirileri çok küçük pozitif alfa değerleri göstererek, sırasıyla 0.08% ve 0.03% olarak gerçekleşmiştir. Devamlılık analizlerinde çalışma periyodu içinde, bu üç fon sınıfının da üç aylık dönemlerde istatistiksel olarak anlamlı devamlılık gösterdiği saptanmıştır. Değişken fonların sekiz yıllık çalışma dönemi genelinde üç aylık, yıllık ve iki yıllık dönemlerde, Hisse fonların yalnızca üç aylık dönemlerde, Karma fonların ise üç aylık ve iki yıllık dönemlerde istatistiksel olarak anlamlı devamlılık gösterdiği görülmüştür. Son olarak da, fon yöneticilerinin araştırma hizmetlerine iyi bir regülasyona tabi, bağımsız ve diğer güdüsel faktörlerden arındırılmış olduğu müddetçe değer verdiği bulgusuna ulaşılmıştır. Şaşırtıcı bir şekilde, araştırma hizmetlerinin Analiz Boyutu değer verilme sıralamasında sonuncu olmuştur. Kısacası, fon yöneticilerinin analist araştırma hizmetlerinin tamamına değil bazı unsurlarına seçici olarak önem verdikleri görülmüştür.

Sonuçta, Türkiye'de yatırım fonu yönetiminde kısmi ve sınırlı bir değer yaratıldığı ve analist araştırmalarının buna katkısının da yine kısmi olduğu sonucuna ulaşılmıştır.

CURRICULUM VITAE

NAME OF AUTHOR: Elif Altuğ
PLACE OF BIRTH: Samsun, Turkey
DATE OF BIRTH: 22 August 1969

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:
University of Strathclyde.
Bilkent University, MBA
Middle East Technical University

DEGREES AWARDED:
Doctor of Philosophy in Management, 2009, Boğaziçi University.
Master of Science, Department of Finance, 1994, Management, University of Strathclyde.
Master of Business Administration, 1993, Management, Bilkent University.
Bachelor of Science, Electrical & Electronics Engineering, 1991, Middle East Technical University.

AREAS OF SPECIAL INTEREST:
Portfolio Management, Investments, Corporate Finance.

PROFESSIONAL EXPERIENCE:
Head of Equity & Balanced Funds, Yapı Kredi Asset Management, 2004-cont.
Board of Director, CFA Society, Istanbul, 2005-2007
Becker Conviser, Istanbul Office, 2002-2004.
Director, Corporate Finance, Ata Yatırım, 2001-2002.
Director, Corporate Finance & Research, Inter Yatırım, 1996-2001.
Associate, Yatırımbank, 1994-1996.

AWARDS AND HONORS:
Capital Markets Board License for Derivative Instruments, 2004.
Capital Markets Board License for Advanced Level, 2003.
CFA (Chartered Financial Analyst), 2001.
British Council Scholarship, 1993-1994.

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DEDICATION

I dedicate this thesis to my son who is my ultimate inspiration, to my husband who supported me throughout this venture with all of his heart and mind, and to my dear parents who offered me unconditional love and support not only throughout the course of this thesis but also throughout my life.

CONTENTS

CHAPTER 1 INTRODUCTION 1

CHAPTER 2 LITERATURE SURVEY ON THE VALUE OF MUTUAL FUND MANAGEMENT FOR INVESTORS 5
Risk Adjusted Performance Measures 6
Survivorship Bias 9
Performance Persistence 16

CHAPTER 3 DATA ON THE VALUE OF MUTUAL FUND MANAGEMENT, SURVIVORSHIP BIAS IMPACTS AND PERFORMANCE PERSISTENCE 34

CHAPTER 4 METHODOLOGY ON THE VALUE OF MUTUAL FUND MANAGEMENT 39
Methodology on Constructing the Survivorship Bias Free Data Set 39
Methodology on Calculating Survivorship Bias 41
Methodology on Measuring Performances of Mutual Funds Using Survivorship Bias Free Data Set 44
Methodology on Evaluating Performance Persistence of Mutual Funds Using Survivorship Bias Free Data Set 46

CHAPTER 5 EMPIRICAL ANALYSIS AND RESULTS 52
Construction of the Survivorship Bias Free Data Set 52
Exploring the Survivorship Bias Free Data Set 57
Measuring the Performance of Mutual Funds Using the Survivorship Bias-Free Net Mutual Fund Returns and the Calculation of the Survivorship Bias 62
The Impact of Management Fees on Mutual Fund Performance and the Calculation of Survivorship Bias Using Gross Returns 106
Performance Persistence of Mutual Funds 148

CHAPTER 6 LITERATURE SURVEY ON THE VALUE OF ANALYST RESEARCH FOR FUND MANAGERS 193

CHAPTER 7 DATA ON VALUATION OF ANALYST RESEARCH 197
Qualitative Research 197

CHAPTER 8 METHODOLOGY ON VALUATION OF ANALYST RESEARCH 204
Operationalization of the Construct: Dimensions and Elements 204

CHAPTER 9 EMPIRICAL ANALYSIS AND RESULTS ON THE VALUE OF ANALYST RESEARCH FOR FUND MANAGERS 205
Design of the Questionnaire 205
Sampling 206
The Results of the Questionnaire 208
Assessment of the Psychometric Properties of the Scale 215

CHAPTER 10 SUMMARY OF RESULTS 224
Raw Returns of Individual Funds 225
Raw Returns of Funds Class Portfolios 226
Risk-Adjusted Returns of Individual Funds 228
Risk-Adjusted Returns of Fund Class Portfolios 230
Persistence 234
Value of Sell-Side Research in Asset Management 241

CHAPTER 11 CONCLUSION 245
Further Study 252

APPENDICES 254

REFERENCES 274

TABLES

1 Summary of Survivorship Bias in the Literature 16
2 Summary of US Managed Fund Performance Studies 32
3 Number of Surviving and Nonsurviving Funds by Fund Class 43
4 Listing of 97 Variable Mutual Funds in the Sample 52
5 Listing of 34 Equity Mutual Funds in the Sample 55
6 Listing of 45 Balanced Mutual Funds in the Sample 56
7 Survival Rates of the Funds that Exist at the Beginning of 2000 57
8 Fund Composition by Category, 2000-2007 60
9 Number of Annual Fund Additions/Deletions and Existing Funds 60
10 Breakdown of Nonsurvival Types 61
11 Annualized Average Variable Fund Class Raw Returns for the Sample Period 63
12 Annual Survivorship Bias/Premium Calculations for Variable Funds 63
13 Annualized Average Equity Fund Class Raw Returns for the Sample Period 64
14 Annual Survivorship Bias/Premium Calculations for Equity Funds 64
15 Annualized Average Balanced Fund Class Raw Returns for the Sample Period 65
16 Annual Survivorship Bias/Premium Calculations for Balanced Funds 66
17 Individual Fund Alphas for Variable Fund Class Net Returns (Market: Variable Fund Index) 67
18 Average Variable Fund Class Alphas Using Net Returns (Market: Variable Fund Index) 69
19 Survivorship Bias/ Premium for Variable Fund Class using Net Risk-Adjusted Returns (Market: Variable Fund Index) 69
20 Average Variable Fund Class Alphas Using Net Returns (Market: ISE-100 Index) 70
21 Survivorship Bias/ Premium for Variable Fund Class using Net Risk-Adjusted Returns (Market: ISE-100 Index) 70
22 Individual Jensen's Alpha Statistics for Variable Fund Class Net Returns 71
23 Individual Fund Alphas for Equity Fund Class Net Returns (Market: Equity Fund Index) 72
24 Average Equity Fund Class Alphas Using Net Returns (Market: Equity Fund Index) 73
25 Survivorship Bias/Premium for Equity Fund Class Using Net Risk-Adjusted Returns (Market: Equity Fund Index) 73
26 Average Equity Fund Class Alphas Using Net Returns (Market: ISE-100 Index) 74
27 Survivorship Bias/Premium for Equity Fund Class Net Risk-Adjusted Returns (Market: ISE-100 Index) 74
28 Individual Jensen's Alpha Statistics for Equity Fund Class Net Returns 75
29 Individual Fund Alphas for Balanced Fund Class Net Returns (Market:Balanced Fund Index) 76
30 Average Balanced Fund Class Alphas Using Net Returns (Market: Balanced Fund Index) 77
31 Survivorship Bias/Premium for Balanced Fund Class Using Net Risk-Adjusted Returns (Market: Balanced Fund Index) 77
32 Average Balanced Fund Class Alphas Using Net Returns (Market: ISE-100 Index) 78
33 Survivorship Bias/Premium for Balanced Fund Class Risk-Adjusted Returns (Market: ISE-100 Index) 78
34 Individual Jensen's Alpha Statistics for Balanced Fund Class Net Returns 79
35 Annualized Net Returns for the Weekly Means of Equal Weighted Variable Fund Portfolios 81
36 Survivorship Bias/Premium Calculations using Equal Weighted Variable Fund Portfolios' Annualized Net Raw Returns 82
37 Equal-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Net) 84
38 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: Variable Fund Index) 84
39 Equal-Weighted Variable Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net) 85
40 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index) 86
41 Annualized Net Returns for the Weekly Means of Size-Weighted Variable Fund Portfolios in Comparison with Equal-Weighted Portfolios 86
42 Survivorship Bias/Premium Calculations using Size Weighted Variable Fund Portfolios' Annualized Net Raw Returns 87
43 Size-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Net) 88
44 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: V. Fund Index) 89
45 Size-Weighted Variable Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net) 89

46 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index) 89
47 Annualized Net Returns for the Weekly Mean Returns of Equal-Weighted Equity Fund Portfolios 90
48 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Net Raw Returns 90
49 Equal-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Net) 91
50 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: E. Fund Index) 92
51 Equal-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net) 93
52 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index) 93
53 Annualized Net Returns for the Weekly Means of Size-Weighted Equity Fund Portfolios 94
54 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Net Raw Returns 94
55 Size-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Net) 95
56 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: E. Fund Index) 96
57 Size-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net) 97
58 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: E. Fund Index) 98
59 Annualized Net Returns for the Weekly Means of Equal-Weighted Balanced Fund Portfolios 99
60 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Net Raw Returns 99
61 Equal-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Net) 100
62 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolio's Annualized Net Risk-Adjusted Returns (Market: B. Fund Index) 100
63 Equal-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net) 101
64 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index) 102
65 Annualized Net Returns for the Weekly Means of Size-Weighted Balanced Fund Portfolios in Comparison with Equal-Weighted Balanced Fund Portfolios 103
66 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Net Raw Returns 104
67 Size-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Net) 104
68 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: B. Fund Index) 105
69 Size-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net) 105
70 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index) 106
71 Summary of Average Variable Fund Class Raw Returns for the Sample Period 108
72 Survivorship Bias/Premium Calculations for Variable Funds 109
73 Summary of Average Equity Fund Class Raw Returns for the Sample Period 110
74 Survivorship Bias/Premium Calculations for Equity Funds 111
75 Summary of Average Balanced Fund Class Raw Returns for the Sample Period 112
76 Survivorship Bias/Premium Calculations for Balanced Funds 112
77 Individual Fund Alphas for Variable Fund Class Gross Returns (Market: ISE-100 Index) 114
78 Jensen's Alpha Statistics for Variable Fund Class Gross Returns 116
79 Average Variable Fund Class Alphas Using Gross Returns (Market: ISE-100 Index) 117
80 Survivorship Bias/Premium for Variable Fund Class Gross Returns (Market: ISE-100 Index) 117
81 Average Variable Fund Class Alphas Using Gross Returns (Market: Variable Fund Index) 118
82 Survivorship Bias/Premium for Variable Fund Class Gross Returns (Market: Variable Fund Index) 118
83 Individual Fund Alphas for Equity Fund Class Gross Returns (Market: ISE-100 Index) 119
84 Jensen's Alpha Statistics for Equity Funds Class Gross Returns 120
85 Average Equity Fund Class Alphas Using Gross Returns (Market: ISE-100 Index) 121
86 Survivorship Bias/Premium for Equity Fund Class Gross Returns (Market: ISE-100 Index) 121
87 Average Equity Fund Class Alphas Using Gross Returns (Market: Equity Fund Index) 121
88 Survivorship Bias/Premium for Equity Fund Class Gross Returns (Market: E. Fund Index) 122
89 Individual Fund Alphas for Balanced Fund Class Gross Returns (Market: ISE-100 Index) 123

90 Jensen's Alpha Statistics for Balanced Fund Class Gross Returns 124
91 Average Balanced Fund Class Alphas Using Gross Returns (Market: ISE-100 Index) 125
92 Survivorship Bias/Premium for Balanced Fund Class Gross Returns(Market: ISE-100 Index) ... 125
93 Average Balanced Fund Class Alphas Using Gross Returns (Market: Balanced Fund Index) 126
94 Survivorship Bias/Premium for Balanced Fund Class Gross Returns (Market:B.Fund Index)..... 126
95 Annualized Gross Returns for the Weekly Means of Equal Weighted Variable Fund Portfolios. 127
96 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Gross Raw Returns 129
97 Equal-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Gross)..... 130
98 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Variable Fund Index)..... 130
99 Equal-Weighted Variable Fund Portfolio Alphas (Market: ISE-100, Returns: Gross) 130
100 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100) 131
101 Annualized Gross Returns for the Weekly Means of Size-Weighted Variable Fund Portfolios in Comparison with Equal-Weighted Variable Fund Portfolios..... 131
102 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Gross Raw Returns 131
103 Size-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Gross)..... 132
104 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Variable Fund Index)..... 132
105 Size-Weighted Variable Fund Portfolio Alphas (Market: ISE-100, Returns: Gross)..... 132
106 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Gross Raw Returns (Market: ISE-100)..... 133
107 Annualized Gross Returns for the Weekly Means of Equal-Weighted Equity Fund Portfolios.. 133
108 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Gross Raw Returns 134
109 Equal-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Gross)..... 134
110 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: E. Fund Index)..... 134
111 Equal-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross) 135
112 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100) 135
113 Annualized Gross Returns for the Weekly Means of Size-Weighted Equity Fund Portfolios in Comparison with Equal-Weighted Equity Fund Portfolios..... 136
114 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Gross Raw Returns 137
115 Size-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Gross) 137
116 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Equity Fund Index)..... 137
117 Size-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross)..... 138
118 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100 Index) 140
119 Annualized Gross Raw Returns for the Weekly Means of Equal-Weighted Balanced Fund Portfolios..... 141
120 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Gross Raw Returns 141
121 Equal-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Gross)..... 142
122 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Balanced Fund Index)..... 142
123 Equal-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross) 143
124 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100 Index) 143
125 Annualized Gross Returns for the Weekly Means of Size-Weighted Balanced Fund Portfolios in Comparison with Equal-Weighted Balanced Fund Portfolios..... 144
126 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Gross Raw Returns 145
127 Size-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Gross)..... 146
128 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Balanced Fund Index)..... 146

129 Size-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross)..... 146
130 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100 Index) 147
131 Contingency Table for Variable Funds Using Quarterly Net Returns..... 149
132 Persistence Tests for Variable Funds Using Quarterly Net Returns..... 150
133 Contingency Table for Variable Funds Using Quarterly Gross Returns 151
134 Persistence Tests for Variable Funds Using Quarterly Gross Returns 153
135 Contingency Table for Variable Funds Using Yearly Net Returns 154
136 Persistence Tests for Variable Funds Using Yearly Net Returns 154
137 Contingency Table for Variable Funds Using Yearly Net Risk-Adjusted Returns 155
138 Persistence Tests for Variable Funds Using Yearly Net Risk-Adjusted Returns 155
139 Contingency Table for Variable Funds Using Yearly Gross Returns 156
140 Persistence Tests for Variable Funds Using Yearly Gross Returns..... 157
141 Contingency Table for Variable Funds Using Two-Yearly Net Returns 157
142 Persistence Tests for Variable Funds Using Two-Yearly Net Returns 158
143 Contingency Table for Variable Funds Using Two-Yearly Net Risk-Adjusted Returns 158
144 Persistence Tests for Variable Funds Using Two-Yearly Net Risk-Adjusted Returns..... 159
145 Contingency Table for Variable Funds Using Two-Yearly Gross Returns..... 159
146 Persistence Tests for Variable Funds Using Two-Yearly Gross Returns..... 160
147 % of Evaluation Periods with Significant Persistence for Variable Funds..... 160
148 Persistence Tests for Variable Funds for the Aggregate Period 162
149 Contingency Table for Equity Funds Using Quarterly Net Returns..... 163
150 Persistence Tests for Equity Funds Using Quarterly Net Returns..... 164
151 Contingency Table for Equity Funds Using Yearly Gross Returns..... 165
152 Persistence Tests for Equity Funds Using Quarterly Gross Returns 166
153 Contingency Table for Equity Funds Using Yearly Net Returns 167
154 Persistence Tests for Equity Funds Using Yearly Net Returns 167
155 Contingency Table for Equity Funds Using Yearly Net Risk-Adjusted Returns 168
156 Persistence Tests for Equity Funds Using Yearly Net Risk-Adjusted Returns 168
157 Contingency Table for Equity Funds Using Yearly Gross Returns..... 169
158 Persistence Tests for Equity Funds Using Yearly Gross Returns..... 169
159 Contingency Table for Equity Funds Using Two-Yearly Net Returns 170
160 Persistence Tests for Equity Funds Using Two-Yearly Net Returns..... 170
161 Contingency Table for Equity Funds Using Two-Yearly Net Risk-Adjusted Returns..... 171
162 Persistence Tests for Equity Funds Using Two-Yearly Net Risk-Adjusted Returns..... 171
163 Contingency Table for Equity Funds Using Two-Yearly Gross Returns..... 172
164 Persistence Tests for Equity Funds Using Two-Yearly Gross Returns 172
165 % of Evaluation Periods with Significant Persistence for Equity Funds..... 173
166 Persistence Tests for Equity Funds for the Aggregate Period 173
167 Contingency Table for Balanced Funds Using Quarterly Net Returns 174
168 Persistence Tests for Balanced Funds Using Quarterly Net Returns..... 176
169 Contingency Table for Balanced Funds Using Quarterly Gross Returns..... 177
170 Persistence Tests for Balanced Funds Using Quarterly Gross Returns 178
171 Contingency Table for Balanced Funds Using Yearly Net Returns..... 179
172 Persistence Tests for Balanced Funds Using Yearly Net Returns..... 179
173 Contingency Table for Balanced Funds Using Yearly Net Risk-Adjusted Returns 180
174 Persistence Tests for Balanced Funds Using Yearly Net Risk-Adjusted Returns 180
175 Contingency Table for Balanced Funds Using Yearly Gross Returns 181
176 Persistence Tests for Balanced Funds Using Yearly Gross Returns 181
177 Contingency Table for Balanced Funds Using Two-Yearly Net Returns 182
178 Persistence Tests for Balanced Funds Using Two-Yearly Net Returns 182
179 Contingency Table for Balanced Funds Using Two-Yearly Net Risk-Adjusted Returns 183
180 Persistence Tests for Balanced Funds Using Two-Yearly Net Risk-Adjusted Returns 183
181 Contingency Table for Balanced Funds Using Two-Yearly Gross Returns..... 184
182 Persistence Tests for Balanced Funds Using Two-Yearly Gross Returns..... 184
183 % of Evaluation Periods with Significant Persistence for Balanced Funds..... 185
184 Persistence Tests for Balanced Funds for the Aggregate Period..... 186
185 Regressions of Variable Funds' Annual Raw Returns 188
186 Regressions of Variable Funds' Annual Risk-Adjusted Returns 188
187 Regressions of Variable Funds' Bi-Annual Raw Returns..... 189

188 Regressions of Variable Funds' Bi-Annual Risk-Adjusted Returns 189
189 Regressions of Equity Funds' Annual Raw Returns 189
190 Regressions of Equity Funds' Annual Risk-Adjusted Returns..... 190
191 Regressions of Equity Funds' Bi-Annual Raw Returns 190
192 Regressions of Equity Funds' Bi-Annual Risk-Adjusted Returns..... 190
193 Regressions of Balanced Funds' Annual Raw Returns 191
194 Regressions of Balanced Funds' Annual Risk-Adjusted Returns 191
195 Regressions of Balanced Funds' Bi-Annual Raw Returns 192
196 Regressions of Balanced Funds' Bi-Annual Risk-Adjusted Returns 192
197 Summary of % of Evaluation Periods with Significant Persistence 192
198 Design of the Questionnaire 205
199 Sampling Aspects 207
200 Frequency and Mean of the Answers in the Analysis Dimension 209
201 Frequency and Mean of the Answers in the Motivation Dimension 210
202 Frequency and Mean of the Answers in the Behavioral Dimension 212
203 Frequency and Mean of the Answers in the Regulation Dimension 213
204 Frequency and Mean of the Answers in the Independent Research Dimension..... 215
205 Reliability 216
206 Survivorship Bias from Raw Returns 225
207 Average Raw Returns of Fund Portfolios 226
208 Average Risk-Adjusted Returns of Individual Funds..... 228
209 Average Risk-Adjusted Returns of Fund Portfolios 230
210 Summary of Value Creation by Fund Class Risk-Adjusted Returns..... 231
211 Breakdown of Evaluation Period Types with Significant Persistence for Variable Funds 234
212 Summary of Persistence Tests for Variable Funds for the Aggregate Period 235
213 Summary Breakdown of Evaluation Periods with Significant Persistence for Variable Funds .. 236
214 Breakdown of Evaluation Period Types with Significant Persistence for Equity Funds..... 237
215 Summary of Persistence Tests for Equity Funds for the Aggregate Period 237
216 Summary Breakdown of Evaluation Periods with Significant Persistence for Equity Funds 238
217 Breakdown of Evaluation Period Types with Significant Persistence for Balanced Funds 239
218 Summary of Persistence Tests for Balanced Funds for the Aggregate Period 240
219 Summary Breakdown of Evaluation Periods with Significant Persistence for Balanced Funds . 241
220 Summary of Value Creation by Fund Class Risk-Adjusted Returns..... 247
221 Summary of Survivorship Bias Figures for Different Fund Classes 249
222 Summary of Survivorship Bias Figures for Raw and Risk-Adjusted Returns..... 249
223 Summary of Persistence Tests by Fund Class and Evaluation Period Type..... 250

FIGURES

1 The whole value chain of managed funds business……....1

2 Survival rate of the funds existing at the beginning of year 2000……59

3 Number of existing funds…….61

4 Dimensions & summary of sell-side equity research…….204

5 Multi Trait Multi Method Matrix (MTMM)……...220

CHAPTER 1 INTRODUCTION

This thesis analyzes the whole value chain of Turkish mutual fund managers by expanding on the following three interrelated topics in the form of a trilogy:

- The value creation by mutual fund portfolio managers for investors: the performance measures of mutual funds in Turkey between 2000 and 2007 including the impact of survivorship bias on performance measures,
- The persistence of mutual fund performance in Turkey during the same period,
- The value creation by sell-side research for the managed funds business in Turkey.

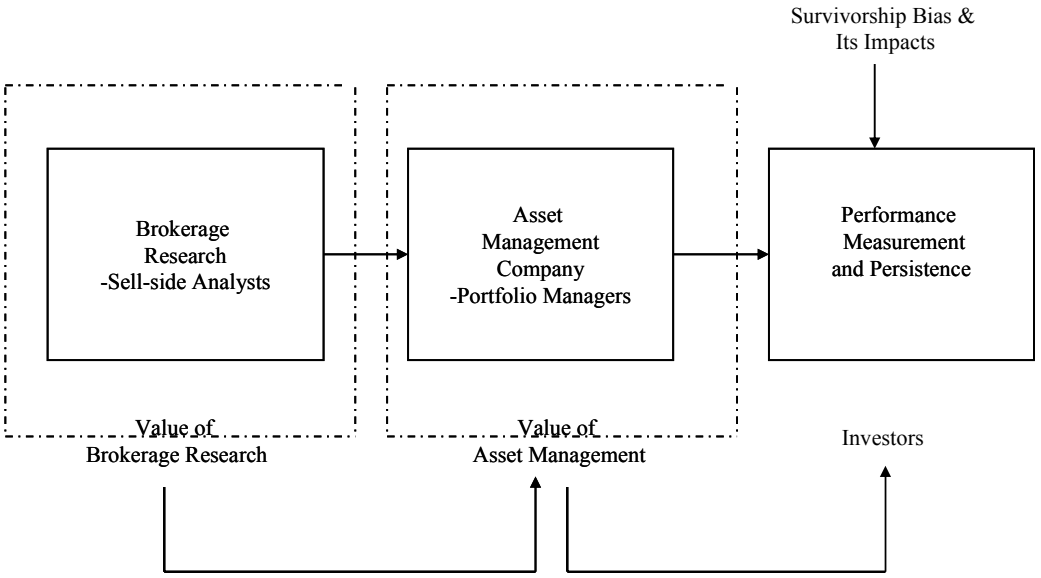

Fig 1. The whole value chain of managed funds business

This study seeks to determine the value creation within managed funds business for investors. This is done in two stages. In the first and the primary stage of this study, value creation for investors by fund managers are evaluated in fund

performance measures along with performance persistence calculations. Additionally in this stage, survivorship bias stemming from the disappearance of nonsurviving fund data from the existing databases is calculated for different fund classes using different methodologies. In the second and supplementary stage of this study, value creation for asset managers by broker research services is evaluated. The first phase utilizes quantitative methods (regression analyses and contingency tables) whereas the second phase utilizes qualitative research methods (focus groups and a questionnaire). Overall, the studies in these two phases try to uncover value creation in the managed funds business.

Starting with terminology, sell-side equity research analysts are analysts employed by brokerage houses and banks to serve investors by writing research reports and making buy/sell/hold recommendations for the stocks they cover. A typical sell-side analyst writes reports on the companies s/he cover, makes earning forecasts for the future periods, issues buy/sell/hold recommendations. On the other hand, "buy-side professionals" are those employed by institutional investment firms such as asset management companies, pension funds, mutual funds and insurance companies. Buy-side professionals manage investors' money using mutual funds, discretionary portfolios or pension funds. The concentration of this study will be on mutual funds due to the availability of more data for mutual funds. The sheer existence of asset management industry and brokerage firms and the huge amount of assets under management in these sectors both in Turkey and in global markets can sometimes be taken by some people, mostly by practitioners, as manifestations of evidence against semi-strong form of market efficiency. However the viewpoint in academia on the above issues is, by and large closer to the other extreme as can be seen from the literature. The academicians assert that in order for the existing asset

management and brokerage industry to be rightful evidence against market efficiency, sheer existence of such players does not suffice. Rather, such sectors should create value for their investors by beating passive indices' returns for asset management companies and by generating investment and trade profits in the recommended stocks for brokerage companies after transaction costs and fees implying that all the information about the stock that trade in markets is not impounded in the share price.

Although the above issues boil down to market efficiency theory, specific data on mutual funds and analyst recommendations is required together with stock market data. There is vast amount of research in both areas especially for the US data. There are also some studies in the UK and other countries in both topics. However, I could not find any study specifically on mutual fund performance and analyst recommendations for Turkish data for obvious reasons. First of all, such data is currently under formation phase in Turkey as both professions of asset management and sell-side research, although dating back to early nineties, turned into better organized formats and organizations in late 90s and much better formats after 2000. Hence proper data accumulation started after the year 2000 for asset management industry. The crisis that started in the year 2000 and went through to 2002 had some impacts on the data. Nevertheless, the following five years from 2003 to 2007 year-end had been relatively normalized years for market data accumulation.

The data accumulation is even worse for the sell-side research business. Although it also dates back to early 90s, there is no historic data for the stock recommendations of the research houses, how and when they change recommendations and their subsequent performance since there is no regulatory requirement as for keeping such data neither by the Capital Markets Board (CMB)

nor by the Istanbul Stock Exchange (ISE). There is also no private company keeping track of these recommendations to sell to the asset management companies (buy-side) like First Call Thomson of US and etc since the asset management business itself is in development phase in Turkey.

In my thesis I tried to uncover whether there is value creation on both asset management and sell-side research which are two interrelated areas with sell-side research feeding asset management to create value. While searching for value creation in managed funds business, I also investigated the impact of survivorship bias on performance measures and tried to calculate the magnitude of survivorship bias using different methodologies: raw fund returns, risk-adjusted fund returns (alphas), equal-weighted and size-weighted fund class portfolio returns. Finally, I searched for persistence in mutual fund performance. In other words, I tried to analyze whether a fund's performance in a given period persists in the subsequent period. I tried to find out both short-term and longer term persistence using nonparametric (contingency table based) approach and parametric (regression based) approach.

CHAPTER 2 LITERATURE SURVEY ON THE VALUE OF MUTUAL FUND MANAGEMENT FOR INVESTORS

The inception of academic studies on the measurement of managed fund performance dates back to 1960s right after the development of the Capital Asset Pricing Model, CAPM (Sharpe (1964), Lintner (1965) which provided a framework for performance analysis studies. Pioneers in this area had been Treynor (1965), Sharpe (1966), Jensen (1968, 1969) who led the way to apply the modern portfolio theory and the CAPM to investment performance measurement. Focusing on both risk and return dimensions, they presented measures which could be used to compare the relative risk adjusted performances of different investments.

The progress of the CAPM from modern portfolio theory created a method of measuring managed fund performance using two dimensions, risk and expected return. Modern portfolio theory has been developed under the assumption that rational investors make their informed choices utilizing information about the expected return and risk of their potential investments. This implies that return and risk must co-exist in a performance measure. There are different ways for the pricing of capital assets under conditions of risk, one of which being the CAPM. There are differing views in the academic literature about the best asset-pricing model. These vary from the CAPM, to arbitrage pricing-based models and other factor-based models. Not only different pricing models are utilized but also a diversity of benchmarks is used to represent the neutral market performance. Academic literature is vast on both asset-pricing models and performance benchmarks.

Risk Adjusted Performance Measures

Various risk-adjusted measures are used to adjust or complement the raw returns namely the standard performance measure of mutual funds.

Standard Deviation

Starting with Markowitz (1952), standard deviation has been the earliest measure of risk. The standard deviation measures the dispersion of returns from a central average value and has distributional properties that allow inferences to be drawn. For instance, if the returns produced by a fund follow a bell-shaped normal distribution, then 95 times out of a hundred the return should be within plus or minus two standard deviations of the long term average. The greater the standard deviation is, the greater the fund's volatility is.

The Sharpe Ratio

The Sharpe ratio is a risk-adjusted measure developed by the Nobel Laureate William Sharpe. Markowitz (1952), the founder of Modern Portfolio Theory (MPT), suggested that investors choose optimum portfolios on the basis of their expected return and risk characteristics. As noted above, the overall risk of a portfolio is measured by the standard deviation of its returns.

Sharpe used this concept to build a "reward to variability" ratio which has become known as the Sharpe Ratio. The metric is calculated using standard deviation and excess return (i.e. return above a risk free investment) to determine reward per unit of risk. The higher the Sharpe ratio, the better the fund's historical risk-adjusted performance is. In theory, any portfolio with a Sharpe index greater than one is performing better than the market benchmark.

Jensen's Alpha

Jensen’s Alpha is also a reward to risk measure. However, it uses a different concept of risk. To explain, we first need to realize that this measure’s framework is taken from the capital asset pricing model (CAPM). In this model, among the assumptions, it is taken that every investor holds a diversified portfolio. This allows investors to diversify away some of their investment risk, leaving them exposed to only “systematic” or non-diversifiable market-related risk. Jensen's Alpha uses only systematic risk for scaling a portfolio's return. Alpha measures the deviation of a portfolio's return from its equilibrium level, defined as the deviation of return from the risk-adjusted expectation for that portfolio's return. For ranking purposes, the higher the alpha, the better the performance is. The fund beats the market, on a systematic risk adjusted basis, if Jensen's Alpha is greater than zero, and vice versa.

Treynor Ratio

A third performance measure is the Treynor ratio. This is calculated in the same manner as the Sharpe ratio, using excess returns on the fund, but the excess return on the fund is scaled by the beta of the fund, as opposed to the funds' standard deviation of returns. Of these three traditional measures, the regression-based Jensen's Alpha is most commonly used in academic research. It provides a measure of whether a manager beats the market, as well as suggesting the magnitude of over/under performance. Studies on managed fund performance have concentrated on three distinct research questions:

1. Does the median or average fund manager add value in the sense of outperforming the market using active management?
2. Are the outcomes of outperforming managers due to skill or pure luck?
3. Does good or bad performance persist?

The first research question has been the focus of the earlier studies of managed fund performance. These studies were carried out in an aim to test the Efficient Markets Theory and help investors decide whether it is better to invest in an actively managed fund or a passive (index) fund. These studies resulted in differing outcomes depending on the benchmark used. A stock market index (such as S&P or Dow Jones) has inherent biases. However, benchmark related problems, which address a different issue is outside the scope of this study.

Recently more attention has been given to understand whether past performance of individual funds can be used as a guide to their future performance and whether consumers can use past performance measures as a decision tool for fund selection. This whole subject is referred to as performance persistence in the literature.

Survivorship Bias

In the mutual fund performance evaluation literature, survivorship bias is defined as the tendency for mutual funds with poor performance to be dropped by mutual fund companies, generally because of poor results or low asset accumulation. This phenomenon, which is widespread in the fund industry, results in an overestimation of the past returns of mutual funds. Survivorship bias in the performance measurement of mutual funds occurs as a result of the disappearance of mutual funds. Mutual funds disappear by merging with another fund or by closing down. This happens generally due to poor performance. Therefore, analyzing only the funds that survive overstates the performance measures to some extent. Most of the time, a disappearing fund is not dissolved but is merged into another fund. Frequently, these two funds belong to the same sponsoring organization. In that way, sponsoring organizations bury the poor performance of the funds by practically causing the deletion of them from the commercial performance measurement databases since investors are only interested in existing funds, hence so are commercial databases. At the same time, merging the fund with another one in the same organization, asset management companies are able to keep the investors' capital and hence the management fees intact.

Evidence on Survivorship Bias Studies

The bulk of mutual fund performance measurement studies utilize funds that existed incessantly over a period of time and with an unchanged investment policy. This

creates survivorship bias because only the funds that existed over the full sampling period are used while those funds that ceased to exist during the period are omitted. That practice was used in the earlier fund performance measurement works by Treynor (1965), Sharpe (1966), Jensen (1968), Henriksson (1984), Lehman and Modest (1987), Grinblatt and Titman (1988, 1992), Connor and Korajczyk (1991).

Later studies by Grinblatt and Titman (1989), Brown and Goetzmann (1994), Malkiel (1994), Elton, Gruber and Blake (1996) and Carhart (1997) presented some estimates of survivorship bias for common stock funds whereas Blake, Elton and Gruber (1993) estimated survivorship bias for bond funds. These have been the pioneering works in the survivorship bias studies.

Blake, Elton and Gruber (1993) estimate that survivorship bias increases return by 27 basis points per annum for bond funds. Grinblatt and Titman (1989) utilized quarterly equity holdings to estimate the impact of survivorship bias. They simulated quarterly returns for each fund by assuming that the fund held the shares disclosed at the beginning of each quarter to the end of that quarter. They calculated returns on two equally weighted portfolios of funds, one with survivorship bias and one without bias. Their estimate of survivorship bias is the difference in alpha between these two portfolios, which was presented as ranging between 10-40 basis points.

Brown and Goetzmann (1994) utilized annual returns over the period 1976-1988 for two samples. The first sample consists of all funds that existed as of 1988 and that did not merge or disappear in the period 1976-1988. The second sample is all funds that existed in any year for the same period. The database used is Wiesenberger. The authors do not track funds that disappear from the Wiesenberger database where Wiesenberger does not record what happened to them. Some of these

disappearances are due to mergers and some are due name changes that Wiesenberger did not record. The authors are aware of this problem and hence called their estimates coming from an "almost survivorship-bias-free" sample. Funds that are included in their sample could have existed for 1, 2, and 3 or up to 12 years since unlike earlier studies they did not use the dual objective of survival and a minimum history. The authors' estimate of survivorship bias is 80 basis points when fund returns are equally weighted and 20 basis points when scaled by capitalization. Their estimates are derived from differences in annual raw returns.

Malkiel (1994) analyzes mutual fund returns during 1971 through 1991 utilizing a data set including returns from all equity mutual funds existing each year provided by Lipper Analytic Services. Excluded from the analysis are the funds investing in foreign securities and sector-funds investing in one particular industry. The return series provided by Lipper are quarterly total returns. Hence every diversified equity mutual fund sold to the public is included in Malkiel's study. Like Brown and Goetzmann (1994) Malkiel also utilizes unadjusted raw returns. He finds that average return for all funds, including the closed and liquidated ones, is 15.69%. This is 150 basis points lower than the average of surviving funds that survived for 10 years, due to the survivorship bias. The difference is more dramatic for the 15-year period ending 1991. The average annual return for equity funds which survived over the whole 15-year period is 18.7% whereas the average yearly return for all funds including non survivors is just 14.5% making the return difference caused by survivorship bias 4.2%. In this study, Malkiel also added the average expenses reported by each fund to the net return to get the funds' gross investment return before expenses. He finds that gross annual returns before expenses for all existing funds each year which is 16.7% also fail to match the broad S&P stock market index

return which is 17.52%. Malkiel also presents statistical tests for survivorship bias. He calculates the mean annual returns for all existing funds from 1982 to 1990. Then he compares the mean yearly returns of funds that survive until 1992 with those funds that did not survive. He finds that the mean return of surviving funds is statistically significantly greater than the mean of the nonsurvivors for every year. He concludes that studies systematically excluding nonsurviving funds will significantly overstate the returns received by mutual fund investors.

His results differ from those of Grinblatt and Titman's (1989) in two ways, First of all, Grinblatt and Titman found evidence of excess gross returns among fund managers. Second, their estimate of the magnitude of survivorship bias (10 to 40 basis points) is smaller than that of Malkiel's (150 to 420 basis points). Malkiel's finding suggests that Grinblatt and Titman's (1989) study may underestimate the magnitude of survivorship bias because rather than using the actual returns, they calculate hypothetical returns for the equity portion of fund portfolios assuming that the funds' quarterly reported portfolios are not changed during the quarter.

Later, Elton, Gruber and Blake (EGB) (1996) studied mutual fund survivorship bias. They initially started with 361 funds categorized as common stock investment policy in Wiesenberger's Investment Companies 1977 edition. Their study differs from other studies because they track subsequent performance of all funds which existed at a prior point in time. If a fund disappeared from standard databases, EGB trace it by contacting the portfolio managers of the original fund. Upon learning what happened to a fund, they track the return an investor would earn in that fund. Namely, if a fund merged with another fund with the same objective, they compute the risk-adjusted return by using the return for the original fund prior to the merger, utilizing actual merger terms to compute return in the month of the

merger and calculating risk-adjusted return for the combined fund after the merger. In that way, EGB formed a sample free of survivorship bias by tracking the performance of an investment in every fund which existed at the start of their sample period to the end of the sample. This technique is called "follow the money". Then they calculated performance from this sample and from a sample with survivorship bias and calculated the impact of survivorship bias on performance. The performance is calculated using raw returns, one-index and three-index model alphas. Among these, three-index model is utilized for EGB's principal results.

$$R_{it} = \alpha_i + \beta_{iL} R_{Lt} + \beta_{iS} R_{St} + \beta_{iB} R_{Bt} + \varepsilon_{it}$$

Where

- R_{it} is the excess return on fund i in month t (the return on the fund minus the thirty-day T-bill rate).

- R_{Lt} is the excess return on S&P 500 Index in month t.

- R_{St} is the excess return on small stocks in month t measured by the return on an equally weighted average of the smallest two deciles of CRSP NYSE stocks.

- R_{Bt} is the excess return on a bond index fund i in month t, measured by a par-weighted combination of the Lehman Brothers Aggregate Bond Index and the Blume/Keim High-Yield Bond Index.

- β_{ik} is the sensitivity of return on fund i to return index k (k=L, S, B).

- ε_{it} is the random error in period t.

As a result, EGB came up with an estimate of survivorship bias equal to 73 bps for 3-index alpha, which is their preferred method of survivorship bias estimation.

Blake and Timmermann (1998) uses a large sample which includes the complete monthly return history of 2300 UK open-ended mutual funds over a 23 year period, between February 1972 and June 1995. For each sector classification and for every month with data records, they created two equal-weighted portfolios: a portfolio consisting of the funds that died at some time during the sample period and a portfolio consisting of the funds that survived until the end of the sample. The difference in mean returns measures the premium enjoyed by those skilled or fortunate enough to have invested in a surviving fund relative to investors who held non surviving funds. Blake and Timmerman denote this difference as "survivor premium". They also related survivor premium to survivor bias in the following way:

survivor premium = survivor bias + nonsurvivor bias

In their results, 16 of the 20 individual sectors produced a positive survivor bias ranging in value from 0.3 basis points to 16 basis points per month. Across all sectors, the survivor bias on the equal-weighted portfolio is 7 basis points per month or 80 basis points per year. Their results indicate that three sectors, namely North America, Europe and Australasia, come up with positive and statistically significant values of the mean survivor bias.

Carhart formed a survivorship-free database first in his dissertation work back in 1995 and used this in his later works in 1997, 2002 and etc. This database is named as Carhart (1997) in the mutual fund survivorship bias literature. It covers all known diversified equity mutual funds monthly from January 1962 to December 1995 and excludes sector funds, international funds, and balanced funds. The study is continuously updated from 1997 until 2002. Carhart's study distinguishes between

survivor bias and look-ahead bias. Look-ahead bias is a kind of bias imposed by test methodology whereas survivor bias is inherent in the data itself. The study also analyzes how the survival rule affects the average performance bias in survivor-only samples.

Carhart et al. (2002) propose that nonsurvivors in the US mutual fund industry cease to exist mainly due to multi-year underperformance. They present that a survival criterion based on multi-year performance typically causes survivor-biased estimates of average performance to increase in time, but at a decreasing rate. In their sample, they calculate the bias in yearly return at 17 basis points for one-year samples, 43 basis points for five-year samples, and roughly one percent for data sets longer than fifteen years. They also examine the effects of survivor bias on persistence tests, and find that the bias decreases performance persistence relative to the full sample.

Furthermore, their work also takes into account the impact of survivor bias on cross-sectional regressions of performance on fund characteristics. Carhart's study measures the impact of survivorship bias in common mutual fund tests using the database of Carhart (1997).

Following table is a summary of the major studies on survivorship bias in the literature.

Table 1 Summary of Survivorship Bias in the Literature

Year	Author(s)	Country/Market	Period	Annual Survivorship Bias (%)
1989	Grinblatt & Titman	US/Equity	1975-1984	0.10-0.40
1993	Blake, Elton & Gruber	US/Bond	1979-1988	0.27
1995	Brown & Goetzmann	US/Equity	1977-1988	0.80
1995	Malkiel	US/Equity	1971-1991	1.50 (10 year) 4.20 (15 year)
1996	Elton, Gruber & Blake	US/Equity	1976-1993	0.73
1998	Blake & Timmermann	UK/Equity	1972-1995	0.80
2000	Dahlquist, Engström & Söderlind	Sweden/Equity, Bond & Money Market	1993-1997	Equity:0.70 Bond:0.10 Money Market:0.07
2001	Liang	US, Hedge Fund	1990-1999	2.43
2002	Carhart	US/Equity	1961-1995	0.43-0.96
2002	Otten & Bams	UK, Germany, Holland, Italy/Equity	1990-1998	0.11-0.45
2004	Deaves	Canada, Equity	1988-1998	0.46

Performance Persistence

Performance persistence can be defined as a positive relation between performance ranking in an initial ranking period and the subsequent period (Carhart, 1997). Two forms of persistence, absolute and relative, have been differentiated in the literature. A fund possesses absolute performance persistence if it is able to consistently beat a specific benchmark. This has implications for the Efficient Market Hypothesis, or the speed with which information is reflected into security prices.

On the other hand, a fund possesses relative performance persistence if its performance is consistently above the average performance of a group of funds. Evidence of relative persistence has implications for investor choices between funds. Many of the early studies were prompted by the development of modern portfolio theory and hence concentrated on performance relative to a market benchmark.

The academic studies utilized two main methodologies to study performance persistence. One methodology is to carry out a regression analysis of risk-adjusted

returns from a benchmark using Jensen's alpha and then examine the correlation between alphas in the prior period and the latter period.

The second methodology is to compare returns that are not risk adjusted between funds in similar asset categories. Medians or quartiles are used to compare rankings in the prior period and the latter period. This is called the contingency table approach to measure fund performance.

Evidence from the US Studies on Performance Evaluation and Persistence

The earlier work in the US is often quoted to deduce that past performance shows no persistence. Nevertheless, these papers are not concentrated on the question of persistence in isolation. Therefore the focus of this study will be on more recent papers that are testing persistence directly. Still, some of these earlier works had a noteworthy effect on the ensuing performance persistence methodology. The most influential works on the topic are those of Sharpe (1966) and Jensen (1968). Sharpe (1966) developed a ratio called Sharpe Ratio to measure the performance of funds. He ranked mutual funds according to their Sharpe ratio over two periods 1944-1953 and 1954-1963 and found a significantly positive relationship between the two ranking periods. Therefore, he concluded that differences in performance can be predicted although imperfectly.

The other landmark work on performance measurement is that Jensen (1968). In his seminal paper, Jensen estimated the abnormal return of a portfolio using a new measure called Jensen’s alpha, which is the intercept of the regression of portfolio excess returns on the market portfolio excess returns as illustrated below.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \varepsilon_{pt}$$

Where

R_{pt} is the return of a mutual fund in month t,

R_{ft} is the return of one-month Treasury Bills,

α_p is the regression intercept showing the abnormal return of the portfolio (Jensen's alpha, alpha),

β_p is the CAPM based measure of the portfolio's exposure to market risk,

Jensen concluded in his seminal paper that there is little evidence for neither the average fund performance nor the individual fund performance to be better than that predicted from mere random chance. In his study he used Jensen's alpha to compute the risk-adjusted abnormal returns for funds and examined their performance during the period 1945-1964.

Early studies often found persistence in risk-adjusted returns harder to get hold of than persistence in raw unadjusted returns. In ensuing early studies, Carlson (1970) found partial evidence of persistence. Carlson examined the equity mutual funds during the period 1948-1967. He compared successive ten-year periods and found no clear performance persistence. Then he examined absolute and risk-adjusted returns and found that persistence is harder to find in risk-adjusted returns. He divided funds into halves and quartiles and found no persistence for 10 year risk adjusted returns but partial persistence for 5 year returns. However, the results are slightly above those based on chance during his observation period.

Ippolito (1989) summarized the resulting work which found that average fund performance on a risk-adjusted basis when netted of expenses is statistically impossible to differentiate from index performance.

Grinblatt and Titman (1989a) studied equity mutual funds for the period from 1975-1984 using 5-year evaluation periods. The authors developed the prior work on performance persistence in two innovative respects. First of all, samples of fund returns were constructed so that gross returns of mutual funds could be approximated. In this way they freed the estimates from the effects of survivorship bias and transaction costs. Secondly, the authors developed an eight-factor portfolio benchmark to diminish the possibility that passive strategies could have an influence on their results. The authors computed Jensen's measure using four sets of benchmark portfolios: the monthly rebalanced Equally Weighted (EW) portfolio of all CRSP (New York and American Stock Exchange) securities, the CRSP Value-Weighted (VW), 10 Factor (F10) portfolios created with factor analytic procedures developed in Lehmann and Modest (1988) and the 8 Portfolio benchmark (P8) established on the basis of firm size, dividend yield and past returns developed in their paper. The appropriateness of these benchmarks was also evaluated by the authors. The 8 Portfolio benchmark emerged to be the most appropriate for benchmark evaluation since the intercepts of 109 passive portfolios that are created on the basis of securities' characteristics and industry classification were closest to zero with this benchmark. The other three benchmarks displayed size, dividend yield and beta-related pricing errors. Therefore, they were mainly used for comparison purposes. Risk-adjusted performance for growth and aggressive growth funds were found to be positive. However this result disappeared when expenses were accounted for. In summary, Grinblatt and Titman's study showed some statistical evidence of

performance persistence over five year return periods but no economically significant strategies.

In their later work Grinblatt and Titman (1992) studied a sample of 279 funds during the period 1975-1984 using their eight portfolio (8P) benchmark with 5-year evaluation periods and found persistence for the next five years. This benchmark consists of a composite of passive portfolios which are constructed to take into account size (four portfolios), dividend yields (three portfolios) and past returns (one portfolio).The authors used regression analysis to calculate the excess return or alpha for each fund. For superior performance to exist, this risk adjusted measure should be positive and significant. Grinblatt and Titman split the sample into 1975-1979 and 1980-1984 sub-periods and assessed whether above-average performance in the earlier period is indicative of above-average performance in the later period. They compared slope coefficients in cross-sectional regressions of abnormal returns from the last five years data on abnormal returns from the first five years. They find that funds achieve a 0.28% abnormal return in the succeeding five-year period for every 1% abnormal return that is achieved during the first five-year period. The authors conclude that there is positive persistence in mutual fund performance and that irrespective of the source of the persistence, the past performance of a fund provides valuable information for the prospective mutual fund investors.

In 1992, existence of performance persistence has been found in a study carried out by Brown, Goetzmann, Ibbotson and Ross (1992). They analyzed the relationship between volatility and returns in a sample showing evidence of survivorship bias. Their study period was during 1976-1987 with a three year evaluation period. They found persistence in two out of three 3-year periods. The authors argued that results of persistence will appear falsely in samples confined to

surviving mutual funds. Their contention is that choosing a high risk strategy and surviving in the first half of the sample period is likely to lead to above average returns. If such funds continue their high risk strategy and survive, they are also likely to achieve above average returns in the second half of the sample. Hence, using a sample of surviving funds biases results towards finding performance persistence. The degree of this bias depends on the portion of managers who drop out of the sample and whether their characteristics differ systematically from surviving managers. The majority of the earlier studies such as Sharpe (1966), Jensen (1968) and Carlson (1970) did not take survivorship bias into account. However Grinblatt and Titman (1992) showed evidence of survivorship bias. Therefore, efforts were made to adjust for survivorship bias in later studies.

Later in 1993, Grinblatt and Titman used a performance measure that tries to avoid problems with the inefficiency of benchmarks by utilizing portfolio holdings. The authors analyzed CRSP listed quarterly holdings of mutual fund portfolios during 1974-84 and found positive results. They found the strongest evidence of abnormal performance persistence in aggressive growth segment within the funds as they did in their earlier work. In contrast to their earlier work, they observed portfolio holdings as a measure of performance. Therefore, the authors did not use any benchmark. They discovered that funds which performed well in first half of the sample period continued performing well also in the second half and funds that lagged continued to perform badly. This suggests that superior performance was predictable to a certain extent. They consider whether investors could have mimicked the funds based on SEC disclosures and concluded that given the 2%-3.5% gross abnormal returns of the funds, it is still probable that the net abnormal returns to mimicking investors would still have been positive.

Hendricks, Patel and Zeckhauser (1993) examined quarterly returns from no-load (no entry fee) growth-oriented mutual funds over the 1974-1988 period using data gathered to mitigate survivorship bias. However, performance persistence was still found by the authors after taking care of survivorship bias. The authors studied portfolios of top performing no-load growth oriented mutual funds for a total sample of 165 funds and measured performance in terms of Jensen's alpha. They transform all returns into excess returns by subtracting the one-month US Treasury bill rate. They found strong evidence that funds that do well in the past do well in the short-term future. In their study, funds in the top octile of past performers over the previous year (as measured with raw returns) outperformed the lowest octile of past performers in the following year. They also found that the persistence of relatively superior mutual fund performance proves to be significant at least for the first four quarters and that there is a similar effect for underperforming funds. They describe funds delivering persistent short-run superior performance as having "hot hands" and those delivering persistent short-run inferior performance as having "icy hands". However, information about performance beyond the previous four quarters does not seem to predict future performance. They reported positive persistence for four quarters and then a reversal. Hence, they call their findings a "hot hands" phenomenon. Ex-ante investment strategies, which identify whether funds have either hot or icy hands and rank them, can improve on risk-adjusted benchmarks by 6% a year and against traditional benchmarks by 3 or 4% a year. Furthermore, they found that icy hands funds were more inferior than hot hands are superior. The impact of time decay is also investigated with the result being strongest 2 to 8 quarters after the measurement period. In their analysis the authors employed time-series regression approach discussed by Grinblatt and Titman (1989) in addition to

contingency tables to avoid problems due to large variance of ε which could affect the previous tests based on autocorrelation. The t-statistic of the intercept from the time-series regression tested the hypothesis whether the alpha performance in one period is correlated with the alpha performance in the other period. The authors utilized γ statistic proposed by Goodman and Kruskal (1954) as a measure of ordinal association in the contingency table where;

$$\gamma = \frac{P - Q}{P + Q}$$

Where P is the number of concordant pairs of observations

Q was the number of discordant pairs.

However the authors concluded that the success of persistence was not from selecting superior funds over the sample period but from timing the selection and further stated that if investors were to capitalize on the "hot hand" phenomenon, they could have generated a significant, risk-adjusted excess return of 10% per year.

Goetzmann and Ibbotson (1994) studied the performance of mutual funds covering the period 1976-1988 using a fairly large sample of 728 mutual funds using contingency tables. They found that both past returns and relative rankings are useful for predicting future returns and rankings in the short term. Furthermore, they found that funds that exhibit higher variance tend to be more consistently successful in the form of repeat winners. Growth funds were examined over a number of 2-year periods. The authors grouped funds into winners and losers according to their 2-year returns and then studied their performance, measured by their alphas over the next 2-year period. During 1976-1978 there were a total of 63 growth funds whose 2-year returns ranked above the average. Of these funds, 49 were also losers during the same time period. The same method was repeated for the entire period. The authors

found that overall 62% of winners are repeat winners and 63% of losers are repeat losers. The authors also conducted the same study over 3-year periods which confirmed the results. They reported that 41% of the funds that were ranked in the top 25% in one period were ranked in the top 25% in the following period. At the same time, 66% of the funds that were ranked in the bottom 25% during the first period maintained the same ranking in the following time period.

Brown and Goetzmann (1995) studied performance persistence in mutual funds using data on both surviving and non-surviving funds, in a sample that is largely free of survivor bias. Their sample consists of all equity funds running from 1976 with 372 funds through to 1988 with 829 funds. They used an approach with contingency tables, a CAPM alpha measure and a 3 factor alpha measure. The authors examined the investment implications of switching to the best performing funds at the beginning of each year. They started with the annual returns in 1976 to rank all the all mutual funds in 8 different equal size groups (1 being the worst and 8 being the best). Then they calculated the annual rate of return on each of these mutual funds for 1977. After that, using the 1977 returns, they created a new set of groups and calculated the rate of return on each group for 1978. This procedure was repeated for every year in 1977 and 1988. Their results indicated that the top ranking two groups had a substantially better performance than the remaining groups. Their results are consistent with the previous studies in which performance is more pronounced among the best and the worst funds groups while the average funds move in and out of the best and the worst groups in a random way. The authors also stated the number of repeat winners and losers. Of the total funds they studied, approximately 60% of the winners in year t were also winners in year t+1. They also found that losers in time t were twice as likely to go out of business in time t+1 as

compared to winners in time t. The authors utilized probabilistic regression analysis to analyze fund disappearance and report that past performance over several years is the major determinant of fund disappearance. Fund growth plays only a marginal role, and other variables; size and age are negatively related to disappearance, whilst expense ratio is positively related to it. They report clear evidence of relative performance persistence, especially in "losing" mutual funds. They suggest that investors can use historical information to beat the pack. The authors also questioned the reason why prior year performance proves to be an excellent predictor of future negative performance and concluded that it is due to the inability of investors to short the losing mutual funds.

Khan and Rudd (1995) is a good example of a study trying to reveal the source of persistence rather than test for its existence. The authors tried to identify the importance of style and selection components. The authors used a sample of 300 equity and fixed-income mutual funds with sample periods running from 1983-1987 for equity funds and 1986-90 for fixed income funds. They tested these funds utilizing both a contingency table and regression analysis approach. They regressed period 2 performance against period 1 performance of the funds. They tested performance persistence in 1988 to 1993 for equity funds and 1990 to 1993 for fixed income funds. They used a variety of performance metrics based on 'alphas' (i.e. risk adjusted returns) plus style analysis. Their persistence analysis is mostly based on contingency table analysis. They do not find any equity fund performance persistence but did find fixed income fund performance persistence even after controlling for fund style and management fees.

Malkiel (1995) analyzed equity mutual funds utilizing a sample of surviving and non-surviving funds between 1971 and 1991 and using one year evaluation

period. The author made use of contingency tables and a strategy of purchasing the mutual funds that had the best performance record during the preceding year. Although he found performance persistence in the 1970s, the phenomenon does not continue through the 1980s. This suggests that conclusions about the importance of survivorship may be sensitive to the time period studied. He also provided evidence that using a sample consisting entirely of surviving funds creates an upwards-bias in apparent performance.

Elton, Gruber and Blake (1996) used a sample free of survivor bias consisting of equity funds with $15 million plus of net assets, from 1997 to 1993 with a total of 188 funds. They used a benchmark which captures the influence of four factors, the S&P 500 index to represent the market, a size factor, a growth factor, and a bond index factor. They estimated excess performance, i.e. alphas for each fund. Funds are ranked and placed in portfolios based on deciles of past year performance. After that, they ranked subsequent performance for each portfolio. They found that ranking using one year's past data gives greater persistence prediction than ranking using three year's data if performance is being predicted over a one-year period. They also discovered that raw returns give greater persistence prediction than risk-adjusted returns. They concluded in favor of the existence of performance persistence in the short run and in the long run. However, 3-year past returns are better than one-year's data in predicting returns over the next three years when ranking is done on a risk-adjusted basis. They suggested that there is more to persistence of performance than the 'hot hands' phenomenon and that the difference in risk-adjusted returns between the top and the bottom deciles was put down to differences in the selection skill of managers and expenses. For instance, they suggested that the very poor performance of the lowest decile is largely accounted for by the fact that it contains the majority

of funds with very high expenses. Using a selection based on alphas over the past 3 years, the top decile generates a positive excess return of 0.9 basis points a month whereas one composed of those in the bottom decile produces a negative return of -43.7 basis points. Hence the authors concluded that there is definite information about future performance conveyed by past performance.

Carhart (1997) studied equity funds for the period 1962-1993 using CAPM, three-factor and four-factor alpha models to estimate performance and rejected the "hot hands" phenomenon of Hendricks et al (1993). He used a sample of all diversified equity funds in existence between 1962- 1993, a sample which is free of survivorship bias. This survivorship free data was created by Carhart and was referred to as "Carhart data" in later studies. Carhart's model attributed performance and gives the proportion of mean return attributable to four different strategies, i.e. high versus low beta stocks, large versus small market capitalization stocks, value versus growth stocks and one-year return momentum versus contrarian stocks. Carhart estimated that funds in the top deciles would earn returns around 3.5% higher than funds in the bottom decile after one year, although all of this difference is due to the poor performance of bottom decile funds. He states that buying last year's top decile funds and selling the bottom decile funds yields a return of 8% in raw terms. Of this 8% return, differences in market value and momentum of stocks explain 4.6%, expense ratios 0.7% and transaction costs 1.0% but about 1% is explained by the categorization of the portfolios and is concentrated in the bottom deciles.

In summary, he finds that the "hot hands" result is mostly driven by the one-year momentum strategy. In fact, some funds by chance happen to have large positions in the previous year's winning stocks. He stated that since the momentum

strategy is based on past returns and replicable by uninformed investors, it should not be counted as a superior part of performance. When he added the above mentioned factor representing the momentum strategy, evidence of persistently superior performance disappears. However, he found positive persistence in strongly under-performing funds. He suggested three important rules of thumb for mutual fund investors: 1) avoid funds with persistently poor performance, 2) funds with high returns last year have higher than average expected returns in the next year, but not in years thereafter, 3) the investment costs of expense ratios, transactions costs, and load fees all have a direct, negative impact on performance.

Recently, Daniel, Grinblatt, Titman and Wermers (1997) and Wermers (1997) applied a portfolio-based performance measurement model to study performance persistence. Their results confirmed that the momentum effect on stock returns and the persistent use of momentum strategies by fund managers are the main reason for performance persistence.

Christopherson, Person and Glassman (1998) employed conditional analysis to examine performance persistence of pension funds. Conditional analyses use time-varying, "conditional" alphas and betas instead of the usual "unconditional" or average ones which are assumed constant after being estimated in regression analysis. The authors argued that institutional investment managers are likely to use current information about the state of the economy when forming expectations about returns. Their data consisted of 273 pension funds from 1979 to 1990. They found evidence that the investment performance of the pension managers persists over time. In particular, low conditional alpha managers in the past tend to be abnormally low-return managers in the future. The conditional variables the authors utilized included the lagged one-month T-bill rate, a lagged dividend yield measure based on

a value-weighted NYSE and AMEX stock index, a lagged measure of the term structure of interest rates, a lagged measure of quality spread in the corporate bond market, plus a dummy variable to capture the January effect. Their unconditional measure is a standard Jensen's alpha regression. They measured performance prediction by regressing current alphas (measures of superior performance) on past alphas. They also acknowledged that conditional measures are more informative about future performance than are unconditional measures (i.e. average alphas and betas). Finally they reported that persistence becomes stronger as the future return horizon increases out to three years.

Zheng (1999) used a different approach tracking the flow of investor's funds into mutual funds to assess whether investors can successfully discriminate between the relative performances of funds. He investigated two key issues. The first issue is whether investors are smart before the event so that they can move their investment money into funds which will perform better. The second issue is whether there is information in tracking this flow of funds and whether it can be used to make abnormal returns. The author's sample is made up of a comprehensive data set of open-end mutual fund data running from 1961-1993 including extinct funds. The sample incorporated both load and no-load (entry fee and no entry fee) funds. On average the author had a sample of 478 funds in existence each month with a minimum of 281 funds and a maximum of 1,196 funds. He concluded that total newly invested money in equity mutual funds is able to forecast short-term future fund performance, in that funds that receive more money subsequently perform better than funds which lose money. For the whole sample there is no statistical evidence that following the money flows will produce a strategy that will beat the market index, but there is evidence for money flows into small funds. However, this

smart money phenomenon seems to be short-lived in that the performance ranking of positive and negative portfolios reverses after 30 months.

Chen, Jegadeesh, Wermers (2000) examined the value of mutual fund management by studying the stockholdings and trade data of mutual funds. The authors found that stocks extensively held by funds do not outperform other stocks. Nevertheless, they found that stocks purchased by mutual funds have significantly higher returns than stocks they sell. This finding had been valid both for large and small stocks, and for value and growth stocks. Besides, the authors found that growth-oriented funds displayed better stock selection skills than income-oriented funds. Lastly, they found only weak evidence that funds with the best past performance had better stock-picking skills than funds with the worst past performance.

Wermers (2002) analyzed the persistence of mutual funds for the period of 1975-1994 using a new database which was established by him. This new database was created through the merger of a database of mutual fund holdings with a database of mutual fund net returns, expenses, turnover levels, and other characteristics. He showed that mutual fund net returns are strongly predictable. Investing in growth-oriented funds with the highest previous year net returns resulted in a strategy that beats holding the market portfolio strategy by about 2-3% over the first year following the ranking and by almost the same amount over the second year. This net return spread is owing to the better stock picking skills of previous year winning funds relative to previous year losers, as well as to winner funds holding stocks with higher characteristic-based returns. Furthermore, consumer flows to these winner funds are strong and persistent. He also found that high turnover growth-oriented funds outperform their lower-turnover counterparts, both in picking stocks

and in providing net returns to shareholders. The evidence that funds trading more frequently, together with the evidence that winners repeat, suggests that conditioning on both past net returns and turnover would provide even higher return predictability (and, perhaps, stock picking talents). Wermers also showed evidence that emphasizes the role of consumer flows in patterns of performance persistence. First of all, he showed inflows are highest for funds with the best past performance, which temporarily reduces the equity exposure of these funds and reduces momentum-based and other equity performance benefits provided by the stockholdings of these funds. However, offsetting this effect is that managers of these top funds eventually invest inflows into stocks with high future returns. At least a part of these returns are due to these top managers buying additional stocks with high past returns. Thus, large cash inflows allow top-performing funds to augment the return boost provided by passively holding their past winners with another boost provided by actively trading on momentum.

Brown (2004) addressed the question whether investors benefit from managers that maintain their designated investment strategy on a more consistent or less consistent basis using a survivorship-free universe of mutual funds from Morningstar database for the period 1988-2003. He found that funds that are the most consistent in their investment styles over time produce better absolute and relative performance than those funds showing less style consistency. Furthermore, the evidence presented by Brown is also strongly supportive of the hypothesis that high style-consistent funds have lower portfolio turnover than low style-consistent funds and that, controlling for turnover as well as fund expenses, style consistency is still an important explanatory factor. Moreover, the author documented the positive relationship that exists between the consistency of a fund's investment style and the

persistence of its return performance, even after accounting for momentum and past abnormal performance effects. Brown's results supported the conclusion that the ability of a manager to make the proper decision regarding the consistency of his or her investment style is a skill valued in the marketplace.

Table 2 below summarizes some major studies of mutual fund performance and indicates the key results produced by each study. The table is adapted from Ippolito (1993) drawing upon his summary of the early work.

Table 2 Summary of US Managed Fund Performance Studies

Authors	Year of Study	Study Period	Number of Funds in Dataset	Type of Funds in Dataset	Benchmark	Existence of Survivorship Bias	Existence of Performance Persistence
Sharpe	1966	1954-63	34	All	DOW-JONES	Yes	No
Jensen	1968	1945-64	115	All	S&P 500	Yes	No
Carlson	1970	1948-67	82	Equity mutual funds	S&P 500, DOWJONES	Yes	Partial
McDonald	1974	1960-69	123	All	EW-NYSE	Yes	Negligible
Mains	1977	1955-64	70	All	S&P 500	Yes	Partially
Kon & Jen	1979	1960-71	49	All	EW-CRSP	Yes	Yes
Shawky	1982	1973-77	255	All	EW-NYSE	Yes	No
Chang & Lewellen	1984	1971-79	67	All	VW-CRSP	Yes	No
Henriksson	1984	1968-80	116	All	VW-NYSE	Yes	No
Lehman & Modest	1987	1968-82	130	All	VW-CRSP	Yes	Yes
Grinblatt & Titman	1989	1975-84	157	Equity	VW-CRSP 8P Portfolio	No	No
Ippolito	1989	1965-84	143	All	S&P 500 VW-NYSE	No	No
Brown, Goetzmann, Ibbotson & Ross	1992	1976-87	126-153	Growth equity	S&P 500	No	Yes but shows impacts of survivorship bias
Grinblatt & Titman	1992	1974-84	279	All	8-factor benchmark	Yes	Yes
Grinblatt & Titman	1993						
Hendricks, Patel & Zechauser	1993	1974-88	165	All	Various	No	Yes
Goetzmann & Ibbotson	1994	1976-88	728	Mutual Funds	S&P 500	Yes	Yes
Brown & Goetzmann	1995	1976-88	372-829	All	Median fund and various indices	No	Yes, relative performance
Kahn &Rudd	1995	1983-93	300	Equity & fixed income funds	SP500 & style indices	Yes	No - equity, Yes - fixed income

Table 2 continued

Authors	Year of Study	Study Period	Number of Funds in Dataset	Type of Funds in Dataset	Benchmark	Existence of Survivorship Bias	Existence of Performance Persistence
Malkiel	1995	1971-91	724	All	Wilshire 5000 S&P 500	Yes	Yes but stronger in 70's than 80' s
Elton, Gruber & Blake	1996	1977-93	188	All	Four factor model	No	Yes
Gruber	1996	1985-94	270	All	Market model Single index 4 factors	No	Yes
Ferson and Schadt	1996	1968-90	67	All	CEB-AVG CEB-EW	Yes	Yes but mainly concentrated in the extremes.
Carhart	1997	1962-93	1,892	All diversified equity funds	CAPM 3 factor model 4 factor model	Yes	Yes, mainly in short term.
Daniel, Grinblatt, Titman & Wermers	1997	1975-94	2,500	All equity funds	Jensen 4 factor model, Jensen CRSP VW & 2 other models	Yes	Yes, short-term, partly related to momentum.
Wermers	1999	1974-94	2,400	All	Control portfolios based on size		Yes, short-term, partly related to momentum
Christopherso, Person & Glassman	1998	1979-90	185	All pension fund managers	No	NYSE&Amex VW Uncond. & cond.models	Yes, stronger over 3 years
Authors	Year of Study	Study Period	Number of Funds in Dataset	Type of Funds in Dataset	Benchmark	Existence of Survivorship Bias	Existence of Performance Persistence
Zheng	1999	1961-93	478 avg.	Equity mutual funds		No	Yes
Chen, Jegadeesh, Wermers	2000	1975-1995	393-2,424	All	Four-factor model	No	No
Liang B.	2001	1990-1999		Hedge funds		No (2.43%)	
Wermers	2002	1974-94	Merger of two databases	All	Carhart 4-factor model	No	1-year shows performance persistence, 3-years shows manager skill
Brown	2004	1988-2003	All from Morningstar and CRSP mutual fund database	Equity mutual funds	Carhart 4-factor model	No	Yes
Boyson	2008	January 94-Dec 2004	3000	Hedge funds	-	No	Yes

Note: CAPM = capital asset pricing model; VW = value weighted; EW = equally weighted; CEB = conditional expectations benchmark; AVG = average of individual fund regression results

CHAPTER 3 DATA ON THE VALUE OF MUTUAL FUND MANAGEMENT, SURVIVORSHIP BIAS IMPACTS AND PERFORMANCE PERSISTENCE

There are not any mutual fund database providers in Turkey like the CDA Investment Technologies or any research center like the Center for Research in Security Prices (CRSP) whose data was utilized by almost all studies on fund performance in the US. There are some vendors (Rasyonet, Fonbul and Fon Market) which are already in the phase of building up fund information history and hence shaping up their database structure according to the needs of market players, i.e. mostly the asset management companies and also individual investors to a certain extent. Their concentration is on existing fund return data to be sold to the investors, especially the asset management companies. However, these databases do not include the funds which do not exist any more. Therefore, managed fund performance studies using such databases face a problem called "survivorship bias". This arises because some funds disappear during the period being studied. They may close or merge, or data on them may become unavailable. To the extent that being a survivor depends on past performance, using data based on surviving funds will bias the true average performance of the managed fund industry upwards. This is because the high-performing funds will tend to be over-represented in the sample. Funds with poor performance will tend to be merged or closed and will drop out of the sample. This may lead to predictable biases in empirical work on managed fund performance.

Therefore, the first part of my thesis had been the construction of a survivorship-free mutual fund database for Turkish equity mutual funds. While constructing the database, I also included the mutual funds which were closed down and/or transformed into another fund until the closure/transformation actually takes

place. In that way, the database had been freed from survivorship bias. The process of establishing the database had been rather labor intensive since the data were consolidated from the Capital Markets Board, Rasyonet, Finnet, asset management companies and various internet sites. Data investigations went as far as searching mutual fund offering circulars and articles of association in order to check or find the correct data whenever different sources come up with conflicting data. My study on fund performance is based on mutual fund data only.

Besides mutual funds, there are also the pension funds which were established exclusively for the management of the assets of private pension fund companies. Since pension fund initiations started back only in 2003, such funds have only four full years of data. Furthermore, the bulk of pension fund assets are in fixed income. Equity portion of pension fund assets are small in size, not only within funds but also in the total pension fund system. Therefore, due to their lack of data, premature stage and small size, I did not include them in my fund performance measurement study. Therefore, the database that I build up is constrained to equity mutual fund data.

There are different types and classes within mutual funds. A-type and B-type classifications basically separate funds into equity and fixed income funds. A-type is the broad name for equity funds in Turkey. A-type funds should have a minimum of 25% equity in their monthly average net asset value to be denoted as A-type. This classification was a result of tax advantage for A-type funds. However this tax advantage for all A-type funds had been partly invalidated during the following years making the A-Type and B-Type classification irrelevant as there is no tax advantage for carrying a minimum of 25% equities any more. There is tax advantage only for investors holding mutual funds with a minimum equity allocation of 51% and a

minimum holding period of one year. A new classification for mutual fund grouping is truly necessary. Association of Institutional Investors established a Work Group in 2007 to prepare a new classification taking industry-wide recommendations into account and proposed it to the Capital Markets Board. The author is also a member of this Work Group. Currently the proposal is finalized by the Work Group and it is under the inspection of the Capital Markets Board. Association of Institutional Investors took the initiative to apply the new proposed structure as of 1 January 2009 internally for test purposes until the CMB modifies the current legislation.

Nevertheless, this study uses the funds in the existing classification. Hence it includes all actively managed and domestically invested A-type funds

-A-Type Variable Funds Class,

-A-Type Equity Funds Class and

-A-Type Balanced Funds Class funds.

A-Type Variable Class includes equity funds whose equity portion can vary between 25%-100%. The rest can be invested in fixed income or money market instruments. There is also a 30% investment band requirement for every instrument category.

A-Type Equity Class includes equity funds whose equity portion can vary between 51%-100%. The rest can be invested in fixed income or money market instruments. There is also a 30% investment band requirement for every instrument category.

A-Type Balanced Class includes equity funds whose equity portion can vary between 25%-80%. The rest can be invested in fixed income or commodity instruments such as gold, metals etc. Two out of three instrument categories, namely equity, fixed income and commodity instruments constitute the fund NAV and their

allocation can also vary between 20% and 80%. Each category should be no less than 20% in the NAV in balanced class. However A-Type balanced funds should carry a minimum of 25% equity in their monthly average net asset value anyway. There is also a 30% investment band requirement for every instrument category.

This study excludes

-Passive, i.e. index funds (broad index or sector index),

-Participation funds,

-Private funds,

-Sector funds,

-Foreign security invested funds.

Passive funds are ISE-30 or ISE-100 index funds. Various participation funds that follow the participations of some holdings or groups such as Koç Holding İştirak Fon, Sabancı Holding İştirak Fon (deceased recently in 2008) and İş Bankası İştirak Fon are also passive funds with a limited investment universe. Private Funds are wholly owned by a dedicated group, cannot be invested by the general public and hence they can have special investment considerations and prohibitions imposed by that group of investors. Sectors funds invest specifically into a sector, ruling out other investments. For these reasons, they are out of the scope of this study.

Therefore this database includes all of the A-type Variable, Equity and Balanced Class Funds with weekly return data for eight years from January 2000 to December 2007. For the weekly returns, I had chosen to calculate the mutual fund returns from Wednesday to Wednesday to be freed from a potential “day of the week” anomaly.

The database is utilized to conduct a return-based performance study. In order to perform a portfolio-based performance study like the ones explained in Literature Survey section, equity holdings of the mutual funds should be known. Since Turkish stock markets are very volatile, mutual funds change some of the stocks they hold very frequently, to be exact daily most of the time. Hence obtaining gross returns from quarterly or monthly holdings would be a futile effort since portfolio turnover is very high. Gross returns obtained from quarterly or monthly holdings would not approximate the real gross returns. Gross returns are obtained from net returns in this study by adding back management fees. Transaction commissions could not be attained correctly. Therefore gross returns are only gross of management fees in this study, not gross of transaction commissions.

Management fee and other expense data are very hard to get not only for the deceased funds but also for survivor funds' previous periods (if fees or expenses change, and they do sometimes).

CHAPTER 4 METHODOLOGY ON THE VALUE OF MUTUAL FUND MANAGEMENT

Methodology on Constructing the Survivorship Bias Free Data Set

When I started to build up a survivorship-free data set, in all honesty I did not expect that it would be so difficult to construct and that it would take so much time and effort. It could have been easier if the Capital Markets Board of Turkey would provide some price or return data on the deceased funds since they are the only entity to whom all the fund management companies are obliged to report various information and the most important one of such information is the price data. That means that dead funds' price and return data were also reported to the CMB when the funds were alive. Nevertheless, CMB's monthly report contains existing fund data at the time of the publishing. Therefore, I checked each and every monthly report starting from 2000 up to the end of 2007. In that way, I was able to see existing fund data and hence the time when a mutual fund drops from the data set. I found the start and end dates of deceased funds. However, monthly CMB Reports supply monthly fund prices. Using monthly returns would decrease the number of data points especially for some nonsurviving funds and would therefore decrease the reliability of the results to be attained in the performance measurement section. Some nonsurviving funds could end up with only 12 or even less data points with monthly data. Therefore, I thought that using weekly data would increase the reliability of the study. Since I decided to use weekly data, I also used information from data vendors,

such as Rasyonet and Fonbul to get information on existing and especially deceased funds. Especially for nonsurviving funds, Rasyonet had been of great help.

I manually formed the whole data set. I started off with the Variable, Equity and Balanced Funds existing at the end of the study period, i.e. 31 December, 2007. There existed 51 Variable Funds, 19 Equity Funds and 18 Balanced Funds, namely only 88 funds of interest at that date. Then I started searching for information and data on the nonsurviving funds whose names I obtained from the CMB's monthly reports. I acquired most of the weekly price data for these nonsurviving funds from Rasyonet.

I investigated the offering circulars and articles of association of the funds to learn whether they were merged with another fund or just closed. Wherever necessary and possible, I also contacted fund management companies to obtain that information.

Finally, I made a classification for the nonsurvival types. There could be five possibilities for the fate of nonsurviving funds:

-Shut down: The fund is closed.

-Name change: Only name changes, no classification change occurs.

-Classification change: The investment policy of the fund changes. It is a new fund.

-Name and classification change occurs at the same time.

-Merge with another fund: The fund is closed effectively.

Under all these scenarios except for simple name change, the price data of the particular fund halts in the dataset. For simple name change, the fund may or may not continue what it does under a new name. There are a few such name changes without classification change in my dataset. However, investment policy of the fund still may change although classification remains intact. All of the name changes without

classification change occur due to the change, merger or acquisition of fund management company and/or sponsoring organization. Such organizational changes usually bring in investment policy change. Therefore, the fund more often than not becomes a new fund with a different investment policy. This could have been checked with the organizations but in the dataset the organizations themselves mostly disappeared as a result of takeovers/mergers by foreign banks for the period 2003-2007 or taken over by the Banking Deposits Insurance Fund (TMSF) for the period 2000-2002. Therefore, in this study I assumed that name changes of funds without classification change also resulted in investment policy change, hence in the halt of price data for the fund whenever the real situation cannot be checked with the sponsor or fund manager. For the name change cases for which I was able to check and find out that there is no change in investment policy, I left the fund in survivors. There are a few such changes.

Methodology on Calculating Survivorship Bias

As explained in the Literature Survey Section, in survivorship studies survivorship bias is usually defined as the performance difference between surviving funds and all funds including the nonsurviving ones. However, Deaves, 2004 defines "survivorship bias" as the performance difference between surviving and nonsurviving funds. Blake and Timmerman (1998) call the performance difference between surviving and nonsurviving funds as "survivor premium". In this study, I followed the majority of the previous studies and used the first definition for survivorship bias. Additionally, I used the definition of Blake and Timmerman

(1998) for surviviorship premium. Apart from its definition, there are also some methodological differences in calculating survivorship bias in mutual funds. I take a comprehensive approach and use different methods wherever possible and compare their results.

First methodological difference is that while some studies use raw returns (Brown and Goetzmann, 1995), (Malkiel, 1995) to calculate the survivorship bias, the others use alphas (one-factor, three-factor or four factor models) (Elton, Gruber and Blake, 1996), (Carhart, 1997). In this study, I use both raw returns and Jensen's alpha.

The second methodological difference lies in the definition of survival conditioning. Some studies use "end-of-sample conditioning" whereas others use "full-data conditioning". In end-of-sample conditioning method, survivors are defined as all funds existing at the end of a specific sample period (Carhart et al., 2002) This approach is followed by Wermers (1997), Blake and Timmermann (1998), Ter Horst et al (2001), Otten and Bams (2004) and Deaves (2004). In the second common definition of survivorship bias, i.e. full-data conditioning, survivors are defined as all funds which were operational through the whole sample period. This approach is used by Grinblatt and Titman (1989), Brown and Goetzmann (1995), Elton, Gruber and Blake (1996). In this study, both end-of-sample conditioning and full-data conditioning approaches are used and their results are compared. As the number of funds in end-of-sample data conditioning in all three different fund categories are nearly twice or more of those in full-data-conditioning, the results of end-of-sample-data-conditioning is given more importance.

Table 3 Number of Surviving and Nonsurviving Funds by Fund Class

Fund Class	Full-data conditioning	End-of-Sample Conditioning	Closed/Merge/Changed Name or Policy	Total
Variable	22	51	46	97
Equity	7	19	15	34
Balanced	11	18	27	45
Total	40	88	88	176

Third methodological difference is the aggregation method of fund returns. As a mutual fund sample is a panel data set, a method of aggregation across funds and time must be chosen (Carhart et al., 2002). First approach is to pool all of the time series and cross-sectional observations. This may skew results towards relations in the final years of the sample, if the growth in the number of funds accelerated during the last years of the sample.

Second approach is basically calculating statistics on individual funds and then averaging cross-sectionally giving the same weight to all funds irrespective of history length. Jensen's alpha calculations are performed for individual funds and average alphas are calculated for different fund categories. This method is used in this study by calculating alphas for all of the individual funds and then averaging alphas in variable, equity and balanced fund classes separately.

Third approach calculates statistics cross-sectionally for each time period and then averages these estimates through time. Portfolios of funds are formed either on an equal-weighted or size-weighted basis and returns of related portfolios are calculated for each time period. Jensen's alpha calculations are performed for the portfolios of funds in different fund categories. This method is utilized in the study by forming both equal-weighted and size-weighted portfolios and calculating alphas accordingly.

Methodology on Measuring Performances of Mutual Funds Using Survivorship Bias Free Data Set

In broad terms performance analysis can be implemented in two different ways as previous studies had shown.

- Returns-based performance analysis
- Portfolio-based performance analysis

Returns-based analysis is a top-down approach to attributing returns to components on an ex-post basis and analyzes statistically the added value of the manager. In returns-based analysis, the attribution is between systematic and residual returns. Managers are given credit only for the residual returns that they generate. Return-based performance analysis generally allocates part of the returns to systematic or style components and gives managers credit only for the remainder of the returns.

Portfolio-based performance analysis is a bottom-up approach which attributes returns to various components derived from the ex-ante portfolio holdings and gives manager credit for returns along many of these components. In that way, not only whether the manager added any value or not can be analyzed but also whether the manager added value in the ex-ante agreed upon dimensions such as stock selection, factor bets and etc. Contrary to the returns-based performance analysis, portfolio-based analysis can attribute returns to a number of components of potential manager skill.

In this study of performance analysis of the mutual funds in Turkey, I started with Jensen's alpha regressions for all the mutual funds in my dataset. For this, time series of portfolio excess returns are regressed against benchmark excess returns. For

benchmark choice, ISE-100 is a natural choice. However, this study analyzes fund performance in classes since in Turkey mutual funds have differing equity portions in them ranging from 25% to 100% making their performances differ from each other according to fund class. Therefore, this study made use of fund indices in addition to the ISE-100 index as benchmark.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \varepsilon_{pt}$$

Where

R_{pt} is the weekly return of a mutual fund in week t,

R_{ft} is the weekly overnight rate,

R_{mt} is the weekly return of the benchmark (Variable, Equity and Balanced Fund indices taken from Rasyonet or ISE-100 index),

α_p is the regression intercept showing the abnormal return of the portfolio (Jensen's alpha),

β_p is the CAPM based measure of the portfolio's exposure to market risk,

In that way, value creation by asset managers in Turkey during the study period of 2000-2007 by beating relevant benchmarks can be uncovered. I carried out some of the analyses not only on the overall study period but also for some subperiods. After examining the value creation (or destruction) of asset managers, I studied the performance persistence of mutual funds.

Methodology on Evaluating Performance Persistence of Mutual Funds Using Survivorship Bias Free Data Set

Performance persistence is detected by comparing performance measures in the current period with those in the following period. The performance persistence of mutual funds is examined by using two different types of tests. The first one is non-parametric (contingency table based) test. The second one is parametric (regression based) test.

Non-Parametric Tests (Contingency Table Based Approach)

The non-parametric test uses contingency tables of winners and losers. The contingency table methodology is based on the comparison of performance rankings in two consecutive periods, identifying the two sub-sets of "winners" (W) and "losers" (L) on the basis of the median of the group. Winners and losers are defined relative to the median of all the funds in that period and strategy. Median returns of the funds can be calculated based on raw returns or risk adjusted returns. When using raw returns, a fund is identified as a winner in the current year if its return is above or equal to the median return of all funds with returns reported that year. Similarly, when using risk-adjusted returns, a fund is identified as a winner in the current year if its risk-adjusted return or alpha is above or equal to the median alpha of all funds with returns reported that year.

The same decisive factor is used to identify the fund as a winner or loser for the following period. Therefore, WW for year 2001 is the number of the winners in

2001 that were also winners in 2000. Altogether WW, LW, WL and LL show that the fund is winner-winner, loser-winner, winner-loser or loser-loser in two consecutive periods. To test the persistence hypothesis, contingency tables are constructed from these series of winners and losers, in which mutual funds that qualify as winners in two successive periods are identified as WW, and those that prove to be losers in two successive periods are identified as LL. Mutual funds that switch from winner to loser are identified as WL whereas those that switch from loser to winner are identified as LW. Under the null hypothesis of no persistence, a mutual fund has exactly the same probability of being a winner as it has of being a loser indicating a probability of 0.5. Persistence exists in the cases of winner-winner and loser-loser.

To assess the performance in two successive periods, I used both raw returns and risk-adjusted returns in this study as I did in survivorship bias and mutual fund performance measurement calculations.

Financial and statistical tests proposed by Brown and Goetzmann (1995), Malkiel (1995) and Kahn and Rudd (1995) are utilized to analyze the robustness of the persistence phenomenon:

First of all I used Brown's and Goetzmann's (1995) test statistic called Cross Product Ratio (CPR) or odds ratio. Cross Product Ratio reports the odds ratio of the number of repeat performers to the number of those that do not repeat. CPR is defined as

CPR= (*WW* * *LL*) / (*WL***LW*)

and it gives the ratio of the cases where there is persistence, both positive and negative, to the product of the two cases where there is no persistence. The null hypothesis that there is no persistence, i.e. the performance in the first period is

unrelated to performance in the second period corresponds to an odds ratio of one. A value higher than one indicates that there are a higher proportion of persistent funds to non-persistent funds, and a value of less than one indicates the opposite. Christensen (1990) shows that in large samples with independent observations, the standard error of the natural log of the odds ratio is well approximated and that the standard deviation of the log of the CPR statistic can be expressed as follows:

$$\sigma_{\ln(\mathrm{CPR})} = \sqrt[2]{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}$$

Next, the Z statistic is calculated which is the log-odds ratio scaled by its standard error under the hypothesis of no persistence. A Z-test that follows a normal distribution (0, 1) is calculated in the following way:

$Z = \ln(\mathrm{CPR}) / \sigma_{\ln(\mathrm{CPR})}$

Under the null hypothesis of no persistence, therefore, the z-value shown above has a normal standard distribution. Positive Z statistic indicates that there is performance persistence while negative Z statistics shows the opposite. The significance of the persistence is determined by the value of the Z statistic.

The odds ratio or CPR statistic does not tell us anything about the origin of the persistence. In order to investigate whether persistence is present in winners, losers or both, I applied Malkiel's Z-test. Malkiel's (1995) Z-test for repeat winners or losers is calculated as follows:

$Z = (\mathrm{Y}-np)/\sqrt{np(1-p)}$

Where:

- Z is the statistical variable, which has a normal distribution (0, 1).
- Y is the number of winner or loser portfolios in two consecutive periods.

- n is the number of winners/losers in the preceding period, i.e. WW + WL or LW+LL.

- p is the probability that a winning (losing) fund continues to be a winning (losing) fund in the next period assuming independence across funds. If there is no persistence, we would expect p to be equal to 0.5. Hence evidence against persistence in winning would be provided by failing to reject the hypothesis that p=0.5. Since the random variable Y of the number of persistently winning funds will have a binomial distribution, we can construct a binomial test to see if the probability p of consistent winning is greater than 0.5. When n is reasonably large (n>=20), the random variable Z shown above will be approximately distributed as normal with mean zero and standard deviation one.

Additionally I utilized Kahn's and Rudd's (1995) χ2-test as follows:

$$\chi^2 = \sum_{i=1}^{n}\sum_{j=1}^{n}\frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where:

- O_{ij} is the observed number for WW-WL-LW-LL in the contingency table.
- E_{ij} is the expected number for WW-WL-LW-LL in the contingency table.

This statistic is obtained by comparing the sample frequencies of WW, LW, WL and LL with the distribution of frequencies expected under the null hypothesis, i.e. 25% each. Furthermore, although survivorship bias is not an issue for this study since nonsurviving funds are also added to make the sample survivorship-bias free, Chi-squared test is found very powerful in detecting persistence and robust to survivorship bias in the sample data by Carpenter and Lynch (1999).

Chi-squared statistic is calculated as shown in the following equation.

$$\chi^2 = \frac{\left[(WW - N/4)^2 + (LW - N/4)^2 + (WL - N/4)^2 + (LL - N/4)^2\right]}{N/4}$$

χ^2 follows a chi-square distribution with 1 degree of freedom in the case of a two-by-two table. The critical χ^2 value here is 3.84146 which is compared with the calculated χ^2 values.

Non-parametric tests are applied on quarterly, yearly and two-yearly returns to test short-term, medium-term and long-term persistence between 2000 and 2007. Between 2000 and 2007, 31 rolling quarters are used for short-term performance persistence calculations. For medium-term calculations 7 annual return periods are utilized. For long-term return calculations, 5 two-yearly rolling return periods are utilized.

Parametric Tests (Regression Based Approach)

The regression based approach also allows us to establish the possible existence of the performance persistence phenomenon. This is because we may use it to discover whether performance in the prior period is a good predictor of performance in the next. This is the model used by scholars such as Grinblatt and Titman (1993), and Kahn and Rudd (1995). Thus, the statistical significance of the relationship between performance in a given period and that of the immediately prior period would be established on the basis of *ex post* values using the following regression:

$$\alpha_{i,t+1} = \beta_1 + \beta_2 \alpha_{i,t} + u_{i,t}$$

Where

$\alpha_{i,t+1}$ is alpha of the future period for fund i and

$\alpha_{i,t}$ is alpha of the current period for fund i.

Positive β_2 values with significant t-statistics would confirm the existence of positive performance persistence. It shows that a mutual fund that had superior performance in the current period also performs better than median in the future period.

CHAPTER 5 EMPIRICAL ANALYSIS AND RESULTS

Construction of the Survivorship Bias Free Data Set

I believe that I found names and return data of almost all the funds which existed at any time during the study period from the beginning of 2000 to the end of 2007. I do not say “definitely all” because construction of the survivorship bias free data set is contructed manually, hence there may be a few funds that cannot be found out. My dataset consisted of 176 mutual funds that existed some time during the sample period, of which 97 are variable funds, 34 are equity funds and 45 are balanced funds. Below table lists the 97 A-type variable funds that existed at some part or whole of the study period giving the breakdown of survivors and nonsurvivors. Full-sample survivors are a subset of end-of-sample survivors.

Table 4 Listing of 97 Variable Mutual Funds in the Sample

		Full- sample Alive	Alive at the end	Dead
1	ABN AMRO BANK A TIPI DEGISKEN FON	0	0	1
2	ACAR M.D. A TIPI DEGISKEN	1	1	0
3	AKBANK A TIPI DEGISKEN FON	0	1	0
4	AKBANK ÖB A TIPI DEGISKEN FON	0	0	1
5	ALFA MEN.ATIPI DEGISKEN FON	0	0	1
6	ALTERNATİF BANK A TIPI DEGISKEN FON	1	1	0
7	ANADOLUBANK A TIPI DEGISKEN FON	0	1	0
8	ATA YAT.A TIPI DEGISKEN FON	0	1	0
9	BANKEUROPA ATIPI DEGISKEN FON	0	1	0
10	BANKEKSPRES A TIPI DEGISKEN FON	0	0	1
11	BANKKAPİTAL A TIPI DEGISKEN FON	0	0	1
12	BANK POZİTİF A TIPI DEGISKEN	0	1	0
13	BAŞKENT M.D. A TIPI DEGISKEN	0	1	0
14	BAYINDIR MEN. A TIPI DEGISKEN FON	0	0	1
15	BENDER ATIPI DEGISKENYAT.FON	0	0	1
16	COMM.UNION SİG. A TIPI DEGISKEN FON	0	0	1
17	DEMİRYATIRIM MD A TIPI DEGISKEN FON	0	0	1
18	DENIZBANKATIPI DEGISKENYAT.FON	1	1	0
19	DUNDAS UNLU A TIPI DEGISKEN FON	0	1	0
20	ECZACIBASI ATIPI DEGISKEN FON	1	1	0

Table 4 continued

		Full- sample Alive	Alive at the end	Dead
21	EGEBANK A TIPI DEGISKEN FON	0	0	1
22	EGS YAT A DEGISKEN FON	0	0	1
23	EKİNCİLER YAT A TIPI DEGISKEN FON	0	0	1
24	ESBANK A TIPI DEGISKEN FON	0	0	1
25	ES MD A TIPI DEGISKEN FON	0	0	1
26	ETİBANK A TIPI DEGISKEN FON	0	0	1
27	EVGIN M.D.A TIPI DEGISKEN FON	0	0	1
28	FINANSBANK A DEGISKEN FON	1	1	0
29	FINANS YAT.A TIPI DEGISKEN FON	0	1	0
30	FORTIS BANK ATIPI DEGISKEN F	1	1	0
31	GARANTI BANK.A TIPI DEGISKEN FON-1	1	1	0
32	GARANTI BANK.A TIPI ÖBY DEGISKEN FON	0	0	1
33	GARANTI BANK.A TIPI ÖB DEGISKEN FON	0	1	0
34	GARANTI YAT MK A TIPI DEGISKEN FON	0	0	1
35	GARANTI YAT.A TIPI PYH DEGISKEN FON	0	1	0
36	GLOBAL MENATIPI DEGISKEN YAT.FON	1	1	0
37	GLOBAL M.D. A TIPI DEGISKEN P.R.	0	1	0
38	HAK MENKUL ATIPI DEGISKENYAT.FON	1	1	0
39	T. HALK BANK.A DEGISKEN YAT. FON	0	1	0
40	HSBC BANK A TIPI DEGISKEN FON-I	0	0	1
41	HSBC BANK A TIPI DEGISKEN FON-II	1	1	0
42	HSBC YAT. ATIPI DEGISKEN FON	0	0	1
43	İKTİSAT BANKASI A TIPI DEGISKEN FON	0	0	1
44	INFO M.D. A TIPI DEGISKEN	0	0	1
45	İNTERBANK A TIPI DEGISKEN FON	0	0	1
46	İNTERYAT/UNICORN A TIPI DEGISKEN FON	0	1	0
47	ISVICRE HAYAT SIG ATIP DEGISKEN FON/ERGO	0	1	0
48	ISVICRE SIGORTA ATIP DEGISKEN FON/ERGO	0	1	0
49	IS BANKASI A TIPI DEGISKEN FON	1	1	0
50	IS YATIRIM ATIPI DEGISKENYAT.FON	1	1	0
51	IS BANK A TIPI PRIVIA DEGISKEN	0	1	0
52	KALKINMA BANK.A TIPI DEGISKEN FON	1	1	0
53	KALKINMA YAT.A TIPI DEGISKEN FON	0	0	1
54	KENT BANK A TIP DEGISKEN FON	0	0	1
55	KENT YAT.ATIPI DEGISKEN FON	0	0	1
56	KOCBANK A TIPI DEGISKEN FON	0	0	1
57	KOC YAT. A TIPI DEGISKEN FON	0	0	1
58	B.T. KÖRFEZ/OSMANLI BANK A TIPI DEGISKEN	0	0	1
59	MEKSA YAT.ATIPI DEGISKEN FON	1	1	0
60	MNG BANK ATIPI DEGISKENYAT.FON	0	0	1
61	NUROL MENKUL ATIPI DEGISKEN FON	1	1	0
62	OYAK/OYAKBANK/ING BANK A TIPI DEG FON	1	1	0
63	OYAKBANK A TIPI DEGISKEN	0	0	1
64	OYAK YAT A TIPI DEGISKEN FON	0	0	1
65	PAMUKBANK ATIPI DEGISKENYAT.FON	0	0	1
66	RJ A DEGISKEN	0	1	0
67	RİVA MD A.Ş. A TIPI DEGISKEN FON	0	0	1
68	SANKO MENKUL A TIPI DEGISKEN FON	0	1	0
69	SINAI YATIRIM BANK.ADEGISKEN FON	0	0	1

Table 4 continued

		Full- sample Alive	Alive at the end	Dead
70	SİTEBANK A TIPI DEGISKEN FON	0	0	1
71	STRATEJI MEN.ATIPI DEGISKEN FON	1	1	0
72	SÜMERBANK A TIPI DEGISKEN FON	0	0	1
73	SEKERBANK A TIPI DEGISKEN FON	1	1	0
74	TACIRLER MEN.ATIPI DEGISKEN FON	1	1	0
75	TAIB YAT.ATIPI DEGISKENYAT.FON	1	1	0
76	TARISBANK A TIPI DEGISKEN FON	0	0	1
77	T. EKONOMİ BANKASI A TIPI DEGISKEN FON-I	0	0	1
78	T. EKONOMİ BANKASI A TIPI DEGISKEN FON-II	0	1	0
79	TEB A.Ş. VARLIK YÖN HİZ DEGISKEN	0	1	0
80	TEB YATIRIM A TIPI DEGISKEN FON	0	0	1
81	TEKFENBANK ATIPI DEGISKEN FON	0	0	1
82	TEKSTIL BANK.A DEGISKEN SEN.FON	0	0	1
83	TEKSTIL MEN.A TIPI DEGISKEN FON	0	1	0
84	T.TİCARET BANKASI A TIPI DEGISKEN FON	0	0	1
85	TOPRAKBANK A TIPI DEGISKEN FON	0	0	1
86	TSKB A TIPI DEGISKEN FON	0	1	0
87	TURKISH YAT.A TIPI DEGISKEN FON	0	1	0
88	TURKLAND BANK A TIPI DEGISKEN FON	0	1	0
89	UB ULUSAL YAT MD A TIPI DEGISKEN FON	0	0	1
90	VAKIFBANK A TIPI DEGISKENYAT.FON	0	1	0
91	YAPIKREDI YATIRIM ADEGISKEN FON	1	1	0
92	YAPI KREDİ YAT.A TIPI OPY DEGISKEN FON	0	1	0
93	YATIRIM FINANSMAN ADEGISKEN FON	1	1	0
94	YAŞARBANK A TIPI DEGISKEN FON	0	0	1
95	ZIRAAT BANKASI ATIPI DEGISKEN FON	1	1	0
96	ZIRAAT YATIRIM ATIPI DEGISKEN FON	0	1	0
97	ZIRAAT BANKASI ATIPI DEGISKEN BAŞAK FON	0	1	0
	TOTAL	23	51	46

Below table lists the 34 A-type equity funds that existed at some part or whole of the study period giving the breakdown of survivors and nonsurvivors. Full-sample survivors are a subset of end-of-sample survivors.

Table 5 Listing of 34 Equity Mutual Funds in the Sample

		Full- sample Alive	Alive at the end	Dead
1	AKBANK ÖB PORTFÖY YÖN A TIPI HISSE FON	0	1	0
2	AKBANK ATIPI HISSE FON	1	1	0
3	AK YATIRIM MD A TIPI HİSSE FON	0	0	1
4	AK YATIRIM MD A TIPI BÜY AM HİSSE FON	0	0	1
5	ALFA MEN. A TIPI HISSE SEN.FON	0	0	1
6	ALTERNATİF BANK A TIPI HISSE FON	0	1	0
7	ANADOLUBANK A TIPI HISSE FON	0	0	1
8	ATA YAT.A TIPI HİSSE FON	0	0	1
9	BAYINDIRBANK A.Ş. A TIPI HİSSE SENEDİ FON	0	0	1
10	BIZIM MEN.ATIP HISSE FON	0	1	0
11	DEMİRYATIRIM MEN.DEĞ. A TIPI HİSSE FON	0	0	1
12	DENIZBANK ATIP HISSE FON	1	1	0
13	ECZACIBASI ATIPI HISSE FON	0	1	0
14	FINANSBANK A TIPI HISSE FON	0	1	0
15	FORTIS YATIRIM A TIPI HİSSE FON	0	1	0
16	GARANTI BANK A TIPI HISSE FON	0	1	0
17	GEDIK YAT. A TIPI HISSE FON	1	1	0
18	HSBC BANK A TIPI HISSE FON	0	0	1
19	HSBC BANK BÜY AMAÇLI A TIPI HISSE FON	0	0	1
20	HSBC BANK A TIPI VYH A TIPI HISSE FON	0	1	0
21	HSBC YAT. A HISSE FON	0	0	1
22	IKTISAT BANKASI A TIPI HİSSE FON	0	0	1
23	IKTISAT YAT. A TIPI HISSE FON	0	0	1
24	INTER YAT/UNICORN CAP ATIP HISSE FON	1	1	0
25	IS BANKASI A TIPI HISSE FON	1	1	0
26	KALKINMA YAT.A TIPI HISSE FON	0	1	0
27	KOCBANK/YAPI KREDİ A TIPI HISSE FON	1	1	0
28	OYAKBANK/ING BANK A TIPI HISSE FON	0	1	0
29	TEB YATIRIM A TIPI HISSE FON	0	1	0
30	TEKSTIL BANK A TIPI HISSE FON	1	1	0
31	TSKB A TIPI HISSE FON	0	1	0
32	VAKIFBANK A TIPI HİSSE FON	0	0	1
33	YAPI KREDI BANK A TIPI HISSE FON	0	0	1
34	YAPIKREDI YATIRIM A TIPI HISSE FON	0	0	1
	TOTAL	7	19	15

Below table lists the 45 A-type balanced funds that existed at some part or whole of the study period giving the breakdown of survivors and nonsurvivors. Full-sample survivors are a subset of end-of-sample survivors.

Table 6 Listing of 45 Balanced Mutual Funds in the Sample

		Full- sample Alive	Alive at the end	Dead
1	ABN AMRO YATIRIM A TIPI KARMA	0	0	1
2	ACAR M.D. A TIPI KARMA	0	1	0
3	AKBANK A TIPI KARMA FON	0	0	1
4	ATA YAT. A TIPI KARMA FON	1	1	0
5	BAYINDIR MEN. A TIPI KARMA FON	0	0	1
6	DEMİRYATIRIM MD A TIPI KARMA FON	0	0	1
7	DENIZBANK A TIPI KARMA FON	1	1	0
8	ECZACIBASI A TIPI KARMA FON	0	0	1
9	EGEBANK A TIPI KARMA FON	0	0	1
10	EGSBANK A TIPI KARMA FON	0	0	1
11	EGS YAT A TIPI KARMA FON	0	0	1
12	EVGIN MD A TIPI KARMA FON	1	1	0
13	FINANSBANK A TIPI KARMA FON	0	0	1
14	FINANS YAT. A TIPI KARMA FON	0	1	0
15	FORTIS BANK A TIPI KARMA FON	1	1	0
16	GARANTI BANK A TIPI KARMA FON	0	0	1
17	GEDIK YAT. A TIPI KARMA FON	1	1	0
18	GLOBAL MD A TIPI KARMA FON	0	1	0
19	GLOBAL MD A TIPI KARMA H.R. FON	0	0	1
20	GLOBAL MD A TIPI KARMA AKTIF STRATEJI FON	0	1	0
21	HALK BANK A TIPI KARMA FON	1	1	0
22	HSBC YAT. A TIPI KARMA FON	0	0	1
23	İNTERBANK A TIPI KARMA FON	0	0	1
24	INTER YAT. A TIPI KARMA FON	0	0	1
25	IS BANKASI A TIPI KARMA KUMBARA FON	0	1	0
26	KALKINMA BANK A TIPI KARMA FON	0	0	1
27	KALKINMA YAT. A TIPI KARMA FON	0	0	1
28	KENTBANK A TIPI KARMA FON	0	0	1
29	KOCBANK A TIPI KARMA FON	0	0	1
30	B.TÜRK KÖRFEZBANK A TIPI KARMA FON	0	0	1
31	MEKSA YAT. A TIPI KARMA FON	0	0	1
32	OSMANLI BANKASI A TIPI KARMA FON	0	0	1
33	RJ MD A TIPI KARMA FON	1	1	0
34	SINAI YATIRIM BANK A TIPI KARMA FON	0	0	1
35	SÜMERBANK A TIPI KARMA FON	0	0	1
36	TACIRLER MD A TIPI KARMA FON	1	1	0
37	T. EKONOMİ BANKASI A TIPI KARMA FON	1	1	0
38	TEKFENBANK ATIPI KARMA FON	0	0	1
39	TOPRAKBANK A TIPI KARMA FON	0	0	1
40	TSKB A TIPI KARMA FON	0	0	1
41	T.TİCARET BANKASI A TIPI KARMA FON	0	0	1
42	VAKIFBANK A TIPI KARMA ILK ADIM FONU	0	1	0
43	YAPI KREDI BANKASI A TIPI KARMA FON	1	1	0
44	YAPI KREDI YATIRIM A TIPI KARMA FON	1	1	0
45	ZIRAAT BANKASI A TIPI KARMA FON	0	1	0
	TOTAL	11	18	27

At the start of the sample period, i.e. year 2000, there were 88 funds within the fund categories of interest, namely the Variable, Equity and Balanced Fund Categories. The table below demonstrates what percentages of these 88 funds survived each month during the study period. At the end of the eight-year study period (end of 2007), 44.94% of these 88 funds, namely 40 funds still exist. In addition to these 40 full-sample existing funds, new funds joined the list. This survival rate is very low when compared with other studies in the US. For example, Elton, Gruber and Blake (1996) demonstrated that survival rate is 80% at the end of eight years for US mutual funds whereas it drops to 65% at the end of 17 year period.

Table 7 Survival Rates of the Funds that Exist at the Beginning of 2000

Months	2000	2001	2002	2003	2004	2005	2006	2007
1	100,00%	98,88%	86,52%	64,04%	57,30%	52,81%	48,31%	47,19%
2	100,00%	98,88%	85,39%	61,80%	57,30%	52,81%	48,31%	47,19%
3	100,00%	98,88%	79,78%	60,67%	57,30%	52,81%	48,31%	46,07%
4	100,00%	98,88%	76,40%	60,67%	57,30%	51,69%	48,31%	46,07%
5	100,00%	97,75%	76,40%	60,67%	56,18%	50,56%	48,31%	46,07%
6	100,00%	95,51%	71,91%	60,67%	56,18%	50,56%	48,31%	46,07%
7	100,00%	95,51%	71,91%	60,67%	53,93%	50,56%	48,31%	46,07%
8	100,00%	94,38%	71,91%	60,67%	53,93%	50,56%	48,31%	44,94%
9	100,00%	94,38%	71,91%	60,67%	52,81%	49,44%	47,19%	44,94%
10	100,00%	92,13%	69,66%	60,67%	52,81%	49,44%	47,19%	44,94%
11	100,00%	91,01%	69,66%	59,55%	52,81%	49,44%	47,19%	44,94%
12	100,00%	89,89%	69,66%	58,43%	52,81%	49,44%	47,19%	44,94%

Nonetheless, one should also keep in my that this study period includes the 2001 crisis which was one of the worst crisis Turkey experienced in the near past, and the pre-crisis period of 2000 as well as the post-crisis years of 2002 and 2003. If we remember how banking licenses have been increasing during 90s up to year 2000 and how several of these banks failed and were taken over by the Bank Deposits Insurance Fund (TMSF) and were subsequently merged, closed or sold, then it is easier to understand why the survival rate of the funds is so low in these years. All

these banks were having their mutual funds managed in their asset management subsidiaries. Hence the number of mutual funds surged until the end of 2001. The thriving stock markets all around the world with the dot com boom in year 2000 also helped that surge. The number of equity investors holding an account at Takasbank hit an all-time-high of 1,000,000 and many of the mutual funds hit their highest net asset values, some of them were even sold out (did not have shares to sell, had to increase capital) in 2000. Then we had the 2001 crisis. The Istanbul Stock Exchange went into free fall and investors shied away from stocks and mutual funds.

Only after 2002 and thereafter, the Turkish economy started to normalize getting rid of the effects of 2001 crisis. In fact if we look at the survival rate of funds, it comes down very fast to 69.99% at the end of 2002 and to 58.43% at the end of 2003. After 2003, the pace of disappearance slows down.

Therefore, it is true that the period of 2000-2002 is a very extraordinary time for Turkish economy when financial institutions, agencies and instruments first had a big time failure and a following restructuring. However rather than seeing data of that period as outliers, we should use them in calculations, observe their outcomes and try to understand them. Hence, forming a data set free of survivorship bias helps us do this in this particular study.

Apart from mutual fund disappearance, I am sure that there is a lot of other information that have become a thing of the past during that period and never used in current studies. Hence survivorship bias should be taken care of in these studies as well.

Below is the graph of survival rate of funds during the study period of 8 years (2000 to end 2007), i.e. 96 months.

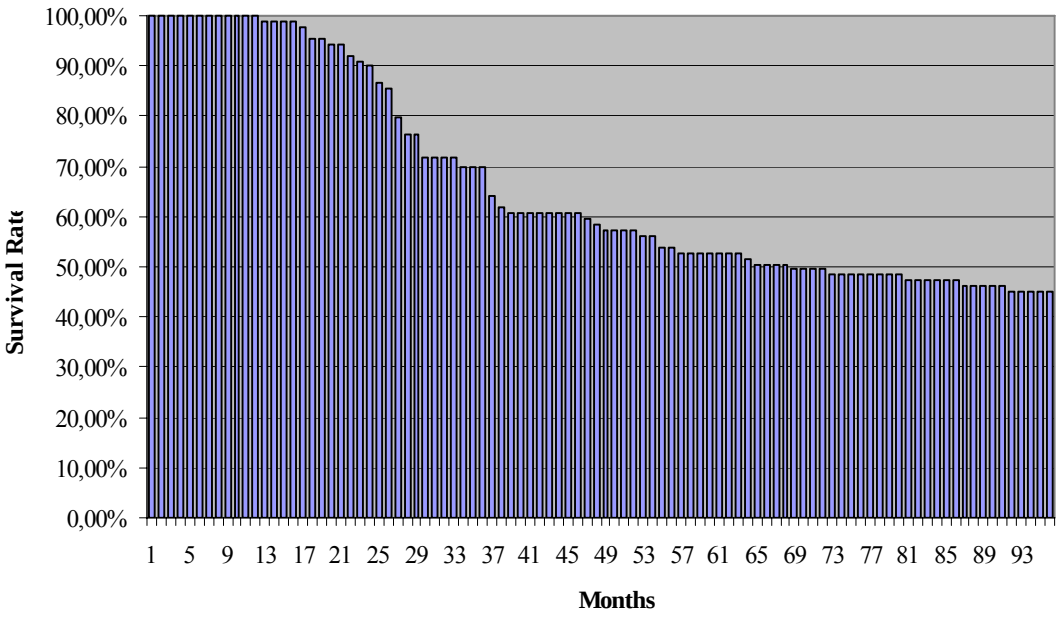

Fig. 2 Survival rate of the funds existing at the beginning of year 2000

With the above mentioned 45% survival rate, only 40 of the 88 funds existing at the beginning of year 2000 survived at the end of 2007. Meanwhile, new funds have been added increasing the total number of funds. The sample period in this study (2000-2007) started with 88 live funds existing at that time and ended with 88 live funds again by coincidence. Of course, they are not the same 88 funds (40 of them are the same funds living from 2000 through 2007). The categorical breakdown has also been changed, with 52 variable funds, 14 equity funds and 22 balanced funds at the beginning of 2000, and 51 variable funds, 19 equity funds and 18 balanced funds at the end of 2007. 22 of the 52 variable funds; 7 of the 14 equity funds and 11 of the 22 balanced funds existing at the beginning of 2000 are still alive.

Table 8 Fund Composition by Category, 2000-2007

	Number of Existing Funds at the Beginning of 2000	-Number of Disappeared Funds	Number of Full-Sample Existing Funds	+Number of New Funds	Number of Existing Funds at the End of 2007
Variable	52	46	22	45	51
Equity	14	15	7	20	19
Balanced	22	27	11	23	18
Total	88	88	40	88	88

Categorical fund composition of existing funds shown in the above table also demonstrates how the rate of survival among funds is so low. It also shows that equity funds have been gaining market share, while balanced funds have lost and variable funds have maintained market share. However, conservation of market share for variable funds does not mean funds in this category did not change at all. 46 variable funds disappeared whereas 45 new variable funds joined the group. The only category in which number of new funds is greater than the number of deceased funds is the equity mutual fund category. As mentioned above, equity category gained market share.

Table 9 Number of Annual Fund Additions/Deletions and Existing Funds

	2000	2001	2002	2003	2004	2005	2006	2007
At start	88	117	116	97	95	89	91	87
Additions	+29	+14	+9	+10	+5	+8	+6	+9
Deletions	0	-15	-28	-12	-11	-6	-10	-8
At end	117	116	97	95	89	91	87	88

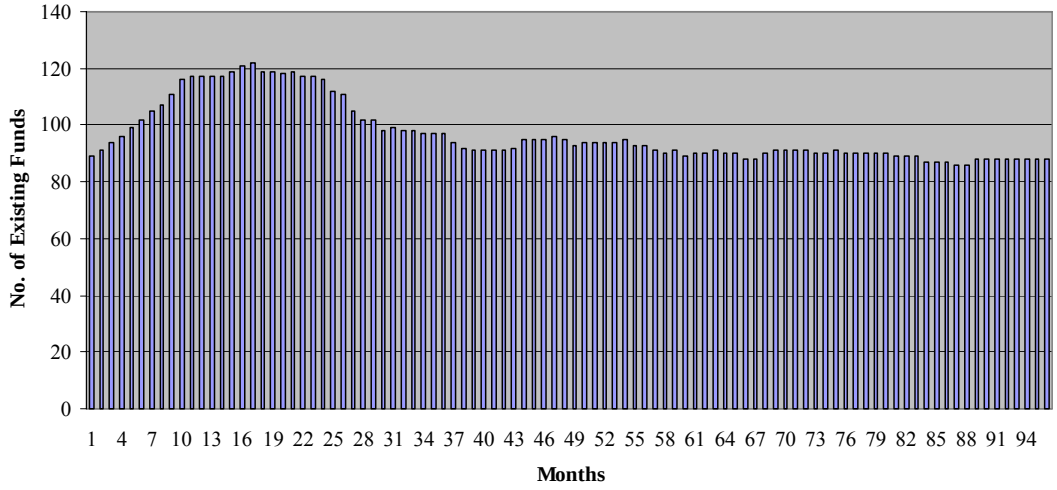

Fig. 3 Number of existing funds

As a conclusion, all of the findings attained as a result of the efforts in establishing the "Survivorship Bias-Free Sample" clearly demonstrate that there is a very high probability of high survivorship bias in the Turkish equity mutual fund market data. Therefore, it is expected that using all funds' return data including the deceased as well as the live funds versus using only the live funds' return data existing at the time of measurement would definitely affect the performance measures of the mutual funds. Nonsurviving funds disappeared due to different reasons as explained in the Methodology section. The numeric breakdown of these different disappearance reasons are explained in the table below along with the number of live funds.

Table 10 Breakdown of Nonsurvival Types

Fund Class / Fund Condition	Variable Fund	Equity Fund	Balanced Fund
Survivor	51	19	18
Nonsurvivor	46	15	27
Closed	20	5	9
Name Changed	0	0	4
Classification Changed	3	7	8
Name & Classification Changed	14	0	3
Merged with another fund	9	3	3
Total	97	34	45

Measuring the Performance of Mutual Funds Using the Survivorship Bias-Free Net Mutual Fund Returns and the Calculation of the Survivorship Bias

First of all, mutual fund performances are measured using the net returns of funds utilizing the newly established survivorship bias free data set.

Measuring Performance and Calculating Survivorship Bias using Net Raw Returns

Average fund returns of variable, equity and balanced fund categories for various fund subgroups (all, full-sample, end-of-sample, and nonsurviving funds) and their respective survivorship bias or survivorship premium calculations using net raw returns are as follows:

Variable Fund Class

Below table shows the average raw returns for surviving, nonsurviving and all variable funds in comparison with the ISE-100 and Variable Funds' indices during 2000-2007. It is observed that average return goes down to 19.69% when all funds are taken into consideration when compared with the average return of 21.16% when only end-of-sample surviving funds are taken into account. Full-sample survivors show the same trend with higher average return of 20.59%. In this study, I will stick with the end-of-sample survivors group in survivorship bias calculations because usually when people calculate average returns over a period of time, they use funds surviving at the end of calculation period, creating survivorship bias. Hence this bias

should be calculated and corrected accordingly. Also, the number of surviving funds in the end-of-sample survivors' category is twice of those for full-sample survivors.

Table 11 Annualized Average Variable Fund Class Raw Returns for the Sample Period

Name of Fund/Index/Group	Annualized Average Weekly Returns
ISE-100 Index	16.12%
Variable Fund Index	26.46%
ALL VARIABLE FUNDS	19.69%
Full-Sample Surviving Funds	20.59%
End-of Sample Surviving Funds	21.16%
Non-surviving Funds	18.33%

Therefore, survivorship bias is calculated as 1.46% for the variable fund category. In other words, variable fund average returns are calculated 1.46% higher (0.89% for full sample survivors) in this period when only end-of sample surviving funds are taken into account.

Table 12 Annual Survivorship Bias/Premium Calculations for Variable Funds

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	0.89%
Survivorship Bias-End-of-Sample Survivors	1.46%
Survivorship Premium-Full-Sample Survivors	2.25%
Survivorship Premium-End-of Sample Survivors	2.82%

Equity Fund Class

Below table shows the average raw returns for surviving, nonsurviving and all equity funds in comparison with the ISE-100 and Equity Funds' indices during 2000-2007. It is observed that average return goes down to 13.19% when all funds are taken into consideration in contrast with the average return of 19.78% when only end-of-sample surviving funds are taken into account. Full-sample survivors show the same trend with higher average return of 18.75%. In this study, I will stick with the end-of-

sample survivors group in survivorship bias calculations because usually when people calculate average returns over a period of time, they use funds surviving at the end of calculation period, creating survivorship bias. Hence this bias should be calculated and corrected accordingly. Also, the number of surviving funds in the end-of-sample survivors' category is twice of those for full-sample survivors.

Table 13 Annualized Average Equity Fund Class Raw Returns for the Sample Period

Name of Fund/Index/Group	Average of Weekly Net Returns
ISE-100 Index	16.12%
Equity Fund Index	18.73%
ALL EQUITY FUNDS	13.19%
Full-Sample Surviving Funds	18.75%
End-of Sample Surviving Funds	19.78%
Nonsurviving Funds	6.22%

Therefore, survivorship bias is calculated as 6.58% for the variable fund category. In other words, variable fund average returns are calculated 6.58% higher (5.56% for full sample survivors) in this period when only end-of sample surviving funds are taken into account. One notable thing here is the size of the survivorship bias which is rather high. This is due to the fact that the average return of the nonsurviving funds which stand at 6.22% is very low with respect to the average return of survivors standing at 19.78%. This low number pulls the average return of all funds to 13.19%.

Table 14 Annual Survivorship Bias/Premium Calculations for Equity Funds

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	5.56%
Survivorship Bias-End-of-Sample Survivors	6.58%
Survivorship Premium-Full-Sample Survivors	12.53%
Survivorship Premium-End-of Sample Survivors	13.56%

Balanced Fund Class

Below table shows the average raw returns for all, surviving and nonsurviving balanced funds in comparison with the ISE-100 and Equity Funds' indices during 2000-2007 periods. It is observed that average return goes down to 20.47% when all funds are taken into consideration in contrast with the average return of 23.46% when only end-of-sample surviving funds are taken into account. Full-sample survivors show the same trend with higher average return of 23.37%. In this study, I will stick with the end-of-sample survivors group in survivorship bias calculations because usually when people calculate average returns over a period of time, they use funds surviving at the end of calculation period, creating survivorship bias. Hence this bias should be calculated and corrected accordingly. Also, the number of surviving funds in the end-of-sample survivors' category is twice of those for full-sample survivors.

Table 15 Annualized Average Balanced Fund Class Raw Returns for the Sample Period

Name of Fund/Index/Group	Average of Weekly Returns
ISE-100 Index	16.12%
Balanced Fund Index	26.27%
ALL BALANCED FUNDS	20.47%
Full Sample Surviving Funds	23.37%
End-of Sample Surviving Funds	23.46%
Nonsurviving Funds	18.70%

Therefore, survivorship bias is calculated as 2.99% for the balanced fund category. In other words, variable fund average returns are calculated 2.99% higher (2.89% for full sample survivors) in this period when only end-of sample surviving funds are taken into account.

Table 16 Annual Survivorship Bias/Premium Calculations for Balanced Funds

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	2.89%
Survivorship Bias-End-of-Sample Survivors	2.99%
Survivorship Premium-Full-Sample Survivors	4.67%
Survivorship Premium-End-of Sample Survivors	4.76%

Measuring Performance and Calculating Survivorship Bias Using Jensen's Alpha for Individual Fund Net Returns

In this section the individual fund alphas for all the funds in the sample period classified by variable, equity and balanced fund classes are calculated to investigate value creation on a risk-adjusted basis. The averages of individual fund alphas are computed to determine value creation by fund class for the period 2000 to 2007. Then the survivorship bias and premium for each fund class is determined using these risk-adjusted returns.

Variable Fund Class

Below table shows the individual variable fund alphas calculated using net fund returns. Out of a total of 97 variable fund alphas, only 25 alphas are positive, 72 are negative. The predominance of negative alphas indicates that the variable funds are not able to forecast future security prices well enough and hence could not do better than the market portfolio so as to recover their management fees, research and commission expenses. Of these 72 negative alphas, 19 are significant and of these 25 positive alphas, 7 are significant.

Table 17 Individual Fund Alphas for Variable Fund Class Net Returns (Market: Variable Fund Index)

	Fund Name	Alpha	T-value	No of observ.
1	ABN AMRO BANK A TIPI DEGISKEN FON	3.61%	0.20	78
2	ACAR M.D. A TIPI DEGISKEN	-7.63%	-2.45*	413
3	AKBANK A TIPI DEGISKEN FON	0.40%	0.19	395
4	AKBANK ÖB A TIPI DEGISKEN FON	7.89%	2.19*	68
5	ALFA MEN.ATIPI DEGISKEN FON	-12.24%	-2.87*	232
6	ALTERNATİF BANK A TIPI DEGISKEN FON	-0.98%	-0.34	413
7	ANADOLUBANK A TIPI DEGISKEN FON	-5.86%	-1.24	310
8	ATA YAT.A TIPI DEGISKEN FON	-5.51%	-1.52	326
9	BANKEUROPA ATIPI DEGISKEN FON	-1.77%	-0.50	231
10	BANKEKSPRES A TIPI DEGISKEN FON	-20.58%	-1.97	102
11	BANKKAPİTAL A TIPI DEGISKEN FON	-7.60%	-0.47	75
12	BANK POZİTİF A TIPI DEGISKEN	-8.59%	-1.60	91
13	BAŞKENT M.D. A TIPI DEGISKEN	-9.17%	-3.60*	201
14	BAYINDIR MEN. A TIPI DEGISKEN FON	-8.97%	-1.38	226
15	BENDER ATIPI DEGISKENYAT.FON	-0.77%	-0.14	311
16	COMM.UNION SİG. A TIPI DEGISKEN FON	-0.46%	-0.12	197
17	DEMİRYATIRIM MD A TIPI DEGISKEN FON	1.67%	0.18	113
18	DENIZBANKATIPI DEGISKENYAT.FON	-5.61%	-1.92	413
19	DUNDAS UNLU A TIPI DEGISKEN FON	13.12%	3.73*	147
20	ECZACIBASI ATIPI DEGISKEN FON	-2.29%	-0.80	413
21	EGEBANK A TIPI DEGISKEN FON	-33.66%	-3.84*	73
22	EGS YAT A DEGISKEN FON	-26.20%	-1.69	99
23	EKİNCİLER YAT A TIPI DEGISKEN FON	-27.84%	-1.81	51
24	ESBANK A TIPI DEGISKEN FON	-16.05%	-0.76	91
25	ES MD A TIPI DEGISKEN FON	-10.89%	-2.31*	96
26	ETİBANK A TIPI DEGISKEN FON	-11.58%	-0.88	117
27	EVGIN M.D.A TIPI DEGISKEN FON	9.04%	1.74	315
28	FINANSBANK A DEGISKEN FON	-2.89%	-0.52	413
29	FINANS YAT.A TIPI DEGISKEN FON	12.03%	2.12*	370
30	FORTIS BANK ATIPI DEGISKEN F	4.34%	1.48	413
31	GARANTI BANK.A TIPI DEGISKEN FON-1	2.22%	1.11	413
32	GARANTI BANK.A TIPI ÖBY DEGISKEN FON	-1.48%	-0.44	119
33	GARANTI BANK.A TIPI ÖB DEGISKEN FON	3.42%	0.78	34
34	GARANTI YAT MK A TIPI DEGISKEN FON	-0.84%	-0.31	282
35	GARANTI YAT.A TIPI PYH DEGISKEN FON	19.78%	2.44*	87
36	GLOBAL MENATIPI DEGISKEN YAT.FON	-1.79%	-0.74	413
37	GLOBAL M.D. A TIPI DEGISKEN P.R.	2.05%	0.45	186
38	HAK MENKUL ATIPI DEGISKENYAT.FON	-11.30%	-2.77*	413
39	T. HALK BANK.A DEGISKEN YAT. FON	1.61%	0.42	135
40	HSBC BANK A TIPI DEGISKEN FON-I	-5.05%	-0.71	116
41	HSBC BANK A TIPI DEGISKEN FON-II	-0.62%	-0.22	407
42	HSBC YAT. ATIPI DEGISKEN FON	-11.57%	-1.84	37
43	İKTİSAT BANKASI A TIPI DEGISKEN FON	-17.28%	-2.03*	116
44	INFO M.D. A TIPI DEGISKEN	-9.95%	-1.41	73
45	İNTERBANK A TIPI DEGISKEN FON	-11.93%	-1.64	89
46	İNTERYAT/UNICORN A TIPI DEGISKEN FON	-6.55%	-0.28	19
47	ISVICRE HAYAT SIG ATIP DEGISKEN FON/ERGO	-3.75%	-1.26	228
48	ISVICRE SIGORTA ATIP DEGISKEN FON/ERGO	-7.52%	-2.28*	228
49	IS BANKASI A TIPI DEGISKEN FON	-4.86%	-2.33*	413
50	IS YATIRIM A TIPI DEGISKENYAT.FON	8.39%	1.33	413
51	IS BANK A TIPI PRIVIA DEGISKEN	3.88%	1.48	42
52	KALKINMA BANK.A TIPI DEGISKEN FON	-4.42%	-1.93	413
53	KALKINMA YAT.A TIPI DEGISKEN FON	-4.15%	-1.20	266
54	KENT BANK A TIP DEGISKEN FON	-13.72%	-0.64	77
55	KENT YAT.ATIPI DEGISKEN FON	-26.38%	-4.45*	231

Table 17 continued

	Fund Name	Alpha	T-value	No of observ.
56	KOCBANK A TIPI DEGISKEN FON	-2.30%	-1.32	372
57	KOC YAT. A TIPI DEGISKEN FON	8.02%	2.17*	235
58	B.T. KÖRFEZBANK/OSMANLI B A TIPI DEGISKEN	19.93%	3.03*	126
59	MEKSA YAT.ATIPI DEGISKEN FON	-13.86%	-3.48*	413
60	MNG BANK ATIPI DEGISKENYAT.FON	-12.76%	-3.61*	349
61	NUROL MENKUL ATIPI DEGISKEN FON	-4.01%	-1.04	413
62	OYAK/OYAKBANK/ING B. A TIPI DEGISKEN FON	-8.76%	-2.85*	413
63	OYAKBANK A TIPI DEGISKEN	-0.31%	-0.04	79
64	OYAK YAT A TIPI DEGISKEN FON	-13.67%	-1.44	109
65	PAMUKBANK ATIPI DEGISKENYAT.FON	-15.93%	-2.52*	277
66	RJ A DEGISKEN	7.06%	1.13	124
67	RİVA MD A.Ş. A TIPI DEGISKEN FON	-12.94%	-1.93	194
68	SANKO MENKUL A TIPI DEGISKEN FON	2.67%	0.64	281
69	SINAI YATIRIM BANK.ADEGISKEN FON	8.93%	1.17	126
70	SİTEBANK A TIPI DEGISKEN FON	-22.98%	-1.73	91
71	STRATEJI MEN.ATIPI DEGISKEN FON	10.66%	2.14*	413
72	SÜMERBANK A TIPI DEGISKEN FON	-11.99%	-1.01	38
73	SEKERBANK A TIPI DEGISKEN FON	-9.70%	-3.09*	413
74	TACIRLER MEN.ATIPI DEGISKEN FON	-2.70%	-0.65	413
75	TAIB YAT.ATIPI DEGISKENYAT.FON	-4.70%	-1.41	413
76	TARISBANK A TIPI DEGISKEN FON	-9.90%	-1.48	160
77	T. EKONOMİ BANKASI A TIPI DEGISKEN FON-I	2.17%	1.31	163
78	T. EKONOMİ BANKASI A TIPI DEGISKEN FON-II	-3.21%	-1.04	208
79	TEB A.Ş. VARLIK YÖN HİZ DEGISKEN	2.60%	0.83	133
80	TEB YATIRIM A TIPI DEGISKEN FON	-4.59%	-1.04	160
81	TEKFENBANK ATIPI DEGISKEN FON	-11.46%	-3.04*	202
82	TEKSTIL BANK.A DEGISKEN SEN.FON	-12.11%	-1.99	102
83	TEKSTIL MEN.A TIPI DEGISKEN FON	-0.90%	-0.25	359
84	T.TİCARET BANKASI A TIPI DEGISKEN FON	-25.66%	-3.92*	145
85	TOPRAKBANK A TIPI DEGISKEN FON	-6.33%	-1.15	158
86	TSKB A TIPI DEGISKEN FON	-2.84%	-0.80	237
87	TURKISH YAT.A TIPI DEGISKEN FON	0.95%	0.21	267
88	TURKLAND BANK A TIPI DEGISKEN FON	-13.16%	-1.20	27
89	UB ULUSAL YAT MD A TIPI DEGISKEN FON	-7.21%	-1.95	156
90	VAKIFBANK A TIPI DEGISKEN YAT.FON	-8.79%	-2.76*	341
91	YAPIKREDI YATIRIM ADEGISKEN FON	-4.58%	-1.38	413
92	YAPI KREDİ YAT.A TIPI ÖPY DEGISKEN	4.68%	1.46	143
93	YATIRIM FINANSMAN A TIPI DEGISKEN FON	-5.78%	-3.33*	413
94	YAŞARBANK A TIPI DEGISKEN FON	-21.19%	-1.98	77
95	ZIRAAT BANKASI ATIPI DEGISKEN FON	-3.79%	-1.33	413
96	ZIRAAT YATIRIM ATIPI DEGISKEN FON	-0.81%	-0.37	394
97	ZIRAAT BANKASI ATIPI DEGISKEN BAŞAK FON	-5.42%	-1.29	144

(*) indicates significance.

The average value of alphas calculated net of expenses is -5.09% which indicates that on average variable funds earned about 5.09% less per year (compounded continuously) than they should have earned given their level of systematic risk during the study period of 2000 to 2007.

However, using data without correcting for survivorship bias leaves us with much better results for funds, which in fact is not true. The result that variable funds cannot be managed well enough to recover their expenses does not change when using survivorship biased data, with alphas still being negative, but less negative than the average of all funds. Alpha calculated net of expenses is -3.24% for full-sample survivors, whereas it is -1.60% for end-of-sample survivors. The real average variable fund performance of -5.09% is due to the dismal performance of nonsurviving variable funds with an alpha of -8.48%.

Table 18 Average Variable Fund Class Alphas Using Net Returns (Market: Variable Fund Index)

Name of Variable Fund Subgroup	Return (%)
Average Alpha -All Variable Funds	-5.09%
Average Alpha -Full-sample Survivors	-3.24%
Average Alpha-End-of-sample Survivors	-1.60%
Nonsurviving Variable Funds	-8.48%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 1.84% for full sample survivors and 3.49% for end-of-sample survivors.

Table 19 Survivorship Bias/ Premium for Variable Fund Class using Net Risk-Adjusted Returns (Market: Variable Fund Index)

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	1.84%
Survivorship Bias-End-of-Sample Survivors	3.49%
Survivorship Premium-Full-Sample Survivors	5.23%
Survivorship Premium-End-of Sample Survivors	6.88%

The same regressions are also run when ISE-100 index is used as the market instead of the variable fund index and the results are shown below. As seen in the table below, alphas are more negative in this case. This is normal since ISE-100 is a market index calculated from the market prices and hence does not include

transaction costs. However, variable fund index is calculated from the fund prices and therefore includes management fees, transactions costs and all other costs incurred by funds. Therefore, comparing net returns with the variable fund index which is net of fees and commissions is more meaningful. However, results of regressions using ISE-100 index is also shown for comparison purposes.

Table 20 Average Variable Fund Class Alphas Using Net Returns (Market: ISE-100 Index)

Name of Variable Fund Subgroup	Return (%)
Average Alpha -All Variable Funds	-8.63%
Average Alpha -Full-sample Survivors	-6.75%
Average Alpha-End-of-sample Survivors	-5.68%
Nonsurviving Variable Funds	-11.41%

Below table gives the size of the survivorship bias and premium when ISE-100 index is used as the market. The size of the survivorship bias is 1.88% for full sample survivors and 2.95% for end-of-sample survivors. Here the different groups' of alphas all drop and become more negative but at varying amounts. Since the least drop in alpha is for nonsurvivors, most for end-of-sample survivors with full-sample survivor's in-between, I expect that fees and costs are the highest for end-of-sample survivors, least for nonsurvivors and in-between for full-sample survivors. I will check this in the later sections related with management fees.

Table 21 Survivorship Bias/ Premium for Variable Fund Class using Net Risk-Adjusted Returns (Market: ISE-100 Index)

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	1.88%
Survivorship Bias-End-of-Sample Survivors	2.95%
Survivorship Premium-Full-Sample Survivors	4.65%
Survivorship Premium-End-of Sample Survivors	5.72%

Below is a summary table showing statistics about variable fund alphas. Alpha statistics are more negative when ISE-100 is used as the market in the regression

equation. This is expected since ISE is an index calculated from market prices and does not include management fees and transaction costs whereas variable fund index is an index calculated from fund prices and hence includes fees and commissions. Therefore, using the results with the variable fund index as the market is more meaningful for net returns.

Table 22 Individual Jensen's Alpha Statistics for Variable Fund Class Net Returns

	Alpha		Number		Percentage	
	Fund Index	ISE	Fund Index	ISE	Fund Index	ISE
Average Alpha	-5.09%	-8.63%				
Minimum Alpha	-33.66%	-36.47%				
Maximum Alpha	19.93%	16.05%				
Standard Deviation	9.68%	9.07%				
Total Fund Alphas			97	97		
Positive Alpha			25	13	26%	13%
Negative Alpha			72	84	74%	87%
No of Nonsignif Alphas			71	71	73%	73%
No of Significant Alphas			26	26	27%	27%
Significant Positive Alpha			7	7	27%	27%
Significant Negative Alpha			19	19	73%	73%
Total Significant			26	26		

Equity Fund Class

Below table shows the individual equity fund alphas calculated using net fund returns. Out of a total of 34 equity fund alphas, only 16 alphas are positive, 18 are negative. Of these 18 negative alphas, 4 are significant and of these 16 positive alphas, none is significant. Almost equal number of positive and negative alphas and the lack of significance do not allow us to make firm conclusions. One important thing to note is that there are noteworthy performances in terms of beating benchmark on an individual fund basis from full-sample survivors.

Table 23 Individual Fund Alphas for Equity Fund Class Net Returns (Market: Equity Fund Index)

	Fund Name	Alpha	T-value	No of observations
1	AKBANK ÖB PORTFÖY YÖN (A) TIPI HISSE FON	-0.76%	-0.18	48
2	AKBANK (A)TIPI HISSE SEN. FONU	2.88%	1.50	413
3	AK YATIRIM MEN. DEĞ. A TİPİ HİSSE FONU	3.15%	0.80	290
4	AK YATIRIM MD A TİPİ BÜY AM HİSSE FONU	-21.16%	-1.30	26
5	ALFA MEN.(A)TIPI HISSE SEN.FON	-6.48%	-1.63	232
6	ALTERNATİF BANK A TİPİ HISSE FON	0.91%	0.41	315
7	ANADOLUBANK (A) TIPI HISSE FON	-7.27%	-0.55	71
8	ATA YAT.(A) TIPI HİSSE SENEDİ FONU	-17.48%	-0.96	80
9	BAYINDIRBANK A TİPİ HİSSE SENEDİ FONU	3.55%	0.40	158
10	BIZIM MEN.(A)TIP HISSE SEN.FON	-8.12%	-1.79	210
11	DEMİRYATIRIM MEN.DEĞ. A TİPİ HİSSE FON	8.14%	1.01	109
12	DENIZBANK (A)TIP HISSE SEN. F.	3.07%	-0.46	413
13	ECZACIBASI (A)TIPI HISSE FONU	3.07%	0.76	84
14	FINANSBANK(A)TIP HISSE SEN.FON	0.80%	0.18	370
15	FORTİS YATIRIM A TİPİ HİSSE FON	0.47%	0.06	53
16	GARANTI BANK.(A) HISSE FON	2.64%	0.66	34
17	GEDIK YAT.(A)TIPI HISSE SEN.FO	-12.68%	-3.06*	413
18	HSBC BANK (A) TIPI HISSE FONU	2.72%	0.57	199
19	HSBC BANK BÜY AMAÇLI (A) TIPI HISSE	-5.23%	-0.60	40
20	HSBC BANK (A) TIPI VYH A TIPI HISSE FONU	-6.79%	-0.92	32
21	HSBC YAT. (A) HISSE SEN.FON	-1.57%	-0.57	171
22	İKTİSAT BANKASI A TİPİ HİSSE FON	25.76%	1.45	64
23	IKTISAT YAT.(A) HISSE SEN. FON	-0.46%	-0.05	231
24	INTER YAT/UNICORN CAP (A)TIPI HISSE FON	-2.84%	-0.83	413
25	IS BANKASI (A) TIPI HISSE FONU	-0.38%	-0.18	413
26	KALKINMA YAT.(A)TIP HISSE FON	-5.74%	-2.00*	306
27	KOCBANK/YAPI KREDİ (A) TIPI HISSE FONU	2.26%	0.81	413
28	OYAKBANK/ING BANK (A) TIPI HISSE	-6.88%	-2.31*	216
29	TEB YATIRIM (A) HISSE SEN.FON	1.81%	0.61	403
30	TEKSTIL BANK.(A) HISSE SEN.FON	8.58%	1.87	413
31	TSKB (A) TIPI HISSE FON	4.45%	1.19	196
32	VAKIFBANK A TİPİ HİSSE FON	-23.46%	-2.28*	71
33	YAPIKREDI BANK.(A)HISSE FON	-3.61%	-1.27	413
34	YAPIKREDI YATIRIM (A)HISSE FON	-5.87%	-1.17	158

(*) indicates significance.

The average value of alpha calculated net of expenses is -1.84% which indicates that on average equity funds earned about 1.84% less per year (compounded continuously) than they should have earned given their level of systematic risk during the study period of 2000 to 2007.

However, using data without correcting for survivorship bias leaves us with much better results for funds, which in fact is not true. The result that equity funds cannot be managed well enough to recover their expenses changes for full-sample

survivors with alpha calculated net of expenses is +0.62% whereas the result does not change for end-of-sample survivors when using survivorship biased data, with alphas still being negative, but less negative (-0.58%) than the average of all funds. The real average equity fund performance of -1.84% is due to the dismal performance of nonsurviving equity funds with an alpha of -3.26%.

Table 24 Average Equity Fund Class Alphas Using Net Returns (Market: Equity Fund Index)

Name of Equity Fund Subgroup	Return (%)
Average Alpha -All Equity Funds	-1.84%
Average Alpha -Full-sample Survivors	0.62%
Average Alpha-End-of-sample Survivors	-0.58%
Nonsurviving Equity Funds	-3.26%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 2.46% for full sample survivors and 1.26% for end-of-sample survivors.

Table 25 Survivorship Bias/Premium for Equity Fund Class Using Net Risk-Adjusted Returns (Market: Equity Fund Index)

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	2.46%
Survivorship Bias-End-of-Sample Survivors	1.26%
Survivorship Premium-Full-Sample Survivors	3.88%
Survivorship Premium-End-of Sample Survivors	2.68%

The same regressions are also run when ISE-100 index is used as the market instead of the Equity Fund Index and the results are shown below. As seen in the table below, alphas are more negative in this case. This is normal since ISE-100 is a market index calculated from the market prices and hence does not include transaction costs. However, Equity Fund Index is calculated from the fund prices and therefore includes management fees and transactions costs. Therefore, comparing net returns with the equity fund index which is net of fees and commissions is more

meaningful. However, results of regressions using ISE-100 index is also shown for comparison purposes.

Table 26 Average Equity Fund Class Alphas Using Net Returns (Market: ISE-100 Index)

Name of Equity Fund Subgroup	Return (%)
Average Alpha -All Equity Funds	-7.70%
Average Alpha -Full-sample Survivors	-5.86%
Average Alpha-End-of-sample Survivors	-5.83%
Nonsurviving Equity Funds	-9.81%

Below table gives the size of the survivorship bias and premium when ISE-100 index is used as the market. The size of the survivorship bias is 1.84% for full sample survivors and 1.88% for end-of-sample survivors. Here the different groups' of alphas all drop and become more negative but at varying amounts. Since the least drop in alpha is at end-of-sample survivors while the highest drop is at nonsurvivors and full-sample survivors in-between, I expect that fees and costs are the highest for non survivors, less for end-of-sample and full-sample survivors. I will check this in the following sections related with management fees.

Table 27 Survivorship Bias/Premium for Equity Fund Class Net Risk-Adjusted Returns (Market: ISE-100 Index)

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	1.84%
Survivorship Bias-End-of-Sample Survivors	1.88%
Survivorship Premium-Full-Sample Survivors	3.95%
Survivorship Premium-End-of Sample Survivors	3.99%

Below is a summary table showing statistics about equity fund alphas. Alpha statistics are more negative when ISE-100 is used as the market in the regression equation. This is expected since ISE is an index calculated from market prices and does not include management fees and transaction costs whereas equity fund index is an index calculated from fund prices and hence includes fees and commissions.

Therefore, using the results with the equity fund index as the market is more meaningful for net returns.

Table 28 Individual Jensen's Alpha Statistics for Equity Fund Class Net Returns

	Alpha		Number		Percentage	
	Fund Index	ISE	Fund Index	ISE	Fund Index	ISE
Average Alpha	-1.84%	-7.70%				
Minimum Alpha	-23.46%	-26.80%				
Maximum Alpha	25.76%	16.63%				
Standard Deviation	8.78%	7.82%				
Total Fund Alphas			34	34		
Positive Alpha			16	3	47%	9%
Negative Alpha			18	31	53%	91%
No of Nonsignif Alphas			30	30	88%	88%
No of Significant Alphas			4	4	12%	12%
Significant Positive Alpha			0	0	0%	0%
Significant Negative Alpha			4	4	100%	100%
Total Significant			4	4		

Balanced Fund Class

Below table shows the individual equity fund alphas calculated using net fund returns. Out of a total of 45 balanced fund alphas, only 13 alphas are positive, 32 are negative. The predominance of negative alphas indicates that the balanced funds are not able to forecast future security prices well enough and hence could not do better than the market portfolio so as to recover their management fees, research and commission expenses. Of these 32 negative alphas, 5 are significant and of these 13 positive alphas, 4 are significant.

Table 29 Individual Fund Alphas for Balanced Fund Class Net Returns (Market:Balanced Fund Index)

	Fund Name	Alpha	T-value	No of observations
1	ABN AMRO YATIRIM A TİPİ KARMA	-5.96%	-1.63	243
2	ACAR M.D. A TİPİ KARMA	-4.59%	-1.27	188
3	AKBANK (A)TIPI KARMA FONU	-1.08%	-0.52	272
4	ATA YAT.(A) TIPI KARMA FON	-3.82%	-1.37	413
5	BAYINDIR MEN.(A)TIPI KARMA FON	-15.95%	-3.41*	293
6	DEMİRYATIRIM MEN.DEĞ. A TİPİ KARMA FON	-8.64%	-1.42	109
7	DENIZBANK(A)TIPI KARMA FON	-0.12%	-0.05	413
8	ECZACIBASI (A)TIPI KARMA FONU	-2.64%	-1.38	295
9	EGEBANK (A) KARMA FON	-20.52%	-1.51	50
10	EGSBANK (A) KARMA FONU	-13.96%	-2.39*	100
11	EGS YAT (A)KARMA FON	-9.34%	-1.37	103
12	EVGIN M.D.(A) TIPI KARMA FONU	1.26%	0.35	413
13	FINANSBANK(A)TIPI KARMA FONU	-12.80%	-2.81*	43
14	FINANS YAT.(A) TIPI KARMA FON	2.51%	0.87	370
15	FORTIS BANK (A) TIPI KARMA FON	-3.15%	-1.07	413
16	GARANTI BANK.(A) KARMA FON	3.40%	2.35*	346
17	GEDIK YAT.(A) TIPI KARMA FON	-9.66%	-2.74*	413
18	GLOBAL M.D.(A) TIPI KARMA FONU	3.67%	0.94	400
19	GLOBAL M.D.(A) TIPI KARMA H.R. FONU	-31.57%	-2.19*	80
20	GLOBAL M.D.(A) TIPI KARMA AKTIF STR FONU	0.09%	0.02	36
21	HALK BANK (A) KARMA YAT. FONU	-5.99%	-2.19*	413
22	HSBC YAT. (A)TIPI KARMA FON	-0.71%	-0.18	90
23	İNTERBANK A TİPİ KARMA FON	-4.61%	-0.69	115
24	INTER YAT.(A) TIPI KARMA FONU	-2.08%	-0.86	391
25	IS BANKASI (A)KAR.KUMBARA FONU	3.07%	2.04*	340
26	KALKINMA BANK.(A) TIPI KARMA FON	-7.72%	-0.93	41
27	KALKINMA YAT.(A) TIPI KARMA FON	-12.98%	-1.50	76
28	KENTBANK (A) TİPİ KARMA	-14.32%	-1.13	111
29	KOCBANK (A) TIPI KARMA FONU	6.43%	1.40	386
30	B.TÜRK KÖRFEZBANK A TİPİ KARMA FON	25.11%	3.01*	65
31	MEKSA YAT.(A)TIPI KARMA.FON	-13.96%	-0.70	19
32	OSMANLI BANKASI A TİPİ KARMA FON	6.62%	2.23	125
33	RJ MD (A) KARMA	-12.99%	-1.37	37
34	SINAI YATIRIM BANK.(A)KAR.FON	-11.05%	-1.69	105
35	SÜMERBANK A TİPİ KARMA FON	-6.27%	-1.17	115
36	TACIRLER MEN.(A) KARMA FON	0.64%	0.30	413
37	T. EKONOMİ BANKASI A TİPİ KARMA FON	3.11%	1.27	413
38	TEKFENBANK (A)TIPI KARMA FON	-0.95%	-0.06	141
39	TOPRAKBANK (A) TIPI KARMA FON	3.80%	0.49	143
40	TSKB (A) TIPI KARMA FON	-17.59%	-3.34*	89
41	T.TİCARET BANKASI A TİPİ KARMA FON	-4.03%	-0.21	35
42	VAKIFBANK (A)KARMA ILK ADIM.F	-0.52%	-0.29	228
43	YAPIKREDI BANK.(A)KARMA FON	-3.96%	-1.51	413
44	YAPIKREDI YATIRIM (A)KARMA FON	0.59%	0.17	413
45	ZIRAAT BANKASI (A) KARMA FONU	-2.90%	-1.32	348

(*) indicates significance.

The average value of alpha calculated net of expenses is -4.58% which indicates that on average balanced funds earned about 4.58% less per year (compounded

continuously) than they should have earned given their level of systematic risk during the study period of 2000 to 2007.

However, using data without correcting for survivorship bias leaves us with much better results for funds, which in fact is not true. The result that equity funds cannot be managed well enough to recover their expenses does not change when using survivorship biased data, with alphas still being negative, but less negative than the average of all (survivorship bias free data) funds. Alpha calculated net of expenses is -2.41% for full-sample survivors, whereas it is -1.16% for end-of-sample survivors. The real average variable fund performance of -4.58% is due to the dismal performance of nonsurviving variable funds with an alpha of -6.66%.

Table 30 Average Balanced Fund Class Alphas Using Net Returns (Market: Balanced Fund Index)

Name of Balanced Fund Subgroup	Return (%)
Average Alpha -All Balanced Funds	-4.58%
Average Alpha -Full-sample Survivors	-2.41%
Average Alpha-End-of-sample Survivors	-1.16%
Nonsurviving Equity Funds	-6.66%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 2.17% for full sample survivors and 3.42% for end-of-sample survivors.

Table 31 Survivorship Bias/Premium for Balanced Fund Class Using Net Risk-Adjusted Returns (Market: Balanced Fund Index)

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	2.17%
Survivorship Bias-End-of-Sample Survivors	3.42%
Survivorship Premium-Full-Sample Survivors	4.25%
Survivorship Premium-End-of Sample Survivors	5.49%

The same regressions are also run when ISE-100 index is used as the market instead of the balanced fund index and the results are shown below. As seen in the table

below, alphas are more negative in this case. This is normal since ISE-100 is a market index calculated from the market prices and hence does not include transaction costs. However, balanced fund index is calculated from the fund prices and therefore includes management fees and transactions commissions. Therefore, comparing net returns with the balanced fund index which is net of fees and commissions is more meaningful. However, results of regressions using ISE-100 index is also shown for comparison purposes.

Table 32 Average Balanced Fund Class Alphas Using Net Returns (Market: ISE-100 Index)

Name of Equity Fund Subgroup	Return (%)
Average Alpha -All Balanced Funds	-10.74%
Average Alpha -Full-sample Survivors	-6.89%
Average Alpha-End-of-sample Survivors	-5.52%
Nonsurviving Equity Funds	-13.90%

Below table gives the size of the survivorship bias and premium when ISE-100 index is used as the market. The size of the survivorship bias is 3.84% for full sample survivors and 5.22% for end-of-sample survivors. Here the different groups' of alphas all drop and become more negative but at varying amounts. Since the least drop in alpha is at end-of-sample survivors and full-sample survivors while the highest drop is at nonsurvivors, I expect that fees and costs are the highest for non survivors, less for end-of-sample and full-sample survivors. I will check this in the following sections related with management fees.

Table 33 Survivorship Bias/Premium for Balanced Fund Class Risk-Adjusted Returns (Market: ISE-100 Index)

Survivorship Type	Size of Bias/Premium
Survivorship Bias-Full-Sample Survivors	3,84%
Survivorship Bias-End-of-Sample Survivors	5,22%
Survivorship Premium-Full-Sample Survivors	7,01%
Survivorship Premium-End-of Sample Survivors	8,38%

Below is a summary table showing statistics about balanced fund alphas. Alpha statistics are more negative when ISE-100 is used as the market in the regression equation. This is expected since ISE is an index calculated from market prices and does not include management fees and transaction costs whereas balanced fund index is an index calculated from fund prices and hence includes fees and commissions. Therefore, using the results with the balanced fund index as the market is more meaningful for net returns.

Table 34 Individual Jensen's Alpha Statistics for Balanced Fund Class Net Returns

	Alpha		Number		Percentage	
	Fund Index	ISE	Fund Index	ISE	Fund Index	ISE
Average Alpha	-4.58%	-10.74%				
Minimum Alpha	-31.57%	-37.54%				
Maximum Alpha	25.11%	9.72%				
Standard Deviation	8.93%	9.77%				
Total Fund Alphas			45	45		
Positive Alpha			13	2	29%	4%
Negative Alpha			32	43	71%	96%
No of Nonsignif Alphas			36	36	80%	80%
No of Significant Alphas			9	9	20%	20%
Significant Positive Alpha			4	4	44%	44%
Significant Negative Alpha			5	5	56%	56%
Total Significant			9	9		

Measuring Performance and Calculating Survivorship Bias using Jensen's Alpha for Fund Portfolios

Aggregation of the funds in various fund categories into portfolios and regressing aggregate portfolio returns against class indices and the broad market index (ISE-100) is an alternative method to regressions of the individual fund returns against the same indices. This aggregation method also cancels out some disadvantages of using individual fund regressions. First of all, in fund portfolios funds do not need to have a return history of certain length to generate reliable regression estimates. Secondly, since individual funds partly exist in different time periods, their performance measures might show a market climate bias whereas fund portfolios do not have such a bias.

Performance and Survivorship Bias Calculations using Jensen's Alpha for Variable Funds Portfolio

Variable fund portfolios are constructed either equal-weighted or size-weighted and results are compared accordingly.

Equal-Weighted Variable Fund Portfolios

Below are the periodic net returns for the equal-weighted variable funds portfolio and also its sub constituent equal-weight portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds.

Table 35 Annualized Net Returns for the Weekly Means of Equal Weighted Variable Fund Portfolios

Period	ISE-100	Variable Fund Index	All Variable Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,46%	21,36%	20,89%	22,07%	20,96%
2000-2006	13,02%	27,16%	21,39%	20,77%	22,19%	19,24%
2000	-44,90%	0,51%	-8,43%	-12,10%	-10,48%	-6,98%
2001	38,48%	79,18%	64,08%	68,97%	70,89%	58,68%
2002	-16,72%	16,36%	9,14%	9,55%	8,33%	10,06%
2003	69,40%	56,71%	48,07%	50,61%	51,04%	43,00%
2004	36,51%	17,28%	17,14%	16,73%	17,88%	14,72%
2005	59,33%	31,29%	29,52%	23,18%	29,14%	31,41%
2006	-1,55%	5,40%	4,48%	5,28%	5,65%	-2,92%
2007	39,89%	21,80%	21,13%	21,73%	21,25%	64,32%

When analyzing fund portfolios, it would be better to use the period from 2000 to 2006 rather than the study period of 2000 to 2007 because in the year 2007, the nonsurvivors subgroup ceased to exist in the first four months of the year due to the disappearance of all funds in the group making the comparison of this year's performance for nonsurvivors to other subgroups not very meaningful. Only two funds remained in nonsurvivors during the final period of 2007. One of them is Koçbank A Type Variable Fund that is merged with Yapı Kredi Yatırım A Type Variable Fund due to the merger of Koçbank with Yapı Kredi Bank. Performance has not played any role in the fund merger decision. In fact its performance has been above the variable fund group's average performance. The other fund that remained is Garanti Bank ÖBY A Type Variable Fund which had also above average performance. Therefore, nonsurvivors' portfolio return should be ignored for the final year of the sample, i.e. year 2007 and the study period should be 2000 to 2006 for the analysis of fund portfolios.

End-of-sample survivor variable fund portfolios' annualized average returns are greater than those of all variable fund portfolios' and nonsurvivor variable fund portfolios' between 2000 and 2006. Full-sample survivor fund portfolios' returns are lower than those of all variable fund portfolios' and nonsurvivors have the lowest annualized returns in the same period.

Yearly returns for the subgroups are shown in the above table to illustrate the variability of returns of nonsurvivor's portfolios from year to year since they do not exist the whole year in some of the years. These years where they do not exist all through the year, they may have returns higher than the other subgroups since some funds may cease to exist before the market drops or they may start to exist just before the market starts increasing pushing the nonsurvivor group's average higher. For example, amazingly nonsurvivor portfolio returns are the highest in year 2000. Furthermore, full-sample portfolio annualized average returns remain lower than those of end-of-sample portfolios in 2000 due to year 2000 being a dismal year with ISE-100 showing a drop of 44.90%. This is shown in year 2000 row in the table above, with a return of -12.10% for full-sample survivors.

As a matter of fact, instead of looking at annual results, the whole sample period should better be investigated since aggregation over the longer term smoothes out periodic volatilities. Below table shows annual survivorship bias and premium calculations for full-sample and end-of-sample survivor portfolios.

Table 36 Survivorship Bias/Premium Calculations using Equal Weighted Variable Fund Portfolios' Annualized Net Raw Returns

Period	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias (00-07)	-0.47%	0.71%
Survivorship Premium (00-07)	-0.07%	1.11%
Survivorship Bias (00-06)	-0.62%	0.80%
Survivorship Premium (00-06)	1.53%	2.94%

Using raw returns may necessary but not sufficient in survivorship bias calculations. Some funds may take on very high market risk. As a result, these funds may sometimes end up with very high returns and sometimes with very low returns leading to closure or name change by the fund sponsor. Therefore, using risk adjusted returns may lead to better results in survivorship bias calculations. Risk-adjusted returns are calculated using Jensen' Alpha equation as shown in the tables below. In the first table, variable fund index is used as the market for the variable funds whereas in the second equation ISE-100 is utilized to observe the impact of using a broad market index. As discussed in previous sections, using the relevant fund index is more meaningful for net returns since equity portions and hence underlying risks of various fund categories widely differ from that of the ISE-100. Funds in all categories has less risk than that of the ISE-100 index, since funds' equity portions vary from 25% to 100% which are mostly benchmarked to the ISE-100 index and in some rare cases to the ISE-30 index. Moreover, fund returns are net and so are fund index returns making them more suitable to be used as the market in comparison with the ISE-100 returns which are gross.

Table 37 Equal-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Net)

Period	All Variable	Full Sample	End-of-Sample	Nonsurvivors
2000-2007	-5.28%	-5.10%	-4.23%	-6.76%
t-values	(-1.80)	(-1.67)	(-1.36)	(-2.64*)
2000-2006	-4.31%	-4.13%	-3.01%	-6.25%
t-values	(-5.33*)	(-3.62*)	(-2.73*)	(-6.49*)
2000	-6.48%	-5.12%	-4.02%	-8.04%
t-values	(-2.31*)	(-1.52)	(-1.29)	(-2.31*)
2001	-7.25%	-3.16%	-1.98%	-10.98%
t-values	(-2.55*)	(-0.72)	(-0.41)	(-4.09*)
2002	-5.75%	-2.72%	-4.57%	-7.17%
t-values	(-4.55*)	(-1.66)	(-2.80*)	(-4.17*)
2003	-4.89%	-3.88%	-3.28%	-7.46%
t-values	(-3.22*)	(-2.67*)	(-2.31*)	(-3.35*)
2004	-0.69%	-0.69%	0.12%	-3.02%
t-values	(-0.41)	(-0.33)	(0.06)	(-1.40)
2005	-1.21%	-5.30%	-1.40%	-0.74%
t-values	(-1.00)	(-3.15*)	(-1.03)	(-0.50)
2006	-1.22%	-1.53%	-0.46%	-4.80%
t-values	(-0.86)	(-1.16)	(-0.32)	(-2.55*)
2007	-0.84%	-0.21%	-0.92%	0.12%
t-values	(-0.06)	(-0.01)	(-0.06)	(0.01)

(*) indicates significance.

As shown in the above table, all fund subgroups had shown negative risk-adjusted return in any of the sub periods or years except for end-of-sample survivors showing an alpha of +0.12% in 2004 (nonsurvivors return for 2007 will be ignored due to the lack of funds as explained above). However, the worst risk adjusted performance came from the nonsurvivor portfolios in every sub period or year and they were mostly statistically significant. This also caused All Variable Funds Portfolio's risk-adjusted returns to be significantly negative in most of the sub periods.

Table 38 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: Variable Fund Index)

Period	Full Sample	End-of-Sample
Survivorship Bias (00-07)	0.18%	1.05%
Survivorship Premium (00-07)	1.66%	2.53%
Survivorship Bias (00-06)	0.18%	1.30%
Survivorship Premium (00-06)	2.12%	3.24%

Portfolios showed similar results when ISE-100 is used as the market in the regression equation. Nevertheless, model specification when variable fund index is used was better with higher R^2 values.

Table 39 Equal-Weighted Variable Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net)

Period	All Variable Funds Portfolio	Full Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-7.92%	-7.81%	-6.97%	-9.31%
t-values	(-2.35*)	(-2.28*)	(-2.00*)	(-3.01*)
2000-2006	-7.04%	-6.91%	-5.83%	-8.88%
t-values	(-2.88*)	(-2.76*)	(-2.31*)	(-3.55*)
2000	-4.52%	-2.36%	-1.35%	-6.51%
t-values	(-0.45)	(-0.22)	(-0.13)	(-0.66)
2001	-11.63%	-7.68%	-6.60%	-15.19%
t-values	(-1.17)	(-0.80)	(-0.65)	(-1.50)
2002	-11.26%	-8.82%	-10.44%	-12.23%
t-values	(-2.74*)	(-1.90)	(-2.32*)	(-3.16*)
2003	-4.30%	-3.23%	-2.67%	-6.93%
t-values	(-0.68)	(-0.47)	(-0.41)	(-1.13)
2004	-10.02%	-10.64%	-9.55%	-11.50%
t-values	(-2.60*)	(-2.57*)	(-2.38*)	(-2.99*)
2005	-5.62%	-9.41%	-5.88%	-4.91%
t-values	(-1.51)	(-2.57*)	(-1.58)	(-1.24)
2006	-1.82%	-2.07%	-1.06%	-5.41%
t-values	(-0.48)	(-0.60)	(-0.28)	(-1.32)
2007	0.14%	0.76%	0.07%	0.92%
	(0.01)	(0.05)	(0.00)	(0.08)

(*) indicates significance.

When the ISE-100 index is used as the market in the regression equation for the study period 2000-2007 and 2000-2006, all subgroups had shown statistically significant negative risk-adjusted returns. In addition, year 2004 had statistically significant negative alphas for all subgroups. Highest number of significant negative alphas is in nonsurvivors. The fact that alphas are more negative when ISE-100 is the market is due to ISE-100 being gross whereas fund returns are net.

Table 40 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index)

Period	Full Sample	End-of-Sample
Survivorship Bias (00-07)	0.11%	0.95%
Survivorship Premium (00-07)	1.50%	2.34%
Survivorship Bias (00-06)	0.13%	1.21%
Survivorship Premium (00-06)	1.97%	3.05%

Size-Weighted Variable Fund Portfolios

Below are the periodic returns for the size-weighted variable funds portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds calculated using monthly net asset values (NAV) of the funds. Although individual fund returns are weekly, fund net asset values can only be found from Monthly Capital Markets Board Reports. Therefore, fund NAVs are monthly.

Table 41 Annualized Net Returns for the Weekly Means of Size-Weighted Variable Fund Portfolios in Comparison with Equal-Weighted Portfolios

Size-Weighted

Period	ISE-100	Variable Fund Index	All Variable Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,46%	23,25%	20,62%	21,56%	26,57%
2000-2006	13,02%	27,16%	23,32%	20,28%	21,36%	26,80%
2000	-44,90%	0,51%	-2,75%	-4,21%	-4,22%	-0,35%
2001	38,48%	79,18%	61,90%	50,38%	50,91%	83,09%
2002	-16,72%	16,36%	13,11%	10,75%	10,64%	17,47%
2003	69,40%	56,71%	55,01%	51,91%	53,10%	59,20%
2004	36,51%	17,28%	14,98%	15,58%	15,93%	12,57%
2005	59,33%	31,29%	29,26%	23,78%	29,48%	26,95%
2006	-1,55%	5,40%	4,80%	4,10%	4,54%	7,11%
2007	39,89%	21,80%	22,75%	23,05%	22,92%	20,20%

Equal-Weighted

Period	ISE-100	Variable Fund Index	All Variable Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,46%	21,36%	20,89%	22,07%	20,96%
2000-2006	13,02%	27,16%	21,39%	20,77%	22,19%	19,24%
2000	-44,90%	0,51%	-8,43%	-12,10%	-10,48%	-6,98%
2001	38,48%	79,18%	64,08%	68,97%	70,89%	58,68%
2002	-16,72%	16,36%	9,14%	9,55%	8,33%	10,06%
2003	69,40%	56,71%	48,07%	50,61%	51,04%	43,00%
2004	36,51%	17,28%	17,14%	16,73%	17,88%	14,72%
2005	59,33%	31,29%	29,52%	23,18%	29,14%	31,41%
2006	-1,55%	5,40%	4,48%	5,28%	5,65%	-2,92%
2007	39,89%	21,80%	21,13%	21,73%	21,25%	64,32%

When variable fund portfolio returns are calculated on a size-weighted basis, results came out in an unexpected way. Nonsurvivor portfolios had the highest annualized average return in most of the years as opposed to the equal-weight results. This means that in nonsurvivor funds, some large size funds were closed not due to bad performance but for other reasons. Or alternatively some large size funds survived although their performance was not so good.

Upon checking the data, it is observed that two funds made up about 73% of the nonsurvivor fund group's total size on the average had rather high returns when compared with the nonsurvivor group average. These Funds are Koçbank A Type Variable Fund which was converted to a B Type Variable Fund in March 2007 and TEB A Type Variable Fund which was converted to Fixed Income Fund in January 2004. The reason of the first incidence is the Koçbank-Yapı Kredi Bank merger, not inferior performance. Koçbank A Type Variable fund holders were transferred into Yapı Kredi Yatırım A Type Variable fund. I do not know the reason of the second incidence but seemingly it is not due to poor performance either.

Therefore, survivorship bias and premium numbers are all negative for size-weighted variable fund portfolios due to these two large size nonsurvivor funds with high performance as shown in the tables below.

Table 42 Survivorship Bias/Premium Calculations using Size Weighted Variable Fund Portfolios' Annualized Net Raw Returns

Period	Full-sample survivors Portfolio	End-of sample survivors Portfolio
Survivorship Bias (00-07)	-2.62%	-1.69%
Survivorship Premium (00-07)	-5.94%	-5.01%
Survivorship Bias (00-06)	-3.05%	-1.96%
Survivorship Premium (00-06)	-6.52%	-5.44%

Survivorship premium is even more negative since it is the difference between the performance of nonsurvivors and survivors. However, when medians of weekly returns are used instead of means, survivorship bias figure becomes positive, i.e. 2.07%, and survivorship premium becomes 2.57% for end-of-sample survivors' portfolio because median is not affected by outliers. This shows that the impact of outliers is very high in nonsurvivors' portfolio. Moreover, outliers are funds that are deceased not due to bad performance but due to other reasons as explained above. The survivorship bias and premium figures are -0.35% and 0.15% respectively for full-sample survivors' portfolio.

In addition to raw returns, risk-adjusted returns are also calculated using both variable fund index and the ISE-100 index as the market. The results are in the tables below. All of the risk-adjusted returns are negative, however nonsurvivors are less so due to the performance contribution from the two high performing nonsurviving funds that made up 73% of the nonsurvivors' total size on the average as explained above. In the sample period, full-sample and end-of-sample survivor portfolios come up with significantly negative risk-adjusted returns in line with their raw return results outlined above.

Table 43 Size-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Net)

Period	All Variable	Full-Sample	End-of-Sample	Nonsurvivors
2000-2007	-4.84%	-7.39%	-6.50%	-1.93%
t-values	(-1.68)	(-2.62*)	(-2.22*)	(-1.22)

(*) indicates significance.

Accordingly, survivorship bias turned out to be -1.66%, slightly less negative than its raw return counterpart when variable fund index is the market and further less negative when ISE-100 index is the market as shown below.

Table 44 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: V. Fund Index)

Period: 2000-2007	Full Sample	End-of-Sample
Survivorship Bias	-2.55%	-1.66%
Survivorship Premium	-5.45%	-4.57%

When ISE-100 index is used as the market, then full-sample, end-of-sample survivors and all variable fund subgroups all came up with significantly negative risk-adjusted returns while nonsurvivors' portfolio had less negative and not significant alpha. This is normal since ISE-100 is a gross index while returns are net. Therefore regressions of net returns against the ISE-100 are shown in the tables below only for comparison purposes.

Table 45 Size-Weighted Variable Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net)

Period	All Variable	Full Sample	End-of-Sample	Nonsurvivors
2000-2007	-7,36%	-9,74%	-8,94%	-4,59%
t-values	(-2,18*)	(-2,98*)	(-2,63*)	(-1,65)

(*) indicates significance.

Table 46 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index)

Period: 2000-2007	Full Sample	End-of-Sample
Survivorship Bias	-2.37%	-1.57%
Survivorship Premium	-5.15%	-4.35%

Performance and Survivorship Bias Calculations using Jensen's Alpha for Equity Funds Portfolio

Equity fund portfolios are constructed either equal-weighted or size-weighted and results are compared accordingly.

Equal-Weighted Equity Fund Portfolios

Below are the periodic net raw returns for the equal-weighted equity fund portfolios and also its sub constituent equal-weight portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds. Full-sample and end-of-sample survivor portfolios have the highest and second highest returns whereas all equity funds' portfolios had lower and nonsurvivors' portfolios had lowest average raw returns in the study period 2000 to 2007. However annual results do not follow the same ranking for 2004, 2005 and 2007.

Table 47 Annualized Net Returns for the Weekly Mean Returns of Equal-Weighted Equity Fund Portfolios

Period	ISE-100	Equity Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	16,90%	18,45%	17,67%	15,66%
2002-2007	27,31%	21,96%	20,38%	20,16%	20,60%	20,04%
2000	-44,90%	-21,72%	-22,49%	-15,75%	-20,16%	-25,07%
2001	38,48%	51,90%	46,52%	51,69%	48,43%	44,93%
2002	-16,72%	-3,47%	-3,20%	-3,38%	-2,65%	-4,63%
2003	69,40%	54,69%	49,58%	51,67%	51,69%	45,49%
2004	36,51%	15,13%	18,42%	15,61%	16,90%	25,41%
2005	59,33%	38,51%	38,78%	39,68%	38,25%	41,30%
2006	-1,55%	7,07%	2,67%	5,41%	3,24%	0,06%
2007	39,89%	28,38%	23,99%	20,13%	24,24%	23,13%

Survivorship bias is 1.55% for full-sample and 0.77% for end-of-sample survivors for the study period. Survivorship premium is 2.79% for full-sample and 2.01% for end-of-sample survivors for the study period.

Table 48 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Net Raw Returns

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	1.55%	0.77%
Survivorship Premium	2.79%	2.01%

Below are the periodic risk-adjusted returns for the equal-weighted equity fund portfolio and also its sub constituent equal-weight portfolios for full-sample survivor,

end-of-sample survivor and nonsurvivor funds when the equity funds index is the market. End-of-sample and full-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007. However annual results do not follow the same ranking for 2004, 2005 and 2007. All the risk-adjusted returns in the study period of 2000 to 2007 are negative. Risk-adjusted returns in sub periods are also negative. However risk-adjusted returns for the overall study period and also for any of the sub periods are not significant except a few.

Table 49 Equal-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Net)

Period	All Variable Funds Portfolio	Full Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-1.21%	-0.77%	-0.66%	-1.83%
t-values	(-1.08)	(-0.59)	(-0.55)	(-0.82)
2000	9.87%	9.06%	6.82%	12.09%
t-values	(1.72)	(1.36)	(1.08)	(1.72)
2001	-3.21%	-0.50%	-0.90%	-5.09%
t-values	(-1.01)	(-0.11)	(-0.20)	(-1.24)
2002	0.61%	-1.36%	2.21%	-2.21%
t-values	(0.28)	(-0.33)	(0.62)	(-0.62)
2003	-3.56%	-2.09%	-2.06%	-6.43%
t-values	(-1.83)	(-0.81)	(-0.97)	(-2.52*)
2004	2.73%	-0.04%	1.31%	9.18%
t-values	(1.03)	(-0.02)	(0.79)	(0.96)
2005	1.15%	2.62%	0.92%	2.22%
t-values	(0.65)	(1.04)	(0.48)	(0.68)
2006	-4.44%	-2.49%	-3.94%	-6.66%
t-values	(-2.08*)	(-0.97)	(-1.92)	(-1.35)
2007	-3.03%	-5.84%	-2.79%	-7.89%
t-values	(-1.62)	(-2.78*)	(-1.57)	(-0.66)

(*) indicates significance.

Survivorship bias is 0.45% for full-sample and 0.56% for end-of-sample survivors for the study period. Survivorship premium is 1.06% for full-sample and 1.17% for end-of-sample survivors for the study period.

Table 50 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: E. Fund Index)

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.45%	0.56%
Survivorship Premium	1.06%	1.17%

In the following table, the periodic risk-adjusted returns for the equal-weighted equity fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds are shown when the ISE-100 index is the market. Since ISE-100 is an index that does not include fees and commission, using the ISE-100 with net fund returns is not very appropriate. Yet it is shown for comparison purposes.

Alphas of all subgroups are negative and statistically significant. Full-sample and end-of-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007. However annual results do not follow the same ranking in many of the sub periods. All the risk-adjusted returns in the study period of 2000 to 2007 are negative. Risk-adjusted returns in sub periods are also negative. Risk-adjusted returns for the overall study period are all significant but not so for the sub periods except a few.

Table 51 Equal-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net)

Period	All Variable Funds Portfolio	Full Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-6.73%	-6.11%	-6.20%	-7.13%
t-values	(-2.41*)	(-2.15*)	(-2.15*)	(-2.07*)
2000	0.52%	-0.04%	-2.35%	2.79%
t-values	(0.04)	(0.00)	(-0.17)	(0.21)
2001	-13.04%	-10.60%	-11.26%	-14.50%
t-values	(-1.21)	(-0.88)	(-0.93)	(-1.39)
2002	-11.34%	-12.67%	-10.19%	-13.48%
t-values	(-1.80)	(-1.87)	(-1.44)	(-2.09*)
2003	-5.96%	-4.48%	-4.46%	-8.80%
t-values	(-0.70)	(-0.52)	(-0.53)	(-0.98)
2004	-10.44%	-12.35%	-11.53%	-5.37%
t-values	(-1.72)	(-2.24*)	(-2.08*)	(-0.49)
2005	-4.18%	-2.63%	-4.32%	-3.49%
t-values	(-0.73)	(-0.47)	(-0.75)	(-0.55)
2006	-0.67%	1.11%	-0.15%	-2.95%
t-values	(-0.11)	(0.20)	(-0.03)	(-0.37)
2007	-6.42%	-9.03%	-6.17%	-7.02%
	(-1.88)	(-2.61*)	(-1.83)	(-0.56)

(*) indicates significance.

Survivorship bias is 0.62% for full-sample and 0.52% for end-of-sample survivors for the study period. Survivorship premium is 1.06% for full-sample and 1.17% for end-of-sample survivors for the study period.

Table 52 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.62%	0.52%
Survivorship Premium	1.02%	0.93%

(*) indicates significance.

Size-Weighted Equity Fund Portfolios

Below are the periodic raw returns for the size-weighted equity funds portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds calculated using monthly Net Asset Values of

the funds. Although individual fund returns are weekly, fund Net Asset Values can only be found from Monthly Capital Markets Board Reports. Therefore, fund NAVs are monthly.

Full-sample and end-of-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolios had lower and nonsurvivors' portfolios had lowest average raw returns in the study period 2000 to 2007. However annual results do not follow the same ranking for 2005 and 2007.

Table 53 Annualized Net Returns for the Weekly Means of Size-Weighted Equity Fund Portfolios in Comparison with Equal-Weighted Equity Fund Protfolios

Size-Weighted

Period	ISE-100	Equity Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	19,15%	22,10%	21,13%	14,98%
2002-2007	27,31%	21,96%	23,10%	25,23%	24,04%	20,99%
2000	-44,90%	-21,72%	-25,50%	-22,27%	-23,15%	-28,15%
2001	38,48%	51,90%	54,86%	63,21%	63,99%	38,82%
2002	-16,72%	-3,47%	5,12%	8,63%	8,01%	-0,77%
2003	69,40%	54,69%	52,18%	56,84%	52,80%	50,37%
2004	36,51%	15,13%	12,09%	12,73%	13,66%	6,43%
2005	59,33%	38,51%	39,01%	39,38%	38,46%	40,55%
2006	-1,55%	7,07%	7,62%	9,91%	7,94%	4,64%
2007	39,89%	28,38%	29,25%	30,43%	29,28%	64,41%

Equal-Weighted

Period	ISE-100	Equity Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	16,90%	18,45%	17,67%	15,66%
2002-2007	27,31%	21,96%	20,38%	20,16%	20,60%	20,04%
2000	-44,90%	-21,72%	-22,49%	-15,75%	-20,16%	-25,07%
2001	38,48%	51,90%	46,52%	51,69%	48,43%	44,93%
2002	-16,72%	-3,47%	-3,20%	-3,38%	-2,65%	-4,63%
2003	69,40%	54,69%	49,58%	51,67%	51,69%	45,49%
2004	36,51%	15,13%	18,42%	15,61%	16,90%	25,41%
2005	59,33%	38,51%	38,78%	39,68%	38,25%	41,30%
2006	-1,55%	7,07%	2,67%	5,41%	3,24%	0,06%
2007	39,89%	28,38%	23,99%	20,13%	24,24%	23,13%

Survivorship bias is 2.95% for full-sample and 1.98% for end-of-sample survivors for the study period. Survivorship premium is 7.13% for full-sample and 6.15% for end-of-sample survivors for the study period.

Table 54 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Net Raw Returns

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	2.95%	1.98%
Survivorship Premium	7.13%	6.15%

Below are the periodic risk-adjusted returns for the size-weighted equity funds portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the equity fund index is the market.

Table 55 Size-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Net)

Period	All Equity Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	0.08%	2.01%	1.29%	-2.84%
t-values	(0.07)	(1.38)	(0.95)	(-1.23)

(*) indicates significance.

The risk-adjusted returns in the study period of 2000 to 2007 are positive for all subgroups except for nonsurvivors. However, none of the subgroup alpha is statistically significant. Full-sample and end-of-sample and survivors' portfolios have the highest and second highest risk-adjusted returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007. This result is important because it shows that a portfolio of equity funds, on a size-weighted basis and freed from survivorship bias, was able to cover all of the costs related with fund management and can even create a miniscule value for investors, i.e. 0.08% per annum between 2000 and 2007. This may be a reason why we can be hopeful from the future since this tiny value is created in this eight year period where costs were very high, interest rates, therefore risk-free rate was very high (although coming down slowly) and asset management was at its infancy, not only in terms of size but also in terms of knowledge, experience and sophistication on the side of asset managers.

The result without correcting for survivorship bias would point to a value creation of 1.29% per annum for the portfolio of size-weighted equity funds if only

the funds existing at the end of the study period were used in the calculation. This result would be subject to survivorship bias.

Another important observation about equity funds is the remarkable success of the portfolio of size-weighted full-sample survivors. They were able to create value over and above their management fees, transaction commissions and all other expenses with a risk-adjusted return of 2.01% for the 2000-2007 period. When the equity funds' individual alphas from previous sections are considered, it is observed that 4 of the 7 equity funds in the full-sample survivors group have positive (not significant) alphas.

One important thing to note is that alphas become better when size-weighted for portfolios of two subgroups, full-sample and end-of-sample-survivors. This means that larger survivor funds perform better on a risk-adjusted basis. This difference and also the increase in survivorship bias becomes more pronounced for full-sample survivors meaning that some large size full-sample survivor equity funds perform better while some large size nonsurvivor equity funds perform worse. Survivors also help better the size-weighted portfolios of all equity funds. However, size-weighted nonsurvivors' portfolio alpha becomes more negative compared to equal-weighted nonsurvivors. This shows that larger nonsurvivor funds perform worse on a risk-adjusted basis. Survivorship bias is 1.93% for full-sample and 1.22% for end-of-sample survivors for the study period. Survivorship premium is 4.85% for full-sample and 4.13% for end-of-sample survivors for the study period.

Table 56 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: E. Fund Index)

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	1.93%	1.22%
Survivorship Premium	4.85%	4.13%

Below are the periodic risk-adjusted returns for the size-weighted equity fund portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the ISE-100 index is the market.

Full-sample and end-of-sample and survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007.

Again alphas become better when size-weighted for portfolios of two subgroups, full-sample and end-of-sample-survivors. This means that larger survivor funds perform better on a risk-adjusted basis. Survivors also help better the performance of size-weighted portfolios of all equity funds. However, size-weighted nonsurvivors' portfolio alpha becomes more negative and significant compared to equal-weighted nonsurvivors. This shows that larger nonsurvivor funds perform worse on a risk-adjusted basis.

Table 57 Size-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net)

Period	All Equity Funds Portfolio	Full Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-5.37%	-3.47%	-4.17%	-8.27%
t-values	(-1.92)	(-1.14)	(-1.39)	(-2.46*)

(*) indicates significance.

Survivorship bias is 1.90% for full-sample and 1.20% for end-of-sample survivors for the study period. Survivorship premium is 4.80% for full-sample and 4.10% for end-of-sample survivors for the study period.

Table 58 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: E. Fund Index)

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	1.90%	1.20%
Survivorship Premium	4.80%	4.10%

Performance and Survivorship Bias Calculations using Jensen's Alpha for Balanced Funds Portfolio

Balanced fund portfolios are constructed either equal-weighted or size-weighted and results are compared accordingly.

Equal-Weighted Balanced Fund Portfolios

Below are the periodic raw returns for the equal-weighted balanced fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds. Full-sample and end-of-sample survivors' portfolios have the highest and second highest returns whereas all balanced funds' portfolios had lower and nonsurvivors' portfolios had lowest average raw returns in the study period from 2000 to 2007. However annual results do not follow the same ranking for 2002.

Table 59 Annualized Net Returns for the Weekly Means of Equal-Weighted Balanced Fund Portfolios

Period	ISE-100	Balanced Fund Index	All Balanced Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,27%	21,88%	22,74%	23,16%	18,39%
2002-2007	27,31%	24,29%	21,59%	21,52%	22,40%	17,50%
2000	-44,90%	-1,53%	-6,50%	-4,14%	-6,06%	-6,72%
2001	38,48%	77,34%	60,37%	66,16%	66,73%	56,17%
2002	-16,72%	15,80%	15,31%	7,82%	9,71%	22,55%
2003	69,40%	55,80%	51,61%	51,47%	54,14%	47,95%
2004	36,51%	19,77%	17,37%	20,16%	20,07%	12,10%
2005	59,33%	27,64%	24,66%	27,55%	26,48%	19,41%
2006	-1,55%	7,62%	4,55%	7,54%	8,03%	-8,05%
2007	39,89%	23,67%	20,37%	19,17%	20,71%	17,30%

Survivorship bias is 0.86% for full-sample and 1.27% for end-of-sample survivors during the study period. Survivorship premium is 4.35% for full-sample and 4.76% for end-of-sample survivors for the study period.

Table 60 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Net Raw Returns

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.86%	1.27%
Survivorship Premium	4.35%	4.76%

Below are the periodic risk-adjusted returns for the equal-weighted equity fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the balanced fund index is the market. End-of-sample and full-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio has lower and nonsurvivors' portfolio has the lowest risk-adjusted returns in the study period 2000 to 2007. However annual results do not follow the same ranking for 2004, 2005 and 2007.

All the risk-adjusted returns in the study period of 2000 to 2007 are negative and significant. Risk-adjusted returns in sub periods are also negative but significant only for some of the sub periods for nonsurvivors.

Table 61 Equal-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Net)

Period	All Equity Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-2.67%	-2.26%	-1.26%	-5.77%
t-values	(-3.07*)	(-2.20*)	(-1.29)	(3.82*)
2000-2001	-2.78%	0.45%	1.44%	-5.38%
t-values	(-1.51)	(0.21)	(0.61)	(-2.33*)
2002-2007	-2.33%	-2.71%	-1.71%	-5.68%
t-values	(-2.74*)	(-2.74*)	(-2.03*)	(-3.10*)
2000	1.24%	2.32%	2.18%	1.04%
t-values	(0.40)	(0.77)	(0.65)	(0.25)
2001	-6.42%	-2.43%	-0.73%	-10.06%
t-values	(-3.09*)	(-0.85)	(-0.23)	(-4.59*)
2002	0.66%	-5.70%	-2.66%	5.05%
t-values	(0.35)	(-2.92*)	(-1.79*)	(1.31)
2003	-3.28%	-3.45%	-1.82%	-5.41%
t-values	(-1.82)	(-1.95)	(-1.35)	(-1.52)
2004	-2.39%	-0.65%	-0.22%	-6.77%
t-values	(-1.61)	(-0.35)	(-0.13)	(-3.45*)
2005	-2.26%	0.09%	-0.90%	-6.41%
t-values	(-1.46)	(0.04)	(-0.57)	(-1.72)
2006	-3.62%	-1.99%	-0.84%	-14.72%
t-values	(-1.30)	(-0.77)	(-0.32)	(-2.47*)
2007	-2.39%	-3.16%	-2.13%	-6.82%
t-values	(-1.14)	(-1.34)	(-1.01)	(-0.96)

(*) indicates significance.

Survivorship bias is 0.41% for full-sample and 1.41% for end-of-sample survivors for the study period. Survivorship premium is 3.51% for full-sample and 4.51% for end-of-sample survivors for the study period.

Table 62 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolio's Annualized Net Risk-Adjusted Returns (Market: B. Fund Index)

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.41%	1.41%
Survivorship Premium	3.51%	4.51%

Below are the periodic net risk-adjusted returns for the equal-weighted balanced fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when ISE-100 index is the

market. Since ISE-100 is an index that does not include fees and commissions, using the ISE-100 is not so fair with net returns. Yet it is shown for comparison purposes.

End-of-sample and full-sample survivors' portfolios have the highest and second highest returns whereas all balanced funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007. However annual results do not follow the same ranking in many of the sub periods. All the risk-adjusted returns in the study period of 2000 to 2007 are negative. Risk-adjusted returns in sub periods are also negative. Risk-adjusted returns are all significant for the overall study period but not so for the sub periods in general.

Table 63 Equal-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net)

Period	All Equity Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-7.30%	-6.88%	-6.08%	-10.01%
t-values	(-3.33*)	(-3.03*)	(-2.68*)	(-4.05*)
2000-2001	-9.76%	-6.75%	-5.92%	-12.13%
t-values	(-1.45)	(-0.98)	(-0.86)	(-1.76)
2002-2007	-5.59%	-5.88%	-5.06%	-8.62%
t-values	(-3.29*)	(-3.31*)	(-2.85*)	(-3.88*)
2000	-3.30%	-1.92%	-2.05%	-3.68%
t-values	(-0.37)	(-0.23)	(-0.24)	(-0.38)
2001	-13.62%	-10.11%	-8.71%	-16.79%
t-values	(-1.34)	(-0.93)	(-0.80)	(-1.69)
2002	-7.26%	-13.14%	-10.83%	-2.53%
t-values	(-1.56)	(-2.91*)	(-2.13*)	(-0.51)
2003	-1.30%	-1.43%	0.23%	-3.51%
t-values	(-0.21)	(-0.23)	(0.04)	(-0.52)
2004	-9.56%	-7.38%	-7.73%	-13.29%
t-values	(-2.64*)	(-1.87)	(-2.03*)	(-3.73*)
2005	-5.01%	-2.37%	-3.59%	-9.29%
t-values	(-1.52)	(-0.64)	(-1.06)	(-2.07*)
2006	-4.52%	-2.84%	-1.74%	-15.56%
t-values	(-1.20)	(-0.79)	(-0.48)	(-2.40*)
2007	-4.15%	-4.83%	-3.88%	-6.65%
	(-1.66)	(-1.74)	(-1.48)	(-1.12)

(*) indicates significance.

Survivorship premium is 0.42% for full-sample and 1.22% for end-of-sample survivors for the study period. Survivorship premium is 3.13% for full-sample and 3.93% for end-of-sample survivors for the study period.

Table 64 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index)

Period: 2000-2007	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.42%	1.22%
Survivorship Premium	3.13%	3.93%

Size-Weighted Balanced Fund Portfolios

Below are the periodic net returns for the size-weighted balanced funds portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds calculated using monthly Net Asset Values of the funds. Although individual fund returns are weekly, fund Net Asset Values can only be found from Monthly Capital Markets Board Reports. Therefore, fund NAVs are monthly.

Table 65 Annualized Net Returns for the Weekly Means of Size-Weighted Balanced Fund Portfolios in Comparison with Equal-Weighted Balanced Fund Portfolios

Size-Weighted

Period	ISE-100	Balanced Fund Index	All Balanced Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,27%	23,88%	22,63%	22,74%	25,38%
2002-2007	27,31%	24,29%	22,73%	19,60%	21,52%	24,63%
2000	-44,90%	-1,53%	-9,96%	-6,82%	-4,14%	-11,02%
2001	38,48%	77,34%	79,31%	70,68%	66,16%	81,44%
2002	-16,72%	15,80%	11,97%	-5,92%	7,82%	21,45%
2003	69,40%	55,80%	54,00%	58,27%	51,47%	54,26%
2004	36,51%	19,77%	17,32%	21,68%	20,16%	15,30%
2005	59,33%	27,64%	24,82%	25,21%	27,55%	21,42%
2006	-1,55%	7,62%	7,89%	1,81%	7,54%	2,40%
2007	39,89%	23,67%	24,80%	26,14%	19,17%	35,12%

Equal-Weighted

Period	ISE-100	Balanced Fund Index	All Balanced Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,27%	21,88%	22,74%	23,16%	18,39%
2002-2007	27,31%	24,29%	21,59%	21,52%	22,40%	17,50%
2000	-44,90%	-1,53%	-6,50%	-4,14%	-6,06%	-6,72%
2001	38,48%	77,34%	60,37%	66,16%	66,73%	56,17%
2002	-16,72%	15,80%	15,31%	7,82%	9,71%	22,55%
2003	69,40%	55,80%	51,61%	51,47%	54,14%	47,95%
2004	36,51%	19,77%	17,37%	20,16%	20,07%	12,10%
2005	59,33%	27,64%	24,66%	27,55%	26,48%	19,41%
2006	-1,55%	7,62%	4,55%	7,54%	8,03%	-8,05%
2007	39,89%	23,67%	20,37%	19,17%	20,71%	17,30%

When balanced fund portfolio returns are calculated on a size-weighted basis, results came out in an unexpected way. Nonsurvivors' portfolios had the highest annualized average return in most of the years as opposed to the equal-weighted results. This means that in nonsurvivor funds, some large size funds were closed not due to bad performance but for other reasons. Or alternatively some large size funds survived although their performance was not so good. Actually both of them happened. When the data is investigated, it is observed that one large size nonsurvivor fund, Garanti Bankası A Tipi Karma Fon have average returns that are very much above the balanced class average. This fund, which makes up 37% of the total nonsurvivor balanced class NAV on the average during the study period, pushes the nonsurvivor portfolio's average considerably up. Besides that, some full-sample survivors had bad performance in some years of the study period and hence drove down the average performance of the group in these periods. Full-sample survivors had been worse performer subset of end-of-sample survivor's portfolio.

Therefore, survivorship bias and premium numbers are all negative for size-weighted balanced fund portfolios due to the large size nonsurvivor fund with high performance as shown in the tables below.

Table 66 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Net Raw Returns

Period: 2000-2007	Full-sample survivors Portfolio	End-of sample survivors Portfolio
Survivorship Bias	-1.25%	-1.14%
Survivorship Premium	-2.74%	-2.64%

Survivorship premium is even more negative since it is the difference between the performance of nonsurvivors and survivors.

In addition to raw returns, risk-adjusted returns are also calculated using both balanced fund index and the ISE-100 index as the market. The results are in the tables below. When adjusted for risk, returns of fund subgroups come out as expected with end-of-sample survivor portfolios having the highest and nonsurvivor portfolios having the lowest returns as shown in the table below. Full-sample survivors had been a worse performer subset of end-of-sample survivors' portfolio. However, none of the sub groups had shown significant performance.

Table 67 Size-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Net)

Period	All Balanced Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	0.03%	-0.16%	0.60%	-0.87%
(t-values)	(0.02)	(-0.09)	(0.44)	(-0.54)

(*) indicates significance.

The risk-adjusted returns in the study period of 2000 to 2007 are positive not only for end-of sample survivors but also for all balanced funds portfolio. Full-sample survivors' portfolio has a slightly negative risk-adjusted return. However, none of the subgroup alphas is statistically significant. This result is important because it shows

that a portfolio of balanced funds, on a size-weighted basis and freed from survivorship bias, was able to cover all of the costs related with fund management and can even create a very miniscule value for investors, i.e. 0.03% per annum between 2000 and 2007. This may be a reason why one can be hopeful from the future since this tiny value is created in this eight year period where costs were very high, interest rates, therefore risk-free rate was very high (although coming down slowly) and asset management was at its infancy, not only in terms of size but also in terms of knowledge, experience and sophistication on the side of asset managers. Accordingly, survivorship bias turned out to be 0.58%, when balanced fund index is the market and 0.28% when ISE-100 index is the market as shown below.

Table 68 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: B. Fund Index)

Period: 2000-2007	Full-sample survivors Portfolio	End-of sample survivors Portfolio
Survivorship Bias	-0.18%	0.58%
Survivorship Premium	0.71%	0.27%

When ISE-100 index is used as the market, then full-sample survivors, all equity funds and nonsurvivors' portfolios subgroups all came up with significantly negative risk-adjusted returns while end-of-sample survivors' portfolio had the least negative and not significant alpha. However, since ISE-100 is an index that does not include fees and commission, using the ISE-100 is not so fair with net returns. Yet it is shown for comparison purposes.

Table 69 Size-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Net)

Period	All Equity Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-4.96%	-5.35%	-4.68%	-5.49%
(t-values)	(-2.21*)	(-2.06*)	(-1.92)	(-2.21*)

(*) indicates significance.

Survivorship bias has been between 1.22 and 1.42% for equal-weighted portfolios whereas it has been between 0.28% and 0.58% for size-weighted portfolios.

Table 70 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Net Risk-Adjusted Returns (Market: ISE-100 Index)

Period: 2000-2007	Full-sample survivors Portfolio	End-of sample survivors Portfolio
Survivorship Bias	-0.39%	0.28%
Survivorship Premium	0.14%	0.81%

The Impact of Management Fees on Mutual Fund Performance and the Calculation of Survivorship Bias Using Gross Returns

In that section, mutual fund performances are measured using the gross returns of funds utilizing the newly established survivorship bias free data set and survivorship bias is calculated accordingly.

Measuring mutual fund performance using gross returns as well as net returns is important in the sense that it gives the indication whether funds can outperform the market before accounting for the fund expenses.

Mutual fund expenses can be classified into three groups:

- Management Fees
- Transaction costs, i.e. broker commissions
- Research Costs
- Other Costs, i.e. audit, various tax expenses (until 2007), custody costs, advertising costs, registry-legal-regulatory costs and start-up costs.

Among these costs, management fees and broker commissions constitute the major part of total mutual fund expenses. In Turkey, research cost are generally paid in the form of soft dollars since there are not any research houses solely focused on

selling research activities. Rather research function is fulfilled within brokerage houses as a department. In other words, research costs are often realized as a part of broker commissions. Other costs usually constitute a small portion but sometimes they can be somewhat more important part of the fund size for funds with small net asset values.

In this study, I concentrated on management fees which are more straightforward to find and check. I obtained the management fee information from the Capital Market Board's Monthly Reports released in the CMB's web site. I examined the data and detected some errors on the size of management fees which are not pretty small, i.e. of the magnitude of one or two decimal place. I corrected the errors using conventional wisdom and used the corrected data. I was also able to get the brokerage commission data from the CMS's Monthly Reports. However, this data was rather peculiarly high for certain funds and very difficult to check and correct with conventional wisdom. Therefore, I chose not to use them in this study because I had to call the companies to check since they are reported to the CMB by the asset management companies themselves and CMB is not in a position to check the accuracy of data. However when asked, most probably the companies would not give any information regarding these costs.

Measuring Performance and Calculating Survivorship Bias Using Gross Raw Returns

Average fund returns of variable, equity and balanced fund categories for various fund subgroups (all, full-sample, end-of-sample and nonsurviving funds) and their

respective survivorship bias or survivorship premium calculations using gross raw returns (adjusted for management fees) are calculated as follows.

Variable Fund Class

Below table shows the average raw returns for surviving, nonsurviving and all variable funds in comparison with the ISE-100 and Variable Funds' indices during 2000-2007. It is observed that average return goes down to 26.08% when all funds are taken into consideration in contrast with the average return of 26.30% when only end-of-sample surviving funds are taken into account. Full-sample survivors show the same trend with higher average return of 27.01%. In this study, I will stick with the end-of-sample survivors group in survivorship bias calculations because usually when people calculate average returns over a period of time, they use funds surviving at the end of calculation period, creating survivorship bias. Hence what should be corrected is generally this bias. Also, the number of surviving funds in the end-of-sample survivors' category is more than twice of those for full-sample survivors.

Table 71 Summary of Average Variable Fund Class Raw Returns for the Sample Period

Name of Fund/Index/Group	Average of Weekly Net Returns	Average of Weekly Gross Returns
ISE-100 Index	16.12%	16.12%
Variable Fund Index	26.46%	26.46%
ALL VARIABLE FUNDS	19.69%	26.08%
Full-Sample Surviving Funds	20.59%	27.01%
End-of Sample Surviving Funds	21.16%	26.30%
Non-surviving Funds	18.33%	25.87%

Note: ISE-100 index returns are gross; Variable Fund Index returns are net.

Therefore, survivorship bias is calculated as 0.23% for the variable fund category. In other words, variable fund average returns are calculated 0.23% higher (0.93% for

full sample survivors) in this period when only end-of sample surviving funds are taken into account.

Table 72 Survivorship Bias/Premium Calculations for Variable Funds

Survivorship Type	Size of Bias/Premium for Net Returns	Size of Bias/Premium for Gross Returns
Survivorship Bias-Full-Sample Survivors	0.89%	0.93%
Survivorship Bias-End-of-Sample Survivors	1.46%	0.23%
Survivorship Premium-Full-Sample Survivors	2.25%	1.14%
Survivorship Premium-End-of Sample Survivors	2.82%	0.43%

When returns are adjusted for management fees, survivorship bias went down to 0.23% for end-of-sample survivors and up to 0.93% for full-sample survivors. This shows that the management fees for end-of-sample survivors are less than those of all funds and also of full-sample survivors on average whereas the management fees for full-sample survivors are more than those of all funds and end-of-sample survivors. This is expected since mutual fund management fees have been in a decreasing trend and full-sample survivors existed since the inception of the sample period when fees were higher, whereas end-of-sample survivors include not only full-sample survivors but also the funds that started close to the end of the sample period with lower management fees.

Equity Fund Class

Below table shows the average raw returns for surviving, nonsurviving and all equity funds in comparison with the ISE-100 and Equity Funds' indices during 2000-2007. It is observed that average return goes down to 19.01% when all funds are taken into consideration in contrast with the average return of 25.47% when only end-of-sample

surviving funds are taken into account. Full-sample survivors show the same trend with higher average return of 25.00%. In this study, I will stick with the end-of-sample survivors group in survivorship bias calculations because usually when people calculate average returns over a period of time, they use funds surviving at the end of calculation period, creating survivorship bias. Hence this should be corrected accordingly. Also, the number of surviving funds in the end-of-sample survivors' category is more than twice of those for full-sample survivors.

Table 73 Summary of Average Equity Fund Class Raw Returns for the Sample Period

Name of Fund/Index/Group	Average of Weekly Net Returns	Average of Weekly Gross Returns
ISE-100 Index	16.12%	16.12%
Equity Fund Index	18.73%	18.73%
ALL EQUITY FUNDS	13.19%	19.01%
Full-Sample Surviving Funds	18.75%	25.00%
End-of Sample Surviving Funds	19.78%	25.47%
Nonsurviving Funds	6.22%	12.15%

Note: ISE-100 index returns are gross; Equity Fund Index returns are net.

Therefore, survivorship bias is calculated as 6.45% for the variable fund category. In other words, variable fund average returns are calculated 6.45% higher (5.98% for full sample survivors) in this period when only end-of sample (full-sample) surviving funds are taken into account. One notable thing here is the size of the survivorship bias which is rather high. This is due to the fact that the average return of the nonsurviving funds which stand at 12.15% is very low with respect to the average return of survivors standing at 25.47%. This low number pulls the average return of all funds down to 19.01%.

Table 74 Survivorship Bias/Premium Calculations for Equity Funds

Survivorship Type	Size of Bias/Premium for Net Returns	Size of Bias/Premium for Gross Returns
Survivorship Bias-Full-Sample Survivors	5.56%	5.98%
Survivorship Bias-End-of-Sample Survivors	6.58%	6.45%
Survivorship Premium-Full-Sample Survivors	12.53%	12.84%
Survivorship Premium-End-of Sample Survivors	13.56%	13.31%

When returns are adjusted for management fees, survivorship bias went slightly down to 6.45% for end-of-sample survivors and up to 5.98% for full-sample survivors. This shows that the management fees for end-of-sample survivors are less than those of all funds and also of full-sample survivors. This is expected since mutual fund management fees have been in a decreasing trend and full-sample survivors existed since the inception of the sample period when fees were higher, whereas end-of-sample survivors include not only full-sample survivors but also the funds that started close to the end of the sample period with lower management fees.

Balanced Fund Class

Below table shows the average raw returns for all, surviving and nonsurviving balanced funds in comparison with the ISE-100 and Equity Funds' indices between 2000-2007. It is observed that average return goes down to 27.83% when all funds are taken into consideration in contrast with the average return of 29.45% when only end-of-sample surviving funds are taken into account. Full-sample survivors show the same trend with higher average return of 28.51%. In this study, I will stick with the end-of-sample survivors group in survivorship bias calculations because usually when people calculate average returns over a period of time, they use funds surviving at the end of calculation period, creating survivorship bias. Hence this bias should be

calculated and corrected accordingly. Also, the number of surviving funds in the end-of-sample survivors' category is more than twice of those for full-sample survivors.

Table 75 Summary of Average Balanced Fund Class Raw Returns for the Sample Period

Name of Fund/Index/Group	Average of Weekly Net Returns	Average of Weekly Gross Returns
ISE-100 Index	16.12%	16.12%
Balanced Fund Index	26.27%	26.27%
ALL BALANCED FUNDS	20.47%	27.83%
Full Sample Surviving Funds	23.37%	28.51%
End-of Sample Surviving Funds	23.46%	29.45%
Nonsurviving Funds	18.70%	26.71%

Note: ISE-100 index returns are gross; Balanced Fund Index returns are net.

Therefore, survivorship bias is calculated as 1.62% for the balanced fund category. In other words, variable fund average returns are calculated 1.62% higher (0.68% for full sample survivors) in this period when only end-of sample surviving funds are taken into account.

Table 76 Survivorship Bias/Premium Calculations for Balanced Funds

Survivorship Type	Size of Bias/Premium for Net Returns	Size of Bias/Premium for Gross Returns
Survivorship Bias-Full-Sample Survivors	2.89%	0.68%
Survivorship Bias-End-of-Sample Survivors	2.99%	1.62%
Survivorship Premium-Full-Sample Survivors	4.67%	1.80%
Survivorship Premium-End-of Sample Survivors	4.76%	2.74%

When returns are adjusted for management fees, survivorship bias went down to 1.62% for end-of-sample survivors and down to 0.68% for full-sample survivors. This shows that the management fees for end-of-sample survivors are more than those of full-sample survivors and less than those of all funds on average. Moreover, nonsurvivors' management fees are more than both end-of-sample and full-sample survivors.

This is not an expected result since mutual fund management fees have been in a decreasing trend and full-sample survivors existed since the inception of the sample period when fees were higher, whereas end-of-sample survivors include not only full-sample survivors but also the funds that started close to the end of the sample period with lower management fees. This means that newly established balanced funds do not have lesser management fees than those of older funds or there might be some errors in the management fee data taken from the Capital Markets Board. I tried to correct those with conventional wisdom.

Measuring Performance and Calculating Survivorship Bias Using Jensen's Alpha for Individual Funds Calculated Using Gross Fund Returns

Variable Fund Class

Below table shows the individual variable fund alphas calculated using gross fund returns. Alpha statistics calculated from the ISE-100 index is more meaningful here because ISE is an index calculated from market prices and does not include management fees and transaction costs whereas variable fund index is an index calculated from fund prices and hence includes fees and commissions. Therefore, when gross returns are used, utilizing ISE-100 is more telling than the variable fund index.

Table 77 Individual Fund Alphas for Variable Fund Class Gross Returns (Market: ISE-100 Index)

		Alpha		T-value		No
	Fund Name	Fund Index	ISE Index	Fund Index	ISE Index	
1	ABN AMRO BANK A TIPI DEGISKEN FON	9.63%	9.92%	0.53	0.55	78
2	ACAR M.D. A TIPI DEGISKEN	-4.55%	-7.28%	-1.45	-2.08*	413
3	AKBANK A TIPI DEGISKEN FON	3.34%	-0.40%	1.62	-0.13	395
4	AKBANK ÖB A TIPI DEGISKEN FON	10.05%	9.39%	2.39*	1.76	68
5	ALFA MEN.ATIPI DEGISKEN FON	-7.57%	-10.72%	-1.75	-1.96	232
6	ALTERNATİF BANK A TIPI DEG FON	4.17%	0.67%	1.44	0.18	413
7	ANADOLUBANK A TIPI DEGISKEN FON	-2.65%	-6.41%	-0.56	-1.29	310
8	ATA YAT.A TIPI DEGISKEN FON	0.54%	-3.61%	0.14	-0.85	326
9	BANKEUROPA ATIPI DEGISKEN FON	3.30%	-2.03%	0.91	-0.46	231
10	BANKEKSPRES A TIPI DEGISKEN FON	-16.13%	-19.35%	-1.51	-1.52	102
11	BANKKAPİTAL A TIPI DEGISKEN FON	-3.83%	-6.46%	-0.23	-0.30	75
12	BANK POZİTİF A TIPI DEGISKEN	-4.43%	-9.46%	-0.80	-1.51	91
13	BAŞKENT M.D. A TIPI DEGISKEN	-5.66%	-8.46%	-2.15*	-2.97*	201
14	BAYINDIR MEN. A TIPI DEGISKEN FON	-3.93%	-6.28%	-0.60	-0.90	226
15	BENDER ATIPI DEGISKENYAT.FON	4.77%	1.48%	0.88	0.24	311
16	COMM.UNION SİG. A TIPI DEGISKEN FON	4.84%	2.84%	1.23	0.00	197
17	DEMİRYATIRIM MD A TIPI DEG FON	7.37%	2.24%	0.76	0.59	113
18	DENIZBANKATIPI DEGISKENYAT.FON	-0.93%	-3.45%	-0.31	0.17	413
19	DUNDAS UNLU A TIPI DEGISKEN FON	16.89%	11.12%	4.70*	-0.99	147
20	ECZACIBASI ATIPI DEGISKEN FON	4.35%	1.14%	1.48	2.53*	413
21	EGEBANK A TIPI DEGISKEN FON	-30.95%	-33.87%	-3.46*	0.30	73
22	EGS YAT A DEGISKEN FON	-22.59%	-27.67%	-1.44	-3.00*	99
23	EKİNCİLER YAT A TIPI DEGISKEN FON	-23.80%	-25.30%	-1.50	-1.64	51
24	ESBANK A TIPI DEGISKEN FON	-11.34%	-9.27%	-0.52	-1.55	91
25	ES MD A TIPI DEGISKEN FON	-3.79%	-8.34%	-0.80	-0.41	96
26	ETİBANK A TIPI DEGISKEN FON	-6.62%	-8.33%	-0.49	-1.53	117
27	EVGIN M.D.A TIPI DEGISKEN FON	16.16%	10.70%	3.05*	-0.59	315
28	FINANSBANK A DEGISKEN FON	1.66%	-2.59%	0.30	1.66	413
29	FINANS YAT.A TIPI DEGISKEN FON	16.79%	11.32%	2.92*	-0.48	370
30	FORTIS BANK ATIPI DEGISKEN F	10.95%	7.01%	3.54*	2.03*	413
31	GARANTI BANK.A TIPI DEGISKEN FON-1	8.05%	4.20%	3.92*	1.71	413
32	GARANTI BANK.A TIPI ÖPY DEG FON	2.40%	-1.27%	0.71	1.39	119
33	GARANTI BANK.A TIPI ÖB DEG FON	6.17%	-3.30%	1.37	-0.34	34
34	GARANTI YAT MK A TIPI DEGISKEN FON	5.76%	1.80%	1.95	-0.73	282
35	GARANTI YAT.A TIPI PYH DEG FON	20.31%	11.11%	2.53*	0.44	87
36	GLOBAL MENATIPI DEGISKEN YAT.FON	3.79%	1.34%	1.54	1.48	413
37	GLOBAL M.D. A TIPI DEGISKEN P.R.	8.46%	5.65%	1.58	0.47	186
38	HAK MENKUL ATIPI DEGISKENYAT.FON	-7.50%	-10.14%	-1.82	1.02	413
39	T. HALK BANK.A DEGISKEN YAT. FON	4.07%	0.07%	0.98	-2.34*	135
40	HSBC BANK A TIPI DEGISKEN FON-I	0.28%	-0.78%	0.04	0.02	116
41	HSBC BANK A TIPI DEGISKEN FON-II	4.70%	1.10%	1.61	-0.10	407
42	HSBC YAT. ATIPI DEGISKEN FON	-6.61%	-9.73%	-1.02	0.29	37
43	İKTİSAT BANKASI A TIPI DEGISKEN FON	-12.64%	-15.14%	-1.44	-1.36	116
44	INFO M.D. A TIPI DEGISKEN	-6.61%	-8.34%	-0.92	-1.48	73
45	İNTERBANK A TIPI DEGISKEN FON	-6.99%	-11.58%	-0.94	-1.00	89
46	İNTERYAT/UNICORN A TIPI DEG FON	-1.31%	-8.34%	-0.06	-0.95	19
47	ISVICRE HYT SIG A TIP DEG FON/ERGO	0.96%	-3.08%	0.31	-0.33	228
48	ISVICRE SIGORTA A TIP DEG FON/ERGO	-6.22%	-7.14%	-1.82	-0.86	228
49	IS BANKASI A TIPI DEGISKEN FON	0.85%	-1.97%	0.40	-2.07*	413
50	IS YATIRIM ATIPI DEGISKENYAT.FON	13.84%	1.95%	2.19*	-0.70	413

Table 77 continued

		Alpha		T-value		No
51	IS BANK A TIPI PRIVIA DEGISKEN	2.88%	-3.97%	0.60	0.29	42
52	KALKINMA BANK.A TIPI DEGISKEN FON	0.81%	-1.95%	0.35	0.00	413
53	KALKINMA YAT.A TIPI DEGISKEN FON	2.20%	-0.25%	0.62	-0.67	266
54	KENT BANK A TIP DEGISKEN FON	-7.21%	-13.72%	-0.32	-0.06	77
55	KENT YAT.ATIPI DEGISKEN FON	-21.57%	-25.39%	-3.58*	-0.58	231
56	KOCBANK A TIPI DEGISKEN FON	3.08%	0.49%	1.74	-3.93*	372
57	KOC YAT. A TIPI DEGISKEN FON	11.76%	4.92%	3.17*	0.17	235
58	KÖRFEZ/OSMANLI BANK A TIPI DEG FON	34.09%	20.60%	4.75*	0.87	126
59	MEKSA YAT.ATIPI DEGISKEN FON	-9.83%	-13.17%	-2.43*	2.31*	413
60	MNG BANK ATIPI DEGISKENYAT.FON	-7.54%	-10.68%	-2.07*	-2.78*	349
61	NUROL MENKUL ATIPI DEGISKEN FON	1.17%	-1.48%	0.30	-2.59*	413
62	OYAK/OYAKBANK/ING A TIPI DEG FON	-3.35%	-5.57%	-1.07	-0.34	413
63	OYAKBANK A TIPI DEGISKEN	5.95%	2.36%	0.80	-1.74	79
64	OYAK YAT A TIPI DEGISKEN FON	-8.16%	-12.34%	-0.84	0.26	109
65	PAMUKBANK ATIPI DEGISKENYAT.FON	-10.84%	-15.10%	-1.69	-1.15	277
66	RJ A DEGISKEN	9.72%	5.19%	1.54	-2.15	124
67	RİVA MD A.Ş. A TIPI DEGISKEN FON	-6.33%	-7.84%	-0.92	0.81	194
68	SANKO MENKUL A TIPI DEGISKEN FON	7.06%	3.23%	1.62	-1.12	281
69	SINAI YATIRIM BANK.ADEGISKEN FON	15.04%	10.08%	1.91	0.68	126
70	SİTEBANK A TIPI DEGISKEN FON	-18.66%	-20.37%	-1.37	0.94	91
71	STRATEJI MEN.ATIPI DEGISKEN FON	16.11%	11.58%	3.18*	-1.30	413
72	SÜMERBANK A TIPI DEGISKEN FON	-7.95%	-11.13%	-0.65	2.09*	38
73	SEKERBANK A TIPI DEGISKEN FON	-4.91%	-7.80%	-1.54	-0.86	413
74	TACIRLER MEN.ATIPI DEGISKEN FON	2.62%	0.40%	0.56	-2.25*	413
75	TAIB YAT.ATIPI DEGISKENYAT.FON	0.15%	-2.38%	0.04	0.08	413
76	TARISBANK A TIPI DEGISKEN FON	-5.88%	-8.43%	-0.86	-0.68	160
77	T. EKONOMİ BANKASI A TIPI DEG FON-I	8.73%	5.61%	5.01*	-1.17	163
78	T. EKONOMİ BANKASI A TIPI DEG FON-II	2.00%	0.07%	0.64	2.41	208
79	TEB A.Ş. VARLIK YÖN HİZ DEGISKEN	8.22%	1.85%	2.51*	0.02	133
80	TEB YATIRIM A TIPI DEGISKEN FON	0.76%	-2.85%	0.17	0.39	160
81	TEKFENBANK ATIPI DEGISKEN FON	-6.84%	-8.50%	-1.79	-0.43	202
82	TEKSTIL BANK.A DEGISKEN SEN.FON	-7.04%	-12.50%	-0.86	-1.74	102
83	TEKSTIL MEN.A TIPI DEGISKEN FON	4.11%	1.54%	1.43	-1.10	359
84	T.TİCARET BANKASI A TIPI DEG FON	-22.50%	-25.46%	-3.37*	0.47	145
85	TOPRAKBANK A TIPI DEGISKEN FON	-4.17%	-7.65%	-0.75	-2.71*	158
86	TSKB A TIPI DEGISKEN FON	2.56%	-1.42%	0.71	-1.12	237
87	TURKISH YAT.A TIPI DEGISKEN FON	8.43%	3.09%	1.69	-0.31	267
88	TURKLAND BANK A TIPI DEGISKEN FON	-7.24%	-11.48%	-0.66	0.61	27
89	UB ULUSAL YAT MD A TIPI DEG FON	-2.01%	-5.84%	-0.53	-1.07	156
90	VAKIFBANK A TIPI DEGISKENYAT.FON	-4.20%	-7.62%	-1.30	-1.06	341
91	YAPIKREDI YATIRIM A DEGISKEN FON	-0.26%	-3.36%	-0.08	-2.15*	413
92	YAPI KREDİ YAT.A TIPI ÖPY DEGISKEN	10.71%	4.59%	2.73*	-0.92	143
93	YATIRIM FINANSMAN A TIPI DEG FON	-1.04%	-4.23%	-0.59	1.24	413
94	YAŞARBANK A TIPI DEGISKEN FON	-17.97%	-17.47%	-1.65	-1.50	77
95	ZIRAAT BANKASI ATIPI DEGISKEN FON	-0.12%	-3.52%	-0.04	-1.58	413
96	ZIRAAT YATIRIM ATIPI DEGISKEN FON	3.37%	0.21%	1.51	-0.99	394
97	ZIRAAT BANKASI ATIPI DEG BAŞAK FON	-2.08%	-7.44%	-0.49	0.07	144

(*) indicates significance.

Below is a summary table showing statistics about variable fund alphas using gross returns. Out of a total of 97 variable fund alphas, 35 alphas are positive, 62 are

negative. With gross returns, negative alphas outweigh positive ones in number. Moreover, of 35 positive alphas, only 5 are significant whereas of 62 negative alphas, 12 are significant. Therefore, this indicates that variable funds are not able to forecast future security prices well enough to recover their management fees, research and commission expenses during the period 2000-2007.

Table 78 Jensen's Alpha Statistics for Variable Fund Class Gross Returns

	Alpha		Number		Percentage	
	Fund Index	ISE	Fund Index	ISE	Fund Index	ISE
Average Alpha	-0.29%	-4.02%				
Minimum Alpha	-30.95%	-33.87%				
Maximum Alpha	34.09%	20.60%				
Standard Deviation	10.14%	9.25%				
Total Fund Alphas			97	97		
Positive Alpha			51	35	53%	36%
Negative Alpha			46	62	47%	64%
No of Nonsignif Alphas			77	80	79%	82%
No of Significant Alphas			20	17	21%	18%
Significant Positive Alpha			14	5	70%	29%
Significant Negative Alpha			6	12	30%	71%
Total Significant			20	17		

The average value of alpha calculated gross of management fees is -4.02 which indicates that on average variable funds earned about 4.02% less per year (compounded continuously) than they should have earned given their level of systematic risk during the study period of 2000 to 2007. Still negative, but this is better than the figure of -5.09%, alpha for net fund returns using the variable fund index as the market.

However, using data without correcting for survivorship bias leaves us with much better results for funds, which in fact is not true. First of all, the result that variable funds cannot be managed well enough to recover their expenses does not

change, with alphas still being negative. Alpha calculated gross of management fees is -1.72% for full-sample survivors, while it is -1.29% for end-of-sample survivors. The real average variable fund performance of -4.02% is due to the dismal performance of nonsurviving variable funds with an alpha of -6.67%.

Table 79 Average Variable Fund Class Alphas Using Gross Returns (Market: ISE-100 Index)

Name of Variable Fund Subgroup	Average Alpha - Net Returns	Average Alpha - Gross Returns
Average Alpha -All Variable Funds	-8.63%	-4.02%
Average Alpha -Full-sample Survivors	-6.75%	-1.72%
Average Alpha-End-of-sample Survivors	-5.68%	-1.29%
Nonsurviving Variable Funds	-11.41%	-6.67%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 2.30% for full sample survivors and 2.73% for end-of-sample survivors.

Table 80 Survivorship Bias/Premium for Variable Fund Class Gross Returns (Market: ISE-100 Index)

Survivorship Type	Size of Bias/Premium - Net Returns	Size of Bias/Premium - Gross Returns
Survivorship Bias-Full-Sample Survivors	1.88%	2.30%
Survivorship Bias-End-of-Sample Survivors	2.95%	2.73%
Survivorship Premium-Full-Sample Survivors	4.65%	4.95%
Survivorship Premium-End-of Sample Survivors	5.72%	5.38%

The same regressions are also run when the variable fund index is used as the market instead of the ISE-100 index and the results are shown below. As seen in the table below, alphas are less negative and even some of them are positive in this case. This is normal since ISE-100 is a market index calculated from the market prices and hence does not include transaction costs. However, variable fund index is calculated from the fund prices, net off management fees and transactions costs. Hence regression of gross returns against a gross index is more meaningful. Nevertheless, regression results against the variable fund index are put for comparison purposes.

Table 81 Average Variable Fund Class Alphas Using Gross Returns (Market: Variable Fund Index)

Name of Variable Fund Subgroup	Average Alpha - Net Returns	Average Alpha - Gross Returns
All Variable Funds	-5.09%	-0.29%
Full-sample Survivors	-3.24%	1.77%
End-of-sample Survivors	-1.60%	2.90%
Nonsurviving Variable Funds	-8.48%	-3.48%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 2.06% for full sample survivors and 3.19% for end-of-sample survivors.

Table 82 Survivorship Bias/Premium for Variable Fund Class Gross Returns (Market: Variable Fund Index)

Survivorship Type	Size of Bias/Premium - Net Returns	Size of Bias/Premium - Gross Returns
Survivorship Bias-Full-Sample Survivors	1.84%	2.06%
Survivorship Bias-End-of-Sample Survivors	3.49%	3.19%
Survivorship Premium-Full-Sample Survivors	5.23%	5.25%
Survivorship Premium-End-of Sample Survivors	6.88%	6.39%

Equity Fund Class

Below table shows the individual equity fund alphas calculated using gross fund returns. Alpha statistics calculated from the ISE-100 index is more meaningful here because ISE is an index calculated from market prices and does not include management fees and transaction costs whereas equity fund index is an index calculated from fund prices and hence includes fees and commissions. Therefore, when gross returns are used, utilizing ISE-100 is more telling than the equity fund index.

Table 83 Individual Fund Alphas for Equity Fund Class Gross Returns (Market: ISE-100 Index)

		Alpha		T-value		No
	Fund Name	Fund Index	ISE-100 Index	Fund Index	ISE-100 Index	
1	AKBANK ÖB PY (A) TIPI HISSE FON	0.50%	-2.44%	0.12	-0.52	48
2	AKBANK (A)TIPI HISSE SEN. FONU	7.82%	1.61%	3.88*	0.49	413
3	AK YAT MD A TİPİ HİSSE FON	8.18%	-1.20%	1.96	-0.22	290
4	AK YAT MD A TİPİ BÜY A HİSSE FON	-16.17%	-11.13%	-1.06	-0.59	26
5	ALFA MEN.(A)TIPI HISSE SEN.FON	-0.01%	-8.89%	0.00	-1.61	232
6	ALTERNATİF BANK A TİPİ HISSE FON	6.50%	0.99%	2.83*	0.29	315
7	ANADOLUBANK (A) TIPI HISSE FON	-2.05%	-13.59%	-0.15	-0.83	71
8	ATA YAT.(A) TIPI HİSSE SENEDİ FONU	-13.97%	-21.08%	-0.82	-1.09	80
9	BAYINDIRBANK A.Ş. A TİPİ HİSSE FON	9.81%	0.95%	1.02	0.10	158
10	BIZIM MEN.(A)TIP HISSE SEN.FON	-3.21%	-7.68%	-0.70	-1.29	210
11	DEMİRYATIRIM MD A TİPİ HİSSE FON	15.27%	2.61%	1.71	0.23	109
12	DENIZBANK (A)TIP HISSE SEN. F.	3.31%	-1.33%	0.81	-0.31	413
13	ECZACIBASI (A)TIPI HISSE FONU	5.97%	2.75%	1.42	0.66	84
14	FINANSBANK(A)TIP HISSE SEN.FON	5.61%	-0.68%	1.22	-0.13	370
15	FORTİS YATIRIM A TİPİ HİSSE FON	8.81%	4.77%	0.97	0.50	53
16	GARANTI BANK.(A) HISSE FON	9.54%	2.20%	2.24*	0.56	34
17	GEDIK YAT.(A)TIPI HISSE SEN.FO	-7.53%	-13.00%	-1.86	-2.62*	413
18	HSBC BANK (A) TIPI HISSE FONU	8.50%	-0.80%	1.69	-0.13	199
19	HSBC BANK BÜY A (A) TIPI HISSE	0.09%	1.22%	0.01	0.12	40
20	HSBC BANK (A) TIPI VYH HISSE FONU	-5.49%	-13.54%	-0.78	-1.62	32
21	HSBC YAT. (A) HISSE SEN.FON	3.29%	-2.94%	1.17	-0.67	171
22	İKTİSAT BANKASI A TİPİ HİSSE FON	42.26%	25.43%	1.90	1.32	64
23	IKTISAT YAT.(A) HISSE SEN. FON	6.90%	-1.60%	0.73	-0.17	231
24	INTERYAT/UNICORN (A)TIP HISSE FON	2.78%	-2.51%	0.79	-0.63	413
25	IS BANKASI (A) TIPI HISSE FONU	5.22%	-0.55%	2.41*	-0.15	413
26	KALKINMA YAT.(A)TIP HISSE FON	0.07%	-4.36%	0.03	-1.34	306
27	KOCBANK/YKB (A) TIPI HISSE FONU	8.15%	1.43%	2.76*	0.38	413
28	OYAKBANK/ING BANK (A) TIPI HISSE	-3.64%	-6.97%	-1.21	-1.74	216
29	TEB YATIRIM (A) HISSE SEN.FON	7.50%	0.09%	2.40*	0.02	403
30	TEKSTIL BANK.(A) HISSE SEN.FON	15.31%	7.70%	3.06*	1.39	413
31	TSKB (A) TIPI HISSE FON	10.51%	5.14%	2.61*	1.13	196
32	VAKIFBANK A TİPİ HİSSE FON	-17.44%	-22.69%	-1.82	-2.01*	71
33	YAPIKREDI BANK.(A)HISSE FON	1.74%	-4.57%	0.59	-1.06	413
34	YAPIKREDI YATIRIM (A)HISSE FON	-1.66%	-12.54%	-0.32	-1.85	158

(*) indicates significance.

Below is a summary table showing statistics about equity fund alphas using gross returns. Out of a total of 34 equity fund alphas, 13 alphas are positive, 21 are negative. With gross returns, negative alphas outweigh positive ones in number. Moreover, of 13 positive alphas, none are significant whereas of 21 negative alphas, 2 are significant. Therefore, this indicates that equity funds are not able to forecast future security prices well enough to recover their management fees, research and

commission expenses during the period 2000-2007. Yet strong conclusions cannot be made since results suffer from lack of significance.

Table 84 Jensen's Alpha Statistics for Equity Funds Class Gross Returns

Jensen's Alpha Statistics	Alpha		Number		Percentage	
	Fund Index	ISE	Fund Index	ISE	Fund Index	ISE
Average Alpha	3.06%	-2.86%				
Minimum Alpha	-19.17%	-22.69%				
Maximum Alpha	35.25%	25.43%				
Standard Deviation	9.71%	8.64%				
Total Fund Alphas			34	34		
Positive Alpha			24	13	71%	38%
Negative Alpha			10	21	29%	62%
No of Nonsignif Alphas			26	32	76%	94%
No of Significant Alphas			8	2	24%	6%
Significant Positive Alpha			8	0	100%	0%
Significant Negative Alpha			0	2	0%	100%
Total Significant			8	2		

The average value of alpha calculated gross of management fees is -2.86% which indicates that on average equity funds earned about 2.86% less per year (compounded continuously) than they should have earned given their level of systematic risk during the study period of 2000 to 2007. Still negative and this is worse than the figure of -1.84%, alpha for net fund returns using the equity fund index as the market.

However, using data without correcting for survivorship bias leaves us with much better results for funds, which in fact is not true. First of all, the result that variable funds cannot be managed well enough to recover their expenses does not change, with alphas still being negative, but less so. Alpha calculated gross of management fees is -0.69% for full-sample survivors, whereas it is -1.32% for end-of-sample survivors. The real average equity fund performance of -2.86% is due to worse performance of nonsurviving equity funds with an alpha of -4.58%.

Table 85 Average Equity Fund Class Alphas Using Gross Returns (Market: ISE-100 Index)

Name of Equity Fund Subgroup	Average Alpha - Net Returns (%)	Average Alpha - Gross Returns (%)
Average Alpha -All Equity Funds	-7.70%	-2.86%
Average Alpha -Full-sample Survivors	-5.86%	-0.69%
Average Alpha-End-of-sample Survivors	-5.83%	-1.32%
Nonsurviving Equity Funds	-9.81%	-4.58%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 2.17% for full sample survivors and 1.53% for end-of-sample survivors.

Table 86 Survivorship Bias/Premium for Equity Fund Class Gross Returns (Market: ISE-100 Index)

Survivorship Type	Size of Bias/Premium - Net Returns	Size of Bias/Premium - Gross Returns
Survivorship Bias-Full-Sample Survivors	1.84%	2.17%
Survivorship Bias-End-of-Sample Survivors	1.88%	1.53%
Survivorship Premium-Full-Sample Survivors	3.95%	3.89%
Survivorship Premium-End-of Sample Survivors	3.99%	3.26%

The same regressions are also run when the equity fund index is used as the market instead of the ISE-100 index and the results are shown below. As seen in the table below, alphas are positive in this case. This is normal since ISE-100 is a market index calculated from the market prices and hence does not include management fees and transaction costs. However, equity fund index is calculated from the fund prices, net off management fees and transactions costs. Hence regression of gross returns against a gross index is more meaningful. Nevertheless, regression results against the equity fund index are also put for comparison purposes.

Table 87 Average Equity Fund Class Alphas Using Gross Returns (Market: Equity Fund Index)

Name of Equity Fund Subgroup	Average Alpha - Net Returns (%)	Average Alpha - Gross Returns (%)
Average Alpha -All Equity Funds	-1.84%	3.06%
Average Alpha -Full-sample Survivors	0.62%	5.02%
Average Alpha-End-of-sample Survivors	-0.58%	3.91%
Nonsurviving Equity Funds	-3.26%	2.11%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 1.96% for full sample survivors and 0.85% for end-of-sample survivors.

Table 88 Survivorship Bias/Premium for Equity Fund Class Gross Returns (Market: E. Fund Index)

Survivorship Type	Size of Bias/Premium - Net Returns	Size of Bias/Premium - Gross Returns
Survivorship Bias-Full-Sample Survivors	2.46%	1.96%
Survivorship Bias-End-of-Sample Survivors	1.26%	0.85%
Survivorship Premium-Full-Sample Survivors	3.88%	2.92%
Survivorship Premium-End-of Sample Survivors	2.68%	1.81%

Balanced Fund Class

Below table shows the individual balanced fund alphas calculated using gross fund returns. Alpha statistics calculated from the ISE-100 index is more meaningful here because ISE is an index calculated from market prices and does not include management fees and transaction costs whereas balanced fund index is an index calculated from fund prices and hence includes fees and commissions. Therefore, when gross returns are used, utilizing ISE-100 is more telling than the equity fund index.

Table 89 Individual Fund Alphas for Balanced Fund Class Gross Returns (Market: ISE-100 Index)

		Alpha		T-value		No
	Fund Name	Fund Index	ISE Index	Fund Index	ISE Index	
1	ABN AMRO YATIRIM A TİPİ KARMA	-0.34%	-6.70%	-0.09	-1.32	243
2	ACAR M.D. A TİPİ KARMA	-1.10%	-3.29%	-0.30	-0.84	188
3	AKBANK (A)TIPI KARMA FONU	3.47%	-0.28%	1.66	-0.09	272
4	ATA YAT.(A) TIPI KARMA FON	1.88%	-2.36%	0.66	-0.74	413
5	BAYINDIR MEN.(A)TIPI KARMA FON	-11.19%	-15.16%	-2.35*	-3.16	293
6	DEMİRYATIRIM MD A TİPİ KARMA FON	-3.87%	-11.92%	-0.62	-1.45	109
7	DENIZBANK(A)TIPI KARMA FON	5.44%	1.45%	2.22	0.48	413
8	ECZACIBASI (A)TIPI KARMA FONU	3.71%	1.04%	1.88	0.45	295
9	EGEBANK (A) KARMA FON	-16.06%	-30.66%	-1.15	-1.80	50
10	EGSBANK (A) KARMA FONU	-9.31%	-17.38%	-1.56	-2.28	100
11	EGS YAT (A)KARMA FON	-4.26%	-11.42%	-0.61	-1.20	103
12	EVGIN M.D.(A) TIPI KARMA FONU	9.20%	3.32%	2.49	0.77	413
13	FINANSBANK(A)TIPI KARMA FONU	-7.91%	-14.15%	-1.69	-2.63	43
14	FINANS YAT.(A) TIPI KARMA FON	7.51%	1.78%	2.57	0.53	370
15	FORTIS BANK (A) TIPI KARMA FON	6.52%	0.93%	1.80	0.21	413
16	GARANTI BANK.(A) KARMA FON	9.26%	4.75%	6.27	1.80	346
17	GEDIK YAT.(A) TIPI KARMA FON	-6.81%	-11.69%	-1.92	-2.78	413
18	GLOBAL MD (A) TIPI KARMA FONU	9.83%	1.30%	2.46	0.28	400
19	GLOBAL MD (A) TIPI KARMA H.R. FONU	-26.59%	-27.73%	-1.78	-1.85	80
20	GLOBAL MD(A) TIPI KARMA AKT ST FON	4.79%	1.41%	0.99	0.24	36
21	HALK BANK (A) KARMA YAT. FONU	-2.07%	-6.18%	-0.75	-1.95	413
22	HSBC YAT. (A)TIPI KARMA FON	4.55%	2.45%	1.11	0.52	90
23	İNTERBANK A TİPİ KARMA FON	0.74%	-6.69%	0.11	-0.75	115
24	INTER YAT.(A) TIPI KARMA FONU	3.85%	-1.09%	1.55	-0.33	391
25	IS BANKASI (A)KAR.KUMBARA FONU	6.74%	3.67%	4.44	1.74	340
26	KALKINMA BANK.(A) TIPI KARMA FON	-2.54%	-7.27%	-0.30	-0.68	41
27	KALKINMA YAT.(A) TIPI KARMA FON	-7.09%	-15.59%	-0.79	-1.51	76
28	KENTBANK (A) TİPİ KARMA	-9.52%	-18.29%	-0.73	-1.28	111
29	KOCBANK (A) TIPI KARMA FONU	9.09%	0.09%	1.69	0.01	386
30	B.T. KÖRFEZBANK A TİPİ KARMA FON	33.87%	17.78%	3.90	1.35	65
31	MEKSA YAT.(A)TIPI KARMA.FON	-9.13%	-34.03%	-0.45	-1.35	19
32	OSMANLI BANKASI A TİPİ KARMA FON	13.47%	5.74%	4.38	0.89	125
33	RJ MD (A) KARMA	-11.05%	-10.73%	-1.18	-1.15	37
34	SINAI YATIRIM BANK.(A)KAR.FON	-5.98%	-15.19%	-0.89	-1.60	105
35	SÜMERBANK A TİPİ KARMA FON	-1.01%	-7.27%	-0.18	-0.96	115
36	TACIRLER MEN.(A) KARMA FON	4.67%	-0.27%	2.19	-0.09	413
37	TEB A TİPİ KARMA FON	8.99%	4.16%	3.59	1.29	413
38	TEKFENBANK (A)TIPI KARMA FON	3.72%	-0.79%	0.25	-0.05	141
39	TOPRAKBANK (A) TIPI KARMA FON	4.18%	-1.93%	0.54	-0.23	143
40	TSKB (A) TIPI KARMA FON	-12.84%	-15.86%	-2.45	-2.39	89
41	T.TİCARET BANKASI A TİPİ KARMA FON	1.36%	-19.48%	0.07	-0.75	35
42	VAKIFBANK (A)KARMA ILK ADIM.F	4.62%	0.84%	2.48	0.32	228
43	YAPIKREDI BANK.(A)KARMA FON	0.81%	-4.51%	0.30	-1.31	413
44	YAPIKREDI YATIRIM (A)KARMA FON	3.18%	-3.16%	0.90	-0.78	413
45	ZIRAAT BANKASI (A) KARMA FONU	1.35%	-2.20%	0.61	-0.79	348

(*) indicates significance.

Below is a summary table showing statistics about variable fund alphas using gross returns. Alpha statistics calculated from the ISE-100 index is more meaningful here

because ISE is an index calculated from market prices and does not include management fees and transaction costs whereas variable fund index is an index calculated from fund prices and hence includes fees and commissions. Therefore, when gross returns are used, utilizing ISE-100 is more telling than the variable fund index.

Below is a summary table showing statistics about balanced fund alphas using gross returns. Out of a total of 45 balanced fund alphas, 15 alphas are positive, 30 are negative. With gross returns, negative alphas outweigh positive ones in number. Moreover, of 15 positive alphas, none are significant whereas of 30 negative alphas, 3 are significant. Therefore, this indicates that balanced funds are not able to forecast future security prices well enough to recover their management fees, research and commission expenses during the period 2000-2007. Yet strong conclusions cannot be made since results suffer from lack of significance.

Table 90 Jensen's Alpha Statistics for Balanced Fund Class Gross Returns

	Alpha		Number		Percentage	
	Fund Index	ISE	Fund Index	ISE	Fund Index	ISE
Average Alpha	0.40%	-6.06%				
Minimum Alpha	-26.59%	-34.03%				
Maximum Alpha	33.87%	17.78%				
Standard Deviation	9.41%	10.15%				
Total Fund Alphas			45	45		
Positive Alpha			26	15	58%	33%
Negative Alpha			19	30	42%	67%
No of Nonsignif Alphas			33	42	73%	93%
No of Significant Alphas			12	3	27%	7%
Significant Positive Alpha			11	0	92%	0%
Significant Negative Alpha			1	3	8%	100%
Total Significant			12	3		

The average value of alpha calculated gross of management fees is -6.06% which indicates that on average equity funds earned about 6.06% less per year

(compounded continuously) than they should have earned given their level of systematic risk during the study period of 2000 to 2007. Still negative and this is worse than the figure of -4.58%, alpha for net fund returns using the balanced fund index as the market.

However, using data without correcting for survivorship bias leaves us with much better results for funds, which in fact is not true. First of all, the result that variable funds cannot be managed well enough to recover their expenses does not change, with alphas still being negative, but less so. Alpha calculated gross of management fees is -1.68% for full-sample survivors, whereas it is -0.87% for end-of-sample survivors. The real average equity fund performance of -6.06% is due to dismal performance of nonsurviving equity funds with an alpha of -9.21%.

Table 91 Average Balanced Fund Class Alphas Using Gross Returns (Market: ISE-100 Index)

Name of Equity Fund Subgroup	Average Alpha - Net Returns (%)	Average Alpha - Gross Returns (%)
Average Alpha -All Balanced Funds	-10.74%	-6.06%
Average Alpha -Full-sample Survivors	-6.89%	-1.68%
Average Alpha-End-of-sample Survivors	-5.52%	-0.87%
Nonsurviving Equity Funds	-13.90%	-9.21%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 4.38% for full sample survivors and 5.19% for end-of-sample survivors.

Table 92 Survivorship Bias/Premium for Balanced Fund Class Gross Returns(Market: ISE-100 Index)

Survivorship Type	Size of Bias/Premium - Net Returns	Size of Bias/Premium - Gross Returns
Survivorship Bias-Full-Sample Survivors	3.84%	4.38%
Survivorship Bias-End-of-Sample Survivors	5.22%	5.19%
Survivorship Premium-Full-Sample Survivors	7.01%	7.53%
Survivorship Premium-End-of Sample Survivors	8.38%	8.34%

The same regressions are also run when the balanced fund index is used as the market instead of the ISE-100 index and the results are shown below. As seen in the table below, alphas are positive in this case. This is normal since ISE-100 is a market index calculated from the market prices and hence does not include transaction costs. However, balanced fund index is calculated from the fund prices, net off management fees and transactions costs. Hence regression of gross returns against a gross index is more meaningful. Nevertheless, regression results against the balanced fund index are also put for comparison purposes.

Table 93 Average Balanced Fund Class Alphas Using Gross Returns (Market: Balanced Fund Index)

Name of Balanced Fund Subgroup	Average Alpha - Net Returns (%)	Average Alpha - Gross Returns (%)
Average Alpha -All Balanced Funds	-4.58%	0.40%
Average Alpha -Full-sample Survivors	-2.41%	3.18%
Average Alpha-End-of-sample Survivors	-1.16%	3.86%
Nonsurviving Equity Funds	-6.66%	-1.69%

Below table gives the size of the survivorship bias and premium of not taking into account the dead funds during 2000-2007. The size of the survivorship bias is 2.78% for full sample survivors and 3.45% for end-of-sample survivors.

Table 94 Survivorship Bias/Premium for Balanced Fund Class Gross Returns (Market:B.Fund Index)

Survivorship Type	Size of Bias/Premium - Net Returns	Size of Bias/Premium - Gross Returns
Survivorship Bias-Full-Sample Survivors	2.17%	2.78%
Survivorship Bias-End-of-Sample Survivors	3.42%	3.45%
Survivorship Premium-Full-Sample Survivors	4.25%	4.88%
Survivorship Premium-End-of Sample Survivors	5.49%	5.55%

Measuring Performance and Calculating Survivorship Bias Using Jensen's Alpha for Fund Portfolios Calculated Using Gross Fund Returns

Performance and Survivorship Bias Calculations Using Jensen's Alpha for Variable Funds Portfolio from Gross Returns

Equal-Weighted Variable Funds Portfolios from Gross Returns

Below are the periodic gross returns for the equal-weight variable funds portfolio and also its sub constituent equal-weight portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds.

Table 95 Annualized Gross Returns for the Weekly Means of Equal Weighted Variable Fund Portfolios

Period	ISE-100	Variable Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,46%	27,44%	27,27%	27,95%	27,47%
2000-2006	27,31%	23,91%	27,58%	27,30%	28,18%	25,73%
2000	-44,90%	0,51%	-3,59%	-7,02%	-6,02%	-1,94%
2001	38,48%	79,18%	72,80%	78,74%	79,71%	67,47%
2002	-16,72%	16,36%	14,74%	15,79%	13,39%	16,30%
2003	69,40%	56,71%	56,22%	58,65%	58,87%	51,83%
2004	36,51%	17,28%	23,17%	22,68%	23,88%	20,89%
2005	59,33%	31,29%	35,67%	29,53%	35,21%	37,95%
2006	-1,55%	5,40%	9,26%	10,50%	10,45%	1,85%
2007	39,89%	21,80%	26,42%	27,07%	26,33%	71,11%

As explained in previous sections using net returns, when analyzing fund portfolios, it would be better to use the period from 2000 to 2006 rather than the study period of 2000 to 2007 because in the year 2007, the nonsurvivors subgroup ceased to exist in the first four months of the year due to the disappearance of all funds in the group making the comparison of this year's performance for nonsurvivors to other subgroups not very meaningful. Only two funds remained in the final period of 2007.

One of them is Koçbank A Type Variable Fund that is merged with Yapı Kredi Yatırım A Type Variable Fund due to the merger of Koçbank with Yapı Kredi Bank. Performance has not played any role in the fund merger decision. In fact its performance has been above the variable fund group's average performance. The other fund that remained is TEB A Type Variable Fund which had also above average performance. Therefore, nonsurvivors' portfolio return should be ignored for the final year of the sample, i.e. year 2007 and the study period should be 2000 to 2006 for the analysis of variable fund portfolios.

End-of-sample survivor variable fund portfolios' annualized average returns are greater than those of all variable fund portfolios' and nonsurvivor variable fund portfolios' between 2000 and 2006. Full-sample survivor fund portfolios' returns are lower than those of all variable fund portfolios' and nonsurvivors have the lowest annualized returns in the same period.

Yearly returns for the subgroups are shown in the above table to illustrate the variability of returns of nonsurvivors' portfolios from year to year since they do not exist the whole year in some of the years. These years where they do not exist all through the year, they may have returns higher than the other subgroups since some funds may cease to exist before the market drops or they may start to exist just before the market starts increasing pushing the nonsurvivor group's average higher. For example, amazingly nonsurvivor portfolio returns are the highest in year 2000. This is only for raw returns and are not so for risk-adjusted returns. Furthermore, full-sample portfolio annualized average returns remain lower than those of end-of-sample portfolios in 2000 due to year 2000 being a dismal year with ISE-100 showing a drop of 44.90%. This is shown in year 2000 row in the table above, with a return of -7.02% for full-sample survivors.

As a matter of fact, instead of looking at annual results, the whole sample period should better be investigated since aggregation over the longer term smoothes out periodic volatilities. Below table shows annual survivorship bias and premium calculations for full-sample and end-of-sample survivor portfolios.

Table 96 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Gross Raw Returns

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias (00-07)	-0.17%	0.51%
Survivorship Premium (00-07)	-0.20%	0.47%
Survivorship Bias (00-06)	-0.29%	0.60%
Survivorship Premium (00-06)	1.56%	2.45%

As explained in the section of net returns, using raw returns may be somewhat misleading in survivorship bias calculations. Some funds may take on very high market risk. As a result, these funds may sometimes end up with very high returns and sometimes with very low returns leading to closure or name change by the fund sponsor. Therefore, using risk adjusted returns may lead to better results in survivorship bias calculations. Risk-adjusted returns are calculated using Jensen' Alpha equation as shown in the tables below. In the first table, variable fund index is used as the market for the variable funds whereas in the second equation ISE-100 is utilized to observe the impact of using a broad market index. As applied in previous sections on net returns, using the relevant fund index may not be more meaningful for gross returns since variable fund returns are gross and so are ISE-100 index returns making them more suitable to use as the market in comparison with the variable fund returns which are net.

Table 97 Equal-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Gross)

Period	All Variable Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	0.68%	0.99%	1.58%	-0.59%
(t-values)	(0.86)	(0.88)	(1.41)	(-0.52)
2000-2006	0.30%	0.71%	1.40%	-1.40%
(t-values)	0.34	0.58	1.14	-1.24

(*) indicates significance.

As shown in the above table, all variable fund subgroups but nonsurvivors were able to show a positive risk-adjusted return in the study periods 2000-2007 and 2000-2006 when the Variable Fund Index is used as the market. But none of them were significant. However, this result should not be taken at face value since the variable fund index is net of all costs whereas fund returns are gross in this section. This result is shown here for comparison purposes. Therefore, ISE-100 index taken as market should be given more importance in this section since it is a gross index.

Table 98 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Variable Fund Index)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias (00-07)	0.31%	0.90%
Survivorship Premium (00-07)	1.58%	2.17%
Survivorship Bias (00-06)	0.41%	1.11%
Survivorship Premium (00-06)	2.11%	2.81%

Portfolios come up with more negative alphas when ISE-100 is used as the market in the regression equation.

Table 99 Equal-Weighted Variable Fund Portfolio Alphas (Market: ISE-100, Returns: Gross)

Period	All Variable Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-2.41%	-2.13%	-1.61%	-3.31%
(t-values)	(-1.08)	(-0.94)	(-0.70)	(-1.25)
2000-2006	-2.56%	-2.18%	-1.54%	-4.25%
(t-values)	(-1.02)	(-0.85)	(-0.59)	(-1.57)

(*) indicates significance.

When the ISE-100 index is used as the market in the regression equation for the study period 2000-2007 and 2000-2006, all subgroups had shown negative risk-adjusted returns. However none of them are significant.

Table 100 Survivorship Bias/Premium Calculations using Equal-Weighted Variable Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100)

Period	Full Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias (00-07)	0.28%	0.80%
Survivorship Premium (00-07)	1.18%	1.71%
Survivorship Bias (00-06)	0.38%	1.03%
Survivorship Premium (00-06)	2.07%	2.72%

Size-Weighted Variable Fund Portfolios

Table 101 Annualized Gross Returns for the Weekly Means of Size-Weighted Variable Fund Portfolios in Comparison with Equal-Weighted Variable Fund Portfolios

Period	ISE-100	Variable Fund Index	All Variable Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,46%	28,40%	26,30%	26,50%	32,80%
2002-2007	27,31%	23,91%	27,47%	26,55%	26,86%	29,28%
2000	-44,90%	0,51%	2,21%	0,43%	0,41%	4,98%
2001	38,48%	79,18%	67,80%	56,27%	55,95%	92,69%
2002	-16,72%	16,36%	18,58%	16,14%	15,95%	23,33%
2003	69,40%	56,71%	62,81%	60,04%	61,10%	66,69%
2004	36,51%	17,28%	20,38%	21,10%	21,41%	17,79%
2005	59,33%	31,29%	30,92%	29,49%	30,57%	32,84%
2006	-1,55%	5,40%	9,79%	9,17%	9,44%	12,86%
2007	39,89%	21,80%	27,79%	28,45%	27,98%	24,04%

Below are the periodic gross returns for the size-weighted variable funds portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds.

Table 102 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Gross Raw Returns

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	-2.10%	-1.90%
Survivorship Premium	-6.50%	-6.30%

As explained in previous sections, some nonsurvivor funds comprising the majority of nonsurvivor portfolio size disappeared due to fund sponsor corporate activity and not due to bad performance. Actually these had very high returns with respect to the group average. Therefore, they affect the nonsurvivor portfolio returns very much due to their size, making both survivorship bias and premium negative.

Table 103 Size-Weighted Variable Fund Portfolio Alphas (Market: V. Fund Index, Returns: Gross)

Period	All Variable Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	0.51%	-1.71%	-1.36%	3.28%
(t-values)	(0.76)	(-1.70)	(-1.37)	(2.73*)

(*) indicates significance.

Regression against the variable fund index is shown for comparison purposes since gross returns should better be regressed against the ISE index which is gross.

Table 104 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Variable Fund Index)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	-2.22%	-1.87%
Survivorship Premium	-4.99%	-4.64%

When gross portfolio returns are regressed against the ISE-100 index, alphas are all negative and above mentioned distortion in nonsurvivors are still in place.

Table 105 Size-Weighted Variable Fund Portfolio Alphas (Market: ISE-100, Returns: Gross)

Period	All Variable Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-2.42%	-4.48%	-4.19%	0.46%
(t-values)	(-1.08)	(-1.98)	(-1.82)	(0.17)

(*) indicates significance.

Therefore, survivorship bias and premium is negative due to this distortion.

Table 106 Survivorship Bias/Premium Calculations using Size-Weighted Variable Fund Portfolios' Annualized Gross Raw Returns (Market: ISE-100)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	-2.06%	-1.77%
Survivorship Premium	-4.94%	-4.65%

Performance and Survivorship Bias Calculations Using Jensen's Alpha for Equity Fund Portfolios from Gross Returns

Equal-Weighted Equity Fund Portfolios from Gross Returns

Below are the periodic gross raw returns for the equal-weighted equity funds portfolio and also its sub constituent equal-weight portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds. Full-sample and end-of-sample survivor portfolios have the highest and second highest returns whereas all equity funds' portfolios had lower and nonsurvivors' portfolios had lowest average raw returns in the study period 2000 to 2007.

Table 107 Annualized Gross Returns for the Weekly Means of Equal-Weighted Equity Fund Portfolios

Period	ISE-100	Equity Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	23,23%	24,74%	23,92%	22,25%
2002-2007	27,31%	21,96%	26,91%	26,65%	27,06%	26,92%
2000	-44,90%	-21,72%	-18,37%	-11,48%	-16,06%	-20,97%
2001	38,48%	51,90%	54,56%	59,33%	56,10%	53,28%
2002	-16,72%	-3,47%	2,33%	1,88%	2,80%	0,97%
2003	69,40%	54,69%	58,11%	59,93%	60,06%	54,29%
2004	36,51%	15,13%	25,17%	21,91%	23,46%	32,87%
2005	59,33%	38,51%	46,48%	47,29%	46,01%	48,69%
2006	-1,55%	7,07%	8,03%	11,15%	8,61%	5,41%
2007	39,89%	28,38%	29,78%	26,34%	29,97%	30,91%

Note: ISE-100 index returns are gross; Variable Fund Index returns are net.

Survivorship bias is 1.50% for full-sample survivors and 0.68% for end-of-sample survivors between 2000 and 2007.

Table 108 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Gross Raw Returns

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	1.50%	0.68%
Survivorship Premium	2.49%	1.66%

Below are the risk-adjusted returns for the equal-weighted equity fund portfolio and also its sub constituent equal-weight portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the equity funds index is the market. End-of-sample and full-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007.

All the risk-adjusted returns in the study period of 2000 to 2007 are positive and significant. However regressing gross fund returns against the equity fund index which is net is not very meaningful. Yet it is shown for comparison purposes.

Table 109 Equal-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Gross)

Period	All Variable Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	4.14%	4.50%	4.62%	4.10%
(t-values)	(3.57*)	(3.37*)	(3.78*)	(1.83*)

(*) indicates significance.

Survivorship bias is 0.37% for full-sample and 0.56% for end-of-sample survivors between 2000 and 2007 as shown below.

Table 110 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: E. Fund Index)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.37%	0.48%
Survivorship Premium	0.40%	0.52%

Below are the gross risk-adjusted returns for the equal-weighted equity fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the ISE-100 index is the market. Since ISE-100 is an index that does not include fees and commission, using the ISE-100 with gross fund returns is more appropriate than the equity fund index.

Alphas of all subgroups are negative and but not statistically significant. Full-sample and end-of-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007.

Table 111 Equal-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross)

Period	All Variable Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-1.68%	-1.12%	-1.23%	-1.79%
(t-values)	(-0.58)	(-0.39)	(-0.42)	(-0.50)

(*) indicates significance.

Survivorship bias is 0.55% for full-sample survivors and 0.45% for end-of-sample survivors.

Table 112 Survivorship Bias/Premium Calculations using Equal-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	0.55%	0.45%
Survivorship Premium	0.67%	0.56%

Size-Weighted Equity Fund Portfolios from Gross Returns

Below are the periodic gross raw returns for the size-weighted equity funds portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-

sample survivor and nonsurvivor funds calculated using monthly Net Asset Values of the Funds. Although individual fund returns are weekly, fund Net Asset Values can only be found from Monthly Capital Markets Board Reports. Therefore, fund NAVs are monthly.

Full-sample and end-of-sample survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolios had lower and nonsurvivors' portfolios had lowest average raw returns in the study period 2000 to 2007. However annual results do not follow the same ranking for 2005 and 2007.

Returns of equity fund portfolios increased for full-sample and end-of-sample survivors as well as all equity funds, going from equal-weighted to size-weighted portfolios similar with net returns showing that large size equity funds have better performance.

Table 113 Annualized Gross Returns for the Weekly Means of Size-Weighted Equity Fund Portfolios in Comparison with Equal-Weighted Equity Fund Portfolios

Size-Weighted

Period	ISE-100	Equity Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	25,42%	28,52%	27,49%	21,28%
2002-2007	27,31%	21,96%	29,61%	31,80%	30,53%	27,84%
2000	-44,90%	-21,72%	-21,70%	-18,17%	-19,10%	-24,68%
2001	38,48%	51,90%	63,04%	71,88%	72,74%	46,02%
2002	-16,72%	-3,47%	10,56%	14,10%	13,52%	4,52%
2003	69,40%	54,69%	60,59%	65,33%	61,00%	59,51%
2004	36,51%	15,13%	18,29%	18,84%	19,92%	12,42%
2005	59,33%	38,51%	46,60%	46,86%	46,04%	47,94%
2006	-1,55%	7,07%	13,23%	15,82%	13,54%	10,50%
2007	39,89%	28,38%	35,48%	36,75%	35,46%	75,77%

Equal-Weighted

Period	ISE-100	Equity Fund Index	All Equity Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	23,23%	24,74%	23,92%	22,25%
2002-2007	27,31%	21,96%	26,91%	26,65%	27,06%	26,92%
2000	-44,90%	-21,72%	-18,37%	-11,48%	-16,06%	-20,97%
2001	38,48%	51,90%	54,56%	59,33%	56,10%	53,28%
2002	-16,72%	-3,47%	2,33%	1,88%	2,80%	0,97%
2003	69,40%	54,69%	58,11%	59,93%	60,06%	54,29%
2004	36,51%	15,13%	25,17%	21,91%	23,46%	32,87%
2005	59,33%	38,51%	46,48%	47,29%	46,01%	48,69%
2006	-1,55%	7,07%	8,03%	11,15%	8,61%	5,41%
2007	39,89%	28,38%	29,78%	26,34%	29,97%	30,91%

Note: ISE-100 index returns are gross; Equity Fund Index returns are net.

Survivorship bias is 3.10% for full-sample survivors and 2.07% for end-of-sample survivors between 2000 and 2007.

Table 114 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Gross Raw Returns

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	3.10%	2.07%
Survivorship Premium	7.24%	6.21%

Below are the gross risk-adjusted returns for the size-weighted equity fund portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the equity fund index is the market.

The risk-adjusted returns in the study period of 2000 to 2007 are positive for all subgroups except for nonsurvivors. However, this is not very meaningful because fund returns are gross whereas equity index return is net.. Favorable alphas are a result of this fact. Yet the results are shown for comparison purposes.

Table 115 Size-Weighted Equity Fund Portfolio Alphas (Market: E. Fund Index, Returns: Gross)

Period	All Equity Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	5.35%	7.38%	6.62%	2.50%
(t-values)	(4.60)	(4.97)	(4.79)	(1.06)

(*) indicates significance.

Survivorship bias is 2.03% for full-sample survivors and 1.27% for end-of-sample survivors.

Table 116 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Equity Fund Index)

	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	3.10%	2.07%
Survivorship Premium	7.24%	6.21%

Below are the gross risk-adjusted returns for the size-weighted equity fund portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the ISE-100 index is the market.

Table 117 Size-Weighted Equity Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross)

Period	All Equity Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-0.39%	1.60%	0.86%	-3.23%
(t-values)	(-0.14)	(0.51)	(0.28)	(-0.94)

(*) indicates significance.

Full-sample and end-of-sample and survivors' portfolios have the highest and second highest returns whereas all equity funds' portfolio had lower and nonsurvivors' portfolios had lowest risk-adjusted returns in the study period 2000 to 2007. None of the subgroup alphas are statistically significant. The risk-adjusted returns are positive for full-sample and end-of-sample survivors. Yet they are negative for portfolios of all equity funds and nonsurvivors.

This result is important because it shows that a portfolio of all equity funds, on a size-weighted basis and freed from survivorship bias, was not able to cover the transaction commissions and other costs (returns are gross of fund management fees) between 2000 and 2007. Nevertheless, risk-adjusted returns of -0.39% per annum are very close to positive level to create value for investors. This may be a reason why we can be hopeful from future since although fund returns are gross of management fees, there are still transaction costs which are as much as or sometimes higher than management fees. Of course transaction costs are a must and unlike management fees, have a direct impact on the gross fund performance. Management fees are at the discretion of fund manager, sponsor and distributor. These parties would easily and willingly forego some part of the management fees if they believe that this will increase the demand for their funds. Although transaction costs cannot be decreased suddenly at the will of the fund sponsor or distributor, they can and should be controlled by the fund manager with prudent investor principle. Almost always transactions of the funds used to be executed through sister company brokers of asset

managers if there is any. This may be an incentive for fund managers to increase turnover at the expense of performance, especially if the investors are short-term oriented and are not sophisticated enough to question past two, three years of performance, which is the case in Turkey. But recently some companies started to execute transactions from different brokers not only to increase the scope of research services they get, but also to create competition for transaction commissions. The CMB discloses the costs of the funds periodically. The CMB also started the requirement for asset managers to report commission rates and broker names that they work with two years ago. However these reports that are taken directly from fund managers are not very much controlled and hence include many errors. Therefore, I could only use returns gross of management fees, but not of transaction costs in this study although I wanted very much. If I were to use such returns as well, I would be able to see the impact of transaction costs. This will be a subject of further study.

The result without correcting for survivorship bias would point to a value creation of 0.86% per annum for the portfolio of size-weighted equity funds if only the funds existing at the end of the study period were used in the calculation. Of course, this result would be subject to survivorship bias.

Another important observation about equity funds is the positive risk-adjusted returns of the portfolio of size-weighted full-sample survivors. They were able to create value over and above transaction commissions and all other expenses with a risk-adjusted return of 1.60% for the period of 2000-2007. This result is in line with results from the section on individual fund alphas. When the equity funds' individual alphas from previous sections are considered, it is observed that 3 of the 7 equity funds in the full-sample survivors group have positive (not significant) alphas.

One important thing to note is that similar with net returns, alphas become better when size-weighted for portfolios of two subgroups, full-sample and end-of-sample-survivors. This means that larger survivor funds perform better on a risk-adjusted basis. This difference becomes more pronounced for survivors meaning that some large size survivor equity funds perform better. Survivors also help better the size-weighted portfolios of all equity funds. However, size-weighted nonsurvivors' portfolio alpha becomes more negative compared to equal-weighted nonsurvivors. This shows that larger nonsurvivor funds perform worse on a risk-adjusted basis.

Survivorship bias is 2.00% for full-sample survivors and 1.25% for end-of-sample survivors.

Table 118 Survivorship Bias/Premium Calculations using Size-Weighted Equity Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100 Index)

Period	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	2.00%	1.25%
Survivorship Premium	4.83%	4.09%

Performance and Survivorship Bias Calculations Using Jensen's Alpha for Balanced Fund Portfolios from Gross Returns

Equal-Weighted Balanced Fund Portfolios from Gross Returns

Below are the periodic gross raw returns for the equal-weighted balanced fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds. Full-sample and end-of-sample survivors' portfolios have the highest and second highest returns whereas all

balanced funds' portfolios had lower and nonsurvivors' portfolios had lowest average raw returns in the study period from 2000 to 2007. However annual results do not follow the same ranking for 2002.

Table 119 Annualized Gross Raw Returns for the Weekly Means of Equal-Weighted Balanced Fund Portfolios

Period	ISE-100	Balanced Fund Index	All Balanced Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	27,99%	25,75%	29,09%	24,99%
2002-2007	27,31%	21,96%	27,57%	24,48%	28,14%	24,12%
2000	-44,90%	-21,72%	-1,56%	0,80%	-1,11%	-1,80%
2001	38,48%	51,90%	68,93%	66,02%	75,22%	64,76%
2002	-16,72%	-3,47%	21,35%	12,05%	15,39%	29,07%
2003	69,40%	54,69%	59,43%	51,96%	61,51%	56,37%
2004	36,51%	15,13%	23,67%	23,47%	26,11%	18,90%
2005	59,33%	38,51%	30,67%	29,88%	32,41%	25,59%
2006	-1,55%	7,07%	9,33%	10,96%	12,57%	-2,56%
2007	39,89%	28,38%	25,60%	22,37%	25,87%	23,87%

Note: ISE-100 index returns are gross; Balanced Fund Index returns are net.

Survivorship bias is 2.25% for full-sample and 1.09% for end-of-sample survivors during the study period.

Table 120 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Gross Raw Returns

Period	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	-2.25%	1.09%
Survivorship Premium	0.75%	4.09%

Below are the gross risk-adjusted returns for the equal-weighted balanced fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when the balanced fund index is the market. End-of-sample survivors and all balanced funds portfolios have the highest and second highest returns whereas full-sample survivors portfolio has lower and nonsurvivors' portfolio has the lowest risk-adjusted returns in the study period from 2000 to 2007.

Since balanced fund index is an index net of fees and commission, using the balanced fund index is not so fair with gross returns. Yet it is shown for comparison purposes.

Table 121 Equal-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Gross)

Period	All Balanced Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	2.38%	-0.56%	3.78%	-1.61%
(t-values)	(2.73*)	(-0.58)	(3.93*)	(-0.96)

(*) indicates significance.

Survivorship premium is -2.94% for full-sample and 1.40% for end-of-sample survivors for the study period.

Table 122 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Balanced Fund Index)

Period	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	-2.94%	1.40%
Survivorship Premium	1.05%	5.39%

Below are the gross net risk-adjusted returns for the equal-weighted balanced fund portfolio and also its sub constituent equal-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds when ISE-100 index is the market. Since ISE-100 is an index that does not include fees and commission, using the ISE-100 is more appropriate with gross returns.

End-of-sample survivors and all balanced funds portfolios have the highest and second highest returns whereas full-sample survivors portfolio has lower and nonsurvivors' portfolio has the lowest risk-adjusted returns in the study period from 2000 to 2007. All the risk-adjusted returns in the study period of 2000 to 2007 are negative. Risk-adjusted returns are significant for full-sample survivors and nonsurvivors portfolios.

Table 123 Equal-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross)

Period	All Balanced Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-2.50%	-4.99%	-1.32%	-6.15%
(t-values)	(-1.12)	(-2.29*)	(-0.57)	(-2.40*)

(*) indicates significance.

Survivorship bias is -2.48% for full-sample survivors and 1.19% for end-of-sample survivors.

Table 124 Survivorship Bias/Premium Calculations using Equal-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100 Index)

Period	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio
Survivorship Bias	-2.48%	1.19%
Survivorship Premium	1.16%	4.83%

Size-Weighted Balanced Fund Portfolios from Gross Returns

Below are the periodic gross returns for the size-weighted balanced funds portfolio and also its sub constituent size-weighted portfolios for full-sample survivor, end-of-sample survivor and nonsurvivor funds calculated using monthly Net Asset Values of the funds? Although individual fund returns are weekly, fund Net Asset Values can only be found from Monthly Capital Markets Board Reports. Therefore, fund NAVs are monthly.

Table 125 Annualized Gross Returns for the Weekly Means of Size-Weighted Balanced Fund Portfolios in Comparison with Equal-Weighted Balanced Fund Portfolios

Size-Weighted

Period	ISE-100	Balanced Fund Index	All Balanced Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	26,27%	29,39%	27,72%	28,43%	32,34%
2002-2007	27,31%	24,29%	27,87%	24,17%	26,56%	31,63%
2000	-44,90%	-1,53%	-5,11%	-1,76%	-3,79%	-6,27%
2001	38,48%	77,34%	88,35%	78,86%	86,32%	91,28%
2002	-16,72%	15,80%	17,59%	-1,49%	8,68%	36,26%
2003	69,40%	55,80%	60,88%	63,57%	59,35%	62,97%
2004	36,51%	19,77%	24,05%	27,84%	24,92%	23,01%
2005	59,33%	27,64%	29,71%	30,11%	32,01%	27,64%
2006	-1,55%	7,62%	11,35%	4,93%	11,56%	7,75%
2007	39,89%	23,67%	28,40%	29,72%	28,37%	42,70%

Equal-Weighted

Period	ISE-100	Balanced Fund Index	All Balanced Funds Portfolio	Full-sample survivors Portfolio	End-of sample survivors Portfolio	Nonsurvivors Portfolio
2000-2007	16,12%	18,73%	27,99%	25,75%	29,09%	24,99%
2002-2007	27,31%	21,96%	27,57%	24,48%	28,14%	24,12%
2000	-44,90%	-21,72%	-1,56%	0,80%	-1,11%	-1,80%
2001	38,48%	51,90%	68,93%	66,02%	75,22%	64,76%
2002	-16,72%	-3,47%	21,35%	12,05%	15,39%	29,07%
2003	69,40%	54,69%	59,43%	51,96%	61,51%	56,37%
2004	36,51%	15,13%	23,67%	23,47%	26,11%	18,90%
2005	59,33%	38,51%	30,67%	29,88%	32,41%	25,59%
2006	-1,55%	7,07%	9,33%	10,96%	12,57%	-2,56%
2007	39,89%	28,38%	25,60%	22,37%	25,87%	23,87%

When balanced fund portfolio returns are calculated on a size-weighted basis, results came similar with net returns. Nonsurvivors' portfolios had the highest annualized average return in most of the years as opposed to the equal-weight results. This means that in nonsurvivor funds, some large size funds were closed not due to bad performance but for other reasons. Or alternatively some large size funds survived although their performance was not so good. When the data is investigated, it is observed that one large size nonsurvivor fund, Garanti Bankası A Tipi Karma Fon have average returns that are very much above the balanced class average. This fund, which makes up 37% of the total nonsurvivor balanced class NAV on the average during the study period, pushes the nonsurvivor portfolio's average considerably up. Besides that, some full-sample survivors had bad performance in some years of the study period and hence drove down the average performance of the group in these periods. Full-sample survivors had been a worse performer subset of end-of-sample survivors' portfolio.

One distinction here is that the difference between the size-weighted nonsurvivor balanced fund portfolios gross return and survivor portfolios' gross return is higher as calculated in the survivorship premium figures which are more negative. This is illustrated in the table below. This means that average management fees are higher for nonsurvivors' portfolio than the survivors' portfolio.

Therefore, survivorship bias and premium numbers are all negative for size-weighted balanced fund portfolios due to the large size nonsurvivor fund with high performance as shown in the tables below. Survivorship bias is -1.67% for full-sample survivors and -0.96% for end-of-sample survivors during the study period.

Table 126 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Gross Raw Returns

Period	Full-sample survivors Portfolio	End-of sample survivors Portfolio
Survivorship Bias	-1.67%	-0.96%
Survivorship Premium	-4.62%	-3.91%

Survivorship premium is even more negative since it is the difference between the performance of nonsurvivors and survivors.

In addition to raw returns, risk-adjusted returns are also calculated using both balanced fund index and the ISE-100 index as the market. The results are in the tables below. When adjusted for risk, returns of fund subgroups come out as expected with end-of-sample survivor portfolios having the highest and nonsurvivor portfolios having the lowest returns as shown in the table below.

Full-sample survivors had been a worse performer subset of end-of-sample survivors' portfolio. Since balanced fund index is an index net of fees and commission, using the balanced fund index is not so fair with gross returns. Yet it is shown for comparison purposes.

Table 127 Size-Weighted Balanced Fund Portfolio Alphas (Market: B. Fund Index, Returns: Gross)

Period	All Balanced Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	4.46%	3.97%	4.72%	4.64%
(t-values)	(4.12*)	(2.29*)	(3.35*)	(2.83*)

(*) indicates significance.

Accordingly, survivorship bias turned out to be 0.26%, when balanced fund index is the market and -0.03%% when ISE-100 index is the market as shown below.

Table 128 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: Balanced Fund Index)

Period	Full-sample survivors	End-of sample survivors
	Portfolio	Portfolio
Survivorship Bias	-0.49%	0.26%
Survivorship Premium	-0.67%	0.08%

When ISE-100 index is used as the market, alphas of all sub groups are negative. However nonsurvivors came up with the least negative alphas. End-of-sample and full-sample survivors followed with more negative risk-adjusted returns. This is again due to a large size nonsurvivor fund with a very high return with respect to the nonsurvivors' average. Yet none of the alphas are significant.

Table 129 Size-Weighted Balanced Fund Portfolio Alphas (Market: ISE-100 Index, Returns: Gross)

Period	All Balanced Funds Portfolio	Full-Sample Survivors Portfolio	End-of-Sample Survivors Portfolio	Nonsurvivors Portfolio
2000-2007	-0.74%	-1.43%	-0.77%	-0.24%
(t-values)	(-0.32)	(-0.54)	(-0.31)	(-0.09)

(*) indicates significance.

Survivorship bias is -0.69% for full-sample survivors and -0.03 for end-of-sample survivors due to very high return of one large size nonsurvivor fund.

Table130 Survivorship Bias/Premium Calculations using Size-Weighted Balanced Fund Portfolios' Annualized Gross Risk-Adjusted Returns (Market: ISE-100 Index)

Period	Full-sample survivors Portfolio	End-of sample survivors Portfolio
Survivorship Bias	-0.69%	-0.03%
Survivorship Premium	-1.19%	-0.53%

Non-Parametric Approach

In non-parametric approach contingency tables showing the distribution of winner-winner, loser-winner, winner-loser and loser-loser funds per analysis period as explained in the Methodology section in detail. Contingency tables are constructed for quarterly, yearly and two-yearly returns, both net and gross of management fees. Subsequently, persistence tests of Brown & Goetzmann (1995), Malkiel (1995) and Kahn & Rudd (1995) are carried out on these quarterly, yearly and two-yearly net and gross returns to test for mutual fund persistence in the short-term, medium-term and long-term respectively.

Variable Funds

Below is a summary of contingency tables using net returns for all quarters between the first quarter of 2000 and the third quarter of 2007 and for the entire period. In the aggregate period, winners in two successive periods (WW) with 461 occurrences outnumber all other cases. The second most frequent incidence is from the losers in two consecutive periods (LL) with 438 occurrences. Loser-Winner and Winner-Loser cases are almost equal in occurrence with 384 and 382 cases respectively.

Table 131 Contingency Table for Variable Funds Using Quarterly Net Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000/1	97	16	11	11	16	0	0	39	4
2000/2	97	16	12	13	17	0	0	36	3
2000/3	97	21	10	10	20	0	0	33	3
2000/4	97	18	14	14	18	0	0	32	1
2001/1	97	16	17	16	15	1	0	31	1
2001/2	97	17	14	16	15	0	3	30	2
2001/3	97	11	21	21	11	0	0	33	0
2001/4	97	13	18	18	12	1	2	32	1
2002/1	97	19	9	8	19	4	3	32	3
2002/2	97	14	14	12	14	3	1	38	1
2002/3	97	12	16	16	10	0	1	41	1
2002/4	97	17	10	10	16	1	1	40	2
2003/1	97	14	12	10	15	4	0	42	0
2003/2	97	13	14	13	11	0	0	43	3
2003/3	97	17	10	10	17	0	0	43	0
2003/4	97	19	7	8	16	0	4	42	1
2004/1	97	12	13	14	11	0	1	45	1
2004/2	97	6	19	19	6	1	0	46	0
2004/3	97	14	11	11	13	0	1	46	1
2004/4	97	13	11	12	11	0	3	44	3
2005/1	97	13	11	11	13	1	1	44	3
2005/2	97	20	6	6	18	0	1	43	3
2005/3	97	21	6	6	20	0	0	44	0
2005/4	97	19	8	8	18	0	0	44	0
2006/1	97	11	16	16	9	0	1	42	2
2006/2	97	11	16	15	11	1	0	43	0
2006/3	97	16	11	11	15	0	0	44	0
2006/4	97	13	13	12	13	2	0	44	0
2007/1	97	12	12	13	11	1	2	44	2
2007/2	97	13	11	11	13	1	1	45	2
2007/3	97	14	11	11	14	0	0	47	0
2000/1-2007/3	3007	461	384	382	438	21	26	1252	43

Persistence tests of Brown & Goetzmann (1995), Malkiel (1995) and Kahn & Rudd (1995) are carried out using both net and gross returns. When net returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 21 of the 31 periods and 6 of them (19% of all quarters) are significant. Of the 10 CPRs that are less than one, 2 are significant. Brown & Goetzmann's (1995) negative and positive persistence results are also supported by Malkiel's (1995) z-statistics of

persistent winners and losers as well as Kahn and Rudd's (1995) chi-squared tests by showing statistically significant statistics.

For the entire period encompassing all quarters the null hypothesis of no persistence can be rejected at a significance level of 1%.

Table 132 Persistence Tests for Variable Funds Using Quarterly Net Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l 0	Chi-square 0
2000/1	2.12	1.35	0.96	0.96	1.85
2000/2	1.74	1.05	0.56	0.93	1.17
2000/3	4.20	2.63**	1.98*	1.83	7.26
2000/4	1.65	1.00	0.71	0.71	1.00
2001/1	0.88	-0.25	0.00	-0.35	0.13
2001/2	1.14	0.25	0.17	0.19	0.32
2001/3	0.27	-2.46	-1.77	-1.77	6.25
2001/4	0.48	-1.40	-0.90	-1.10	2.02
2002/1	5.01	2.76**	2.12*	1.89	8.05
2002/2	1.17	0.28	0.39	0.00	0.22
2002/3	0.47	-1.36	-0.76	-1.18	2.00
2002/4	2.72	1.77	1.35	1.18	3.23
2003/1	1.75	0.99	0.82	0.58	1.16
2003/2	0.79	-0.43	0.00	-0.60	0.37
2003/3	2.89	1.88	1.35	1.35	3.63
2003/4	5.43	2.73**	2.12*	1.88	8.40
2004/1	0.73	-0.57	-0.39	-0.41	0.40
2004/2	0.10	-3.48	-2.60	-2.60	13.52
2004/3	1.50	0.71	0.60	0.41	0.55
2004/4	1.08	0.14	0.20	0.00	0.23
2005/1	1.40	0.58	0.41	0.41	0.33
2005/2	10.00	3.48**	2.75**	2.45*	13.68
2005/3	11.67	3.74**	2.89**	2.75**	15.91
2005/4	5.34	2.80**	2.12*	1.96*	8.36
2006/1	0.39	-1.66	-0.96	-1.40	2.92
2006/2	0.50	-1.23	-0.78	-0.96	1.57
2006/3	1.98	1.23	0.96	0.78	1.57
2006/4	1.08	0.14	0.20	0.00	0.06
2007/1	0.85	-0.29	-0.20	-0.21	0.17
2007/2	1.40	0.58	0.41	0.41	0.33
2007/3	1.62	0.85	0.60	0.60	0.72
2000/1-2007/3	1.38	3.25**	2.72**	1.88	11.26

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all quarters between the first quarter of 2000 and the third quarter of 2007 as well as the

contingency table for the entire period. In aggregate, winners in two successive periods with 456 occurrences outnumber all other cases. The second most frequent incidence is from the losers in two consecutive periods with 427 occurrences. Loser-Winner and Winner-Loser cases are almost equal in occurrence with 371 and 376 cases respectively.

Table 133 Contingency Table for Variable Funds Using Quarterly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000/1	97	15	12	12	14	0	0	40	4
2000/2	97	16	11	13	17	0	0	37	3
2000/3	97	21	9	10	20	0	0	34	3
2000/4	97	18	13	14	18	0	0	33	1
2001/1	97	14	18	17	14	1	0	32	1
2001/2	97	16	15	16	14	0	3	31	2
2001/3	97	12	20	20	11	0	0	34	0
2001/4	97	14	17	17	12	1	2	33	1
2002/1	97	19	9	8	18	4	3	33	3
2002/2	97	13	14	13	13	3	1	39	1
2002/3	97	11	16	16	10	0	1	42	1
2002/4	97	15	10	11	16	1	1	41	2
2003/1	97	13	12	11	14	3	1	43	0
2003/2	97	13	14	12	11	0	0	44	3
2003/3	97	17	10	10	16	0	0	44	0
2003/4	97	19	6	8	16	0	4	43	1
2004/1	97	11	13	14	11	0	1	46	1
2004/2	97	7	18	18	6	0	1	47	0
2004/3	97	13	12	12	11	0	1	47	1
2004/4	97	13	11	12	10	0	3	45	3
2005/1	97	13	10	11	13	1	1	45	3
2005/2	97	19	6	6	18	0	1	44	3
2005/3	97	20	6	6	20	0	0	45	0
2005/4	97	19	7	7	18	0	1	45	0
2006/1	97	11	15	15	9	0	1	44	2
2006/2	97	10	16	16	10	0	0	45	0
2006/3	97	15	11	11	15	0	0	45	0
2006/4	97	14	10	11	12	1	4	43	2
2007/1	97	17	8	8	15	0	1	46	2
2007/2	97	15	9	9	16	1	0	46	1
2007/3	97	13	13	12	9	0	3	42	5
2000/1-2007/3	3007	456	371	376	427	16	34	1278	49

When gross returns are used, Cross Product Ratio (CPR) is greater than one in 17 of the 31 periods and 7 of them (23% of all quarters) are significant. Of the 14 CPRs that are less than one, 2 are significant. Brown & Goetzmann's (1995) negative and positive persistence results are also supported by Malkiel's (1995) z-statistics of persistent winners and losers as well as Kahn and Rudd's (1995) chi-squared tests by showing statistically significant statistics. Persistence is more often due to persistent winners. However, persistent losers are closer in significance to persistent winners in sub periods and persistent losers become significant for the entire period. For the entire period, the null hypothesis of no persistence can be rejected at a significance level of 1%. The significantly persistent periods are the same and the highest number of persistent periods is in 2005 for net and gross returns.

Table 134 Persistence Tests for Variable Funds Using Quarterly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000/1	1.46	0.68	0.58	0.39	0.51
2000/2	1.90	1.20	0.56	1.13	1.60
2000/3	4.67	2.77**	2.19*	1.83	8.13
2000/4	1.78	1.13	0.71	0.90	1.32
2001/1	0.64	-0.88	-0.54	-0.71	0.81
2001/2	0.93	-0.13	0.00	-0.19	0.18
2001/3	0.33	-2.12	-1.41	-1.62	4.62
2001/4	0.58	-1.04	-0.54	-0.93	1.20
2002/1	4.75	2.66**	2.12*	1.73	7.48
2002/2	0.93	-0.13	0.00	-0.19	0.06
2002/3	0.43	-1.50	-0.96	-1.18	2.32
2002/4	2.18	1.38	0.78	1.18	2.00
2003/1	1.38	0.57	0.41	0.39	0.40
2003/2	0.85	-0.28	0.20	-0.60	0.40
2003/3	2.72	1.77	1.35	1.18	3.23
2003/4	6.33	2.89**	2.12*	2.13	9.53
2004/1	0.66	-0.71	0.00	0.00	0.55
2004/2	0.13	-3.15	-2.20	-2.45	10.84
2004/3	0.99	-0.01	0.20	-0.21	0.17
2004/4	0.98	-0.03	0.20	-0.22	0.43
2005/1	1.54	0.73	0.41	0.63	0.57
2005/2	9.50	3.39**	2.60**	2.45*	12.80
2005/3	11.11	3.66**	2.75**	2.75**	15.08
2005/4	6.98	3.10**	2.35*	2.20*	10.41
2006/1	0.44	-1.42	-0.78	-1.22	2.16
2006/2	0.39	-1.65	-1.18	-1.18	2.77
2006/3	1.86	1.10	0.78	0.78	1.23
2006/4	1.53	0.72	0.60	0.43	0.74
2007/1	3.98	2.26*	1.80	1.46	5.50
2007/2	2.96	1.83	1.22	1.40	3.49
2007/3	0.75	-0.49	0.20	-0.85	0.91
2000/1-2007/3	1.40	3.35**	2.77**	1.98*	12.41

(*) indicates significance at 5%. (**) indicates significance at 1%.

While going from net to gross returns, persistence increased in the aggregate period. As for the periods, number of significant periods increased by one but number of significant reversals increased by one as well. In individual periods from net to gross returns, persistence increase has been as frequent as persistence decrease and such changes have almost equally been due to repeat winners as well as repeat losers. Below is a summary of contingency tables using net returns for annual intervals and for the entire period. In the aggregate period, winners in two successive periods with

118 occurrences also outnumber all other outcomes. The second most frequent incidence is from the losers in two successive periods (LL) with 95 occurrences. Winner-Loser and Loser-Winner occurrences are 88 and 78 cases respectively.

Table 135 Contingency Table for Variable Funds Using Yearly Net Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	97	21	12	11	20	0	0	29	4
2001	97	20	11	14	16	0	7	23	6
2002	97	15	14	16	8	3	11	25	5
2003	97	18	8	11	13	0	8	36	3
2004	97	13	9	13	12	1	5	35	9
2005	97	14	14	14	11	0	3	39	2
2006	97	17	10	9	15	2	2	38	4
2000-2007	679	118	78	88	95	6	36	225	33

Persistence tests are carried out using both net and gross returns. When net returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 5 of the 7 periods and one of them (14% of all years) is significant. This significant persistence is in year 2000 and it is due to more repeat winners. Of the 2 CPRs that are less than one, none is significant. For the aggregate period encompassing all years the null hypothesis of no persistence can be rejected at a significance level of 1%.

Table 136 Persistence Tests for Variable Funds Using Yearly Net Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-square
2000	3.18	2.22*	1.77	1.41	5.13
2001	2.08	1.40	1.03	0.96	2.80
2002	0.54	-1.09	-0.18	-1.28	2.92
2003	2.66	1.66	1.30	1.09	4.24
2004	1.33	0.49	0.00	0.65	0.91
2005	0.79	-0.44	0.00	-0.60	0.51
2006	2.83	1.80	1.57	1.00	3.51
2000-2007	1.63	2.36*	2.09*	1.29	9.15

(*) indicates significance at 5%. (**) indicates significance at 1%.

When risk-adjusted returns are used in the contingency table approach, there is noteworthy improvement in persistency as seen in the related tables below.

Table 137 Contingency Table for Variable Funds Using Yearly Net Risk-Adjusted Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	97	21	12	10	20	1	0	28	5
2001	97	20	11	13	15	1	8	22	7
2002	97	17	8	12	16	4	9	26	5
2003	97	14	12	12	12	3	5	36	3
2004	97	14	7	13	13	0	6	35	9
2005	97	17	10	9	17	2	1	39	2
2006	97	13	11	12	12	3	4	38	4
2000-2007	679	116	71	81	105	14	33	224	35

When risk-adjusted returns are used, the cross product ratio increases to 2.12 from 1.63 with z-statistics up at 3.55 from 2.36, Z_w up at 2.49 from 2.09 and Z_l up at 2.56 from 1.29 and chi-squared value up at 13.95 from 9.15. Using risk-adjusted returns increase significance level for all z-statistics. Major difference is the persistent losers becoming significant and persistence stemming from both persistent winners and losers on equal measure rather than on winners as suggested by raw returns. This demonstrates that some loser-winners (LW) or winner-losers (WL) calculated using raw returns are in fact repeat losers when adjusted for risk. Along with year 2000, one more period performance becomes significantly persistent, i.e. year 2005.

Table 138 Persistence Tests for Variable Funds Using Yearly Net Risk-Adjusted Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-square
2000	3.50	2.36*	1.98*	1.41	5.89
2001	2.10	1.39	1.22	0.78	3.03
2002	2.83	1.81	0.93	1.63	3.83
2003	1.17	0.27	0.39	0.00	0.24
2004	2.00	1.14	0.19	1.34	2.62
2005	3.21	2.03*	1.57	1.35	4.28
2006	1.18	0.29	0.20	0.21	0.17
2000-2007	2.12	3.55**	2.49*	2.56*	13.95

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all years between 2000 and 2007 and for the entire period. In aggregate, winners in two successive periods with 119 occurrences outnumber all other cases. The second most frequent incidence is from the losers in two consecutive periods (LL) with 92 occurrences. Winner-Loser and Loser-Winner occurrences are 85 and 72 cases respectively.

Table 139 Contingency Table for Variable Funds Using Yearly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	97	21	12	11	19	0	0	30	4
2001	97	21	10	13	16	0	7	24	6
2002	97	16	13	15	8	2	12	26	5
2003	97	17	8	12	12	0	8	37	3
2004	97	15	7	10	14	1	5	36	9
2005	97	16	11	11	13	1	3	40	2
2006	97	13	11	13	10	1	5	39	5
2000-2007	679	119	72	85	92	5	40	232	34

When gross returns are used, Cross Product Ratio (CPR) is greater than one in 5 of the 7 periods and 1 of them (14% of all years) is significant. Of the 2 CPRs that are less than one, none is significant. For the entire period encompassing all quarters, the null hypothesis of no persistence can be rejected at a significance level of 1%. The significantly persistent periods did not change for net and gross returns which is year 2000.

Table 140 Persistence Tests for Variable Funds Using Yearly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000	3.02	2.11*	1.77	1.26	4.75
2001	2.58	1.77	1.37	1.18	4.40
2002	0.66	-0.73	0.18	-1.09	2.92
2003	2.13	1.27	0.93	0.89	3.33
2004	3.00	1.78	1.00	1.53	3.57
2005	1.72	0.96	0.96	0.41	1.31
2006	0.91	-0.16	0.00	-0.22	0.57
2000-2007	1.79	2.74**	2.38*	1.56	12.80

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using net returns for all two-yearly periods between 2000 and 2007 and for the entire period. In the aggregate period, winners in two successive periods (WW) with 96 occurrences again outnumber all other outcomes. The second most frequent incidence is from the winner-losers (WL) with 65 occurrences. Winner-Loser and Loser-Winner occurrences follow suit with 65 and 48 cases respectively.

Table 141 Contingency Table for Variable Funds Using Two-Yearly Net Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	97	22	11	12	16	0	7	18	11
01/02-03/04	97	18	13	15	7	4	17	15	8
02/03-04/05	97	20	8	12	10	4	18	13	12
03/04-05/06	97	17	7	14	9	0	14	25	11
04/05-06/07	97	19	9	12	13	0	9	29	6
00/01-02/03 to 04/05-06/07	485	96	48	65	55	8	65	100	48

In persistence tests when net returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 4 of the 5 periods and none of them is significant. The CPR that is less than one is not significant as well. For the aggregate two-yearly periods, the null hypothesis of no persistence can be rejected at a significance level of 5%.

Table 142 Persistence Tests for Variable Funds Using Two-Yearly Net Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-square
00/01-02/03	2.67	1.85	1.71	0.96	4.90
01/02-03/04	0.65	-0.75	0.52	-1.34	4.89
02/03-04/05	2.08	1.23	1.41	0.47	6.64
03/04-05/06	1.56	0.72	0.54	0.50	5.34
04/05-06/07	2.29	1.45	1.26	0.85	3.98
00/01-02/03 to 04/05-06/07	1.69	2.07*	2.44*	0.69	20.39

(*) indicates significance at 5%. (**) indicates significance at 1%.

Similar with yearly returns, when risk-adjusted returns are used in the contingency table approach, there is a noteworthy improvement in persistence results as seen in the related tables below.

Table 143 Contingency Table for Variable Funds Using Two-Yearly Net Risk-Adjusted Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	97	19	9	12	16	1	7	18	15
01/02-03/04	97	19	9	14	11	4	17	15	8
02/03-04/05	97	15	8	13	14	8	13	14	12
03/04-05/06	97	15	7	11	13	5	10	24	12
04/05-06/07	97	19	8	9	17	3	6	29	6
00/01-02/03 to 04/05-06/07	485	87	41	59	71	21	53	100	53

In persistence tests when risk-adjusted returns are used as shown in the table below, the Cross Product Ratio (CPR) is greater than one in all of the two-yearly periods and one of them (period 04/05-06/07) is significant (20% of all periods).

When risk-adjusted returns are used, the cross product ratio increases to 2.55 from 1.69 with z-statistics up at 3.62 from 2.07, Z_w down at 2.32 from 2.44 and Z_l up at 2.83 from 0.69 and chi-squared value down at 17.53 from 20.39. Using risk-adjusted returns increase significance level for z-statistics and Z_l. Major difference is

the persistent losers becoming significant and persistence stemming from both persistent winners and losers on equal measure rather than on winners alone as suggested by raw returns. This demonstrates that some loser-winners (LW) or winner-losers (WL) calculated using raw returns are in fact repeat losers (LL) when adjusted for risk. The performance of the period 04/05-06/07 becomes significantly persistent after risk adjustment.

Table 144 Persistence Tests for Variable Funds Using Two-Yearly Net Risk-Adjusted Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-square
00/01-02/03	2.81	1.86	1.26	1.40	4.14
01/02-03/04	1.66	0.89	0.87	0.45	4.28
02/03-04/05	2.02	1.21	0.38	1.28	2.32
03/04-05/06	2.53	1.51	0.78	1.34	3.04
04/05-06/07	4.49	2.55*	1.89	1.80	7.00
00/01-02/03 to 04/05-06/07	2.55	3.62**	2.32*	2.83**	17.53

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all two-year periods between 2000 and 2007 and for the entire period. In aggregate, winners in two successive periods with 98 occurrences outnumber all other cases. The second most frequent incidence is from the winner-losers (WL) with 62 occurrences. Winner-Loser and Loser-Winner occurrences follow suit with 62 and 48 cases respectively.

Table 145 Contingency Table for Variable Funds Using Two-Yearly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	97	22	11	12	15	0	7	19	11
01/02-03/04	97	19	11	15	7	3	18	16	8
02/03-04/05	97	21	9	11	8	4	18	14	12
03/04-05/06	97	18	7	12	9	0	14	26	11
04/05-06/07	97	18	10	12	11	1	9	29	7
00/01-02/03 to 04/05-06/07	485	98	48	62	50	8	66	104	49

In persistence tests when two-yearly gross returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 4 of the 5 periods and none of them is significant. The CPR that is less than one is not significant. For the aggregate two-yearly periods, the null hypothesis of no persistence cannot be rejected at a significance level of 5%.

Table 146 Persistence Tests for Variable Funds Using Two-Yearly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
00/01-02/03	2.50	1.71	1.71	0.78	4.93
01/02-03/04	0.81	-0.36	0.69	-0.94	6.15
02/03-04/05	1.70	0.86	1.77	-0.24	8.71
03/04-05/06	1.93	1.05	1.10	0.50	6.00
04/05-06/07	1.65	0.87	1.10	0.22	3.04
00/01-02/03 to 04/05-06/07	1.65	1.92	2.85**	0.20	24.98

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below table shows a summary of quarterly, yearly and two-yearly evaluation periods with significant persistence. The significantly persistent periods did not change for net and gross returns in general. The percentage of significantly persistent periods decreases as the length of evaluation periods increases. The highest percentage of significantly persistent funds is seen in the quarterly evaluation periods.

Table 147 % of Evaluation Periods with Significant Persistence for Variable Funds

	Net Returns	Gross Returns	Risk-Adjusted Returns
Quarterly	19%	23%	-
Yearly	14%	14%	29%
Two-Yearly	0%	0%	20%

As shown in the table below, in the aggregate period between 2000 and 2007, variable funds exhibit performance persistence at 5% significance for all evaluation

periods of quarterly and yearly returns both net and gross of management fees. Two-yearly periods had also shown performance persistence at 5% significance level for net returns, but not for gross returns as shown in the table below.

The overall significance decreases as the length of evaluation periods increases. The highest significance is seen in the quarterly evaluation periods. The overall significance increased for gross returns for all three different evaluation period types except for two-yearly returns for which overall significance decreased going from net to gross. Actually it became not significant going from net to gross. Persistent losers showed the same pattern in significance with increased significance going from net to gross except for two-yearly returns. For persistent winners overall significance increased from net to gross for all evaluation period types. This shows that loss of significance for two-yearly returns from net to gross is because of persistent losers losing their persistence going from net to gross.

As for risk-adjusted returns, yearly and two yearly returns are all persistent at 5% significance level. This persistence is due equally to persistent winners and losers. Persistence of quarterly returns are not tested on a risk-adjusted basis because to calculate quarterly risk-adjusted returns, there are only 12 weekly return data for each period which would decrease reliability of alphas and hence the power of tests.

Winner funds' persistence is significant at 5% level for all three types of assessment periods both net and gross. In addition, winner funds' persistence is significant at 5% level on a risk-adjusted basis both for yearly and two-yearly returns. Losing funds' persistence is significant at 5% level for only quarterly gross returns, but it is significant on a risk-adjusted basis for yearly and two-yearly periods.

Table 148 Persistence Tests for Variable Funds for the Aggregate Period

	WW	LW	WL	LL	CPR	Z	Z_w	Z_l	Chi-sq
Variable									
Net Returns									
Quarterly	461	384	382	438	1.38	3.25**	2.72**	1.88	11.26
Yearly	118	78	88	95	1.63	2.36*	2.09*	1.29	9.15
Two-Yearly	96	48	65	55	1.69	2.07*	2.44*	0.69	20.39
Gross Returns									
Quarterly	456	371	376	427	1.40	3.35**	2.77**	1.98*	12.41
Yearly	119	72	85	92	1.79	2.74**	2.38*	1.56	12.80
Two-Yearly	98	48	62	50	1.65	1.92	2.85**	0.20	24.98
Risk-Adjusted Returns									
Quarterly	-	-	-	-	-	-	-	-	-
Yearly	116	71	81	105	2.12	3.55**	2.49*	2.56*	13.95
Two-Yearly	87	41	59	71	2.55	3.62**	2.32*	2.83**	17.53

Equity Funds

Below is a summary of contingency tables using net returns for all quarters between the first quarter of 2000 and the third quarter of 2007 and for the entire period. In the aggregate period, winners in two successive periods (WW) with 166 occurrences outnumber all other cases. The second most frequent incidence is from the losers in two consecutive periods (LL) with 141 occurrences. Loser-Winner and Winner-Loser cases are almost equal in occurrence with 128 and 123 cases respectively.

Table 149 Contingency Table for Equity Funds Using Quarterly Net Returns

Period	Total 0	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000/1	34	6	1	2	6	0	0	17	2
2000/2	34	5	4	4	4	0	0	15	2
2000/3	34	8	2	2	7	0	0	14	1
2000/4	34	6	4	4	6	0	0	13	1
2001/1	35	6	5	5	5	1	0	13	0
2001/2	34	6	4	4	6	1	0	13	0
2001/3	34	4	6	5	4	1	0	13	1
2001/4	34	4	6	5	4	1	0	13	1
2002/1	34	5	4	4	5	1	1	14	0
2002/2	34	6	3	3	6	0	0	16	0
2002/3	34	5	5	4	4	0	0	15	1
2002/4	34	6	4	4	5	0	0	15	0
2003/1	34	6	3	2	6	2	0	15	0
2003/2	34	4	5	5	3	0	0	17	0
2003/3	34	7	3	2	5	0	0	15	2
2003/4	34	6	4	4	4	0	1	14	1
2004/1	34	6	4	4	5	0	0	15	0
2004/2	34	5	5	5	4	0	0	15	0
2004/3	34	5	4	5	4	0	1	15	0
2004/4	34	3	6	6	2	0	1	16	0
2005/1	34	5	4	4	4	0	0	17	0
2005/2	34	6	3	3	5	0	0	17	0
2005/3	34	5	4	4	4	0	0	17	0
2005/4	34	5	4	4	4	0	0	16	1
2006/1	34	5	4	4	4	0	1	15	1
2006/2	34	5	4	3	5	1	0	15	1
2006/3	34	5	4	4	4	0	1	15	1
2006/4	34	5	5	4	4	0	0	15	1
2007/1	34	7	3	3	5	0	1	13	2
2007/2	34	6	4	4	5	0	1	14	0
2007/3	34	6	4	4	5	0	0	15	0
2000/1-2007/3	1055	169	125	120	144	8	8	462	19

Persistence tests are carried out using both net and gross returns. When net returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 22 of the 31 periods and 2 of them (6% of all quarters) are significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence can be rejected at a 5% significance level. Persistence is due to repeat winners in the aggregate period.

Table 150 Persistence Tests for Equity Funds Using Quarterly Net Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000/1	18.00	2.13*	1.41	1.89	5.53
2000/2	1.25	0.23	0.33	0.00	0.18
2000/3	14.00	2.34*	1.90	1.67	6.47
2000/4	2.25	0.89	0.63	0.63	0.80
2001/1	1.20	0.21	0.30	0.00	0.14
2001/2	2.25	0.89	0.63	0.63	0.80
2001/3	0.53	-0.68	-0.33	-0.63	0.58
2001/4	0.53	-0.68	-0.33	-0.63	0.58
2002/1	1.56	0.47	0.33	0.33	0.22
2002/2	4.00	1.39	1.00	1.00	2.00
2002/3	1.00	0.00	0.33	-0.33	0.22
2002/4	1.88	0.68	0.63	0.33	0.58
2003/1	6.00	1.66	1.41	1.00	3.00
2003/2	0.48	-0.74	-0.33	-0.71	0.65
2003/3	5.83	1.63	1.67	0.71	3.47
2003/4	1.50	0.42	0.63	0.00	0.67
2004/1	1.88	0.68	0.63	0.33	0.58
2004/2	0.80	-0.24	0.00	-0.33	0.16
2004/3	1.00	0.00	0.00	0.00	0.22
2004/4	0.17	-1.66	-1.00	-1.41	3.00
2005/1	1.25	0.23	0.33	0.00	0.18
2005/2	3.33	1.18	1.00	0.71	1.59
2005/3	1.25	0.23	0.33	0.00	0.18
2005/4	1.25	0.23	0.33	0.00	0.18
2006/1	1.25	0.23	0.33	0.00	0.18
2006/2	2.08	0.74	0.71	0.33	0.65
2006/3	0.48	-0.74	-0.33	-0.71	0.65
2006/4	0.40	-0.94	-0.33	-1.00	1.11
2007/1	1.50	0.42	0.63	0.00	0.67
2007/2	1.88	0.68	0.63	0.33	0.58
2007/3	1.88	0.68	0.63	0.33	0.58
2000/1-2007/3	1.49	2.33*	2.53*	0.79	7.95

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all quarterly periods between 2000 and 2007 and for the entire period. In aggregate, winners in two successive periods with 169 occurrences outnumber all other cases. The second most frequent incidence is from the loser-losers (LL) with 144 occurrences. Winner-Loser and Loser-Winner occurrences follow suit with 120 and 125 cases respectively.

Table 151 Contingency Table for Equity Funds Using Yearly Gross Returns

Period	Total 0	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000/1	34	6	1	2	6	0	0	17	2
2000/2	34	5	4	4	4	0	0	15	2
2000/3	34	8	2	2	7	0	0	14	1
2000/4	34	6	4	4	6	0	0	13	1
2001/1	35	6	5	5	5	1	0	13	0
2001/2	34	6	4	4	6	1	0	13	0
2001/3	34	4	6	5	4	1	0	13	1
2001/4	34	4	6	5	4	1	0	13	1
2002/1	34	5	4	4	5	1	1	14	0
2002/2	34	6	3	3	6	0	0	16	0
2002/3	34	5	5	4	4	0	0	15	1
2002/4	34	6	4	4	5	0	0	15	0
2003/1	34	6	3	2	6	2	0	15	0
2003/2	34	4	5	5	3	0	0	17	0
2003/3	34	7	3	2	5	0	0	15	2
2003/4	34	6	4	4	4	0	1	14	1
2004/1	34	6	4	4	5	0	0	15	0
2004/2	34	5	5	5	4	0	0	15	0
2004/3	34	5	4	5	4	0	1	15	0
2004/4	34	3	6	6	2	0	1	16	0
2005/1	34	5	4	4	4	0	0	17	0
2005/2	34	6	3	3	5	0	0	17	0
2005/3	34	5	4	4	4	0	0	17	0
2005/4	34	5	4	4	4	0	0	16	1
2006/1	34	5	4	4	4	0	1	15	1
2006/2	34	5	4	3	5	1	0	15	1
2006/3	34	5	4	4	4	0	1	15	1
2006/4	34	5	5	4	4	0	0	15	1
2007/1	34	7	3	3	5	0	1	13	2
2007/2	34	6	4	4	5	0	1	14	0
2007/3	34	6	4	4	5	0	0	15	0
2000/1-2007/3	1055	169	125	120	144	8	8	462	19

Persistence tests carried out using gross returns are shown in the table below, Cross Product Ratio (CPR) is greater than one in 23 of the 31 periods and 2 of them (6% of all quarters) are significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence can be rejected at a 1% significance level. Persistence is due to repeat winners in the aggregate period.

The significantly persistent periods did not change for net and gross returns being the first quarter of 2000 and the third quarter of 2000.

Table 152 Persistence Tests for Equity Funds Using Quarterly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000/1	18.00	2.13*	1.41	1.89	5.53
2000/2	1.25	0.23	0.33	0.00	0.18
2000/3	14.00	2.34*	1.90	1.67	6.47
2000/4	2.25	0.89	0.63	0.63	0.80
2001/1	1.20	0.21	0.30	0.00	0.14
2001/2	2.25	0.89	0.63	0.63	0.80
2001/3	0.53	-0.68	-0.33	-0.63	0.58
2001/4	0.53	-0.68	-0.33	-0.63	0.58
2002/1	1.56	0.47	0.33	0.33	0.22
2002/2	4.00	1.39	1.00	1.00	2.00
2002/3	1.00	0.00	0.33	-0.33	0.22
2002/4	1.88	0.68	0.63	0.33	0.58
2003/1	6.00	1.66	1.41	1.00	3.00
2003/2	0.48	-0.74	-0.33	-0.71	0.65
2003/3	5.83	1.63	1.67	0.71	3.47
2003/4	1.50	0.42	0.63	0.00	0.67
2004/1	1.88	0.68	0.63	0.33	0.58
2004/2	0.80	-0.24	0.00	-0.33	0.16
2004/3	1.00	0.00	0.00	0.00	0.22
2004/4	0.17	-1.66	-1.00	-1.41	3.00
2005/1	1.25	0.23	0.33	0.00	0.18
2005/2	3.33	1.18	1.00	0.71	1.59
2005/3	1.25	0.23	0.33	0.00	0.18
2005/4	1.25	0.23	0.33	0.00	0.18
2006/1	1.25	0.23	0.33	0.00	0.18
2006/2	2.08	0.74	0.71	0.33	0.65
2006/3	1.25	0.23	0.33	0.00	0.18
2006/4	1.00	0.00	0.33	-0.33	0.22
2007/1	3.89	1.35	1.26	0.71	2.44
2007/2	1.88	0.68	0.63	0.33	0.58
2007/3	1.88	0.68	0.63	0.33	0.58
2000/1-2007/3	1.62	2.80**	2.88**	1.16	10.62

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using net returns for all yearly periods between 2000 and 2007 and for the entire period. In aggregate, winners in two successive periods with 39 occurrences outnumber all other cases. The second most frequent incidence is from the Loser-Winners (LW) with 33 occurrences. Winner-Loser and Loser-Loser occurrences follow suit with 30 and 26 cases respectively.

Table 153 Contingency Table for Equity Funds Using Yearly Net Returns

Period	Total 0	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	34	5	5	5	5	0	0	12	2
2001	34	6	5	5	3	0	3	10	2
2002	34	5	6	5	3	1	1	11	2
2003	34	6	4	5	3	0	3	12	1
2004	34	4	5	5	3	1	1	15	0
2005	34	7	3	2	5	0	0	13	4
2006	34	6	5	3	4	2	1	10	3
2000-2007	238	39	33	30	26	4	9	83	14

Persistence tests are carried out using both net and gross returns. When net returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 2 of the 7 periods and none of them (0% of all years) is significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected at a 5% significance level.

Table 154 Persistence Tests for Equity Funds Using Yearly Net Returns

Period	Cross-Product Ratio	Z-Statistic 0	Z_w 0	Z_l 0	Chi-sq 0
2000	1.00	0.00	0.00	0.00	0.00
2001	0.72	-0.35	0.30	-0.71	1.00
2002	0.50	-0.73	0.00	-1.00	1.00
2003	0.90	-0.11	0.30	-0.38	1.11
2004	0.48	-0.74	-0.33	-0.71	0.65
2005	5.83	1.63	1.67	0.71	3.47
2006	1.60	0.48	1.00	-0.33	1.11
2000-2007	1.02	0.07	1.08	-0.91	2.81

(*) indicates significance at 5%. (**) indicates significance at 1%.

When risk-adjusted returns are used in the contingency table approach, there is some improvement in persistence as seen in the related tables below.

Table 155 Contingency Table for Equity Funds Using Yearly Net Risk-Adjusted Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	34	4	5	6	5	0	0	12	2
2001	34	7	3	4	5	0	3	11	1
2002	34	7	3	3	5	0	2	11	3
2003	34	3	6	5	4	3	0	12	1
2004	34	5	4	4	4	1	1	15	0
2005	34	6	3	3	5	0	0	14	3
2006	34	6	2	4	5	0	3	10	4
2000-2007	238	38	26	29	33	4	9	85	14

When risk-adjusted returns are used, the cross product ratio increases to 1.66 from 1.02 with z-statistics up at 1.41 from 0.07, Z_w up at 1.10 from 1.08 and Z_l up at 0.91 from -0.91 and chi-squared value down at 2.57 from 2.81. Using risk-adjusted returns increase significance level for z-statistics. Major difference is that the number of persistent losers increases. However, neither persistent losers nor persistent winners are significant. Hence we cannot talk about persistence for any of the subperiods as well.

Table 156 Persistence Tests for Equity Funds Using Yearly Net Risk-Adjusted Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000	0.67	-0.45	-0.63	0.00	0.40
2001	2.92	1.11	0.90	0.71	1.84
2002	3.89	1.35	1.26	0.71	2.44
2003	0.40	-0.94	-0.71	-0.63	1.11
2004	1.25	0.23	0.33	0.00	0.18
2005	3.33	1.18	1.00	0.71	1.59
2006	3.75	1.25	0.63	1.13	2.06
2000-2007	1.66	1.41	1.10	0.91	2.57

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all yearly periods between 2000 and 2007 and for the entire period. In aggregate, winners in two

successive periods with 38 occurrences outnumber all other cases. The second most frequent incidence is from the Loser-Winners (LW) with 34 occurrences. Winner-Loser and Loser-Loser occurrences follow suit with 31 and 25 cases respectively.

Table 157 Contingency Table for Equity Funds Using Yearly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	34	5	5	5	5	0	0	12	2
2001	34	6	5	5	3	0	3	10	2
2002	34	5	6	5	3	1	1	11	2
2003	34	5	5	6	2	0	3	12	1
2004	34	4	5	5	3	1	1	15	0
2005	34	7	3	2	5	0	0	13	4
2006	34	6	5	3	4	2	1	10	3
2000-2007	238	38	34	31	25	4	9	83	14

Persistence tests using gross returns are shown in the table below, Cross Product Ratio (CPR) is greater than one in 2 of the 7 periods and none of them (0% of all yearly periods) is significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected at a 5% significance level.

Table 158 Persistence Tests for Equity Funds Using Yearly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000	1.00	0.00	0.00	0.00	0.00
2001	0.72	-0.35	0.30	-0.71	1.00
2002	0.50	-0.73	0.00	-1.00	1.00
2003	0.33	-1.06	-0.30	-1.13	2.00
2004	0.48	-0.74	-0.33	-0.71	0.65
2005	5.83	1.63	1.67	0.71	3.47
2006	1.60	0.48	1.00	-0.33	1.11
2000-2007	0.90	-0.29	0.84	-1.17	2.81

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using net returns for all two-yearly periods between 2000 and 2007 and for the entire period. In aggregate, winners in

two successive periods with 33 occurrences outnumber all other cases. The other three outcomes are equal in number with 19 cases each.

Table 159 Contingency Table for Equity Funds Using Two-Yearly Net Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	34	6	5	5	3	0	3	8	4
01/02-03/04	34	6	5	4	4	2	3	7	3
02/03-04/05	34	8	1	4	5	0	5	10	1
03/04-05/06	34	6	5	4	2	1	4	8	4
04/05-06/07	34	7	3	2	5	1	1	8	7
2000-2007	170	33	19	19	19	4	16	41	19

Persistence tests using net returns are shown in the table below. Cross Product Ratio (CPR) is greater than one in 3 of the 5 periods and none of them (0% of all two-yearly periods) is significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected at a 5% significance level.

Table 160 Persistence Tests for Equity Funds Using Two-Yearly Net Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
00/01-02/03	0.72	-0.35	0.30	-0.71	1.00
01/02-03/04	1.20	0.20	0.63	-0.33	0.58
02/03-04/05	10.00	1.83	1.15	1.63	5.56
03/04-05/06	0.60	-0.48	0.63	-1.13	2.06
04/05-06/07	5.83	1.63	1.67	0.71	3.47
2000-2007	1.74	1.27	1.94	0.00	6.53

(*) indicates significance at 5%. (**) indicates significance at 1%.

Similar with yearly returns, when risk-adjusted returns are used in the contingency table approach, there is some improvement in persistence results as seen in the related tables below.

Table 161 Contingency Table for Equity Funds Using Two-Yearly Net Risk-Adjusted Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	34	7	4	4	4	1	3	7	4
01/02-03/04	34	6	4	4	4	2	3	7	4
02/03-04/05	34	6	3	4	5	2	3	10	1
03/04-05/06	34	4	5	4	4	3	2	9	3
04/05-06/07	34	7	2	2	6	1	1	7	8
2000-2007	170	30	18	18	23	9	12	40	20

When risk-adjusted returns are used, the cross product ratio increases to 2.13 from 1.74 with z-statistics up at 1.74 from 1.27, Z_w down at 1.73 from 1.94 and Z_l up at 0.78 from 0.00 and chi-squared value down at 4.35 from 6.53. Using risk-adjusted returns increase significance level for z-statistics. Major difference is that the number of persistent losers increases but does not become significant. The period 04-05 becomes significant. However, neither persistent losers nor persistent winners are significant.

Table 162 Persistence Tests for Equity Funds Using Two-Yearly Net Risk-Adjusted Returns

Period	Cross-Product Ratio	Z-Statistic	Zw	Zl	Chi-sq
00/01-02/03	1.75	0.59	0.90	0.00	1.42
01/02-03/04	1.50	0.42	0.63	0.00	0.67
02/03-04/05	2.50	0.94	0.63	0.71	1.11
03/04-05/06	0.80	-0.23	0.00	-0.33	0.18
04/05-06/07	10.50	2.05*	1.67	1.41	4.88
2000-2007	2.13	1.74	1.73	0.78	4.35

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all two-yearly periods between 2000 and 2007 and for the entire period. In aggregate, winners in two successive periods with 33 occurrences outnumber all other cases. The other three outcomes are close in number with 20, 19 and 18 cases for WL, LW and LL outcomes respectively.

Table 163 Contingency Table for Equity Funds Using Two-Yearly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	34	6	5	5	3	0	3	8	4
01/02-03/04	34	6	5	4	4	2	3	7	3
02/03-04/05	34	8	1	4	5	0	5	10	1
03/04-05/06	34	6	5	4	2	1	4	8	4
04/05-06/07	34	7	3	3	4	0	2	8	7
2000-2007	170	33	19	20	18	3	17	41	19

Persistence tests using gross returns are shown in the table below, Cross Product Ratio (CPR) is greater than one in 3 of the 5 periods and none of them (0% of all two-yearly periods) is significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected at a 5% significance level

Table 164 Persistence Tests for Equity Funds Using Two-Yearly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
00/01-02/03	0.72	-0.35	0.30	-0.71	1.00
01/02-03/04	1.20	0.20	0.63	-0.33	0.58
02/03-04/05	10.00	1.83	1.15	1.63	5.56
03/04-05/06	0.60	-0.48	0.63	-1.13	2.06
04/05-06/07	3.11	1.10	1.26	0.38	2.53
2000-2007	1.56	1.03	1.79	-0.16	6.62

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below table shows a summary of quarterly, yearly and two-yearly evaluation periods with significant persistence. For raw returns, all of the significantly persistent funds are observed in the quarterly evaluation periods and the significantly persistent periods did not change for net and gross returns. As for risk-adjusted returns only two-yearly evaluation periods showed significant persistence in 20% of the periods.

Table 165 % of Evaluation Periods with Significant Persistence for Equity Funds

	Net Returns	Gross Returns	Risk-adjusted Returns
Quarterly	6%	6%	-
Yearly	0%	0%	0%
Two-Yearly	0%	0%	20%

As shown in the table below, in the aggregate period between 2000 and 2007, variable funds exhibit performance persistence at 5% significance only for quarterly evaluation periods both net and gross of management fees. Persistence originates from repeat winners. Winner funds' persistence is significant at 5% level only for all quarterly evaluation periods both net and gross of management fees. The source of persistence in quarterly returns is winners whose significance increased going from net to gross. Losing funds' persistence is not significant at 5% level both net and gross of management fees for any of the three evaluation period type. In the aggregate period, risk-adjusted returns are not found to be significantly persistent for yearly and two-yearly evaluation periods.

Table 166 Persistence Tests for Equity Funds for the Aggregate Period

	WW	LW	WL	LL	CPR	Z	Z_w	Z_l	Chi-sq
Equity									
Net Returns									
Quarterly	166	128	123	141	1.49	2.33*	2.53*	0.79	7.95
Yearly	39	33	30	26	1.02	0.07	1.08	-0.91	2.81
Two-Yearly	33	19	19	19	1.74	1.27	1.94	0.00	6.53
Gross Returns									
Quarterly	169	125	120	144	1.62	2.83**	2.88**	1.16	10.62
Yearly	38	34	31	25	0.90	-0.29	0.84	-1.17	2.81
Two-Yearly	33	19	20	18	1.56	1.03	1.79	-0.16	6.62
Risk-Adjusted Returns									
Quarterly	-	-	-	-	-	-	-	-	-
Yearly	38	26	29	33	1.66	1.41	1.10	0.91	2.57
Two-Yearly	30	18	18	23	2.13	1.74	1.73	0.78	4.35

Balanced Funds

Below is a summary of contingency tables using net returns for all quarters between the first quarter of 2000 and the third quarter of 2007 and for the entire period. In the aggregate period, winners in two successive periods (WW) with 210 occurrences outnumber all other cases. The second most frequent incidence is from the losers in two consecutive periods (LL) with 184 occurrences. Winner-Loser and Loser-Winner cases are 173 and 165 cases respectively.

Table 167 Contingency Table for Balanced Funds Using Quarterly Net Returns

Period	Total 0	Winner-Winner-	Loser-Winner	Winner-Loser	Loser-Loser	Winner-Gone	Loser-Gone	No Fund	New Fund
2000/1	45	3	6	8	5	0	0	20	3
2000/2	45	8	3	3	11	0	0	16	4
2000/3	45	9	3	6	11	0	0	14	2
2000/4	45	10	6	6	9	0	0	12	2
2001/1	45	11	9	6	6	0	1	8	4
2001/2	45	12	5	6	11	2	0	9	0
2001/3	45	7	11	10	6	0	0	11	0
2001/4	45	6	8	11	7	1	1	11	0
2002/1	45	9	4	3	10	2	4	11	2
2002/2	45	8	5	4	8	2	1	17	0
2002/3	45	7	4	6	8	0	0	20	0
2002/4	45	6	6	5	7	0	1	20	0
2003/1	45	7	5	5	7	0	0	21	0
2003/2	45	6	5	6	7	0	0	20	1
2003/3	45	7	6	4	8	0	0	19	1
2003/4	45	6	6	6	7	1	0	19	0
2004/1	45	7	7	5	4	0	2	19	1
2004/2	45	10	5	5	4	0	0	21	0
2004/3	45	11	3	4	3	0	3	21	0
2004/4	45	6	5	8	2	0	0	24	0
2005/1	45	6	3	5	7	0	0	24	0
2005/2	45	4	4	5	7	0	1	24	0
2005/3	45	4	6	4	5	0	1	24	1
2005/4	45	5	7	5	3	0	0	25	0
2006/1	45	5	5	7	3	0	0	25	0
2006/2	45	4	7	5	3	1	0	25	0
2006/3	45	7	4	3	4	1	0	26	0
2006/4	45	5	4	6	2	0	1	27	0
2007/1	45	6	4	3	4	0	0	26	2
2007/2	45	5	5	6	2	0	1	26	0
2007/3	45	3	4	7	3	0	1	27	0
00/1-07/3	1395	210	165	173	184	10	18	612	23

Persistence tests are carried out using both net and gross returns. When net returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 19 of the 31 periods and four of them (13% of all quarters) are significant. Z_w and Z_l statistics provide additional information since they show that the persistence in three of these four periods originate in almost equal measure from both kinds of mutual funds, winners and losers alike, however persistent winners or losers are not significant. One period's (2000/2) persistence originates from losers and persistent losers are significant.

For the aggregate period encompassing all quarters, the null hypothesis of no persistence can be rejected at a 5% significance level.

Table 168 Persistence Tests for Balanced Funds Using Quarterly Net Returns

Period 0	Cross-Product Ratio 0	Z-Statistic 0	Z_w 0	Z_l 0	Chi-sq 0
2000/1	0.31	-1.28	-1.51	-0.30	2.36
2000/2	9.78	2.40*	1.51	2.14	7.48
2000/3	5.50	2.03*	1.73	1.21	5.07
2000/4	2.50	1.24	1.00	0.77	1.65
2001/1	1.22	0.27	1.21	-0.77	2.25
2001/2	4.40	2.01*	1.41	1.50	4.35
2001/3	0.38	-1.36	-0.73	-1.21	2.00
2001/4	0.48	-1.02	-1.21	-0.26	1.75
2002/1	7.50	2.26*	1.73	1.60	5.69
2002/2	3.20	1.39	1.15	0.83	2.04
2002/3	2.33	1.02	0.28	1.15	1.40
2002/4	1.40	0.41	0.30	0.28	0.33
2003/1	1.96	0.81	0.58	0.58	0.67
2003/2	1.40	0.41	0.00	0.58	0.33
2003/3	2.33	1.02	0.90	0.53	1.40
2003/4	1.17	0.19	0.00	0.28	0.12
2004/1	0.80	-0.26	0.58	-0.90	1.17
2004/2	1.60	0.54	1.29	-0.33	3.67
2004/3	2.75	1.01	1.81	0.00	8.52
2004/4	0.30	-1.21	-0.53	-1.13	3.57
2005/1	2.80	1.12	0.30	1.26	1.67
2005/2	1.40	0.37	-0.33	0.90	1.20
2005/3	0.83	-0.20	0.00	-0.30	0.58
2005/4	0.43	-0.91	0.00	-1.26	1.60
2006/1	0.43	-0.91	-0.58	-0.71	1.60
2006/2	0.34	-1.11	-0.33	-1.26	1.84
2006/3	2.33	0.86	1.26	0.00	2.00
2006/4	0.42	-0.83	-0.30	-0.82	2.06
2007/1	2.00	0.69	1.00	0.00	1.12
2007/2	0.33	-1.06	-0.30	-1.13	2.00
2007/3	0.32	-1.10	-1.26	-0.38	2.53
00/1-07/3	1.35	2.04*	1.89	1.02	6.31

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all quarters between the first quarter of 2000 and the third quarter of 2007 and for the entire period. In aggregate period, winners in two successive periods (WW) with 203 occurrences outnumber all other cases. The second most frequent incidence is from the losers in two consecutive periods (LL) with 182 occurrences. Winner-Loser and Loser-Winner cases are 175 and 172 cases respectively.

Table 169 Contingency Table for Balanced Funds Using Quarterly Gross Returns

Period	Total	Winner-Winner-	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000/1	45	3	7	8	4	0	0	20	3
2000/2	45	9	4	4	8	0	0	16	4
2000/3	45	10	5	5	9	0	0	14	2
2000/4	45	10	6	6	9	0	0	12	2
2001/1	45	9	9	8	6	0	1	8	4
2001/2	45	10	7	6	11	2	0	9	0
2001/3	45	6	11	11	6	0	0	11	0
2001/4	45	7	9	9	7	1	1	11	0
2002/1	45	9	4	5	8	2	4	11	2
2002/2	45	8	5	4	8	2	1	17	0
2002/3	45	7	6	6	6	0	0	20	0
2002/4	45	6	6	7	5	0	1	20	0
2003/1	45	7	5	5	7	0	0	21	0
2003/2	45	7	6	5	6	0	0	20	1
2003/3	45	8	5	5	7	0	0	19	1
2003/4	45	6	7	6	6	1	0	19	0
2004/1	45	6	5	7	5	0	2	19	1
2004/2	45	7	5	5	7	0	0	21	0
2004/3	45	6	5	6	4	0	3	21	0
2004/4	45	4	7	7	3	0	0	24	0
2005/1	45	8	3	3	7	0	0	24	0
2005/2	45	6	4	5	5	0	1	24	0
2005/3	45	6	4	4	5	0	1	24	1
2005/4	45	5	5	5	5	0	0	25	0
2006/1	45	4	6	6	4	0	0	25	0
2006/2	45	4	6	5	4	1	0	25	0
2006/3	45	6	3	4	5	0	1	26	0
2006/4	45	4	5	5	3	0	1	27	0
2007/1	45	5	4	4	4	0	0	26	2
2007/2	45	4	5	6	3	0	1	26	0
2007/3	45	6	3	3	5	0	1	27	0
2000/1-2007/3	1395	203	172	175	182	9	19	612	23

Persistence tests when gross returns are used as shown in the table below, Cross Product Ratio (CPR) is greater than one in 17 of the 31 periods and none of them (0% of all periods) are significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected at a 5% significance level.

Table 170 Persistence Tests for Balanced Funds Using Quarterly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
2000/1	0.21	-1.67	-1.51	-0.90	3.09
2000/2	4.50	1.75	1.39	1.15	3.32
2000/3	3.60	1.64	1.29	1.07	2.86
2000/4	2.50	1.24	1.00	0.77	1.65
2001/1	0.75	-0.40	0.24	-0.77	0.75
2001/2	2.62	1.36	1.00	0.94	2.00
2001/3	0.30	-1.69	-1.21	-1.21	2.94
2001/4	0.60	-0.71	-0.50	-0.50	0.50
2002/1	3.60	1.55	1.07	1.15	2.62
2002/2	3.20	1.39	1.15	0.83	2.04
2002/3	1.17	0.19	0.28	0.00	0.12
2002/4	0.71	-0.41	-0.28	-0.30	0.33
2003/1	1.96	0.81	0.58	0.58	0.67
2003/2	1.40	0.41	0.58	0.00	0.33
2003/3	2.24	0.99	0.83	0.58	1.08
2003/4	0.86	-0.19	0.00	-0.28	0.12
2004/1	0.86	-0.18	-0.28	0.00	0.48
2004/2	1.96	0.81	0.58	0.58	0.67
2004/3	0.80	-0.25	0.00	-0.33	0.52
2004/4	0.24	-1.51	-0.90	-1.26	2.43
2005/1	6.22	1.89	1.51	1.26	3.95
2005/2	1.50	0.45	0.30	0.33	0.40
2005/3	1.88	0.68	0.63	0.33	0.58
2005/4	1.00	0.00	0.00	0.00	0.00
2006/1	0.44	-0.89	-0.63	-0.63	0.80
2006/2	0.53	-0.68	-0.33	-0.63	0.58
2006/3	2.50	0.94	0.63	0.71	1.11
2006/4	0.48	-0.74	-0.33	-0.71	0.65
2007/1	1.25	0.23	0.33	0.00	0.18
2007/2	0.40	-0.94	-0.63	-0.71	1.11
2007/3	3.33	1.18	1.00	0.71	1.59
2000/1-2007/3	1.23	1.38	1.44	0.53	3.20

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using net returns for all years between 2000 and 2007 and for the entire period. In the aggregate period, winners in two successive periods (WW) with 53 occurrences outnumber all other cases. The second most frequent incidence is Winner-Losers with 43 occurrences.

Table 171 Contingency Table for Balanced Funds Using Yearly Net Returns

Period	Total 0	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	45	9	9	7	6	0	0	8	6
2001	45	11	5	8	8	0	5	6	2
2002	45	8	5	8	3	1	9	9	2
2003	45	7	5	5	8	1	0	18	1
2004	45	6	5	7	3	0	5	18	1
2005	45	7	3	4	6	0	2	23	0
2006	45	5	5	4	3	1	2	23	2
2000-2007	315	53	37	43	37	3	23	105	14

Persistence tests using net returns are shown in the table below, Cross Product Ratio (CPR) is greater than one in 3 of the 7 periods and none of them (0% of all years) are significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected.

Table 172 Persistence Tests for Balanced Funds Using Yearly Net Returns

Period	Cross-Product Ratio	Z-Statistic 0	Z_w 0	Z_l 0	Chi-sq 0
2000	0.86	-0.21	0.50	-0.77	0.87
2001	2.20	1.07	0.69	0.83	2.25
2002	0.60	-0.58	0.00	-0.71	3.00
2003	2.24	0.99	0.58	0.83	1.08
2004	0.51	-0.72	-0.28	-0.71	1.67
2005	3.50	1.33	0.90	1.00	2.00
2006	0.75	-0.29	0.33	-0.71	0.65
2000-2007	1.23	0.67	1.02	0.00	4.02

(*) indicates significance at 5%. (**) indicates significance at 1%.

When risk-adjusted returns are used in the contingency table approach, there is some deterioration in persistence as seen in the related tables below.

Table 173 Contingency Table for Balanced Funds Using Yearly Net Risk-Adjusted Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	45	8	9	8	6	0	0	8	6
2001	45	11	6	6	9	2	3	6	2
2002	45	6	6	7	5	4	6	9	2
2003	45	6	7	5	6	2	0	18	1
2004	45	6	6	6	4	1	2	19	1
2005	45	6	5	5	4	1	2	21	1
2006	45	5	5	5	3	1	2	22	2
2000-2007	315	48	44	42	37	11	15	103	15

When risk-adjusted returns are used, the cross product ratio decreases to 0.96 from 1.23. Hence we cannot talk about persistence for any of the periods.

Table 174 Persistence Tests for Balanced Funds Using Yearly Net Risk-Adjusted Returns

Period	Cross-Product Ratio	Z-Statistic	Zw	Zl	Chi-sq
2000	0.67	-0.56	0.00	-0.77	0.61
2001	2.75	1.38	1.21	0.77	2.25
2002	0.71	-0.41	-0.28	-0.30	0.33
2003	1.03	0.03	0.30	-0.28	0.33
2004	0.67	-0.47	0.00	-0.63	0.55
2005	0.96	-0.05	0.30	-0.33	0.40
2006	0.60	-0.53	0.00	-0.71	0.67
2000-2007	0.96	-0.13	0.63	-0.78	1.47

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all years between 2000 and 2007 and for the entire period. In the aggregate period, winners or losers in two successive periods (WW) do not outnumber all other cases indicating no persistence.

Table 175 Contingency Table for Balanced Funds Using Yearly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
2000	45	9	9	7	6	0	0	8	6
2001	45	9	7	10	6	0	5	6	2
2002	45	3	5	9	4	5	8	6	5
2003	45	2	5	4	5	7	3	9	10
2004	45	7	4	6	4	0	5	18	1
2005	45	7	3	4	6	0	2	23	0
2006	45	6	4	3	4	1	2	23	2
2000-2007	315	43	37	43	35	13	25	93	26

Persistence tests using gross returns are shown in the table below, Cross Product Ratio (CPR) is greater than one in 2 of the 7 periods and none of them (0% of all years) is significant. For the aggregate period encompassing all quarters, the null hypothesis of no persistence cannot be rejected.

Table 176 Persistence Tests for Balanced Funds Using Yearly Gross Returns

Period	Cross-Product Ratio	Z-Statistic 0	Z_w 0	Z_l 0	Chi-sq 0
2000	0.86	-0.21	0.50	-0.77	0.87
2001	0.77	-0.36	-0.23	-0.28	1.25
2002	0.27	-1.40	-1.73	-0.33	3.95
2003	0.50	-0.65	-0.82	0.00	1.50
2004	1.17	0.17	0.28	0.00	1.29
2005	3.50	1.33	0.90	1.00	2.00
2006	2.00	0.69	1.00	0.00	1.12
2000-2007	0.95	-0.17	0.00	-0.24	1.29

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using net returns for all two-yearly periods between 2000 and 2007 and for the entire period. In the aggregate period, winners in two successive periods (WW) with 48 occurrences outnumber all other cases. The second most frequent incidence is from the winner-losers in two consecutive periods (WL) with 29 occurrences. Loser-Loser and Loser-Winner cases are 26 and 19 cases respectively.

Table 177 Contingency Table for Balanced Funds Using Two-Yearly Net Returns

Period	Total 0	Winner-Winner-	Loser-Winner	Winner-Loser	Loser-Loser	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	45	10	7	8	7	1	4	4	4
01/02-03/04	45	8	6	7	3	5	10	3	3
02/03-04/05	45	12	2	5	6	1	10	7	2
03/04-05/06	45	9	2	4	6	1	5	17	1
04/05-06/07	45	9	2	5	4	0	7	16	2
	0	0	0	0	0	0	0	0	0
00/01-02/03 to 04/05-06/07	225	48	19	29	26	8	36	47	12

Persistence tests using net returns are shown in the table below, Cross Product Ratio (CPR) is greater than one in 4 of the 5 periods and one of them (20% of all years) is significant. For the aggregate period encompassing all years, the null hypothesis of no persistence can be rejected at a 5% significance level. Persistence is due to significant persistent winners.

Table 178 Persistence Tests for Balanced Funds Using Two-Yearly Net Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
00/01-02/03	1.25	0.31	0.47	0.00	0.75
01/02-03/04	0.57	-0.64	0.26	-1.00	2.33
02/03-04/05	7.20	2.03*	1.70	1.41	8.44
03/04-05/06	6.75	1.88	1.39	1.41	5.10
04/05-06/07	3.60	1.24	1.07	0.82	5.20
00/01-02/03 to 04/05-06/07	2.26	2.14*	2.17*	1.04	15.11

(*) indicates significance at 5%. (**) indicates significance at 1%.

Similar with yearly returns, when risk-adjusted returns are used in the contingency table approach, there is somewhat improvement in persistence results as seen in the related tables below.

Table 179 Contingency Table for Balanced Funds Using Two-Yearly Net Risk-Adjusted Returns

Period	Total	Winner-Winner-	Loser-Winner	Winner-Loser	Loser-Loser	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	45	11	5	6	10	2	3	4	4
01/02-03/04	45	9	4	7	4	4	11	3	3
02/03-04/05	45	7	6	4	7	7	5	7	2
03/04-05/06	45	9	3	4	6	1	4	17	1
04/05-06/07	45	8	3	4	6	1	4	17	2
00/01-02/03 to 04/05-06/07	225	44	21	25	33	15	27	48	12

When risk-adjusted returns are used, the cross product ratio increases to 2.77 from 2.26 with z-statistics up at 2.71 from 2.14, Z_w up at 2.29 from 2.17 and Z_l up at 1.63 from 1.04 and chi-squared value down at 10.04 from 15.11. Using risk-adjusted returns increase significance level for z-statistics. Again persistence is due to significant persistent winners. Major difference is that the number of persistent losers increases but persistent losers does not become significant. There is no significant sub period.

Table 180 Persistence Tests for Balanced Funds Using Two-Yearly Net Risk-Adjusted Returns

Period	Cross-Product Ratio	Z-Statistic	Zw	Zl	Chi-sq
00/01-02/03	3.67	1.74	1.21	1.29	3.25
01/02-03/04	1.29	0.29	0.50	0.00	3.00
02/03-04/05	2.04	0.85	0.90	0.28	1.00
03/04-05/06	4.50	1.62	1.39	1.00	3.82
04/05-06/07	4.00	1.48	1.15	1.00	2.81
00/01-02/03 to 04/05-06/07	2.77	2.71**	2.29*	1.63	10.04

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below is a summary of contingency tables using gross returns for all two-year periods between 2000 and 2007 and for the entire period. In aggregate period, winners in two successive periods (WW) with 51 occurrences outnumber all other cases. Winner-Loser and Loser-Loser cases are at 28 and 27 occurrences respectively.

Table 181 Contingency Table for Balanced Funds Using Two-Yearly Gross Returns

Period	Total	Winner-Winner	Loser-Winner	Winner-Loser	Loser-Loser-	Winner-Gone	Loser-Gone	No Fund	New Fund
00/01-02/03	45	10	7	8	7	1	4	4	4
01/02-03/04	45	11	3	5	5	4	11	3	3
02/03-04/05	45	12	2	5	6	1	10	7	2
03/04-05/06	45	9	2	5	5	0	6	17	1
04/05-06/07	45	9	2	5	4	0	7	16	2
00/01-02/03 to 04/05-06/07	225	51	16	28	27	6	38	47	12

Persistence tests using gross returns are shown in the table below. Cross Product Ratio (CPR) is greater than one in all of the 5 periods and one of them (20% of all periods) is significant. For the aggregate period encompassing all two-yearly periods, the null hypothesis of no persistence can be rejected at a 1% significance level.

Table 182 Persistence Tests for Balanced Funds Using Two-Yearly Gross Returns

Period	Cross-Product Ratio	Z-Statistic	Z_w	Z_l	Chi-sq
00/01-02/03	1.25	0.31	0.47	0.00	0.75
01/02-03/04	3.67	1.43	1.50	0.71	6.00
02/03-04/05	7.20	2.03*	1.70	1.41	8.44
03/04-05/06	4.50	1.50	1.07	1.13	4.71
04/05-06/07	3.60	1.24	1.07	0.82	5.20
00/01-02/03 to 04/05-06/07	3.07	2.85**	2.59**	1.68	21.28

(*) indicates significance at 5%. (**) indicates significance at 1%.

Below table shows a summary of quarterly, yearly and two-yearly evaluation periods with significant persistence. There is some statistically significant persistence at quarterly assessment periods which fades away at yearly evaluation periods and then reappears at two-yearly evaluation periods. Therefore, for balanced funds the percentage of significantly persistent periods increases as the length of evaluation periods increases. This pattern repeats itself for gross returns as well with smaller

number of significant periods for quarterly returns. The fact that the number of significant periods decreases for quarterly returns going from net to gross returns means that some of the repeat underperformers with respect to the median actually had higher management fees than the average so that when adjusted for fees they switch to over performer in one period (LW or WL). On the other hand, some of the repeat over performers actually paid lower fees so that when adjusted for fees they switch to underperformer (WL or LW).

Table 183 % of Evaluation Periods with Significant Persistence for Balanced Funds

	Net Returns	Gross Returns	Risk-adjusted Returns
Quarterly	13%	6%	-
Yearly	0%	0%	0%
Two-Yearly	20%	20%	0%

As shown in the table below, in the aggregate period between 2000 and 2007, balanced funds exhibit performance persistence at 5% significance level for quarterly and two-yearly evaluation periods for net returns. For gross and risk-adjusted returns, only two-yearly periods had shown performance persistence at 5% significance level.

In these significant cases, persistence originates all from repeat winners. Winner funds' persistence is significant at 5% level only for two-yearly evaluation periods for net, gross and risk-adjusted returns. Losing funds' persistence is not significant at 5% level for net, gross and risk-adjusted returns for any three evaluation period type.

Table 184 Persistence Tests for Balanced Funds for the Aggregate Period

	WW	LW	WL	LL	CPR	Z	Z_w	Z_l	Chi-sq
Net Returns									
Quarterly	210	165	173	184	1.35	2.04*	1.89	1.02	6.31
Yearly	53	37	43	37	1.23	0.67	1.02	0.00	4.02
Two-Yearly	48	19	29	26	2.26	2.14*	2.17*	1.04	15.11
Gross Returns									
Quarterly	203	172	175	182	1.23	1.38	1.44	0.53	3.20
Yearly	43	37	43	35	0.95	-0.17	0.00	-0.24	1.29
Two-Yearly	51	16	28	27	3.07	2.85**	2.59**	1.68	21.28
Risk-Adjusted Returns									
Quarterly	-	-	-	-	-	-	-	-	-
Yearly	48	44	42	37	0.96	-0.13	0.63	-0.78	1.47
Two-Yearly	44	21	25	33	2.77	2.71**	2.29*	1.63	10.04

Parametric Approach

In the investigation of persistence using regression analysis, Period 2 performance is regressed against Period 1 performance using the regression equation shown below as explained in the Methodology section. Here as performance indicator both raw and risk-adjusted returns are utilized.

$$\alpha_{i,t+1} = \beta_1 + \beta_2 \alpha_{i,t} + u_{i,t}$$

Where

$\alpha_{i,t+1}$ is alpha of the future period for fund i and

$\alpha_{i,t}$ is alpha of the current period for fund i.

Positive estimates of β_2 in the above equation with significant t-statistics are evidence of persistence showing that Period 1 performance contains useful information for predicting Period 2 performance.

In parametric approach, the same evaluation periods of one quarter, one year and two years are used for regressing raw returns but quarterly periods are not used for risk-adjusted returns because 12 weekly returns per quarter used to calculate risk-adjusted returns or alphas for funds would not yield reliable alphas in these regression equations.

Mutual fund alphas are calculated for annual and bi-annual periods for each fund category before regressing Period 2 returns on Period 1 returns.

Regressions of Annual and Bi-Annual Variable Fund Raw and Risk-Adjusted Returns

Using raw returns, the year 2000, 2001, 2003, 2004 and 2005 variable fund returns are found to be persistent. In other words, variable fund returns in these years can help predict their successive year fund returns.

Table 185 Regressions of Variable Funds' Annual Raw Returns

x	y	alpha	t	Signif	beta	t	Signif
2000	2001	0.501	19.23	0.00	0.32	3.13*	0.00
2001	2002	-0.095	-2.19	0.03	0.34	4.16*	0.00
2002	2003	0.360	14.14	0.00	0.12	0.84	0.41
2003	2004	0.033	0.76	0.45	0.29	2.73*	0.01
2004	2005	0.118	3.19	0.00	0.69	3.41*	0.00
2005	2006	0.002	0.11	0.91	0.17	2.13*	0.04
2006	2007	0.133	9.16	0.00	0.32	1.92	0.06

(*) indicates significance.

However, risk adjustment changes the years that are significant. Risk-adjusted variable fund returns in years 2001, 2002, 2004 and 2006 are found to be persistent as shown below.

Table 186 Regressions of Variable Funds' Annual Risk-Adjusted Returns

X	y	alpha	t	Signif	beta	t	Signif
2000	2001	-0.001	-1.88	0.06	0.14	0.85	0.40
2001	2002	-0.001	-1.62	0.11	0.52	4.47*	0.00
2002	2003	-0.001	-2.14	0.04	0.44	4.19*	0.00
2003	2004	0.000	-0.36	0.72	0.23	1.84	0.07
2004	2005	0.000	-1.28	0.21	0.66	4.21*	0.00
2005	2006	0.000	0.24	0.81	0.24	1.50	0.14
2006	2007	0.000	0.03	0.98	0.38	2.33*	0.02

(*) indicates significance.

Using raw returns, two-year periods of 2003-2004 and 2004-2005 variable fund returns are found to be persistent. In other words, variable fund returns in these periods can help predict their successive two-year period fund returns.

Table 187 Regressions of Variable Funds' Bi-Annual Raw Returns

x	y	alpha	t	Signif	beta	t	Signif
00-01	02-03	0.28	5.09	0.00	0.20	1.92	0.06
01-02	03-04	0.51	8.08	0.00	-0.03	-0.27	0.79
02-03	04-05	0.23	3.23	0.00	0.26	1.91	0.06
03-04	05-06	0.11	1.64	0.11	0.29	2.40*	0.02
04-05	06-07	0.09	2.18	0.03	0.24	2.45*	0.02

(*) indicates significance.

However, risk adjustment changes one of the periods that are significant. Risk-adjusted variable fund returns in periods 2001-2002 and 2003-2004 are found to be persistent as shown below.

Table 188 Regressions of Variable Funds' Bi-Annual Risk-Adjusted Returns

x	y	alpha	t	Signif	beta	T	Signif
00-01	02-03	0.00	-2.95	0.00	0.15	1.15	0.25
01-02	03-04	0.00	-1.73	0.09	0.21	2.30*	0.03
02-03	04-05	0.00	-0.80	0.43	0.18	1.47	0.15
03-04	05-06	0.00	-0.17	0.86	0.54	3.84*	0.00
04-05	06-07	0.00	0.13	0.90	0.13	0.71	0.48

(*) indicates significance.

Regressions of Annual and Bi-Annual Equity Fund Raw and Risk-Adjusted Returns

Using raw returns, only the year 2005 returns are found to be persistent. In other words, equity fund returns in years between 2000 and 2006 except for 2005 cannot help predict their successive year fund returns.

Table 189 Regressions of Equity Funds' Annual Raw Returns

x	y	alpha	t	Signif	beta	t	Signif
2000	2001	0.43	5.33	0.00	0.29	1.11	0.28
2001	2002	-0.14	-2.13	0.05	0.29	1.83	0.08
2002	2003	0.36	9.55	0.00	-0.07	-0.24	0.81
2003	2004	0.11	1.25	0.23	0.13	0.60	0.56
2004	2005	0.33	4.88	4.88	-0.01	-0.02	0.98
2005	2006	-0.10	-1.85	0.08	0.42	2.75*	0.01
2006	2007	0.21	6.98	0.00	-0.20	-0.55	0.59

(*) indicates significance.

Risk-adjusted returns wipe away the persistence of year 2005 returns as well. Therefore, risk-adjusted equity fund returns are not found to be persistent in any of the years between 2000 and 2006 as shown below.

Table 190 Regressions of Equity Funds' Annual Risk-Adjusted Returns

x	y	alpha	t	Signif	beta	t	Signif
2000	2001	-0.001	-1.39	0.18	0.05	0.51	0.62
2001	2002	0.000	-0.35	0.73	0.09	0.50	0.62
2002	2003	0.001	0.74	0.47	0.30	0.38	0.71
2003	2004	0.001	0.99	0.34	0.22	0.60	0.55
2004	2005	0.000	0.46	0.65	-0.02	-0.06	0.95
2005	2006	-0.001	-2.04	0.06	0.31	0.82	0.42
2006	2007	-0.005	-0.28	0.78	18.64	1.79	0.09

(*) indicates significance.

Using raw returns, only one two-year period (2004-2005) equity fund returns are found to be persistent. In other words, equity fund returns only in that period can help predict the successive two-year period fund returns.

Table 191 Regressions of Equity Funds' Bi-Annual Raw Returns

x	y	alpha	t	Signif	beta	t	Signif
00/01	02-03	0.31	4.69	0.00	-0.12	-0.51	0.61
01/02	03-04	0.49	5.97	0.00	-0.01	-0.04	0.97
02/03	04-05	0.25	2.38	0.03	0.54	1.88	0.08
03/04	05-06	0.36	2.85	0.01	0.01	0.06	0.96
04/05	06-07	-0.05	-0.41	0.69	0.55	2.19*	0.04

(*) indicates significance.

However, risk adjustment positive persistence disappears as shown below.

Table 192 Regressions of Equity Funds' Bi-Annual Risk-Adjusted Returns

x	y	alpha	t	Signif	beta	t	Signif
00/01	02-03	0.00	-1.03	0.32	-0.26	-2.07	0.05
01/02	03-04	0.00	1.12	0.28	-0.21	-0.29	0.78
02/03	04-05	0.00	0.82	0.43	0.22	0.59	0.56
03/04	05-06	0.00	-0.67	0.51	-0.41	-0.90	0.38
04/05	06-07	0.00	-2.16	0.05	0.46	0.83	0.42

(*) indicates significance.

Regressions of Annual and Bi-Annual Balanced Fund Raw and Risk-Adjusted Returns

Using raw returns, only the year 2005 returns are found to be persistent. In other words, balanced fund returns in years between 2000 and 2006 except for 2005 cannot help predict their successive year fund returns.

Table 193 Regressions of Balanced Funds' Annual Raw Returns

x	y	alpha	t	Signif	beta	t	Signif
2000	2001	0.4359	9.48	0.00	-0.05	-0.17	0.87
2001	2002	0.0284	0.45	0.66	0.17	1.28	0.21
2002	2003	0.4187	18.02	0.00	0.04	0.31	0.76
2003	2004	0.0353	0.55	0.59	0.26	1.66	0.11
2004	2005	0.1316	2.08	0.05	0.50	1.40	0.18
2005	2006	-0.1576	-3.15	0.01	0.91	4.37*	0.00
2006	2007	0.1798	11.29	0.00	0.08	0.67	0.51

(*) indicates significance.

Risk-adjusted returns show the same pattern. Therefore, risk-adjusted balanced fund returns are not found to be persistent in any of the years between 2000 and 2006 except for 2005 as shown below.

Table 194 Regressions of Balanced Funds' Annual Risk-Adjusted Returns

x	y	alpha	t	Signif	beta	t	Signif
2000	2001	-0.0014	-2.02	0.05	-0.1380	-0.81	0.43
2001	2002	-0.0002	-0.35	0.73	0.1648	1.15	0.26
2002	2003	-0.0006	-1.80	0.09	0.0982	0.62	0.54
2003	2004	-0.0004	-1.37	0.18	-0.1130	-0.58	0.57
2004	2005	-0.0003	-0.83	0.42	0.3512	1.30	0.21
2005	2006	-0.0002	-0.58	0.57	0.6685	5.67*	0.00
2006	2007	-0.0006	-2.12	0.05	-0.0901	-0.75	0.46

(*) indicates significance.

Using raw returns, bi-annual periods of 2003-2004 and 2004-2005 balanced fund returns are found to be persistent. In other words, balanced fund returns in these periods can help predict their successive two-year period fund returns.

Table 195 Regressions of Balanced Funds' Bi-Annual Raw Returns

x	y	alpha	t	Signif	beta	t	Signif
00/01	02/03	0.27	2.61	0.01	0.36	1.51	0.14
01/02	03/04	0.47	8.82	0.00	0.15	1.79	0.09
02/03	04/05	0.16	1.51	0.14	0.29	1.47	0.16
03/04	05/06	-0.01	-0.04	0.97	0.49	2.25*	0.04
04/05	06/07	-0.11	-1.28	0.22	0.79	3.85*	0.00

(*) indicates significance.

Risk adjustment shows similar persistence results. Risk-adjusted variable fund returns in periods 2003-2004 and 2004-2005 are found to be persistent as shown below.

Table 196 Regressions of Balanced Funds' Bi-Annual Risk-Adjusted Returns

x	y	alpha	t	Signif	beta	t	Signif
00/01	02/03	0.00	-1.11	0.28	0.05	0.30	0.77
01/02	03/04	0.00	-1.69	0.11	0.10	0.90	0.38
02/03	04/05	0.00	-1.34	0.20	-0.05	-0.29	0.78
03/04	05/06	0.00	-0.71	0.49	0.77	2.43*	0.02
04/05	06/07	0.00	-2.16	0.04	0.53	7.47*	0.00

(*) indicates significance.

Below is a summary of parametric and nonparametric tests of persistence showing the percentage of periods with significant persistence.

Table 197 Summary of % of Evaluation Periods with Significant Persistence

	Variable		Equity		Balanced	
	raw	risk-adjusted	raw	risk-adjusted	raw	risk-adjusted
Quarterly						
Non-parametric	19-23%	-	6%	-	13-6%	-
Parametric	-	-	-	-	-	-
Annual						
Non-parametric	14%	29%	0%	0%	0%	0%
Parametric	71%	57%	14%	0%	14%	14%
Bi-Annual						
Non-parametric	0%	20%	0%	20%	20%	0%
Parametric	40%	40%	20%	0%	40%	40%

(*) indicates significance.

CHAPTER 6 LITERATURE SURVEY ON THE VALUE OF ANALYST RESEARCH FOR FUND MANAGERS

The research on securities analysts and equity research dates back to 1970s (Groth, Wilbur, Schlarbaum, Lease, 1979). The earlier works dwelled on the process of making recommendations. During late 70s and 80s, in line with the fast developments in the stock markets originated from the US and spread elsewhere, research work concentrated on the issue of whether it is possible to earn abnormal returns from analyst recommendations, which is against the Efficient Market Hypothesis (EMH). EMH states that security prices fully reflect all available information. This theory has been subject to much research and analysis and has been a major source of disagreement between academicians and practitioners. The practitioners have tended to resist the theory for obvious reasons as the theory questions the justification of investment management profession in its fundamentals while the academics have forcefully promoted it. Yet the amount of equity research in developing and emerging markets skyrocketed in the last two decade.

The implications of this theory for equity research had been observed in many tests that were performed to check whether the recommendations of the sell-side equity research analysts (buy, sell, hold) can result in abnormal returns creating value for investors, which in turn may indicate that market is not efficient. However, the issue of whether investors obtain abnormal returns remained as an unresolved issue with contradicting research results. As such tests involve measuring returns over long period of time, they are blurred by the joint hypothesis problem of equilibrium model and market efficiency interaction. Abnormal returns can result from market inefficiency, a bad market equilibrium model or both. The sole reason

for excess returns of some security analysts can be due to the argument that they are informed people. Hence proponents of EMH asserted that analysts are rewarded not for their superior analysis skills but rather their access to some inside information in companies (Fama, 1991)

Late 80s and early 90s witnessed the questioning of accuracy forecasts of the analysts in the research papers. A number of studies of US and UK analyst accuracy have been conducted since 80s. O'Brien was unable to distinguish between random sample of UK analysts (1990) forecasting in selected industries. However Brown (1990) and Stickel (1992) were able to demonstrate that an independently identified sample of reputable analysts forecast more accurately than other analysts do. These vast amounts of earning forecast investigations have tended to demonstrate that analysts' consensus forecasts are more accurate than those derived from naïve models or other resources. In the US studies analysts tend to be optimistic in their forecasts. UK evidence is split on this issue with Bhaskar and Morris (1984) and O'Hanlon and Whiddett (1991) suggesting pessimism and Patz (1989) and the large sample study by Capstaff et al (1995) presenting results that are consistent with optimism. According to Capstaff et al (1996) optimistic forecasting is endemic throughout Europe. In all these studies evidence suggests that the forecast accuracy is conditional on the forecast horizon, the size of the firm whose earnings are being forecasted, the industry in which company operates, and across time as economic conditions change. De Bondt and Thaler (1990) present evidence that US analysts' forecasts tend to be optimistic and extreme and that even after allowing for typical bias, forecasts of positive changes in earnings are too positive and of negative changes are too negative. The underlying view is that earning forecasting errors are accidental and result from shortcomings in human information processing

(Kahneman and Tversky, 1979). On the other hand a number of researchers doubt the overreaction which De Bondt and Thaler (1985) tried to demonstrate in share prices and some evidence also disputes the existence of overreaction in earning forecasts (Abarbanell and Bernard, 1992). However majority of the studies came up with results demonstrating optimism and inaccuracies in forecasts.

In Capstaff et al (1995) the authors refer to the persistent forecasting errors as "irrational" implying that analysts could observe their performance and improve the quality of their forecasts by correcting for predictable errors. The fact that they do not correct is viewed as a mistake and a failure of rationality. Capstaff et al (1996) consider an alternative explanation for this fact. They assert that earnings forecasting by investment analysts is primarily driven by the need to simulate share trading by fund managers and suggest that extreme forecasts and optimistic forecasts are more likely to stimulate trading than are forecasts which suggest little change. In addition to this, Pike et al (1993) present their results from a survey of UK and German investment analysts, which confirm that one of the analysts' primary sources of information is the management of the firm that they are researching. This valuable relationship will possibly be damaged by adverse analyst reports or forecasts and this is another incentive to optimism, or at least a constraint on pessimism.

The incentives to produce biased forecasts may be constrained by the need to maintain credibility. Recommendations, reports or forecasts by analysts who have previously been to be unreliable are unlikely to stimulate trading. Stickel (1992) has shown that forecasting performance is related to the selection for the Institutional Investor's All-American Research Team and that share prices react more strongly following forecasts by All-Americans than by other analysts. All in all, evidence regarding deliberate versus accidental forecasting errors is inconclusive.

The research on securities analysts and equity research gained more visibility in the eyes of public, media and regulatory bodies after 2000. During 2001, stock markets faced a serious credibility problem worldwide, especially in the US in the wake of the corporate scandals like the Enron debacle. Investors, media, regulatory agencies and the politicians in the US started to question whether the investing public can trust the recommendations they receive from the analysts. This brought the issues of credibility and objectivity of sell-side analysts. At the heart of this controversy are the misaligned incentives of investment bank clients. While brokerage clients (investors) want unbiased research, most corporate financing clients benefit from optimistic research. So the investment banks having brokerage and corporate finance operations under one roof have this obvious conflict of interest. As corporate finance revenues are larger than brokerage commissions, investment banks face huge incentives to maintain policies that favor issuers over investors. The case in Turkey, although the sizes are much smaller with respect to US markets, is very much the same. Therefore the issue is present irrespective of the location in all the global financial markets. However, the size of public interest to this issue increases in line with the size of markets and investors' presence in these markets and so does the size of the problem.

CHAPTER 7 DATA ON VALUATION OF ANALYST RESEARCH

Data are generated through the implementation of two focus groups, one for sell-side (brokerage) equity analysts and one for buy-side (asset management) professionals. Data from these focus groups are used to construct a survey for buy-side professionals.

Qualitative Research

Although literature survey provided me with some dimensions for sell-side equity research, a qualitative research would help more on dimension and item generation. Considering the alternative qualitative research methodologies such as individual or group interviews and participant observation, I contemplated that the appropriate qualitative research method to generate dimensions for the construct was focus group method. The reasons for this are the ease and speed with which I can conduct focus groups. Most important of all, since my construct is on a niche topic in finance with a special participant group, I thought number of generated items would be more with focus groups. Besides, the group of people would mostly know each other eliminating any timidity in the focus group. Last but not least, having worked as an analyst prior in my career, I have the expertise necessary to dig in the subject.

In the first stage, a focus group ("Sell-Side Focus Group") was conducted to sell-side equity research analysts to determine the analytical dimensions of analyst decision making process. As I expected at the very outset, although I was able to get analytical dimensions from this focus group, behavioral and motivational dimensions were difficult to get rightfully. Therefore, I decided to conduct another focus group

("Buy-Side Focus Group") to portfolio managers and buy-side analysts to determine the behavioral dimensions of analyst decision-making process.

As a third perspective (which is half-way between field and literature) to find dimensions, the NASD and NYSE rules approved in 2002 regarding "conflicts of interest that are raised when research analysts recommend securities in public communications."(SEC (2002), page 3) was made use of to find the "Regulation" dimension and its underlying items.

I also made use of a study by Boni (2002) to establish dimensions. Boni conducted a survey to Buy-side professionals in 2001 to obtain their views on sell-side research, analyst conflicts of interest and possible remedies just before the approval of NASD/NYSE regulation on analyst conflict of interest. Then she compared this regulation with her survey results of the buy-side professionals' expectations to see if they are similar.

Sell-Side Focus Group

A focus group was conducted among a group of sell-side analysts to find the analytical dimensions in the decision-making process of sell-side equity analysts. The group was a judgment sample of 8 analysts working for banks or brokerage houses all with 5-10 years of experience. This corresponds to a senior and experienced analyst level for Turkish capital markets, which has only around 20 years of history, with an organized equity research background of 15 years, last 10 years of which has seen accelerated, more professional and higher quality equity research. I framed the aim of the focus group by saying that I was trying to delineate

their decision-making process, i.e. how they make their recommendations from the first stage of determining which stock to investigate, to the last stage of writing the recommendation in an equity report.

So my first question was “How do you determine which stock to cover?” The answers came up rather homogeneous. Most of them said that it was their company policy to cover ISE-100 or ISE-30 index stocks which are the stocks determining the index values and hence the general direction in the market. These are all higher market capitalization stocks. Some of them commented that they also get requests from their institutional and/or individual clients to start coverage for particular stocks that they are interested in and sometimes they started such coverage. These are usually lower market cap stocks and so are not in the ISE-30 or ISE-100. They also voiced that they generally initiated coverage as soon as a new company went public if the company is a large capitalization one.

As the process is a chronological one, my second question had been “How do you proceed after you started initiation decision and how do you proceed if you are already covering the stock?” The process is very similar for new and existing coverage cases except for the extent of the company visits. They told that if it is new coverage they make longer company visits most probably including the production facilities (if it is a manufacturing company), various different company departments, investor relations people, top management (CEO or CFO). Some analysts told that they usually have predetermined question sets and that they asked these questions to the company executives. Some other analysts told that they preferred to have an ad hoc conversation and believed that they get more data and more easily since they

believed executives feel more relaxed and give more info when whey are not interrogated. They all collectively stated that they gathered as many company data as they can get from these visits such as annual reports, special descriptive reports but most of the time it is the notes they take during the interview which is of most value. Some said that they asked for permission to tape when they are talking to technical people not to make mistakes on technical terms but top-level managers did not welcome usually getting taped. If it is an existing coverage they voiced that all that they had to do is to visit the investor relations contact and sometimes the finance director or CFO ask for the subsequent quarters' expectations and guidance on company financials.

My next question was "How do you proceed once you made the company visit and what other data do you use?" They said that they get all of the news related with the company from data bases and read them before they visit the company and that in time they produce special data files for these companies by following newspapers and economic publications. However the most valuable data they refer to was the data they get through company visits asking specific questions. One interesting result was that most of them said that they also read other analyst reports, especially the reports from foreign investment banks periodically and followed what type of recommendations they have. None of them admitted that they could be affected by the ideas from other reports when I asked a question about it.

My subsequent question was "Now that you have the data and visited the company, how do you shape your recommendation?" This is where the very much uniform answers by analysts were replaced by diverse answers. Some said that they

have predefined valuation formats in their companies and used them and modify them to value companies whereas others said that they created their own personal models that they looked very proud of. They talked about different types of methods like DCF (Discounted Cash Flow) Method, Comparables Method, and Net Asset Value with mostly preferred ones being DCF in the first place, followed by Comparables Method. We did not get into details with these methods as it is beyond the scope of this study. The aim of the models developed by analysts is to calculate the fair price of the stocks by forecasting sales, costs, earnings, investment plans and working capital needs of the companies. The horizon of forecast period in these models varied from analyst to analyst ranging from 5 to 10 years. Then they told that they form their recommendations inputting all these company visits, market and other data to their models and valuation frameworks.

My next question was "What is the most important one among your final products?" Most of the analysts answered this as their full report, which they told they put all their experience and judgment other than hard data. Some of them said that what matters most is the personal judgments and experience.

To my question "What do you think is the most closely watched part of your recommendation by the investment community?" Consensus on this question has easily been the earnings expectations.

As a result of this focus group, I obtained four analytical dimensions: Research Initiation Criteria, Company Visits, Modeling and Valuation Framework and Personal Judgment and Experience. Furthermore, I obtained 7 items related with these dimensions.

Buy-Side Focus Group

The second focus group was conducted among a group of portfolio managers and buy-side analysts to uncover the behavioral dimensions in the decision-making process of sell-side equity analysts. The group was again a judgment sample of 6 analysts working for portfolio management companies or asset management divisions of banks or brokerage houses with 5-10 years of experience. This again corresponds to a senior and experienced level for the same reasons as explained above.

I framed the aim of the focus group as to get an opinion of buy-side people as to how they view sell-side research and recommendations. Sometimes I asked the same questions to the buy-side people so as to get an idea on the reliability of some dimensions I obtained from sell-side people. One such question was related with research initiation criteria that I obtained from sell-side focus group. So I asked my first question of sell-side focus group, "How do you think sell-side people determine which stocks to cover?" to buy-side focus group as well. I got similar answers from buy-side people but with an important addition. They added that another reason of research initiation for sell-side is to gain and retain the related company that is subject to research coverage as a potential client in banking and other business relations (sell-side research brokerage houses are often part of big banks with commercial and investment banking operations). They also stated that this motivational aspect is present not only for new research initiation but also for present research coverage and that one of the reasons why the sell-side cover certain companies is to keep their existing clients in banking relations.

This question raised the issue of motivation and from this question onward we discussed motivational and behavioral issues related with of sell side securities analysts. Therefore, I obtained the motivational and behavioral dimension for the operationalization of the construct.

The buy-side professionals also raised the issue of independent research, which I also covered in the literature survey. Hence I also put it as a dimension for my construct.

In both of the questionnaires, we get to the maturity point where additional questions did not bring any incremental information. Therefore, I was satisfied from the results of the focus groups because I obtained a lot of information to use in the design of the questionnaire.

CHAPTER 8 METHODOLOGY ON VALUATION OF ANALYST RESEARCH

Operationalization of the Construct: Dimensions and Elements

As a result of the above literature based and field based approaches, I obtained the following dimensions to be used in the operationalization of construct "the value of sell-side equity research".

Analysis

Motivation

Behavioral & Cognitive

Regulatory & Disclosure

Independent Research

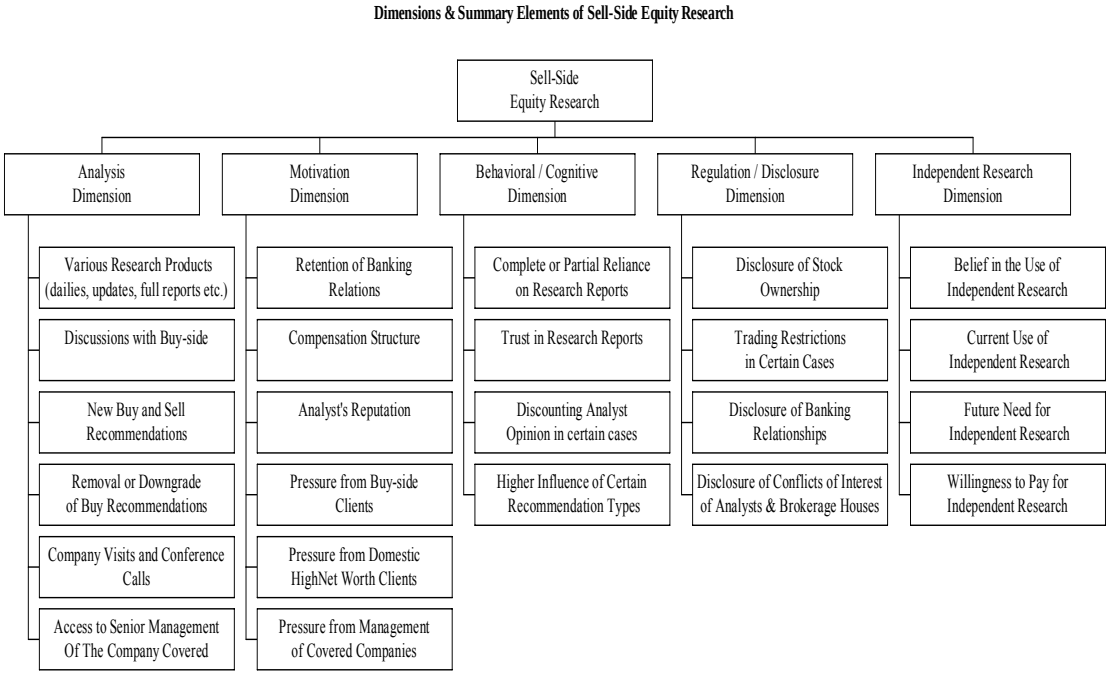

Fig 4. Dimensions & summary elements of sell-side equity research

I used the summary elements in the above diagram, which I separated into different variables and coded into different questions in the questionnaire.

CHAPTER 9 EMPIRICAL ANALYSIS AND RESULTS ON THE VALUE OF ANALYST RESEARCH FOR FUND MANAGERS

Design of the Questionnaire

Five dimensions and about 45 items related with these dimensions were obtained from the focus groups. After a careful assessment of these 45 items, they were decreased down to 35 as some of them were found to be similar with other items in context. As a result, the survey consisted of 39 questions: 35 independent, 2 dependent, 2 categorical and 2 questionnaire identification variables (See Appendix 2 for the questionnaire). A summary of the questions, dimensions, number and types of variables are given in the table below.

Table 198 Design of the Questionnaire

Column #	Question #	Dimension Measured	Variable #	Variable Type
1-2	-	Identification number	1-2	independent
3	1	-	3	dependent
4	2	-	4	dependent
5-13	3-11	Analysis	5-13	independent
14-19	12-17	Motivation	14-19	independent
20-27	18-25	Cognitive Aspects	20-27	independent
28-34	26-32	Regulatory Aspects	28-34	independent
35-39	33-37	Independency of Research	35-39	independent
40-41	38-39	Position & Experience	40-41	independent

The same variable numbers are used in SPSS. Dependent variables are as follows:
Question 1: Value attributed to sell-side research services by buy-side professionals.
Question 2: Bias perceived in sell-side research services by buy-side professionals.

The survey was prepared in two different formats, first is a likert scale format and the second is a semantic differential format (See Appendix 2 for the questionnaire). After the first part of the survey is completed, it is advised not to

check previous pages. But as I mention in the validity/reliability part, I suspect that most of the participants checked their previous answers and replied accordingly. Therefore, I believe that the second method to check validity should have better been conducted, after the first part of the survey is collected from the participants so that they would not be able to align their answers. This necessitates the questionnaire to be conducted all in physical terms and hard copies, which would probably decrease the response rate or increase the time and effort for the questionnaires to be collected.

The complete questionnaire gets around 15 minutes to fill for a professional who are familiar with the terms.

Sampling

I used a non-probability sample, to be exact, a judgment sample to conduct the questionnaire. My sample consisted of portfolio managers, traders and analysts I have access to and who would complete the questionnaire seriously in my opinion. I sent the survey to 25 such people and I got 18 responses indicating a response rate of 72%. Some of the responses were received via e-mail and some of them via hard copy. With a few of the earlier eager respondents, I made a pretest of the questionnaire. These people helped me correct and clarify the wording of some of the questions. I sent the questionnaire in the corrected new version to the later respondents. As the questionnaire has some sensitive issues regarding the motivational aspect of sell-side research, all of the respondents wanted to be sure of the anonymity of their responses and I guess that the reason why some did not respond to the questionnaire is because of these sensitive issues.

Table 199 Sampling Aspects

Aspect	Explanation
Element	Buy-side professionals
Unit	Asset management companies, brokerage houses
Extent	Only to buy-side people who use sell-side research in their decision making
Time	June 2008- September 2008

The reason I use a judgment sample is that, first of all, the questionnaire was targeted for people managing assets and use broker research in their decision making process. As such companies and people are not that many in number, capturing 50 of them would be a very aggressive target. Moreover, all the people working in buy-side is not the target of this study. People working in support departments of such companies, such as marketing or IT departments, are not the real target of this study. It is rather the portfolio managers, traders or buy-side analysts using sell-side equity research who are in a position to judge and these people are not a great many in number. Moreover beside banks, there would still be relevant target people working in banks or treasury departments of companies who are investing funds using sell-side research other than asset management companies forming the rest of the population and moreover identifying such people would not be as easy as the case of asset management companies that are registered in the CMB.

I think that it could still be a more meaningful sample, if I had used a probability sample with stratified sampling when the total population is defined in the sense of "all portfolio managers, traders and analysts working in asset management companies registered by the CMB". The strata then would have been "the assets under management of such companies" as assets under management can be a distinguishing characteristic of the sample. A company with very high assets under management can be a small part of the total population and hence may not be

represented in the samples. Yet, the responses of asset managers of such companies are very important, as they are the biggest users or clients (buyer) of sell-side research with a very important effect on the questionnaire results. It then becomes imperative that this subgroup is adequately represented in the sample and stratified sampling ensures this. However, asset managers of one big company did not respond to the questionnaire. Hence, proper execution of such well defined stratified sampling is not easy and had not really been possible due to the lack of response from the participants. Hence, I made use of a judgment sample.

The Results of the Questionnaire

Only results of Method1 (first questionnaire) are evaluated below since Method2 (second questionnaire) results are very close which has implications for validity.

Analysis Dimension

Analysis dimension is scrutinized with 9 questions in the questionnaire, from question 3 to 11 (variables 5 to 13). Participants were asked to rate the given sell-side research services. The highest ranked items are from questions 4, 8 and 5 (variables 6, 10, and 7) with means 3.67, 3.50 and 3.22 respectively. These items are "Discussions with sell-side analysts", "New sell recommendations" and "Full research reports" in that order. The least valuable ranked services are from questions 6 and 7 (variables 8 and 9) with means 2.11 and 2.22 respectively. These items are "Updates to research reports" and "New buy recommendations". It is interesting that

"New buy recommendations" by analysts are found close to seldom valuable whereas "New sell recommendations" get the highest ranking and are found close to usually valuable. Also analyst discussions and full research reports received highest rankings. This shows that buy-side professional are rather selective in sell-side services and that they do not get every service at face value. Overall mean of Analysis dimension is 2.91 implying that buy-side professionals view analysis aspects of sell-side research as close to sometimes valuable.

Table 200 Frequency and Mean of the Answers in the Analysis Dimension

	How valuable do you believe are the following sell-side research services provided by brokerage firms?						
		Mean	Rarely Valuable 1	Seldom Valuable 2	Sometimes Valuable 3	Usually Valuable 4	Always Valuable 5
3	Daily bulletins, calls, faxes and mails	2,94	2	2	10	3	1
4	Discussions with sell-side analysts	3.67	0	2	5	8	3
5	Full research reports	3.22	1	1	9	7	0
6	Updates to research reports	2.11	2	12	4	0	0
7	New buy recommendations	2.22	2	11	4	1	0
8	New sell recommendations	3.50	0	0	12	3	3
9	Removal or downgrades of buy recommendations	2.94	0	6	7	5	0
10	Arranging company visits and conference calls with the companies	2.72	1	6	8	3	0
11	Access to senior management of the company covered	2.83	1	5	8	4	0
	ANALYSIS DIMENSION	2.91					

Motivation Dimension

Motivation dimension is measured with 6 questions in the questionnaire, from question 12 to 17 (variables 14 to 19). Participants were asked to give opinions on motivational factors for sell-side analysts. The highest ranked items are from

questions 12, 15 and 16 (variables 14, 17, and 18) with means 3.78, 3.67 and 3.28 respectively. These items are “Retention of banking clients”, “Pressure from management of companies covered” and “Pressure from domestic high net worth clients” in that order. The least important motivation factors are from questions 14 and 17 (variables 16 and 19) with means 2.56 both. These items are “Pressure from buy-side clients” and “Reputation”. Overall mean of Motivation dimension is 3.11 implying that buy-side professionals view motivational aspects of sell-side research as more than sometimes important. Moreover banking relationships, pressure from management companies and domestic high net worth clients take first places in motivational factors.

Table 201 Frequency and Mean of the Answers in the Motivation Dimension

How important do you believe are the following motivation factors to sell-side analysts?							
		Mean	Rarely Imp 1	Seldom Imp 2	S.times Imp 3	Usually Imp 4	Always Imp 5
12	Analysts’ desire to retain and attract banking clients	3.78	0	6	0	10	2
13	Compensation linked to trading volume in the stocks s/he covers	2.83	0	6	9	3	0
14	Pressure from buy-side clients not to downgrade stocks they hold	2.56	1	6	11	0	0
15	Pressures from the management of companies s/he covers	3,67	0	1	6	9	2
16	Pressure from domestic high-net worth clients not to downgrade stocks they hold	3.28	1	2	8	5	2
17	Desire to make the best buy and sell calls to increase her/his reputation	2.56	3	5	7	3	0
	MOTIVATION DIMENSION	3.11					

Behavioral / Cognitive Dimension

Behavior dimension is analyzed with 8 questions in the questionnaire, from question 18 to 25 (variables 20 to 27). Participants were asked to give opinions on behavioral factors for sell-side equity research. The most agreed upon items are from questions 22, 24, 20 and 18 (variables 24, 26, and 22 & 20) with means 3.94, 3.50, 3.00 and 3.00 respectively. These items are "Discounting analyst opinion in certain cases", "Interpreting hold recommendations as sell", "Giving more importance to buy recommendations than sell recommendations" and "Analysts should issue more sell recommendations" in that order. The least agreed upon item is from question 19 (variable 21) with a mean of 2.56. This item is "Stock ownership leading better analysis for analysts". Overall mean of Behavior/Cognition dimension is 2.99 implying that buy-side professionals view behavioral and cognitive aspects of sell-side research as close to neutral.

Table 202 Frequency and Mean of the Answers in the Behavioral Dimension

	Please indicate the extent to which you agree or disagree with the following statements.						
		Mean	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
18	Analysts should issue more sell recommendations.	3.00	0	6	7	4	1
19	Analysts who own stocks they follow will make better valuation calls	2.28	1	11	6	0	0
20	I give more importance to sell recommendations than buy recommendations.	3.00	0	6	8	2	2
21	I use analyst recommendations as a contrary indicator of attractiveness.	2.56	2	9	4	1	2
22	I discount the opinions and recommendations of analysts where there is an investment banking relationship.	3.94	0	1	3	10	4
23	My decision-making is often influenced more by changes to "strong buy" categories than attractive/outperform.	2.83	0	4	13	1	0
24	I interpret "hold" recommendations as sell recommendations.	3.50	0	2	7	7	2
25	Removal from an analyst's list is more informative than initiation of "buy".	2.78	0	9	6	1	2
	BEHAVIORAL DIMENSION	2.99					

Regulation/Disclosure Dimension

Regulation / Disclosure dimension is analyzed with 7 questions in the questionnaire, from question 26 to 32 (variables 28 to 34). Participants were asked to give opinions on regulatory and disclosure requirements necessary for sell-side equity research. The most agreed upon items are from questions 29, 32, 27 and 31 (variables 31, 34, and 29 & 33) with means 4.61, 4.33, 4.28 and 4.22 respectively. These items are "Disclosure of banking relationships", "Disclosure of conflicts of interest in all media exposure", "Restriction of trade during recommendation change/make" and "Disclosure of related stock ownership by brokerage firms" in that order. There is no

item here with a mean less than 4 indicating that all items are agreed or strongly agreed. Overall mean of this dimension is 4.17 implying that buy-side professionals view regulatory aspects of sell-side research as more than usually valuable.

Table 203 Frequency and Mean of the Answers in the Regulation Dimension

	How valuable do you believe the following regulatory issues regarding sell-side research can be if taken into practice?						
		Mean	Rarely Valuable 1	Seldom Valuable 2	Sometimes Valuable 3	Usually Valuable 4	Always Valuable 5
26	Analysts should be required to disclose their positions in the stocks they cover.	4.17	0	0	1	13	4
27	Analysts should be restricted from trading for a period of time while they make or change their recommendations.	4.28	0	0	1	11	6
28	Brokerage firm reports should disclose banking relationships and other potential conflicts.	4.06	0	0	3	11	4
29	Brokerage firm reports should disclose exactly when the firm last acted as underwriter or merger/acquisition advisor to the company covered.	4.61	0	0	1	5	12
30	Brokerage firm reports should disclose the value of stock in the company reported owned by the brokerage firm.	4.11	0	0	2	12	4
31	Brokerage firm reports should disclose the value of stock in the company reported owned by the analyst	4.22	0	0	0	14	4
32	Brokerage firm reports should disclose all conflicts of interest during all media exposure (TV and print).	4.33	0	0	0	12	6
	REGULATION DIMENSION	4.17					

Independent Research Dimension

Independent research dimension is analyzed with 5 questions in the questionnaire, from question 33 to 37 (variables 35 to 39). Participants were asked to give opinions on independent research for buy-side. The most agreed upon items are from questions 35, 36 and 34 (variables 37, 38, and 36) with means 4.00, 3.78, and 3.72 respectively. These items are “Need for more independent research companies”, “Willingness to pay more for independent research if better quality and more reliable research is provided”, “Independent research being more informative than other sell-side research” in that order. The least agreed item is from question 33 (variable 35) with means 3.22. This item is “My firm gets independent research”. Overall mean of this dimension is 3.74 implying that buy-side professionals view independent type of sell-side research as close to usually valuable which is higher than the Analysis dimension. This shows that independent research will increase the value of sell-side research.

Table 204 Frequency and Mean of the Answers in the Independent Research Dimension

	Please indicate your opinion regarding independent (non-brokerage) research.						
		Mean	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
33	My firm gets independent research.	3.22	0	2	11	4	1
34	The independent research I get is typically more informative than other sell-side research I receive.	3.72	0	2	3	11	2
35	There is more need for independent research in the buy-side companies.	4.00	0	2	1	10	5
36	My firm would be willing to pay more for independent research if better quality and more reliable research is provided.	3.78	1	1	1	13	2
37	It is unlikely that I would be willing to pay more for independent research since I am able to de-bias and use sell-side information.	3.44	2	1	5	7	3
	INDEPENDENT RESEARCH DIMENSION	3.74					

Assessment of the Psychometric Properties of the Scale

Reliability

In this part, I assessed internal consistency or equivalence reliability. In other words, I evaluated the internal consistency of the set of items, i.e. whether the items under each dimension are consistent or equivalent in what they indicate about the dimension. To do this, I calculated Cronbach's Alpha for each dimension using SPSS.

Table 205 Reliability

Dimension	Cronbach's Alpha	Variable #	Deleted Variables	Staying Variable #
Analysis	0.910	5-13	None	5-13
Motivation	0.869	14-19	None	14-19
Behavioral /Cognitive	0.881	20-27	None	20-27
Regulation/disclosure	0.957	28-34	29,30,31,34	28,32,33
Independent Research	0.942	35-39	35	39-39

In analysis, motivation and behavioral/cognitive aspects, no deletion of items was necessary to improve coefficient alpha. There had been some deletion of items (variables) for regulatory and independent research aspects to increase coefficient alpha as summarized in the above table. Alpha increased from 0.768 to 0.957 for regulation dimension and it increased from 0.929 to 0.942 for independent research dimension. All of the coefficient alphas are high and close to 1 indicating that they are reliable.

Validity

Different forms of validity are assessed as follows.

Content (Face) Validity

During the process of specifying the domain of the sell-side equity research construct with 5 dimensions and generating items as a result of literature survey and focus groups and purifying the items through pretests, I assessed that the sell-side equity research construct has content or face validity. Although as a result of the literature

survey and focus groups, I can conclude content validity, I suspect that some items (no dimensions hopefully) may have remained still to be found. Therefore, a further thing to do could have been to consult an expert regarding these dimensions and items. In that way I would be able to assess consultative validity. Currently, I do not know such an expert but in the future these dimensions could have been consulted to such a person.

Construct Validity

Construct validity is assessed by evaluating internal (trait) validity and external (nomological) validity. Internal validity is assessed by evaluating convergent validity, discriminant validity and reliability. Convergent and discriminant validity can be established through the Multitrait Multimethod Matrix (MTMM) as shown below (Campbell, 1959). Method1 is the first part of the questionnaire with likert scale format and Method2 is the second part of the questionnaire with semantic differential format.

The reliability diagonal (0.910, 0.869, 0.881, 0.957, 0.942) consists of Cronbach's Alpha values calculated in the Reliability section above.

The validity diagonal values are correlations calculated using Pearson correlation in the SPSS. For this I first computed a new variable for each dimension, which is an average of items forming the dimension. I called them "Analysis", "Motiv", "Behav", "Reg" and "IndepRes". Then I calculated the Pearson correlation of these new variables as shown below.

Comment on inter-dimensional correlations

The correlations between dimensions came up with interesting results mostly aligned with theory. Analysis dimension is found to have significant and negative correlations with motivational, cognitive and regulatory/disclosure dimensions. As buy-side professionals give more importance and value to analysis dimension of sell-side equity research, motivational and cognitive dimensions of sell-side research gets less value because they think that analysts are doing their job of investigating companies and making recommendations depending on more analytical fundamentals rather than other factors. Analysis dimension is found to have positive and significant correlation with independent research implying that they move in the same direction, which is an expected result.

As for regulation, it has been found that it has negative and significant correlation with analysis and independent research, significant and positive correlation with motivational and behavioral aspects. I would expect value given to analysis to increase, as value given to regulation increase because more regulation would impede the presence of behavioral and motivational factors. However, buy-side professionals might have thought that more regulation can also be taken as a signal of increasing efforts for motivational and behavioral factors and that regulation can always be circumvented one way or another.

Comment on dependent variables

Question1: Value attributed to sell-side research services by buy-side professionals. (Designated as Variable3)

Question2: Bias seen present in sell-side research services by buy-side professionals. (Designated as Variable4)

Variable3 has significant and positive correlation with analysis and independent research dimensions whereas it has negative and significant correlation with motivation, behavior and regulation dimensions.

Variable4 has significant and negative correlation with analysis and independent research dimensions whereas it has significant and positive correlation with behavior but positive and insignificant correlation with motivation and regulation.

These are in line with expectations. Value attributed to sell-side research increases as analysis and independent research increases but it decreases as motivational, behavioral factors in sell side research increase.

Variables 3 and 4 have significant and negative correlation with each other. This is also in line with expectation. As presence of bias in sell-side equity research increases, the value of sell-side research decrease.

Multitrait Multimethod Matrix (MTMM)

I repeated the same Pearson correlation calculations for Method2 and put into them into the MTMM. The respective new variables for Method2 are called “analysis”,

"motiv", "behav", regul", "indepres" (all with small letters). I also put the averaged variables from Method1 "Analysis (VAR42)", "Motiv (VAR43)", "Behav (VAR44)", "Reg (VAR45)" and "IndepRes (VAR46)" in the same data sheet with Method2 to calculate the rest of MTMM.

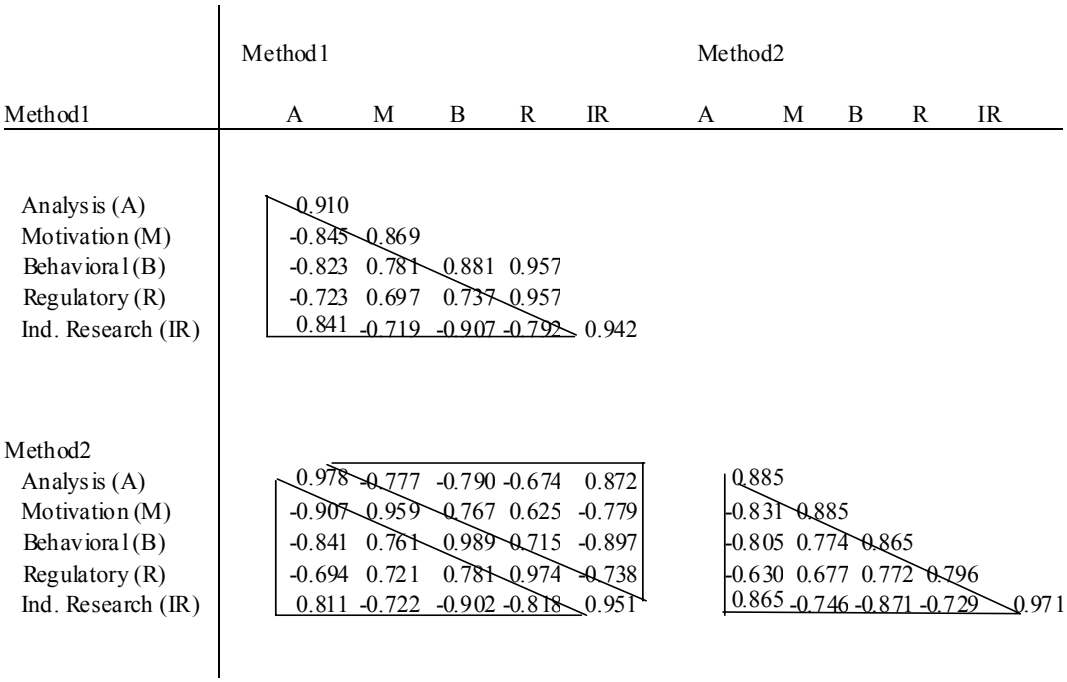

Fig. 5 Multi Trait Multi Method Matrix (MTMM)

Convergent Validity:

Validity diagonal values are all significantly different from zero and sufficiently large. This is evidence of convergent validity.

Discriminant Validity:

The three assessments required for discriminant validity are:

1. Entries in the validity diagonal are higher than the correlations that occupy the same row and column in the heteromethod block. So the first condition of discriminant validity is met.

2. The validity coefficients are higher than the correlations in the heterotrait-monomethod triangles, which suggest that the correlations within a trait measured by different methods, are higher than the correlations between traits that have method in common. So this condition is met, too. However as I mentioned before, I have a reservation in this conclusion as follows.

The survey was prepared in two different formats, first is a likert scale format and the second is a semantic differential format (See Appendix D for survey). After the first part of the survey is completed, it is advised to the participants not to check previous pages. But I suspect that most, if not all the participants checked their previous answers and replied accordingly. Then again these people are finance people and the thing they hate and fear most is to err in numbers! Therefore, I believe that the second method to check validity should better be conducted after the first part of the survey is collected from them so that they would not be able to align their answers. This necessitates the questionnaire to be conducted all in physical terms and hard copies, which would probably decrease the response rate or increase the time and effort for the questionnaires to be collected

3. Although there is some pattern in the heterotrait triangles, the pattern of correlations is not exactly the same in all of them.

Therefore, I cannot comfortably conclude that there is dicriminant validity. Furthermore, the monomethod correlations and heteromethod correlations are both high suggesting that the traits may not be independent and in this case evidence about discriminant validity of the measure will not be as easily established as when they are independent. (Churchill, 1979)

Although there is convergent validity, I cannot comfortably conclude that there is internal validity due to lack of discriminant validity. To do so, I think I have to conduct the second part of the questionnaire separately after the first part is collected as I stated above or use another method. This is a weak part of this study.

Nomological Validity

To assess nomological validity, we have to see how well the measure relates to measures of other constructs to which the construct is theoretically related. That other construct may be "Analysts' Risk Taking". For this I have to develop or find another scale which measures analysts' risk taking degree. Theoretically there has to be an inverse relationship between the constructs "Value of Sell Side Equity Research" and "Analysts' Risk Taking" because as analysts seek more risk in their valuations and forecasts, the value of their research will decrease for buy side professionals. If I can find such a scale and verify the inverse relationship between the two constructs, I still will not be able to conclude external validity for my own construct as I have to find more than one such constructs and relationships. This can be a further study for future. Therefore, for the time being I can only conclude that

my construct has external validity on theory level depending upon my literature survey.

CHAPTER 10 SUMMARY OF RESULTS

This study seeks to determine the value creation within managed funds business for investors. This is done in two stages. In the first and the primary stage of this study, value creation for investors by fund managers are evaluated in fund performance measures along with performance persistence calculations. Additionally in this stage, survivorship bias stemming from the disappearance of nonsurviving fund data from the existing databases is calculated for different fund classes using different methodologies. In the second and supplementary stage of this study, value creation for asset managers by broker research services is evaluated. The first phase utilizes quantitative methods (regression analyses and contingenct tables) whereas the second phase utilizes qualitative research methods (focus groups and a questionnaire). Overall, the analyses in these two phases aim to uncover value creation in the managed funds business.

The performance of variable, equity and balanced mutual funds are evaluated using Jensen's alpha equation for not only individual fund returns but also equal-weighted and size-weighted portfolio returns of different fund classes. All of the analyses are carried out separately for different fund classes, i.e. variable, equity and balanced funds.

First of all, average raw returns for differing fund classes and the respective survivorship bias and premium calculations are summarized below.

Raw Returns of Individual Funds

Table 206 Survivorship Bias from Raw Returns

Fund Type	Net	Gross	Difference
Variable Funds			
Average Variable Class Return	19.69%	26.08%	6.39%
Biased (survivors) Average Return	21.16%	26.30%	5.14%
Survivorship Bias	1.46%	0.23%	-1.23%
Survivorship Premium	2.82%	0.43%	-2.39%
Equity Funds	Net	Gross	Difference
Average Equity Class Return	13.19%	19.01%	5.82%
Biased (survivors) Average Return	19.78%	25.47%	5.69%
Survivorship Bias	6.58%	6.45%	-0.13%
Survivorship Premium	13.56%	13.31%	-0.25%
Balanced Funds	Net	Gross	Difference
Average Balanced Class Return	20.47%	27.83%	7.36%
Biased (survivors) Average Return	23.46%	29.45%	5.99%
Survivorship Bias	2.99%	1.62%	-1.37%
Survivorship Premium	4.76%	2.74%	-2.02%

When annualized average raw fund returns are investigated, it is observed that positive survivorship bias exists in the entire fund classes both for net and gross raw returns. For raw returns, survivorship bias ranges between 0.23% and 1.46% for variable funds; between 6.58% and 6.45% for equity funds and between 1.62% and 2.99% for balanced funds.

Differences between gross and net returns are higher for average fund class returns than the biased (survivors) average return. This shows that nonsurvivor funds' management fees are higher than survivor funds and that they increase the average management fees of variable fund class. This can also be seen from the survivorship bias and premium numbers, which decrease when returns are adjusted for management fees from net to gross for variable, equity and balanced fund classes. For equity fund class, the difference between all equity fund class net and gross returns are very close but still higher than survivors' difference, showing slightly

higher nonsurvivor management fees. Hence survivorship bias and premium decrease only slightly for gross returns. Next, equal-weighted and size-weighted portfolios of raw fund returns are calculated and their survivorship bias and premiums are computed as shown below.

Raw Returns of Funds Class Portfolios

Table 207 Average Raw Returns of Fund Portfolios

Fund Class Portfolios	Net	Gross	Difference
Variable Funds Portfolio-EW			
Portfolio of All Variable Funds	21.36%	27.44%	6.08%
Portfolio of End-of-Sample Survivors	22.07%	27.95%	5.88%
Survivorship Bias	0.71%	0.51%	-0.20%
Survivorship Premium	1.11%	0.47%	-0.64%
Variable Funds Portfolio-SW			
Portfolio of All Variable Funds	23.25%	28.40%	5.15%
Portfolio of End-of-Sample Survivors	21.56%	26.50%	4.94%
Survivorship Bias	-1.69%	-1.90%	-0.21%
Survivorship Premium	-5.01%	-6.30%	-1.29%
Equity Funds Portfolio-EW			
Portfolio of All Equity Funds	16.90%	23.23%	6.33%
Portfolio of End-of-Sample Survivors	17.67%	23.92%	6.25%
Survivorship Bias	0.77%	0.68%	-0.09%
Survivorship Premium	2.01%	1.66%	-0.35%
Equity Funds Portfolio-SW			
Portfolio of All Equity Funds	19.15%	25.42%	6.27%
Portfolio of End-of-Sample Survivors	21.13%	27.49%	6.36%
Survivorship Bias	1.98%	2.07%	0.09%
Survivorship Premium	6.15%	6.21%	0.06%
Balanced Funds Portfolio-EW			
Portfolio of All Balanced Funds	21.88%	27.99%	6.11%
Portfolio of End-of-Sample Survivors	23.16%	29.09%	5.93%
Survivorship Bias	1.27%	1.09%	-0.18%
Survivorship Premium	4.76%	4.09%	-0.67%
Balanced Funds Portfolio-SW			
Portfolio of All Balanced Funds	23.88%	29.39%	5.51%
Portfolio of End-of-Sample Survivors	22.74%	28.43%	5.69%
Survivorship Bias	-1.14%	-0.96%	0.18%
Survivorship Premium	-2.64%	-3.91%	-1.27%

EW: Equal-Weighted, SW: Size-Weighted

When annualized average raw portfolio returns are investigated, it is observed that positive survivorship bias exists in all equal-weighted fund class portfolios plus size-weighted equity fund class portfolios. There is negative survivorship bias for size-weighted variable and balanced fund portfolios. However, for variable fund class this is as a result of some very large size funds to be closed/merged not due to bad performance but due to the corporate actions of their sponsor banks (mergers and acquisitions). These funds have average returns way above the nonsurvivor fund class average. Negative survivorship bias is observed also for size-weighted balanced fund portfolio. Likewise, this is due to one large size fund with above average performance which was changed into money market fund category again not due to bad performance but due probably to save various costs of establishing a new money market fund which is by far the highest market share category of asset management business in Turkey.

For raw portfolio returns, survivorship bias ranges between 0.51% and 0.71% for variable funds; between 0.68% and 2.07% for equity funds and between 1.09% and 1.27% for balanced funds. It is observed that survivorship bias and premium tripled when equity fund class portfolios are size-weighted showing that large size equity survivor funds have higher returns than their group average when compared with large size nonsurvivor funds which do not have higher returns than their group average. This is just the reverse for size-weighted variable and balanced fund classes with nonsurvivor funds' size weighted average return beating those of survivors as explained above.

The same relationships in management fees are observed in all equal-weighted fund classes pointing to higher average management fees for nonsurvivors when compared with survivors. For size-weighted portfolios, only variable size-

weighted nonsurvivor fund portfolios point to higher management fees. Size-weighted equity and balanced survivor portfolios have slightly higher management fees than size-weighted nonsurvivors.

The performance of the three fund classes are measured using Jensen's alpha equation both for individual fund returns and fund class portfolio returns. Risk-adjusted returns are more important than raw returns.

Risk-Adjusted Returns of Individual Funds

Table 208 Average Risk-Adjusted Returns of Individual Funds

Fund Class Type	Net Return		Gross Return	
	Fund Index	ISE-100	Fund Index	ISE-100
Variable Funds Class				
Average Alpha	-5.09%	-8.63%	-0.29%	-4.02%
End-of-Sample Biased Alpha	-1.60%	-5.68%	2.90%	-1.29%
Survivorship Bias	3.49%	2.95%	3.20%	2.73%
Survivorship Premium	6.88%	5.72%	6.39%	5.38%
Equity Funds Class				
Average Alpha	-1.84%	-7.70%	3.06%	-2.86%
End-of-Sample Biased Alpha	-0.58%	-5.83%	3.91%	-1.32%
Survivorship Bias	1.26%	1.88%	0.85%	1.53%
Survivorship Premium	2.68%	3.99%	1.81%	3.26%
Balanced Funds Class				
Average Alpha	-4.58%	-10.74%	0.40%	-6.06%
End-of-Sample Biased Alpha	-1.16%	-5.52%	3.86%	-0.87%
Survivorship Bias	3.42%	5.22%	3.45%	5.19%
Survivorship Premium	5.49%	8.38%	5.55%	8.34%

In the above table, only the second and fifth columns, i.e. Net Return-Variable Fund Index and Gross Return-ISE-100 Index columns are important because one shows value creation using net returns and a net index (variable, equity and balanced fund indices) whereas the other shows value creation using gross returns and a gross index (ISE-100). The other two are shown for comparison purposes.

Net of costs, fund class that is the most close to value creation in terms of risk-adjusted returns is equity fund class with an average alpha of -1.84% for all funds including survivors when equity fund index is used as the market. If we were not to adjust for deceased funds, then we would calculate a biased alpha of -0.58%. Moreover, if we were to concentrate on funds that existed the whole of sample period, we would calculate another biased alpha of +0.62%.

When ISE-100 index is used as the market, value creation is less since the equity (ISE-100 or ISE-30) portion of equity funds is generally less than 100%, mostly drifting around 70-90% levels. Therefore, returns generally lag those of ISE-100 in good times and lead in bad times. However, since 2000 to 2007 was a period with an upward trend (actually, end of 2007 is accepted as the peak of the last bull market globally), it is normal that equity funds have lower alphas during that period when the ISE-100 is the market. Fund class that is the most close to value creation in terms of risk-adjusted returns is again equity fund class with an average alpha of -2.86% for all funds including survivors when ISE-100 index is used as the market. Actually this study adjusted only the management fees. There are also the transaction commissions which may probably amount as much as the management fees. Even though transaction commissions amount less, they would most likely be enough to move the average alpha (unbiased) of all equity funds into positive territory signaling value creation for investors. This is where I am hopeful about the future.

When annualized average risk-adjusted fund returns are investigated, it is observed that positive survivorship bias exists in the entire fund classes both for net and gross raw returns.

For risk-adjusted returns, survivorship bias ranges between 2.73% and 3.49% for variable funds; between 1.26% and 1.53% for equity funds and between 3.42% and 5.19% for balanced funds.

Risk-Adjusted Returns of Fund Class Portfolios

Table 209 Average Risk-Adjusted Returns of Fund Portfolios

	Net Return		Gross Return	
	V. Fund Index	ISE-100	V. Fund Index	ISE-100
Variable Funds Portfolio-EW				
Average Alpha	-5.28%	-7.92%	0.68%	-2.41%
End-of-Sample Biased Alpha	-4.23%	-6.97%	1.58%	-1.61%
Survivorship Bias	1.05%	0.95%	0.90%	0.80%
Survivorship Premium	2.53%	2.34%	2.17%	1.71%
Variable Funds Portfolio-SW				
Average Alpha	-4.84%	-7.36%	0.51%	-2.42%
End-of-Sample Biased Alpha	-6.50%	-8.94%	-1.36%	-4.19%
Survivorship Bias	-1.66%	-1.57%	-1.87%	-1.77%
Survivorship Premium	-4.57%	-4.35%	-4.64%	-4.65%
Equity Funds Portfolio-EW				
Average Alpha	-1.21%	-6.73%	4.14%	-1.68%
End-of-Sample Biased Alpha	-0.66%	-6.20%	4.62%	-1.23%
Survivorship Bias	0.56%	0.52%	0.48%	0.45%
Survivorship Premium	1.17%	0.93%	0.52%	0.56%
Equity Funds Portfolio-SW				
Average Alpha	0.08%	-5.37%	5.35%	-0.39%
End-of-Sample Biased Alpha	1.29%	-4.17%	6.62%	0.86%
Survivorship Bias	1.22%	1.20%	1.27%	1.25%
Survivorship Premium	4.13%	4.10%	4.12%	4.09%
Balanced Funds Portfolio-EW				
Average Alpha	-2.67%	-7.30%	2.38%	-2.50%
End-of-Sample Biased Alpha	-1.26%	-6.08%	3.78%	-1.32%
Survivorship Bias	1.41%	1.22%	1.40%	1.19%
Survivorship Premium	4.51%	3.93%	5.39%	4.83%
Balanced Funds Portfolio-SW				
Average Alpha	0.03%	-4.96%	4.46%	-0.74%
End-of-Sample Biased Alpha	0.60%	-4.68%	4.72%	-0.77%
Survivorship Bias	0.58%	0.28%	0.26%	-0.03%
Survivorship Premium	0.27%	0.81%	0.08%	-0.53%

Again, in the above table, only the second and fifth columns, i.e. Net Return-Variable Fund Index and Gross Return-ISE-100 Index columns are important because one shows value creation using net returns and a net index (variable, equity and balanced fund indices) whereas the other shows value creation using gross returns and a gross index (ISE-100). The other two are shown for comparison purposes.

Table 210 Summary of Value Creation by Fund Class Risk-Adjusted Returns

INDIVIDUAL FUNDS	Net Return Fund Index	Gross Return ISE-100
Variable Funds Class		
Average Alpha	-5.09%	-4.02%
End-of-Sample Biased Alpha	-1.60%	-1.29%
Equity Funds Class		
Average Alpha	-1.84%	-2.86%
End-of-Sample Biased Alpha	-0.58%	-1.32%
Balanced Funds Class		
Average Alpha	-4.58%	-6.06%
End-of-Sample Biased Alpha	-1.16%	-0.87%
PORTFOLIOS		
Variable Funds Portfolio-EW		
Average Alpha	-5.28%	-2.41%
End-of-Sample Biased Alpha	-4.23%	-1.61%
Variable Funds Portfolio-SW		
Average Alpha	-4.84%	-2.42%
End-of-Sample Biased Alpha	-6.50%	-4.19%
Equity Funds Portfolio-EW		
Average Alpha	-1.21%	-1.68%
End-of-Sample Biased Alpha	-0.66%	-1.23%
Equity Funds Portfolio-SW		
Average Alpha	0.08%	-0.39%
End-of-Sample Biased Alpha	1.29%	0.86%
Balanced Funds Portfolio-EW		
Average Alpha	-2.67%	-2.50%
End-of-Sample Biased Alpha	-1.26%	-1.32%
Balanced Funds Portfolio-SW		
Average Alpha	0.03%	-0.74%
End-of-Sample Biased Alpha	0.60%	-0.77%

When fund class portfolio returns are risk-adjusted, there are slightly positive alphas for size-weighted equity and balanced fund portfolios indicating that large

size equity and balanced fund portfolios are able to cover all of their costs and create slight value for investors (0.08% for equity and 0.03% for balanced fund portfolios respectively). It is observed that size-weighted equity and balanced fund portfolios create value, although very little, when fund indices are used as the market. The value creation for these portfolios increases if we concentrate on funds that existed the whole of sample period with biased alphas. For equity funds portfolio, if we were not to adjust for deceased funds, then we would calculate a biased alpha of +1.29%. Moreover, if we were to concentrate on funds that existed the whole of sample period, we would calculate another biased alpha of +2.01%. For balanced funds portfolio, if we were not to adjust for deceased funds, then we would calculate a biased alpha of +0.60%. Moreover, if we were to concentrate on funds that existed the whole of sample period, we would calculate another biased alpha of -0.16%.

When ISE-100 index is used as the market and gross returns are used, both equity fund and balanced fund size-weighted portfolio alphas come up with slightly negative alphas (-0.39% and -0.74% respectively). Once more, this study adjusted only the management fees. There are also the transaction commissions which may probably amount as much as the management fees. Even though transaction commissions amount less, they would most likely be enough to move the average alpha (unbiased) of some other funds into positive territory signaling value creation for investors. Controlling transaction costs and portfolio turnover ratios are important for value creation. The impact of transaction commissions and fund turnover ratios on portfolio performance could be direction for further study which may yield interesting results. It should yet to be seen whether they can take some other negative alphas into positive territory.

When annualized average risk-adjusted fund returns are investigated, it is observed that positive survivorship bias exists in the entire fund classes both for net and gross raw returns. For risk-adjusted returns, survivorship bias ranges between 2.73% and 3.49% for variable funds; between 1.26% and 1.53% for equity funds and between 3.42% and 5.19% for balanced funds.

When annualized average risk-adjusted portfolio returns are investigated, it is observed that positive survivorship bias exists in all equal-weighted and size-weighted fund class portfolios except for size-weighted variable fund class portfolios (There is also a slight negative survivorship bias of of 0.03% for size-weighted balanced funds portfolio when ISE-100 index is used as the market). However, for variable fund class, this is as a result of some very large size funds to be closed/merged not due to bad performance but due to the corporate actions of their sponsor banks (mergers and acquisitions). These funds have average returns way above the nonsurvivor fund class average.

Persistence

To test mutual fund persistence, both parametric and nonparametric tests are utilized for variable, equity and balanced fund classes separately.

In non-parametric tests for variable funds, significance in individual periods varies between 0 and 29% for variable funds and significantly persistent periods decrease as the length of evaluation period increases. The highest percentage of significantly persistent funds is seen in the quarterly evaluation periods for raw returns and in the yearly returns for risk-adjusted returns.

Table 211 Breakdown of Evaluation Period Types with Significant Persistence for Variable Funds

	Net Returns	Gross Returns	Risk-Adjusted Returns
Quarterly	19%	23%	-
Yearly	14%	14%	29%
Two-Yearly	0%	0%	20%

In the aggregate period between 2000 and 2007, variable fund raw returns exhibit performance persistence at 5% significance for quarterly and yearly evaluation periods both net and gross of management fees. Two-yearly periods had also shown performance persistence at 5% significance level for net raw net returns, but not for gross returns as shown in the table below. Throughout all periods for net and gross returns, significant persistence stems from significant winners.

Table 212 Summary of Persistence Tests for Variable Funds for the Aggregate Period

	WW	LW	WL	LL	CPR	Z	Z_w	Z_l	Chi-sq
Variable									
Net Returns									
Quarterly	461	384	382	438	1.38	3.25**	2.72**	1.88	11.26
Yearly	118	78	88	95	1.63	2.36*	2.09*	1.29	9.15
Two-Yearly	96	48	65	55	1.69	2.07*	2.44*	0.69	20.39
Gross Returns									
Quarterly	456	371	376	427	1.40	3.35**	2.77**	1.98	12.41
Yearly	119	72	85	92	1.79	2.74**	2.38*	1.56	12.80
Two-Yearly	98	48	62	50	1.65	1.92	2.85**	0.20	24.98
Risk-Adjusted Returns									
Quarterly	-	-	-	-	-	-	-	-	-
Yearly	116	71	81	105	2.12	3.55**	2.49*	2.56*	13.95
Two-Yearly	87	41	59	71	2.55	3.62**	2.32*	2.83*	17.53

(*) indicates significance at 5%. (**) indicates significance at 1%.

The aggregate period significance decreases as the length of evaluation periods increases. The highest significance is seen in the quarterly evaluation periods. The overall significance increases for gross returns compared to net returns for quarterly and yearly evaluation periods but not for two-yearly returns for which overall significance decreased going from net to gross. Actually it became not significant going from net to gross. Persistent losers showed the same pattern in significance with increased significance going from net to gross except for two-yearly returns. For persistent winners overall significance increased from net to gross for all evaluation period types. This shows that loss of significance for two-yearly returns from net to gross is because of persistent losers losing their persistence going from net to gross.

As for risk-adjusted returns, yearly and two yearly returns are all persistent at 5% significance level. This persistence is due equally to persistent winners and losers. Persistence of quarterly returns are not tested on a risk-adjusted basis because to calculate quarterly risk-adjusted returns, there are only 12 weekly return data for each period which would decrease reliability of alphas and hence the power of tests.

Winner funds' persistence is significant at 5% level for all three types of assessment periods both net and gross. In addition, winner funds' persistence is significant at 5% level on a risk-adjusted basis both for yearly and two-yearly returns. Losing funds' persistence is not significant at 5% level both net and gross of management fees for any three evaluation period type, but it is significant on a risk-adjusted basis for yearly and two-yearly periods.

After that parametric tests are run for variable funds. Parametric tests can only be done for individual periods, but the results cannot be gathered for the aggregate period. The percentage of persistent periods increases in parametric tests. In parametric tests it was observed that 71% and 57% of the annual periods between 2000 and 2007 using raw returns and risk-adjusted returns respectively are found to be significantly persistent at 5% significance level. Moreover, 40% of the bi-annual periods are found to be significantly persistent for both raw and risk-adjusted returns.

Table 213 Summary Breakdown of Evaluation Periods with Significant Persistence for Variable Funds

Period Type	Raw Returns	Risk-Adjusted Returns
Quarterly		
Non-parametric	19-23%	-
Parametric	-	-
Annual		
Non-parametric	14%	29%
Parametric	71%	57%
Bi-Annual		
Non-parametric	0%	20%
Parametric	40%	40%

Secondly, non-parametric tests are run for equity funds. Period by period significant persistence is 0-20% for equity funds. The highest percentage of significantly persistent funds is seen in the quarterly evaluation periods for raw returns and in the two-yearly periods for risk-adjusted returns.

Table 214 Breakdown of Evaluation Period Types with Significant Persistence for Equity Funds

	Net Returns	Gross Returns	Risk-adjusted Returns
Quarterly	6%	6%	-
Yearly	0%	0%	0%
Two-Yearly	0%	0%	20%

In the aggregate period between 2000 and 2007, equity fund raw returns exhibit performance persistence at 5% significance for only quarterly evaluation periods both net and gross of management fees with increasing significance going from net to gross returns. Persistence originates from repeat winners. Winner funds' persistence is significant at 5% level only for all quarterly evaluation periods both net and gross of management fees. The significance of winners increased going from net to gross. Losing funds' persistence is not significant at 5% level both net and gross of management fees for any of the three evaluation period type.

Table 215 Summary of Persistence Tests for Equity Funds for the Aggregate Period

	WW	LW	WL	LL	CPR	Z	Z_w	Z_l	Chi-sq
Equity									
Net Returns									
Quarterly	166	128	123	141	1.49	2.33*	2.53*	0.79	7.95
Yearly	39	33	30	26	1.02	0.07	1.08	-0.91	2.81
Two-Yearly	33	19	19	19	1.74	1.27	1.94	0.00	6.53
Gross Returns									
Quarterly	169	125	120	144	1.62	2.83**	2.88**	1.16	10.62
Yearly	38	34	31	25	0.90	-0.29	0.84	-1.17	2.81
Two-Yearly	33	19	20	18	1.56	1.03	1.79	-0.16	6.62
Risk-Adjusted Returns									
Quarterly									
Yearly	38	26	29	33	1.66	1.41	1.10	0.91	2.57
Two-Yearly	30	18	18	23	2.13	1.74	1.73	0.78	4.35

(*) indicates significance at 5%. (**) indicates significance at 1%.

As for risk-adjusted returns, there exists no persistence for yearly and two yearly returns. Persistence of quarterly returns are not tested on a risk-adjusted basis

because to calculate quarterly risk-adjusted returns, there are only 12 weekly return data for each period which would decrease reliability of alphas and hence the power of tests.

Then parametric tests are executed for equity funds. Parametric tests can only be done for individual periods, but the results cannot be gathered for the aggregate period. The percentage of persistent periods somewhat increases in parametric tests. In parametric tests it was observed that 14% of the annual periods between 2000 and 2007 using raw returns only are found to be significantly persistent. Moreover, 20% of the bi-annual periods are found to be significantly persistent for raw returns only. There is no significance in risk-adjusted returns.

Table 216 Summary Breakdown of Evaluation Periods with Significant Persistence for Equity Funds

Period Type	Raw Returns	Risk-Adjusted Returns
Quarterly		
Non-parametric	6%	-
Parametric	-	-
Annual		
Non-parametric	0%	0%
Parametric	14%	0%
Bi-Annual		
Non-parametric	0%	20%
Parametric	20%	0%

Finally, non-parametric tests are executed for balanced funds. Period by period significant persistence varies as 0% to 20% of periods for balanced funds with increasing number of significantly persistent periods as the length of evaluation periods increase. The highest percentage of significantly persistent funds is seen in the bi-annual evaluation periods for raw returns both net and gross. There exists no persistence in annual returns for net, gross and risk-adjusted returns in individual periods. Moreover, there is no persistence for risk-adjusted returns for any evaluation period type.

Table 217 Breakdown of Evaluation Period Types with Significant Persistence for Balanced Funds

	Net Returns	Gross Returns	Risk-adjusted Returns
Quarterly	13%	6%	-
Yearly	0%	0%	0%
Two-Yearly	20%	20%	0%

Below table shows a summary of quarterly, yearly and two-yearly evaluation periods with significant persistence. There is some statistically significant persistence at quarterly assessment periods which fades away at yearly evaluation periods and then reappears at two-yearly evaluation periods. For balanced funds the percentage of significantly persistent periods increases as the length of evaluation periods increases. This pattern repeats itself for gross returns as well with smaller number of significant periods for quarterly returns. The fact that the number of significant periods decreases for quarterly returns going from net to gross returns means that some of some of the repeat underperformers with respect to the median actually had higher management fees than the average so that when adjusted for fees they switch to loser-winner or winner-loser. On the other hand, some of the repeat over performers actually paid lower fees so that when adjusted for fees they switch to winner-loser or loser-winner.

In the aggregate period between 2000 and 2007, balanced fund raw returns exhibit performance persistence at 5% significance for quarterly and two-yearly evaluation periods using net returns and for only two-yearly evaluation periods using gross returns. Persistence originates from repeat winners. Winner funds' persistence is significant at 5% level only for two-yearly quarterly evaluation periods both net and gross of management fees. The significance of winners increased going from net to gross for two-yearly returns. Losing funds' persistence is not significant at 5% level for net, gross and risk-adjusted returns for any of the three evaluation period

type. As for risk-adjusted returns, there is persistence only for two-yearly returns which originates from significantly persistent winners. Persistence of quarterly returns are not tested on a risk-adjusted basis because to calculate quarterly risk-adjusted returns, there are only 12 weekly return data for each period which would decrease reliability of alphas and hence the power of tests.

Table 218 Summary of Persistence Tests for Balanced Funds for the Aggregate Period

	WW	LW	WL	LL	CPR	Z	Z_w	Z_l	Chi-sq
Net Returns									
Quarterly	210	165	173	184	1.35	2.04*	1.89	1.02	6.31
Yearly	53	37	43	37	1.23	0.67	1.02	0.00	4.02
Two-Yearly	48	19	29	26	2.26	2.14*	2.17*	1.04	15.11
Gross Returns									
Quarterly	203	172	175	182	1.23	1.38	1.44	0.53	3.20
Yearly	43	37	43	35	0.95	-0.17	0.00	-0.24	1.29
Two-Yearly	51	16	28	27	3.07	2.85**	2.59**	1.68	21.28
Risk-Adjusted Returns									
Quarterly	-	-	-	-	-	-	-	-	-
Yearly	48	44	42	37	0.96	-0.13	0.63	-0.78	1.47
Two-Yearly	44	21	25	33	2.77	2.71**	2.29*	1.63	10.04

(*) indicates significance at 5%. (**) indicates significance at 1%.

Then parametric tests are carried out for balanced funds. Parametric tests can only be done for individual periods, but the results cannot be gathered for the aggregate period. The percentage of persistent periods somewhat increases in parametric tests. In parametric tests it was observed that 14% of the annual periods between 2000 and 2007 using raw returns only are found to be significantly persistent at 5% significance level. Moreover, 40% of the bi-annual periods are found to be significantly persistent for both raw and risk-adjusted returns.

Table 219 Summary Breakdown of Evaluation Periods with Significant Persistence for Balanced Funds

	Raw Returns	Risk-Adjusted Returns
Quarterly		
Non-parametric	13-6%	-
Parametric	-	-
Annual		
Non-parametric	0%	0%
Parametric	14%	14%
Bi-Annual		
Non-parametric	20%	0%
Parametric	40%	40%

Value of Sell-Side Research in Asset Management

In order to determine the value creation by sell-side research services for managed funds business, a questionnaire is utilized. To design the questionnaire, focus groups are used. As a result of these, the construct "Sell-Side Research" is operationalized by determining five dimensions, i.e. analysis, motivation, behavioral & cognitive, regulatory & disclosure and independent research. Psychometric properties of the survey scale to be used to measure the construct, i.e. its reliability and validity are assessed using Cronbach's Alpha. The study is found to be reliable, i.e. the items under each dimension are consistent or equivalent in what they indicate about the dimension. As for validity, the study has found to have content (face) validity as a result of literature survey and focus groups. However, it cannot be comfortably concluded that the study has internal validity since it has convergent validity but not surely have discriminant validity. Therefore, although the study has external validity on a theoretical level, it cannot be concluded that it has construct validity due to the doubt about internal validity.

Answers to the questionnaire resulted in interesting results. The highest ranked items in the Analysis Dimension are "Discussions with sell-side analysts",

"New sell recommendations" and "Full research reports" in that order. The least valuable ranked services are "Updates to research reports" and "New buy recommendations". "New buy recommendations" by analysts are found close to seldom valuable whereas "New sell recommendations" get the highest ranking and are found close to usually valuable. Also analyst discussions and full research reports received highest rankings. This shows that buy-side professional are rather selective in sell-side services and that they do not get every service at face value. Overall mean of Analysis dimension is 2.91 implying that buy-side professionals view analysis aspects of sell-side research as close to sometimes valuable.

The highest ranked items in the Motivation Dimension are "Retention of banking clients", "Pressure from management of companies covered" and "Pressure from domestic high net worth clients" in that order. The least important motivation factors are "Pressure from buy-side clients" and "Reputation". Overall mean of Motivation dimension is 3.11 implying that buy-side professionals view motivational aspects of sell-side research as more than sometimes important. Moreover banking relationships, pressure from management companies and domestic high net worth clients take first places in motivational factors.

The most agreed upon items in the Behavior Dimension are "Discounting analyst opinion in certain cases", "Interpreting hold recommendations as sell", "Giving more importance to buy recommendations than sell recommendations" and "Analysts should issue more sell recommendations" in that order. The least agreed upon item is "Stock ownership leading better analysis for analysts". Overall mean of Behavior/Cognition dimension is 2.99 implying that buy-side professionals view behavioral and cognitive aspects of sell-side research as close to neutral.

The most agreed upon items in the Regulation Dimension are “Disclosure of banking relationships”, “Disclosure of conflicts of interest in all media exposure”, “Restriction of trade during recommendation change/make” and “Disclosure of related stock ownership by brokerage firms” in that order. There is no item here with a mean less than 4 indicating that all items are agreed or strongly agreed. Overall mean of this dimension is 4.17 implying that buy-side professionals view regulatory aspects of sell-side research as more than usually valuable.

The most agreed upon items in the Independent Research Dimension are “Need for more independent research companies”, “Willingness to pay more for independent research if better quality and more reliable research is provided”, “Independent research being more informative than other sell-side research” in that order. The least agreed upon item is “My firm gets independent research”. Overall mean of this dimension is 3.74 implying that buy-side professionals view independent type of sell-side research as close to usually valuable which is higher than the Analysis dimension. This shows that independent research increases the value of sell-side research.

If we rank the dimensions according to their overall mean, Regulation Dimension becomes the first, Independent Research Dimension becomes the second and Motivation Dimension becomes the third. Behavior Dimension turns out to be the fourth whereas Analysis Dimension develops into the last place. This is an interesting result because buy-side professionals value sell-side research higher as long as it is well-regulated, independent and freed from motivational issues. Behavioral factors are assessed as neutral. Astonishingly, Analysis Dimension which is the first and foremost aspiration of research process is the last one in rank order.

That means that asset managers do not grant value to sell-side research at face value, but selectively appreciate certain elements of it.

This questionnaire was implemented during the period June 2008 to September 2008 when global markets was in its slide from the 2007 peak, most developed economies were in recession at the same time, and earnings were continuously being revised downwards by analysts. Therefore, it is obviously not a perfect time for analyst credibility which was in a downward trend. That may be a reason why Analysis Dimension had the poorest place in the value of sell-side research. Nevertheless, if the questionnaire were conducted after September 2008 when the markets lost all confidence after the Lehman Brothers went under and filed for bankruptcy protection, then results would be not only devastating but also abnormal for the value of sell-side research. Those results presented may be somewhat pessimistic but at least they are normal. Therefore, it would be good to reconduct this questionnaire in an expansionary economic environment and compare the results with this one which is carried out in a contractionary environment.

CHAPTER 11 CONCLUSION

This study explains the whole value chain of Turkish mutual fund management industry by expanding on the following three interrelated topics in the form of a trilogy:

- The value creation by mutual fund portfolio managers for investors: the performance evaluation of equity mutual funds in Turkey between 2000 and 2007 including the impact of survivorship bias on performance measures,
- The persistence of mutual fund performance in Turkey during the same period,
- The value creation by sell-side research for the managed funds business in Turkey.

The performance of actively managed equity mutual funds are evaluated in separate fund classes, which comprise variable, equity and balanced funds. Passive funds, i.e. index funds or participation funds along with special funds are outside the scope of this study. The study period is 8 years between 2000 and 2007. Weekly return data for the funds are used with Wednesday to Wednesday returns to get rid of day-of-the-week anomaly.

The initial phase of this study had been constructing a survivorship free database including all variable, equity and balanced funds during the study period including the deceased ones. That made a total of 176 funds: 97 variable funds, 34 equity funds and 45 balanced funds. If only the funds that existed as of 31 December 2007 were used in the dataset, there would be 88 funds: 51 variable, 19 equity and 18 balanced funds. That is nearly half of the actual numbers for each fund class. Out of these 88 funds, only 40 funds still exist at the end of the study period pointing to a survival rate of 45%. This survival rate is very low when compared with other studies in the US. For example, Elton, Gruber and Blake (1996) showed that survival

rate is 80% at the end of eight years and it drops to 65% at the end of 17 year period in the US. In Turkey, survival rate from year 2000 comes down very fast to 69.99% at the end of 2002 in three years and to 58.43% at the end of 2003 in four years. After that time, the pace of disappearance slows down. This hinted that there would be a very high probability of high survivorship bias in the Turkish equity mutual fund market data at the very beginning of this study.

The performances of funds are evaluated using Jensen's alpha equation for not only individual fund returns but also equal-weighted and size weighted portfolio returns of different fund classes. At the same time, the survivorship bias in different performance measures is calculated for different fund classes arising from the disappearance of nonsurviving fund data in the existing data bases.

Table 220 Summary of Value Creation by Fund Class Risk-Adjusted Returns

INDIVIDUAL FUNDS	Net Return Fund Index	Gross Return ISE-100
Variable Funds Class		
Average Alpha	-5.09%	-4.02%
End-of-Sample Biased Alpha	-1.60%	-1.29%
Equity Funds Class		
Average Alpha	-1.84%	-2.86%
End-of-Sample Biased Alpha	-0.58%	-1.32%
Balanced Funds Class		
Average Alpha	-4.58%	-6.06%
End-of-Sample Biased Alpha	-1.16%	-0.87%
PORTFOLIOS OF FUNDS		
Variable Funds Portfolio-EW		
Average Alpha	-5.28%	-2.41%
End-of-Sample Biased Alpha	-4.23%	-1.61%
Variable Funds Portfolio-SW		
Average Alpha	-4.84%	-2.42%
End-of-Sample Biased Alpha	-6.50%	-4.19%
Equity Funds Portfolio-EW		
Average Alpha	-1.21%	-1.68%
End-of-Sample Biased Alpha	-0.66%	-1.23%
Equity Funds Portfolio-SW		
Average Alpha	0.08%	-0.39%
End-of-Sample Biased Alpha	1.29%	0.86%
Balanced Funds Portfolio-EW		
Average Alpha	-2.67%	-2.50%
End-of-Sample Biased Alpha	-1.26%	-1.32%
Balanced Funds Portfolio-SW		
Average Alpha	0.03%	-0.74%
End-of-Sample Biased Alpha	0.60%	-0.77%

When individual fund returns are risk-adjusted, the fund class that is the most close to value creation in terms of average risk-adjusted returns is equity fund class with an average alpha of -1.84% for all funds including nonsurvivors when equity fund index is used as the market. If we were not to adjust for deceased funds, then we would calculate a biased alpha of -0.58%. Moreover, if we were to concentrate only on the funds that existed the whole of sample period (full-sample survivors), then we would calculate another biased alpha of +0.62%. Actually this study adjusted for only the management fees. There are also the transaction commissions which may probably amount as much as the management fees. Even though transaction

commissions amount less, they would most likely be enough to move the average alpha (unbiased) of all equity funds into positive territory signaling value creation for investors. This is where I got hopeful about the future.

When fund class portfolio returns are risk-adjusted, there are positive alphas for size-weighted equity (0.08%) and size-weighted balanced fund (0.03%) returns indicating that large size equity and balanced funds perform better than indices creating value. It is observed that size-weighted equity and balanced fund portfolios create value, although very little, when fund indices are used as the market. The value creation for these portfolios increases if we concentrate on funds that existed the whole of sample period with biased alphas. For equity funds portfolio, if we were not to adjust for deceased funds, then we would calculate a biased alpha of +1.29%. Moreover, if we were to concentrate on funds that existed the whole of sample period, we would calculate another biased alpha of +2.01%. For balanced funds portfolio, if we were not to adjust for deceased funds, then we would calculate a biased alpha of +0.60%. Moreover, if we were to concentrate on funds that existed the whole of sample period, we would calculate another biased alpha of -0.16%.

When ISE-100 index is used as the market and gross returns are used, full-sample biased and end-of-sample biased equity fund portfolios still create positive alpha (1.60% and 0.86% respectively) whereas both full-sample biased and end-of-sample biased balanced fund portfolio alphas go into negative territory (-1.43% and -0.77% respectively).

This study adjusted for only the management fees. There are also the transaction commissions which may probably amount as much as the management fees. Even though transaction commissions amount less, they would most likely be enough to move the average alpha (unbiased) of some other funds into positive

territory signaling value creation for investors. Controlling transaction costs are important for value creation.

There is no value creation by variable fund portfolios or equal-weighted equity and balanced fund portfolios.

Below is the summary of survivorship bias figures for variable, equity and balanced fund classes calculated using different methodologies in this study. For raw returns, survivorship bias ranges between 0.23% and 1.46% for variable funds; between 0.68% and 6.58% for equity funds and between 1.09% and 2.99% for balanced funds. For risk-adjusted returns, survivorship bias ranges between 0.80% and 1.53% for variable funds; between 0.58% and 5.19% for equity funds and between 0.45% and 3.49% for balanced funds.

Table 221 Summary of Survivorship Bias Figures for Different Fund Classes

	Raw Returns for Funds	Raw Returns for Portfolios	Risk-Adjusted Returns for Funds	Risk-Adjusted Returns for Portfolios
Variable	0.23% - 1.46%	0.51% - 0.71%	1.26% - 1.53%	0.80% - 1.05%
Balanced	1.62% - 2.99%	1.09% - 1.27%	2.73% - 3.49%	0.45% - 1.25%
Equity	6.45% - 6.58%	0.68% - 2.07%	3.42% - 5.19%	0.58% - 1.41%

Table 222 Summary of Survivorship Bias Figures for Raw and Risk-Adjusted Returns

	Raw Return Range	Risk-Adjusted Return Range
Variable Fund Class	0.23% - 1.46%	0.80% - 1.53%
Balanced Fund Class	1.09% - 2.99%	0.45% - 3.49%
Equity Fund Class	0.68% - 6.58%	0.58% - 5.19%

As for persistence, all three fund classes of variable, equity and balanced funds are persistent in the short-term and the source of persistence is persistent winners. Quarterly evaluation periods are used for net and gross returns but not risk-adjusted returns in the contingency table based approach due to small number of data points to obtain reliable alphas in quarters.

According to the results of both parametric and non-parametric tests, variable funds are significantly persistent for short-term, medium-term and long-term. The source of persistence is persistent winners for net and gross returns. For risk-adjusted returns, persistence is due equally to persistent winners and losers. That shows that some funds take high risk and that when adjusted for risk some of the persistent winners become persistent losers.

Equity funds are significantly persistent only for short-term, i.e. quarterly evaluation periods. Balanced funds are significantly persistent for short-term and long-term but not for medium-term, namely for quarterly and two-yearly evalution periods but not for annual periods. The source of persistence is persistent losers. Short-term significant persistence disappears when returns are grossed up for management fees. This means that some of the winners success is due to lower management fees when compared with peers.

Table 223 Summary of Persistence Tests by Fund Class and Evaluation Period Type

		Quarterly Periods			Yearly Periods			Two-Yearly Periods		
		Net	Gross	Risk-Ad	Net	Gross	Risk-Ad	Net	Gross	Risk-Ad
	Non-Parametric									
Variable	Entire period	+	+	NA	+	+	+ -	+	0+	+ -
Funds	% of signif periods	19%	23%	NA	14%	14%	29%	14%	14%	29%
	Parametric	NA	NA	NA	+		+	+	+	+
	% of signif periods				71%		57%	40%		40%
	Non-Parametric									
Equity	Entire period	+	+	NA	0	0	0	0	0	0
Funds	% of signif periods	6%	6%	NA	0%	0%	0%	0%	0%	20%
	Parametric	NA	NA	NA	0+		0	0+		0+
	% of signif periods				14%		0%	20%		0%
	Non-Parametric									
Balanced	Entire period	+	0	NA	0	0	0	+	+	+
Funds	% of signif periods	13%	6%	NA	0%	0%	0%	20%	20%	0%
	Parametric	NA	NA	NA	0+		0+	+		+
	% of signif periods				14%		14%	40%		40%

Note: "+" denotes persistence due to persistent winners.
"-" denotes persistence due to persistent losers.
"+ -" denotes persistence due equally to persistent winners and losers.
"0" denotes no persistence.
"0+" denotes persistence at 10% significance.

In the final part of this study, I examined the final part of the value chain for the Turkish managed funds business which is the value of sell-side research feeding asset management. To measure the value of sell-side research, a questionnaire was designed by using some qualitative research in the form of focus groups. After that, the construct "Sell-Side Research" was operationalized by determining five dimensions, i.e. analysis, motivation, behavioral & cognitive, regulatory & disclosure and independent research to measure the construct. Then the questionnaire was implemented to a judgment sample of investment professionals. The results of the questionnaire elements were discussed in detail in the previous sections.

To summarize the findings, if we rank the dimensions according to their overall mean, Regulation Dimension becomes the first, Independent Research Dimension becomes the second and Motivation Dimension becomes the third. Behavior Dimension turns out to be the fourth whereas Analysis Dimension develops into the last place. This is an interesting result because buy-side professionals give sell-side research more value as long as it is well-regulated, independent and freed from motivational issues. Behavioral factors are assessed as neutral. Astonishingly, Analysis Dimension which is the first and foremost aspiration of research process is the last one in rank order. That means that asset managers do not grant value to sell-side research at face value, but selectively appreciate certain elements of it.

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the questionnaire were conducted after September 2008 when the markets lost all confidence after the Lehman Brothers filed for bankruptcy protection, then results would be not only devastating but also abnormal for the value of sell-side research. Those results presented may be somewhat pessimistic but at least they are normal. Therefore, it would be good to conduct this questionnaire in an expansionary economic environment and compare the results with this one which is carried out in a contractionary environment.

Further Study

This study expands on the value creation in managed funds business in the form of a trilogy: Performance measurement including survivorship bias, performance persistence and value of research services for asset management. Performance measurement analysis is carried out for individual funds and fund portfolios using different aggregation methods, net and gross returns using Jensen's single index model. Further study can be directed towards multi-index models trying to capture different factors like momentum, small cap and etc. Performance persistence is also analyzed for short-term, medium-term and long-term using parametric and non-parametric analyses using net, gross and risk-adjusted returns. Performance measurement, survivorship bias and performance persistence work can further be expanded to various fixed income funds, again applying fund classifications and results can be compared with those of equity fund classes analyzed in this study. Value of research services is analyzed with qualitative research using a questionnaire for asset management professionals trying to reveal the value of research for asset

management. Further study to value such services can be on analyst accuracy or monitoring the stock recommendations of analyst recommendations.

APPENDICES

APPENDIX A: Survivorship Bias-Free Data Set-All Funds

1	ABN AMRO BANK A TIPI DEGISKEN FON	Variable
2	ABN AMRO YATIRIM A TIPI KARMA FON	Balanced
3	ACAR MD A TIPI DEGISKEN FON	Variable
4	ACAR MD A TIPI KARMA FON	Balanced
5	AKBANK A TIPI DEGISKEN FON	Variable
6	AKBANK ÖB A TIPI DEGISKEN FON	Variable
7	AKBANK ÖB PORTFÖY YÖN A TIPI HISSE FON	Equity
8	AKBANK A TIPI HISSE FON	Equity
9	AKBANK A TIPI KARMA FON	Balanced
10	AK YATIRIM MEN. DEGISKEN A TIPI HISSE FON	Equity
11	AK YATIRIM MD A TIPI BÜYÜME AMAÇLI HISSE FON	Equity
12	ALFA MEN A TIPI DEGISKEN FON	Variable
13	ALFA MEN A TIPI HISSE SEN.FON	Equity
14	ALTERNATİF BANK A TIPI DEGISKEN FON	Variable
15	ALTERNATİF BANK A TIPI HISSE FON	Equity
16	ANADOLUBANK A TIPI HISSE FON	Equity
17	ANADOLUBANK A TIPI DEGISKEN FON	Variable
18	ATA YAT A TIPI DEGISKEN FON	Variable
19	ATA YAT A TIPI HISSE SENEDİ FON	Equity
20	ATA YAT A TIPI KARMA FON	Balanced
21	BANKEUROPA A TIPI DEGISKEN FON	Variable
22	BANKEKSPRES A TIPI DEGISKEN FON	Variable
23	BANKKAPİTAL A TIPI DEGISKEN FON	Variable
24	BANK POZİTİF A TIPI DEGISKEN	Variable
25	BAŞKENT MD A TIPI DEGISKEN	Variable
26	BAYINDIR MEN A TIPI DEGISKEN.FON	Variable
27	BAYINDIRBANK A.Ş. A TIPI HISSE SENEDİ FON	Equity
28	BAYINDIR MEN A TIPI KARMA FON	Balanced
29	BENDER A TIPI DEGISKEN YAT. FON	Variable
30	BIZIM MEN A TIPI HISSE SEN.FON	Equity
31	COMM.UNION SİG. A TIPI DEGISKEN FON	Variable
32	DEMİRYATIRIM MEN.DEGISKEN A TIPI DEGISKEN FON	Variable
33	DEMİRYATIRIM MEN.DEGISKEN A TIPI HISSE SENEDİ FON	Equity
34	DEMİRYATIRIM MEN.DEGISKEN A TIPI KARMA FON	Balanced
35	DENIZBANK A TIPI HISSE SEN FON	Equity
36	DENIZBANK A TIPI DEGISKEN YAT FON	Variable
37	DENIZBANK A TIPI KARMA FON	Balanced
38	DUNDAS UNLU A TIPI DEGISKEN FON	Variable
39	ECZACIBASI A TIPI DEGISKEN FON	Variable
40	ECZACIBASI A TIPI KARMA FON	Balanced
41	ECZACIBASI A TIPI HISSE FON	Equity
42	EGEBANK A TIPI DEGISKEN FON	Variable
43	EGEBANK A TIPI KARMA FON	Balanced
44	EGS YAT A DEGISKEN FON	Variable
45	EGS BANK AKARMA FON	Balanced
46	EGS YAT A KARMA FON	Balanced
47	EKİNCİLER YAT A TIPI DEGISKEN FON	Variable
48	ESBANK A TIPI DEGISKEN FON	Variable
49	ES MD YAT A TIPI DEGISKEN FON	Variable
50	ETİBANK A TIPI DEGISKEN FON	Variable
51	EVGIN MD A TIPI DEGISKEN FON	Variable

APPENDIX A Cont.

52	EVGIN M.D.A TIPI KARMA FON	Balanced
53	FINANS YAT.A TIPI DEGISKEN FON	Variable
54	FINANS YAT.A TIPI KARMA FON	Balanced
55	FINANSBANK A DEGISKEN FON	Variable
56	FINANSBANK TIPI HISSE SEN FON	Equity
57	FINANSBANK A TIPI KARMA FON	Balanced
58	FORTIS BANK A TIPI KARMA FON	Balanced
59	FORTIS BANK A TIPI DEGISKEN FON	Variable
60	FORTİS YATIRIM A TIPI HISSE FON	Equity
61	GARANTI BANK A KARMA FON	Balanced
62	GARANTI BANK A TIPI DEGISKEN. FON-1	Variable
63	GARANTI BANK A TIPI ÖZEL BİRİKİM YÖN. DEGISKEN FON	Variable
64	GARANTI BANK A TIPI ÖZEL BANKACILIK DEGISKEN FON	Variable
65	GARANTI YAT MK A TIPI DEGISKEN Fon	Variable
66	GARANTI YAT A TIPI PORTFOY YON HIZMETI DEGISKEN. FON	Variable
67	GARANTI BANK A HISSE FON	Equity
68	GEDIK YAT. A TIPI KARMA FON	Balanced
69	GEDIK YAT. A TIPI HISSE SEN FON	Equity
70	GLOBAL M.D. A TIPI KARMA FON	Balanced
71	GLOBAL M.D. A TIPI KARMA H.R. FON	Balanced
72	GLOBAL M.D. A TIPI KARMA AKTIF STRATEJI FON	Balanced
73	GLOBAL MEN A TIPI DEGISKEN. YAT.FON	Variable
74	GLOBAL M.D. A TIPI DEGISKEN P.R.	Variable
75	HAK MENKUL A TIPI DEGISKEN.YAT.FON	Variable
76	T. HALK BANK A TIPI DEGISKEN YAT. FON	Variable
77	HALK BANK A TIPI KARMA YAT. FON	Balanced
78	HSBC BANK A TIPI DEGISKEN FON-I	Variable
79	HSBC BANK A TIPI DEGISKEN FON-II	Variable
80	HSBC BANK A TIPI HISSE FON	Equity
81	HSBC BANK BÜY AMAÇLI A TIPI HISSE	Equity
82	HSBC BANK A TIPI VARLIK YON HIZMETI A TIPI HISSE FON	Equity
83	HSBC YAT. A HISSE SEN.FON	Equity
84	HSBC YAT. A TIPI KARMA FON	Balanced
85	HSBC YAT. A TIPI DEGISKEN FON	Variable
86	İKTİSAT BANKASI A TIPI HISSE FON	Equity
87	İKTİSAT BANKASI A TIPI DEGISKEN FON	Variable
88	IKTISAT YAT.A HISSE SEN. FON	Equity
89	INFO M.D. A TIPI DEGISKEN FON	Variable
90	İNTERBANK A TIPI DEGISKEN FON	Variable
91	İNTERYAT/UNICORN A TIPI DEGISKEN FON	Variable
92	İNTERBANK A TIPI KARMA FON	Balanced
93	INTER YAT.A TIPI KARMA FON	Balanced
94	INTER YAT/UNICORN CAP ATIP HISSE SEN.FON	Equity
95	IS BANKASI A TIPI DEGISKEN.FON	Variable
96	IS BANKASI A TIPI HISSE FON	Equity
97	IS BANKASI A KARMA KUMBARA FON	Balanced
98	IS YATIRIM A TIPI DEGISKEN.YAT.FON	Variable
99	IS BANK A TIPI PRIVIA DEGISKEN	Variable
100	ISVICRE SIGORTA ATIP DEGISKEN FON/ERGO	Variable
101	ISVICRE HAYAT SIG ATIP DEGISKEN FON/ERGO	Variable

APPENDIX A Cont.

102	KALKINMA BANK A TIPI DEGISKEN.FON	Variable
103	KALKINMA BANK A TIPI KARMA FON	Balanced
104	KALKINMA YAT. A TIPI DEGISKEN FON	Variable
105	KALKINMA YAT. A TIPI KARMA FON	Balanced
106	KALKINMA YAT. A TIPI HISSE FON	Equity
107	KENT BANK A TIPI DEGISKEN FON	Variable
108	KENT YAT.A TIPI DEGISKEN FON	Variable
109	KENTBANK A TIPI KARMA	Balanced
110	KOC YAT. A TIPI DEGISKEN FON	Variable
111	KOCBANK A TIPI DEGISKEN FON	Variable
112	KOCBANK/YAPI KREDİ A TIPI HISSE FON	Equity
113	KOCBANK A TIPI KARMA FON	Balanced
114	B.T. KÖRFEZBANK/OSMANLI BANKASI A TIPI DEGISKEN	Variable
115	B.T. KÖRFEZBANK A TIPI KARMA FON	Balanced
116	MEKSA YAT.ATIPI DEGISKEN FON	Variable
117	MEKSA YAT.ATIPI KARMA FON	Variable
118	MNG BANK ATIPI DEGISKEN.YAT. FON	Variable
119	NUROL MENKUL ATIPI DEGISKEN. FON	Variable
120	ORDU YARD.KURUMU A TIPI DEGISKEN FON	Variable
121	OYAKBANK A TIPI DEGISKEN	Variable
122	OYAKBANK/ING BANK A TIPI HISSE FON	Equity
123	OYAK YAT A TIPI DEGISKEN FON	Variable
124	OSMANLI BANKASI A TIPI KARMA FON	Balanced
125	PAMUKBANK ATIPI DEGISKEN.YAT. FON	Variable
126	RJ A DEGISKEN FON	Variable
127	RJ MD A KARMA FON	Balanced
128	RİVA MD A.Ş. A TIPI DEGISKEN FON	Variable
129	SANKO MENKUL A TIPI DEGISKEN FON	Variable
130	SEKERBANK A TIPI DEGISKEN FON	Variable
131	SİTEBANK A TIPI DEGISKEN FON	Variable
132	SINAI YATIRIM BANK.ADEGISKEN.FON	Variable
133	SINAI YATIRIM BANK A TIPI KARMA FON	Balanced
134	STRATEJI MEN. A TIPI DEGISKEN FON	Variable
135	SÜMERBANK A TIPI DEGISKEN FON	Variable
136	SÜMERBANK A TIPI KARMA FON	Balanced
137	TACIRLER MEN A KARMA FON	Balanced
138	TACIRLER MEN ATIPI DEGISKEN.FON	Variable
139	TAIB YAT.ATIPI DEGISKEN. YAT. FON	Variable
140	TARISBANK A TIPI DEGISKEN FON	Variable
141	TEB YATIRIM A TIPI DEGISKEN FON	Variable
142	TÜRK EKONOMİ BANKASI A TIPI DEGISKEN FON	Variable
143	TÜRK EKONOMİ BANKASI A TIPI DEGISKEN FON	Variable
144	T. EKONOMİ BANKASI A TIPI KARMA FON	Balanced
145	TEB YATIRIM A HISSE SEN. FON	Equity
146	TEB A.Ş. VARLIK YÖN HİZ DEGISKEN FON	Variable
147	TEKFENBANK A TIPI DEGISKEN.FON	Variable
148	TEKFENBANK A TIPI KARMA FON	Balanced
149	TEKSTIL BANK A TIPI DEGISKEN FON	Variable
150	TEKSTIL BANK.A HISSE SEN. FON	Equity
151	TEKSTIL MEN.A TIPI DEGISKEN FON	Variable

APPENDIX A Cont.

152	TOPRAKBANK A TIPI DEGISKEN FON	Variable
153	TOPRAKBANK A TIPI KARMA FON	Balanced
154	TSKB A TIPI DEGISKEN FON	Variable
155	TSKB A TIPI KARMA FON	Balanced
156	TSKB A TIPI HISSE FON	Equity
157	TURKISH YAT.A TIPI DEGISKEN.FON	Variable
158	T.TİCARET BANKASI A TIPI DEGISKEN FON	Variable
159	T.TİCARET BANKASI A TIPI KARMA FON	Balanced
160	TURKLAND BANK A TIPI DEGISKEN FON	Variable
161	UB ULUSAL YAT.MEN.DEGISKEN. A TIPI DEGISKEN FON	Variable
162	VAKIFBANK A TIPI DEGISKEN.YAT.FON	Variable
163	VAKIFBANK A TIPI KARMA ILK ADIM FONU	Balanced
164	VAKIFBANK A TIPI HISSE FON	Equity
165	YAPI KREDI BANK A TIPI HISSE FON	Equity
166	YAPI KREDI YATIRIM A TIPI HISSE FON	Equity
167	YAPIKREDI BANK A TIPI KARMA FON	Balanced
168	YAPIKREDI YATIRIM A TIPI KARMA FON	Balanced
169	YAPIKREDI YATIRIM A TIPI DEGISKEN FON	Variable
170	YAPI KREDİ YAT. A TIPI OZEL PORT. YON DEGISKEN FON	Variable
171	YAŞARBANK A TIPI DEGISKEN FON	Variable
172	YATIRIM FINANSMAN A TIPI DEGISKEN.FON	Variable
173	ZIRAAT BANKASI A TIPI KARMA FON	Balanced
174	ZIRAAT BANKASI A TIPI DEGISKEN FON	Variable
175	ZIRAAT YATIRIM A TIPI DEGISKEN FON	Variable
176	ZIRAAT BANKASI A TIPI DEGISKEN BAŞAK FON	Variable

APPENDIX B: Summary of Raw, Risk-Adjusted and EW & SW Portfolio Returns (%)

Class	Method	Port. Type	Raw/Alpha	Return		Return	
Variable				Net		Gross	
	Fund		Raw				
	All			19.69		26.08	
	Full-sample			20.59		27.01	
	End-of-sample			21.16		26.30	
	Nonsurviving			18.33		25.87	
	Fund		Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-5.09	-8.63	-0.29	-4.02
	Full-sample			-3.24	-6.75	1.77	-1.72
	End-of-sample			-1.60	-5.68	2.90	-1.29
	Nonsurviving			-8.48	-11.41	-3.48	-6.67
	Portfolio	EW	Raw				
	All			21.36		27.44	
	Full-sample			20.89		27.27	
	End-of-sample			22.07		27.95	
	Nonsurviving			20.96		27.47	
	Portfolio	EW	Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-5.28	-7.92	0.68	-2.41
	Full-sample			-5.10	-7.81	0.99	-2.13
	End-of-sample			-4.23	-6.97	1.58	-1.61
	Nonsurviving			-6.76	-9.31	-0.59	-3.31
	Portfolio	SW	Raw				
	All			23.25		28.40	
	Full-sample			20,62		26,30	
	End-of-sample			21,56		26,50	
	Nonsurviving			26,57		32,80	
	Portfolio	SW	Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-4,84	-7,36	0,51	-2,42
	Full-sample			-7,39	-9,74	-1,71	-4,48
	End-of-sample			-6,50	-8,94	-1,36	-4,19
	Nonsurviving			-1,93	-4,59	3,28	0,46

EW: Equal-Weighted; SW: Size-Weighted.

APPENDIX B Cont.

Class	Method	Port. Type	Raw/Alpha	Return		Return	
Equity							
	Fund		Raw				
	All			13.19		19.01	
	Full-sample			18.75		25.00	
	End-of-sample			19.78		25.47	
	Nonsurviving			6.22		12.15	
	Fund		Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-1.84	-7.70	3.06	-2.86
	Full-sample			0.62	-5.86	5.02	-0.69
	End-of-sample			-0.58	-5.83	3.91	-1.32
	Nonsurviving			-3.26	-9.81	2.11	-4.58
	Portfolio	EW	Raw				
	All			16.90		23.23	
	Full-sample			18.45		24.74	
	End-of-sample			17.67		23.92	
	Nonsurviving			15.66		22.25	
	Portfolio	EW	Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-1.21	-6.73	4.14	-1.68
	Full-sample			-0.77	-6.11	4.50	-1.12
	End-of-sample			-0.66	-6.20	4.62	-1.23
	Nonsurviving			-1.83	-7.13	4.10	-1.79
	Portfolio	SW	Raw				
	All			19.15		25.42	
	Full-sample			22.10		28.52	
	End-of-sample			21.13		27.49	
	Nonsurviving			14.98		21.28	
	Portfolio	SW	Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			0.08	-5.37	5.35	-0.39
	Full-sample			2.01	6.76	7.38	1.6
	End-of-sample			1.29	-4.17	6.62	0.86
	Nonsurviving			-2.84	-8.27	2.50	-3.23

EW: Equal-Weighted; SW: Size-Weighted.

APPENDIX B Cont.

Class	Method	Port. Type	Raw/Alpha	Return		Return	
Balanced							
	Fund		Raw				
	All			20.47		27.83	
	Full-sample			23.37		28.51	
	End-of-sample			23.46		29.45	
	Nonsurviving			18.70		26.71	
	Fund		Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-4.58	-10.74	0.40	-6.06
	Full-sample			-2.41	-6.89	3.18	-1.68
	End-of-sample			-1.16	-5.52	3.86	-0.87
	Nonsurviving			-6.66	-13.90	-1.69	-9.21
	Portfolio	EW	Raw				
	All			21.88		27.99	
	Full-sample			22.74		25.75	
	End-of-sample			23.16		29.09	
	Nonsurviving			18.39		24.99	
	Portfolio	EW	Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			-2.67	-7.30	2.38	-2.5
	Full-sample			-2.26	-6.88	-0.56	-4.99
	End-of-sample			-1.26	-6.08	3.78	-1.32
	Nonsurviving			-5.77	-10.01	-1.61	-6.15
	Portfolio	SW	Raw				
	All			23.88		29.39	
	Full-sample			22.63		27.72	
	End-of-sample			22.74		28.43	
	Nonsurviving			25.38		32.34	
	Portfolio	SW	Alpha	Fund Index	ISE Index	Fund Index	ISE Index
	All			0.03	-4.96	4.46	-0.74
	Full-sample			-0.16	-5.35	3.97	-1.43
	End-of-sample			0.60	-4.68	4.72	-0.77
	Nonsurviving			-0.87	-5.49	4.64	-0.24

EW: Equal-Weighted; SW: Size-Weighted.

APPENDIX C: Summary of Survivorship Bias and Premium for Raw, Risk-Adjusted and EW & SW Portfolio Returns (%)

Class	Net/Gross		Method		Survivorship Bias		Survivorship Premium	
Variable								
	Net	Fund	ES	Raw	1.46		2.82	
			FS		0.89		2.25	
					Fund Index	ISE Index	Fund Index	ISE Index
		Fund	ES	Alpha	3.49	2.95	6.88	5.72
			FS		1.84	1.88	5.23	4.65
			EW					
		Portfolio	ES	Raw	0.71		1.11	
			FS		-0.47		-0.07	
			EW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES	Alpha	1.05	0.95	2.53	2.34
			FS		0.18	0.11	1.66	1.50
			SW					
		Portfolio	ES	Raw	-1.69		-5.01	
			FS		-2.62		-5.94	
			SW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES	Alpha	-1.66	-1.57	-4.57	-4.35
			FS		-2.55	-2.37	-5.45	-5.15
	Gross	Fund	ES	Raw	0.23		0.43	
			FS		0.93		1.14	
					Fund Index	ISE Index	Fund Index	ISE Index
		Fund		Alpha	3.19	2.73	6.39	5.38
					2.06	2.30	5.25	4.95
			EW					
		Portfolio	ES	Raw	0.51		0.47	
			FS		-0.17		-0.20	
			EW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES	Alpha	0.90	0.80	2.17	1.71
			FS		0.31	0.28	1.58	1.18
			SW					
		Portfolio	ES	Raw	-1.90		-6.30	
			FS		-2.10		-6.50	
			SW					
		Portfolio	ES	Alpha	-1.87	-1.77	-4.64	-4.65
			FS		-2.22	-2.06	-4.99	-4.94

FS: Full-Sample; ES: End-of-Sample; EW: Equal-Weighted; SW: Size-Weighted

APPENDIX C cont.

Class	Net/Gross		Method			Survivorship Bias		Survivorship Premium	
Equity									
	Net	Fund	ES		Raw	6.58		13.56	
			FS			5.56		12.53	
						Fund Index	ISE Index	Fund Index	ISE Index
		Fund	ES		Alpha	1.26	1.88	2.68	3.99
			FS			2.46	1.84	3.88	3.95
				EW					
		Portfolio	ES		Raw	0.77		2.01	
			FS			1.55		2.79	
				EW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	0.56	0.52	1.17	0.93
			FS			0.45	0.62	1.06	1.02
				SW					
		Portfolio	ES		Raw	1.98		6.15	
			FS			2.95		7.13	
				SW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	1.22	1.20	4.13	4.10
			FS			14.23	13.13	17.15	15.03
	Gross	Fund	ES		Raw	6.45		13.31	
			FS			5.98		12.84	
						Fund Index	ISE Index	Fund Index	ISE Index
		Fund	ES		Alpha	0.85	1.53	1.81	3.26
			FS			1.96	2.17	2.92	3.89
				EW					
		Portfolio	ES		Raw	0.68		1.66	
			FS			1.50		2.49	
				EW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	0.48	0.45	0.52	0.56
			FS			0.37	0.55	0.40	0.67
				SW					
		Portfolio	ES		Raw	2.07		6.21	
			FS			3.10		7.24	
				SW					
		Portfolio	ES		Alpha	1.27	1.25	4.12	4.09
			FS			2.03	2.00	4.88	4.83

FS: Full-Sample; ES: End-of-Sample; EW: Equal-Weighted; SW: Size-Weighted

APPENDIX C cont.

Class	Net/Gross			Method		Survivorship Bias		Survivorship Premium	
Balanced									
	Net	Fund	ES			2.99		4.76	
			FS			2.89		4.67	
						Fund Index	ISE Index	Fund Index	ISE Index
		Fund	ES		Alpha	3.42	5.22	5.49	8.38
			FS			2.17	3.84	4.25	7.01
				EW					
		Portfolio	ES		Raw	1.27		4.76	
			FS			0.86		4.35	
				EW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	1.41	1.22	4.51	3.93
			FS			0.41	0.42	3.51	3.13
				SW					
		Portfolio	ES		Raw	-1.14		-2.64	
			FS			-1.25		-2.74	
				SW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	0.58	0.28	0.27	0.81
			FS			-0.18	-0.39	0.71	0.14
	Gross	Fund	ES		Raw	1.62		2.74	
			FS			0.68		1.80	
						Fund Index	ISE Index	Fund Index	ISE Index
		Fund	ES		Alpha	3.45	5.19	5.55	8.34
			FS			2.78	4.38	4.88	7.53
				EW					
		Portfolio	ES		Raw	1.09		4.09	
			FS			-2.25		0.75	
				EW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	1.40	1.19	5.39	4.83
			FS			-2.94	-2.48	1.05	1.16
				SW					
		Portfolio	ES		Raw	-0.96		-3.91	
			FS			-1.67		-4.62	
				SW		Fund Index	ISE Index	Fund Index	ISE Index
		Portfolio	ES		Alpha	0.26	-0.03	0.08	-0.53
			FS			-0.49	-0.69	-0.67	-1.19

FS: Full-Sample; ES: End-of-Sample; EW: Equal-Weighted; SW: Size-Weighted

APPENDIX D: The Questionnaire

		Rarely Valuable	Seldom Valuable	Sometimes Valuable	Usually Valuable	Always Valuable
1	How valuable do you think sell-side research services in general are for buy-side?					

		Rarely Biased 1	Seldom Biased 2	Sometimes Biased 3	Usually Biased 4	Always Biased 5
2	How biased do you think sell-side research recommendations are?					

How valuable do you believe are the following sell-side research services provided by brokerage firms?						
		Rarely Valuable 1	Seldom Valuable 2	Sometimes Valuable 3	Usually Valuable 4	Always Valuable 5
3	Daily bulletins, calls, faxes and mails					
4	Discussions with sell-side analysts					
5	Full research reports					
6	Updates to research reports					
7	New buy recommendations					
8	New sell recommendations					
9	Removal or downgrades of buy recommendations					
10	Arranging company visits and conference calls with the companies covered					
11	Access to senior management of the company covered					

How important do you believe are the following motivation factors to sell-side analysts?						
		Rarely Important 1	Seldom Important 2	Sometimes Important 3	Usually Important 4	Always Important 5
12	Analysts' desire to retain and attract banking clients					
13	Compensation linked to trading volume in the stocks s/he covers					
14	Pressure from buy-side clients not to downgrade stocks they hold					
15	Pressures from the management of companies s/he covers					
16	Pressure from domestic high-net worth clients not to downgrade stocks they hold					
17	Desire to make the best buy and sell calls to increase her/his reputation					

Please indicate the extent to which you agree or disagree with the following statements.						
		Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
18	Analysts should issue more sell recommendations.					
19	Analysts who own stocks they follow will make better valuation calls					
20	I give more importance to sell recommendations than buy recommendations.					
21	I use analyst recommendations as a contrary indicator of attractiveness.					
22	I discount the opinions and recommendations of analysts where there is an investment banking relationship.					
23	My decision-making is often influenced more by changes to "strong buy" categories than attractive/outperform.					
24	I interpret "hold" recommendations as sell recommendations.					
25	Removal from an analysts's list is more informative than initiation of "buy".					

How valuable do you believe the following regulatory issues regarding sell-side research can be if taken into practice?						
		Rarely Valuable 1	Seldom Valuable 2	Sometimes Valuable 3	Usually Valuable 4	Always Valuable 5
26	Analysts should be required to disclose their positions in the stocks they cover.					
27	Analysts should be restricted from trading for a period of time while they make or change their recommendations.					
28	Brokerage firm reports should disclose banking relationships and other potential conflicts .					
29	Brokerage firm reports should disclose exactly when the firm last acted as underwriter or merger/acquisition advisor to the company covered.					
30	Brokerage firm reports should disclose the value of stock in the company reported owned by the brokerage firm.					
31	Brokerage firm reports should disclose the value of stock in the company reported owned by the brokerage firm.					
32	Brokerage firm reports should disclose all conflicts of interest during all media exposure (TV and print).					

Please indicate your opinion regarding independent (non-brokerage) research.

		Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
33	My firm gets independent research.					
34	The independent research I get is typically more informative than other sell-side research I receive.					
35	There is more need for independent research in the buy-side companies.					
36	My firm would be willing to pay more for independent research if better quality and more reliable research is provided.					
37	It is unlikely that I would be willing to pay more for independent research since I am able to de-bias and use sell-side information.					

38 Please indicate your current position.

- Equity Portfolio Manager ☐
- Buy-side Equity Analyst ☐
- Fixed-income portfolio manager or trader ☐

39 Please indicate your work experience.

- 0-3 years ☐
- 4-6 years ☐
- 7-10 years ☐
- Above 10 years ☐

Please answer the following questions without checking the previous pages.

40	How valuable do you think sell-side research services in general are for buy-side?								
	Rarely Valuable	:-------:	------:	-------:	------:	-------:	------:	-------:	Always Valuable
41	How biased do you think sell-side research recommendations are?								
	Rarely Biased	:-------:	------:	-------:	------:	-------:	------:	--------:	Always Biased

How valuable do you believe are the following sell-side research services provided by brokerage firms?

		Rarely Valuable							Always Valuable
42	Daily bulletins, calls, faxes and mails	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
43	Discussions with sell-side analysts	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
44	Full research reports	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
45	Updates to research reports	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
46	New buy recommendations	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
47	New sell recommendations	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
48	Removal or downgrades of buy recommendations	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
49	Arranging company visits and conference calls with the companies covered	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
50	Access to senior management of the company covered	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	

How important do you believe are the following motivation factors to sell-side analysts?

	Rarely Important							Always Important
51	Analysts' desire to retain and attract banking clients	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
52	Compensation linked to trading volume in the stocks s/he covers	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
53	Pressure from buy-side clients not to downgrade stocks they hold	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
54	Pressures from the management of companies s/he covers	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
55	Pressure from domestic high-net worth clients not to downgrade stocks they hold	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
56	Desire to make the best buy and sell calls to increase her/his reputation	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:

Please indicate the extent to which you agree or disagree with the following statements.

		Strongly Agree						Strongly Disagree
57	Analysts should issue more sell recommendations.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
58	Analysts who own stocks they follow will make better valuation calls	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
59	I give more importance to sell recommendations than buy recommendations.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
60	I use analyst recommendations as a contrary indicator of attractiveness.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
61	I discount the opinions and recommendations of analysts where there is an investment banking relationship.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
62	My decision-making is often influenced more by changes to "strong buy" categories than attractive/outperform.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
63	I interpret "hold" recommendations as sell recommendations.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
64	Removal from an analysts's list is more informative than initiation of "buy".	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:

How valuable do you believe the following regulatory issues regarding sell-side research can be if taken into practice?

	Rarely Valuable							Always Valuable
65	Analysts should be required to disclose their positions in the stocks they cover.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
66	Analysts should be restricted from trading for a period of time while they make or change their recommendations.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
67	Brokerage firm reports should disclose banking relationships and other potential conflicts .	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
68	Brokerage firm reports should disclose exactly when the firm last acted as underwriter or merger/acquisition advisor to the company covered.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
69	Brokerage firm reports should disclose the value of stock in the company reported owned by the brokerage firm.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
70	Brokerage firm reports should disclose the value of stock in the company reported owned by the analyst.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	
71	Brokerage firm reports should disclose all conflicts of interest during all media exposure (TV and print).	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:	

Please indicate your opinion regarding independent (non-brokerage) research.

		Strongly Disagree						Strongly Agree
72	My firm gets independent research.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
73	The independent research I get is typically more informative than other sell-side research I receive.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
74	There is more need for independent research in the buy-side companies.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
75	My firm would be willing to pay more for independent research if better quality and more reliable research is provided.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:
76	It is unlikely that I would be willing to pay more for independent research since I am able to de-bias and use sell-side information.	:-------:	:-----:	:------:	:-----:	:------:	:-----:	:-------:

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