

**EVALUATION OF US AND EUROPEAN HEDGE
FUNDS AND ASSOCIATED INTERNATIONAL
MARKETS: A RISK - PERFORMANCE
MEASURE APPROACH**

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Dissertation submitted for the degree

MAGISTER COMMERCII

in

RISK MANAGEMENT

in the

SCHOOL OF ECONOMIC SCIENCES

in the

FACULTY OF ECONOMIC SCIENCES AND INFORMATION TECHNOLOGY

at the

NORTH –WEST UNIVERSITY (VAAL TRIANGLE CAMPUS)

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October 2014

Dedication

I would like to dedicate this dissertation to my parents, Christo and Kate Brand.

ACKNOWLEDGEMENTS

I would like to extend my gratitude to the following people who contributed to my successful completion of this research report:

- My supervisor, Dr. André Mellet for his assistance, guidance and patience and for all those long hours you had to sacrifice;
- My co-supervisor, Dr. Chris van Heerden for his advice and assistance on the empirical report;
- My parents, Christo and Kate Brand for their undivided love and care. Thank you for each word of encouragement and all the support you gave me during the past years. Thank you for all the times you made me coffee during late evenings. Thank you for giving me the opportunity to complete my studies;
- My best friend, Chris van Heerden, you have been a pillar of strength to me during this year. Thank you for believing in me and for all your love;
- All my family members and friends for their interest and motivation during this year;
- The School of Economics at the Vaal Triangle campus for the bursary;
- The personnel of the Vaal Triangle campus library for their friendly service;
- Linda Scott for assisting me with the grammatical and final editing; and
- My Lord, Jesus Christ, for the life and the knowledge I have gained. Thank you for always being there in difficult times.

Corinthians 12:9–10

But he said to me: “My grace is sufficient for you, for my power is made perfect in weakness”. Therefore I will boast all the more gladly about my weaknesses, so that Christ’s power may rest on me. That is why for Christ’s sake, I delight in weaknesses, in insults, in hardships, in persecutions, in difficulties. For when I am weak, then I am strong.

ABSTRACT

The 2007–2009 financial crisis led to a decrease in consumer and investor confidence worldwide (SARB, 2008:2). Along with the weakened business sentiment and consumer demand, tightened funding conditions in financial markets, increased inflationary pressures, and declining global manufacturing activities, the world economic recession that followed the collapse of the world financial sector led to an estimated wealth destruction of approximately US\$50 trillion (SARB, 2008:2; Aisen & Franken, 2010:3; Karunanayake *et al.*, 2010). Apart from this estimate, the International Monetary Fund (IMF) also projected that the global bank balance sheets in advanced countries suffered losses of approximately US\$4 trillion during the period 2009–2010 (Aisen & Franken, 2010:3). As a result, investors have become more risk-adverse (Guiso *et al.*, 2013:1), and the consequences of the financial crisis, made insurable profitable investment decisions extremely difficult as market volatility tends to increase during crises periods (Karunanayake *et al.*, 2010; Schwert, 1989:83).

With the financial environment in distress, some fund managers consider equities as the preferred asset class to protect the purchasing power of their clients (Ivan, 2013). However, the studies of Ennis and Sebastian (2003) and Nicholas (2004) found evidence that hedge funds will outperform equity markets during a downswing in financial markets. In addition, hedge funds are considered market-neutral due to these investment funds' unrestricted investment flexibility and more efficient market timing abilities (Ennis & Sebastian, 2003). Hedge funds are also considered to be more unconventional assets for improving portfolio diversification (Lamm, 1999:87), where the variation of investment strategies available in a hedge fund has the ability to satisfy investors with several different risk preferences (Shin, 2012). Still, a number of previous studies have debated conflicting evidence regarding the performance of hedge funds and the persistence in outperforming other markets. This led to the objective of this study; to evaluate the risk-adjusted performance of US and EU hedge funds compared to the associated world equity markets over the 2007–2009 financial crisis.

The evidence from this study confirmed the dominance of hedge funds over the CAC 40, DAX, S&P 500 and Dow Jones, from 2004 to 2011, emphasising that the performance of the US and EU hedge funds would overshadow a normal buy-and-

hold strategy on the world equity markets under investigation. Overall, the Sharpe-, Sortino-, Jensen's alpha-, Treynor- and Calmar ratios illustrated that US hedge funds outperformed both EU hedge funds and the associated equity markets over this period. The presence of non-normality among the return distributions led to the use of the Omega ratio as the proper benchmark, which also confirmed the outperformance of US hedge funds over EU hedge funds and associated world equity markets.

Keywords: EU hedge funds; EWMA; Calmar; hedge funds; international world equity markets; Jensen's alpha; Omega; Sharpe; Sortino; Treynor; US hedge funds.

OPSOMMING

Die 2007–2009 finansiële krisis het gelei tot 'n wêreldwye-daling in verbruikers- en beleggersvertroue (SARB, 2008:2). Tesame met die verswakte besigheids sentiment en verbruikersvraag, strenger befondsings-kondisies in finansiële markte, hoër inflasionêre druk en 'n afname in globale vervaardigingsaktiwiteite, het die wêreld ekonomiese resessie, wat die val van die finansiële sektor opgevolg het, gelei tot 'n welvaartsvernietiging van ongeveer US\$50 triljoen (SARB, 2008:2; Aisen & Franken, 2010:3; Karunanayake *et al.*, 2010). Behalwe van die skatting, het die Internasionale Monetêre Fonds (IMF) ook verliese van ongeveer US\$4 triljoen geprojekteer wat globale banke se balansstate in gevorderde lande gedurende 2009-2010 sou toon (Aisen & Franken, 2010:3). Gevolglik het investeerders minder risikonemend geword (Guiso *et al.*, 2013:1) en met die inagneming van die finansiële krisis se nagevolge, het dit moeiliker geword om versekerde winsgewende beleggingsbesluite te maak met markvolatiliteit wat geneig is om toe te neem gedurende krisis periodes (Karunanayake *et al.*, 2010; Schwert, 1989:83).

Met die finansiële omgewing onder druk, argumenteer fondsbestuurders dat aandele die mees gekose bateklas is om hul kliënte se koopkrag te beskerm (Ivan, 2013). Maar die studie van Ennis en Sebastian (2003) en van Nicholas (2004) het egter bevind dat verskansingsfondse beter presteer as aandelemarkte gedurende 'n afswaai in die finansiële markte. Verskansingsfondse word ook geag as mark-neutraal as gevolg van die beleggingsfondse se onbeperkte beleggingsbuigbaarheid en vermoë van goeie tydsberekening van die mark (Ennis & Sebastian, 2003). Verskansingsfondse word ook geag as die mees onkonvensionele bateklas om portefeuljediwersifikasie te verbeter (Lamm, 1999:87), met die variasie in beleggingstrategieë wat verskansingsfondse bied om beleggers met verskeie risiko-voorkeure te bevredig (Shin, 2012). Daar is egter steeds 'n reeks kontrasterende bevindinge van verskeie studies rakende die prestasie en volhoubaarheid van verskansingsfondse om beter te presteer as ander markte. Dit het gelei tot die doelwit van die studie, om die risiko-aangepaste prestasie van die VS- en EU verskansingsfondse gedurende die 2007–2009 finansiële krisis te evalueer en te vergelyk met geassosieerde wêreld-aandelemarkte.

Bevindinge van d e studie bevestig die oorheersing van verskansingsfondse oor die CAC 40, DAX, S&P 500 en die Dow Jones van 2004 tot 2011. Dit beklemtoon dat 'n normale koop-en-behou strategie op w reld-aandelemarkte, wat onder observasie is, oorskadu sou word met die prestasie van VS- en EU verskansingsfondse. As geheel, het die Sharpe, Sortino, Jensen se alpha, Treynor en Calmar verhouding getoon dat die VS verskansingsfondse beide die EU verskansingsfondse en alle geassosieerde aandelemarkte oor die hele periode onder observasie oortref het. Met die teenwoordigheid van nie-normaal opbrengverspreidings, is die Omega verhouding as 'n rugsteenmaatstaf gebruik, wat ook die oorheersing van die VS verskansingsfondse oor die EU verskansingsfondse en geassosieerde w reld aandelemarkte bevestig het.

Sleutelwoorde: EU verskansingsfondse; EGBG; Calmar; verskansingsfondse; internasionale aandelemarkte; Jensen se alpha; Omega; Sharpe; Sortino; Treynor; VS verskansingsfondse.

TABLE OF CONTENTS

DEDICATION	i
ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
OPSOMMING	v
LIST OF FIGURES.....	xi
LIST OF TABLES.....	xii
LIST OF ACRONYMS	xv
CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY	1
1.1 Introduction	1
1.2 Problem statement	3
1.3 Research question	3
1.4 Research objective	3
1.4.1 Primary objective	3
1.4.2 Theoretical objective	4
1.4.3 Empirical objective	4
1.5 Research design and methodology	5
1.5.1 Literature review.....	5
1.5.2 Empirical study	5
1.5.2.1 Measuring instrument and data collection method	5
1.5.3 Statistical analysis	6
1.6 Chapter classification	6
1.6.1 Chapter 1 – Introduction and background to the study	6
1.6.2 Chapter 2 and 3 – Literature review	6
1.6.3 Chapter 4 – Research design and methodology	7
1.6.4 Chapter 5 – Results and findings	7
1.6.5 Chapter 6 – Conclusion and recommendations.....	7
CHAPTER 2: THE CONCEPT OF INVESTMENT	8
2.1 Introduction	8
2.2 Investment defined	8
2.3 Return defined.....	10
2.4 Risk defined	12
2.4.1 Non-financial- and financial risk.....	12

2.4.2 Non-systematic- and systematic risk	13
2.5 Determinants of the required rate of return	15
2.5.1 The real risk-free rate	15
2.5.2 Inflation and the nominal risk-free rate (NRFR)	15
2.5.3 Risk premiums	16
2.6 The relationship between risk and return	16
2.7 The role of diversification	17
2.7.1 The advantages of diversification	18
2.8 Developments in investment theory	19
2.8.1 Markowitz portfolio theory	20
2.8.2 The single-factor model: The capital asset pricing model.....	22
2.8.2.1 Assumptions of capital market theory.....	22
2.8.2.2 The calculation and interpretation of beta	23
2.9 The security market line (SML) and the capital market line (CML)	25
2.9.1 Disadvantages of the capital asset pricing model.....	29
2.10 Summary	30
CHAPTER 3: BACKGROUND TO HEDGE FUNDS AND PERFORMANCE	
MEASUREMENTS.....	31
3.1 Introduction	31
3.2 The definition of hedge funds	31
3.3 The historical background of hedge funds.....	32
3.4 The characteristics of hedge funds.....	35
3.4.1 Return objective and benchmark.....	35
3.4.2 Disclosure	35
3.4.3 Investment strategies	35
3.4.4 Performance and attrition rate	36
3.4.5 Regulation	36
3.4.6 Subscription, withdrawal and trading.....	36
3.4.7 Fee structure	37
3.5 The return distribution of hedge funds.....	37
3.5.1 Mean	37
3.5.2 Variance / standard deviation	38
3.5.3 Skewness.....	39
3.5.4 Kurtosis	40

3.6 Hedge fund style strategies	41
3.6.1 Event driven	42
3.6.2 Global	43
3.6.3 Global macro	43
3.6.4 Market neutral	43
3.6.5 Long only leveraged	45
3.6.6 Short sellers	45
3.6.7 Sector	45
3.6.8 Fund of Hedge Funds.....	46
3.7 New regulations of hedge funds in South Africa.....	46
3.8 Measures of risk	47
3.8.1 Standard deviation	48
3.9 Performance measures	50
3.9.1 Sharpe ratio.....	51
3.9.2 Sortino ratio	52
3.9.3 Treynor ratio	53
3.9.4 Jensen's alpha	54
3.9.5 Calmar ratio.....	56
3.9.6 Omega ratio	57
3.10 Volatility	60
3.10.1 Exponentially weighted moving average (EWMA).....	61
3.11 Market indices	63
3.11.1 The purpose of market indices	63
3.11.2 International market indices	63
3.11.2.1 Dow Jones industrial average (DJIA) index.....	64
3.11.2.2 Standard & Poor's 500 (S&P 500) index	65
3.11.2.3 Deutscher Aktien index (DAX).....	66
3.11.2.4 CAC 40 index	66
3.12 Passive management.....	67
3.12.1 Buy-and-hold strategy	67
3.13 Summary.....	69
CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY.....	70
4.1 Introduction	70
4.2 Performance measures and methodology.....	70

4.3 The data	74
4.4 Summary	76
CHAPTER 5: RESULTS AND FINDINGS	77
5.1 Introduction	77
5.2 Results	78
5.3 Summary	89
CHAPTER 6: CONCLUSION AND RECOMMENDATIONS	90
6.1 Introduction	90
6.2 Literature overview of this study	91
6.3 Methodology overview of this study	93
6.4 Overview of empirical findings	94
6.5 Conclusion	94
6.6 Recommendations for future studies	95
REFERENCES	97
APPENDIX	115
PROOF OF LANGUAGE EDITING	173

LIST OF FIGURES

Figure 2.1 The risk/return trade-off of various assets	9
Figure 2.2 Systematic and non-systematic risk	14
Figure 2.3 The efficient frontier	20
Figure 2.4 The security market line (SML)	26
Figure 2.5 Over- and undervaluation of a security	27
Figure 2.6 Capital market line assuming lending or borrowing at the risk-free rate ..	28
Figure 3.1 Timeline of events	34
Figure 3.2 Normal returns distribution	38
Figure 3.3 Skewness.....	40
Figure 3.4 Kurtosis	41
Figure 3.5 The cumualative returns distribution for asset A	58
Figure 3.6 Omega function.....	59
Figure 4.1 Sample period under investigation – illustrated by the S&P 500 index ...	75

LIST OF TABLES

Table 2.1	The interpretation of different beta (β) values	25
Table 5.1	The descriptive statistics of the monthly returns of hedge funds and world indices	80
Table 5.2	The average correlation between hedge fund returns and equity market returns	82
Table 5.3	The level of volatility between the hedge fund returns and equity market returns	83
Table 5.4	Performance evaluation.....	84
Table 5.5	The average annualised cumulative returns of US- and EU hedge funds	86
Table 5.6	Outperformance evaluation	88
Table A	Descriptive statistics – EU Hedge funds & indices (Pre-financial crisis period)	115
Table B	Descriptive statistics – US Hedge funds & indices (Pre-financial crisis period)	116
Table C	Descriptive statistics – EU Hedge funds & indices (During financial crisis period)	118
Table D	Descriptive statistics – US Hedge funds & indices (During financial crisis period)	119
Table E	Descriptive statistics – EU Hedge funds & indices (Post-financial crisis period)	121
Table F	Descriptive statistics – US Hedge funds & indices (Post-financial crisis period)	122
Table G	Average correlation of EU Hedge funds with the US Hedge funds	124
Table H	Average correlation of EU Hedge funds with the other EU Hedge funds	125
Table I	Average correlation of US Hedge funds with the other US Hedge funds	126
Table J	Correlation between EU Hedge funds and indices (Pre-financial crisis period)	128
Table K	Correlation between US Hedge funds and indices (Pre-financial crisis period)	129

Table L	Correlation between EU Hedge funds and indices (During financial crisis period).....	131
Table M	Correlation between US Hedge funds and indices (During financial crisis period).....	132
Table N	Correlation between EU Hedge funds and indices (Post-financial crisis period).....	134
Table O	Correlation between US Hedge funds and indices (Post-financial crisis period).....	135
Table P	The EWMA results: Ranked from highest to lowest volatility.....	137
Table Q	Results from the Sharpe ratio – ranked from best to worst (Based on risk-free rates: Pre-financial crisis period).....	139
Table R	Results from the Sharpe ratio – ranked from best to worst (Based on risk-free rates: During financial crisis period)	141
Table S	Results from the Sharpe ratio – ranked from best to worst	
	(Based on risk-free rates: Post-financial crisis period)	143
Table T	Results from the Sortino ratio – ranked from best to worst (Based on risk-free rates: Pre-financial crisis period).....	145
Table U	Results from the Sortino ratio – ranked from best to worst	
	(Based on risk-free rates: During financial crisis period)	147
Table V	Results from the Sortino ratio – ranked from best to worst (Based on risk-free rates: Post-financial crisis period)	149
Table W	Results from the Omega ratio: Ranked from best to worst.....	151
Table X	Results from the Calmar ratio: Ranked from best to worst.....	153
Table Y	Results from the Sortino ratio – ranked from best to worst (Based on the indices, respectively: Pre-financial crisis period).....	155
Table Z	Results from the Sortino ratio – ranked from best to worst (Based on the indices, respectively: During financial crisis period)	157
Table AA	Results from the Sortino ratio – ranked from best to worst (Based on the indices, respectively: Post-financial crisis period)	159
Table BB	Results from the Treynor ratio – ranked from best to worst (Based on the indices, respectively: Pre-financial crisis period).....	161
Table CC	Results from the Treynor ratio – ranked from best to worst (Based on the indices, respectively: During financial crisis period)	163
Table DD	Results from the Treynor ratio – ranked from best to worst	

	(Based on the indices, respectively: Post-financial crisis period)	165
Table EE	Results from the Jensen's alpha – ranked from best to worst (Based on the indices, respectively: Pre-financial crisis period)	167
Table FF	Results from the Jensen's alpha – ranked from best to worst (Based on the indices, respectively: During financial crisis period)	169
Table GG	Results from the Jensen's alpha – ranked from best to worst (Based on the indices, respectively: Post-financial crisis period)	171

LIST OF ACRONYMS

APT	Arbitrage pricing theory
AUM	Asset under management
CAC 40	Cotation Assistée en Continu 40
CAPM	Capital asset pricing model
CML	Capital market line
DAX	Deutscher Aktien index
DJIA	Dow Jones industrialAverage
EU	European
EWMA	Exponentially weighted moving average
FSB	Financial services board
HPR	Holding period return
IMF	International Monetary Fund
NRFR	Nominal risk-free rate
RMP	Risk management programme
RMSE	Root-mean-square-error
RRFR	Real risk-free rate of return
SEC	Security exchange commission
S&P 500	Standard and Poor's 500Index
SML	Security market line
US	United States

CHAPTER 1

INTRODUCTION AND BACKGROUND TO THIS STUDY

1.1 Introduction

On 15 September 2008, one of the largest investment firms, Lehman Brothers, collapsed due to bankruptcy (Tebogo, 2012:1). This collapse, as well as the failures of other financial institutions, had a significantly negative impact on the global economy (Aubuchon & Wheelock, 2010:395). This caused the breakdown of the global financial system that escalated into other parts of the world. According to Tebogo (2012:2), the events over the period 2007 to 2008 had the most substantial influence on the American economy, which ultimately resulted in a recession. This can be emphasised by the US stock market volatility, which increased significantly after 2007 (Manda, 2010:2). In 2008 the Standard and Poor's 500-stock index, as well as the United States' (US) Dow Jones index, dropped by 9 percent and by another seventeen percent of its value (Tebogo, 2012:1). This major failure event would have never happened if it were not for poor and irresponsible financial decisions made by managers, where they failed to ensure the effective evaluation of borrowers' creditworthiness (Rose & Hudgins, 2010:606). Several liquidity problems followed the outcome of this event, where financial institutions declined lending activities.

To elaborate more on the cause of the financial crisis, it was debated that the subprime-mortgage disaster in the US during 2007 contributed to the severity of the financial crisis (Lenza *et al.*, 2010:3). The adverse conditions of the indebted US economy spilled over to England's economy and to most European countries, where the European region still finds itself in a debt crisis. This was evident in 2008 when the British government nationalised the Northern Rock Bank due to the subprime-mortgage tragedy (Bruni & Llewellyn, 2009:8). This is also further emphasised by the debt problems of Greece and Spain (Blundell-Wignall, 2012:10). All these disasters contributed to a world-wide economic recession, which has also escalated uncertainty and risk within future investments, especially in US and European (EU) investments.

The after-effects of the financial crisis caused investors to revise their portfolio composition, where investors responded by adapting more risk-adverse investment

strategies (Guiso *et al.*, 2013). This development highlighted the importance of the risk-reward relationship as an investment management principle (Marx *et al.*, 2013:35). Therefore, this study will begin by discussing investment theory which provides an explanation on the risk-return behaviour of investors and how investment decisions are formulated (Brown & Reilly, 2009:20). This is essential because a wide variety of investment alternatives is available to investors. They range from risk-free government securities to highly risky derivative instruments (Omisore, 2012:23). Investors will choose investments based on their risk preferences. There are differences in risk level between the investment instruments due to the different sources of risk (Nwude, 2012:139). If investors want to maximise the future benefits expected from the investment they have to take the risk associated with the investment option (Marx *et al.*, 2013:15).

This study considers hedge funds as an investment option. Hedge funds are a pool of private capital structured as a limited partnership with the aim to achieve absolute returns under all market conditions (Nicholas, 1999:243). The aim of a hedge fund is to deliver abnormal returns and mitigate volatility and downside risk of a total investment portfolio. Although hedge funds serve as a hedging instrument, certain hedge funds are exposed to high volatility and risk (Sabbaghi, 2012:105). Therefore, this study will make use of standardised risk measures and risk-adjusted performance measures to evaluate the total risk and performances on the returns of US and EU hedge funds for the pre-financial crisis, during and post financial crisis periods, respectively.

In addition, volatility in terms of overall risk on the returns of US and EU hedge funds were evaluated to determine which fund has generated more risk over the period under investigation. Whereas, volatility is the degree of risk and uncertainty due to the size of changes in a security price (Alexander, 1998:2), evidence has been found that hedge fund volatilities have increased significantly during the financial crisis. It is also evident that all hedge fund strategies performed poorly during that time (Billio *et al.*, 2012). Due to the more volatile markets, tactics to mitigate high risk in the hedge fund industry became more complex. The aim of this study is, therefore, to provide insight as to how the financial crisis affected these investment choices, and will enable South African investors to make more informed future investment-decisions.

1.2 Problem statement

With high levels of volatility present in the world markets, caused by the 2008 financial crisis, investors have become more risk averse due to the higher risk involved (Guiso *et al.*, 2013:1). To manage the higher risk levels, investors may invest in hedge funds, because this investment strategy is associated as an active risk-managed investment.

1.3 Research question

From a South African investor's point of view, which of the selected hedge funds in the US or EU market are more appropriate for the risk-averse appetite of the current investor? The answer lies in evaluating the overall risk and performance levels of the selected hedge funds. Another option is to invest in associated international market indices with a buy-and-hold strategy approach. These indices include the CAC 40 and DAX in the EU market, as well as the S&P 500 and Dow Jones in the US market. The question is whether hedge funds were the preferred investment decision. Alternatively, did the associated international market indices, with a buy-and-hold strategy, approach outperform these selected hedge funds over the period of investigation?

1.4 Research objectives

The following objectives have been formulated for the study:

1.4.1 Primary objective

The primary objective of this study is to evaluate and rank the returns of the top US and EU hedge funds, based on the risk-adjusted performance measures during the 2007–2009 financial crisis. In addition, to establish whether a buy-and-hold strategy approach on associated international market indices would be a more appropriate investment decision, rather than investment in hedge funds. This is based on the same risk-adjusted performance measures and ranked according to the results from the primary objective.

1.4.2 Theoretical objective

To achieve the primary objective, the following theoretical objectives are formulated for the study:

- Review the concept of investment theory. These fundamental principles include factors such as risk versus return, the security market line (SML), the Markowitz efficient frontier, and the capital asset pricing model (CAPM);
- Provide a literature review on hedge funds;
- Review the literature on standardised risk measures;
- Provide a literature review on risk-adjusted portfolio performance measures; and
- Identify and provide an overview of associated US and EU equity markets, specifically the CAC 40 and the DAX in the EU market, and the S&P 500 and Dow Jones in the US market.

1.4.3 Empirical objectives

In accordance with the primary objective of the study, the following empirical objectives are formulated:

- Measure the total risk and performance levels on returns of hedge funds in the US market before, during and after the financial crisis, respectively;
- Measure the total risk and performance levels on returns of hedge funds in the EU market before, during and after the financial crisis, respectively;
- The ranking of the US and EU hedge funds based on the overall risk- and performance measures; and
- Determine whether a buy-and-hold strategy would be more appropriate, by ranking associated international market indices according to the same overall risk- and performance measures and compare it with the hedge funds rankings.

1.5. Research design and methodology

The research method of this study will be divided into a literature review and an empirical study. Given that the study evaluated and ranked US and EU hedge funds and associated international market indices based only on risk and risk-adjusted performance measures, a positivistic research method was adopted. A positivistic paradigm asserts that real events can be observed empirically and explained with logical analysis (Kaboub, 2008:343; Goede *et al.*, 2013:245). Furthermore, previous studies were evaluated to emphasise the results found in this study. The descriptive research design was in the form of a longitudinal research for the empirical portion of this study.

A quantitative research approach, which is in accordance of the positivistic paradigm, was followed to explain the risk and performance levels of international hedge funds and associated international market indices.

1.5.1 Literature review

The empirical study was supported by reviewing historical studies on the concept of risk-adjusted performance measures, which highlighted the decision-making process in investment management. Historical studies of volatility and its applicability as a portfolio performance measure was also examined. This chapter, therefore, emphasised the aim of the study topic and provided the necessary platform for formulating the methodology used in this study.

1.5.2 Empirical study

The empirical portion of this study comprises the following methodology dimension:

1.5.2.1 Measuring instrument and data collection method

A quantitative research approach was followed which included several numerical methods. The data on hedge funds in the US and EU market were provided by EurekaHedge (2012) database. The advantage of this database is that no previous studies have used it due to its limited availability to the public. The investigation spans the period from January 2004 to December 2011. Monthly observations were used to determine if the US and EU hedge funds outperformed associate equity

markets, and monthly return data were also obtained from Yahoo Finance (2013). The null hypotheses of this study states the following:

- US hedge funds outperformed EU hedge funds;
- EU hedge funds outperformed the US hedge funds; or
- The associated international market indices with a buy-and-hold strategy approach will outperform US and EU hedge funds.

1.5.3 Statistical analysis

The captured data were analysed using Microsoft Excel 2010, version 17.0 for Windows. Descriptive analysis as a statistical method was used on the empirical data sets. In order to evaluate the total risk and performance levels on the returns on the US and EU hedge funds and associated international markets, a number of standardised risk measures and risk-adjusted performance measures have been applied. The standardised risk measures included the standard deviation and variance. Risk-adjusted performance measures entailed the Sharpe ratio, Treynor ratio, Jensen's alpha, Sortino ratio, Calmar ratio and Omega ratio. In addition, the exponentially-weighted moving average (EWMA) model enabled volatility to serve as an additional performance measure. These standardised risk and risk-adjusted performance measures applied on selected hedge funds and associated international market indices have been ranked for the pre-, during- and post-financial crisis period, respectively.

1.6. Chapter classification

The study will comprise the following chapters:

1.6.1 Chapter 1 - Introduction and background to the study

The first chapter focused on the background and the aim of this study. The problem statement, research objective, and the research method, were briefly discussed.

1.6.2 Chapter 2 and 3 - Literature review

The literature study commenced by evaluating general investment theory. This continued by giving an overview of hedge funds and associated international market

indices. In addition, an overview of standardised risk measures as well as risk-adjusted performance measures were discussed and applied in the empirical study to evaluate the risk and performance levels of the US and EU hedge funds and associated international market indices. This enhanced the background of this study's research question and objective.

1.6.3 Chapter 4 - Research design and methodology

The research method of this study is divided into a literature review and an empirical study. Quantitative data, using the positivistic research method, is used for the empirical portion of this study. The descriptive research design followed a longitudinal research approach.

1.6.4. Chapter 5 - Results and findings

A brief summary of the results is discussed regarding the risk-adjusted performance measures applied on the returns of the US and EU hedge funds and associated international markets.

1.6.5. Chapter 6 - Conclusion and recommendations

This chapter reconciles the problem statement, the objective, and the final empirical results to provide a conclusion to this study.

CHAPTER 2

THE CONCEPT OF INVESTMENT

2.1 Introduction

This chapter defines and explains the concept of investment. The concept of risk versus reward is also highlighted as an important principle of investment, along with an explanation of the required rate of return. In addition, the developments of investment theory follow, which includes the Markowitz portfolio theory and the CAPM. It attempts to describe the way in which investors specify and measure risk and the expected return and provides an overview of the risk-return behaviour of investors and how investment decisions are made. The aim of this chapter is to highlight the concept of investment and the basic principles when investment decisions are formulated. This is essential because a wide variety of investment alternatives is available to investors.

2.2 Investment defined

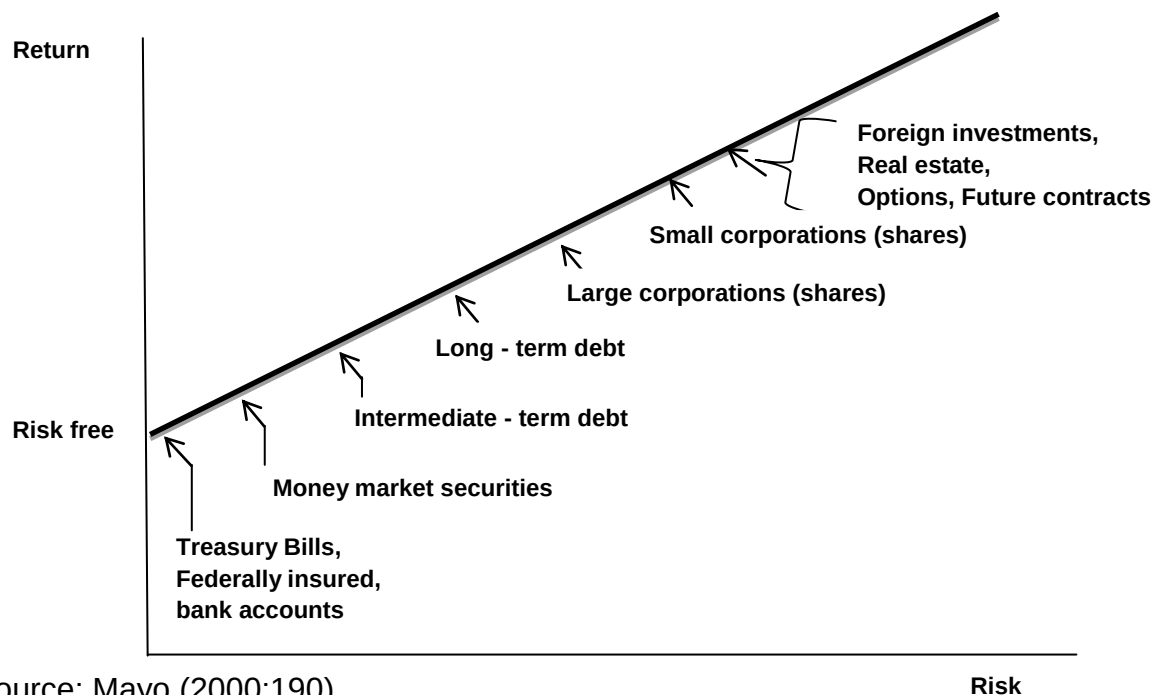
Investment is the current commitment of money for a given period in order to derive future payments that will compensate the investor for the time the funds are committed, the expected rate of inflation, or the uncertainty of future payments (Brown & Reilly, 2009:4; Marx *et al.*, 2013:3). This view, supported by Mayo (2000:165), states that the term investing could be associated with different activities, but the general target in these activities is to employ the funds, during the time period, with the aim to enhance the investor's wealth for future consumption. To compensate individuals over the long term, they invest to earn a required rate of return.¹ The investor can be an individual, an investment company that invests on behalf of individuals, or a pension fund that invests on behalf of individuals or the government. Several types of investments are available and include investment by individuals in bonds, shares, commodities and real estate (Teborek & Cohen, 2012).

Figure 2.1 illustrates a classical economic view of the risk and return characteristics and trade-off of some of the major asset classes available to investors.

¹ See Section 2.5.

The difference in risk levels between the investment instruments is due to the different sources of risk faced by the investor. These investment assets range from low risk investments such as treasury bills (also termed conservative investments) to high risk investments such as real estate (also termed aggressive investments (Mayo, 2000:190).

Figure 2.1: The risk/return trade-off of various assets



Source: Mayo (2000:190).

Figure 2.1 illustrates how low risk investments generate a modest return without minimum risk. As individual assets move further to the right, returns increase as the investor acquires riskier assets. Money market securities follow risk-free assets with marginally higher yields. At the extreme right of Figure 2.1, *inter alia* foreign investments, real estates, options and future contracts generate the highest returns but carry the greatest amount of risk (Mayo, 2000:190).

The goal of investment management is to achieve the investor's required rate of return. In the subsequent sections, the fundamental principles of investment are discussed. Section 2.3 explains the concept of risk and return, followed by the relationship between risk and return and diversification. These factors must be considered when an investor has to select between investment alternatives.

2.3 Return defined

Return refers to the sum of cash flows an investment generates (Firer *et al.*, 2004:351). The term return can also refer to expected return (Correia *et al.*, 2000:69) or required return (Mayo, 2000:165). The expected return is the anticipated flow of income. An investment may generate a return from either one of two sources. The first source is the flow of income (*inter alia* interest and dividends) that may be generated by the investment, and the second source of return is capital appreciation² if the asset's price rises (Correia *et al.*, 2000:70). Some investments, like the savings account, offer only income, whereas other investments, such as an investment in property, may offer only capital appreciation.

The expected return must be compared with the investor's required return, which is the return necessary to encourage the investor to bear the risk associated with a particular investment (Mayo, 2000:165). The required return includes what the investor may earn on alternative investments, such as the risk-free return available on treasury bills, and the premium for bearing the risk that includes compensation for the expected rate of inflation and for fluctuations in security prices (Marx *et al.*, 2013:4). Since the required return involves a measure of risk, a discussion on this will follow after the concept of risk is covered.

The measure of total return on any security across a time horizon must include both income and price change (Nwude, 2012:140). The income is the periodic cash earnings from an investment and can be either in the form of dividends or interest. For example, the dividends on common shares are compensated annually or quarterly, whereas interest payments on bonds are compensated semi-annually. In addition, yield is used frequently in connection with the component of return. This term comprises the income component relative to the purchase price of a security.

The price change of a security refers to the difference between the beginning value (purchase price) and ending value (selling price) of an investment security at which the security can be sold. The change in price can either result in a positive price change (capital gain), where the sales price exceeds the purchase price, or a

² If an investor wants the portfolio to grow in real terms over time to meet future need. Under this strategy, growth occurs through capital gains (Brown & Reilly, 2009:39).

negative price change (capital loss), where the purchase price is above the sales price (Fisher & Hall, 1969; Singh, 1994).

In addition, the return on an investment over time can be measured using the total return concept. The period during which an investor owns an investment is referred to as its holding period, and the total return of an investment during a selected period is referred to as the holding period return (HPR) (Brown & Reilly, 2009:5). For example, if an investor invests R 2000 at the beginning of the year, and is compensated with R 2300 at the end of the year, the HPR is 1.15, calculated as follows:

$$\begin{aligned} \text{HPR} &= \frac{P_1}{P_0} \\ &= \frac{R2300}{R2000} \\ &= 1.15 \end{aligned} \tag{2.1}$$

where:

HPR is the holding period return;

P_0 is the beginning value;

P_1 is the ending value.

The value will always be zero or greater, thus it can never be a negative value. A value > 1 , indicates an increase in wealth or a positive rate of return during the period. Conversely, a value < 0 , indicates a decline in wealth or a negative return during the period (Brown & Reilly, 2009:6).

Although HPR can be used to express the change in value of an investment, investors generally evaluate returns in percentage terms on an annual basis. This makes it easier to compare alternative investments directly, which have significantly different features. The first step in converting the HPR to an annual percentage rate is to derive a percentage return, referred to as the holding period yield (HPY) (Brown & Reilly, 2009:6; Marx *et al.*, 2013:7). For example, if an investor invests R 2000 at

the beginning of the year and it is worth R 2300 at the end of the year, the HPY is 0.15 or 15%, calculated as follows:

$$\begin{aligned} \text{HPY} &= \frac{P_1 - P_0}{P_0} & (2.2) \\ &= \frac{2300 - 2000}{2000} \\ &= 0.15 \text{ or } 15\% \end{aligned}$$

where:

HPY is the holding period return;

P_0 is the beginning value; and

P_1 is the ending value.

The ending value of the investment can be the result of a positive or negative change in price for the investment alone.

2.4 Risk defined

Risk refers to the possibility as to whether the expected return of an investment will be realised or not (Holton, 2004:22; Botha, 2006:567). The greater the level of deviation between expected return and the actual return, the greater the risk and uncertainty will be on an investment (Correia *et al.*, 2000:63). In other words, risk arises when there is a likelihood of awareness of the future outcome or the probability of an averse outcome (Burt, 2001; Correia *et al.*, 2000:62; Nwude, 2012:141), while the level of uncertainty linked to the future event is associated with the investor's limited knowledge of what to expect in terms of future returns (Valsamakis *et al.*, 2010:33). To enhance the concept of risk further, it is also important to distinguish between non-financial and financial risk.

2.4.1 Non-financial- and financial risk

This type of risk is associated with dangerous exposures that have a non-monetary outcome (Marx *et al.*, 2013:7). This type of risk is part of human existence on a daily basis. Examples of this are drinking (health risk) and speeding (safety risk). There will be no financial benefit to gain if there is an increased exposure to this type of

risk; it will not be a financial benefit if investors desire to increase their exposure to health and safety risks.

Financial risk, in contrast, is associated with different possible outcomes with a firm's sources of financing (Douplos & Zopounidis, 2001:98; Brigham & Houston, 2009:424). This includes both positive and negative circumstances. This type of risk is associated primarily with investments where investors can experience the risk of an unexpected decline in the value of their investments (Mayo, 2000:12).

Investors are exposed to two broad categories of risk, namely unsystematic risk and systematic risk, as explained in Section 2.4.2.

2.4.2 Non-systematic- and systematic risk

Non-systematic risk is also called diversifiable or company specific risk. This portion of total risk is associated with events that affect individual firms' operations and method of financing (Mayo, 2000:165). These factors include product innovation, market development, consumer preference, labour strikes and management competence (Otto & Henderson, 2006:519).

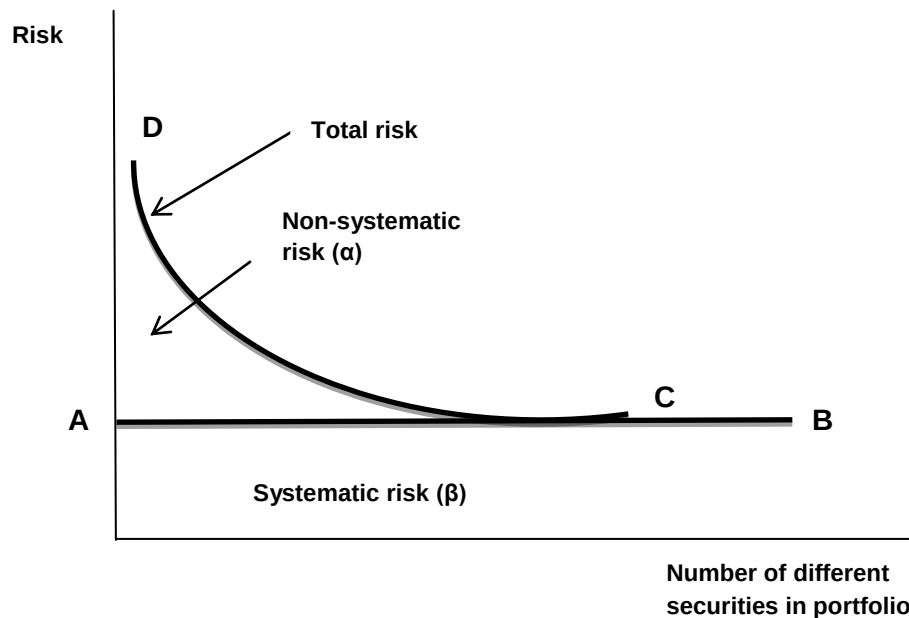
Systematic risk conversely is also called market or non-diversifiable risk. This risk is inherent in the entire market and cannot be diversified (Marx *et al.*, 2013:6). This portion of total risk includes factors such as fluctuating security prices, changes in interest rates, the loss of purchasing power through inflation, and loss from changes in the value of exchange rates (Mayo, 2000:165). These factors that cause the market to increase and decrease will have a similar effect on firms that are closely related to the market (Valsamakis *et al.*, 2010:3).

Although the investor can do little to reduce systematic risk, non-systematic risk can be reduced by diversification (Brigham & Houston, 2009:243). This occurs when the investor purchases the securities of firms from different industries. Thus by diversification, undesirable events that affect one firm may be offset by positive results from another firm (Otto & Henderson, 2006:518).

The combination of systematic and non-systematic risk is defined as total risk (or portfolio risk) that the investor bears. Some researchers propose quantitative

measures for these two types of risks. Non-systematic risk is also called alpha, while systematic risk is also called beta (Mayo, 2000:165). Figure 2.2 illustrates this:

Figure 2.2: Systematic and non-systematic risk



Source: Mayo (2000:169).

Figure 2.2 illustrates the combination of unsystematic risk and systematic risk, defined as total risk. The vertical axis measures units of risk, and the horizontal axis gives the number of securities. Since market risk is independent of the number of securities in the portfolio, a line AB, which runs parallel to the horizontal axis, illustrates this element. Regardless of the number of securities that an individual owns, the amount of market risk remains the same. Line CD indicates total risk (the sum of systematic and unsystematic risk). The difference between lines AB and CD is the unsystematic risk associated with the specific securities in the portfolio. As the number increases, unsystematic risk diminishes; this reduction in risk is illustrated where line CD approaches line AB (Mayo, 2000:169).

The goal of investment management is to choose among alternative investment strategies that will meet an investor's required rate of return. The key determinants of the required rate of return are explained in Section 2.5.

2.5 Determinants of the required rate of return

The required return refers to the minimum return an investor should accept from an investment in order to compensate the investor for deferring consumption (Marx *et al.*, 2013:4). The importance of an investor's required return to an investment selection consists of three components, which are the following (Marx *et al.*, 2013:4; Otto & Henderson, 2006):

- The time value of money during the period of investment;
- The expected rate of inflation during the period; and
- The risk involved (risk premium).

2.5.1 The real risk-free rate

The time value of money is defined as the amount of money that increased in value due the accumulation of interest earned from an investment over time (Otto & Henderson, 2006:98). According to Marx *et al.* (2013:4), this term refers to the real risk-free rate of return (RRFR), which is the price charged for the exchange between current goods (consumption) and future goods (consumption). A risk-free rate assumes no inflation and no uncertainty about future cash flows (Brown & Reilly, 2009:15). This means an investor knows with certainty what cash flow a risk-free investment will provide regarding the time period, and the amount of the expected returns. A treasury bill can be viewed as a risk-free investment because the government derive income from taxes in order to pay its debt, *inter alia* to pay interest and pay off loans (Bodie *et al.*, 1993:65).

To determine the required rate of return, an investor has to determine the nominal risk-free rate of return and add risk premiums (Section 2.5.3) to compensate for the risks related to the investment. Section 2.5.2 and Section 2.5.3 explain these aspects.

2.5.2 Inflation and the nominal risk-free rate (NRFR)

Nominal rates of interest, often quantified in money terms, which prevail in the market, are determined by real rates of interest, plus factors that will affect the nominal rate of interest (Brown & Reilly, 2009:15). The two factors that will have an influence on the nominal risk-free rate (NRFR) are the expected rate of inflation and

the conditions in the capital market. Inflation causes a decrease in the purchasing power of a monetary unit. If there is an increase in expected inflation, this will lead to the increase in nominal interest rates and vice versa (Mohr & Fourie, 2008:496). The capital market is affected by the monetary and fiscal policy. Changes in these policies affect the demand and supply conditions in the capital market and cause interest rates to either decrease or increase (Mohr & Fourie, 2008:342).

2.5.3 Risk premiums

A risk-free investment (Section 2.5.2) is one in which the investor is most certain of the amount and period of expected returns. However, a degree of uncertainty occurs in the view of an investor on whether and when the income will be received. Investments range from risk-free securities (such as T-bills) to more risky derivative instruments (Omisore, 2012:23). Most investors require a high rate of return on investments due to the degree of uncertainty about the expected rate of return. An increase in the required rate of return over the NRFR is known as the risk premium. The risk premium embodies several major sources of risk. These major types of risk include business risk, political risk, financial risk, liquidity risk, and currency risk (Brown & Reilly, 2006:21-23).

2.6 The relationship between risk and return

Investments are made to earn a return; however, to earn a return, the investor must accept the possibility of the risk of loss (Malkiel & Xu, 1997:9; Peirson, 2009:170). The relationship between risk and the subsequent expected level of return is essential in investment management (Nwude, 2012:138). It is important to understand why investors consider some of the investment decisions as they do. The difference in the level of risk between the investment alternatives is due to the different sources of risk confronted by investors. A wide variety of investment alternatives is available to the investor. These range from risk-free government bonds to highly risky derivative instruments (Omisore, 2012:23).

However, the question remains on what is the level of risk an investor will tolerate, and what is the level of expected return. The higher the risk an investment instrument possesses, the greater the expected return will be. Conversely, the smaller the risk an investment instrument possesses, the lower the expected return

(Marx *et al.*, 2009:45). Real estate is considered riskier than bonds. The reason for this is that there exists a liquidity difference between the two markets. In modern finance theory, some investors are risk averse, meaning that they require compensation by way of a greater expected return for assuming additional risk in an investment decision (Van Zyl *et al.*, 2008:26).

From the discussion above it is evident that there will always be a degree of risk, not only in an investment project, but also in any aspect of life. Risk will never be eliminated, but it can be successfully managed with diversification (Levy & Sarnat, 1970).

2.7 The role of diversification

Investment theory emphasises the need to diversify if an investor wants to minimise the risk of investment. Diversification is an investment approach to reduce the systematic risk of an investment portfolio (Goetzmann & Kumar, 2008:433). The degree to which diversification can be reduced depends upon the correlation among security returns (Levy & Sarnat, 1970:668). If the returns are not correlated, diversification will minimise risk (Brown & Reilly, 2009:211). Conversely, if security returns are correlated perfectly, no amount of diversification can reduce the risk (Levy & Sarnat, 1970:668). Asset allocation is the most important factor of return of a portfolio investment. Asset allocation generally refers to the allocation of an investor's portfolio amongst different asset classes (Sharpe, 1992:7). The main asset classes for diversification can be divided into real assets and financial assets.

Real assets generally refer to tangible assets. An example of real assets is land and buildings in the form of shopping centres, offices, industrial and residential property (Bodie *et al.*, 1998). Real assets may also be commodities in the form of gold, platinum and diamonds (Marx *et al.*, 2013:11). According to Sears and Trennepol, (1993:27) real assets are characterised not to have the same liquidity as a financial asset, thus real assets can be converted to cash relatively quickly at a price close to fair market value.

Financial assets, also called financial instruments or securities, represent legal claims to some future benefit (Sears & Trennepol, 1993:28). Financial assets include

fixed income securities in the form of bonds and preference shares. They also include equity shares in the form of ordinary shares (Mayo, 2000).

In addition, investors can engage in international diversification by means of investing directly in foreign investments such as mutual funds which consist of bonds and shares (Doukas & Lang, 2003:153). The investor is entitled to receive all dividends and capital gains associated with these shares (Solnik & McLeavy, 2003:92). The main advantages of international diversification are that portfolio risk is reduced and the risk-adjusted return of the portfolio is improved (Solnik & McLeavy, 2003:98). In addition, studies done by Capar and Kotabe, (2003) and Sundaram and Black (1992), with regard to multinational firms, proved that there is a positive linear relationship between international diversity and performance.

There is a variety of other investments available to investors. These include investments like unit trusts, investment trusts, hedge funds, and participation bond schemes. Some of these investments are called collective investment schemes because an investment institution pools the funds contributed by investors and invested on behalf of the investors in the form of assets (Mayo, 2000; Otto & Henderson, 2006).

2.7.1 The advantages of diversification

The advantages of portfolio diversification, which include minimising the level of risk, preservation of capital, and the ability to hedge portfolio investment, are discussed as follow:

- **Minimise the level of risk**

Although an investor chooses the best possible investment strategy, the level of risk will not be eliminated completely, but it can be managed. Several investors were far too exposed to share market risk during the economic downturn (Lenza, *et al.*, 2010). Investors should diversify into safer low risk assets such as treasury bills (*inter alia* government issued securities) rather than in highly risky derivative instruments (Otto & Henderson, 2006:156). This will benefit investors because it reduces the investment portfolio risk and maximises their returns (Bloomberg, 2008; Goetzmann & Kumar, 2008:33).

- **Preservation of capital**

Several investors strive for capital preservation as an investment strategy rather than capital appreciation. This investment strategy attempts to protect an investor's capital rather than to focus on the rate of return on the investment. Investors seek to maintain the purchasing power of their investment (Mohr & Fourie, 2008:496). In other words, the rate of return needs to be no less than the rate of inflation. Normally this strategy is used by risk-averse investors or funds needed in the short term such as down payment on a house. In addition to capital preservation, an investor can hedge a portfolio investment to reduce the level of risk when diversification is engaged as an investment strategy.

- **Ability to hedge portfolio investment**

Diversification gives an investor the benefit that a portfolio will grow when markets experience periods of expansion (upward) and contraction (downward) phases in one sector. This strategy allows an investor to achieve positive returns on a portfolio in one market when another market experience negative returns (Bloomberg, 2008).

To summarise, diversification remains the most effective strategy to manage investment risk. This investment approach is appropriate for cautious investors. Together with maintaining a long-term perspective, diversification is important to create a well-diversified portfolio that is aligned to an investor's investment goals.

2.8 Developments in investment theory

Investment theory attempts to explain the way investors specify and measure risk and return in the valuation process. Investors face systematic and unsystematic risk and will construct a portfolio that is well diversified in order to reduce risk. Investment theory, particularly the Markowitz's modern portfolio theory, explains risk aversion as a phenomenon (Levy & Sarnat, 1970:668). In addition, an important theory about risk and return is the CAPM. This theory allows the investor to determine the required rate of return on whether a security asset is over -or undervalued (Fama & French, 2004:25).

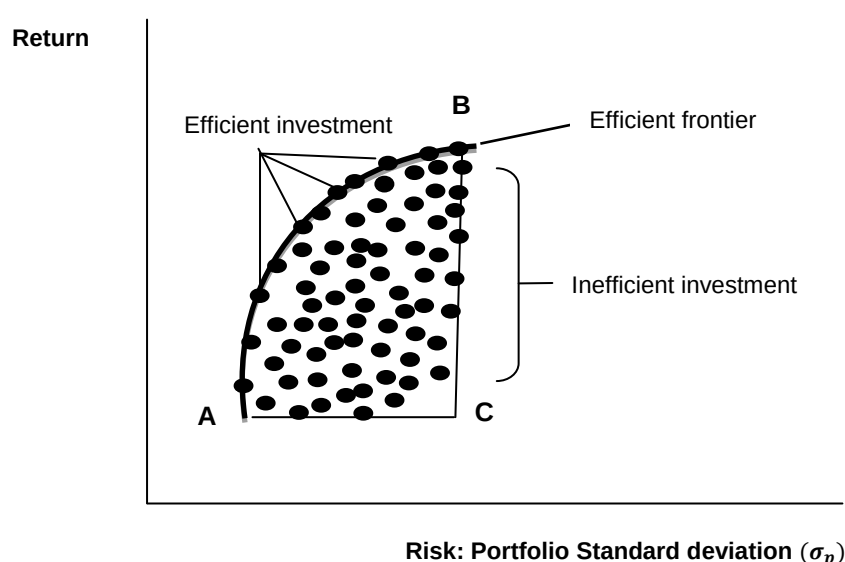
Although an investor's portfolio may be well diversified, there still exists a certain amount of risk. To eliminate some of the risk, an investor must choose between

different types of portfolios that will provide the highest return on an investment with the least amount of risk. This is done by studying the Markowitz efficient frontier, which is discussed in Section 2.8.1.

2.8.1 Markowitz portfolio theory

In the early 1960s, the investment community talked about risk, but there was no specific measurement for this term. In order to quantify the investor's risk variable and use as an investment decision tool, Markowitz developed a portfolio model (Markowitz, 1952:79). This model derived the expected rate of return for a portfolio of assets, and an expected risk measure (Levy & Sarnat, 1970:668). The Markowitz efficient frontier represents that set of portfolios (consisting of risky investments) that has a maximum return for every given level of risk. It may also display that set of portfolios that has the minimum risk for every level of return (Iyiola *et al.*, 2012:19). Diversification is achieved when an investor invests in portfolios rather in individual assets, which leads to the reduction of the total risk of the investments without giving up return (Leavens, 1945). Figure 2.3 depicts this process and illustrates the optimal combinations of risk and return available to investors, and the desire of investors to maximise their utility.

Figure 2.3: The efficient frontier



Source: Brown & Reilly (2009:198).

In Figure 2.3 the vertical axis measures portfolio expected returns. The horizontal axis measures the risk associated with the portfolio, using the portfolio's standard

deviation(σ_p).³ The dotted area represents all the portfolios composed of various combinations of risky securities. Generally, this area is referred to as the feasible set of portfolios. Some of these portfolios are inefficient because such portfolios offer an inferior return for a given amount of risk. A portfolio that lies on the efficient frontier has either a higher rate of return for equal risk, or lower risk for an equal rate of return, than some portfolios beneath the frontier. Portfolio A in Figure 2.3 dominates Portfolio C because it has an equal rate of return but significantly less risk. Equivalently, Portfolio B dominates Portfolio C because it has equal risk but a substantially higher expected rate of return (Brown & Reilly, 2009:198). All portfolios that offer the highest return for a given amount of risk are referred to as efficient. No combination of risk and expected return that lies above the efficient frontier is attainable.

All combinations that lie on the efficient frontier represent portfolios that offer the best possible return for a given level of risk and provide the best possible choice for an investor. No portfolio on the efficient frontier can dominate any other portfolio on the efficient frontier. All of these portfolios have different return and risk measures, with the expected rates of return that increase with higher risk (Brown & Reilly, 2009:198).

Investors are considered risk-averse, and for any increase in risk, there is an increase in the required rate of return. To select a set of portfolios that offers the maximum return for the least amount of risk, the Markowitz efficient frontier must be considered. However, to determine how an asset price is determined with the trade-off between risk and return, this study needs to continue with the general models used to price equity. The asset pricing theories are based on the premise that if an investor could measure risk, it will be possible to determine the required rate of return (Gitman & Joehnk, 1996:165). This leads to Section 2.8.2, which provides an overview of the asset price model available.

³ See Section 3.8.1

2.8.2 The single-factor model: The capital asset pricing model

The Markowitz efficient frontier's aim is to identify potential portfolios with reference to the risk-return relationship, however, it has not been able to predict the expected or required rate of return for the selected portfolios. The capital asset pricing model (CAPM) builds on the model of portfolio choice developed by Markowitz (Perold, 2004; Bollen, 2010:1231; Nel, 2011:5337). The CAPM is still widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios (Fama & French, 2004:25). The major factor that allowed portfolio theory to develop into capital market theory is the concepts of a risk-free asset⁴. The CAPM is an equilibrium model, which allows the investor to determine the required rate of return for any risky asset (Brown & Reilly, 2009:205; Brown & Walter, 2012:44). The CAPM indicates the return an investor should require from a risky asset with the assumption that the investor is exposed only to the asset's systematic risk as measured by beta (β). This new risk measure calculates the level of an asset's systematic risk compared to that of the market portfolio (Marx *et al.*, 2013:38).

To construct an effective CAPM, it is important to understand the following assumptions that support the CAPM (Alexander *et al.*, 1993:218–219; Marx *et al.*, 2013:38).

2.8.2.1 Assumptions of capital market theory

- Investors are risk averse and will attempt to invest in tangent points on the efficient frontier with the aim to earn a maximum return;
- This is a risk-free rate (R_f) at which investors may either lend (invest) or borrow any amount of money;
- Investors have homogeneous expectations; this means investors estimate identical probability distributions for future rates of return;
- There are no taxes or transaction costs involved if an investor wants to buy or sell assets;

⁴ Risk-free asset refers to an asset with zero variance (Brown & Reilly, 2009:206).

- Investors have the same one-period time horizon for their investment, that could be a month or a year;
- There is no inflation or any change in interest rates, or inflation is fully predicted;
- All investments are infinitely divisible; This means an investor may buy or sell fractions of any asset portfolio; and
- The capital markets are in equilibrium where all assets are priced properly in line with the risk levels.

These assumptions form the foundation for effective portfolio decision or portfolio selection. The theory and the model explain the rates of return on a wide variety of risky assets, even if some of its assumptions are unrealistic. A skilled investor is able to eliminate diversifiable risk if the investor diversifies the portfolio, therefore, the only relevant risk is non-diversifiable risk (Brigham & Houston, 2009:243). Each portfolio asset has its own level of non-diversifiable risk and can be measured by β . In the following section the calculation and interpretation of β will be discussed.

2.8.2.2 The calculation and interpretation of beta

The measure of risk used by the CAPM is the β of a security. This is a relative measure of volatility, or systematic risk of a security compared to the risk of the market as a whole (Van Zyl *et al.*, 2008:28). Since different securities have different degrees of sensitivity to the factors that drive the whole market, individual securities have different betas. The estimated β compares the historical return information of a security with the historical return information for a broad security market index that represents the market (Van Zyl *et al.*, 2008:28). The β coefficient that is produced provides a sensitivity measure for the systematic portion of the security's return relative to the market return. The larger the response of a security to market forces, the larger the β value will be (Gitman & Joehnk, 1990:197). Beta values can have a positive or negative sign (Gitman & Joehnk, 1996:164). A positive β value indicates that a security moves in the same direction as the general market; whereas, a negative β value indicates that a security moves in the opposite direction to the general market (Gitman & Joehnk, 1996:164). To calculate β , the basic equation for CAPM must first be established.

The equation used for the CAPM is as follows (Fama & French, 2004:31):

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f] \quad (2.3)$$

where

$E(R_i)$ is the expected or required rate of return;

R_f is the risk-free rate of return;

β_i is the sensitivity of the asset i against market fluctuations; and

$E(R_m)$ is the expected return on the market portfolio.

β can be calculated as follows (Marx et al., 2013:38):

$$\beta = \frac{\text{Systematic risk of security } i}{\text{Market risk}} \quad (2.4)$$

$$\beta = \frac{\text{Covariance}_{i,m}}{\text{Variance}_m} \quad (2.5)$$

or

$$\beta = \frac{\text{Corr}_{i,m} \sigma_i \sigma_m}{\sigma_m^2} \quad (2.6)$$

where

$\text{Corr}_{i,m}$ is the correlation between the individual security i and the market m ;

σ_i is the standard deviation of the individual security; and

σ_m is the average standard deviation of the market.

If a security has a $\beta = 1$, it will indicate that the security's return is in line with the market return. If a security has a $\beta < 1$, it will indicate that the security's return will be less volatile than the market return, therefore a lower β value means a smaller systematic risk and a lower required rate of return (Van Zyl et al., 2008:28). A security that has a $\beta > 1$, indicates that the security's return will be more volatile than the market return. Therefore, a greater β value indicates greater systematic risk and higher required rate return. Table 2.1 consists of a summary for the interpretation of beta (Van Zyl et al., 2008:28).

Table 2.1: The interpretation of different β values

Beta value	Movement observation	Interpretation
2.0	The security moves in the same direction as the market.	The security is twice as responsive as the market.
1.0		The security has the same risk and response as the market
0.5		The security is half as responsive as the market.
0	The security is unaffected by any market movements	
-0.5	The security moves in the opposite direction of the market.	The security is half as responsive as the market
-1.0		The security has the same risk and response as the market
-2.0		The security is twice as responsive as the market.

Source: Gitman & Joehnk (1990:197).

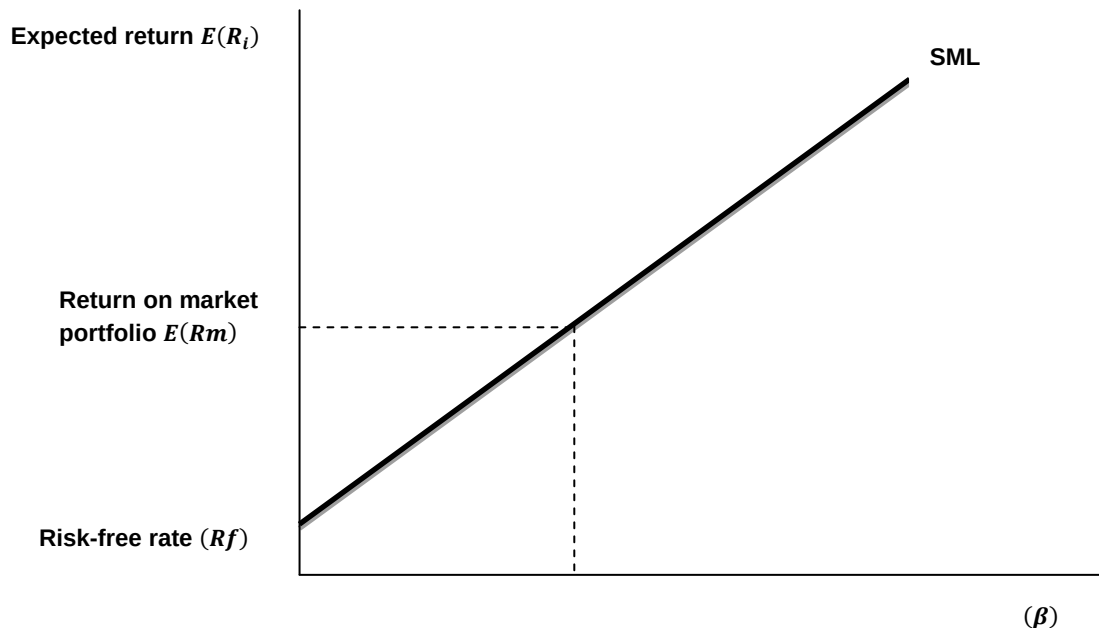
The CAPM expanded the concepts introduced by the Markowitz efficient frontier model into the general equilibrium asset model. The CAPM can be illustrated by the security market line (SML). The slope of the SML is the β and the risk-free rate (R_f) forms the y-intercept (Gitman & Joehnk, 1996:164). Conservative investors normally prefer securities with low β values, whereas high-risk investors who desire a high-risk reward choose high β securities. This leads to Section 2.9 where the security market line is discussed as an efficient frontier. In addition, a discussion on the capital market line, which provides the opportunity to lend or borrow in a portfolio investment, will then follow.

2.9 The security market line (SML) and the capital market line (CML)

According to Sharpe (1964:425), the CAPM, as discussed previously, was developed by Sharpe (1964) along with Lintner (1965) and Mossin (1966). In modern portfolio theory, the CAPM can also be illustrated in graphical form as the SML. Figure 2.4 illustrates this. The SML reflects the trade-off between risk and expected return as a straight line that meets the vertical axis (the zero-risk point) at the risk-free rate (Brown & Reilly, 2009:216). β indicates the sensitivity of an asset to market movements (Van Zyl *et al.*, 2008:28). Therefore, the SML identifies the best combinations of risk and return available on alternative investments (Marx *et al.*, 2013:35). Investors would select investments that are consistent with their risk preferences; some would consider only low-risk investments whereas others are in favour of high risk investments (Brown & Reilly, 2009:216). Furthermore, the SML

can also be used as a benchmark for the investor to evaluate the performance of a specific investment (Bodie *et al.*, 1998:205).

Figure 2.4: The security market line (SML)



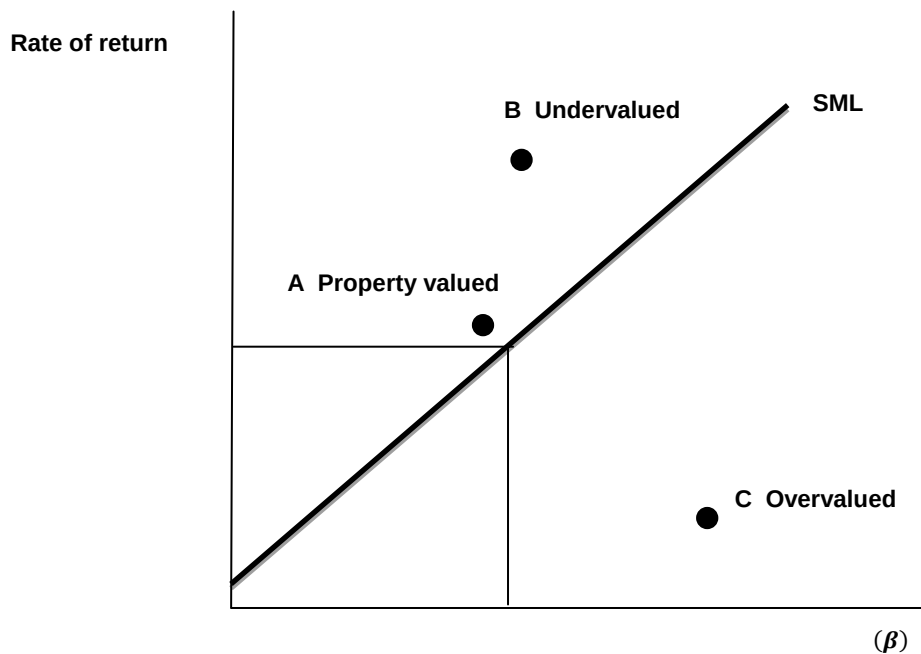
Source: Brown & Reilly (2009:216).

The SML also provides the investor with information to identify whether an asset is under- or overvalued. To determine whether an investment is appropriate, the required rate of return is compared to the security's estimated rate of return over a specific investment period (Brown & Reilly, 2009:217). The difference between estimated return and expected return is called alpha (α) or excess return (Brown & Reilly, 2009:217). This α value can be positive (the security is undervalued) or negative (the security is overvalued). If α is zero the security is on the SML and is properly valued in with its systematic risk.

These estimated rates of return and securities β 's are plotted on the SML as illustrated in Figure 2.5. Security A is almost exactly on line and is considered properly valued. Security A's estimated rate of return is almost equal to its required return. Security C is plotted below the SML and considered overvalued. Security C's estimated rate of return is significantly less than what an investor should expect, given the risk involved. Security B is plotted above the SML and is considered as undervalued. Conversely, security B is expected to provide a rate of return greater

than an investor would require based on the securities' systematic risk (Brown & Reilly, 2009:218).

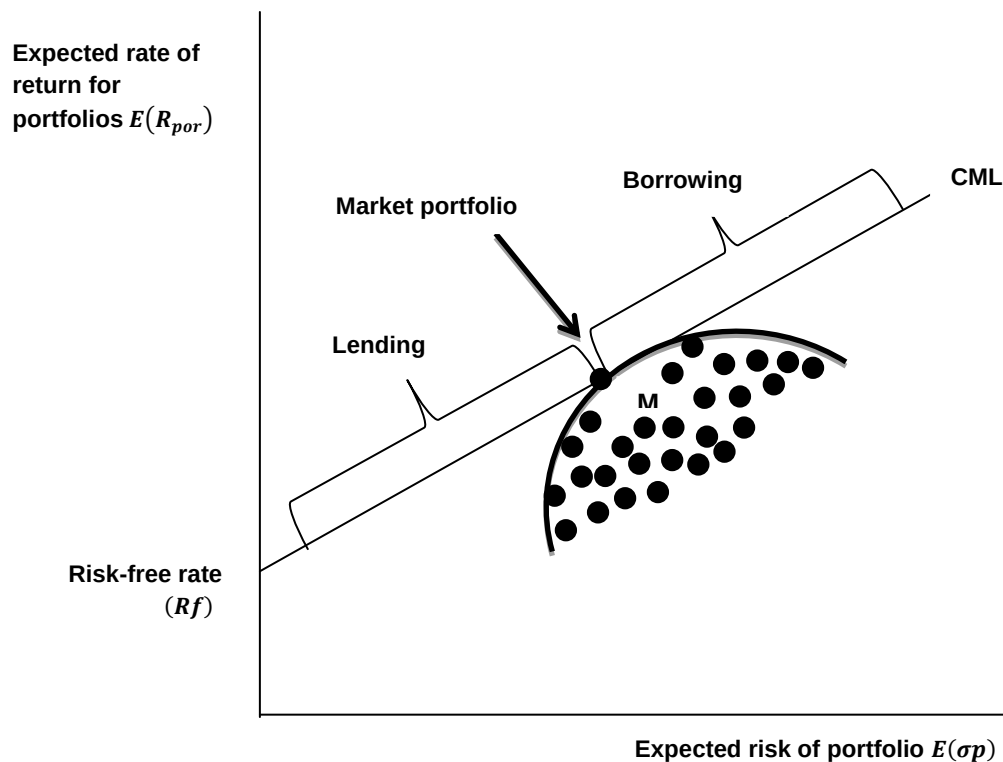
Figure 2.5: Over- and undervaluation of a security



Source: Marx *et al.*, (2013:41).

A disadvantage of the SML is that it has made no provision for investors to lend or borrow in a portfolio (Marx *et al.*, 2013:40). In practice, an investor will borrow at the risk-free rate and for this the risk and return will increase in a linear fashion along the SML, which leads to the derivation of the capital market line (CML) as illustrated in Figure 2.6.

Figure 2.6: Capital market line assuming lending or borrowing at the risk-free rate



Source: Brown & Reilly (2009:210).

Similar to the SML, the CML characterises the relationship between risk and the expected rate of return for portfolios. The CML is a straight line that starts from the risk-free rate (R_f) tangent to a point M (see Figure 2.6). This implies that all portfolios on the CML are correlated perfectly positively (Brown & Reilly 2009:210). The positive correlation occurs because all portfolios on the CML combine the risky asset portfolio M and the risk-free asset. Portfolio M lies at the point of tangency to the risk-free rate. This means that every investor wants to invest in portfolio M and borrow or lend in order to be somewhere on the CML (Brown & Reilly 2009:210). This portfolio must include all risky assets in proportion to the portfolio's individual market value and, therefore, is also called market portfolio. The investor could invest part of the portfolio in the risk-free rate asset and the rest in the risky portfolio M, or could choose to borrow at the risk-free rate and invest the borrowed sum in the risky asset portfolio (Brown & Reilly, 2009:210).

One of the differences between the CML and SML is that risk is measured by means of variance in the case of the CML, while risk is measured by means of β in the case of the SML (Gitman & Joehnk, 1996:164).

2.9.1 Disadvantages of the capital asset pricing model

Although the CAPM is an elegant and appealing explanation for the way in which investment risk and expected risk return are related, this model has received criticism for theoretical and empirical reasons. The first disadvantage of the CAPM is the great number of unrealistic assumptions and its empirical shortcomings such as the overestimating of the risk-free rate, and the underestimating of the market risk premium (Paavola, 2006:15). The second disadvantage is the use of β to predict the returns on assets (Paavola, 2006:15), as the returns on the securities with a high β value will tend to be overestimated, whereas the returns on securities with a low β value will tend to be underestimated (Groenewold & Fraser, 1997:1367). The third disadvantage of this model is that it considers that the risk premium depends only on the systematic factor. For these reasons, an alternative model with multiple factors was needed, which has the ability to provide a better indication of asset risk and improved estimates for the required rate of returns (Dhankar & Esq, 2005:14).

Apart from the shortcomings mentioned above, the CAPM is still being used as an equilibrium model, and contributed to the investment field (Brown & Reilly, 2009:238). This model provides a stronger specification of the relationship among asset yields than can be easily interpreted (Merton, 1973:867). It has the advantage in that its single risk factor is well defined (Brown & Reilly, 2009:257). Due to the criticisms the CAPM holds, the academic community searched for an alternative asset-pricing model to the CAPM.

Suggestions were that a more complex model was needed to incorporate the multiple aspects of risk, in other words, a multi-factor model was needed. This led to the arbitrage pricing theory (APT), which was developed by Ross (1976). The APT has fewer assumptions than the CAPM, and considers multiple factors of investment risk. This model is beyond the scope of this study and will not be discussed.

2.10 Summary

Chapter 2 presented and explained the concept of investment. An overview of the fundamental principles of investment, namely risk versus return and diversification, was provided. It is necessary for the investor to understand the basic fundamental principles when investment decisions have to be formulated.

To elaborate more on the fundamental principles of investment, the development of the investment theory followed. The investment theory attempts to explain the way investors specify and measure risk and return in the valuation process. An overview on the investment theory, particularly the Markowitz modern portfolio theory, explained risk aversion as a phenomenon.

This chapter concluded with an overview of the CAPM. The risk measure, β as one of the components of the CAPM was explained to provide a clear understanding of how this model is applied to make valuable investment decisions. Against the background of investment principles, Chapter 3 discusses the background to hedge funds and associated international market indices as investment options. In addition, a brief discussion on standardised risk measures and risk-adjusted performance measures will follow.

CHAPTER 3

BACKGROUND TO HEDGE FUNDS AND PERFORMANCE MEASUREMENTS

3.1 Introduction

This chapter begins with a definition of hedge funds together with a brief background. An overview on the development of hedge funds and the characteristics and different style strategies applied to hedge funds will follow, along with a brief explanation of the regulation of hedge funds in South Africa.

In addition, a brief overview is presented of associated international market indices with a buy-and-hold strategy approach as an alternative investment option. These world market indices include the S&P 500, Dow Jones, DAX and CAC 40. Of the several investment alternatives available to investors, hedge funds and international market indices are chosen as investment options due to the differences of investment strategies employed. Hedge funds are regarded as high-risk investment vehicles (AIMA, 2009:7), whereas international market indices with the use of a buy-and-hold strategy approach are regarded as low- to moderate risk investment vehicles (Otto & Henderson, 2006). To generate abnormal returns, hedge funds are used with complex investment strategies, whereas international market indices are used with a simpler investment strategy.

This chapter also provides a theoretical overview of standardised risk measures, as well as risk-adjusted performance measures that provide the necessary platform for formulating the methodology and empirical review used in this study. These risk measures include the following: standard deviation, variance, Sharpe ratio, Sortino ratio, Treynor ratio, Jensen's alpha, Calmar ratio and Omega ratio, as well as the exponentially weighted moving average (EWMA) model that enables volatility to serve as an additional performance measure. The aim of this chapter is to provide and explain the terminology used in this study, and to evaluate the risk performance levels on both hedge funds and world equity markets.

3.2 The definition of hedge funds

According to Garbaravicius and Dierick (2005:7), there is no universally-accepted definition for hedge funds. Normally, the term is described as an actively managed,

pooled investment vehicle that is open to only a limited group of investors, and whose performance is measured in absolute return units (Botha, 2006:543). Normally, hedge funds are considered high-risk investment vehicles (Botha, 2006:543). A hedge fund embodies several characteristics. These include taking long and short positions (Mayo, 2000:150), the use of arbitrage, leverage⁵ and to trade in options and bonds (Lhabitant, 2004:26; Kanellakos, 2005:4). This investment fund serves as a hedge in periods of market downturns. The main objective of a hedge fund is to minimise risk and volatility, while attempting to deliver absolute returns that exceed market returns under all market conditions (Lhabitant, 2002; Marx *et al.*, 2013:14). The positive abnormal returns refer to a target rate of return that is neither indexed nor benchmarked. One of the main advantages of hedge funds is that these funds are less restricted in what strategies they follow and investment techniques they can employ (Bollen & Whaley, 2009).

The hedge fund manager (*inter alia* the entity that manages the specific hedge fund) will invest in similar asset sectors that most investors do, but use different skill-based strategies (Botha, 2005:10). The term hedge means to lower overall risk, this means an investor has taken on an asset position that offsets an existing source of risk. For example, an investor that holds a large position in foreign equities can hedge the portfolio's risk with the use of short currency futures. If this hedge strategy is applied the investor aims to achieve positive returns despite the direction of the market (AIMA, 2009; Brown & Reilly, 2009:931).

3.3 The historical background of hedge funds

The emergence of hedge funds was one of the most significant developments as an investment strategy in the professional asset management industry since 1980 (AIMA, 2009). The total value of assets held in hedge funds has significantly increased from the 1990s into the mid-2000s. From the start of the 1990s the hedge fund industry has grown from an estimated US\$39 billion in assets to approximately

⁵ Leverage refers to the use of financial instruments (derivatives) or borrowed capital to increase the potential return of investments. Typically, financial leverage takes the form of a loan that is reinvested with the hope of earning a rate of return that is greater than the cost of interest (National Treasury, 2012).

US\$2156.7 billion by the end of 2013 (AIMA 2009; Brown & Reilly, 2009:910; BarclayHedge, 2014).

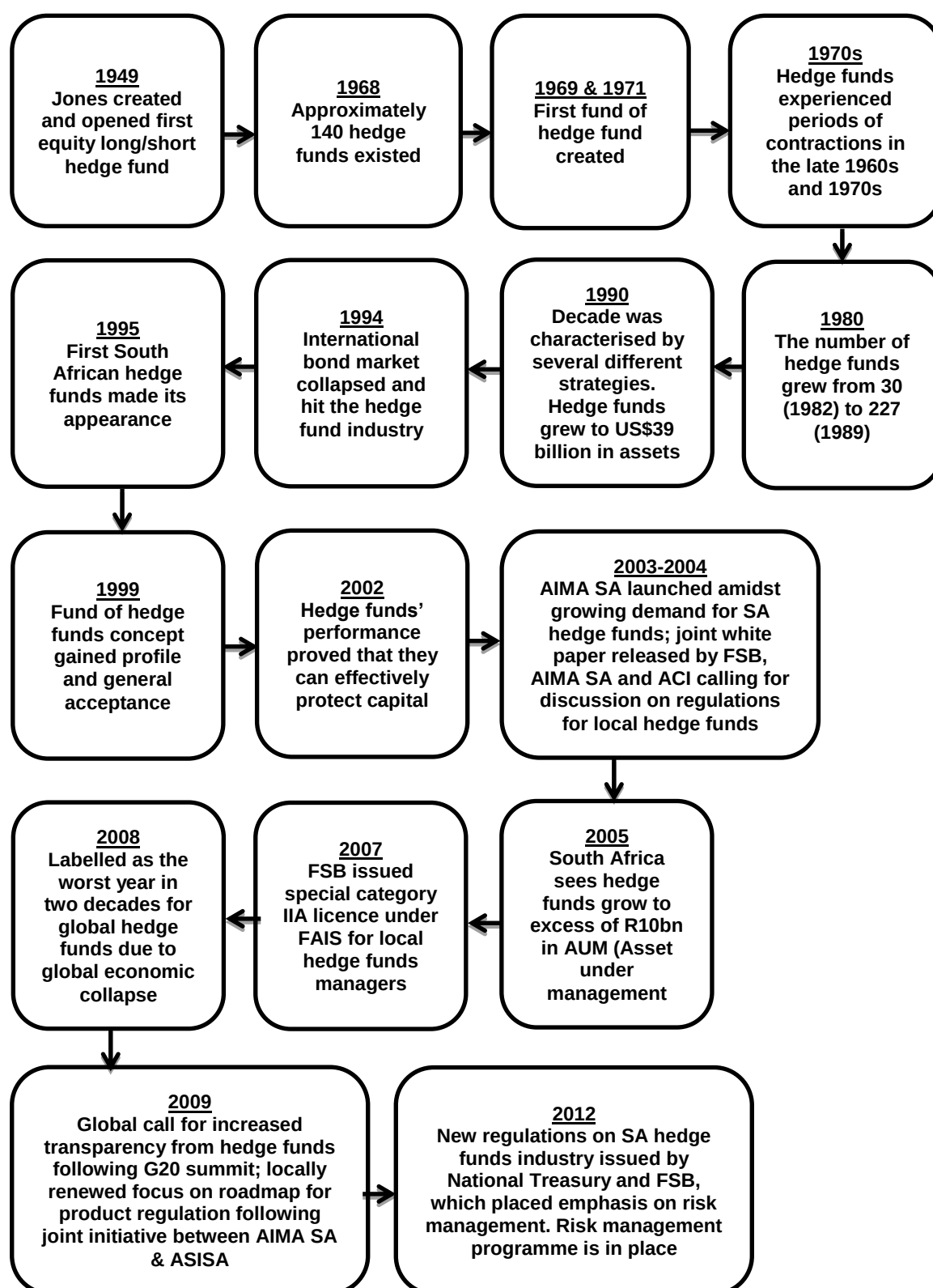
According to Brown *et al.* (1999:92), the term hedge fund originated in 1949 when Jones started an investment partnership that is regarded as the first hedge fund. After he received his PhD in Sociology, he became a reporter for Fortune Magazine where he created the idea of a hedge fund (Botha, 2005:12).

Jones formed a structured partnership that avoided Security Exchange Commission (SEC) regulations described in the Investment Company Act of 1940 (Duong, 2008:6). This enabled Jones's fund to use a wider variety of investment techniques, and created a portfolio that combined both short and long positions in the equity market with the use of financial leverage to enhance returns (Brown & Reilly, 2009:911). These investment techniques were used to eliminate market movements and reduce the risk exposure. This investment strategy is successful if a hedge fund manager has share-picking ability, but does not know the timing of the market (Duong, 2008:6). Jones committed his own money in the partnership and included an incentive fee for superior performance (Kanellakos, 2005:5). Jones also hired other managers to give authority for portions of the fund and therefore initiated the multi-manager hedge fund concept. The multi-manager approach evolved into the first Fund of Hedge Funds.⁶

During the years 1966 to 1968, the hedge fund industry experienced periods of rapid growth, but also contraction in the late 1960s and 1970s (Botha, 2005:12; Kanellakos, 2005:5). Since 1990, the hedge fund industry has become an important investment vehicle in the global financial market. Many investors have come to regard hedge funds as being in a unique position to produce superior risk-adjusted returns. The development of the hedge fund industry over the years is illustrated in Figure 3.1.

⁶ See Section 3.6.8.

Figure 3.1: Timeline of events



Source: AIMA (2009) and FSB (2012).

3.4 The characteristics of hedge funds

There are minimum asset requirements necessary for an investor to invest in hedge funds. Unlike traditional investment companies, hedge funds are normally less restricted in what strategies and sophisticated investment techniques to follow (Botha, 2006:543; Kambhu *et al.*, 2007:2). Hedge funds are not licensed by the Financial Services Board (FSB) and therefore, are not publicly available (Botha, 2006:543). Although hedge funds use both leverage and short selling to generate absolute returns, hedge funds also trade in a wider range of assets than traditional asset class investments. These include fixed income securities, currencies, exchange traded futures, over-the-counter derivatives, future contracts, commodity options and other non-securities investments (Kanellakos, 2005:7).

Hedge funds are an asset class that shares common characteristics as follows:

3.4.1 Return objective and benchmark

Hedge funds' main objective is to achieve absolute returns on a consistent basis without regard to a particular investment benchmark. Most of the time hedge funds generate a positive return above inflation as a benchmark. The hedge fund manager's compensation is incentive-based as returns that depend on the performance of the fund. The performance of hedge funds is often independent of market direction (AIMA, 2009:7; Marx *et al.*, 2013:14).

3.4.2 Disclosure

The belief of the hedge fund industry is to keep information private. The managers are obligated to report information on the fund's size, assets under management (AUM) and trading strategies involved (Kanellakos, 2005:9). Information is only available to high net worth individuals and institutions that have certain requirements by a confidential offering memorandum and partnership agreement (Marx *et al.*, 2013:14).

3.4.3 Investment strategies

Hedge funds protect investors against declining markets with the use of various hedging strategies. Certain types of hedging strategies are able to generate positive returns even in declining markets. These strategies vary immensely depending on

the investment style of a specific hedge fund. This includes techniques such as short-selling, leverage and usage of derivatives (Kanellakos, 2005:13).

3.4.4 Performance and attrition rate

The future performance of many hedge funds strategies tends to be highly predictable and not dependent on the direction of the equity markets. Lamm (1999) states that if an investor adds hedge funds to conventional portfolios it will improve the portfolio performance significantly in a risk-reward context. Hedge funds tend to be less correlated with traditional asset class investments and offer diversification benefits in these funds' overall portfolios. When risk-adjusted awards are considered, portfolios of hedge funds outperformed traditional investment asset portfolios (Kanellakos, 2005:10). However, the survival rate of some hedge funds is in question when evaluating the attrition rate. The attrition rate is the number of hedge funds which closes down over a certain time horizon. According to the study of Xu *et al.* (2010:33), the attrition rate for hedge funds was approximately 5.33 per cent during 2009, whereas Joenväära *et al.* (2012:43) reported an attrition rate of 14.87 per cent during 2010.

3.4.5 Regulation

Hedge funds are unregulated and therefore less restricted in what strategies to follow and investment techniques to apply (AIMA 2009; FSB, 2012). However, normally an informal restriction is imposed on all hedge fund managers by professional investors who understand the different strategies, and because of the manager's expertise in a particular investment strategy. These investors require and expect the hedge fund to stay within its area of specialisation and competence (Brown & Reilly, 2009:931). There are no specific rules to lead hedge fund pricing, and hedge fund managers may not be able to determine the value of their investment at any given time. The lack of regulatory disclosure can promote undesirable behaviour, as this may make it easier for hedge fund managers to engage in fraudulent activities (Levi *et al.*, 2003:11).

3.4.6 Subscription, withdrawal and trading

Nearly all hedge funds impose redemption policies. This normally consists of a lock-up period provision and redemption notice period (Liang, 1999:2). A lock-up

provision means that new capital invested in a hedge fund must remain and cannot be withdrawn before the end of a pre-specified duration, which is usually up to a year. After the initial lock-up period, a pre-arranged schedule with quarterly or monthly subscription and redemption may be allowed. Many hedge fund investors have the right to suspend redemptions under special circumstances if large capital withdrawals can threaten the financial stability of the fund. If investors want to withdraw capital from a hedge fund, a redemption notice period must be provided to the hedge fund manager (Kanellakos, 2005:8; Kambhu *et al.*, 2007:3). The average hedge fund permits investors to enter or exit a few times a year (*inter alia* monthly, quarterly, respectively) compared to the daily ownership adjustments allowed by traditional investment funds (Brown & Reilly, 2009:211).

3.4.7 Fee structure

The average hedge fund management fees have increased from approximately 1.38% before 2002 to approximately 1.58% for the post-financial crisis time period. However, the average incentive fees were 19.82% for hedge funds during 2002, but decreased to approximately 19.25% for the post-financial crisis time period, thus illustrating an inverse relationship to the changes in management fees (Evestment, 2013). In addition, to avoid risk tolerance investors, some hedge funds include a hurdle rate and a high-water mark clause. The hurdle rate is a pre-specified return level the hedge fund manager must exceed to take a part of the profit. If the fund does not perform above the hurdle rate, no profit is reallocated to the fund manager (Botha *et al.*, 2006:534). The “high-water mark” arrangement is that investors usually require that any past losses be recovered before managers receive the additional pay-out (Kanellakos, 2005:16).

3.5 The return distributions of hedge funds

3.5.1 Mean

The mean return refers to the average of returns and is, therefore, the first moment in a return distribution (Gujarati & Porter, 2010:77). Investors expect investment managers to deliver hedge fund returns that display a positive mean. This shows the central tendency of a hedge fund manager’s performance (Kanellakos, 2005:29).

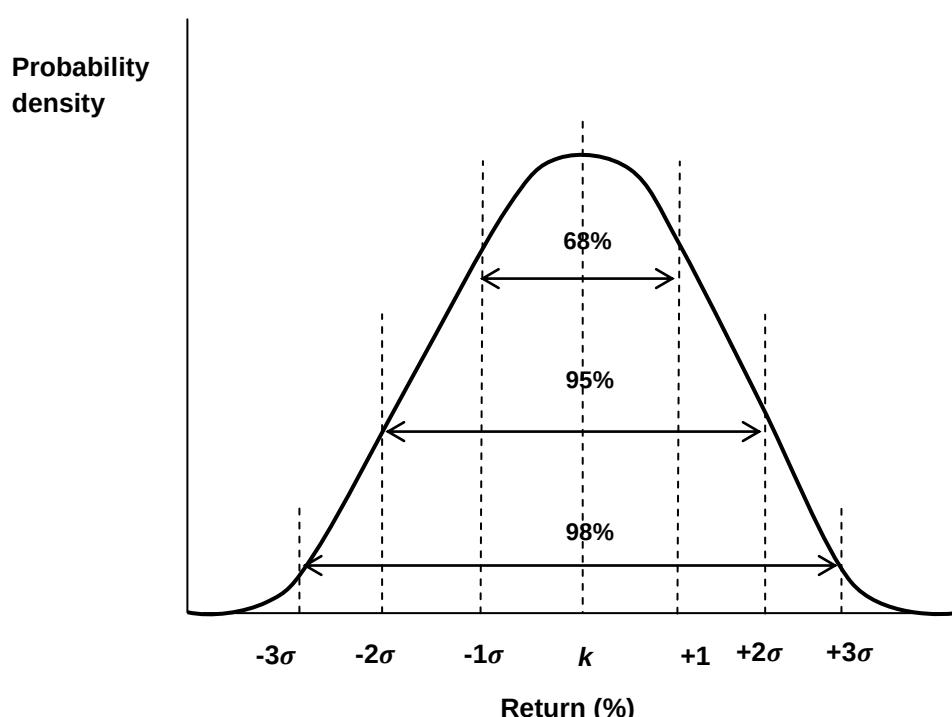
Ackermann *et al.* (1999) and Brown *et al.* (1999) are among the several studies in the hedge funds literature that display mean returns.

3.5.2 Variance/standard deviation

During the 1950s, Markowitz proposed the standard deviation (variance) of a return distribution as a measure of risk. This measure focuses on volatility or dispersion of returns over time and is the second moment of distribution (Kanellakos, 2005:29). In the hedge fund literature, several studies use the standard deviation, including Ackermann *et al.* (1999), Brown *et al.* (1999), and Fund and Hsieh (1999).

The significance of the standard deviation(σ) may be evaluated in terms of a normal distribution. A normal distribution resembles a bell-shaped curve (Bergh & Van Rensburg, 2008:103). This symmetry curve is consistent with a normal distribution and can be characterised by the first two moments, which are the mean return and the variance. Figure 3.2 illustrates an example of a normal distribution.

Figure 3.2 Normal returns distribution



Source: Marx *et al.* (2013:10).

In Figure 3.2, for a normal probability distribution, 68 percent of the possible outcomes will lie between $+1$ and -1 standard deviations(σ) from the expected value, 95 percent of all outcomes will lie between $+2$ and -2 standard deviations (σ) from

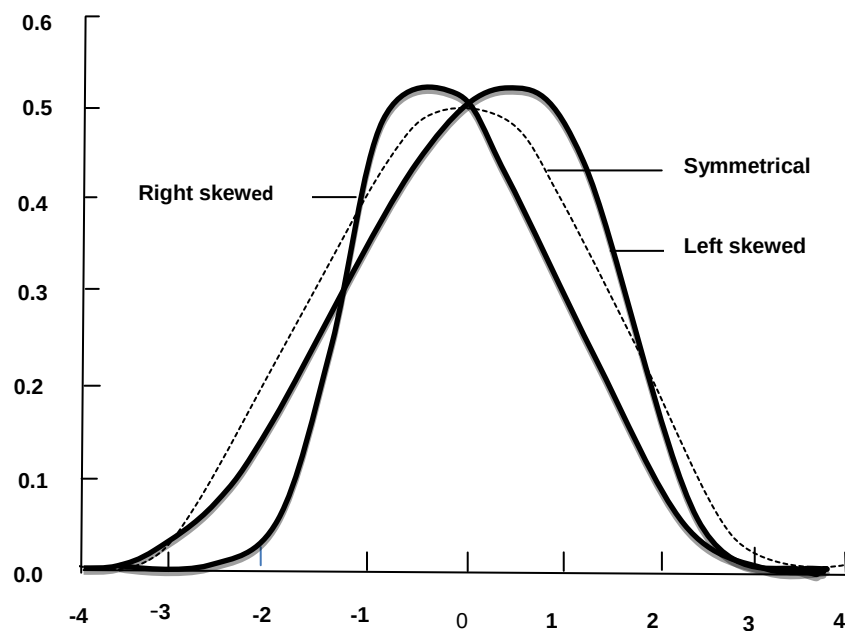
the expected value, and 98 percent of all outcomes will lie between +3 and -3 standard deviations (σ) from the expected value (Marx *et al.*, 2013:10). This corresponds with a common approach to risk. To view risk as determined by the variability on either side of the expected value, the greater this variability, the less confident an investor is about the outcomes associated with a security or investment (Hentati *et al.*, 2010:1084). In Figure 3.2, the standard deviation measures risk on both sides of the expected value. If the distribution is skewed, with a long tail in one direction or the other, both the expected return and the standard deviation will be deficient (Bergh & Van Rensburg, 2008:103). In such a case, other measures such as the skewness and kurtosis are needed, which are the higher moments of probability distribution and are explained in Section 3.5.3 and 3.5.4.

3.5.3 Skewness

The return distributions of hedge funds cannot be characterised only by the mean return and standard deviation. Several hedge funds exhibit a non-normal return distribution because of the diverse trading strategies employed by hedge fund managers (Fung & Hsieh, 1999; Korkmaz *et al.*, 2010). Nearly all strategies demonstrated negatively skewed return distributions.

Skewness measures the degree of symmetry of the return distribution around the mean and is the third moment of distribution (Lhabitant, 2004). In a normal distribution, the value of the skewness is = 0 (Marx *et al.*, 2013:9). Conversely, empirical evidence demonstrated that the returns on hedge funds exhibit skewness, which is $\neq 0$. Investors prefer portfolio investment returns with positive (right-skewed) distributions (Bergh & Van Rensburg, 2008: 104) and dislike negative (left-skewed) distributions (Kraus & Litzenberger, 1976). A positively skewed investment reflects a small probability of experiencing a small loss but an extremely high return. Conversely, a negatively skewed investment reflects a probability of achieving small gains, but extremely large loss (Kraus & Litzenberger, 1976; Lhabitant, 2004). Figure 3.3 illustrates this. Several hedge fund papers presented skewness, including Harvey and Siddique (2001), Brooks and Kat (2002), and Billio *et al.* (2010).

Figure 3.3: Skewness

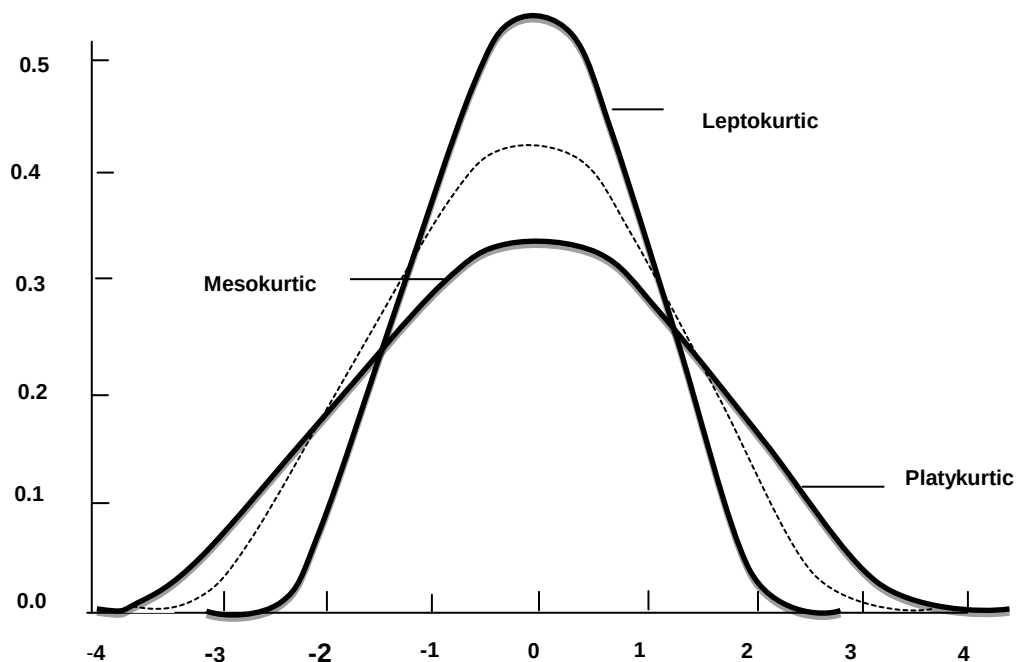


Source: Gujarati & Porter (2010:66).

3.5.4 Kurtosis

Kurtosis is a measure of the relative peakedness or flatness of the tails of a distribution and is the fourth moment of distribution (Bergh & Van Rensburg, 2008:104). It is an important deviation from normality, which is highly applicable to hedge funds (Ackermann *et al.*, 1999). Distributions are defined to be leptokurtic when the return distribution of an investment has a kurtosis value smaller than three, thus a negative kurtosis. A negative kurtosis displays a flat peak near the mean. This means a high probability for extreme values as illustrated in Figure 3.4. Distributions are defined to be platykurtic when the return distribution of an investment has a kurtosis value greater than three, thus a positive kurtosis. A positive kurtosis displays a wider peak near the mean. The probability for extreme values is less for a normal distribution as illustrated in Figure 3.4. A normal distribution is characterised as mesokurtic with a kurtosis of three, and is displayed graphically as a normal distribution.

Figure 3.4: Kurtosis



Source: Gujarati & Porter (2010:66).

Empirical studies show that the normality in return distribution is not justified, in particular when dealing with hedge funds, which have significant positive or negative skewness and high kurtosis (Ackermann, 1999; Fung & Hsieh, 1999; McFall Lamm, 2003; Agarwal & Naik, 2004).

An important characteristic of the skewness and kurtosis is that these two measures should not be evaluated in isolation from the other statistical moments, but also should be considered with respect to the mean and standard deviation (Jondeau & Rockinger, 2003). Also, these two measures cannot be diversified away by increasing the number of assets in a hedge fund portfolio (Brockett & Garven, 1998).

In Section 3.6 a brief overview of the strategies used in hedge funds to generate abnormal returns are discussed.

3.6 Hedge fund style strategies

To compare performance, risk and other characteristics, it is helpful to categorise hedge funds by the investment strategies used by various hedge fund managers. Hedge funds protect investors against declining markets with the use of various

hedging strategies. The hedge fund strategies represent various aspects of alternative investment styles (Ackermann *et al.*, 1999:843). These strategies are used on the tardiness or efficient aspects of the financial markets and combine multiple transactions to take advantage of the market and offset the related potential risk. Hedge fund strategies depend on management skills investment opportunities (Lhabitant, 2002). The aim of hedge fund strategies is to generate absolute returns, regardless of the direction of the market (Botha, 2006:545). A brief overview of the main features of the hedge fund strategies are discussed in Section 3.6.1. From this discussion, it will be seen that certain strategies are risky because these strategies use gearing to magnify the gains (and losses). Other strategies are in fact, risk averse, as the manager has to estimate the impact of market prices on the fund.

Hedge fund managers implement the following hedge fund investment strategies:

3.6.1 Event driven

An event-driven strategy means a position is taken to take advantage of a special situation of returns that occur due to the outcomes of significant events that take place during the normal lifecycle of a corporation (Ackermann *et al.*, 1999:843).

- **Distressed securities:** This strategy takes place when managers invest in companies around the time of financial reconstruction, bankruptcies or recapitalisations, that range from senior secured debt (low risk) to the common share (high risk) of the company (Fung & Hsieh, 1999; BARRA Rogerscasey, 2001:11). Managers could either take a long (buying) or short (selling) position in the shares or debt instruments of the company concerned (Botha, 2006:535).
- **Risk arbitrage:** Entails the simultaneous buy and sell of a related or similar security to profit from the spread between current market price and the ultimate purchase price of the company (Botha, 2006:535). A manager that uses this strategy will buy the undervalued security and simultaneously sell the overvalued security. The risk associated with such strategies is more of a deal risk rather than a market risk (Botha, 2005:21; Kanellakos, 2005:16).

3.6.2 Global

- **International:** Hedge fund managers pay attention to economic change around the world, except the home country. This strategy is a bottom-up approach. The manager buys, for example equities, bonds, currencies, or commodities when it is forecasted that these investments will appreciate in value, or sell if it is likely to decline in value. Hedge fund managers can have shares across different markets at any time (Ackermann *et al.*, 1999:843).
- **Emerging:** The hedge fund manager invests in less mature markets, which tend to have higher inflation and volatile growth. Since short selling is not allowed in most emerging markets, managers must revert to cash or other markets when valuations are unattractive. These less mature markets are perceived to have more opportunities but more risk (Ackermann *et al.*, 1999:843; Botha, 2005:22; Kanellakos, 2005:13).
- **Regional:** The hedge fund manager focuses on opportunities in established markets of the world. The hedge fund manager may seek opportunities in Europe, US and Asia and allocate capital between these already-developed markets to the best potential opportunity (Ackerman *et al.*, 1999:843).

3.6.3 Global macro

This strategy seeks to profit from changes in global economics, typically brought about by shifts in government policy that affect interest rates, and in turn affect currency, bond and share markets. A global fund manager uses a top-down approach to identify opportunities, and often participates in all major markets – equities, currencies, bonds, and commodities, which will have different time frames. The strategy uses leverage and derivatives to enhance returns, but also might hedge exposures on a situational basis (Fung & Hsieh, 1999; Brown & Reilly, 2009:913).

3.6.4 Market neutral

The hedge fund manager uses these hedge fund strategies with the aim to lock out market risk or to neutralise market risks (Botha, 2005:24). This strategy generates profits with speculation on relative price movements between assets and indices. Examples of this method include long-short equity, fixed income arbitrage,

convertible arbitrage, and share index arbitrage. The A.W. Jones Hedge Fund, in 1949, is an example of a long-short equity method that took long and short positions in equities (Ackermann *et al.*, 1999:843).

The different types of market neutral strategies are as follows:

- **Long/short**

The hedge fund manager focuses on security selection and takes long positions in undervalued securities and short positions in the overvalued ones. Since investors participate in both the long and short side of the market, one major advantage of the long-short strategy is the ability to achieve double alpha, which is profit from price corrections for both undervalued and overvalued securities (Ackermann *et al.*, 1999:843; Brown & Reilly, 2009:912). Security selection decisions may incorporate industry long-short (such as buy technology and short natural resources) or regional long-short (such as buy Latin America and short Eastern Europe).

- **Fixed-income arbitrage**

Returns are generated when a hedge fund manager is in the position to take advantage of bond pricing disparities caused by the change of market events, investor preference or fluctuations in the fixed-income market (Botha, 2006:535). Due to the valuation disparities between related instruments (for example coupon bearing, treasury bonds, and zero-coupon treasury strips) that are typically small, managers normally employ leverage to enhance overall returns. The ability to generate absolute returns is driven largely by the skills incorporated by the manager to build quantitative models, as well as to structure and manage fixed income portfolios (Ackermann *et al.*, 1999:843; Brown & Reilly, 2009:912).

- **Convertible arbitrage**

The hedge fund manager buys convertible securities of a specific company and sells the underlying equity of that same company. The fund manager seeks to profit from the disparities in the relationship between prices for convertible bonds and the equities (Botha, 2006:537). Returns are generated in several ways, which include income on convertible bonds, interest on the proceeds of related equity short sales and the price appreciation of the convertible bonds as investors gradually assume

the value of the equity into which it is exchangeable. Like fixed-income arbitrage, convertible arbitrage positions often use leverage to enhance returns (Ackermann *et al.*, 1999:843; BARRA Rogerscasey, 2001:10).

3.6.5 Long-only leveraged

Traditional equity funds are structured like hedge funds in the sense that these funds are strategies, which employ a growth or value approach. According to (Fung & Hsieh, 1999), these strategies invest in equities with no short selling of equities or hedging to minimise inherent risk. Long-only leveraged funds differ from traditional equity funds in that they take on leverage to enhance returns. These funds mainly invest in emerging markets where there may be restrictions on short sales. Long-only leverage funds deliver absolute returns without short selling, and make use of leverage (Botha, 2005:23).

3.6.6 Short sellers

The hedge fund manager takes this position if share prices will go down. The hedge fund manager borrows securities and sells securities short with the intention to re-buy them at a future date at a lower price. Only overvalued securities are shorted. This strategy is used as a hedge for long-only portfolios, and if the market approached a bearish cycle (Fung & Hsieh, 1999; Botha, 2005:25).

3.6.7 Sector

The hedge fund manager allocates assets among different asset classes subjected on the manager's view of the different economic sectors. For this strategy to be successful, the hedge fund manager follows a specific economic sector, for example airlines, or telecoms, that is sufficiently large to provide the manager with enough exploitable opportunities (Botha, 2006:536). The investment instrument itself can be a variety of types, for example short selling, long, and leveraged positions. The hedge fund manager invests money in sectors that are believed to increase in value, and sectors that are believed to decrease in value are short sold (Fung & Hsieh, 1999; Botha, 2005:25).

3.6.8 Fund of Hedge Funds

The hedge fund manager allocates the investor's capital as well as other pooled investment vehicles among different hedge funds. The combination of different strategies and styles aims to provide a more stable long-term investment return than any of the individual funds. The mix of underlying strategies and funds can manage the risks, returns and volatility (Ackermann *et al.*, 1999:843).

The primary benefit to the hedge fund manager of a fund or fund position is that it is a convenient method to achieve a well-diversified allocation to the hedge fund investment space. The blending of various strategies, if done correctly, reduces volatility (risk) (Botha, 2006:537). A hedge fund manager can follow two approaches. Firstly, a fund of funds can offer either a concentration in a particular strategy (for example long-short equity) and then diversify across different hedge fund managers – this is a multiple manager approach. Second, it can diversify across strategies, which is the multiple strategy approach.

The primary disadvantage to the fund of funds approach is that it will create an extra layer of fees necessary to compensate the fund of funds manager (McFall, 1999). The additional fee can be as high as 3 percent of the assets under management (BARRA Rogerscasey, 2001:11; Brown & Reilly, 2009:913). This study has provided a discussion on the history and development of hedge funds, and discussed the characteristics and different style strategies. Section 3.7 presents a brief explanation of regulation of hedge funds in South Africa.

3.7 New regulations of hedge funds in South Africa

Hedge fund strategies performed poorly during the 2008 global financial crisis (Billio *et al.*, 2012). There is a general view that hedge funds did not cause the financial crisis, but could have played a role in making it worse. For this reason, risk management in the South African hedge fund industry has evolved under new proposed regulations released by the National Treasury (National Treasury, 2012) and the Financial Services Board (FSB) (FSB, 2012). This proposed framework for risk management is issued to ensure that all applicable risks of hedge funds can be identified, monitored and managed at all times.

The National Treasury and Financial Services Board (FSB, 2012) issued a proposed framework for the hedge fund industry, which placed greater emphasis on risk management. For example, a new proposed framework published in 2012 for the legislation of South African hedge fund products declared that all funds should have a risk management programme (RMP). This RMP must cover all derivative instruments used by the fund and the trading process employed. With regard to the usage of derivatives, the hedge fund manager will need to specify the risks associated with the derivatives and their management. The section dedicated to risk management also includes disclosure of conflict of interest, liquidity, valuation of assets, segregation of assets, leverage, and prudential requirements (National Treasury, 2012; FSB, 2012:7).

The South African hedge fund industry is relatively new and small; more than R31 billion in assets are managed in South Africa employing vanilla long/short strategies (FSB, 2012; AIMA, 2012). Entities that invest in hedge funds are pension funds, long-term insurers, qualified investors and Funds of Hedge Funds. According to (FSB, 2012) hedge funds in South Africa are not regulated, although the conduct of hedge fund managers is already regulated through the Financial Advisory and Intermediary Services Act (37 of 2002) (FAIS Act). The transparency is good, mainly because of the Funds of Hedge Funds being the largest investor group (FSB, 2012). Although hedge funds have many advantages and rewarding characteristics, they do have some hidden risks. In Section 3.9 and Section 3.10, some of these risks are explored, as well as different ways of measuring this risk.

Section 3.8 gives overview on standard risk measures and risk-adjusted performance measures to quantify the degree of risk in hedge funds and associated international market indices.

3.8 Measures of risk

A significant difference between hedge funds and traditional investment funds is that the former are permitted to sell securities short; this presents unique risk (AIMA, 2012). Risk management in hedge funds, therefore, differs in some instances from traditional fund management. Hedge fund managers must also manage downside risk; a skill not possessed by all active managers. Section 3.8.1 and Section 3.9

introduce and explain the standardised measures and risk-adjusted performance measures.

3.8.1 Standard deviation

As discussed in Section 3.5.2, the standard deviation (variance)⁷ of expected returns⁸ refers to a statistical measure which measures the dispersion of returns around the expected value, whereby a larger variance or standard deviation indicates a greater level of risk (Brown & Reilly, 2009:183). The more dispersed the expected returns, the greater the uncertainty of future returns (Fung & Hsieh, 1999). The standard deviation is applied widely in modern theory, and is calculated as the square root of variance (Marx *et al.*, 2013:8).

Variance is defined as (Brown & Reilly, 2009:28; Marx *et al.*, 2013:8):

$$\text{Variance } (\sigma^2) = \sum_{n=1}^n (P_i) [R_i - E(R_i)]^2 \quad (3.1)$$

where

$E(R_i)$ is the expected return;

R_i is the outcome associated with the i th state; and

P_i is the probability associated with the i th outcome.

The standard deviation is equal to the square root of the variance and is defined as (Brown & Reilly, 2009:28; Marx *et al.*, 2013:8):

$$\text{Standard deviation } (\sigma) = \sqrt{\sum_{n=1}^n (P_i) [R_i - E(R_i)]^2} \quad (3.2)$$

where

σ is the standard deviation;

⁷ Accept the variance and standard deviation as one measure of risk because the standard deviation is the square root of the variance (Brown & Reilly, 2009:183).

⁸ Expected return refers to a weighted average of all expected rates of returns, where the weights are the probabilities assigned to each potential return that could be achieved (Sears & Trennepohl, 1993:13).

$E(R_i)$ is the expected return;

R_i is the outcome associated with the i th state; and

(P_i) is the probability associated with the i th outcome.

The standard deviation is applied to the expected returns of an investment to measure the investment's volatility. A volatile investment fund will have a high standard deviation, whereas a less volatile investment fund will have a smaller deviation distribution. Thus, the standard deviation focuses on volatility⁹ or dispersion of returns over time (Botha, 2005:41).

Although this measure is frequently used, it also has drawbacks. In most cases the standard deviation measures volatility. Investments will be ranked equally according to the Sharpe ratio,¹⁰ however, the performance measures will be artificially overestimated as higher moments are not considered (Agarwal & Naik, 2004:65; Hentati *et al.*, 2010:2). The standard deviation implicitly assumes that returns are normally distributed. However empirical evidence showed that, in the context of hedge funds, returns have a non-normal distribution and thus invalidates this key assumption (Bergh & Van Rensburg, 2008:102).

The standard deviation is based on the deviation from the mean. It reflects both up and below-the-mean dispersion. Investors have a preference for upside risk and aversion for downside risk (Kanellakos, 2005:30). In this case, the problem arises because this risk measure will not accurately measure the volatility of above average positive returns (Ackermann *et al.*, 1999). Most investors will not be concerned about volatility if investments funds experience above average returns.

However volatility measures both positive and negative returns with the same weight. This means that upside returns are considered to be a mirror of downside risk (Hentati *et al.*, 2010:3).

Although there are various potential risk measures, the standard deviation is a traditional risk measure and is recognised widely by investment professionals. The standard deviation is simply a measure of volatility and is of limited use unless, in

⁹ See Section 3.10.

¹⁰ See Sharpe ratio in Section 3.9.1.

interpreting it, it is paired with returns as in the Sharpe ratio, which are presented and discussed in Section 3.9.1.

3.9 Performance measures

In Chapter 2, it was evident that the relationship between risk and return is an essential part of the investment management decision. An evaluation will be incomplete if it only measures the return and performance levels on hedge funds and associated international market indices without taking the risk on both investment options into consideration. Risk-adjusted performance measures for the measurement of performance that incorporates both risk and return have been developed. These performance measures include the Sharpe ratio, Sortino ratio, Treynor ratio, Calmar ratio, Omega ratio and the exponentially weighted moving average (EWMA) model. The differences among these performance measures rest primarily with the adjustment for risk (Mayo, 2000:249). The measurement of risk is essential because a lower return is not necessarily indicative of inferior performance. The more relevant question is, was the investment option's performance sufficient to justify additional risk?

In Chapter 2, the concept of risk aversion implied that for a given amount of risk, an investor would be in favour of a high return rather than a low return on an investment fund. Given this, once the risk levels of hedge funds and associated international markets are considered, these risk levels can relate to the returns of US and EU hedge funds and associated international market indices to determine whether the return was sufficient to compensate the investor for an acquired amount of risk. Regardless of which ratio is used, investors gain better insight as to the risk of several investment alternatives.

The following risk-adjusted performance¹¹ measures are discussed throughout Chapter 3, to evaluate the risk on hedge funds and associated international market indices for the pre-financial crisis, during and post the financial crisis period, respectively.

¹¹ To compare returns, an investor needs to standardise for differences in risk. After making this adjustment, the investor can better determine if the fund's management outperformed other funds of the market (Mayo, 2000:249).

3.9.1 Sharpe ratio

The Sharpe ratio, developed by Sharpe (1966), is a risk-adjusted financial measure of the return of an investment. The Sharpe ratio measures the relationship between the risk premium and the standard deviation of the returns generated by a fund to determine per unit of risk (Sharpe, 1966; Eling & Schuhmacher, 2007:2633). The Sharpe ratio also indicates that the higher a fund's Sharpe ratio, the higher the return for a given risk (*inter alia* a higher risk-adjusted average rate of return), or a lower risk for a given return (Marx *et al.*, 2013:295). Therefore, the Sharpe ratio evaluates the portfolio manager based on both the rate of performance and diversification.

For investment fund p , the Sharpe ratio can be formulated as follows (Sharpe 1966; Bodie *et al.*, 1999:758):

$$\text{Sharpe ratio} = \frac{(r_p - r_b)}{\sigma_p} \quad (3.3)$$

where

r_p represents the annual return of the portfolio;

r_b represents the annual return of the benchmark or the risk-free annual interest rate;
and

σ is the standard deviation of the annual portfolio returns.

The Sharpe ratio is a widely-known performance measure, and its popularity is attributed to the simplicity of its risk measure (standard deviation), as opposed to other measures that rely on more advanced measures (Marx *et al.*, 2013:295).

The Sharpe ratio also has a few limitations. The Sharpe ratio is an acceptable measure if the returns generated by the fund are normally distributed and if an investor desires to place all his risky assets in only one fund (Eling & Schuhmacher, 2007:2633). The drawback is that it may not be an acceptable measure if an investor wants to split the risky assets, for example between a market index and investment fund (Bodie *et al.*, 2005). In this case, more appropriate performance measures are required that will give attention to the correlation between market index and the

respective fund. Such performance measures include the Treynor and Jensen measures.

In case of normally distributed returns, and if an investor desires to place all risky assets in only one fund, the Sharpe ratio is a suitable measure that relies on the standard deviation and expected value (*inter alia* the first two moments of the return distribution) (Eling & Schuhmacher, 2007:2633). This performance measure may not be appropriate on investment funds, such as hedge funds, that generate returns with a non-normal distribution (Sharma, 2004:107). Although the Sharpe ratio is an excellent measure of risk to compare funds, the return distribution of hedge funds in this research will not be evaluated fully.

3.9.2 Sortino ratio

The Sortino ratio, introduced by Sortino and Price (1994), is a modification of the Sharpe ratio that relies on the downside deviation (semi-deviation) rather than standard deviation as the measure of risk. This is also called lower partial moments. The Sharpe ratio does not penalise upside volatility (Bergh & Van Rensburg, 2008:104). The downside deviation is a measure of dispersion of data below a minimal acceptable rate (which could be the risk-free rate of average return) as determined by the fund manager (Botha, 2005:44). Although the standard deviation is a traditional measure of risk, the Sortino ratio relies only on the volatility of the negative portfolio returns. The Sortino ratio addresses the problem of skewed distributions and it does not require symmetry between gains and losses (Harding, 2004). Hence, the Sortino ratio is a more appropriate measure to use than the Sharpe ratio for dynamic investment strategies such as hedge funds (Kanellakos, 2005:76).

As discussed in Section 3.8.1, the standard deviation is the most commonly used risk measurement to evaluate the risk of an investment. With reference to Equation 3.2, no distinction is made between upside and downside deviation. For instance, a hedge fund with a monthly return of -7 percent and +7 percent will have the same standard deviation as a different hedge fund that has a return of 0 percent and +10 percent the next month. (Botha, 2005:43). The Sharpe ratio does not distinguish between upside and downside deviations; hence, this measure concentrates on a non-directionally based measurement of volatility to adjust risk. This is criticised as it

penalises a fund for a month of high excess returns and large volatility. Of course, for many investors this type of deviation is undesirable, thus the Sortino ratio was developed. The Sortino ratio addresses and improves on the weak areas of the Sharpe ratio.

In brief, the Sortino ratio only measures the downside volatility and is formulated as follows (Bodie *et al.*, 1999:758):

$$\text{Sortino ratio} = \frac{(r_p - r_b)}{\sigma_d} \quad (3.4)$$

where

r_p represents the returns of the portfolio;

r_b is the benchmark or the risk free-rate rate; and

σ_d is the downside volatility of the portfolio returns.

The Sortino ratio only concentrates on the volatility of the negative portfolio returns and is designed to incorporate non-normal distributions essential in hedge fund data. According to Bergh and Van Rensburg (2008:104), the Sortino ratio is more relevant than the Sharpe ratio when the distribution is left skewed (downside volatility returns). This makes the Sortino ratio a more appropriate performance measure for investment strategies such as hedge funds.

The Treynor ratio and Jensen ratio rely on more advanced measures, and will be discussed in Section 3.9.3.

3.9.3 Treynor ratio

As discussed in Chapter 2, a distinction can be made between risk that is unique to a company that is diversifiable in nature, and un-diversifiable risk that results from general market fluctuations. In 1965 Treynor, as an alternative for investment funds developed the Treynor rule (Kanellakos, 2005:48). Treynor opposed that unique risk (non-systematic) should not be present in a completely diversified portfolio. Given this, risk-adjusted performance evaluation should only focus on the systematic risk rather on the total (systematic and un-systematic) risk of a portfolio (Kanellakos, 2005:48). This performance measure is a ratio of the excess returns generated by

the fund, to the systematic risk (beta). In Chapter 2, it was presented that systematic portfolio risk may be measured by an investment's β value (Marx *et al.*, 2013:294). A higher Treynor ratio is more favoured over a lower ratio, as this indicates a superior performance.

The Treynor ratio can be formulated as follows (Eling & Schuhmacher, 2007:2637):

$$\text{Treynor ratio} = \frac{(r_p - r_b)}{\beta_p} \quad (3.5)$$

where

r_p is the return of the portfolio;

r_b is the risk-free rate; and

β_p is the beta of the portfolio.

Treynor's ratio indicates the portfolio's return per unit of risk. If the Treynor ratio value exceeds that of the market risk premium ($r_p - r_b$), it indicates that a portfolio has achieved superior performance. Generally, the beta factor (β_p) is calculated using the correlation between the returns of a market index and the returns of the investment fund (Eling & Schuhmacher, 2007:2637). The logic behind the Treynor ratio is that a larger ratio value would indicate a higher return for a given risk or a lower risk for a given return. This is consistent with the Markowitz theory, which would indicate that greater values of the Treynor's ratio would lead to a higher return per unit of risk (Mayo, 2000:255; Marx *et al.*, 2013:294).

3.9.4 Jensen's alpha

Jensen (1968) based his performance evaluation on the CAPM introduced in Chapter 2. It was earlier indicated that the expected return of assets can be calculated as follows from the CAPM (Marx *et al.*, 2013:295):

$$\text{Required return} = r_f + \beta_p (r_m - r_f) \quad (3.6)$$

where

r_f is the risk-free rate of return;

β_p is the systematic risk (portfolio β). The calculation of factor β relies on the correlation between the returns of a market index and the returns of the investment fund; and

r_m is the expected return on the market.

Jensen's alpha indicates the excess actual return (referred to as alpha (α)) that a portfolio generated over the return required (as measured by β) of the portfolio indicated by the CAPM (Kanellakos, 2005:58). Jensen's alpha may be formulated as follows (Marx *et al.*, 2013:295):

$$\text{Jensen's alpha } (\alpha) = r_p - [r_b + \beta_p(r_m - r_b)] \quad (3.7)$$

where

r_p is the historical return of a portfolio;

β_p measures the sensitivity of the portfolio returns to the market portfolio return; and

$(r_m - r_b)$ is the respectively excess returns on the portfolio p .

In Equation 3.7, the α value indicates whether the portfolio manager is superior or inferior with investment ability. The logic behind Jensen's alpha is that if a portfolio performed according to its CAPM expectations, it would have an alpha α value of zero.

Inferior portfolio performances will be indicated by $\alpha < 0$ (negative alpha values), whereas superior portfolio performances will be indicated by positive alpha values (Mayo, 2000:252; Brown & Reilly, 2009:945; Marx *et al.*, 2013:295). Therefore the α coefficient represents how much of the managed portfolio's return is attributable to the manager's ability to derive above average returns adjusted for risk. Superior risk-adjusted returns indicate that the investment manager is good at predicting market returns, selecting undervalued issues for the portfolio, or both (Brown & Reilly, 2009:946). The value of β_p measures the sensitivity of the portfolio returns to the market portfolio return. Generally, the (β_p) factor is calculated using the correlation between the returns of a market index and the returns of the investment fund (Eling & Schuhmacher, 2007:2637). Normally, Jensen alpha is calculated with a drawn

linear regression of the time series of portfolio returns in excess of the risk-free interest rate against the market's return in excess of the risk-free rate (Marx *et al.*, 2013:295).

3.9.5 Calmar ratio

The Calmar ratio is similar to the Sharpe type measure. The difference is that the Calmar ratio is based on the maximum drawdown of an investment instead of the standard deviation to reflect the investor's level of risk (Young, 1991). The Calmar ratio was developed in 1991 by Young, and is an acronym of California managed annual reports (Eling & Schuhmacher, 2007:2636). The lower the Calmar ratio, the worse the investment performed on a risk-adjusted basis over a certain investment period. Conversely, the higher the Calmar ratio the better it performed. The Calmar ratio compares the opportunity of gain to the possible loss. The Calmar ratio can be formulated as follows (Eling & Schuhmacher, 2007:2636):

$$\text{Calmar ratio} = \frac{r_i^d - r_f}{-MD_{i1}} \quad (3.8)$$

where

$r_i^d - r_f$ is the compounded annual return; and

$-MD_{i1}$ is the maximum drawdown.

The drawdown of an investment fund is the loss incurred over a certain investment period. To achieve the level of return on different investment funds available, the levels of risks must be considered when each fund's performance has to be measured (Géhin, 2004:27). If an investor were to invest in different investment funds, a single fund might achieve higher return than the other investment fund alternatives. Although this fund generated a high level of return, the downside risk (the investment loss), is not considered. Each fund's maximum drawdown proves this; thus, it will appear that the other investment fund alternatives are more sensible, risk-adjusted investments (Eling & Schuhmacher, 2007:2636). In the context of hedge funds, it is noticeable that investors are more in favour of the maximum possible loss from peak to trough as an appropriate performance measure of risk.

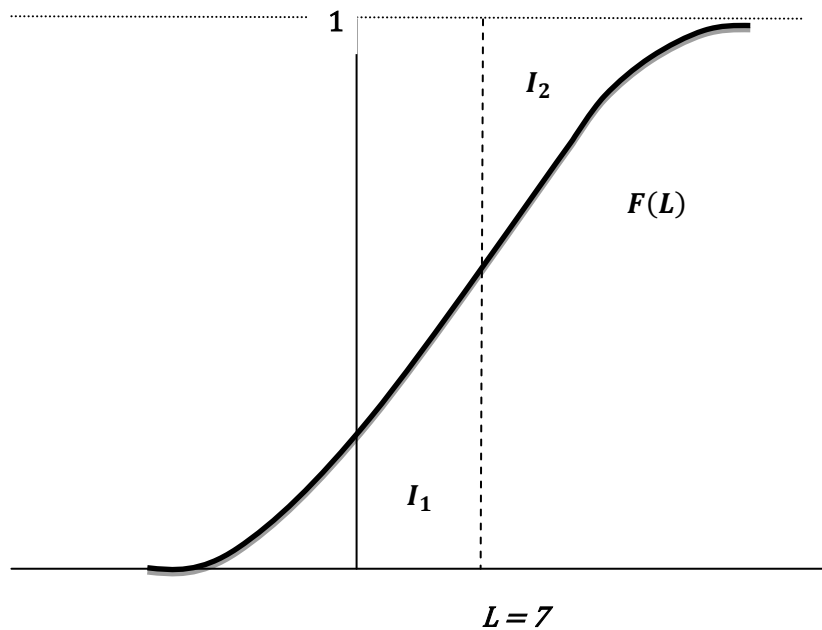
Since the returns of hedge funds are difficult to measure, mainly because the returns are not normally distributed, performance measures such as the Sharpe ratio or traditional approaches that rely on mean and variance appear inadequate to evaluate hedge funds. The reason for this is they ignore the effects of higher moments and underestimates the risk inherent in hedge fund returns (Duong, 2008:12). This concern was addressed for new performance measures to measure risk and performances of non-normal distributions of investment funds. Keating and Shadwick (2002:2) introduced a measure called Omega, which accounts for the effects of higher moments.

3.9.6 Omega ratio

Omega is defined as the ratio between the expected gain and the expected loss, with respect to the return threshold (Kanellakos, 2005:83). The threshold refers to a given return level (Keating & Shadwick, 2002). The purpose of the Omega ratio is to incorporate the entire return distribution, and this includes the mean, variance, skewness and kurtosis (Togher & Barsbay, 2007). This performance measure possesses several mathematical features. Firstly, the Omega ratio is not affected by the sampling uncertainty as it is calculated directly from the observed distribution and requires no estimates (Bergh & Van Rensburg, 2008:105); therefore, it contains all information of higher moments. Secondly, it is a pay-off function. It calculates, for each return level, a probability adjusted ratio of gains to loss (Géhin, 2004:21). This means that with a given return level, and a criterion rule of preferring more to less, an asset with a higher value is more desirable than one with a lower value. The portfolio with the higher Omega value has a greater probability to deliver returns, which will match or exceed the threshold (L).

Thirdly, Omega will always be between zero and positive infinity (Keating & Shadwick, 2002). The reason for this is the integrals are restricted by a and b in the bottom and top integrals, respectively. Therefore, Omega will never provide a negative value as it mathematically cannot be less than zero. As graphically illustrated in Figure 3.5, it involves the separation of returns into loss and gain above and below a return (L) and then considering the probability-weighted ratio of returns above and below the separation (Keating & Shadwick, 2002).

Figure 3.5: The cumulative returns distribution for asset A

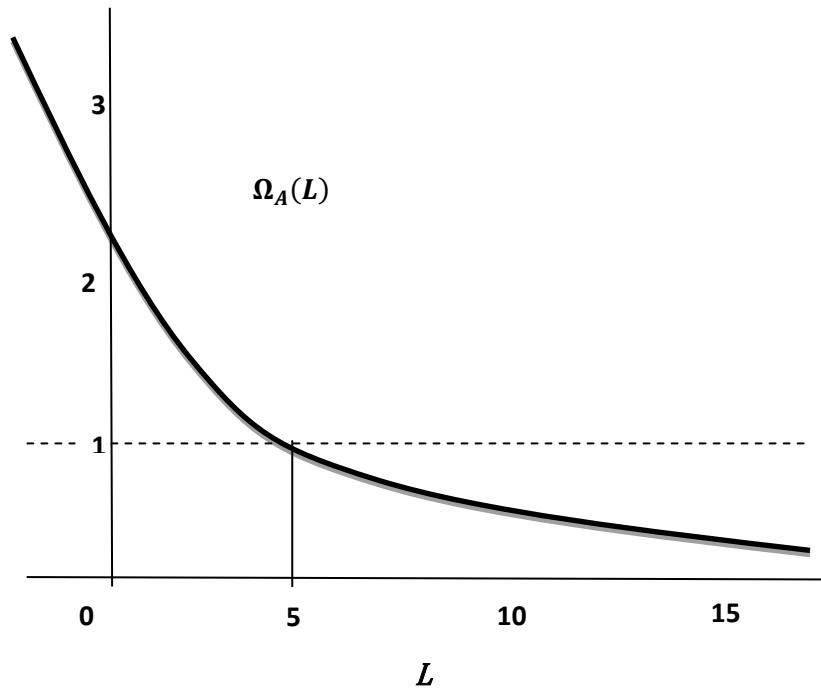


Source: Keating & Shadwick (2002).

For example, Figure 3.5 illustrates the cumulative distribution F for asset A. Consider that the loss threshold is at $L=7$. The value I_2 is the area above the graph of F and to the right of seven. The value I_1 is the area under the graph of F and to the left of seven. This implies that the Omega for asset A at $L=7$ is the ratio of the probability weighted gains, I_2 , to the probability weighted losses, I_1 .

By considering this Omega ratio at all values of the returns threshold, (*inter alia* calculating the ratio for all threshold levels(L) from the highest observed return to the lowest) the Omega function $\Omega(L)$ is obtained, which is representative of the particular asset or portfolio (Keating & Shadwick, 2002). Put differently, by incorporating in different levels of L , and for each level the result is a specific value of the Omega ratio, which can then be graphed; the result is the Omega function (see Figure 3.6).

Figure 3.6: Omega function



Source: Keating & Shadwick (2002).

Figure 3.6 illustrates asset A as a function of returns from $L=-2$ to $L=15$. Omega is decreasing strictly as a function of L and takes the value one at asset A's mean return of five.

Omega, therefore, be defined as (Keating & Shadwick, 2002:3):

$$\Omega(L) = \frac{\int_L^b [1-F(x)]dx}{\int_a^L F(x)dx} \quad (3.9)$$

where

x is a random one-period of rate return of an investment;

L is a required return threshold selected by the investor;

a and b represent the upper and lower bounds of return distribution respectively;

$\int_L^b [1 - F(x)] dx$ denotes the upside potential;

$\int_a^L F(x)dx$ denotes the downside potential; and

$F(x)$ represents the cumulative distribution of return below threshold L .

The interval a to b is the interval of returns and F is the cumulative distribution of returns, (*inter alia* the ratio of the two areas illustrated in Figure 3.5 with a loss threshold set as the return level (L)). For any return level (L), the number $\Omega(L)$ is the probability weighted ratio of gains to loss, relative to the threshold L (Keating & Shadwick, 2002:3). As illustrated in Figure 3.6, the Omega function takes the value one when L is the mean return. The choice of the L level is set according to the investor's preference. The amount of loss (threshold level) is selected by the investor in which the investor is comfortable with that reflects the acceptance of risk (Kanellakos, 2005:83).

However, a weakness of the Omega function is that each investor sets different threshold values as preferred. For instance, a higher threshold means an investor is willing to accept a lower return on the investment, and *vice versa* (Keating & Shadwick, 2002:3). Although each Omega is personalised to the investor, it has little significance at the aggregate level. It will not be applicable for an investment professional to report one return L , as it will characterise the risk threshold of a small proportion of investors (Kanellakos, 2005:88).

Omega was designed with the intention not to take only the non-normally distributed returns into account, but the entire distribution, *inter alia* the four moments of distribution (Bergh & Van Rensburg, 2008:104). The Omega is perfectly appropriate for evaluating the performance of hedge funds as it considers the whole distribution function of the evaluated assets.

In addition, volatility is estimated with the exponential weighted moving average (EWMA) model as an additional performance measure. This performance measure improves portfolio management when a comparison has to be made for risk and reward between different investment funds given the investor's objective and risk tolerance (Ladokhin, 2009:4). The concept of volatility and the method used to measure volatility are discussed in Section 3.10.

3.10 Volatility

Volatility can be described as something that is changeable or variable and is mathematically expressed in terms of standard deviations (Daly, 2008:2378). High

volatility (large fluctuations or change in price) over time equates to high risk, uncertainty, and unpredictability of the underlying variable (Daly, 2008:2378; Marx *et al.*, 2013:246). In finance, volatility refers to the variability of returns on an asset, *inter alia* the distribution of the rates of return around the average rate of the return (Wuite, 2009:401). It is crucial for investors not only to know the current value of the volatility of the managed assets, but also to be able to predict the future values. To forecast volatility is especially important for individuals and institutions involved in portfolio management (Ladokhin, 2009:4). In this research, volatility is an important factor in the comparison of risk and reward between hedge funds and associated international market indices. The comparison helps to determine the appropriate investment strategy, given the investor's objectives and risk tolerance.

Volatility can be measured in a variety of ways. In Section 3.10.1 a method for volatility forecasting are briefly explained.

3.10.1 Exponentially weighted moving average (EWMA) model

The most recent price return data are more important for accurate measurement and for forecasting of contemporary risk measures than data that occurred in the past. Section 3.10.1 presents the J.P. Morgan RiskMetrics™ approach, which evaluates and forecasts volatility with the use of an exponentially weighted moving average (EWMA) model (J.P. Morgan/Reuters, 1996).

The EWMA model is a statistic, which approaches recent observations with the use of exponentially weighted moving averages of squared deviations (Čisar, 2011:73). The EWMA model calculates volatility based on the previous day's value, and that value depends on the previous day's value before it, and so on. It monitors the process that averages the data in a way that gives less and less weight to data that are further removed in time (Hendriks, 1996:42). Since the weights decline exponentially, the most recent observations receive more weight than earlier observations in the calculation of the volatility (J.P. Morgan/Reuters, 1996).

The EWMA model can be formulated as follows (J.P. Morgan/Reuters, 1996:78):

$$\sigma = \sqrt{(1 - \lambda) \sum_{t=1}^T \lambda^{t-1} (r_t - \bar{r})^2} \quad (3.10)$$

The EWMA model depends on the parameter, λ ($0 < \lambda < 1$), which refers to the decay factor (Roberts, 2000). This parameter determines the relative weights that must be applied to the returns (the parameter λ determines the rate at which “older” data enter into the calculation of the EWMA statistic). A value of $\lambda = 1$ implies that only the most recent measurement influences the EWMA. Thus, a large value of $\lambda = 1$ gives more weight to recent data and less weight to older data. A small value of $\lambda = 1$ gives more weight to older data (Ladokhin, 2009:13; Čisar, 2011:74).

To estimate the decay factor, the following steps must be followed (J.P. Morgan/Reuters, 1996:98):

Firstly find Π , which is the sum of all N minimal root-mean-square-errors (RMSE), τ 's:

$$\Pi = \sum_{i=1}^N \tau_i \quad (3.11)$$

where

$$\text{RMSE}_v = \frac{1}{T} \sum_{t=1}^T \left(r_{t+1}^2 - \hat{\sigma}_{t+1|t}^2(\lambda) \right)^2 \quad (3.12)$$

Second, define the relative error measure:

$$\theta_i = \frac{\tau_i}{\sum_{i=1}^N \tau_i} \quad (3.13)$$

Third, define the weight:

$$\phi_i = \frac{\theta_i^{-1}}{\sum_{i=1}^N \theta_i^{-1}} \quad (3.14)$$

where

$$\sum_{i=1}^N \phi_i = 1 \quad (3.15)$$

Finally, the optimal decay factor $\tilde{\lambda}$ can be defined as:

$$\tilde{\lambda} = \sum_{i=1}^N \phi_i \hat{\lambda}_i \quad (3.16)$$

where the final optimal decay factor applied is the weighted average of individual optimal decay factors.

Chapter 3 concludes by providing a brief overview of the common world indices. These indices are also used in the estimation of ratios like the Jensen and Treynor

ratio, where a benchmark is required to establish a ranking. These world indices comprise the Dow Jones industrial average (DJIA), S&P 500, DAX and CAC 40, and are discussed in Section 3.11.

3.11 Market indices

The market indices are a useful way of providing investors with an indication of the movement of the aggregate market. Market indices represent an entire security market and track the market's changes over time (Otto & Henderson, 2006:231). To supply investors with a composite report on the market performance, some financial publications or investment firms have created and maintained share-market and bond-market indices. Details of the various indices are published daily. Investors can track changes in the index's value over a specific period and use it as a benchmark against which to compare the performance of their portfolio returns (Brown & Reilly, 2009:128). If the overall market rises, an investor with a diversified portfolio of assets will expect that the portfolio will also increase in value (Otto & Henderson, 2006:231). Several ways that investors use security market indices are discussed in Section 3.11.1

3.11.1 The purpose of market indices

According to Brown and Reilly (2009:128) and Marx *et al.* (2013:28), security market indices are used for the following purposes:

- The primary use is as benchmarks to evaluate the performance of individual portfolios. Investors should be able to select bonds and shares randomly, and earn a rate of return comparable to the market return. A superior portfolio manager should consistently do better than the market;
- To create and monitor an index fund. The goal of an index fund is to track the performance of the specified index over time and to achieve at least similar rates of return. The portfolio fund may consist of either ordinary shares or bonds;
- In terms of the portfolio market theory, the relevant risk for an individual risky asset is its systematic risk. Systematic risk is the relationship between the rates of return for a risky asset and the rates of return for a market portfolio of risky

assets. Therefore, an aggregate market index is used as a proxy for the market portfolio of risky assets;

- To measure market rates of return in economic studies. Investment analysts study the factors that influence the local market movements and the correlation between various markets; and
- To predict future market movements. Technical analysts believe past price changes can be used to predict future movements.

With the background of market indices in place discussed in Section 3.11.1, a brief overview of the common world indices follows. These world indices are used in the estimation of risk-adjusted performance measures that require a benchmark to establish a ranking.

3.11.2 International market indices

3.11.2.1 Dow Jones industrial average (DJIA) index

The Dow Jones Industrial Average (DJIA) is the best-known price-weighted index, as well as the oldest and certainly the most popular share-market index (CME Group Company, 2011). The DJIA is a price-weighted average that consists of 30 large, well-known, blue chip firms (Brown & Reilly, 2009:129). It tracks closely with other major market indices and is a major market index with more than 100 years of history. Charles H. Dow, creator of the Wall Street Journal, began in 1884 with 11 liquid and highly capitalised shares, and the most actively traded shares were railways. The average comprised nine railways and two industrials (CME Group Company, 2011).

On 26 May, 1896, the DJIA was created and formally launched. The new DJIA comprised 12 share companies listed on the New York Stock Exchange and included a steel provider, leather maker and sugar producer (Beneish & Gardner, 1995:137; Shoven & Sialm, 2000:1; CME Group Company, 2011). The industrial and manufacturing sectors increased and became important relative to the previously dominant railroads. The DJIA waited more than 25 years to achieve status outside the narrow canyon of Wall Street (CME Group Company, 2011).

To calculate DJIA, the current prices of the 30 shares are totalled together and this sum is divided by a divisor that has been adjusted to take account of share splits and changes in the sample over time (Brown & Reilly, 2009:129). The adjusted divisor is designed to keep the index consistent through events such as component changes, share splits, mergers and acquisitions, and large dividend distributions. The divisor insures that the index value will be the same after these events as it was before. The 30 companies in the DJIA are large, but no longer a true proxy for the industrial sector. Detailed reports of the DJIA are quoted worldwide on a daily basis in news broadcasts, newspapers, websites and journals. It also has been licensed to financial institutions around the world as the basis of investment products. The 30 companies represent every important sector in the USA share market (Shoven & Sialm, 2000:1).

3.11.2.2 Standard & Poor's 500 (S&P 500) index

The Standard and Poor's 500 (S&P 500) is regarded as one of the best indices of the US equity market. This index is a widely used benchmark to measure the performance of large capitalisation of all regularly traded US-based shares (Siegel & Schwartz, 2006:18). The S&P 500 index comprises almost all of the 500 top companies ranked by market value. Although the S&P 500 focuses on the large-cap segment of the market, it is also an ideal proxy for the total market. The S&P 500 tends to move more or less in tandem with its widely-known cousin, the DJIA but there are differences between the two indices. The S&P 500 index measures total return (this includes reinvested dividend), whereas the DJIA is based exclusively on price. This gives the S&P 500 the advantage relative to the DJIA when the market falls and dividend yields rise (Kathman, 2012).

The history of the S&P 500 dates back to 1923 when Standard and Poor's introduced an index that covered 233 companies (O'Shaughnessy, 1998). On 1 March 1957, the composite was expanded to 500 shares and renamed the S&P 500 index (Siegel & Schwartz, 2006:18). The index originally contained industrial, railroad and utility companies. In 1976, financial shares were added and industrial, transportation and utility groups were reduced. In 1988, Standard & Poor's reduced fixed sectors in order to obtain a diversified and representative portfolio of all shares that traded in the US markets (Siegel & Schwartz, 2006:18).

The companies in the index are chosen and maintained by a committee at Standard & Poor's, who meet on a regular basis to discuss possible changes to the list. These members include Standard & Poor's economists and index analysts. The committee established an index committee policy to maintain the indices in an independent and objective manner. This means, the committee selects the companies based on market size, liquidity and group representation (Kathman, 2012).

3.11.2.3 Deutscher Aktien index (DAX)

Along with the DJIA and S&P 500 indices, the Deutscher Aktien index (DAX) is a major German share market index, which consists of blue-chip share companies that measure the development of the 30 largest and best-performing companies on the German equities market. This index represents more or less 80 percent of the market capital authorised in Germany (Gonçalves *et al.*, 2010:3). The DAX 30 was developed by Deutsche Börse AG, then called the Association of German Stock Exchanges (FWB), and was launched on 1 July, 1988 (Gonçalves *et al.*, 2010:3).

The companies are chosen carefully in terms of market capitalisation and by 12-month trading volume. This list is reviewed every quarter to update the companies on the list in accordance with its rules and regulations. The 30 companies included in the DAX 30 index represent nearly 75 percent of the value on the Frankfurt stock exchange (iFOREX, 2013b). The primary reason to trade the DAX 30 is that it is open for extended hours to fit an individual's schedule. Unlike the DJIA that is a price-weighted index of 30 shares, which treats both high and low priced shares the same in the calculation of the average, the DAX is a capitalisation-weighted index, which considers the size of the firm when a decision has to be made on the change in average. The DAX 30 is one of the few country indices that are completely rule-based and transparent (iFOREX, 2013b).

3.11.2.4 CAC 40 index

The Cotation Assistée en Continu 40 (CAC 40a) is a well-known French share index. This CAC 40 is a capitalisation-weighted index and consists of 40 shares that are most representative of the various economic sectors quoted on the Euronext Paris market (Capelle-Blancard & Ghaudhury, 2001:2).

The CAC 40 index started on 31 December 1987 with a present base value of 1000. Like the DAX 30, the companies included in the CAC 40 are reviewed on a quarterly basis and carefully selected based on capitalisation and share turnover. At each review, the companies listed on the Euronext Paris are ranked by the previous 12 months' performance, and 40 are selected for inclusion (iFOREX, 2013a). Since December 2003, the index weightings of companies in the index have been capped at 15 percent at each quarterly review (Otto & Henderson, 2006). This means that companies in the index are not allowed to constitute more than 15 percent of the value of the index. An independent committee manages the index. This committee adapts the index as necessary to reflect changes in the market or in the capital and turnover of the index's essential shares. The CAC 40 index is the main benchmark for Euronext Paris and it is almost completely composed of companies based in France (iFOREX, 2013a).

Overall, depending on the risk-adjusted performance of each world index, this will determine if an investor will consider buying shares from these markets. This will also determine if the investor will consider following a more passive managing approach in holding the share to benefit from its performance. This leads to Section 3.12 that briefly elaborates on the concept of passive management and a buy-and hold approach.

3.12 Passive management

A passive portfolio strategy may be classified as a portfolio management strategy in which an investor buys shares and holds them for a long period, regardless of fluctuations in the market (Brown & Reilly, 2009:680). A passive portfolio management is a strategy of constructing and holding a portfolio of blue chip shares without attempting to outperform the market constantly in the short term through superior forecasting or finding undervalued shares (Marx *et al.*, 2013:282). The main passive management strategy that will be applied on the associated international market indices is the buy-and-hold strategy.

3.12.1 Buy-and-hold strategy

Since so much attention has been given to the efficiency (or lack thereof) of share markets since 1970, passive buy-and-hold strategies have become popular. A buy-

and hold-strategy is the simplest form of portfolio management (Shilling, 1992:46). A buy-and-hold strategy is characterised by an initial mix for example 70/30 shares/bills that is bought and then held (Perold & Sharpe, 1988:18). An investor who employs a buy-and-hold strategy will construct a well-diversified and low standard deviation portfolio of high-quality investments with no rebalancing performed, and will keep the portfolio over a medium- to long-term period such as 10 to 20 years. Once the investor is in position, there will be no concern with short-term price movements and technical indicators (Marín-Solano *et al.*, 2010:17; Marx *et al.*, 2013:282).

Buy-and-hold investors do not consider active trading as a viable alternative to achieve abnormal returns (Perold & Sharpe, 1988:16). Many successful institutional portfolio managers and bond investors follow a modified buy-and-hold strategy that invests in an issue with the objective of holding it to maturity, but still seeks opportunities to trade into a more desirable position should the opportunity to do so arise. Indubitably, if the buy-and-hold approach is modified too much, it becomes an active strategy (Brown & Reilly, 2009:680).

The buy-and-hold strategy approach does not require a dynamic follow-up and is easy to implement. The main advantage of such a strategy is a more predictable return and substantial cost savings due to the minimal amount of trading conducted (Marín-Solano *et al.*, 2010:17). It is often contended that the large volume of trading and associated high transaction costs of active trading strategies add to the attractiveness of a buy-and hold-strategy (Marx *et al.*, 2013:282).

The drawbacks of these strategies are that they miss the opportunity to profit from anticipated changes in interest rates, demand and supply imbalances, and spread relationships. More prominently, buy-and-hold strategies allow minimal flexibility for adjusting the change of personal needs, change in credit quality, tax considerations and liquidity needs. Investors may find themselves limited and negatively constrained by the passive investment approach if personal needs must be changed (Thompson, 2012).

Successful buy-and-hold investors incorporate timing considerations into their strategy by using their knowledge of market rates, yield spreads and expectations. Whether the manager follows a traditional or modified buy-and-hold approach, the

most important concept is to find investment vehicles that possess the appropriate maturity, yield and credit quality features. The strategy does not restrict the investor to accept whatever the market has to offer, nor does it imply that selectivity is unimportant (Brown & Reilly, 2009:680).

3.13 Summary

Chapter 3 presented a brief history of the hedge fund industry. It explained the origins, subsequent developments and strategies employed. In addition, a brief explanation of regulation on hedge funds in South Africa was presented. In Section 3.8, standardised risk measures and risk-adjusted performance measures were introduced. It explained the origins, and how these risk measures are applied and interpreted. Section 3.11 concluded with a brief overview of the common world market indices, which are applied with a buy-and-hold strategy approach. The EU hedge funds, US hedge funds and associated international market indices as investment options are used in the estimation of risk-adjusted performance measures that require a benchmark return.

With the overview in place, Chapter 4 provides the methodology involved by reviewing historical studies on the concept of standardised risk and risk-adjusted performance measures. This highlights the decision-making process in investment management. Historical studies of volatility and its applicability as portfolio performance measures are also examined. Chapter 4 emphasises the study topic and provides the necessary platform for formulating the methodology used in this study.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

The primary objective of this study is to determine which of the US or EU hedge funds have performed better during the 2007–2009 financial crisis, and if these hedge funds have outperformed associated international market indices. This assessment is based on a risk-adjusted performance evaluation by applying several ratios, which include the Sharpe ratio¹², Sortino ratio¹³, Treynor ratio¹⁴, Jensen's alpha¹⁵, Calmar ratio¹⁶, Omega ratio¹⁷ and the EWMA model¹⁸. These risk-adjusted performance measures capture different forms of risk to provide an investor with a unique risk-return perspective on different investment opportunities. The aim of this chapter is to provide a brief overview of the several risk-adjusted performance measures and the data that were used in the empirical study.

4.2 Performance measures and methodology

Efficient asset allocation is important for improving portfolio performance to obtain the risk-return profile favoured by an investor (Das *et al.*, 2013:247). The basic portfolio model developed by Markowitz (1952)¹⁹ uses the mean-variance formulation (the variance of the rate of the return as a measure of portfolio risk) to enhance efficient asset allocation. Based on the mean-variance formulation, different assets are combined which minimise the variance for a given level of return (Brown & Reilly, 2009:182). However, one of the greatest drawbacks of this approach is that it ignores the effect of higher moments, *inter alia* skewness and kurtosis (Hentati *et al.*, 2010:2; see also Section 3.5.3 and Section 3.5.4). In the case of evaluating hedge funds, which is focus point of this study, this type of investment has undesirable higher moment properties (Cremers *et al.*, 2005). For example, hedge fund returns can be negatively skewed and have high kurtosis (Ackermann *et al.*,

¹² See Section 3.9.1.

¹³ See Section 3.9.2.

¹⁴ See Section 3.9.3.

¹⁵ See Section 3.9.4.

¹⁶ See Section 3.9.5.

¹⁷ See Section 3.9.6.

¹⁸ See Section 3.10.1.

¹⁹ See Section 2.8.1.

1999; Agarwal & Naik, 2004). These arguments was also emphasised by Agarwal and Naik (2004) and Terhaar *et al.* (2003) who found that the mean-variance approach is no more valid when investors include hedge funds in their portfolios. A further argument by Harlow (1991) suggests that variance does not provide a consistent perception of actual risk.

To overcome these shortcomings researchers introduced additional risk-adjusted performance measures that capture different forms of risk, each providing the investor with unique risk-return perspective. These performance measures include the Sharpe ratio, Sortino ratio, Treynor ratio, Jensen's alpha, Calmar ratio and the Omega ratio, which are also applied in the empirical study. Evidence from the study of Pedersen and Rudholm-Alfvén (2003), Pfingsten *et al.* (2004), and Eling and Schuhmacher (2007), have also established the presence of a high correlation between performance measures' rankings, which further emphasise the use of these performance measures to evaluate US and EU hedge- and associated international market indices.

The empirical study commenced by applying three performance ratios, which will include the Sharpe ratio, Treynor ratio and Jensen's alpha that can be formulated as follows, respectively (Bodie *et al.*, 1999:758; Marx *et al.*, 2013:295):

$$\text{Sharpe ratio} = \frac{(r_p - r_b)}{\sigma_p} \quad (3.3)$$

$$\text{Treynor ratio} = \frac{(r_p - r_b)}{\beta_p} \quad (3.5)$$

$$\text{Jensen's alpha } (\alpha) = r_p - [r_b + \beta_p(r_m - r_b)] \quad (3.7)$$

The Sharpe ratio measures the relationship between the risk premium and the dispersion of the mean return, namely the standard deviation (σ_p) (Eling & Schuhmacher, 2007:2633; Sharpe, 1966). The Treynor ratio, conversely, provides a wider evaluation of risk compared to the Sharpe ratio (Treynor, 1965). The Treynor ratio considers the systematic risk component of an investment, namely β_p ²⁰ (Kanellakos, 2005:48). The third performance measure, namely Jensen's alpha, measures the difference between a fund's actual return and its expected return for a

²⁰ See Section 2.8.2.2.

given level of risk. The α coefficient, therefore, represents how much of the managed portfolio's return is attributable to the manager's ability to derive above-average returns adjusted for risk.

However, the Sharpe ratio has several weaknesses that must be addressed, which is why several additional performance measures will also be applied in the empirical study. Firstly, the σ_p is only an adequate risk measure if the returns are normally distributed (Eling & Schuhmacher, 2007:2633), and as hedge funds frequently generate returns that have non-normal distribution, these funds will not be adequately evaluated with the use of the classic Sharpe ratio (Brooks & Kat, 2002; Mahdavi, 2004; Sharma, 2004). This implies that the Sharpe ratio can easily be manipulated (Sharma, 2004:107; Amenc *et al.*, 2004:2). Second, it does not take the higher moments of the return distribution of hedge funds into account (Kat, 2003). Third, the Sharpe ratio does not differentiate between upside risk and downside risk and thus penalises positive returns (De Wet *et al.*, 2008; Harding, 2004). Finally, the Sharpe ratio does not take a benchmark of funds into consideration to measure excess returns, thus making the performance evaluation of some investment portfolios, especially hedge funds, difficult (Amenc *et al.*, 2004:2). These weaknesses, therefore, imply that traditional performance measures, like the Sharpe ratio, will underestimate risk and overestimate performance (Kat, 2003).²¹ Therefore, additional performance measures have been implemented, which will overcome some of these weaknesses. These measures will be more suitable to capture all the risk-return features in a return distribution of an investment fund (Keating & Shadwick, 2002), and able to incorporate the risk of loss more extensively (Pedersen & Rudholm-Alfvén, 2003). These risk-adjusted performance measures include the Sortino ratio, Calmar ratio and the Omega ratio.

The Sortino ratio relies on the downside deviation (semi-deviation) rather than σ_p as the measure of risk (also called lower partial moments). This performance measure, therefore, concentrates on the volatility of the negative portfolio returns, which is considered a more superior risk measure than σ_p in the Sharpe ratio (Sortino & Van

²¹ See also Lo (2001); Brooks and Kat (2002); Agarwal and Naik (2004); Kannellakos (2005); Eling and Schuhmacher (2007) and Bergh and Van Rensburg (2008) for related studies.

Der Meer, 1991; Bergh & Van Rensburg, 2008:104). The Sortino ratio can be formulated as follows (Bodie *et al.*, 1999:758):

$$\text{Sortino ratio} = \frac{(r_p - r_b)}{\sigma_d} \quad (3.4)$$

The fifth performance measure, which also emphasises the importance of the risk of loss, is the Calmar ratio. This ratio is based on the maximum drawdown of an investment, instead of the σ_p , to reflect the investor's level of risk (Young, 1991). The maximum drawdown of an investment fund is the loss incurred over a certain investment period (Lhabitant, 2004). The Calmar ratio can be formulated as follows (Eling & Schuhmacher, 2007:2636):

$$\text{Calmar ratio} = \frac{r_i^d - r_f}{-MD_{i1}} \quad (3.8)$$

However, since the Sortino ratio and Calmar ratio measure performance on the basis of the lower partial moments (downside risk) and the maximum drawdown, respectively, these performance measures can underestimate the risk inherent in hedge fund returns. For this reason the Omega ratio, introduced by Keating and Shadwick (2002), which treats downside risk and upside risk differently will be consulted additionally. It will also overcome the criticism of mean-variance portfolio optimisation of Markowitz (1952) (Gilli *et al.*, 2011:95). The Omega ratio incorporates the entire statistical properties of the return distribution, *inter alia* the mean, variance, skewness and kurtosis (Kazemi *et al.*, 2003; Togher & Barsbay, 2007). This implies that the Omega ratio considers the possibility for non-normal return distributions, which will make this ratio a superior benchmark to confirm greater performance accuracy and to determine if normality has influenced the performance rankings of more traditional measures (Keating & Shadwick, 2002). In addition, the Omega ratio does not require any assumption about moments or on the utility function of an investor (De Wet *et al.*, 2008; Géhin, 2004). Furthermore, it is represented by the ratio of the gain with respect to the threshold, and the loss with respect to the same threshold (Géhin, 2004).

Although the Omega ratio is considered as the most appropriate performance measure to use for evaluating different portfolio investments, it is still backward-

looking (Togher & Barsbay, 2007). In addition, there can be discrimination between the performance level of different investment funds because each investor sets different threshold levels as preferred (Kanellakos, 2005:88). Nonetheless, the Omega ratio is still appropriate for this study, where the same threshold will be used to evaluate all the hedge funds. The Omega ratio can be formulated as follows (Keating & Shadwick (2002:3):

$$\Omega(L) = \frac{\int_L^b [1-F(x)]dx}{\int_a^L F(x)dx} \quad (3.9)$$

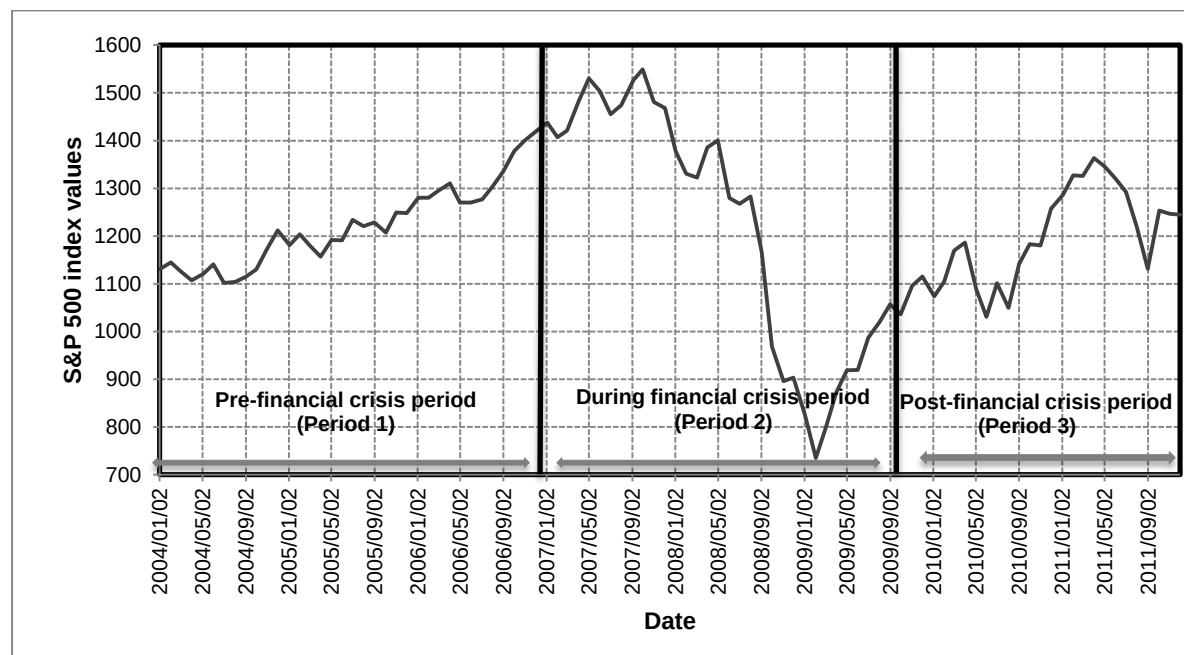
In addition, to improve portfolio performance this study will incorporate volatility as an additional risk-adjusted performance measure, by means of the EWMA model. This measure is essential for portfolio management when a risk-return comparison has to be made between different investment funds, given an investor's objective and risk tolerance (Ladokhin, 2009:4). The EWMA model can be formulated as follows (J.P. Morgan/Reuters, 1996:78):

$$\sigma = \sqrt{(1 - \lambda) \sum_{t=1}^T \lambda^{t-1} (r_t - \bar{r})^2} \quad (3.10)$$

4.3 The data

The time series used in this study were structured to incorporate two aspects that can affect hedge fund performance. Firstly, the data series were divided into three periods, where two of these periods included a bullish phase, and the remaining period included a bearish phase. The motivation for this analysis comes from two different studies. Although evidence revealed that hedge funds are highly correlated with equity markets during a bearish phase (Edwards & Caglayan, 2001), the study of Nicholas (2004) found evidence that hedge funds will outperform other equity markets. This finding is emphasised by Ennis and Sebastian (2003) who found evidence that hedge funds will perform better during a bearish phase. Second, the empirical study evaluates hedge fund performance in different financial environmental periods. These three periods include a pre-financial crisis period, a period during the financial crisis period, and a post-financial crisis period respectively, as illustrated by Figure 4.1.

Figure 4.1: Sample period under investigation – illustrated by the S&P 500 index



Source: Data obtained from Yahoo Finance (2013).

The pre-financial crisis period (period 1) spanned from January 2004 to December 2006, and was regarded as a period with normal market conditions (Blundell-Wignall *et al.*, 2008). The period during the crisis (period 2), spanned from January 2007 to December 2009. The period during the financial crisis was constructed carefully to incorporate key events of the 2007 to 2009 financial crisis to ensure that the effect of the crisis can be evaluated effectively. For example, this period began when the Federal Home Loan Mortgage Corporation (Freddie Mac) announced that no more risky subprime mortgages and mortgages-related securities will be bought (27 February, 2007). This period also includes events such as when then British government nationalised the Northern Rock Bank due to the subprime-mortgage crisis (Bruni & Llewellyn, 2009:8). All these events had a significant effect on the global financial market, which will make it ideal to analyse the superiority of hedge funds' investment flexibility. Finally, the post-financial crisis period (period 3) spanned from January 2010 to December 2011, which will confirm whether hedge funds were able to time the market correctly by closing the short positions, after the downswing (bearish phase) of the financial markets.

It was possible to evaluate only 38 EU hedge funds and 84 US hedge funds for this study due to the unavailability of data. The performance evaluation of return on these selected hedge funds will be estimated with the use of monthly returns that were obtained from the Eurekahedge (2012) database. To determine if the US and EU hedge funds outperformed associated equity markets, monthly return data were also obtained from Yahoo Finance (2013). The selected associated financial markets include CAC 40, DAX, S&P 500, and the Dow Jones. In addition, the 90-day US treasury bill rate (constant maturity) and the Euro area bond yield were chosen as the US and EU risk-free rates, respectively. The 90-day US treasury bill rate series was obtained from the Board of the Federal Reserve System's (2012) website and the Euro area bond yield series was obtained from the International Monetary Fund (IMF) (2012) database.

4.4 Summary

Markowitz (1952) stated that the traditional approach in achieving the most efficient portfolio is based on the mean-variance formulation. However, variance does not have the ability to reflect that actual risk and it ignores higher moments, which can lead to biased performance estimates. To overcome these problems, several additional risk-adjusted performance measures were chosen to apply in the empirical study, which will provide different forms of risk to provide an investor with a unique risk-return perspective. These risk-adjusted performance measures include the Sharpe ratio, Treynor ratio, Jensen's alpha, Sortino ratio, Calmar ratio, Omega ratio and an exponential-weighted moving average (EWMA) model. This leads to Chapter 5, which will report the results of these performance measures.

CHAPTER 5

RESULTS AND FINDINGS

5.1 Introduction

The 2007–2009 financial crisis led to a decrease in consumer and investor confidence worldwide (SARB, 2008). The outcome of this event was followed by liquidity problems, where financial institutions declined lending activities (Rose & Hudgins, 2010). As a result, investors have become more risk-averse (Zhang *et al.*, 2010; Guiso *et al.*, 2013) and with the consequences of the financial crisis, made insurable profitable investment decisions extremely difficult as market volatility tends to increase during crises periods (Schwert, 1989; Karunanayake *et al.*, 2010). With the financial environment in distress, some fund managers consider equities as the ideal asset class to protect the purchasing power of their clients (Ivan, 2013). However, the studies of Ennis and Sebastian (2003), and Nicholas (2004), found evidence that hedge funds will outperform equity markets during a downturn in financial markets. This led to the objective of this study, to evaluate the risk-adjusted performance of US and EU hedge funds compared to the associated world equity markets over the 2007–2009 financial crisis.

In Chapter 5, both US and EU hedge funds were evaluated over three different periods to establish performance dominance during different market trends. The performance of these hedge funds are evaluated by employing the Sharpe ratio, Sortino ratio, Treynor ratio, Jensen's alpha, Calmar ratio and the Omega ratio. In addition, the EWMA model enabled volatility to serve as an additional performance measure. Chapter 5 evaluates these hedge funds against the associated international market indices, namely DAX, CAC 40, S&P 500, and the Dow Jones, over three different periods. The aim of Chapter 5 is to evaluate these hedge funds against the associated international market indices to establish whether hedge funds outperformed associated equity markets, and whether a normal buy-hold-strategy on these equity markets would have been a better option than to invest in a US or EU hedge fund. These hedge funds' performances are evaluated over the pre-financial crisis, the period during the financial crisis, and the post-financial crisis period, respectively. This establishes if the 2007–2009 financial crisis period, which

originated in the US, and the current (2012) debt crisis in the EU, have influenced performance dominance.

Given that this study evaluated and ranked both US and EU hedge funds and associated international market indices based on standardised risk and risk-adjusted performance measures, a quantitative research approach, which is in accordance of the positivism paradigm, was adopted. These risk measures provide valuable information when investors have to make an investment decision. Furthermore, previous studies were evaluated to emphasise the results found in this study.

5.2 Results

The first step of the empirical results is to evaluate the descriptive statistics for both selected hedge fund and associated equity markets return series. The study of Amin and Kat (2003) stated that some return distributions tend to be non-linear and normally distributed, which will limit the performance ranking abilities of traditional performance ratios, like the Sharpe-, Jensen's Alpha- and Treynor ratio (Eling & Schuhmacher, 2007), especially if the deviation from normality becomes more apparent when the higher moments (skewness and kurtosis) of the return distribution are considered (Kat, 2003). The empirical study of Amenc *et al.* (2004) argues that hedge funds do not conform to the presumption of normality of distribution of its returns. Hedge fund managers must take these two higher moments of distributions into account when an asset portfolio allocation has to be chosen, to reflect the investor's needs and preferences in the correct manner (Brockett & Garven, 1998; Harvey *et al.*, 2003). In addition, the presence of non-normal distributions of returns is possible when an investor has invested in different portfolio allocations and wants to compare the traditional mean-variance basis to more advanced performance measures (Cvitanić *et al.*, 2003; McFall Lamm, 2003; Staub & Singer, 2003). This includes performance measures developed by Sortino (Sortino & Price, 1994), Omega (Keating & Shadwick, 2002), and Calmar (Young, 1991).

From the results reported in Table 5.1, it is likely that the returns will display a non-normal distribution as well as the possibility of differences with the performance rankings. In Table 5.1 the findings indicate that both the US and EU hedge funds are leptokurtic (fat-tailed) due to a kurtosis greater than three, with the exception of the EU hedge funds being platykurtic during the post-financial crisis period. These

results justify the empirical findings of Fung and Hsieh (1999), who stated that hedge fund returns are known to be leptokurtic and negatively skewed. These empirical findings are emphasised by Dittmar (2002), and Harvey and Siddique (2001), who also argued that the return distributions of hedge funds are likely to be leptokurtic and left skewed. Furthermore, the world indices reveal inconsistency during all three periods, except the CAC 40 that displayed a platykurtic distribution throughout all three periods. In addition, all returns for both hedge funds and world indices display a left-skewed distribution (negative skewness), which indicates the possibility of downside shock (see for example McFall Lamm, 2003). There was, however, only one exception, where US hedge funds had a right skewed distribution (positive skewness) during the post-financial crisis period.

From these findings in Table 5.1, it can be argued that most of the returns series have a non-normal distribution. However, based on the average Jarque-Bera²² estimates, all the hedge funds returns are normally distributed. This is however, a misperception created by looking at the averages only. In reality, the returns of several US and EU hedge funds reveal a non-normal distribution when considering at the hedge funds individually. During the pre-financial crisis period, six EU hedge funds and 22 US hedge funds are not normally distributed. In addition, 10 EU hedge funds and 30 US hedge funds are not distributed normally during the crisis period. During the post-financial crisis period, this number decreased to only one EU hedge fund and 13 US hedge funds not being normally distributed.

²² The Jarque-Bera test measures the departure from normality in return distributions based on skewness and kurtosis (Gujarati & Porter, 2010).

Table 5.1: The descriptive statistics of the monthly returns of hedge funds and world indices

Descriptive statistics of hedge funds								
Averages	EU Hedge funds							
	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Pre-financial crisis period	0.011	0.013	0.060	-0.046	0.072	-0.315	3.334	3.498**
During financial crisis period	0.002	0.004	0.091	-0.087	0.132	-0.089	4.174	13.401**
Post-financial crisis period	-0.001	-0.002	0.057	-0.069	0.078	-0.152	2.849	1.240**
Averages	US Hedge funds							
	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Pre-financial crisis period	0.008	0.009	0.067	-0.055	0.075	-0.200	3.423	4.580**
During financial crisis period	0.004	0.008	0.111	-0.130	0.190	-0.469	4.160	11.000**
Post-financial crisis period	0.003	0.003	0.101	-0.080	0.092	0.037	3.441	9.007**
Descriptive statistics of world indices								
	CAC 40							
	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Pre-financial crisis period	0.013	0.017	0.053	-0.050	0.073	-0.590	2.859	2.117**
During financial crisis period	-0.008	-0.009	0.126	-0.135	0.175	-0.270	2.768	0.518**
Post-financial crisis period	-0.008	-0.013	0.087	-0.113	0.117	-0.015	1.992	1.018**
	DAX							
	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Pre-financial crisis period	0.015	0.023	0.066	-0.053	0.101	-0.443	2.315	1.880**
During financial crisis period	0.000	0.018	0.168	-0.151	0.199	-0.284	3.156	0.520**
Post-financial crisis period	0.001	-0.001	0.116	-0.192	0.155	-0.899	5.577	9.875*
	S&P 500							
	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Pre-financial crisis period	0.007	0.011	0.037	-0.036	0.033	-0.443	2.296	1.921**
During financial crisis period	-0.008	0.009	0.086	-0.204	0.196	-1.077	4.307	9.519*
Post-financial crisis period	0.003	-0.001	0.097	-0.089	0.083	-0.041	2.262	0.551**
	Dow Jones							
	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Pre-financial crisis period	0.005	0.006	0.038	-0.031	0.049	-0.091	1.853	2.024**
During financial crisis period	-0.006	0.001	0.079	-0.164	0.180	-0.932	3.711	5.972*
Post-financial crisis period	0.005	0.008	0.087	-0.086	0.069	-0.094	2.324	0.493**

*Note: The complete results are available in Table A - F in the appendix.

**Implies that the null-hypothesis of a normal distribution is not rejected at a 5% confidence level.

*Implies that the null-hypothesis of a normal distribution is rejected at a 5% confidence level.

**Note: All return series are also stationary at $I(0)$ with both Augmented Dickey-Fuller functions including only a intercept and a trend and intercept, respectively.

+++Note: Std. Dev. denotes standard deviation.

++++Note: The descriptive statistics were generated with the use of the Eviews 7 program (QMS, 2009)

Source: Compiled by author.

In addition, Table 5.1 reported that the DAX has a non-normal distribution during the post-financial crisis period and the S&P 500 and Dow Jones have a non-normal distribution during the crisis period, whereas the CAC 40 has a normal distribution throughout all three periods. With the presence of non-normality, a high kurtosis and negative skewness will cause risk measures, such as the variance and standard deviation to provide a misperception of actual risk. This will cause traditional performance measures, like the Sharpe ratio, to generate inaccurate performance ranking, which should be avoided (Bernardo and Ledoit, (2000); McFall Lamm, 2003). Similarly, with the inconsistencies between normal and non-normal return distributions, these performance measures will provide different rankings, which are inconsistent with the findings of Géhin (2004); Pfingsten *et al.*, (2004); Eling and Schuhmacher (2007), who found a strong correlation between the performance measure rankings.

Therefore, this study makes use of the Omega ratio as the main benchmark to determine whether the presence of a non-normal return distribution has influenced the rankings of each performance measure. This approach is based on the fact that the Omega ratio treats upside and downside risk differently, thus, it overcomes the criticism of the mean-variance portfolio optimisation of Markowitz (Gilli *et al.*, 2011:95). Furthermore, the Omega ratio also incorporates the entire statistical properties of the return distribution, *inter alia* variance, mean, skewness and kurtosis (Togher & Barsbay, 2007); it does not require any assumptions about any moments or on the utility function of an investor (Géhin, 2004; De Wet *et al.*, 2008). However, this study will also use traditional performance ratios to incorporate different risk measure perspectives, but will also be benchmarked with the results from the Omega ratio (Géhin, 2004; De Wet *et al.*, 2008).

The second step of the empirical study is to determine the level of correlation between the returns of hedge funds as reflected in Table 5.2, where the presence of correlation can cause the Sharpe ratio to generate biased performance rankings. This is based on the study of Sharpe (1994), who argued that the Sharpe ratio assumes that individual securities are uncorrelated with the mean portfolio return. The results from Tables G to O in the appendix confirm the presence of a correlation between US and EU hedge fund returns. Overall, there is a positive average correlation present between most hedge fund returns, with only a few displaying a

negative average correlation throughout the three periods. There is also a small increase in average correlation present among the returns of the hedge funds, although most hedge funds display a decrease in average correlation during the post-financial crisis period, to almost the same level as the pre-financial crisis period. Therefore, these findings from Tables G to O in the appendix stress the further possibility for the Sharpe ratio to generate biased performance rankings due to the presence of correlation between US and EU hedge fund returns. This implies that these rankings must be interpreted with extreme caution and must be benchmarked with the Omega ratio to ensure a more unbiased ranking.

Table 5.2: The average correlation between hedge fund returns and equity market returns

Average correlation	Pre-crisis period		During crisis period		Post-crisis period	
	EU Hedge funds	US Hedge funds	EU Hedge funds	US Hedge funds	EU Hedge funds	US Hedge funds
S&P 500	0.408	0.498	0.493	0.572	0.509	0.689
Dow Jones	0.340	0.407	0.444	0.510	0.488	0.667
CAC 40	0.577	0.389	0.554	0.571	0.481	0.608
DAX	0.533	0.428	0.524	0.576	0.461	0.562

Note: The complete results are available in Tables G – O in the appendix.

Source: Compiled by author.

From the results reported in Table 5.2, it is also evident that the returns of most EU hedge funds displayed a relatively constant average correlation with the returns of different world equity markets, with an increase in this correlation over the three time periods. This illustrates a higher dependence on equities, especially with the S&P 500 and Dow Jones. Furthermore, it was to be expected that the average correlation of returns should increase during the financial crisis period and stabilise afterwards, but the results displayed a continuation in this trend.

The returns of US and EU hedge funds also display a higher level of average correlation between the returns of the S&P 500 and Dow Jones during the post-financial crisis period, compared to the returns of CAC 40 and DAX. This may be due to a lower level of anticipated risk (volatility) in these markets. These results do, therefore, not conclusively prove that the US and EU hedge funds are more correlated with equity markets during a bullish or a bearish phase, which contradicts the findings of Edwards and Caglayan (2001). This implies that hedge funds may still

have the ability to outperform equity markets during both a bullish and/or bearish phase, which will be established by the results found with the estimation of the different performance measures later on.

Table 5.3: The level of volatility between the hedge fund returns and equity market returns

Percentage of hedge funds under the top 10 ranking for highest volatility			
	Pre-crisis period	During crisis period	Post-crisis period
EU Hedge funds	20%	0%	0%
US Hedge funds	80%	100%	100%
Ranking of indices: A higher ranking is associated with a higher level of volatility (risk)			
	Pre-crisis period	During crisis period	Post-crisis period
CAC 40	53	25	22
DAX	35	18	11
S&P 500	92	29	41
Dow Jones	97	34	55

⁺The complete results are available in Table P in the appendix.

⁺⁺Note that the upper part of this table provides a summary of how many of the 84 US hedge funds, the 38 EU hedge funds, and 4 world indices (a total of 126) ranked under the top 10. The bottom part of this table illustrates the rankings of the different equity indices from a total of 126, respectively.

Source: Compiled by author.

The third step of the empirical study is to determine the level of volatility over the three different periods. This will be determined by estimating an exponential weighted moving average (EWMA) model. In Table 5.3, it is evident that US hedge funds display the highest level of volatility in returns throughout all three periods, based on top 10 rankings. This means that some US hedge funds consist of a higher level of risk compared with EU hedge funds, not only during the financial crisis period but also before and after the crisis period. These results confirm the findings of Ackermann *et al.* (1999) where hedge funds were associated with higher volatility levels compared to market indices. In addition, the results show that the level of volatility also increased in the equity markets, and continued to increase in the CAC 40 and DAX, even during the post-financial crisis. However, the level of volatility decreased in the S&P 500 and Dow Jones. This highlights the results reported in Table 5.2, where the US and EU hedge funds were more correlated with the S&P 500 and Dow Jones during the post-financial crisis period. Hence, these results justify the fact that the S&P 500 and Dow Jones may have been associated as

markets with a lower degree of anticipated risk (volatility) and making them more desirable during times when markets will display extreme noise.

Table 5.4: Performance evaluation

Sharpe ratio							
EU risk-free rate				US risk-free rate			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU Hedge funds	50%	60%	30%	EU Hedge funds	40%	60%	30%
US Hedge funds	50%	40%	70%	US Hedge funds	60%	40%	70%
Ranking of indices where one is the most superior				Ranking of indices where one is the most superior			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
CAC 40	39	116	96	CAC 40	38	119	103
DAX	38	82	63	DAX	39	90	75
S&P 500	72	118	49	S&P 500	74	122	61
Dow Jones	110	115	38	Dow Jones	107	117	44
Sortino ratio							
EU risk-free rate as target rate				US risk-free rate as target rate			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU Hedge funds	40%	40%	30%	EU Hedge funds	40%	40%	30%
US Hedge funds	60%	60%	70%	US Hedge funds	60%	60%	70%
Ranking of indices where one is the most superior				Ranking of indices where one is the most superior			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
CAC 40	44	117	96	CAC 40	57	124	109
DAX	39	82	60	DAX	58	97	75
S&P 500	77	112	48	S&P 500	76	118	60
Dow Jones	108	109	38	Dow Jones	111	125	48
Omega ratio							
EU risk-free rate as the threshold				US risk-free rate as the threshold			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	30%	60%	30%	EU hedge funds	30%	60%	30%
US hedge funds	70%	40%	70%	US hedge funds	70%	40%	70%
Ranking of indices where one is the most superior				Ranking of indices where one is the most superior			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
CAC 40	46	120	99	CAC 40	48	118	99
DAX	54	91	73	DAX	54	93	74

S&P 500	78	122	61	S&P 500	78	122	61
Dow Jones	107	119	44	Dow Jones	105	119	44
Calmar ratio							
Percentage of hedge funds under the top 10							
	Pre-crisis period	During crisis period	Post-crisis period				
EU hedge funds	40%	50%	30%				
US hedge funds	60%	50%	70%				
Ranking of indices where one is the most superior							
	Pre-crisis period	During crisis period	Post-crisis period				
CAC 40	45	120	103				
DAX	21	93	75				
S&P 500	67	118	61				
Dow Jones	91	115	43				

⁺Note: The complete results are available in Table Q - X in the appendix.

⁺⁺Note that the upper part of the table of each performance measure provides a summary of how many of the 84 US hedge funds, the 38 EU hedge funds, and 4 world indices (a total of 126) ranked under the top 10. The bottom part of each performance measure illustrates the rankings of the different equity indices from a total of 126, respectively.

Source: Compiled by author.

The fourth step of this empirical study is to determine whether US or EU hedge funds were the more dominant funds over the three periods in terms of risk-adjusted performance. This will be evaluated with the Sharpe, Sortino, Treynor, Jensen's Alpha, Calmar and Omega ratios, respectively. To provide a more composite report, Table 5.4 and Table 5.6 reveal the percentage of the US and EU hedge funds that were ranked under the top 10 (the best 10 performing hedge funds and equity markets). By doing it in this manner, a more comprehensive conclusion can be drawn regarding which hedge funds exhibited the highest risk-adjusted performance over the three periods. From the results reported in Table 5.4, it is evident, based on the Sharpe, Sortino Calmar and Omega ratios, that more US hedge funds were ranked under the top 10 during the pre-financial crisis period. One exception with the Sharpe ratio, where the EU risk-free rate was used, emphasises the performance of the EU hedge funds. The dominance of the US hedge funds may be explained by the fact that US hedge funds were more volatile compared to EU hedge funds, based on the results from Table 5.2 and Table 5.3. The results reported in Table 5.5 also confirm these results, where it is evident that US hedge funds were able to generate a higher level of average cumulative returns during the crisis period and during the post-financial crisis period compared to EU hedge funds. The EU hedge funds display a higher level of average cumulative returns during the pre-financial

crisis period (see Table 5.5). These results are consistent with the results found by the Sharpe ratio in Table 5.4.

Table 5.5: The average annualised cumulative returns of US and EU hedge funds

	Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	14.313%	1.846%	-1.428%
US hedge funds	10.144%	3.524%	3.003%

Source: Compiled by author.

However, the results are inconclusive during the crisis period, where the Sharpe- and Omega ratio reported that EU hedge funds outperformed the US hedge funds. The Sortino ratio, on the other hand, also indicated the dominance of the US hedge funds during the financial crisis period. Although the Omega and Sortino ratio differ in terms of the top ranked hedge funds, these performance measures still rank hedge funds higher than the equity market indices. These results contradict the findings of Duong (2008), who found that hedge funds tend to underperform equity markets when accounting for downside risk with the use of the Sortino- and Omega ratios. Also, based on the Calmar ratio's rankings, the US and EU hedge funds display similar performance during the crisis period.

The results for the post-financial crisis period are slightly different in that all the performance ratios reported that US hedge funds were more dominant during the post-financial crisis period. The weaker performance of the EU hedge funds can be explained partly by the fear of the sovereign debt crisis that started to develop in late 2009. The fear was encouraged by a number of downgrades of government debt and rising government and private debt levels in some European states. Consequently, this downgrading of government debt contributed to a decrease in investors' confidence in EU investments (European Investment Bank, 2013; Baum *et al.*, 2014:1).

It is also evident from the rankings reported in Table 5.4 that several US and EU hedge funds were able to outperform the equity markets during all three periods. This is confirmed by all the performance measures. Not all the performance measures placed the same funds in the same rankings. These inconsistencies can be attributed largely to the presence of non-normality in the return distributions. This

is why the traditional performance measures, like the Sharpe ratio, should be benchmarked with the Omega ratio to overcome the individual weaknesses. These results largely contradict the results found by Ackermann *et al.* (1999). However, these results justify the results of Edwards and Caglayan (2001) who argue that hedge funds tend to outperform equity markets in terms of traditional performance ratios, like the Sharpe ratio.

In order to check the robustness of the results, in terms of the presence of outperformance, the Sortino ratio was estimated with the CAC 40 and DAX as target rates, respectively. This approach was also followed by the estimation of the Treynor ratio and Jensen's alpha, where all four equity markets were used as the market portfolio, respectively. Based on the results reported in Table 5.6 it is evident that several US and EU hedge funds were able to outperform the equity markets during all three periods. The Sortino ratio results indicate that the EU hedge funds were able to outperform the CAC 40 and DAX better than US hedge funds during the pre-financial crisis period, but display similar performance in outperforming the DAX during the crisis period. These results were emphasised by Jensen's alpha, which reported that EU hedge funds outperformed the CAC 40 more often than the US hedge funds during the pre-financial crisis period, and outperformed the DAX more often than the US hedge funds during the pre-financial crisis period and during the crisis period. However, Jensen's alpha also reported similar performance for both US and EU hedge funds, where they display similar performance in outperforming the S&P 500 during the crisis period and during the post-financial crisis period. The results also display that EU hedge funds were able to outperform the Dow Jones more often, compared to the performance of US hedge funds during the crisis period and during the post-financial crisis period.

Table 5.6: Outperformance evaluation

Sortino ratio							
CAC 40 as the target rate				DAX as the target rate			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	60%	40%	20%	EU hedge funds	60%	50%	30%
US hedge funds	40%	60%	80%	US hedge funds	40%	50%	70%
Treynor ratio							
CAC 40 as the market portfolio				DAX as the market portfolio			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	10%	10%	30%	EU hedge funds	20%	20%	30%
US hedge funds	90%	90%	70%	US hedge funds	80%	80%	70%
S&P 500 as the market portfolio				Dow Jones as the market portfolio			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	40%	20%	20%	EU hedge funds	40%	30%	20%
US hedge funds	60%	80%	80%	US hedge funds	60%	70%	80%
Jensen's alpha							
CAC 40 as the market portfolio				DAX as the market portfolio			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	80%	40%	30%	EU hedge funds	80%	60%	40%
US hedge funds	20%	60%	70%	US hedge funds	20%	40%	60%
S&P 500 as the market portfolio				Dow Jones as the market portfolio			
Percentage of hedge funds under the top 10				Percentage of hedge funds under the top 10			
	Pre-crisis period	During crisis period	Post-crisis period		Pre-crisis period	During crisis period	Post-crisis period
EU hedge funds	10%	50%	50%	EU hedge funds	10%	60%	60%
US hedge funds	90%	50%	50%	US hedge funds	90%	40%	40%

⁺⁺ Note: The complete results are available in Table Y - GG in the appendix.

⁺ Note that the upper part of the table of each performance measure provides a summary of how many of the 84 US hedge funds, the 38 EU hedge funds, and 4 world indices (a total of 126) ranked under the top 10.

Source: Compiled by author.

From the remaining results reported in Table 5.6 by the Sortino ratio and by Jensen's alpha, the US hedge funds were also able to outperform the CAC 40 and the DAX more often than EU hedge funds. This is also emphasised by the results reported by

the Treynor ratio, where the US hedge funds display greater performance than EU hedge funds in outperforming all the equity markets during all three periods. From these results, it is conclusive that although US hedge funds consisted of a higher level of volatility (risk) throughout the three periods, these hedge funds more often illustrated greater overall performance than EU hedge funds and world equity markets. The results from Table 5.6 also showed that hedge funds were able to outperform the associated equity markets during both a bullish and bearish phase. Therefore, hedge funds were the best option to invest in during the three different financial environments.

5.3 Summary

The objective of this study has been to evaluate the risk-adjusted performance of US and EU hedge funds against to the associated world equity markets indices (*inter alia* S&P 500, Dow Jones, DAX and CAC 40) in different financial environmental periods. These periods included a pre-financial crisis period, a period during the financial crisis period and a post-financial crisis period. The performance of these hedge funds and associated world equity market indices were evaluated by the employment of the Sharpe ratio, Treynor ratio, Jensen's alpha, Calmar ratio and Omega ratio. In addition, the EWMA model enabled volatility to serve as an additional performance measure. The risk-adjusted performance measures used in the empirical results captured different forms of risk and provided the investor with distinctive risk-return perspectives.

In this chapter, the empirical results illustrated that US hedge funds comprised a higher volatility (risk) throughout the three time periods. US hedge funds more often illustrated greater overall performance than EU hedge funds and world equity markets. It may be concluded that hedge funds outperformed the world equity market during different financial periods. The concluding remarks and recommendations are discussed in Chapter 6.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The 2007–2009 financial crisis caused a dramatic increase in volatility in world markets. This was followed by declined business activities and consumer demand, tightened funding conditions in financial markets and increased inflationary pressures. All these events contributed to a worldwide economic recession, which increased uncertainty and risk within future investments, especially in US and EU investments.

The question that was posed for this study is as follows: From a South African investor's point of view, which of the selected hedge funds in the US or EU market are more appropriate for the risk-averse appetite of the current investor, based on risk-adjusted performance measures during the 2007–2009 financial crisis? Another question is if associated international market indices (these indices include the CAC 40 and DAX in the EU market, as well as the S&P 500 and Dow Jones in the US market) with a buy-and-hold strategy approach outperformed these selected hedge funds over the period of investigation? To answer these questions, the primary objective of this study was to evaluate and rank the returns of the top US and EU hedge funds, compared to the associated international market indices, based on the risk-adjusted performance measures during the 2007–2009 financial crisis.

This chapter briefly summarises how this research objective was achieved by providing a broad review of the literature and the results from the empirical study (Section 6.2 and Section 6.4). The literature review focused on general investment theory as well as an overview of hedge funds and associated international market indices. In addition, the literature review focused on standardised risk and risk-adjusted performance measures applied in the empirical study. The empirical review focused in the evaluation of performance levels of US and EU hedge funds, as well as on associated international market indices, based on risk-adjusted performance measures. This chapter concludes with recommendations for future studies (Section 6.5).

6.2 Literature overview of this study²³

With high levels of volatility present in the world markets, caused by the 2008 financial crisis, investors have become more risk averse due to the higher risk involved. The concept of risk versus reward was highlighted as an important principle of investment where investors responded by adapting more risk-averse investments. This study began with the background on general investment theory. These fundamental principles included factors such as risk versus return, the SML, the Markowitz efficient frontier, and the CAPM. These factors described how investors specify and measure risk against the expected return. It also explained the risk-return behaviour of investors and how investment decisions are made. This is essential because a wide variety of investment alternatives is available to investors. Against the background of these investment principles, an overview of hedge funds and associated international market indices as investment options were discussed.

Hedge funds are described as actively managed, pooled investment vehicles that are open only to a limited group of individuals and firms. Hedge fund managers use a variety of investment strategies that allow the investor larger trading flexibility. Hedge funds' main objective is to minimise risk and volatility, while attempting to deliver absolute returns that exceed market returns in both bull and bear markets.

Hedge funds originated in 1949 when Jones started an investment partnership that is regarded as the first hedge fund. The emergence of hedge funds was one of the most significant developments as an investment strategy in the professional asset management industry, since 1980. Hedge funds are an asset class that shares common characteristics. These characteristics include achieving abnormal returns, not being publicly available, and the use of various hedging strategies to generate positive returns. The hedge fund industry is unregulated and therefore less restricted in what strategies to follow. Although the lack of regular disclosure can promote undesirable behaviour of hedge funds managers, risk management in the South African hedge fund industry has evolved under new proposed regulation released by the National Treasury and Financial Services Board (FSB). This proposed framework issued a RMP in the South Africa's hedge fund industry. The purpose of this RMP is

²³ See Chapter 2 and Chapter 3 for a detailed discussion on the literature findings.

to ensure that all applicable risks of hedge funds can be identified, monitored and managed at all times.

In addition to the hedge fund analysis, an overview of associated international market indices with a buy-and-hold strategy approach as an alternative investment option was presented. These world equity markets included the S&P 500, Dow Jones, DAX and CAC 40. These market indices are a useful way of providing investors with an indication of the movement of the aggregate market. Market indices represent an entire security market and track the market's changes over time. One of the purposes of market indices is that superior portfolio managers use them as benchmarks to evaluate the performance of individual portfolios with the aim to earn a return better than the market.

Hedge funds in the US and EU market and associated international market indices were chosen as investment options due to the different of investment strategies employed. Complex investment strategies are employed on hedge funds, thus this investment option is regarded as a high-risk investment vehicle. Conversely a simple investment strategy is employed on international market indices, thus this investment option is regarded as low- to moderate risk investment vehicle.

Although hedge funds and common world indices have many advantages and rewarding characteristics, these investment options do have some hidden risks. Overview standardised risk measures and risk-adjusted performance measures were given to quantify the risk in hedge funds and associated international market indices. Standardised risk measures that are widely recognised by investment professionals are the standard deviation and variance. The standard deviation is a measure of volatility and has limited use.

In addition, risk-adjusted performance measures for the measurement of performance that incorporate both risk and return have been developed. These risk-adjusted performance measures include the Sharpe ratio, Sortino ratio, Treynor ratio, Calmar ratio, and Omega ratio. In addition, the exponentially-weighted moving average (EWMA) model enabled volatility to serve as an additional performance measure. The differences among these performance measures rest primarily with the adjustment for risk. The measurement of risk is essential because a lower return is not necessarily indicative of inferior performance. The concept of risk aversion

implied that for a given amount of risk, an investor would rather be in favour of a high return than a low return on an investment. Given this, one the risk levels of the US and EU and associated international market indices are considered, these risk levels can relate to the returns of US and EU, and associated international market indices, to determine whether the return was sufficient to compensate the investor for the acquired amount of risk. Regardless of which ratio is used, investors gain better insight into the risk of several investment alternatives. All of these risk-adjusted performance measures capture different forms of risk, and each measure provides an investor with a unique risk-return perspective. Some of these risk-adjusted performance measures lack important aspects concerning the performance of hedge funds and the associated international indices, which led to the use of the Omega ratio as the proper benchmark.

6.3 Methodology overview of this study

Research design and the methodology used in this study form an important part of the research process. The first step is to determine and understand the objective of this study in order to apply the appropriate methodology involved in this research. The correct methodology will ensure that the problem statement is addressed appropriately and will prevent any empirical biasness.

The aim of this study was to evaluate and rank the returns of US and EU hedge funds and associated international market indices based on risk and risk-adjusted performance measures. A quantitative research approach, which is in accordance with the positivistic paradigm, was followed to explain the risk and performance levels of international hedge funds and associated international market indices.

The data on hedge funds in the US and EU market were collected from the EurekaHedge (2012) database. The investigation period spanned from January 2004 to December 2011. Monthly observations were used in the empirical study. Monthly data were also obtained from Yahoo Finance (2013) to determine if US and EU hedge funds outperformed associate equity markets. The time series used in this study were divided into three financial environmental periods, where two of these periods included a bullish phase, and the remaining period included a bearish phase. These three periods included a pre-financial crisis period, a period during the financial crisis, and a post-financial crisis period.

6.4 Overview of empirical findings²⁴

The objective of this study was to evaluate and rank the returns of both US and EU hedge funds over three different financial environmental periods to establish performance dominance, based on risk-adjusted performance measures during different market trends. These selected hedge funds' performances were compared with the associated international market indices. The evidence from this study confirmed the dominance of hedge funds over the CAC 40, DAX, S&P 500 and Dow Jones, from 2004 to 2011. Overall, the Sharpe-, Sortino-, Jensen's alpha-, Treynor- and Calmar ratio illustrated that US hedge funds outperformed both EU hedge funds and associated equity markets over this period. The Omega ratio was used as the proper benchmark, which also confirmed the outperformance of US hedge funds compared to EU hedge funds and associated world equity markets. Furthermore, the empirical results from this study emphasised the ability of hedge funds to use these funds' investment flexibility to outperform equity markets during different financial environment periods, thus making hedge funds the superior vehicle when an investor has to choose between different investment options.

6.5 Conclusion

Conflicting evidence regarding the performance of hedge funds and this fund's persistence in outperforming other markets has been debated in a number of previous studies. In general, it is assumed that due to the flexibility of hedge funds, in being able to apply different investment strategies, these investment funds are the more considered unconventional investment option. However, previous research seems to suggest that hedge funds tend to be correlated with equity markets. Thus, it indicated the possibility of hedge funds underperforming during bearish phases. The relatively high attrition rate among hedge funds, coupled with these funds' non-normally distributed returns (*inter alia* displaying high kurtosis and negative skewness), also makes it difficult to provide a detailed performance evaluation of all the hedge funds.

Since non-normal distributions were also present in this study, all risk-adjusted performance results were benchmarked to the Omega ratio in an attempt to overcome most of the shortcomings of traditional performance measures. From the

²⁴ See Chapter 5 for a detailed discussion on the empirical findings.

results, it was evident that several US and EU hedge funds were able to outperform the CAC 40, the DAX, the S&P 500, and the Dow Jones during both a bearish and bullish phase. Although the US hedge funds illustrated greater volatility compared to EU hedge funds, evidence from the risk-adjusted performance measures supported the overall dominance of US hedge funds. These findings further emphasised that a normal buy-and-hold strategy on the four world equity indices under investigation would have been overshadowed by the performance of the US and EU hedge funds, despite a higher correlation between the hedge funds and the Dow Jones and S&P 500 after the financial crisis period.

6.6 Recommendations for future studies

This study only focused on the performance of US and EU hedge funds, as well as their associated equity markets. This study can however easily be extended to evaluate the performance of several different unit trusts and the bond market as additional investment options. As unit trusts can be a combination of individual shares, money market or capital market securities, it will be useful to establish how this level of diversification within unit trusts can influence the investment choice as already determined in this study. A second possible future study will be to evaluate how different data frequencies can influence the risk-adjusted performance rankings. The general assumption is that daily and monthly returns are normally distributed (Aparicio & Estrada, 2001:1), although, a normal return distribution cannot be ensured for every investment option, which can lead to different performance rankings.

An alternative study will be to investigate how the Omega ratio can be improved. Currently a threshold is required to compile a performance ranking; however, this ranking can change, depending of an investor's minimum required returns. A suggestion will be to incorporate the entire Omega function in order to compile a performance ranking. Further studies are also required in terms of cost and resource allocation efficiency of hedge funds when compared to other investment vehicles. This study can also be extended by evaluating how effective US and EU hedge funds were in timing the market. While evaluating the different performance ratios in this study, there was some evidence to suggest that, only some hedge funds were able to time the market accurately, whereas most hedge funds illustrated huge

losses during the post-financial crisis period. From an international investor's perspective, it will also be beneficial to apply the approach of this study to several emerging markets as well, as emerging markets are considered to be the potential drivers of global growth (Deloitte Consulting LLP, 2012:4).

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APPENDIX

Table A: Descriptive statistics - EU Hedge funds & indices (Pre-financial crisis period)

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
EU Hedge Fund 1	0.015	0.013	0.096	-0.058	0.117	0.082	3.232	0.121	0.941
EU Hedge Fund 2	0.016	0.013	0.099	-0.057	0.122	0.193	3.328	0.384	0.825
EU Hedge Fund 3	0.008	0.010	0.029	-0.022	0.033	-0.675	3.617	3.305	0.192
EU Hedge Fund 4	0.009	0.011	0.028	-0.020	0.040	-0.634	3.275	2.524	0.283
EU Hedge Fund 5	0.020	0.021	0.073	-0.050	0.075	-0.567	4.209	4.124	0.127
EU Hedge Fund 6	0.021	0.021	0.081	-0.050	0.073	-0.439	4.270	3.576	0.167
EU Hedge Fund 7	0.020	0.021	0.073	-0.050	0.073	-0.571	4.146	3.925	0.141
EU Hedge Fund 8	0.007	0.009	0.082	-0.035	0.055	0.623	3.522	2.738	0.254
EU Hedge Fund 9	0.014	0.018	0.053	-0.073	0.069	-1.253	4.820	14.382	0.001
EU Hedge Fund 10	0.014	0.018	0.058	-0.073	0.062	-0.969	4.068	7.342	0.025
EU Hedge Fund 11	0.017	0.020	0.096	-0.051	0.102	-0.135	2.998	0.109	0.947
EU Hedge Fund 12	0.016	0.021	0.066	-0.052	0.107	-0.654	2.838	2.608	0.271
EU Hedge Fund 13	0.016	0.017	0.059	-0.055	0.097	-0.622	3.384	2.540	0.281
EU Hedge Fund 14	0.010	0.016	0.033	-0.032	0.044	-0.672	2.597	2.957	0.228
EU Hedge Fund 15	0.010	0.017	0.033	-0.032	0.045	-0.706	2.551	3.290	0.193
EU Hedge Fund 16	0.010	0.016	0.034	-0.032	0.046	-0.708	2.682	3.159	0.206
EU Hedge Fund 17	0.016	0.023	0.069	-0.065	0.093	-0.592	2.890	2.123	0.346
EU Hedge Fund 18	0.016	0.026	0.051	-0.049	0.065	-0.884	2.873	4.717	0.095
EU Hedge Fund 19	0.016	0.024	0.046	-0.047	0.067	-0.912	3.107	5.010	0.082
EU Hedge Fund 20	0.014	0.020	0.056	-0.056	0.069	-0.748	2.797	3.415	0.181
EU Hedge Fund 21	0.008	0.007	0.052	-0.073	0.043	-1.036	5.304	14.411	0.001
EU Hedge Fund 22	0.005	0.008	0.046	-0.037	0.076	-0.235	2.398	0.876	0.645
EU Hedge Fund 23	0.005	0.008	0.045	-0.035	0.087	-0.257	2.268	1.199	0.549
EU Hedge Fund 24	0.012	0.015	0.037	-0.033	0.038	-1.000	4.414	9.004	0.011
EU Hedge Fund 25	0.002	0.002	0.037	-0.046	0.039	-0.475	2.775	1.428	0.490
EU Hedge Fund 26	0.007	0.004	0.094	-0.054	0.092	0.594	4.280	4.570	0.102
EU Hedge Fund 27	0.007	0.004	0.099	-0.054	0.091	0.697	4.501	6.294	0.043
EU Hedge Fund 28	0.008	0.005	0.100	-0.057	0.098	0.629	4.499	5.744	0.057
EU Hedge Fund 29	0.006	0.008	0.033	-0.018	0.040	-0.049	2.392	0.569	0.752
EU Hedge Fund 30	0.005	0.007	0.033	-0.021	0.041	-0.069	2.644	0.219	0.896
EU Hedge Fund 31	0.021	0.023	0.108	-0.082	0.152	-0.346	2.302	1.450	0.484
EU Hedge Fund 32	0.020	0.026	0.098	-0.088	0.166	-0.444	2.476	1.595	0.451
EU Hedge Fund 33	0.007	0.008	0.047	-0.048	0.102	-0.342	2.595	0.946	0.623
EU Hedge Fund 34	0.009	0.008	0.047	-0.023	0.040	0.146	2.513	0.484	0.785
EU Hedge Fund 35	0.008	0.006	0.049	-0.024	0.046	0.127	2.473	0.514	0.773
EU Hedge Fund 36	0.007	0.006	0.046	-0.025	0.039	0.113	2.431	0.562	0.755
EU Hedge Fund 37	0.004	0.005	0.052	-0.026	0.034	0.559	5.064	8.266	0.016
EU Hedge Fund 38	0.005	0.004	0.048	-0.030	0.046	0.256	4.168	2.439	0.295
AVERAGE	0.011	0.013	0.060	-0.046	0.072	-0.315	3.334	3.498	0.356
CAC 40	0.013	0.017	0.053	-0.050	0.073	-0.590	2.859	2.117	0.347
DAX	0.015	0.023	0.066	-0.053	0.101	-0.443	2.315	1.880	0.391

Source: Compiled by author.

Table B: Descriptive statistics - US Hedge funds & indices (Pre-financial crisis period)

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
US Hedge Fund 1	0.005	0.006	0.042	-0.084	0.049	-1.354	6.914	33.987	0.000
US Hedge Fund 2	0.010	0.013	0.089	-0.052	0.057	0.058	3.010	0.021	0.990
US Hedge Fund 3	0.009	0.009	0.112	-0.077	0.075	0.075	2.663	0.204	0.903
US Hedge Fund 4	0.015	0.014	0.087	-0.055	0.140	0.310	3.418	0.841	0.657
US Hedge Fund 5	0.021	0.022	0.089	-0.024	0.101	0.194	3.048	0.230	0.891
US Hedge Fund 6	0.020	0.022	0.087	-0.017	0.092	0.568	3.933	3.240	0.198
US Hedge Fund 7	0.006	0.015	0.075	-0.079	0.067	-0.476	2.472	1.779	0.411
US Hedge Fund 8	0.006	0.012	0.077	-0.078	0.070	-0.447	2.474	1.616	0.446
US Hedge Fund 9	0.010	0.013	0.046	-0.054	0.048	-0.591	2.543	2.412	0.299
US Hedge Fund 10	0.016	0.018	0.090	-0.052	0.084	0.030	2.577	0.274	0.872
US Hedge Fund 11	0.006	0.008	0.034	-0.031	0.035	-0.565	3.155	1.954	0.376
US Hedge Fund 12	0.001	0.003	0.061	-0.056	0.042	-0.039	3.122	0.031	0.984
US Hedge Fund 13	0.007	0.016	0.067	-0.099	0.055	-0.896	4.379	7.674	0.022
US Hedge Fund 14	0.014	0.013	0.080	-0.089	0.132	-0.610	2.809	2.290	0.318
US Hedge Fund 15	0.014	0.012	0.077	-0.090	0.129	-0.643	2.849	2.515	0.284
US Hedge Fund 16	0.012	0.012	0.070	-0.049	0.087	-0.085	2.864	0.071	0.965
US Hedge Fund 17	0.003	0.002	0.087	-0.066	0.046	0.131	2.930	0.110	0.947
US Hedge Fund 18	0.009	0.011	0.036	-0.016	0.055	0.060	2.535	0.346	0.841
US Hedge Fund 19	0.009	0.011	0.059	-0.048	0.070	-0.106	2.852	0.101	0.951
US Hedge Fund 20	0.009	0.010	0.045	-0.035	0.042	-0.294	2.907	0.530	0.767
US Hedge Fund 21	0.005	0.003	0.033	-0.027	0.030	-0.018	1.833	2.043	0.360
US Hedge Fund 22	0.011	0.008	0.084	-0.035	0.159	0.328	2.549	0.952	0.621
US Hedge Fund 23	0.010	0.008	0.041	-0.025	0.060	0.108	1.958	1.699	0.428
US Hedge Fund 24	-0.003	0.003	0.056	-0.107	0.110	-0.865	3.835	5.540	0.063
US Hedge Fund 25	0.002	0.004	0.048	-0.068	0.064	-0.787	4.461	6.916	0.031
US Hedge Fund 26	0.002	0.004	0.048	-0.070	0.063	-0.828	4.626	8.085	0.018
US Hedge Fund 27	0.002	0.004	0.048	-0.072	0.066	-0.857	4.661	8.544	0.014
US Hedge Fund 28	0.002	0.003	0.048	-0.070	0.061	-0.871	4.786	9.333	0.009
US Hedge Fund 29	0.010	0.013	0.106	-0.094	0.113	-0.246	2.720	0.480	0.787
US Hedge Fund 30	0.009	0.008	0.047	-0.035	0.043	-0.230	3.152	0.352	0.839
US Hedge Fund 31	0.011	0.010	0.062	-0.026	0.034	0.547	4.793	6.616	0.037
US Hedge Fund 32	0.009	0.008	0.049	-0.011	0.062	1.166	5.480	17.379	0.000
US Hedge Fund 33	0.008	0.009	0.056	-0.045	0.072	-0.181	2.104	1.399	0.497
US Hedge Fund 34	0.006	0.014	0.090	-0.093	0.099	-0.364	2.123	1.948	0.378
US Hedge Fund 35	0.011	0.014	0.046	-0.047	0.045	-0.826	3.662	4.753	0.093
US Hedge Fund 36	0.009	0.007	0.037	-0.032	0.045	-0.167	2.432	0.652	0.722
US Hedge Fund 37	0.007	0.005	0.098	-0.092	0.120	-0.064	2.859	0.054	0.973
US Hedge Fund 38	0.007	0.003	0.098	-0.090	0.112	0.009	2.751	0.094	0.954
US Hedge Fund 39	0.008	0.008	0.036	-0.024	0.085	-0.162	1.872	2.065	0.356
US Hedge Fund 40	0.010	0.001	0.095	-0.067	0.081	0.316	2.710	0.725	0.696
US Hedge Fund 41	0.009	0.011	0.027	-0.027	0.033	-1.099	4.926	12.814	0.002
US Hedge Fund 42	0.009	0.011	0.026	-0.027	0.033	-1.097	4.831	12.247	0.002
US Hedge Fund 43	0.009	0.011	0.026	-0.028	0.033	-1.113	4.931	13.025	0.001
US Hedge Fund 44	0.000	-0.006	0.074	-0.059	0.037	0.790	4.860	8.936	0.011
US Hedge Fund 45	0.006	0.006	0.052	-0.056	0.064	-0.373	2.888	0.855	0.652
US Hedge Fund 46	0.006	0.007	0.019	-0.008	0.017	-0.212	2.774	0.347	0.841
US Hedge Fund 47	0.007	0.008	0.019	-0.008	0.019	-0.233	2.757	0.413	0.813
US Hedge Fund 48	0.012	0.018	0.121	-0.133	0.204	-0.371	3.293	0.955	0.620
US Hedge Fund 49	0.006	0.010	0.034	-0.048	0.055	-1.123	4.309	10.135	0.006
US Hedge Fund 50	0.009	0.010	0.048	-0.026	0.029	-0.224	2.917	0.311	0.856
US Hedge Fund 51	0.006	0.010	0.034	-0.048	0.056	-1.115	4.246	9.783	0.008
US Hedge Fund 52	0.010	0.011	0.072	-0.031	0.050	0.218	2.917	0.296	0.862
US Hedge Fund 53	0.007	0.006	0.084	-0.074	0.097	-0.084	3.023	0.044	0.978
US Hedge Fund 54	0.008	0.011	0.080	-0.068	0.081	-0.052	2.861	0.045	0.978
US Hedge Fund 55	0.006	0.012	0.062	-0.056	0.055	-0.558	2.590	2.119	0.347
US Hedge Fund 56	0.010	0.012	0.053	-0.022	0.041	0.081	2.839	0.078	0.962
US Hedge Fund 57	0.005	0.002	0.046	-0.026	0.042	0.334	2.346	1.309	0.520
US Hedge Fund 58	0.004	0.006	0.024	-0.033	0.022	-1.329	6.372	27.647	0.000
US Hedge Fund 59	0.005	0.004	0.039	-0.035	0.067	0.202	2.600	0.484	0.785
US Hedge Fund 60	0.008	-0.005	0.154	-0.052	0.070	1.470	6.144	27.794	0.000

US Hedge Fund 61	0.011	-0.005	0.158	-0.054	0.102	1.123	4.448	10.709	0.005
US Hedge Fund 62	0.006	0.000	0.114	-0.055	0.058	0.872	4.303	7.106	0.029
US Hedge Fund 63	0.008	-0.005	0.151	-0.052	0.073	1.373	5.660	21.920	0.000
US Hedge Fund 64	0.015	0.017	0.110	-0.065	0.090	0.263	3.945	1.755	0.416
US Hedge Fund 65	0.014	0.019	0.106	-0.063	0.091	0.111	3.426	0.346	0.841
US Hedge Fund 66	0.007	0.012	0.047	-0.088	0.086	-1.146	4.386	10.767	0.005
US Hedge Fund 67	0.007	0.003	0.094	-0.085	0.068	0.158	2.754	0.241	0.886
US Hedge Fund 68	0.006	0.012	0.036	-0.057	0.038	-1.215	4.930	14.444	0.001
US Hedge Fund 69	0.015	0.020	0.123	-0.090	0.111	-0.125	2.347	0.734	0.693
US Hedge Fund 70	0.005	0.007	0.024	-0.019	0.028	-0.461	3.073	1.281	0.527
US Hedge Fund 71	0.005	0.007	0.024	-0.020	0.029	-0.477	2.964	1.369	0.504
US Hedge Fund 72	0.015	0.010	0.097	-0.108	0.172	-0.318	2.749	0.701	0.704
US Hedge Fund 73	0.005	0.002	0.040	-0.019	0.028	0.468	2.817	1.364	0.506
US Hedge Fund 74	0.019	0.015	0.115	-0.067	0.169	0.240	2.590	0.598	0.742
US Hedge Fund 75	0.020	0.014	0.116	-0.070	0.177	0.184	2.548	0.509	0.775
US Hedge Fund 76	0.010	0.009	0.051	-0.036	0.046	-0.118	3.833	1.124	0.570
US Hedge Fund 77	0.014	0.015	0.090	-0.061	0.151	0.115	3.280	0.197	0.906
US Hedge Fund 78	0.008	0.016	0.112	-0.128	0.262	-0.731	3.820	4.216	0.121
US Hedge Fund 79	-0.002	0.001	0.033	-0.088	0.099	-1.459	6.413	30.240	0.000
US Hedge Fund 80	0.010	0.013	0.093	-0.058	0.068	0.122	3.055	0.093	0.954
US Hedge Fund 81	0.011	0.015	0.058	-0.052	0.047	-0.532	2.888	1.718	0.424
US Hedge Fund 82	0.006	0.009	0.045	-0.058	0.070	-0.440	2.392	1.716	0.424
US Hedge Fund 83	0.006	0.008	0.045	-0.057	0.069	-0.472	2.460	1.775	0.412
US Hedge Fund 84	0.009	0.008	0.063	-0.038	0.054	0.189	3.206	0.278	0.870
AVERAGE	0.008	0.009	0.067	-0.055	0.075	-0.200	3.423	4.580	0.483
S&P 500	0.007	0.011	0.037	-0.036	0.033	-0.443	2.296	1.921	0.383
Dow Jones	0.005	0.006	0.038	-0.031	0.049	-0.091	1.853	2.024	0.364

Source: Compiled by author.

Table C: Descriptive statistics - EU Hedge funds & indices (During financial crisis period)

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
EU Hedge Fund 1	0.000	0.004	0.064	-0.084	0.102	-0.287	2.925	0.501	0.778
EU Hedge Fund 2	0.000	0.003	0.063	-0.081	0.103	-0.247	2.827	0.410	0.815
EU Hedge Fund 3	0.004	0.005	0.030	-0.021	0.060	0.034	2.263	0.821	0.663
EU Hedge Fund 4	0.004	0.004	0.033	-0.020	0.063	0.088	2.413	0.563	0.754
EU Hedge Fund 5	-0.001	-0.001	0.097	-0.115	0.172	-0.495	4.192	3.600	0.165
EU Hedge Fund 6	-0.001	-0.001	0.094	-0.108	0.170	-0.400	3.797	1.910	0.385
EU Hedge Fund 7	-0.001	-0.001	0.097	-0.108	0.171	-0.371	3.826	1.851	0.396
EU Hedge Fund 8	0.014	0.012	0.094	-0.070	0.084	0.216	2.995	0.281	0.869
EU Hedge Fund 9	-0.004	-0.004	0.100	-0.079	0.140	0.438	2.437	1.628	0.443
EU Hedge Fund 10	-0.003	-0.002	0.111	-0.073	0.151	0.550	2.598	2.055	0.358
EU Hedge Fund 11	-0.007	-0.002	0.047	-0.081	0.102	-0.641	2.983	2.466	0.291
EU Hedge Fund 12	0.001	0.002	0.075	-0.085	0.105	-0.351	3.585	1.254	0.534
EU Hedge Fund 13	-0.006	-0.002	0.069	-0.078	0.103	-0.256	3.267	0.501	0.779
EU Hedge Fund 14	-0.001	0.002	0.047	-0.060	0.082	-0.079	2.567	0.319	0.852
EU Hedge Fund 15	-0.001	0.002	0.047	-0.058	0.082	-0.084	2.563	0.329	0.848
EU Hedge Fund 16	0.000	0.003	0.049	-0.047	0.082	0.167	2.230	1.058	0.589
EU Hedge Fund 17	0.005	0.013	0.143	-0.122	0.161	-0.284	2.767	0.566	0.753
EU Hedge Fund 18	-0.007	-0.001	0.112	-0.159	0.187	-0.459	3.086	1.276	0.528
EU Hedge Fund 19	-0.005	-0.003	0.113	-0.111	0.171	-0.060	2.817	0.071	0.965
EU Hedge Fund 20	0.002	0.009	0.114	-0.124	0.162	-0.336	2.544	0.991	0.609
EU Hedge Fund 21	-0.001	0.002	0.075	-0.074	0.149	-0.168	3.226	0.246	0.884
EU Hedge Fund 22	0.009	0.010	0.054	-0.016	0.029	0.460	3.316	1.421	0.491
EU Hedge Fund 23	0.009	0.009	0.057	-0.016	0.029	0.650	3.842	3.599	0.165
EU Hedge Fund 24	-0.003	-0.001	0.064	-0.079	0.126	-0.525	3.258	1.751	0.417
EU Hedge Fund 25	0.025	0.019	0.277	-0.102	0.185	1.776	10.013	92.700	0.000
EU Hedge Fund 26	0.003	0.007	0.075	-0.103	0.106	-1.109	5.825	19.351	0.000
EU Hedge Fund 27	0.003	0.007	0.074	-0.097	0.100	-0.991	5.463	14.985	0.001
EU Hedge Fund 28	0.003	0.007	0.076	-0.104	0.110	-1.094	5.758	18.599	0.000
EU Hedge Fund 29	0.008	0.008	0.042	-0.037	0.037	-0.295	2.730	0.633	0.729
EU Hedge Fund 30	0.008	0.007	0.041	-0.036	0.045	-0.336	2.875	0.702	0.704
EU Hedge Fund 31	-0.001	0.010	0.151	-0.169	0.277	-0.559	3.143	1.907	0.385
EU Hedge Fund 32	-0.001	0.008	0.116	-0.122	0.228	-0.295	2.687	0.670	0.716
EU Hedge Fund 33	0.004	0.004	0.142	-0.108	0.186	0.727	5.137	10.018	0.007
EU Hedge Fund 34	0.005	0.003	0.143	-0.060	0.221	1.483	7.263	40.466	0.000
EU Hedge Fund 35	0.004	0.002	0.148	-0.062	0.225	1.546	7.642	46.656	0.000
EU Hedge Fund 36	0.005	0.001	0.149	-0.061	0.233	1.553	7.468	44.412	0.000
EU Hedge Fund 37	0.003	0.006	0.096	-0.199	0.132	-1.813	10.898	113.289	0.000
EU Hedge Fund 38	0.004	0.005	0.096	-0.195	0.137	-1.544	9.381	75.383	0.000
AVERAGE	0.002	0.004	0.091	-0.087	0.132	-0.089	4.174	13.401	0.444
CAC 40	-0.008	-0.009	0.126	-0.135	0.175	-0.270	2.768	0.518	0.772
DAX	0.000	0.018	0.168	-0.151	0.199	-0.284	3.156	0.520	0.771

Source: Compiled by author.

Table D: Descriptive statistics - US Hedge funds & indices (During financial crisis period)

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
US Hedge Fund 1	0.001	0.020	0.088	-0.241	0.230	-1.810	7.174	45.781	0.000
US Hedge Fund 2	-0.012	-0.006	0.112	-0.221	0.177	-1.187	6.408	25.877	0.000
US Hedge Fund 3	0.004	0.019	0.181	-0.265	0.390	-0.830	4.411	7.123	0.028
US Hedge Fund 4	-0.005	0.004	0.144	-0.206	0.249	-0.698	4.394	5.838	0.054
US Hedge Fund 5	0.012	0.018	0.191	-0.164	0.275	0.021	3.957	1.376	0.503
US Hedge Fund 6	0.014	0.012	0.208	-0.124	0.263	0.525	4.356	4.408	0.110
US Hedge Fund 7	0.003	0.004	0.123	-0.154	0.211	-0.536	3.663	2.382	0.304
US Hedge Fund 8	0.004	0.005	0.105	-0.156	0.206	-0.659	3.706	3.356	0.187
US Hedge Fund 9	0.000	0.006	0.059	-0.132	0.177	-1.248	4.289	11.835	0.003
US Hedge Fund 10	-0.003	0.001	0.176	-0.176	0.231	-0.225	3.612	0.867	0.648
US Hedge Fund 11	0.002	0.004	0.034	-0.055	0.074	-0.848	4.077	6.059	0.048
US Hedge Fund 12	0.014	0.007	0.151	-0.088	0.244	0.273	2.466	0.876	0.645
US Hedge Fund 13	0.002	0.023	0.127	-0.244	0.335	-1.157	3.968	9.433	0.009
US Hedge Fund 14	0.005	0.012	0.098	-0.100	0.105	-0.626	3.832	3.391	0.184
US Hedge Fund 15	0.005	0.013	0.099	-0.098	0.106	-0.614	3.764	3.134	0.209
US Hedge Fund 16	0.004	0.010	0.098	-0.133	0.166	-0.540	3.302	1.884	0.390
US Hedge Fund 17	-0.012	0.026	0.239	-0.567	0.603	-1.466	5.608	23.090	0.000
US Hedge Fund 18	0.000	-0.003	0.239	-0.185	0.328	0.447	3.781	2.111	0.348
US Hedge Fund 19	0.008	0.012	0.075	-0.104	0.181	-0.934	3.958	6.617	0.037
US Hedge Fund 20	0.006	0.008	0.074	-0.110	0.169	-1.159	4.859	13.245	0.001
US Hedge Fund 21	0.006	0.010	0.258	-0.114	0.156	1.468	9.306	72.584	0.000
US Hedge Fund 22	0.003	0.009	0.100	-0.145	0.111	-0.692	3.814	3.869	0.145
US Hedge Fund 23	0.003	0.010	0.090	-0.093	0.126	-0.391	3.055	0.921	0.631
US Hedge Fund 24	-0.002	0.002	0.097	-0.136	0.190	-0.323	2.458	1.067	0.586
US Hedge Fund 25	0.004	0.006	0.049	-0.045	0.124	-0.069	1.733	2.438	0.296
US Hedge Fund 26	0.003	0.000	0.045	-0.044	0.107	-0.037	1.740	2.390	0.303
US Hedge Fund 27	0.003	0.004	0.043	-0.044	0.104	-0.067	1.726	2.463	0.292
US Hedge Fund 28	0.003	0.005	0.045	-0.044	0.105	-0.112	1.798	2.241	0.326
US Hedge Fund 29	-0.001	0.014	0.141	-0.251	0.236	-0.915	4.446	8.155	0.017
US Hedge Fund 30	0.012	0.003	0.246	-0.080	0.291	2.144	9.622	93.347	0.000
US Hedge Fund 31	0.007	0.014	0.056	-0.039	0.092	-0.219	2.266	1.096	0.578
US Hedge Fund 32	0.018	0.013	0.085	-0.108	0.166	-0.936	6.748	26.337	0.000
US Hedge Fund 33	0.010	0.015	0.157	-0.142	0.265	-0.191	4.768	4.911	0.086
US Hedge Fund 34	-0.009	0.005	0.094	-0.187	0.254	-0.841	3.187	4.292	0.117
US Hedge Fund 35	0.000	-0.004	0.154	-0.207	0.236	-0.633	5.378	10.888	0.004
US Hedge Fund 36	0.003	0.009	0.039	-0.040	0.048	-0.417	2.568	1.321	0.517
US Hedge Fund 37	0.007	0.007	0.218	-0.219	0.300	-0.044	4.541	3.574	0.167
US Hedge Fund 38	0.008	0.008	0.219	-0.203	0.293	0.068	4.289	2.520	0.284
US Hedge Fund 39	0.005	0.008	0.041	-0.043	0.030	-0.529	3.434	1.963	0.375
US Hedge Fund 40	0.006	0.010	0.124	-0.177	0.263	-0.783	3.302	3.811	0.149
US Hedge Fund 41	0.001	0.002	0.072	-0.102	0.131	-0.498	4.414	4.486	0.106
US Hedge Fund 42	0.001	0.003	0.070	-0.103	0.131	-0.511	4.363	4.351	0.114
US Hedge Fund 43	0.001	0.002	0.070	-0.107	0.129	-0.578	4.425	5.050	0.080
US Hedge Fund 44	0.006	0.005	0.074	-0.033	0.083	0.692	3.639	3.487	0.175
US Hedge Fund 45	0.001	0.007	0.062	-0.176	0.159	-1.861	7.502	51.188	0.000
US Hedge Fund 46	0.000	0.004	0.016	-0.054	0.038	-2.285	9.164	88.330	0.000
US Hedge Fund 47	0.000	0.004	0.016	-0.054	0.038	-2.288	9.168	88.480	0.000
US Hedge Fund 48	0.018	0.008	0.318	-0.290	0.304	-0.016	3.295	0.132	0.936
US Hedge Fund 49	0.001	-0.006	0.120	-0.121	0.173	0.054	2.546	0.327	0.849
US Hedge Fund 50	0.003	0.008	0.106	-0.109	0.218	-0.252	3.144	0.412	0.814
US Hedge Fund 51	0.000	-0.006	0.121	-0.121	0.175	0.058	2.541	0.337	0.845
US Hedge Fund 52	-0.002	0.012	0.086	-0.171	0.162	-1.037	4.168	8.502	0.014
US Hedge Fund 53	-0.001	0.011	0.150	-0.166	0.236	-0.319	2.931	0.616	0.735
US Hedge Fund 54	-0.001	0.011	0.092	-0.127	0.172	-0.664	2.963	2.644	0.267
US Hedge Fund 55	0.004	0.010	0.068	-0.098	0.177	-0.935	3.371	5.446	0.066
US Hedge Fund 56	-0.002	0.011	0.082	-0.142	0.100	-0.984	4.631	9.798	0.007
US Hedge Fund 57	0.012	0.012	0.072	-0.029	0.088	0.420	3.075	1.068	0.586
US Hedge Fund 58	0.003	0.003	0.049	-0.031	0.058	0.223	3.801	1.260	0.533
US Hedge Fund 59	0.003	0.002	0.046	-0.050	0.087	-0.358	3.364	0.966	0.617
US Hedge Fund 60	0.014	0.008	0.108	-0.081	0.284	0.102	2.127	1.205	0.547

US Hedge Fund 61	0.014	0.009	0.109	-0.086	0.308	0.005	2.046	1.367	0.505
US Hedge Fund 62	0.012	0.002	0.101	-0.082	0.277	0.123	2.144	1.190	0.551
US Hedge Fund 63	0.014	0.007	0.107	-0.084	0.285	0.085	2.158	1.106	0.575
US Hedge Fund 64	0.003	0.005	0.076	-0.100	0.131	-0.563	3.714	2.664	0.264
US Hedge Fund 65	0.003	0.005	0.076	-0.100	0.131	-0.509	3.541	1.995	0.369
US Hedge Fund 66	0.005	0.008	0.103	-0.163	0.239	-1.229	5.431	17.926	0.000
US Hedge Fund 67	-0.005	-0.002	0.107	-0.068	0.168	0.442	3.277	1.289	0.525
US Hedge Fund 68	0.003	0.002	0.034	-0.085	0.054	-1.817	7.786	54.173	0.000
US Hedge Fund 69	0.002	0.011	0.286	-0.239	0.157	0.425	5.263	8.765	0.012
US Hedge Fund 70	0.008	0.008	0.058	-0.032	0.091	0.405	3.033	0.984	0.611
US Hedge Fund 71	0.008	0.008	0.058	-0.032	0.092	0.360	2.973	0.779	0.677
US Hedge Fund 72	0.025	0.014	0.418	-0.327	0.781	0.310	4.008	2.100	0.350
US Hedge Fund 73	0.004	0.017	0.079	-0.166	0.181	-1.041	4.853	11.647	0.003
US Hedge Fund 74	0.016	0.020	0.128	-0.161	0.204	-0.748	5.532	12.970	0.002
US Hedge Fund 75	0.016	0.020	0.129	-0.160	0.209	-0.710	5.432	11.896	0.003
US Hedge Fund 76	0.001	0.005	0.054	-0.117	0.156	-1.395	6.051	25.632	0.000
US Hedge Fund 77	-0.005	0.005	0.146	-0.207	0.252	-0.663	4.259	5.016	0.081
US Hedge Fund 78	0.019	0.009	0.114	-0.059	0.147	0.242	2.319	1.046	0.593
US Hedge Fund 79	0.015	0.011	0.073	-0.050	0.089	0.029	3.105	0.022	0.989
US Hedge Fund 80	-0.010	-0.004	0.111	-0.181	0.164	-0.845	5.062	10.660	0.005
US Hedge Fund 81	0.004	0.012	0.064	-0.097	0.169	-1.021	3.663	6.919	0.031
US Hedge Fund 82	0.000	0.010	0.037	-0.088	0.117	-1.410	4.796	16.772	0.000
US Hedge Fund 83	0.000	0.010	0.036	-0.088	0.116	-1.416	4.830	17.051	0.000
US Hedge Fund 84	0.004	0.000	0.079	-0.127	0.247	-0.607	3.771	3.103	0.212
AVERAGE	0.004	0.008	0.111	-0.130	0.190	-0.469	4.160	11.000	0.265
S&P 500	-0.008	0.009	0.086	-0.204	0.196	-1.077	4.307	9.519	0.009
Dow Jones	-0.006	0.001	0.079	-0.164	0.180	-0.932	3.711	5.972	0.050

Source: Compiled by author.

Table E: Descriptive statistics - EU Hedge funds & indices (Post-financial crisis period)

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
EU Hedge Fund 1	0.002	0.001	0.043	-0.036	0.042	-0.032	1.971	1.064	0.588
EU Hedge Fund 2	0.002	0.001	0.045	-0.038	0.043	0.058	2.050	0.916	0.633
EU Hedge Fund 3	-0.001	-0.002	0.017	-0.024	0.011	-0.167	2.719	0.190	0.909
EU Hedge Fund 4	-0.001	-0.002	0.018	-0.022	0.011	0.001	2.573	0.182	0.913
EU Hedge Fund 5	0.006	0.007	0.052	-0.071	0.128	-0.628	3.131	1.593	0.451
EU Hedge Fund 6	0.006	0.007	0.054	-0.071	0.131	-0.575	3.072	1.327	0.515
EU Hedge Fund 7	0.006	0.007	0.053	-0.071	0.130	-0.606	3.104	1.479	0.477
EU Hedge Fund 8	0.004	-0.006	0.090	-0.048	0.068	0.778	2.520	2.652	0.266
EU Hedge Fund 9	0.000	-0.004	0.087	-0.156	0.156	-0.615	3.529	1.792	0.408
EU Hedge Fund 10	-0.001	-0.003	0.091	-0.161	0.174	-0.521	3.551	1.390	0.499
EU Hedge Fund 11	0.014	0.012	0.039	-0.015	0.033	-0.170	1.899	1.328	0.515
EU Hedge Fund 12	0.011	0.007	0.060	-0.040	0.044	0.150	2.639	0.221	0.896
EU Hedge Fund 13	0.013	0.012	0.045	-0.022	0.041	0.111	2.100	0.859	0.651
EU Hedge Fund 14	-0.002	-0.006	0.054	-0.049	0.092	0.390	2.389	0.980	0.613
EU Hedge Fund 15	-0.002	-0.006	0.054	-0.047	0.093	0.476	2.536	1.122	0.571
EU Hedge Fund 16	-0.002	-0.007	0.051	-0.048	0.092	0.419	2.434	1.024	0.599
EU Hedge Fund 17	-0.001	-0.013	0.095	-0.093	0.134	0.109	2.031	0.987	0.611
EU Hedge Fund 18	-0.008	-0.001	0.072	-0.106	0.066	-0.159	2.193	0.752	0.687
EU Hedge Fund 19	0.000	-0.004	0.083	-0.091	0.086	0.091	2.965	0.034	0.983
EU Hedge Fund 20	-0.002	-0.010	0.090	-0.083	0.103	0.170	1.992	1.131	0.568
EU Hedge Fund 21	0.006	0.008	0.072	-0.047	0.056	-0.038	3.246	0.066	0.968
EU Hedge Fund 22	-0.009	-0.010	0.049	-0.054	0.025	0.403	3.149	0.671	0.715
EU Hedge Fund 23	-0.009	-0.010	0.050	-0.055	0.025	0.427	3.306	0.822	0.663
EU Hedge Fund 24	-0.003	-0.002	0.025	-0.039	0.034	-0.371	2.475	0.826	0.662
EU Hedge Fund 25	-0.008	-0.002	0.103	-0.135	0.105	-0.398	2.994	0.632	0.729
EU Hedge Fund 26	-0.008	-0.006	0.026	-0.062	0.062	-0.628	2.811	1.613	0.447
EU Hedge Fund 27	-0.007	-0.006	0.027	-0.056	0.063	-0.548	2.662	1.317	0.518
EU Hedge Fund 28	-0.007	-0.005	0.026	-0.061	0.062	-0.626	2.808	1.604	0.449
EU Hedge Fund 29	0.001	0.001	0.042	-0.040	0.033	-0.187	3.027	0.141	0.932
EU Hedge Fund 30	0.001	0.002	0.044	-0.045	0.041	-0.250	3.365	0.384	0.825
EU Hedge Fund 31	-0.011	-0.011	0.041	-0.114	0.077	-1.191	5.071	9.964	0.007
EU Hedge Fund 32	-0.009	-0.008	0.041	-0.079	0.072	-0.535	3.211	1.189	0.552
EU Hedge Fund 33	-0.003	-0.004	0.075	-0.079	0.033	-0.111	2.477	0.323	0.851
EU Hedge Fund 34	-0.006	-0.005	0.058	-0.099	0.164	-0.189	2.440	0.457	0.796
EU Hedge Fund 35	-0.006	-0.005	0.056	-0.100	0.164	-0.199	2.448	0.462	0.794
EU Hedge Fund 36	-0.005	-0.005	0.058	-0.099	0.163	-0.192	2.436	0.466	0.792
EU Hedge Fund 37	0.004	0.011	0.081	-0.084	0.056	-0.291	3.987	1.312	0.519
EU Hedge Fund 38	0.003	0.005	0.096	-0.092	0.050	-0.123	4.947	3.853	0.146
AVERAGE	-0.001	-0.002	0.057	-0.069	0.078	-0.152	2.849	1.240	0.624
CAC 40	-0.008	-0.013	0.087	-0.113	0.117	-0.015	1.992	1.018	0.601
DAX	0.001	-0.001	0.116	-0.192	0.155	-0.899	5.577	9.875	0.007

Source: Compiled by author.

Table F: Descriptive statistics - US Hedge funds & indices (Post-financial crisis period)

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.
US Hedge Fund 1	0.007	0.006	0.120	-0.095	0.122	0.286	3.007	0.327	0.849
US Hedge Fund 2	0.002	0.012	0.097	-0.109	0.091	-0.741	2.805	2.233	0.327
US Hedge Fund 3	0.005	0.006	0.268	-0.152	0.193	0.930	5.071	7.750	0.021
US Hedge Fund 4	-0.009	-0.007	0.056	-0.081	0.084	-0.379	2.368	0.972	0.615
US Hedge Fund 5	0.005	-0.001	0.156	-0.144	0.138	0.035	3.131	0.022	0.989
US Hedge Fund 6	0.005	-0.001	0.139	-0.128	0.126	0.029	3.162	0.030	0.985
US Hedge Fund 7	0.004	0.018	0.111	-0.106	0.119	-0.076	1.931	1.166	0.558
US Hedge Fund 8	0.005	0.016	0.110	-0.104	0.121	-0.059	1.968	1.079	0.583
US Hedge Fund 9	0.005	0.007	0.065	-0.069	0.113	-0.306	2.235	0.960	0.619
US Hedge Fund 10	0.009	0.007	0.081	-0.059	0.047	0.170	2.478	0.389	0.823
US Hedge Fund 11	-0.003	-0.002	0.048	-0.039	0.027	0.499	5.258	6.093	0.048
US Hedge Fund 12	0.002	0.003	0.056	-0.054	0.032	0.067	2.592	0.184	0.912
US Hedge Fund 13	0.014	0.012	0.164	-0.113	0.148	0.383	2.626	0.727	0.695
US Hedge Fund 14	-0.005	0.003	0.078	-0.161	0.153	-0.951	4.929	7.336	0.026
US Hedge Fund 15	-0.005	0.003	0.076	-0.161	0.152	-1.005	5.105	8.474	0.014
US Hedge Fund 16	-0.001	0.000	0.068	-0.081	0.133	-0.216	2.761	0.243	0.886
US Hedge Fund 17	0.007	-0.001	0.171	-0.136	0.224	0.560	2.862	1.273	0.529
US Hedge Fund 18	0.000	-0.012	0.097	-0.084	0.071	0.187	2.194	0.789	0.674
US Hedge Fund 19	0.005	0.018	0.066	-0.063	0.083	-0.401	2.277	1.166	0.558
US Hedge Fund 20	0.006	0.006	0.050	-0.071	0.065	-0.652	2.966	1.702	0.427
US Hedge Fund 21	-0.001	0.000	0.097	-0.112	0.113	-0.115	2.796	0.094	0.954
US Hedge Fund 22	0.011	0.013	0.113	-0.118	0.069	-0.418	3.464	0.914	0.633
US Hedge Fund 23	0.000	0.009	0.047	-0.085	0.070	-0.919	2.959	3.383	0.184
US Hedge Fund 24	-0.001	-0.010	0.119	-0.066	0.090	1.387	5.515	14.023	0.001
US Hedge Fund 25	0.002	0.006	0.048	-0.062	0.057	-0.469	2.891	0.892	0.640
US Hedge Fund 26	0.002	0.006	0.048	-0.062	0.055	-0.497	2.919	0.994	0.608
US Hedge Fund 27	0.002	0.006	0.048	-0.062	0.055	-0.485	2.900	0.951	0.621
US Hedge Fund 28	0.025	0.006	0.570	-0.062	0.277	4.187	19.784	351.832	0.000
US Hedge Fund 29	0.016	0.027	0.129	-0.098	0.125	-0.216	2.384	0.566	0.754
US Hedge Fund 30	0.001	0.008	0.104	-0.087	0.107	-0.189	2.270	0.676	0.713
US Hedge Fund 31	0.007	0.005	0.036	-0.037	0.035	-0.230	2.254	0.767	0.681
US Hedge Fund 32	0.003	0.004	0.018	-0.019	0.015	-0.655	3.353	1.840	0.398
US Hedge Fund 33	0.007	0.014	0.090	-0.089	0.117	-0.394	2.847	0.643	0.725
US Hedge Fund 34	-0.004	-0.007	0.114	-0.123	0.133	0.057	2.235	0.598	0.742
US Hedge Fund 35	0.006	0.008	0.063	-0.067	0.094	-0.297	2.499	0.603	0.740
US Hedge Fund 36	-0.002	-0.002	0.016	-0.033	0.037	-0.618	2.843	1.554	0.460
US Hedge Fund 37	0.008	0.000	0.191	-0.119	0.089	0.739	4.186	3.589	0.166
US Hedge Fund 38	0.012	0.003	0.200	-0.118	0.082	0.698	4.314	3.673	0.159
US Hedge Fund 39	0.006	0.006	0.042	-0.030	0.035	0.100	2.601	0.199	0.905
US Hedge Fund 40	0.057	0.026	0.672	-0.056	0.212	3.501	15.651	209.073	0.000
US Hedge Fund 41	0.003	0.005	0.045	-0.034	0.037	-0.113	3.162	0.078	0.962
US Hedge Fund 42	0.003	0.005	0.045	-0.036	0.039	-0.145	3.169	0.112	0.945
US Hedge Fund 43	0.002	0.005	0.043	-0.037	0.038	-0.230	3.080	0.218	0.897
US Hedge Fund 44	-0.008	-0.003	0.016	-0.037	0.024	-0.588	2.366	1.784	0.410
US Hedge Fund 45	0.015	0.014	0.123	-0.100	0.168	-0.215	2.638	0.316	0.854
US Hedge Fund 46	0.001	0.005	0.066	-0.104	0.055	-1.328	7.158	24.337	0.000
US Hedge Fund 47	0.001	0.005	0.066	-0.104	0.055	-1.328	7.158	24.337	0.000
US Hedge Fund 48	0.008	-0.006	0.190	-0.088	0.197	0.844	3.284	2.933	0.231
US Hedge Fund 49	-0.007	-0.002	0.074	-0.110	0.056	-0.470	2.305	1.365	0.505
US Hedge Fund 50	0.003	0.004	0.098	-0.082	0.087	0.029	3.239	0.061	0.970
US Hedge Fund 51	-0.007	-0.002	0.074	-0.110	0.056	-0.470	2.305	1.366	0.505
US Hedge Fund 52	0.009	0.011	0.135	-0.084	0.089	0.130	2.471	0.348	0.840
US Hedge Fund 53	0.009	0.015	0.136	-0.089	0.131	0.138	2.476	0.351	0.839
US Hedge Fund 54	0.009	0.011	0.130	-0.090	0.136	0.183	2.544	0.342	0.843
US Hedge Fund 55	0.007	0.011	0.089	-0.059	0.084	0.015	2.096	0.817	0.664
US Hedge Fund 56	0.005	0.008	0.092	-0.060	0.062	0.000	2.251	0.562	0.755
US Hedge Fund 57	0.002	0.001	0.035	-0.035	0.044	-0.009	2.072	0.861	0.650
US Hedge Fund 58	-0.002	-0.002	0.034	-0.032	0.025	0.194	3.824	0.830	0.660
US Hedge Fund 59	0.002	0.005	0.035	-0.031	0.021	-0.349	2.563	0.678	0.713
US Hedge Fund 60	-0.012	-0.026	0.134	-0.078	0.071	1.211	4.803	9.112	0.011

US Hedge Fund 61	-0.013	-0.025	0.136	-0.081	0.074	1.202	4.844	9.180	0.010
US Hedge Fund 62	-0.011	-0.019	0.115	-0.071	0.059	1.205	4.718	8.759	0.013
US Hedge Fund 63	-0.012	-0.026	0.132	-0.079	0.072	1.190	4.708	8.578	0.014
US Hedge Fund 64	0.009	0.009	0.071	-0.057	0.065	0.121	3.462	0.272	0.873
US Hedge Fund 65	0.009	0.009	0.071	-0.068	0.071	-0.139	3.381	0.222	0.895
US Hedge Fund 66	0.004	0.006	0.109	-0.106	0.146	-0.097	2.769	0.092	0.955
US Hedge Fund 67	-0.002	0.001	0.054	-0.082	0.085	-0.353	2.799	0.539	0.764
US Hedge Fund 68	0.003	0.004	0.018	-0.020	0.018	-0.413	2.682	0.782	0.676
US Hedge Fund 69	0.002	-0.013	0.222	-0.130	0.310	0.708	2.940	2.007	0.367
US Hedge Fund 70	0.007	0.006	0.035	-0.009	0.033	0.625	2.837	1.590	0.452
US Hedge Fund 71	0.007	0.005	0.034	-0.008	0.032	0.646	2.882	1.685	0.431
US Hedge Fund 72	0.002	0.001	0.181	-0.221	0.250	-0.149	2.575	0.269	0.874
US Hedge Fund 73	0.006	0.012	0.116	-0.123	0.140	-0.219	2.268	0.728	0.695
US Hedge Fund 74	-0.011	-0.019	0.066	-0.109	0.108	-0.129	2.227	0.664	0.717
US Hedge Fund 75	-0.011	-0.018	0.067	-0.108	0.106	-0.104	2.196	0.689	0.709
US Hedge Fund 76	0.004	0.003	0.100	-0.059	0.053	0.661	3.298	1.838	0.399
US Hedge Fund 77	-0.009	-0.009	0.060	-0.089	0.086	-0.331	2.429	0.765	0.682
US Hedge Fund 78	0.019	0.022	0.063	-0.040	0.103	-0.403	2.580	0.827	0.661
US Hedge Fund 79	-0.009	-0.007	0.029	-0.043	0.026	-0.352	3.143	0.516	0.773
US Hedge Fund 80	0.003	0.015	0.093	-0.105	0.086	-0.777	2.817	2.446	0.294
US Hedge Fund 81	0.003	0.000	0.055	-0.065	0.069	-0.296	2.675	0.455	0.797
US Hedge Fund 82	0.002	0.001	0.064	-0.075	0.056	-0.461	2.601	1.010	0.603
US Hedge Fund 83	0.002	0.002	0.064	-0.075	0.055	-0.457	2.604	0.992	0.609
US Hedge Fund 84	0.006	0.003	0.046	-0.025	0.044	0.375	2.252	1.124	0.570
AVERAGE	0.003	0.003	0.101	-0.080	0.092	0.037	3.441	9.007	0.563
S&P 500	0.003	-0.001	0.097	-0.089	0.083	-0.041	2.262	0.551	0.759
Dow Jones	0.005	0.008	0.087	-0.086	0.069	-0.094	2.324	0.493	0.781

Source: Compiled by author.

Table G: Average correlation of EU Hedge funds with the US Hedge funds

Pre-financial crisis period		During financial crisis period		Post-financial crisis period	
Name	Estimate	Name	Estimate	Name	Estimate
EU Hedge Fund 1	0.369	EU Hedge Fund 1	0.479	EU Hedge Fund 1	0.394
EU Hedge Fund 2	0.373	EU Hedge Fund 2	0.484	EU Hedge Fund 2	0.395
EU Hedge Fund 3	0.313	EU Hedge Fund 3	0.438	EU Hedge Fund 3	0.465
EU Hedge Fund 4	0.319	EU Hedge Fund 4	0.439	EU Hedge Fund 4	0.478
EU Hedge Fund 5	0.338	EU Hedge Fund 5	0.501	EU Hedge Fund 5	0.410
EU Hedge Fund 6	0.342	EU Hedge Fund 6	0.501	EU Hedge Fund 6	0.414
EU Hedge Fund 7	0.346	EU Hedge Fund 7	0.500	EU Hedge Fund 7	0.412
EU Hedge Fund 8	0.107	EU Hedge Fund 8	-0.082	EU Hedge Fund 8	0.122
EU Hedge Fund 9	0.280	EU Hedge Fund 9	0.471	EU Hedge Fund 9	0.618
EU Hedge Fund 10	0.281	EU Hedge Fund 10	0.472	EU Hedge Fund 10	0.609
EU Hedge Fund 11	0.273	EU Hedge Fund 11	0.343	EU Hedge Fund 11	0.019
EU Hedge Fund 12	0.367	EU Hedge Fund 12	0.285	EU Hedge Fund 12	0.397
EU Hedge Fund 13	0.297	EU Hedge Fund 13	0.348	EU Hedge Fund 13	0.075
EU Hedge Fund 14	0.328	EU Hedge Fund 14	0.518	EU Hedge Fund 14	0.433
EU Hedge Fund 15	0.334	EU Hedge Fund 15	0.520	EU Hedge Fund 15	0.450
EU Hedge Fund 16	0.342	EU Hedge Fund 16	0.506	EU Hedge Fund 16	0.449
EU Hedge Fund 17	0.374	EU Hedge Fund 17	0.480	EU Hedge Fund 17	0.613
EU Hedge Fund 18	0.358	EU Hedge Fund 18	0.556	EU Hedge Fund 18	0.512
EU Hedge Fund 19	0.392	EU Hedge Fund 19	0.572	EU Hedge Fund 19	0.586
EU Hedge Fund 20	0.387	EU Hedge Fund 20	0.510	EU Hedge Fund 20	0.618
EU Hedge Fund 21	0.267	EU Hedge Fund 21	0.155	EU Hedge Fund 21	0.312
EU Hedge Fund 22	-0.100	EU Hedge Fund 22	-0.068	EU Hedge Fund 22	0.292
EU Hedge Fund 23	-0.091	EU Hedge Fund 23	-0.048	EU Hedge Fund 23	0.281
EU Hedge Fund 24	0.350	EU Hedge Fund 24	0.575	EU Hedge Fund 24	0.509
EU Hedge Fund 25	0.247	EU Hedge Fund 25	0.358	EU Hedge Fund 25	0.625
EU Hedge Fund 26	0.395	EU Hedge Fund 26	0.480	EU Hedge Fund 26	0.259
EU Hedge Fund 27	0.410	EU Hedge Fund 27	0.479	EU Hedge Fund 27	0.243
EU Hedge Fund 28	0.393	EU Hedge Fund 28	0.478	EU Hedge Fund 28	0.259
EU Hedge Fund 29	0.299	EU Hedge Fund 29	0.099	EU Hedge Fund 29	0.162
EU Hedge Fund 30	0.299	EU Hedge Fund 30	0.058	EU Hedge Fund 30	0.161
EU Hedge Fund 31	0.467	EU Hedge Fund 31	0.543	EU Hedge Fund 31	0.463
EU Hedge Fund 32	0.432	EU Hedge Fund 32	0.578	EU Hedge Fund 32	0.454
EU Hedge Fund 33	0.112	EU Hedge Fund 33	-0.153	EU Hedge Fund 33	-0.301
EU Hedge Fund 34	0.257	EU Hedge Fund 34	0.306	EU Hedge Fund 34	0.410
EU Hedge Fund 35	0.256	EU Hedge Fund 35	0.312	EU Hedge Fund 35	0.408
EU Hedge Fund 36	0.254	EU Hedge Fund 36	0.305	EU Hedge Fund 36	0.409
EU Hedge Fund 37	0.123	EU Hedge Fund 37	0.368	EU Hedge Fund 37	0.248
EU Hedge Fund 38	0.144	EU Hedge Fund 38	0.381	EU Hedge Fund 38	0.294

Source: Compiled by author.

Table H: Average correlation of EU Hedge funds with the other EU Hedge funds

Pre-financial crisis period		During-financial crisis period		Post-financial crisis period	
Name	Estimate	Name	Estimate	Name	Estimate
EU Hedge Fund 1	0.637	EU Hedge Fund 1	0.537	EU Hedge Fund 1	0.429
EU Hedge Fund 2	0.634	EU Hedge Fund 2	0.541	EU Hedge Fund 2	0.426
EU Hedge Fund 3	0.591	EU Hedge Fund 3	0.480	EU Hedge Fund 3	0.472
EU Hedge Fund 4	0.588	EU Hedge Fund 4	0.476	EU Hedge Fund 4	0.482
EU Hedge Fund 5	0.541	EU Hedge Fund 5	0.498	EU Hedge Fund 5	0.465
EU Hedge Fund 6	0.543	EU Hedge Fund 6	0.497	EU Hedge Fund 6	0.464
EU Hedge Fund 7	0.546	EU Hedge Fund 7	0.496	EU Hedge Fund 7	0.465
EU Hedge Fund 8	0.227	EU Hedge Fund 8	-0.042	EU Hedge Fund 8	0.112
EU Hedge Fund 9	0.593	EU Hedge Fund 9	0.515	EU Hedge Fund 9	0.539
EU Hedge Fund 10	0.578	EU Hedge Fund 10	0.513	EU Hedge Fund 10	0.535
EU Hedge Fund 11	0.459	EU Hedge Fund 11	0.335	EU Hedge Fund 11	0.165
EU Hedge Fund 12	0.590	EU Hedge Fund 12	0.300	EU Hedge Fund 12	0.303
EU Hedge Fund 13	0.547	EU Hedge Fund 13	0.333	EU Hedge Fund 13	0.198
EU Hedge Fund 14	0.591	EU Hedge Fund 14	0.521	EU Hedge Fund 14	0.467
EU Hedge Fund 15	0.588	EU Hedge Fund 15	0.523	EU Hedge Fund 15	0.478
EU Hedge Fund 16	0.583	EU Hedge Fund 16	0.518	EU Hedge Fund 16	0.476
EU Hedge Fund 17	0.548	EU Hedge Fund 17	0.471	EU Hedge Fund 17	0.476
EU Hedge Fund 18	0.593	EU Hedge Fund 18	0.539	EU Hedge Fund 18	0.412
EU Hedge Fund 19	0.606	EU Hedge Fund 19	0.551	EU Hedge Fund 19	0.524
EU Hedge Fund 20	0.518	EU Hedge Fund 20	0.502	EU Hedge Fund 20	0.489
EU Hedge Fund 21	0.546	EU Hedge Fund 21	0.219	EU Hedge Fund 21	0.226
EU Hedge Fund 22	0.036	EU Hedge Fund 22	-0.070	EU Hedge Fund 22	0.205
EU Hedge Fund 23	0.039	EU Hedge Fund 23	-0.050	EU Hedge Fund 23	0.199
EU Hedge Fund 24	0.578	EU Hedge Fund 24	0.577	EU Hedge Fund 24	0.386
EU Hedge Fund 25	0.338	EU Hedge Fund 25	0.372	EU Hedge Fund 25	0.516
EU Hedge Fund 26	0.595	EU Hedge Fund 26	0.476	EU Hedge Fund 26	0.391
EU Hedge Fund 27	0.584	EU Hedge Fund 27	0.476	EU Hedge Fund 27	0.383
EU Hedge Fund 28	0.597	EU Hedge Fund 28	0.475	EU Hedge Fund 28	0.391
EU Hedge Fund 29	0.497	EU Hedge Fund 29	0.178	EU Hedge Fund 29	0.272
EU Hedge Fund 30	0.507	EU Hedge Fund 30	0.154	EU Hedge Fund 30	0.274
EU Hedge Fund 31	0.640	EU Hedge Fund 31	0.509	EU Hedge Fund 31	0.529
EU Hedge Fund 32	0.656	EU Hedge Fund 32	0.558	EU Hedge Fund 32	0.518
EU Hedge Fund 33	0.421	EU Hedge Fund 33	-0.156	EU Hedge Fund 33	-0.263
EU Hedge Fund 34	0.457	EU Hedge Fund 34	0.331	EU Hedge Fund 34	0.351
EU Hedge Fund 35	0.457	EU Hedge Fund 35	0.336	EU Hedge Fund 35	0.349
EU Hedge Fund 36	0.455	EU Hedge Fund 36	0.331	EU Hedge Fund 36	0.349
EU Hedge Fund 37	0.145	EU Hedge Fund 37	0.316	EU Hedge Fund 37	0.277
EU Hedge Fund 38	0.154	EU Hedge Fund 38	0.321	EU Hedge Fund 38	0.301

Source: Compiled by author.

Table I: Average correlation of US Hedge funds with the other US Hedge funds

Pre-financial crisis period		During-financial crisis period		Post-financial crisis period	
Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 1	0.282	US Hedge Fund 1	0.512	US Hedge Fund 1	0.618
US Hedge Fund 2	0.326	US Hedge Fund 2	0.482	US Hedge Fund 2	0.616
US Hedge Fund 3	0.533	US Hedge Fund 3	0.61	US Hedge Fund 3	0.608
US Hedge Fund 4	0.139	US Hedge Fund 4	0.504	US Hedge Fund 4	0.616
US Hedge Fund 5	0.235	US Hedge Fund 5	0.573	US Hedge Fund 5	0.676
US Hedge Fund 6	0.241	US Hedge Fund 6	0.545	US Hedge Fund 6	0.672
US Hedge Fund 7	0.448	US Hedge Fund 7	0.57	US Hedge Fund 7	0.66
US Hedge Fund 8	0.448	US Hedge Fund 8	0.573	US Hedge Fund 8	0.659
US Hedge Fund 9	0.46	US Hedge Fund 9	0.525	US Hedge Fund 9	0.555
US Hedge Fund 10	0.41	US Hedge Fund 10	0.498	US Hedge Fund 10	0.541
US Hedge Fund 11	0.32	US Hedge Fund 11	0.458	US Hedge Fund 11	0.318
US Hedge Fund 12	-0.163	US Hedge Fund 12	0.077	US Hedge Fund 12	-0.277
US Hedge Fund 13	0.329	US Hedge Fund 13	0.594	US Hedge Fund 13	0.631
US Hedge Fund 14	0.511	US Hedge Fund 14	0.471	US Hedge Fund 14	0.605
US Hedge Fund 15	0.509	US Hedge Fund 15	0.47	US Hedge Fund 15	0.604
US Hedge Fund 16	0.46	US Hedge Fund 16	0.57	US Hedge Fund 16	0.621
US Hedge Fund 17	0.183	US Hedge Fund 17	0.558	US Hedge Fund 17	0.556
US Hedge Fund 18	0.336	US Hedge Fund 18	0.347	US Hedge Fund 18	0.66
US Hedge Fund 19	0.493	US Hedge Fund 19	0.552	US Hedge Fund 19	0.592
US Hedge Fund 20	0.441	US Hedge Fund 20	0.536	US Hedge Fund 20	0.521
US Hedge Fund 21	0.335	US Hedge Fund 21	0.462	US Hedge Fund 21	0.675
US Hedge Fund 22	0.244	US Hedge Fund 22	0.473	US Hedge Fund 22	0.563
US Hedge Fund 23	0.422	US Hedge Fund 23	0.516	US Hedge Fund 23	0.615
US Hedge Fund 24	0.367	US Hedge Fund 24	0.57	US Hedge Fund 24	0.419
US Hedge Fund 25	0.412	US Hedge Fund 25	0.509	US Hedge Fund 25	0.529
US Hedge Fund 26	0.413	US Hedge Fund 26	0.506	US Hedge Fund 26	0.527
US Hedge Fund 27	0.414	US Hedge Fund 27	0.517	US Hedge Fund 27	0.533
US Hedge Fund 28	0.408	US Hedge Fund 28	0.523	US Hedge Fund 28	0.282
US Hedge Fund 29	0.539	US Hedge Fund 29	0.591	US Hedge Fund 29	0.673
US Hedge Fund 30	0.385	US Hedge Fund 30	0.312	US Hedge Fund 30	0.65
US Hedge Fund 31	0.394	US Hedge Fund 31	0.419	US Hedge Fund 31	0.561
US Hedge Fund 32	-0.035	US Hedge Fund 32	0.008	US Hedge Fund 32	0.325
US Hedge Fund 33	0.518	US Hedge Fund 33	0.538	US Hedge Fund 33	0.547
US Hedge Fund 34	0.528	US Hedge Fund 34	0.606	US Hedge Fund 34	0.679
US Hedge Fund 35	0.544	US Hedge Fund 35	0.536	US Hedge Fund 35	0.674
US Hedge Fund 36	0.425	US Hedge Fund 36	0.462	US Hedge Fund 36	0.464
US Hedge Fund 37	0.341	US Hedge Fund 37	0.501	US Hedge Fund 37	0.56
US Hedge Fund 38	0.379	US Hedge Fund 38	0.494	US Hedge Fund 38	0.552
US Hedge Fund 39	0.467	US Hedge Fund 39	0.487	US Hedge Fund 39	0.616
US Hedge Fund 40	0.431	US Hedge Fund 40	0.547	US Hedge Fund 40	0.129
US Hedge Fund 41	0.301	US Hedge Fund 41	0.211	US Hedge Fund 41	0.624
US Hedge Fund 42	0.301	US Hedge Fund 42	0.21	US Hedge Fund 42	0.624
US Hedge Fund 43	0.302	US Hedge Fund 43	0.22	US Hedge Fund 43	0.625
US Hedge Fund 44	0.406	US Hedge Fund 44	0.159	US Hedge Fund 44	-0.298
US Hedge Fund 45	0.32	US Hedge Fund 45	0.464	US Hedge Fund 45	0.436
US Hedge Fund 46	0.008	US Hedge Fund 46	0.299	US Hedge Fund 46	0.365
US Hedge Fund 47	0.025	US Hedge Fund 47	0.299	US Hedge Fund 47	0.365
US Hedge Fund 48	0.446	US Hedge Fund 48	0.348	US Hedge Fund 48	0.582
US Hedge Fund 49	0.321	US Hedge Fund 49	0.313	US Hedge Fund 49	0.578
US Hedge Fund 50	0.512	US Hedge Fund 50	0.571	US Hedge Fund 50	0.662
US Hedge Fund 51	0.321	US Hedge Fund 51	0.312	US Hedge Fund 51	0.578
US Hedge Fund 52	0.483	US Hedge Fund 52	0.585	US Hedge Fund 52	0.68
US Hedge Fund 53	0.519	US Hedge Fund 53	0.588	US Hedge Fund 53	0.677
US Hedge Fund 54	0.515	US Hedge Fund 54	0.605	US Hedge Fund 54	0.672
US Hedge Fund 55	0.542	US Hedge Fund 55	0.596	US Hedge Fund 55	0.675
US Hedge Fund 56	0.338	US Hedge Fund 56	0.489	US Hedge Fund 56	0.679
US Hedge Fund 57	-0.115	US Hedge Fund 57	0.05	US Hedge Fund 57	-0.064
US Hedge Fund 58	0.352	US Hedge Fund 58	0.375	US Hedge Fund 58	0.279
US Hedge Fund 59	0.448	US Hedge Fund 59	0.565	US Hedge Fund 59	0.57
US Hedge Fund 60	0.415	US Hedge Fund 60	0.426	US Hedge Fund 60	0.328
US Hedge Fund 61	0.415	US Hedge Fund 61	0.42	US Hedge Fund 61	0.325
US Hedge Fund 62	0.418	US Hedge Fund 62	0.416	US Hedge Fund 62	0.303
US Hedge Fund 63	0.422	US Hedge Fund 63	0.429	US Hedge Fund 63	0.331
US Hedge Fund 64	0.045	US Hedge Fund 64	0.351	US Hedge Fund 64	0.358
US Hedge Fund 65	0.062	US Hedge Fund 65	0.348	US Hedge Fund 65	0.347
US Hedge Fund 66	0.516	US Hedge Fund 66	0.54	US Hedge Fund 66	0.661
US Hedge Fund 67	0.467	US Hedge Fund 67	0.463	US Hedge Fund 67	0.504
US Hedge Fund 68	0.271	US Hedge Fund 68	0.223	US Hedge Fund 68	0.42
US Hedge Fund 69	0.452	US Hedge Fund 69	0.348	US Hedge Fund 69	0.529

US Hedge Fund 70	0.353	US Hedge Fund 70	0.149	US Hedge Fund 70	0.385
US Hedge Fund 71	0.355	US Hedge Fund 71	0.152	US Hedge Fund 71	0.385
US Hedge Fund 72	0.489	US Hedge Fund 72	0.537	US Hedge Fund 72	0.65
US Hedge Fund 73	0.422	US Hedge Fund 73	0.542	US Hedge Fund 73	0.68
US Hedge Fund 74	0.409	US Hedge Fund 74	0.356	US Hedge Fund 74	0.545
US Hedge Fund 75	0.413	US Hedge Fund 75	0.357	US Hedge Fund 75	0.547
US Hedge Fund 76	0.434	US Hedge Fund 76	0.561	US Hedge Fund 76	0.639
US Hedge Fund 77	0.205	US Hedge Fund 77	0.508	US Hedge Fund 77	0.603
US Hedge Fund 78	0.262	US Hedge Fund 78	0.425	US Hedge Fund 78	0.521
US Hedge Fund 79	-0.085	US Hedge Fund 79	-0.251	US Hedge Fund 79	-0.09
US Hedge Fund 80	0.343	US Hedge Fund 80	0.482	US Hedge Fund 80	0.615
US Hedge Fund 81	0.474	US Hedge Fund 81	0.482	US Hedge Fund 81	0.642
US Hedge Fund 82	0.525	US Hedge Fund 82	0.537	US Hedge Fund 82	0.652
US Hedge Fund 83	0.523	US Hedge Fund 83	0.536	US Hedge Fund 83	0.651
US Hedge Fund 84	-0.014	US Hedge Fund 84	-0.07	US Hedge Fund 84	-0.198

Source: Compiled by author.

Table J: Correlation between EU Hedge funds and indices (Pre-financial crisis period)

Name	CAC 40	Name	DAX	Name	S&P 500	Name	Dow Jones
EU Hedge Fund 1	0.779	EU Hedge Fund 1	0.724	EU Hedge Fund 1	0.491	EU Hedge Fund 1	0.401
EU Hedge Fund 2	0.776	EU Hedge Fund 2	0.724	EU Hedge Fund 2	0.496	EU Hedge Fund 2	0.404
EU Hedge Fund 3	0.759	EU Hedge Fund 3	0.637	EU Hedge Fund 3	0.466	EU Hedge Fund 3	0.355
EU Hedge Fund 4	0.762	EU Hedge Fund 4	0.648	EU Hedge Fund 4	0.477	EU Hedge Fund 4	0.374
EU Hedge Fund 5	0.528	EU Hedge Fund 5	0.452	EU Hedge Fund 5	0.379	EU Hedge Fund 5	0.169
EU Hedge Fund 6	0.531	EU Hedge Fund 6	0.457	EU Hedge Fund 6	0.386	EU Hedge Fund 6	0.177
EU Hedge Fund 7	0.536	EU Hedge Fund 7	0.464	EU Hedge Fund 7	0.392	EU Hedge Fund 7	0.183
EU Hedge Fund 8	0.212	EU Hedge Fund 8	0.340	EU Hedge Fund 8	0.247	EU Hedge Fund 8	0.305
EU Hedge Fund 9	0.566	EU Hedge Fund 9	0.515	EU Hedge Fund 9	0.407	EU Hedge Fund 9	0.313
EU Hedge Fund 10	0.520	EU Hedge Fund 10	0.477	EU Hedge Fund 10	0.406	EU Hedge Fund 10	0.315
EU Hedge Fund 11	0.582	EU Hedge Fund 11	0.526	EU Hedge Fund 11	0.436	EU Hedge Fund 11	0.453
EU Hedge Fund 12	0.674	EU Hedge Fund 12	0.641	EU Hedge Fund 12	0.469	EU Hedge Fund 12	0.415
EU Hedge Fund 13	0.561	EU Hedge Fund 13	0.494	EU Hedge Fund 13	0.341	EU Hedge Fund 13	0.304
EU Hedge Fund 14	0.814	EU Hedge Fund 14	0.754	EU Hedge Fund 14	0.557	EU Hedge Fund 14	0.518
EU Hedge Fund 15	0.802	EU Hedge Fund 15	0.759	EU Hedge Fund 15	0.562	EU Hedge Fund 15	0.527
EU Hedge Fund 16	0.787	EU Hedge Fund 16	0.754	EU Hedge Fund 16	0.577	EU Hedge Fund 16	0.542
EU Hedge Fund 17	0.859	EU Hedge Fund 17	0.868	EU Hedge Fund 17	0.652	EU Hedge Fund 17	0.587
EU Hedge Fund 18	0.915	EU Hedge Fund 18	0.839	EU Hedge Fund 18	0.609	EU Hedge Fund 18	0.558
EU Hedge Fund 19	0.932	EU Hedge Fund 19	0.877	EU Hedge Fund 19	0.667	EU Hedge Fund 19	0.586
EU Hedge Fund 20	0.870	EU Hedge Fund 20	0.873	EU Hedge Fund 20	0.681	EU Hedge Fund 20	0.611
EU Hedge Fund 21	0.669	EU Hedge Fund 21	0.594	EU Hedge Fund 21	0.568	EU Hedge Fund 21	0.436
EU Hedge Fund 22	-0.124	EU Hedge Fund 22	-0.172	EU Hedge Fund 22	-0.244	EU Hedge Fund 22	-0.133
EU Hedge Fund 23	-0.110	EU Hedge Fund 23	-0.152	EU Hedge Fund 23	-0.228	EU Hedge Fund 23	-0.111
EU Hedge Fund 24	0.674	EU Hedge Fund 24	0.731	EU Hedge Fund 24	0.568	EU Hedge Fund 24	0.451
EU Hedge Fund 25	0.349	EU Hedge Fund 25	0.203	EU Hedge Fund 25	0.219	EU Hedge Fund 25	0.112
EU Hedge Fund 26	0.637	EU Hedge Fund 26	0.615	EU Hedge Fund 26	0.495	EU Hedge Fund 26	0.388
EU Hedge Fund 27	0.624	EU Hedge Fund 27	0.619	EU Hedge Fund 27	0.522	EU Hedge Fund 27	0.414
EU Hedge Fund 28	0.640	EU Hedge Fund 28	0.616	EU Hedge Fund 28	0.496	EU Hedge Fund 28	0.389
EU Hedge Fund 29	0.595	EU Hedge Fund 29	0.569	EU Hedge Fund 29	0.477	EU Hedge Fund 29	0.443
EU Hedge Fund 30	0.615	EU Hedge Fund 30	0.580	EU Hedge Fund 30	0.466	EU Hedge Fund 30	0.413
EU Hedge Fund 31	0.740	EU Hedge Fund 31	0.739	EU Hedge Fund 31	0.613	EU Hedge Fund 31	0.533
EU Hedge Fund 32	0.788	EU Hedge Fund 32	0.759	EU Hedge Fund 32	0.564	EU Hedge Fund 32	0.482
EU Hedge Fund 33	0.358	EU Hedge Fund 33	0.310	EU Hedge Fund 33	0.152	EU Hedge Fund 33	0.117
EU Hedge Fund 34	0.496	EU Hedge Fund 34	0.447	EU Hedge Fund 34	0.315	EU Hedge Fund 34	0.263
EU Hedge Fund 35	0.494	EU Hedge Fund 35	0.448	EU Hedge Fund 35	0.319	EU Hedge Fund 35	0.278
EU Hedge Fund 36	0.491	EU Hedge Fund 36	0.442	EU Hedge Fund 36	0.315	EU Hedge Fund 36	0.270
EU Hedge Fund 37	0.112	EU Hedge Fund 37	0.037	EU Hedge Fund 37	0.090	EU Hedge Fund 37	0.031
EU Hedge Fund 38	0.098	EU Hedge Fund 38	0.055	EU Hedge Fund 38	0.106	EU Hedge Fund 38	0.061
AVERAGE	0.577	AVERAGE	0.533	AVERAGE	0.408	AVERAGE	0.340

Source: Compiled by author.

Table K: Correlation between US Hedge funds and indices (Pre-financial crisis period)

Name	CAC 40	Name	DAX	Name	S&P 500	Name	Dow Jones
US Hedge Fund 1	0.218	US Hedge Fund 1	0.434	US Hedge Fund 1	0.520	US Hedge Fund 1	0.498
US Hedge Fund 2	0.543	US Hedge Fund 2	0.534	US Hedge Fund 2	0.422	US Hedge Fund 2	0.396
US Hedge Fund 3	0.564	US Hedge Fund 3	0.673	US Hedge Fund 3	0.761	US Hedge Fund 3	0.614
US Hedge Fund 4	0.373	US Hedge Fund 4	0.465	US Hedge Fund 4	0.333	US Hedge Fund 4	0.349
US Hedge Fund 5	0.337	US Hedge Fund 5	0.294	US Hedge Fund 5	0.215	US Hedge Fund 5	0.240
US Hedge Fund 6	0.314	US Hedge Fund 6	0.282	US Hedge Fund 6	0.235	US Hedge Fund 6	0.277
US Hedge Fund 7	0.584	US Hedge Fund 7	0.620	US Hedge Fund 7	0.662	US Hedge Fund 7	0.468
US Hedge Fund 8	0.578	US Hedge Fund 8	0.611	US Hedge Fund 8	0.666	US Hedge Fund 8	0.475
US Hedge Fund 9	0.707	US Hedge Fund 9	0.624	US Hedge Fund 9	0.637	US Hedge Fund 9	0.522
US Hedge Fund 10	0.431	US Hedge Fund 10	0.497	US Hedge Fund 10	0.702	US Hedge Fund 10	0.562
US Hedge Fund 11	0.348	US Hedge Fund 11	0.226	US Hedge Fund 11	0.300	US Hedge Fund 11	0.118
US Hedge Fund 12	-0.227	US Hedge Fund 12	-0.233	US Hedge Fund 12	-0.317	US Hedge Fund 12	-0.342
US Hedge Fund 13	0.356	US Hedge Fund 13	0.540	US Hedge Fund 13	0.580	US Hedge Fund 13	0.541
US Hedge Fund 14	0.593	US Hedge Fund 14	0.658	US Hedge Fund 14	0.715	US Hedge Fund 14	0.565
US Hedge Fund 15	0.592	US Hedge Fund 15	0.655	US Hedge Fund 15	0.713	US Hedge Fund 15	0.563
US Hedge Fund 16	0.583	US Hedge Fund 16	0.694	US Hedge Fund 16	0.787	US Hedge Fund 16	0.684
US Hedge Fund 17	0.202	US Hedge Fund 17	0.140	US Hedge Fund 17	0.255	US Hedge Fund 17	0.134
US Hedge Fund 18	0.449	US Hedge Fund 18	0.471	US Hedge Fund 18	0.665	US Hedge Fund 18	0.665
US Hedge Fund 19	0.675	US Hedge Fund 19	0.745	US Hedge Fund 19	0.832	US Hedge Fund 19	0.660
US Hedge Fund 20	0.536	US Hedge Fund 20	0.574	US Hedge Fund 20	0.722	US Hedge Fund 20	0.565
US Hedge Fund 21	0.294	US Hedge Fund 21	0.274	US Hedge Fund 21	0.291	US Hedge Fund 21	0.261
US Hedge Fund 22	0.520	US Hedge Fund 22	0.473	US Hedge Fund 22	0.392	US Hedge Fund 22	0.277
US Hedge Fund 23	0.468	US Hedge Fund 23	0.442	US Hedge Fund 23	0.497	US Hedge Fund 23	0.336
US Hedge Fund 24	0.377	US Hedge Fund 24	0.431	US Hedge Fund 24	0.499	US Hedge Fund 24	0.337
US Hedge Fund 25	0.287	US Hedge Fund 25	0.465	US Hedge Fund 25	0.605	US Hedge Fund 25	0.470
US Hedge Fund 26	0.291	US Hedge Fund 26	0.466	US Hedge Fund 26	0.607	US Hedge Fund 26	0.471
US Hedge Fund 27	0.291	US Hedge Fund 27	0.467	US Hedge Fund 27	0.611	US Hedge Fund 27	0.476
US Hedge Fund 28	0.285	US Hedge Fund 28	0.461	US Hedge Fund 28	0.601	US Hedge Fund 28	0.467
US Hedge Fund 29	0.635	US Hedge Fund 29	0.718	US Hedge Fund 29	0.791	US Hedge Fund 29	0.594
US Hedge Fund 30	0.331	US Hedge Fund 30	0.463	US Hedge Fund 30	0.709	US Hedge Fund 30	0.566
US Hedge Fund 31	0.443	US Hedge Fund 31	0.496	US Hedge Fund 31	0.479	US Hedge Fund 31	0.409
US Hedge Fund 32	-0.130	US Hedge Fund 32	-0.144	US Hedge Fund 32	-0.083	US Hedge Fund 32	0.024
US Hedge Fund 33	0.672	US Hedge Fund 33	0.733	US Hedge Fund 33	0.726	US Hedge Fund 33	0.611
US Hedge Fund 34	0.579	US Hedge Fund 34	0.652	US Hedge Fund 34	0.769	US Hedge Fund 34	0.607
US Hedge Fund 35	0.598	US Hedge Fund 35	0.640	US Hedge Fund 35	0.776	US Hedge Fund 35	0.635
US Hedge Fund 36	0.485	US Hedge Fund 36	0.450	US Hedge Fund 36	0.472	US Hedge Fund 36	0.369
US Hedge Fund 37	0.209	US Hedge Fund 37	0.204	US Hedge Fund 37	0.477	US Hedge Fund 37	0.289
US Hedge Fund 38	0.213	US Hedge Fund 38	0.271	US Hedge Fund 38	0.540	US Hedge Fund 38	0.382
US Hedge Fund 39	0.645	US Hedge Fund 39	0.713	US Hedge Fund 39	0.698	US Hedge Fund 39	0.581
US Hedge Fund 40	0.327	US Hedge Fund 40	0.418	US Hedge Fund 40	0.693	US Hedge Fund 40	0.528
US Hedge Fund 41	0.239	US Hedge Fund 41	0.242	US Hedge Fund 41	0.525	US Hedge Fund 41	0.480
US Hedge Fund 42	0.235	US Hedge Fund 42	0.243	US Hedge Fund 42	0.527	US Hedge Fund 42	0.485
US Hedge Fund 43	0.238	US Hedge Fund 43	0.244	US Hedge Fund 43	0.527	US Hedge Fund 43	0.482
US Hedge Fund 44	0.314	US Hedge Fund 44	0.412	US Hedge Fund 44	0.428	US Hedge Fund 44	0.324
US Hedge Fund 45	0.363	US Hedge Fund 45	0.486	US Hedge Fund 45	0.506	US Hedge Fund 45	0.424
US Hedge Fund 46	-0.204	US Hedge Fund 46	-0.325	US Hedge Fund 46	-0.327	US Hedge Fund 46	-0.377
US Hedge Fund 47	-0.183	US Hedge Fund 47	-0.304	US Hedge Fund 47	-0.316	US Hedge Fund 47	-0.372
US Hedge Fund 48	0.363	US Hedge Fund 48	0.496	US Hedge Fund 48	0.650	US Hedge Fund 48	0.619
US Hedge Fund 49	0.111	US Hedge Fund 49	0.082	US Hedge Fund 49	0.389	US Hedge Fund 49	0.296
US Hedge Fund 50	0.568	US Hedge Fund 50	0.604	US Hedge Fund 50	0.821	US Hedge Fund 50	0.742
US Hedge Fund 51	0.114	US Hedge Fund 51	0.085	US Hedge Fund 51	0.387	US Hedge Fund 51	0.295
US Hedge Fund 52	0.604	US Hedge Fund 52	0.709	US Hedge Fund 52	0.769	US Hedge Fund 52	0.704
US Hedge Fund 53	0.646	US Hedge Fund 53	0.785	US Hedge Fund 53	0.900	US Hedge Fund 53	0.810
US Hedge Fund 54	0.635	US Hedge Fund 54	0.779	US Hedge Fund 54	0.911	US Hedge Fund 54	0.812
US Hedge Fund 55	0.655	US Hedge Fund 55	0.706	US Hedge Fund 55	0.830	US Hedge Fund 55	0.696
US Hedge Fund 56	0.443	US Hedge Fund 56	0.546	US Hedge Fund 56	0.587	US Hedge Fund 56	0.551
US Hedge Fund 57	-0.182	US Hedge Fund 57	-0.213	US Hedge Fund 57	-0.344	US Hedge Fund 57	-0.292
US Hedge Fund 58	0.349	US Hedge Fund 58	0.225	US Hedge Fund 58	0.295	US Hedge Fund 58	0.117
US Hedge Fund 59	0.637	US Hedge Fund 59	0.681	US Hedge Fund 59	0.780	US Hedge Fund 59	0.639
US Hedge Fund 60	0.303	US Hedge Fund 60	0.412	US Hedge Fund 60	0.456	US Hedge Fund 60	0.352
US Hedge Fund 61	0.349	US Hedge Fund 61	0.425	US Hedge Fund 61	0.443	US Hedge Fund 61	0.348
US Hedge Fund 62	0.277	US Hedge Fund 62	0.381	US Hedge Fund 62	0.481	US Hedge Fund 62	0.376
US Hedge Fund 63	0.313	US Hedge Fund 63	0.422	US Hedge Fund 63	0.468	US Hedge Fund 63	0.359
US Hedge Fund 64	0.262	US Hedge Fund 64	0.189	US Hedge Fund 64	0.109	US Hedge Fund 64	0.033
US Hedge Fund 65	0.287	US Hedge Fund 65	0.206	US Hedge Fund 65	0.126	US Hedge Fund 65	0.039
US Hedge Fund 66	0.634	US Hedge Fund 66	0.692	US Hedge Fund 66	0.781	US Hedge Fund 66	0.587
US Hedge Fund 67	0.549	US Hedge Fund 67	0.617	US Hedge Fund 67	0.567	US Hedge Fund 67	0.446
US Hedge Fund 68	0.282	US Hedge Fund 68	0.294	US Hedge Fund 68	0.314	US Hedge Fund 68	0.353
US Hedge Fund 69	0.452	US Hedge Fund 69	0.591	US Hedge Fund 69	0.715	US Hedge Fund 69	0.602
US Hedge Fund 70	0.571	US Hedge Fund 70	0.593	US Hedge Fund 70	0.514	US Hedge Fund 70	0.441
US Hedge Fund 71	0.570	US Hedge Fund 71	0.587	US Hedge Fund 71	0.514	US Hedge Fund 71	0.440

US Hedge Fund 72	0.599	US Hedge Fund 72	0.664	US Hedge Fund 72	0.696	US Hedge Fund 72	0.621
US Hedge Fund 73	0.436	US Hedge Fund 73	0.579	US Hedge Fund 73	0.771	US Hedge Fund 73	0.785
US Hedge Fund 74	0.416	US Hedge Fund 74	0.443	US Hedge Fund 74	0.392	US Hedge Fund 74	0.337
US Hedge Fund 75	0.433	US Hedge Fund 75	0.445	US Hedge Fund 75	0.389	US Hedge Fund 75	0.317
US Hedge Fund 76	0.395	US Hedge Fund 76	0.412	US Hedge Fund 76	0.572	US Hedge Fund 76	0.519
US Hedge Fund 77	0.515	US Hedge Fund 77	0.551	US Hedge Fund 77	0.434	US Hedge Fund 77	0.419
US Hedge Fund 78	0.347	US Hedge Fund 78	0.375	US Hedge Fund 78	0.500	US Hedge Fund 78	0.400
US Hedge Fund 79	-0.040	US Hedge Fund 79	-0.168	US Hedge Fund 79	-0.241	US Hedge Fund 79	-0.257
US Hedge Fund 80	0.532	US Hedge Fund 80	0.539	US Hedge Fund 80	0.453	US Hedge Fund 80	0.422
US Hedge Fund 81	0.456	US Hedge Fund 81	0.383	US Hedge Fund 81	0.557	US Hedge Fund 81	0.380
US Hedge Fund 82	0.548	US Hedge Fund 82	0.623	US Hedge Fund 82	0.796	US Hedge Fund 82	0.651
US Hedge Fund 83	0.575	US Hedge Fund 83	0.633	US Hedge Fund 83	0.786	US Hedge Fund 83	0.637
US Hedge Fund 84	0.105	US Hedge Fund 84	0.004	US Hedge Fund 84	-0.126	US Hedge Fund 84	-0.069
AVERAGE	0.389	AVERAGE	0.428	AVERAGE	0.498	AVERAGE	0.407

Source: Compiled by author.

Table L: Correlation between EU Hedge funds and indices (During financial crisis period)

Name	CAC 40	Name	DAX	Name	S&P 500	Name	Dow Jones
EU Hedge Fund 1	0.756	EU Hedge Fund 1	0.700	EU Hedge Fund 1	0.593	EU Hedge Fund 1	0.516
EU Hedge Fund 2	0.760	EU Hedge Fund 2	0.705	EU Hedge Fund 2	0.601	EU Hedge Fund 2	0.526
EU Hedge Fund 3	0.656	EU Hedge Fund 3	0.605	EU Hedge Fund 3	0.552	EU Hedge Fund 3	0.516
EU Hedge Fund 4	0.647	EU Hedge Fund 4	0.602	EU Hedge Fund 4	0.546	EU Hedge Fund 4	0.514
EU Hedge Fund 5	0.762	EU Hedge Fund 5	0.733	EU Hedge Fund 5	0.686	EU Hedge Fund 5	0.607
EU Hedge Fund 6	0.763	EU Hedge Fund 6	0.734	EU Hedge Fund 6	0.680	EU Hedge Fund 6	0.605
EU Hedge Fund 7	0.763	EU Hedge Fund 7	0.735	EU Hedge Fund 7	0.679	EU Hedge Fund 7	0.605
EU Hedge Fund 8	-0.152	EU Hedge Fund 8	-0.160	EU Hedge Fund 8	-0.090	EU Hedge Fund 8	-0.076
EU Hedge Fund 9	0.754	EU Hedge Fund 9	0.712	EU Hedge Fund 9	0.655	EU Hedge Fund 9	0.592
EU Hedge Fund 10	0.754	EU Hedge Fund 10	0.722	EU Hedge Fund 10	0.648	EU Hedge Fund 10	0.588
EU Hedge Fund 11	0.435	EU Hedge Fund 11	0.334	EU Hedge Fund 11	0.368	EU Hedge Fund 11	0.333
EU Hedge Fund 12	0.384	EU Hedge Fund 12	0.345	EU Hedge Fund 12	0.442	EU Hedge Fund 12	0.408
EU Hedge Fund 13	0.437	EU Hedge Fund 13	0.348	EU Hedge Fund 13	0.370	EU Hedge Fund 13	0.338
EU Hedge Fund 14	0.869	EU Hedge Fund 14	0.818	EU Hedge Fund 14	0.791	EU Hedge Fund 14	0.747
EU Hedge Fund 15	0.871	EU Hedge Fund 15	0.820	EU Hedge Fund 15	0.790	EU Hedge Fund 15	0.747
EU Hedge Fund 16	0.861	EU Hedge Fund 16	0.810	EU Hedge Fund 16	0.760	EU Hedge Fund 16	0.728
EU Hedge Fund 17	0.832	EU Hedge Fund 17	0.827	EU Hedge Fund 17	0.785	EU Hedge Fund 17	0.755
EU Hedge Fund 18	0.929	EU Hedge Fund 18	0.885	EU Hedge Fund 18	0.843	EU Hedge Fund 18	0.810
EU Hedge Fund 19	0.959	EU Hedge Fund 19	0.906	EU Hedge Fund 19	0.834	EU Hedge Fund 19	0.800
EU Hedge Fund 20	0.881	EU Hedge Fund 20	0.864	EU Hedge Fund 20	0.829	EU Hedge Fund 20	0.794
EU Hedge Fund 21	0.164	EU Hedge Fund 21	0.185	EU Hedge Fund 21	0.053	EU Hedge Fund 21	-0.011
EU Hedge Fund 22	-0.198	EU Hedge Fund 22	-0.245	EU Hedge Fund 22	-0.166	EU Hedge Fund 22	-0.156
EU Hedge Fund 23	-0.174	EU Hedge Fund 23	-0.220	EU Hedge Fund 23	-0.143	EU Hedge Fund 23	-0.134
EU Hedge Fund 24	0.829	EU Hedge Fund 24	0.813	EU Hedge Fund 24	0.715	EU Hedge Fund 24	0.619
EU Hedge Fund 25	0.555	EU Hedge Fund 25	0.615	EU Hedge Fund 25	0.463	EU Hedge Fund 25	0.416
EU Hedge Fund 26	0.641	EU Hedge Fund 26	0.633	EU Hedge Fund 26	0.585	EU Hedge Fund 26	0.491
EU Hedge Fund 27	0.642	EU Hedge Fund 27	0.636	EU Hedge Fund 27	0.577	EU Hedge Fund 27	0.485
EU Hedge Fund 28	0.637	EU Hedge Fund 28	0.629	EU Hedge Fund 28	0.582	EU Hedge Fund 28	0.488
EU Hedge Fund 29	0.124	EU Hedge Fund 29	0.005	EU Hedge Fund 29	0.062	EU Hedge Fund 29	0.066
EU Hedge Fund 30	0.091	EU Hedge Fund 30	-0.021	EU Hedge Fund 30	0.008	EU Hedge Fund 30	0.020
EU Hedge Fund 31	0.715	EU Hedge Fund 31	0.730	EU Hedge Fund 31	0.753	EU Hedge Fund 31	0.669
EU Hedge Fund 32	0.797	EU Hedge Fund 32	0.780	EU Hedge Fund 32	0.732	EU Hedge Fund 32	0.650
EU Hedge Fund 33	-0.330	EU Hedge Fund 33	-0.252	EU Hedge Fund 33	-0.406	EU Hedge Fund 33	-0.395
EU Hedge Fund 34	0.533	EU Hedge Fund 34	0.486	EU Hedge Fund 34	0.423	EU Hedge Fund 34	0.361
EU Hedge Fund 35	0.542	EU Hedge Fund 35	0.496	EU Hedge Fund 35	0.432	EU Hedge Fund 35	0.371
EU Hedge Fund 36	0.533	EU Hedge Fund 36	0.486	EU Hedge Fund 36	0.424	EU Hedge Fund 36	0.361
EU Hedge Fund 37	0.519	EU Hedge Fund 37	0.551	EU Hedge Fund 37	0.627	EU Hedge Fund 37	0.541
EU Hedge Fund 38	0.523	EU Hedge Fund 38	0.570	EU Hedge Fund 38	0.649	EU Hedge Fund 38	0.564
AVERAGE	0.554	AVERAGE	0.524	AVERAGE	0.493	AVERAGE	0.444

Source: Compiled by author.

Table M: Correlation between US Hedge funds and indices (During financial crisis period)

Name	CAC 40	Name	DAX	Name	S&P 500	Name	Dow Jones
US Hedge Fund 1	0.673	US Hedge Fund 1	0.634	US Hedge Fund 1	0.727	US Hedge Fund 1	0.648
US Hedge Fund 2	0.636	US Hedge Fund 2	0.602	US Hedge Fund 2	0.727	US Hedge Fund 2	0.666
US Hedge Fund 3	0.834	US Hedge Fund 3	0.844	US Hedge Fund 3	0.894	US Hedge Fund 3	0.801
US Hedge Fund 4	0.756	US Hedge Fund 4	0.731	US Hedge Fund 4	0.773	US Hedge Fund 4	0.691
US Hedge Fund 5	0.838	US Hedge Fund 5	0.855	US Hedge Fund 5	0.878	US Hedge Fund 5	0.821
US Hedge Fund 6	0.820	US Hedge Fund 6	0.841	US Hedge Fund 6	0.851	US Hedge Fund 6	0.803
US Hedge Fund 7	0.776	US Hedge Fund 7	0.792	US Hedge Fund 7	0.775	US Hedge Fund 7	0.689
US Hedge Fund 8	0.783	US Hedge Fund 8	0.801	US Hedge Fund 8	0.786	US Hedge Fund 8	0.699
US Hedge Fund 9	0.601	US Hedge Fund 9	0.584	US Hedge Fund 9	0.622	US Hedge Fund 9	0.511
US Hedge Fund 10	0.824	US Hedge Fund 10	0.840	US Hedge Fund 10	0.841	US Hedge Fund 10	0.806
US Hedge Fund 11	0.504	US Hedge Fund 11	0.521	US Hedge Fund 11	0.503	US Hedge Fund 11	0.408
US Hedge Fund 12	-0.128	US Hedge Fund 12	-0.097	US Hedge Fund 12	-0.178	US Hedge Fund 12	-0.260
US Hedge Fund 13	0.855	US Hedge Fund 13	0.833	US Hedge Fund 13	0.883	US Hedge Fund 13	0.814
US Hedge Fund 14	0.594	US Hedge Fund 14	0.579	US Hedge Fund 14	0.503	US Hedge Fund 14	0.403
US Hedge Fund 15	0.596	US Hedge Fund 15	0.580	US Hedge Fund 15	0.506	US Hedge Fund 15	0.408
US Hedge Fund 16	0.831	US Hedge Fund 16	0.836	US Hedge Fund 16	0.850	US Hedge Fund 16	0.760
US Hedge Fund 17	0.642	US Hedge Fund 17	0.641	US Hedge Fund 17	0.730	US Hedge Fund 17	0.612
US Hedge Fund 18	0.674	US Hedge Fund 18	0.682	US Hedge Fund 18	0.724	US Hedge Fund 18	0.738
US Hedge Fund 19	0.708	US Hedge Fund 19	0.692	US Hedge Fund 19	0.654	US Hedge Fund 19	0.562
US Hedge Fund 20	0.658	US Hedge Fund 20	0.654	US Hedge Fund 20	0.613	US Hedge Fund 20	0.530
US Hedge Fund 21	0.702	US Hedge Fund 21	0.762	US Hedge Fund 21	0.722	US Hedge Fund 21	0.675
US Hedge Fund 22	0.646	US Hedge Fund 22	0.699	US Hedge Fund 22	0.730	US Hedge Fund 22	0.647
US Hedge Fund 23	0.611	US Hedge Fund 23	0.612	US Hedge Fund 23	0.541	US Hedge Fund 23	0.414
US Hedge Fund 24	0.784	US Hedge Fund 24	0.764	US Hedge Fund 24	0.737	US Hedge Fund 24	0.674
US Hedge Fund 25	0.599	US Hedge Fund 25	0.664	US Hedge Fund 25	0.602	US Hedge Fund 25	0.551
US Hedge Fund 26	0.618	US Hedge Fund 26	0.669	US Hedge Fund 26	0.616	US Hedge Fund 26	0.566
US Hedge Fund 27	0.627	US Hedge Fund 27	0.674	US Hedge Fund 27	0.628	US Hedge Fund 27	0.579
US Hedge Fund 28	0.630	US Hedge Fund 28	0.678	US Hedge Fund 28	0.628	US Hedge Fund 28	0.572
US Hedge Fund 29	0.867	US Hedge Fund 29	0.893	US Hedge Fund 29	0.917	US Hedge Fund 29	0.837
US Hedge Fund 30	0.499	US Hedge Fund 30	0.408	US Hedge Fund 30	0.435	US Hedge Fund 30	0.410
US Hedge Fund 31	0.569	US Hedge Fund 31	0.588	US Hedge Fund 31	0.511	US Hedge Fund 31	0.437
US Hedge Fund 32	-0.054	US Hedge Fund 32	0.020	US Hedge Fund 32	-0.181	US Hedge Fund 32	-0.170
US Hedge Fund 33	0.671	US Hedge Fund 33	0.651	US Hedge Fund 33	0.706	US Hedge Fund 33	0.612
US Hedge Fund 34	0.798	US Hedge Fund 34	0.785	US Hedge Fund 34	0.827	US Hedge Fund 34	0.715
US Hedge Fund 35	0.739	US Hedge Fund 35	0.761	US Hedge Fund 35	0.816	US Hedge Fund 35	0.708
US Hedge Fund 36	0.480	US Hedge Fund 36	0.499	US Hedge Fund 36	0.471	US Hedge Fund 36	0.340
US Hedge Fund 37	0.620	US Hedge Fund 37	0.638	US Hedge Fund 37	0.760	US Hedge Fund 37	0.696
US Hedge Fund 38	0.608	US Hedge Fund 38	0.624	US Hedge Fund 38	0.747	US Hedge Fund 38	0.685
US Hedge Fund 39	0.622	US Hedge Fund 39	0.731	US Hedge Fund 39	0.599	US Hedge Fund 39	0.503
US Hedge Fund 40	0.732	US Hedge Fund 40	0.783	US Hedge Fund 40	0.740	US Hedge Fund 40	0.685
US Hedge Fund 41	0.457	US Hedge Fund 41	0.360	US Hedge Fund 41	0.425	US Hedge Fund 41	0.465
US Hedge Fund 42	0.458	US Hedge Fund 42	0.360	US Hedge Fund 42	0.425	US Hedge Fund 42	0.465
US Hedge Fund 43	0.469	US Hedge Fund 43	0.371	US Hedge Fund 43	0.438	US Hedge Fund 43	0.478
US Hedge Fund 44	0.227	US Hedge Fund 44	0.274	US Hedge Fund 44	0.070	US Hedge Fund 44	0.000
US Hedge Fund 45	0.690	US Hedge Fund 45	0.669	US Hedge Fund 45	0.787	US Hedge Fund 45	0.727
US Hedge Fund 46	0.481	US Hedge Fund 46	0.538	US Hedge Fund 46	0.445	US Hedge Fund 46	0.431
US Hedge Fund 47	0.480	US Hedge Fund 47	0.538	US Hedge Fund 47	0.445	US Hedge Fund 47	0.431
US Hedge Fund 48	0.664	US Hedge Fund 48	0.657	US Hedge Fund 48	0.638	US Hedge Fund 48	0.658
US Hedge Fund 49	0.550	US Hedge Fund 49	0.493	US Hedge Fund 49	0.506	US Hedge Fund 49	0.472
US Hedge Fund 50	0.818	US Hedge Fund 50	0.819	US Hedge Fund 50	0.824	US Hedge Fund 50	0.758
US Hedge Fund 51	0.550	US Hedge Fund 51	0.492	US Hedge Fund 51	0.505	US Hedge Fund 51	0.471
US Hedge Fund 52	0.878	US Hedge Fund 52	0.881	US Hedge Fund 52	0.950	US Hedge Fund 52	0.888
US Hedge Fund 53	0.899	US Hedge Fund 53	0.890	US Hedge Fund 53	0.912	US Hedge Fund 53	0.851
US Hedge Fund 54	0.922	US Hedge Fund 54	0.909	US Hedge Fund 54	0.920	US Hedge Fund 54	0.855
US Hedge Fund 55	0.858	US Hedge Fund 55	0.880	US Hedge Fund 55	0.844	US Hedge Fund 55	0.780
US Hedge Fund 56	0.783	US Hedge Fund 56	0.812	US Hedge Fund 56	0.882	US Hedge Fund 56	0.831
US Hedge Fund 57	0.127	US Hedge Fund 57	0.047	US Hedge Fund 57	0.096	US Hedge Fund 57	0.093
US Hedge Fund 58	0.362	US Hedge Fund 58	0.390	US Hedge Fund 58	0.335	US Hedge Fund 58	0.220
US Hedge Fund 59	0.803	US Hedge Fund 59	0.757	US Hedge Fund 59	0.722	US Hedge Fund 59	0.614
US Hedge Fund 60	0.396	US Hedge Fund 60	0.449	US Hedge Fund 60	0.384	US Hedge Fund 60	0.310
US Hedge Fund 61	0.391	US Hedge Fund 61	0.436	US Hedge Fund 61	0.373	US Hedge Fund 61	0.308
US Hedge Fund 62	0.372	US Hedge Fund 62	0.435	US Hedge Fund 62	0.366	US Hedge Fund 62	0.292
US Hedge Fund 63	0.401	US Hedge Fund 63	0.452	US Hedge Fund 63	0.388	US Hedge Fund 63	0.314
US Hedge Fund 64	0.419	US Hedge Fund 64	0.394	US Hedge Fund 64	0.508	US Hedge Fund 64	0.443
US Hedge Fund 65	0.415	US Hedge Fund 65	0.391	US Hedge Fund 65	0.500	US Hedge Fund 65	0.434
US Hedge Fund 66	0.720	US Hedge Fund 66	0.700	US Hedge Fund 66	0.821	US Hedge Fund 66	0.730
US Hedge Fund 67	0.664	US Hedge Fund 67	0.614	US Hedge Fund 67	0.613	US Hedge Fund 67	0.585
US Hedge Fund 68	0.250	US Hedge Fund 68	0.249	US Hedge Fund 68	0.168	US Hedge Fund 68	0.156
US Hedge Fund 69	0.393	US Hedge Fund 69	0.417	US Hedge Fund 69	0.335	US Hedge Fund 69	0.284
US Hedge Fund 70	0.077	US Hedge Fund 70	0.118	US Hedge Fund 70	-0.033	US Hedge Fund 70	-0.025
US Hedge Fund 71	0.073	US Hedge Fund 71	0.111	US Hedge Fund 71	-0.036	US Hedge Fund 71	-0.031

US Hedge Fund 72	0.783	US Hedge Fund 72	0.762	US Hedge Fund 72	0.803	US Hedge Fund 72	0.732
US Hedge Fund 73	0.671	US Hedge Fund 73	0.707	US Hedge Fund 73	0.568	US Hedge Fund 73	0.464
US Hedge Fund 74	0.250	US Hedge Fund 74	0.255	US Hedge Fund 74	0.276	US Hedge Fund 74	0.143
US Hedge Fund 75	0.250	US Hedge Fund 75	0.257	US Hedge Fund 75	0.283	US Hedge Fund 75	0.151
US Hedge Fund 76	0.748	US Hedge Fund 76	0.768	US Hedge Fund 76	0.890	US Hedge Fund 76	0.825
US Hedge Fund 77	0.758	US Hedge Fund 77	0.737	US Hedge Fund 77	0.775	US Hedge Fund 77	0.693
US Hedge Fund 78	0.654	US Hedge Fund 78	0.654	US Hedge Fund 78	0.614	US Hedge Fund 78	0.544
US Hedge Fund 79	-0.308	US Hedge Fund 79	-0.251	US Hedge Fund 79	-0.271	US Hedge Fund 79	-0.218
US Hedge Fund 80	0.639	US Hedge Fund 80	0.607	US Hedge Fund 80	0.724	US Hedge Fund 80	0.670
US Hedge Fund 81	0.523	US Hedge Fund 81	0.516	US Hedge Fund 81	0.549	US Hedge Fund 81	0.424
US Hedge Fund 82	0.675	US Hedge Fund 82	0.684	US Hedge Fund 82	0.689	US Hedge Fund 82	0.588
US Hedge Fund 83	0.673	US Hedge Fund 83	0.681	US Hedge Fund 83	0.687	US Hedge Fund 83	0.586
US Hedge Fund 84	-0.249	US Hedge Fund 84	-0.228	US Hedge Fund 84	-0.276	US Hedge Fund 84	-0.281
AVERAGE	0.571	AVERAGE	0.576	AVERAGE	0.572	AVERAGE	0.510

Source: Compiled by author.

Table N: Correlation between EU Hedge funds and indices (Post-financial crisis period)

Name	CAC 40	Name	DAX	Name	S&P 500	Name	Dow Jones
EU Hedge Fund 1	0.573	EU Hedge Fund 1	0.534	EU Hedge Fund 1	0.569	EU Hedge Fund 1	0.544
EU Hedge Fund 2	0.582	EU Hedge Fund 2	0.531	EU Hedge Fund 2	0.568	EU Hedge Fund 2	0.543
EU Hedge Fund 3	0.654	EU Hedge Fund 3	0.623	EU Hedge Fund 3	0.723	EU Hedge Fund 3	0.708
EU Hedge Fund 4	0.673	EU Hedge Fund 4	0.637	EU Hedge Fund 4	0.735	EU Hedge Fund 4	0.719
EU Hedge Fund 5	0.522	EU Hedge Fund 5	0.598	EU Hedge Fund 5	0.551	EU Hedge Fund 5	0.529
EU Hedge Fund 6	0.527	EU Hedge Fund 6	0.600	EU Hedge Fund 6	0.557	EU Hedge Fund 6	0.536
EU Hedge Fund 7	0.526	EU Hedge Fund 7	0.600	EU Hedge Fund 7	0.554	EU Hedge Fund 7	0.533
EU Hedge Fund 8	0.208	EU Hedge Fund 8	0.252	EU Hedge Fund 8	0.145	EU Hedge Fund 8	0.142
EU Hedge Fund 9	0.826	EU Hedge Fund 9	0.889	EU Hedge Fund 9	0.841	EU Hedge Fund 9	0.799
EU Hedge Fund 10	0.833	EU Hedge Fund 10	0.888	EU Hedge Fund 10	0.839	EU Hedge Fund 10	0.802
EU Hedge Fund 11	0.020	EU Hedge Fund 11	0.175	EU Hedge Fund 11	-0.027	EU Hedge Fund 11	-0.063
EU Hedge Fund 12	0.546	EU Hedge Fund 12	0.377	EU Hedge Fund 12	0.567	EU Hedge Fund 12	0.559
EU Hedge Fund 13	0.110	EU Hedge Fund 13	0.232	EU Hedge Fund 13	0.056	EU Hedge Fund 13	0.021
EU Hedge Fund 14	0.476	EU Hedge Fund 14	0.515	EU Hedge Fund 14	0.540	EU Hedge Fund 14	0.489
EU Hedge Fund 15	0.500	EU Hedge Fund 15	0.522	EU Hedge Fund 15	0.560	EU Hedge Fund 15	0.509
EU Hedge Fund 16	0.503	EU Hedge Fund 16	0.531	EU Hedge Fund 16	0.559	EU Hedge Fund 16	0.508
EU Hedge Fund 17	0.904	EU Hedge Fund 17	0.753	EU Hedge Fund 17	0.880	EU Hedge Fund 17	0.881
EU Hedge Fund 18	0.808	EU Hedge Fund 18	0.658	EU Hedge Fund 18	0.810	EU Hedge Fund 18	0.822
EU Hedge Fund 19	0.864	EU Hedge Fund 19	0.845	EU Hedge Fund 19	0.837	EU Hedge Fund 19	0.816
EU Hedge Fund 20	0.894	EU Hedge Fund 20	0.747	EU Hedge Fund 20	0.901	EU Hedge Fund 20	0.897
EU Hedge Fund 21	0.290	EU Hedge Fund 21	0.398	EU Hedge Fund 21	0.390	EU Hedge Fund 21	0.377
EU Hedge Fund 22	0.427	EU Hedge Fund 22	0.365	EU Hedge Fund 22	0.415	EU Hedge Fund 22	0.408
EU Hedge Fund 23	0.411	EU Hedge Fund 23	0.356	EU Hedge Fund 23	0.399	EU Hedge Fund 23	0.391
EU Hedge Fund 24	0.745	EU Hedge Fund 24	0.532	EU Hedge Fund 24	0.788	EU Hedge Fund 24	0.803
EU Hedge Fund 25	0.881	EU Hedge Fund 25	0.842	EU Hedge Fund 25	0.883	EU Hedge Fund 25	0.869
EU Hedge Fund 26	0.288	EU Hedge Fund 26	0.121	EU Hedge Fund 26	0.361	EU Hedge Fund 26	0.347
EU Hedge Fund 27	0.274	EU Hedge Fund 27	0.112	EU Hedge Fund 27	0.333	EU Hedge Fund 27	0.319
EU Hedge Fund 28	0.288	EU Hedge Fund 28	0.122	EU Hedge Fund 28	0.362	EU Hedge Fund 28	0.347
EU Hedge Fund 29	0.312	EU Hedge Fund 29	0.345	EU Hedge Fund 29	0.313	EU Hedge Fund 29	0.331
EU Hedge Fund 30	0.313	EU Hedge Fund 30	0.323	EU Hedge Fund 30	0.325	EU Hedge Fund 30	0.347
EU Hedge Fund 31	0.642	EU Hedge Fund 31	0.583	EU Hedge Fund 31	0.654	EU Hedge Fund 31	0.634
EU Hedge Fund 32	0.591	EU Hedge Fund 32	0.595	EU Hedge Fund 32	0.586	EU Hedge Fund 32	0.544
EU Hedge Fund 33	-0.538	EU Hedge Fund 33	-0.357	EU Hedge Fund 33	-0.490	EU Hedge Fund 33	-0.479
EU Hedge Fund 34	0.357	EU Hedge Fund 34	0.332	EU Hedge Fund 34	0.509	EU Hedge Fund 34	0.470
EU Hedge Fund 35	0.355	EU Hedge Fund 35	0.331	EU Hedge Fund 35	0.505	EU Hedge Fund 35	0.466
EU Hedge Fund 36	0.356	EU Hedge Fund 36	0.331	EU Hedge Fund 36	0.508	EU Hedge Fund 36	0.470
EU Hedge Fund 37	0.332	EU Hedge Fund 37	0.322	EU Hedge Fund 37	0.329	EU Hedge Fund 37	0.264
EU Hedge Fund 38	0.396	EU Hedge Fund 38	0.356	EU Hedge Fund 38	0.414	EU Hedge Fund 38	0.357
AVERAGE	0.481	AVERAGE	0.461	AVERAGE	0.509	AVERAGE	0.488

Source: Compiled by author.

Table O: Correlation between US Hedge funds and indices (Post-financial crisis period)

Name	CAC 40	Name	DAX	Name	S&P 500	Name	Dow Jones
US Hedge Fund 1	0.742	US Hedge Fund 1	0.647	US Hedge Fund 1	0.894	US Hedge Fund 1	0.872
US Hedge Fund 2	0.702	US Hedge Fund 2	0.662	US Hedge Fund 2	0.855	US Hedge Fund 2	0.833
US Hedge Fund 3	0.724	US Hedge Fund 3	0.604	US Hedge Fund 3	0.846	US Hedge Fund 3	0.814
US Hedge Fund 4	0.749	US Hedge Fund 4	0.639	US Hedge Fund 4	0.850	US Hedge Fund 4	0.821
US Hedge Fund 5	0.864	US Hedge Fund 5	0.766	US Hedge Fund 5	0.960	US Hedge Fund 5	0.943
US Hedge Fund 6	0.860	US Hedge Fund 6	0.767	US Hedge Fund 6	0.950	US Hedge Fund 6	0.931
US Hedge Fund 7	0.787	US Hedge Fund 7	0.782	US Hedge Fund 7	0.935	US Hedge Fund 7	0.919
US Hedge Fund 8	0.785	US Hedge Fund 8	0.777	US Hedge Fund 8	0.932	US Hedge Fund 8	0.915
US Hedge Fund 9	0.565	US Hedge Fund 9	0.610	US Hedge Fund 9	0.717	US Hedge Fund 9	0.675
US Hedge Fund 10	0.709	US Hedge Fund 10	0.616	US Hedge Fund 10	0.815	US Hedge Fund 10	0.830
US Hedge Fund 11	0.210	US Hedge Fund 11	0.356	US Hedge Fund 11	0.352	US Hedge Fund 11	0.312
US Hedge Fund 12	-0.344	US Hedge Fund 12	-0.366	US Hedge Fund 12	-0.330	US Hedge Fund 12	-0.287
US Hedge Fund 13	0.755	US Hedge Fund 13	0.644	US Hedge Fund 13	0.922	US Hedge Fund 13	0.902
US Hedge Fund 14	0.761	US Hedge Fund 14	0.813	US Hedge Fund 14	0.803	US Hedge Fund 14	0.780
US Hedge Fund 15	0.761	US Hedge Fund 15	0.812	US Hedge Fund 15	0.799	US Hedge Fund 15	0.777
US Hedge Fund 16	0.764	US Hedge Fund 16	0.738	US Hedge Fund 16	0.812	US Hedge Fund 16	0.770
US Hedge Fund 17	0.637	US Hedge Fund 17	0.555	US Hedge Fund 17	0.756	US Hedge Fund 17	0.698
US Hedge Fund 18	0.830	US Hedge Fund 18	0.697	US Hedge Fund 18	0.939	US Hedge Fund 18	0.910
US Hedge Fund 19	0.760	US Hedge Fund 19	0.635	US Hedge Fund 19	0.846	US Hedge Fund 19	0.843
US Hedge Fund 20	0.672	US Hedge Fund 20	0.605	US Hedge Fund 20	0.736	US Hedge Fund 20	0.739
US Hedge Fund 21	0.798	US Hedge Fund 21	0.775	US Hedge Fund 21	0.934	US Hedge Fund 21	0.909
US Hedge Fund 22	0.770	US Hedge Fund 22	0.806	US Hedge Fund 22	0.809	US Hedge Fund 22	0.802
US Hedge Fund 23	0.642	US Hedge Fund 23	0.724	US Hedge Fund 23	0.799	US Hedge Fund 23	0.761
US Hedge Fund 24	0.433	US Hedge Fund 24	0.300	US Hedge Fund 24	0.570	US Hedge Fund 24	0.529
US Hedge Fund 25	0.469	US Hedge Fund 25	0.422	US Hedge Fund 25	0.690	US Hedge Fund 25	0.658
US Hedge Fund 26	0.469	US Hedge Fund 26	0.423	US Hedge Fund 26	0.686	US Hedge Fund 26	0.657
US Hedge Fund 27	0.478	US Hedge Fund 27	0.430	US Hedge Fund 27	0.697	US Hedge Fund 27	0.667
US Hedge Fund 28	0.398	US Hedge Fund 28	0.423	US Hedge Fund 28	0.373	US Hedge Fund 28	0.354
US Hedge Fund 29	0.783	US Hedge Fund 29	0.756	US Hedge Fund 29	0.932	US Hedge Fund 29	0.902
US Hedge Fund 30	0.803	US Hedge Fund 30	0.684	US Hedge Fund 30	0.905	US Hedge Fund 30	0.875
US Hedge Fund 31	0.608	US Hedge Fund 31	0.510	US Hedge Fund 31	0.745	US Hedge Fund 31	0.743
US Hedge Fund 32	0.247	US Hedge Fund 32	0.197	US Hedge Fund 32	0.392	US Hedge Fund 32	0.353
US Hedge Fund 33	0.680	US Hedge Fund 33	0.624	US Hedge Fund 33	0.752	US Hedge Fund 33	0.732
US Hedge Fund 34	0.861	US Hedge Fund 34	0.801	US Hedge Fund 34	0.949	US Hedge Fund 34	0.923
US Hedge Fund 35	0.890	US Hedge Fund 35	0.755	US Hedge Fund 35	0.956	US Hedge Fund 35	0.941
US Hedge Fund 36	0.491	US Hedge Fund 36	0.579	US Hedge Fund 36	0.609	US Hedge Fund 36	0.575
US Hedge Fund 37	0.686	US Hedge Fund 37	0.630	US Hedge Fund 37	0.755	US Hedge Fund 37	0.721
US Hedge Fund 38	0.682	US Hedge Fund 38	0.644	US Hedge Fund 38	0.748	US Hedge Fund 38	0.725
US Hedge Fund 39	0.768	US Hedge Fund 39	0.653	US Hedge Fund 39	0.861	US Hedge Fund 39	0.849
US Hedge Fund 40	0.248	US Hedge Fund 40	0.095	US Hedge Fund 40	0.193	US Hedge Fund 40	0.177
US Hedge Fund 41	0.766	US Hedge Fund 41	0.691	US Hedge Fund 41	0.839	US Hedge Fund 41	0.802
US Hedge Fund 42	0.766	US Hedge Fund 42	0.694	US Hedge Fund 42	0.836	US Hedge Fund 42	0.797
US Hedge Fund 43	0.769	US Hedge Fund 43	0.699	US Hedge Fund 43	0.839	US Hedge Fund 43	0.800
US Hedge Fund 44	-0.517	US Hedge Fund 44	-0.581	US Hedge Fund 44	-0.502	US Hedge Fund 44	-0.518
US Hedge Fund 45	0.395	US Hedge Fund 45	0.487	US Hedge Fund 45	0.543	US Hedge Fund 45	0.499
US Hedge Fund 46	0.306	US Hedge Fund 46	0.368	US Hedge Fund 46	0.449	US Hedge Fund 46	0.421
US Hedge Fund 47	0.306	US Hedge Fund 47	0.368	US Hedge Fund 47	0.449	US Hedge Fund 47	0.421
US Hedge Fund 48	0.718	US Hedge Fund 48	0.674	US Hedge Fund 48	0.826	US Hedge Fund 48	0.793
US Hedge Fund 49	0.662	US Hedge Fund 49	0.630	US Hedge Fund 49	0.785	US Hedge Fund 49	0.749
US Hedge Fund 50	0.894	US Hedge Fund 50	0.785	US Hedge Fund 50	0.939	US Hedge Fund 50	0.924
US Hedge Fund 51	0.662	US Hedge Fund 51	0.631	US Hedge Fund 51	0.786	US Hedge Fund 51	0.749
US Hedge Fund 52	0.855	US Hedge Fund 52	0.763	US Hedge Fund 52	0.975	US Hedge Fund 52	0.955
US Hedge Fund 53	0.851	US Hedge Fund 53	0.756	US Hedge Fund 53	0.956	US Hedge Fund 53	0.935
US Hedge Fund 54	0.855	US Hedge Fund 54	0.753	US Hedge Fund 54	0.950	US Hedge Fund 54	0.928
US Hedge Fund 55	0.823	US Hedge Fund 55	0.761	US Hedge Fund 55	0.950	US Hedge Fund 55	0.929
US Hedge Fund 56	0.844	US Hedge Fund 56	0.771	US Hedge Fund 56	0.963	US Hedge Fund 56	0.946
US Hedge Fund 57	0.013	US Hedge Fund 57	-0.111	US Hedge Fund 57	-0.056	US Hedge Fund 57	-0.041
US Hedge Fund 58	0.209	US Hedge Fund 58	0.368	US Hedge Fund 58	0.300	US Hedge Fund 58	0.257
US Hedge Fund 59	0.738	US Hedge Fund 59	0.726	US Hedge Fund 59	0.821	US Hedge Fund 59	0.792
US Hedge Fund 60	0.530	US Hedge Fund 60	0.375	US Hedge Fund 60	0.460	US Hedge Fund 60	0.451
US Hedge Fund 61	0.525	US Hedge Fund 61	0.371	US Hedge Fund 61	0.455	US Hedge Fund 61	0.445
US Hedge Fund 62	0.497	US Hedge Fund 62	0.337	US Hedge Fund 62	0.425	US Hedge Fund 62	0.417
US Hedge Fund 63	0.532	US Hedge Fund 63	0.377	US Hedge Fund 63	0.464	US Hedge Fund 63	0.455
US Hedge Fund 64	0.412	US Hedge Fund 64	0.468	US Hedge Fund 64	0.436	US Hedge Fund 64	0.418
US Hedge Fund 65	0.396	US Hedge Fund 65	0.461	US Hedge Fund 65	0.419	US Hedge Fund 65	0.401
US Hedge Fund 66	0.784	US Hedge Fund 66	0.734	US Hedge Fund 66	0.907	US Hedge Fund 66	0.867
US Hedge Fund 67	0.748	US Hedge Fund 67	0.626	US Hedge Fund 67	0.698	US Hedge Fund 67	0.664
US Hedge Fund 68	0.647	US Hedge Fund 68	0.552	US Hedge Fund 68	0.582	US Hedge Fund 68	0.602
US Hedge Fund 69	0.586	US Hedge Fund 69	0.496	US Hedge Fund 69	0.698	US Hedge Fund 69	0.665
US Hedge Fund 70	0.513	US Hedge Fund 70	0.561	US Hedge Fund 70	0.524	US Hedge Fund 70	0.518
US Hedge Fund 71	0.512	US Hedge Fund 71	0.563	US Hedge Fund 71	0.524	US Hedge Fund 71	0.518

US Hedge Fund 72	0.810	US Hedge Fund 72	0.679	US Hedge Fund 72	0.889	US Hedge Fund 72	0.845
US Hedge Fund 73	0.790	US Hedge Fund 73	0.727	US Hedge Fund 73	0.940	US Hedge Fund 73	0.917
US Hedge Fund 74	0.625	US Hedge Fund 74	0.566	US Hedge Fund 74	0.729	US Hedge Fund 74	0.692
US Hedge Fund 75	0.626	US Hedge Fund 75	0.568	US Hedge Fund 75	0.731	US Hedge Fund 75	0.694
US Hedge Fund 76	0.780	US Hedge Fund 76	0.722	US Hedge Fund 76	0.923	US Hedge Fund 76	0.899
US Hedge Fund 77	0.737	US Hedge Fund 77	0.626	US Hedge Fund 77	0.834	US Hedge Fund 77	0.801
US Hedge Fund 78	0.680	US Hedge Fund 78	0.669	US Hedge Fund 78	0.722	US Hedge Fund 78	0.701
US Hedge Fund 79	0.008	US Hedge Fund 79	0.176	US Hedge Fund 79	-0.236	US Hedge Fund 79	-0.257
US Hedge Fund 80	0.702	US Hedge Fund 80	0.666	US Hedge Fund 80	0.853	US Hedge Fund 80	0.831
US Hedge Fund 81	0.715	US Hedge Fund 81	0.678	US Hedge Fund 81	0.860	US Hedge Fund 81	0.834
US Hedge Fund 82	0.842	US Hedge Fund 82	0.779	US Hedge Fund 82	0.935	US Hedge Fund 82	0.920
US Hedge Fund 83	0.839	US Hedge Fund 83	0.778	US Hedge Fund 83	0.935	US Hedge Fund 83	0.920
US Hedge Fund 84	-0.202	US Hedge Fund 84	-0.136	US Hedge Fund 84	-0.241	US Hedge Fund 84	-0.195
AVERAGE	0.608	AVERAGE	0.562	AVERAGE	0.689	AVERAGE	0.667

Source: Compiled by author.

Table P: The EWMA results: Ranked from highest to lowest volatility

Pre-financial crisis period		During financial crisis period		Post-financial crisis period	
Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 69	0.194	US Hedge Fund 17	0.561	US Hedge Fund 40	0.594
US Hedge Fund 72	0.184	US Hedge Fund 72	0.556	US Hedge Fund 72	0.311
US Hedge Fund 78	0.181	US Hedge Fund 48	0.478	US Hedge Fund 69	0.283
EU Hedge Fund 31	0.177	US Hedge Fund 18	0.313	US Hedge Fund 3	0.274
EU Hedge Fund 32	0.173	US Hedge Fund 3	0.308	US Hedge Fund 28	0.270
US Hedge Fund 48	0.168	US Hedge Fund 37	0.289	US Hedge Fund 38	0.253
US Hedge Fund 14	0.168	US Hedge Fund 38	0.285	US Hedge Fund 17	0.248
US Hedge Fund 15	0.164	US Hedge Fund 13	0.284	US Hedge Fund 37	0.247
US Hedge Fund 75	0.161	US Hedge Fund 29	0.263	US Hedge Fund 5	0.236
US Hedge Fund 34	0.157	US Hedge Fund 53	0.258	US Hedge Fund 13	0.234
US Hedge Fund 40	0.155	US Hedge Fund 5	0.255	DAX	0.230
US Hedge Fund 29	0.155	US Hedge Fund 6	0.253	US Hedge Fund 7	0.228
US Hedge Fund 74	0.153	EU Hedge Fund 25	0.250	US Hedge Fund 8	0.228
US Hedge Fund 3	0.152	US Hedge Fund 10	0.247	US Hedge Fund 34	0.228
US Hedge Fund 17	0.151	US Hedge Fund 69	0.245	US Hedge Fund 48	0.217
US Hedge Fund 64	0.148	EU Hedge Fund 31	0.245	US Hedge Fund 6	0.209
US Hedge Fund 65	0.147	US Hedge Fund 77	0.244	US Hedge Fund 73	0.207
US Hedge Fund 67	0.140	DAX	0.243	US Hedge Fund 29	0.206
US Hedge Fund 38	0.140	US Hedge Fund 4	0.239	EU Hedge Fund 10	0.199
US Hedge Fund 37	0.138	US Hedge Fund 30	0.237	US Hedge Fund 53	0.199
EU Hedge Fund 2	0.135	US Hedge Fund 40	0.230	US Hedge Fund 61	0.199
US Hedge Fund 24	0.135	US Hedge Fund 21	0.229	CAC 40	0.197
EU Hedge Fund 1	0.131	US Hedge Fund 35	0.222	US Hedge Fund 63	0.196
US Hedge Fund 61	0.129	EU Hedge Fund 17	0.221	US Hedge Fund 60	0.195
US Hedge Fund 7	0.129	CAC 40	0.220	EU Hedge Fund 25	0.195
US Hedge Fund 8	0.128	US Hedge Fund 34	0.216	EU Hedge Fund 17	0.193
US Hedge Fund 10	0.126	US Hedge Fund 1	0.211	EU Hedge Fund 9	0.193
EU Hedge Fund 6	0.126	EU Hedge Fund 20	0.211	US Hedge Fund 54	0.192
EU Hedge Fund 11	0.125	S&P 500	0.211	US Hedge Fund 52	0.190
EU Hedge Fund 10	0.124	EU Hedge Fund 18	0.208	US Hedge Fund 14	0.184
US Hedge Fund 13	0.124	US Hedge Fund 24	0.203	US Hedge Fund 15	0.180
EU Hedge Fund 7	0.122	US Hedge Fund 33	0.195	US Hedge Fund 21	0.178
EU Hedge Fund 5	0.120	US Hedge Fund 7	0.194	US Hedge Fund 45	0.176
EU Hedge Fund 17	0.117	Dow Jones	0.193	EU Hedge Fund 20	0.174
DAX	0.117	US Hedge Fund 8	0.192	US Hedge Fund 22	0.172
EU Hedge Fund 9	0.116	US Hedge Fund 2	0.191	US Hedge Fund 1	0.170
US Hedge Fund 63	0.113	EU Hedge Fund 9	0.191	US Hedge Fund 49	0.169
US Hedge Fund 80	0.113	EU Hedge Fund 32	0.191	US Hedge Fund 51	0.169
EU Hedge Fund 18	0.112	EU Hedge Fund 19	0.190	EU Hedge Fund 18	0.163
US Hedge Fund 60	0.112	EU Hedge Fund 10	0.189	US Hedge Fund 62	0.163
EU Hedge Fund 13	0.110	US Hedge Fund 61	0.185	S&P 500	0.160
US Hedge Fund 53	0.109	US Hedge Fund 51	0.182	US Hedge Fund 75	0.159
US Hedge Fund 2	0.107	US Hedge Fund 49	0.182	US Hedge Fund 55	0.159
EU Hedge Fund 8	0.106	US Hedge Fund 52	0.182	US Hedge Fund 66	0.158
US Hedge Fund 77	0.106	US Hedge Fund 60	0.180	US Hedge Fund 74	0.158
EU Hedge Fund 21	0.105	US Hedge Fund 63	0.180	US Hedge Fund 2	0.153
EU Hedge Fund 12	0.105	US Hedge Fund 66	0.179	US Hedge Fund 80	0.152
EU Hedge Fund 20	0.104	US Hedge Fund 12	0.176	US Hedge Fund 30	0.152
US Hedge Fund 54	0.104	US Hedge Fund 54	0.176	US Hedge Fund 18	0.151
US Hedge Fund 5	0.102	US Hedge Fund 80	0.176	US Hedge Fund 56	0.150
US Hedge Fund 22	0.102	US Hedge Fund 50	0.175	EU Hedge Fund 38	0.148
EU Hedge Fund 28	0.101	US Hedge Fund 16	0.171	US Hedge Fund 20	0.145
CAC 40	0.100	US Hedge Fund 22	0.170	US Hedge Fund 19	0.144
US Hedge Fund 82	0.100	US Hedge Fund 62	0.170	EU Hedge Fund 37	0.144
US Hedge Fund 83	0.099	US Hedge Fund 73	0.170	Dow Jones	0.144
US Hedge Fund 16	0.099	US Hedge Fund 74	0.168	US Hedge Fund 9	0.141
US Hedge Fund 4	0.099	US Hedge Fund 75	0.168	US Hedge Fund 33	0.138
EU Hedge Fund 27	0.097	EU Hedge Fund 38	0.160	EU Hedge Fund 19	0.137
US Hedge Fund 62	0.096	US Hedge Fund 45	0.156	EU Hedge Fund 34	0.136
EU Hedge Fund 19	0.096	EU Hedge Fund 33	0.155	EU Hedge Fund 35	0.136
US Hedge Fund 33	0.096	EU Hedge Fund 37	0.152	EU Hedge Fund 36	0.136
EU Hedge Fund 26	0.095	US Hedge Fund 56	0.150	US Hedge Fund 82	0.134
US Hedge Fund 55	0.095	US Hedge Fund 78	0.150	US Hedge Fund 83	0.133
US Hedge Fund 9	0.095	US Hedge Fund 55	0.149	US Hedge Fund 50	0.131
US Hedge Fund 66	0.094	US Hedge Fund 9	0.146	US Hedge Fund 23	0.131
US Hedge Fund 19	0.093	EU Hedge Fund 5	0.145	EU Hedge Fund 33	0.127
US Hedge Fund 81	0.092	US Hedge Fund 15	0.145	US Hedge Fund 12	0.127
EU Hedge Fund 33	0.092	US Hedge Fund 14	0.144	EU Hedge Fund 8	0.124
US Hedge Fund 12	0.092	EU Hedge Fund 7	0.143	US Hedge Fund 76	0.124
US Hedge Fund 1	0.090	EU Hedge Fund 6	0.143	US Hedge Fund 10	0.123
US Hedge Fund 6	0.089	EU Hedge Fund 36	0.140	US Hedge Fund 77	0.123
US Hedge Fund 45	0.081	US Hedge Fund 19	0.139	US Hedge Fund 16	0.121

US Hedge Fund 44	0.080	EU Hedge Fund 35	0.138	US Hedge Fund 4	0.119
US Hedge Fund 84	0.080	US Hedge Fund 23	0.138	US Hedge Fund 46	0.113
US Hedge Fund 52	0.077	US Hedge Fund 84	0.137	US Hedge Fund 47	0.113
EU Hedge Fund 25	0.076	EU Hedge Fund 34	0.135	US Hedge Fund 67	0.113
US Hedge Fund 30	0.075	EU Hedge Fund 1	0.133	EU Hedge Fund 31	0.109
EU Hedge Fund 16	0.074	EU Hedge Fund 2	0.132	US Hedge Fund 35	0.107
US Hedge Fund 79	0.074	US Hedge Fund 81	0.132	US Hedge Fund 81	0.107
EU Hedge Fund 34	0.074	US Hedge Fund 67	0.132	US Hedge Fund 24	0.105
EU Hedge Fund 35	0.073	US Hedge Fund 65	0.129	EU Hedge Fund 32	0.105
US Hedge Fund 23	0.073	EU Hedge Fund 12	0.128	US Hedge Fund 65	0.102
US Hedge Fund 18	0.072	US Hedge Fund 64	0.128	EU Hedge Fund 6	0.102
EU Hedge Fund 36	0.072	US Hedge Fund 20	0.126	EU Hedge Fund 7	0.101
EU Hedge Fund 15	0.072	EU Hedge Fund 8	0.125	EU Hedge Fund 5	0.100
US Hedge Fund 35	0.072	EU Hedge Fund 13	0.114	US Hedge Fund 78	0.096
US Hedge Fund 31	0.071	US Hedge Fund 43	0.112	US Hedge Fund 25	0.094
EU Hedge Fund 14	0.071	US Hedge Fund 76	0.112	US Hedge Fund 27	0.094
US Hedge Fund 39	0.070	US Hedge Fund 42	0.110	US Hedge Fund 26	0.093
US Hedge Fund 20	0.070	US Hedge Fund 41	0.110	US Hedge Fund 64	0.091
US Hedge Fund 59	0.069	US Hedge Fund 24	0.109	EU Hedge Fund 14	0.091
S&P 500	0.069	EU Hedge Fund 21	0.108	EU Hedge Fund 21	0.091
US Hedge Fund 25	0.068	EU Hedge Fund 11	0.106	EU Hedge Fund 23	0.090
US Hedge Fund 27	0.068	US Hedge Fund 32	0.098	EU Hedge Fund 16	0.089
EU Hedge Fund 23	0.067	US Hedge Fund 28	0.096	EU Hedge Fund 22	0.089
US Hedge Fund 26	0.067	US Hedge Fund 57	0.095	EU Hedge Fund 15	0.089
Dow Jones	0.067	EU Hedge Fund 26	0.094	EU Hedge Fund 12	0.085
EU Hedge Fund 24	0.066	US Hedge Fund 82	0.093	EU Hedge Fund 26	0.080
EU Hedge Fund 22	0.066	US Hedge Fund 83	0.092	EU Hedge Fund 28	0.079
US Hedge Fund 28	0.066	US Hedge Fund 25	0.091	EU Hedge Fund 27	0.079
US Hedge Fund 36	0.064	EU Hedge Fund 27	0.091	US Hedge Fund 11	0.078
US Hedge Fund 57	0.064	US Hedge Fund 27	0.090	US Hedge Fund 84	0.077
US Hedge Fund 49	0.063	US Hedge Fund 44	0.089	EU Hedge Fund 11	0.077
US Hedge Fund 51	0.063	EU Hedge Fund 15	0.089	EU Hedge Fund 13	0.075
US Hedge Fund 21	0.060	EU Hedge Fund 14	0.089	US Hedge Fund 57	0.075
US Hedge Fund 76	0.060	US Hedge Fund 26	0.087	EU Hedge Fund 2	0.074
US Hedge Fund 73	0.059	US Hedge Fund 28	0.087	EU Hedge Fund 1	0.073
US Hedge Fund 56	0.058	EU Hedge Fund 16	0.086	EU Hedge Fund 30	0.068
US Hedge Fund 50	0.057	US Hedge Fund 79	0.085	EU Hedge Fund 29	0.068
US Hedge Fund 68	0.056	US Hedge Fund 31	0.084	US Hedge Fund 58	0.065
US Hedge Fund 32	0.056	EU Hedge Fund 29	0.079	US Hedge Fund 31	0.064
EU Hedge Fund 4	0.052	EU Hedge Fund 30	0.079	US Hedge Fund 39	0.061
EU Hedge Fund 3	0.051	US Hedge Fund 59	0.076	US Hedge Fund 42	0.058
EU Hedge Fund 38	0.050	US Hedge Fund 71	0.068	US Hedge Fund 43	0.058
EU Hedge Fund 30	0.048	US Hedge Fund 70	0.068	US Hedge Fund 79	0.058
EU Hedge Fund 29	0.048	EU Hedge Fund 23	0.067	US Hedge Fund 41	0.057
US Hedge Fund 11	0.046	EU Hedge Fund 22	0.065	EU Hedge Fund 24	0.052
US Hedge Fund 41	0.046	US Hedge Fund 68	0.061	US Hedge Fund 44	0.051
US Hedge Fund 42	0.046	US Hedge Fund 39	0.060	US Hedge Fund 59	0.051
US Hedge Fund 43	0.045	US Hedge Fund 11	0.060	US Hedge Fund 36	0.045
EU Hedge Fund 37	0.045	US Hedge Fund 36	0.057	US Hedge Fund 70	0.038
US Hedge Fund 71	0.041	EU Hedge Fund 4	0.051	US Hedge Fund 71	0.037
US Hedge Fund 70	0.038	EU Hedge Fund 3	0.050	US Hedge Fund 68	0.032
US Hedge Fund 47	0.034	US Hedge Fund 58	0.048	EU Hedge Fund 3	0.030
US Hedge Fund 46	0.033	US Hedge Fund 47	0.047	EU Hedge Fund 4	0.029
US Hedge Fund 58	0.032	US Hedge Fund 46	0.047	US Hedge Fund 32	0.027

Source: Compiled by author.

Table Q: Results from the Sharpe ratio – ranked from best to worst (Based on risk-free rates: Pre-financial crisis period)

EU Risk-free rate		US Risk-free rate	
Name	Estimate	Name	Estimate
US Hedge Fund 6	3.068	US Hedge Fund 6	3.160
US Hedge Fund 5	2.755	US Hedge Fund 5	2.833
EU Hedge Fund 6	2.672	EU Hedge Fund 6	2.748
EU Hedge Fund 7	2.666	EU Hedge Fund 7	2.744
EU Hedge Fund 5	2.590	EU Hedge Fund 5	2.668
EU Hedge Fund 24	2.350	EU Hedge Fund 24	2.487
US Hedge Fund 41	2.097	US Hedge Fund 47	2.347
US Hedge Fund 42	2.050	US Hedge Fund 41	2.280
US Hedge Fund 47	2.030	US Hedge Fund 42	2.234
EU Hedge Fund 19	2.019	US Hedge Fund 46	2.141
US Hedge Fund 43	1.888	EU Hedge Fund 19	2.102
EU Hedge Fund 4	1.886	US Hedge Fund 43	2.068
EU Hedge Fund 13	1.863	EU Hedge Fund 4	2.061
US Hedge Fund 46	1.824	US Hedge Fund 32	1.989
US Hedge Fund 32	1.819	EU Hedge Fund 13	1.935
US Hedge Fund 31	1.807	US Hedge Fund 31	1.929
EU Hedge Fund 18	1.727	EU Hedge Fund 3	1.882
EU Hedge Fund 12	1.721	EU Hedge Fund 18	1.796
EU Hedge Fund 3	1.706	EU Hedge Fund 12	1.790
EU Hedge Fund 11	1.619	US Hedge Fund 18	1.717
EU Hedge Fund 17	1.586	EU Hedge Fund 11	1.678
US Hedge Fund 18	1.576	US Hedge Fund 35	1.651
US Hedge Fund 35	1.552	EU Hedge Fund 17	1.648
EU Hedge Fund 15	1.504	EU Hedge Fund 15	1.614
EU Hedge Fund 9	1.500	US Hedge Fund 56	1.612
US Hedge Fund 56	1.500	EU Hedge Fund 9	1.572
US Hedge Fund 4	1.467	EU Hedge Fund 16	1.555
EU Hedge Fund 2	1.456	US Hedge Fund 4	1.532
EU Hedge Fund 20	1.447	EU Hedge Fund 14	1.530
EU Hedge Fund 16	1.445	EU Hedge Fund 2	1.517
US Hedge Fund 10	1.444	EU Hedge Fund 20	1.515
EU Hedge Fund 31	1.422	US Hedge Fund 76	1.504
EU Hedge Fund 14	1.417	US Hedge Fund 10	1.502
EU Hedge Fund 32	1.404	EU Hedge Fund 31	1.464
US Hedge Fund 76	1.390	EU Hedge Fund 10	1.450
EU Hedge Fund 1	1.387	EU Hedge Fund 1	1.449
EU Hedge Fund 10	1.383	EU Hedge Fund 32	1.448
DAX	1.361	CAC 40	1.430
CAC 40	1.355	DAX	1.423
US Hedge Fund 75	1.305	US Hedge Fund 64	1.358
US Hedge Fund 64	1.299	US Hedge Fund 23	1.349
US Hedge Fund 74	1.292	US Hedge Fund 75	1.346
US Hedge Fund 77	1.263	US Hedge Fund 50	1.344
US Hedge Fund 23	1.247	US Hedge Fund 74	1.335
US Hedge Fund 65	1.246	US Hedge Fund 77	1.323
US Hedge Fund 50	1.228	US Hedge Fund 30	1.318
US Hedge Fund 30	1.212	US Hedge Fund 65	1.304
US Hedge Fund 20	1.186	US Hedge Fund 20	1.290
US Hedge Fund 36	1.158	US Hedge Fund 36	1.271
US Hedge Fund 16	1.147	US Hedge Fund 16	1.215
EU Hedge Fund 34	1.093	EU Hedge Fund 34	1.199
US Hedge Fund 52	1.075	US Hedge Fund 52	1.158
US Hedge Fund 81	1.072	US Hedge Fund 81	1.147
US Hedge Fund 84	1.020	US Hedge Fund 84	1.113
US Hedge Fund 9	0.934	US Hedge Fund 9	1.011
US Hedge Fund 22	0.908	EU Hedge Fund 35	1.005
EU Hedge Fund 35	0.902	US Hedge Fund 22	0.973
US Hedge Fund 72	0.872	US Hedge Fund 39	0.971
US Hedge Fund 39	0.865	EU Hedge Fund 29	0.937
US Hedge Fund 14	0.857	US Hedge Fund 72	0.911
US Hedge Fund 15	0.849	US Hedge Fund 14	0.901
EU Hedge Fund 29	0.777	US Hedge Fund 15	0.893
US Hedge Fund 80	0.762	EU Hedge Fund 36	0.850
US Hedge Fund 19	0.760	US Hedge Fund 19	0.837
EU Hedge Fund 36	0.746	US Hedge Fund 80	0.821
US Hedge Fund 2	0.738	US Hedge Fund 11	0.817
US Hedge Fund 69	0.701	US Hedge Fund 2	0.801
US Hedge Fund 11	0.683	EU Hedge Fund 30	0.767
EU Hedge Fund 21	0.664	US Hedge Fund 70	0.750
EU Hedge Fund 30	0.615	EU Hedge Fund 21	0.742

US Hedge Fund 68	0.602	US Hedge Fund 69	0.735
S&P 500	0.598	US Hedge Fund 71	0.734
US Hedge Fund 49	0.584	US Hedge Fund 68	0.702
US Hedge Fund 33	0.572	S&P 500	0.696
US Hedge Fund 40	0.569	US Hedge Fund 49	0.693
EU Hedge Fund 8	0.557	US Hedge Fund 33	0.641
EU Hedge Fund 33	0.555	US Hedge Fund 51	0.638
US Hedge Fund 61	0.551	EU Hedge Fund 8	0.632
US Hedge Fund 29	0.548	EU Hedge Fund 33	0.630
US Hedge Fund 70	0.548	US Hedge Fund 40	0.620
US Hedge Fund 54	0.544	US Hedge Fund 54	0.604
US Hedge Fund 71	0.540	EU Hedge Fund 38	0.601
US Hedge Fund 51	0.529	US Hedge Fund 61	0.595
EU Hedge Fund 28	0.512	US Hedge Fund 29	0.593
US Hedge Fund 48	0.492	EU Hedge Fund 28	0.579
EU Hedge Fund 27	0.474	EU Hedge Fund 27	0.542
EU Hedge Fund 38	0.473	US Hedge Fund 73	0.538
EU Hedge Fund 26	0.433	US Hedge Fund 48	0.528
US Hedge Fund 63	0.421	US Hedge Fund 21	0.517
US Hedge Fund 13	0.415	EU Hedge Fund 26	0.503
US Hedge Fund 73	0.405	US Hedge Fund 13	0.475
US Hedge Fund 21	0.396	US Hedge Fund 59	0.470
US Hedge Fund 66	0.392	US Hedge Fund 45	0.470
US Hedge Fund 45	0.391	US Hedge Fund 63	0.469
US Hedge Fund 60	0.390	US Hedge Fund 58	0.464
US Hedge Fund 3	0.384	US Hedge Fund 66	0.458
US Hedge Fund 53	0.373	EU Hedge Fund 23	0.440
US Hedge Fund 82	0.365	US Hedge Fund 60	0.439
US Hedge Fund 83	0.364	US Hedge Fund 83	0.436
US Hedge Fund 59	0.359	US Hedge Fund 82	0.436
EU Hedge Fund 23	0.343	US Hedge Fund 53	0.430
US Hedge Fund 67	0.311	EU Hedge Fund 37	0.430
EU Hedge Fund 37	0.296	US Hedge Fund 3	0.428
US Hedge Fund 78	0.289	US Hedge Fund 67	0.360
US Hedge Fund 55	0.281	US Hedge Fund 57	0.357
US Hedge Fund 37	0.272	US Hedge Fund 55	0.347
US Hedge Fund 58	0.269	Dow Jones	0.329
US Hedge Fund 62	0.259	US Hedge Fund 78	0.327
US Hedge Fund 57	0.252	US Hedge Fund 62	0.317
Dow Jones	0.235	US Hedge Fund 37	0.315
EU Hedge Fund 22	0.218	EU Hedge Fund 22	0.315
US Hedge Fund 38	0.215	US Hedge Fund 1	0.290
US Hedge Fund 1	0.207	US Hedge Fund 38	0.259
US Hedge Fund 8	0.167	US Hedge Fund 8	0.216
US Hedge Fund 7	0.147	US Hedge Fund 7	0.196
US Hedge Fund 34	0.101	US Hedge Fund 34	0.139
US Hedge Fund 17	-0.082	US Hedge Fund 17	-0.026
US Hedge Fund 25	-0.220	US Hedge Fund 25	-0.136
US Hedge Fund 28	-0.246	US Hedge Fund 28	-0.160
US Hedge Fund 26	-0.247	US Hedge Fund 26	-0.162
US Hedge Fund 27	-0.281	EU Hedge Fund 25	-0.188
EU Hedge Fund 25	-0.283	US Hedge Fund 27	-0.197
US Hedge Fund 12	-0.352	US Hedge Fund 12	-0.280
US Hedge Fund 44	-0.568	US Hedge Fund 44	-0.486
US Hedge Fund 24	-0.635	US Hedge Fund 24	-0.582
US Hedge Fund 79	-0.828	US Hedge Fund 79	-0.746

Source: Compiled by author.

Table R: Results from the Sharpe ratio – ranked from best to worst (Based on risk-free rates: During financial crisis period)

EU Risk-free rate		US Risk-free rate	
Name	Estimate	Name	Estimate
US Hedge Fund 79	1.644	US Hedge Fund 79	1.889
US Hedge Fund 32	1.629	US Hedge Fund 32	1.821
US Hedge Fund 57	1.386	US Hedge Fund 57	1.665
US Hedge Fund 78	1.372	EU Hedge Fund 22	1.613
EU Hedge Fund 25	1.329	EU Hedge Fund 23	1.607
EU Hedge Fund 22	1.195	US Hedge Fund 78	1.529
EU Hedge Fund 23	1.192	EU Hedge Fund 25	1.437
EU Hedge Fund 8	1.018	EU Hedge Fund 30	1.218
EU Hedge Fund 30	0.868	EU Hedge Fund 29	1.204
EU Hedge Fund 29	0.860	EU Hedge Fund 8	1.193
US Hedge Fund 74	0.848	US Hedge Fund 70	1.105
US Hedge Fund 75	0.823	US Hedge Fund 71	1.083
US Hedge Fund 70	0.790	US Hedge Fund 74	0.974
US Hedge Fund 71	0.768	US Hedge Fund 75	0.948
US Hedge Fund 60	0.719	US Hedge Fund 60	0.851
US Hedge Fund 61	0.700	US Hedge Fund 61	0.828
US Hedge Fund 63	0.684	US Hedge Fund 63	0.816
US Hedge Fund 62	0.579	US Hedge Fund 31	0.790
US Hedge Fund 12	0.563	US Hedge Fund 62	0.717
US Hedge Fund 31	0.508	EU Hedge Fund 4	0.702
US Hedge Fund 30	0.491	EU Hedge Fund 3	0.695
US Hedge Fund 6	0.465	US Hedge Fund 44	0.685
US Hedge Fund 44	0.402	US Hedge Fund 12	0.674
US Hedge Fund 5	0.331	US Hedge Fund 39	0.611
US Hedge Fund 33	0.330	US Hedge Fund 30	0.605
US Hedge Fund 19	0.318	US Hedge Fund 6	0.564
US Hedge Fund 72	0.316	US Hedge Fund 19	0.479
US Hedge Fund 39	0.239	US Hedge Fund 33	0.453
EU Hedge Fund 4	0.206	US Hedge Fund 5	0.426
US Hedge Fund 20	0.203	US Hedge Fund 20	0.374
EU Hedge Fund 3	0.185	US Hedge Fund 72	0.362
US Hedge Fund 48	0.179	US Hedge Fund 25	0.318
EU Hedge Fund 34	0.089	US Hedge Fund 36	0.298
US Hedge Fund 25	0.082	US Hedge Fund 58	0.283
US Hedge Fund 15	0.065	EU Hedge Fund 34	0.269
US Hedge Fund 38	0.064	US Hedge Fund 48	0.229
EU Hedge Fund 36	0.049	EU Hedge Fund 36	0.223
US Hedge Fund 14	0.047	US Hedge Fund 15	0.219
US Hedge Fund 37	0.021	US Hedge Fund 68	0.206
US Hedge Fund 21	0.020	US Hedge Fund 14	0.201
US Hedge Fund 40	0.018	EU Hedge Fund 35	0.179
US Hedge Fund 81	0.008	US Hedge Fund 81	0.176
EU Hedge Fund 35	0.004	US Hedge Fund 59	0.150
US Hedge Fund 66	0.000	US Hedge Fund 38	0.145
US Hedge Fund 55	-0.017	EU Hedge Fund 28	0.141
EU Hedge Fund 17	-0.020	EU Hedge Fund 27	0.137
EU Hedge Fund 38	-0.035	US Hedge Fund 55	0.135
EU Hedge Fund 33	-0.039	US Hedge Fund 27	0.130
US Hedge Fund 84	-0.051	US Hedge Fund 66	0.130
US Hedge Fund 36	-0.057	US Hedge Fund 21	0.125
EU Hedge Fund 28	-0.062	US Hedge Fund 28	0.117
US Hedge Fund 16	-0.068	US Hedge Fund 40	0.115
EU Hedge Fund 27	-0.076	US Hedge Fund 26	0.101
US Hedge Fund 68	-0.077	US Hedge Fund 37	0.101
US Hedge Fund 73	-0.078	EU Hedge Fund 38	0.099
US Hedge Fund 8	-0.095	US Hedge Fund 84	0.098
US Hedge Fund 27	-0.117	EU Hedge Fund 33	0.096
US Hedge Fund 7	-0.129	EU Hedge Fund 17	0.087
US Hedge Fund 58	-0.130	EU Hedge Fund 26	0.074
EU Hedge Fund 26	-0.133	US Hedge Fund 16	0.065
US Hedge Fund 28	-0.134	US Hedge Fund 73	0.051
US Hedge Fund 50	-0.138	US Hedge Fund 11	0.031
US Hedge Fund 3	-0.139	US Hedge Fund 64	0.027
US Hedge Fund 64	-0.142	US Hedge Fund 65	0.023
US Hedge Fund 65	-0.143	US Hedge Fund 8	0.018
US Hedge Fund 22	-0.145	US Hedge Fund 23	0.007
US Hedge Fund 59	-0.146	US Hedge Fund 50	-0.006
US Hedge Fund 26	-0.149	US Hedge Fund 22	-0.012
US Hedge Fund 23	-0.156	US Hedge Fund 7	-0.018
EU Hedge Fund 37	-0.160	EU Hedge Fund 37	-0.022

EU Hedge Fund 20	-0.161	EU Hedge Fund 20	-0.050
US Hedge Fund 69	-0.194	US Hedge Fund 3	-0.065
US Hedge Fund 13	-0.229	US Hedge Fund 41	-0.077
US Hedge Fund 1	-0.250	US Hedge Fund 42	-0.103
US Hedge Fund 49	-0.273	US Hedge Fund 69	-0.122
US Hedge Fund 41	-0.275	EU Hedge Fund 12	-0.131
US Hedge Fund 18	-0.281	US Hedge Fund 76	-0.131
US Hedge Fund 51	-0.285	US Hedge Fund 1	-0.149
US Hedge Fund 42	-0.301	US Hedge Fund 13	-0.153
US Hedge Fund 45	-0.307	US Hedge Fund 49	-0.155
US Hedge Fund 35	-0.311	US Hedge Fund 43	-0.161
DAX	-0.318	US Hedge Fund 45	-0.167
EU Hedge Fund 12	-0.319	US Hedge Fund 51	-0.167
US Hedge Fund 11	-0.322	EU Hedge Fund 16	-0.201
US Hedge Fund 53	-0.323	EU Hedge Fund 2	-0.203
US Hedge Fund 76	-0.329	EU Hedge Fund 1	-0.207
US Hedge Fund 29	-0.348	US Hedge Fund 18	-0.208
US Hedge Fund 43	-0.355	US Hedge Fund 35	-0.208
EU Hedge Fund 31	-0.364	US Hedge Fund 82	-0.222
US Hedge Fund 9	-0.367	DAX	-0.223
EU Hedge Fund 32	-0.377	US Hedge Fund 9	-0.223
EU Hedge Fund 2	-0.394	US Hedge Fund 53	-0.229
EU Hedge Fund 1	-0.396	US Hedge Fund 83	-0.235
US Hedge Fund 24	-0.398	EU Hedge Fund 32	-0.257
US Hedge Fund 54	-0.424	US Hedge Fund 29	-0.263
US Hedge Fund 52	-0.431	EU Hedge Fund 31	-0.271
US Hedge Fund 10	-0.431	US Hedge Fund 24	-0.290
US Hedge Fund 82	-0.445	US Hedge Fund 54	-0.291
EU Hedge Fund 16	-0.457	EU Hedge Fund 5	-0.298
EU Hedge Fund 5	-0.458	EU Hedge Fund 6	-0.308
US Hedge Fund 83	-0.459	US Hedge Fund 52	-0.310
EU Hedge Fund 6	-0.471	EU Hedge Fund 7	-0.311
EU Hedge Fund 7	-0.473	US Hedge Fund 10	-0.340
US Hedge Fund 56	-0.505	US Hedge Fund 56	-0.354
US Hedge Fund 77	-0.515	EU Hedge Fund 21	-0.360
US Hedge Fund 4	-0.548	EU Hedge Fund 15	-0.368
EU Hedge Fund 21	-0.553	EU Hedge Fund 14	-0.377
EU Hedge Fund 10	-0.557	EU Hedge Fund 10	-0.420
EU Hedge Fund 9	-0.594	US Hedge Fund 77	-0.422
US Hedge Fund 17	-0.600	US Hedge Fund 4	-0.453
EU Hedge Fund 15	-0.617	EU Hedge Fund 9	-0.457
EU Hedge Fund 14	-0.626	US Hedge Fund 47	-0.470
EU Hedge Fund 19	-0.644	US Hedge Fund 46	-0.477
EU Hedge Fund 18	-0.670	EU Hedge Fund 19	-0.523
Dow Jones	-0.692	US Hedge Fund 17	-0.561
CAC 40	-0.706	EU Hedge Fund 18	-0.567
US Hedge Fund 34	-0.721	Dow Jones	-0.577
S&P 500	-0.754	EU Hedge Fund 24	-0.589
US Hedge Fund 67	-0.786	CAC 40	-0.600
EU Hedge Fund 24	-0.790	US Hedge Fund 67	-0.619
US Hedge Fund 80	-0.952	US Hedge Fund 34	-0.623
US Hedge Fund 47	-0.954	S&P 500	-0.648
US Hedge Fund 46	-0.961	US Hedge Fund 80	-0.828
US Hedge Fund 2	-0.985	EU Hedge Fund 13	-0.835
EU Hedge Fund 13	-1.037	US Hedge Fund 2	-0.873
EU Hedge Fund 11	-1.199	EU Hedge Fund 11	-0.986

Source: Compiled by author.

Table S: Results from the Sharpe ratio – ranked from best to worst (Based on risk-free rates: Post-financial crisis period)

EU Risk-free rate		US Risk-free rate	
Name	Estimate	Name	Estimate
EU Hedge Fund 11	2.316	EU Hedge Fund 11	2.991
US Hedge Fund 78	2.223	US Hedge Fund 78	2.656
EU Hedge Fund 13	2.012	EU Hedge Fund 13	2.621
US Hedge Fund 40	1.512	US Hedge Fund 70	2.189
EU Hedge Fund 12	1.208	US Hedge Fund 71	2.122
US Hedge Fund 70	1.152	EU Hedge Fund 12	1.686
US Hedge Fund 71	1.079	US Hedge Fund 40	1.592
US Hedge Fund 45	0.721	US Hedge Fund 31	1.281
US Hedge Fund 31	0.719	US Hedge Fund 39	1.245
US Hedge Fund 64	0.719	US Hedge Fund 84	1.153
US Hedge Fund 65	0.642	US Hedge Fund 64	1.130
US Hedge Fund 29	0.621	US Hedge Fund 32	1.072
US Hedge Fund 39	0.598	US Hedge Fund 68	1.041
US Hedge Fund 28	0.563	US Hedge Fund 65	1.012
US Hedge Fund 84	0.552	US Hedge Fund 45	0.929
US Hedge Fund 22	0.503	US Hedge Fund 10	0.822
US Hedge Fund 10	0.499	US Hedge Fund 29	0.800
US Hedge Fund 13	0.408	US Hedge Fund 22	0.731
US Hedge Fund 38	0.378	EU Hedge Fund 21	0.726
EU Hedge Fund 5	0.317	EU Hedge Fund 5	0.684
EU Hedge Fund 21	0.312	US Hedge Fund 20	0.677
US Hedge Fund 20	0.304	US Hedge Fund 28	0.659
US Hedge Fund 52	0.268	EU Hedge Fund 6	0.628
EU Hedge Fund 6	0.268	EU Hedge Fund 7	0.598
US Hedge Fund 33	0.265	US Hedge Fund 13	0.566
US Hedge Fund 53	0.250	US Hedge Fund 38	0.550
EU Hedge Fund 7	0.234	US Hedge Fund 35	0.545
US Hedge Fund 35	0.218	US Hedge Fund 33	0.533
US Hedge Fund 54	0.215	US Hedge Fund 41	0.509
US Hedge Fund 55	0.212	US Hedge Fund 55	0.477
US Hedge Fund 1	0.206	US Hedge Fund 52	0.470
US Hedge Fund 48	0.166	US Hedge Fund 42	0.454
US Hedge Fund 37	0.153	US Hedge Fund 53	0.434
US Hedge Fund 9	0.112	US Hedge Fund 1	0.434
US Hedge Fund 56	0.106	US Hedge Fund 9	0.433
US Hedge Fund 19	0.096	US Hedge Fund 19	0.423
US Hedge Fund 17	0.063	US Hedge Fund 59	0.422
Dow Jones	0.056	US Hedge Fund 54	0.405
EU Hedge Fund 37	0.032	US Hedge Fund 43	0.382
US Hedge Fund 73	0.021	US Hedge Fund 56	0.380
US Hedge Fund 6	-0.001	EU Hedge Fund 37	0.361
US Hedge Fund 5	-0.031	US Hedge Fund 48	0.336
EU Hedge Fund 8	-0.033	US Hedge Fund 37	0.329
US Hedge Fund 8	-0.033	Dow Jones	0.313
US Hedge Fund 66	-0.033	US Hedge Fund 57	0.309
US Hedge Fund 76	-0.044	EU Hedge Fund 1	0.305
US Hedge Fund 50	-0.060	US Hedge Fund 81	0.270
US Hedge Fund 3	-0.078	US Hedge Fund 76	0.260
S&P 500	-0.081	EU Hedge Fund 8	0.257
EU Hedge Fund 38	-0.088	EU Hedge Fund 2	0.234
US Hedge Fund 7	-0.090	EU Hedge Fund 38	0.233
US Hedge Fund 81	-0.115	US Hedge Fund 50	0.227
US Hedge Fund 41	-0.127	US Hedge Fund 27	0.219
US Hedge Fund 80	-0.133	US Hedge Fund 17	0.213
US Hedge Fund 2	-0.148	US Hedge Fund 73	0.200
US Hedge Fund 42	-0.171	US Hedge Fund 6	0.193
US Hedge Fund 69	-0.186	US Hedge Fund 66	0.192
US Hedge Fund 82	-0.187	US Hedge Fund 25	0.184
US Hedge Fund 27	-0.191	US Hedge Fund 26	0.160
US Hedge Fund 68	-0.199	US Hedge Fund 8	0.151
US Hedge Fund 83	-0.206	S&P 500	0.149
EU Hedge Fund 1	-0.210	US Hedge Fund 5	0.141
DAX	-0.214	US Hedge Fund 12	0.127
US Hedge Fund 32	-0.218	US Hedge Fund 82	0.118
US Hedge Fund 59	-0.218	US Hedge Fund 83	0.102
US Hedge Fund 25	-0.226	EU Hedge Fund 30	0.100
US Hedge Fund 72	-0.232	US Hedge Fund 7	0.093
US Hedge Fund 30	-0.239	US Hedge Fund 80	0.085
US Hedge Fund 43	-0.243	US Hedge Fund 2	0.065
US Hedge Fund 26	-0.251	EU Hedge Fund 29	0.063

US Hedge Fund 57	-0.267	US Hedge Fund 3	0.055
EU Hedge Fund 2	-0.270	US Hedge Fund 46	0.024
US Hedge Fund 12	-0.273	US Hedge Fund 47	0.024
US Hedge Fund 18	-0.293	US Hedge Fund 30	-0.023
EU Hedge Fund 9	-0.321	DAX	-0.028
EU Hedge Fund 19	-0.337	EU Hedge Fund 19	-0.055
EU Hedge Fund 10	-0.341	US Hedge Fund 69	-0.055
EU Hedge Fund 17	-0.342	US Hedge Fund 18	-0.064
US Hedge Fund 46	-0.344	US Hedge Fund 23	-0.105
US Hedge Fund 47	-0.344	US Hedge Fund 72	-0.118
US Hedge Fund 21	-0.410	EU Hedge Fund 9	-0.121
US Hedge Fund 23	-0.429	EU Hedge Fund 17	-0.142
EU Hedge Fund 20	-0.432	EU Hedge Fund 10	-0.148
US Hedge Fund 24	-0.448	US Hedge Fund 24	-0.152
EU Hedge Fund 30	-0.474	US Hedge Fund 16	-0.177
US Hedge Fund 16	-0.491	US Hedge Fund 21	-0.182
US Hedge Fund 34	-0.516	EU Hedge Fund 20	-0.213
EU Hedge Fund 29	-0.525	US Hedge Fund 67	-0.266
US Hedge Fund 67	-0.593	EU Hedge Fund 15	-0.295
EU Hedge Fund 33	-0.621	EU Hedge Fund 16	-0.314
US Hedge Fund 15	-0.672	EU Hedge Fund 33	-0.318
US Hedge Fund 14	-0.677	EU Hedge Fund 14	-0.324
EU Hedge Fund 15	-0.697	US Hedge Fund 34	-0.338
EU Hedge Fund 16	-0.719	EU Hedge Fund 3	-0.339
EU Hedge Fund 14	-0.720	EU Hedge Fund 4	-0.355
CAC 40	-0.748	US Hedge Fund 15	-0.445
US Hedge Fund 49	-0.760	US Hedge Fund 14	-0.452
US Hedge Fund 51	-0.767	US Hedge Fund 58	-0.463
EU Hedge Fund 25	-0.781	US Hedge Fund 36	-0.482
EU Hedge Fund 36	-0.798	EU Hedge Fund 36	-0.519
EU Hedge Fund 34	-0.815	EU Hedge Fund 34	-0.537
EU Hedge Fund 18	-0.819	US Hedge Fund 49	-0.542
EU Hedge Fund 35	-0.840	CAC 40	-0.543
US Hedge Fund 77	-1.064	US Hedge Fund 51	-0.549
US Hedge Fund 75	-1.127	EU Hedge Fund 35	-0.561
US Hedge Fund 60	-1.129	EU Hedge Fund 25	-0.574
US Hedge Fund 74	-1.133	EU Hedge Fund 18	-0.590
US Hedge Fund 4	-1.138	US Hedge Fund 11	-0.625
US Hedge Fund 63	-1.148	EU Hedge Fund 24	-0.695
US Hedge Fund 61	-1.172	US Hedge Fund 77	-0.785
US Hedge Fund 62	-1.179	US Hedge Fund 4	-0.847
US Hedge Fund 58	-1.277	US Hedge Fund 75	-0.877
US Hedge Fund 11	-1.301	US Hedge Fund 74	-0.882
EU Hedge Fund 24	-1.339	US Hedge Fund 60	-0.889
US Hedge Fund 36	-1.400	US Hedge Fund 62	-0.904
EU Hedge Fund 32	-1.402	US Hedge Fund 63	-0.909
EU Hedge Fund 31	-1.443	US Hedge Fund 61	-0.938
EU Hedge Fund 3	-1.504	EU Hedge Fund 32	-1.031
EU Hedge Fund 4	-1.530	EU Hedge Fund 31	-1.110
EU Hedge Fund 28	-1.616	EU Hedge Fund 28	-1.122
EU Hedge Fund 27	-1.632	EU Hedge Fund 27	-1.128
EU Hedge Fund 26	-1.677	EU Hedge Fund 26	-1.183
EU Hedge Fund 23	-1.798	EU Hedge Fund 23	-1.318
EU Hedge Fund 22	-1.807	EU Hedge Fund 22	-1.322
US Hedge Fund 79	-2.344	US Hedge Fund 79	-1.696
US Hedge Fund 44	-2.559	US Hedge Fund 44	-1.783

Source: Compiled by author.

Table T: Results from the Sortino ratio – ranked from best to worst (Based on risk-free rates: Pre-financial crisis period)

EU Risk-free rate		US Risk-free rate	
Name	Estimate	Name	Estimate
US Hedge Fund 6	16.351	US Hedge Fund 6	16.839
US Hedge Fund 5	10.093	US Hedge Fund 5	10.273
US Hedge Fund 32	7.896	US Hedge Fund 32	9.097
US Hedge Fund 47	6.804	US Hedge Fund 47	7.012
EU Hedge Fund 6	6.309	EU Hedge Fund 6	6.463
EU Hedge Fund 7	6.174	US Hedge Fund 46	6.367
US Hedge Fund 46	6.090	EU Hedge Fund 7	6.327
EU Hedge Fund 5	5.904	EU Hedge Fund 5	6.081
US Hedge Fund 31	5.605	US Hedge Fund 31	5.887
EU Hedge Fund 24	5.295	EU Hedge Fund 24	5.602
US Hedge Fund 41	4.702	US Hedge Fund 41	5.113
US Hedge Fund 42	4.592	EU Hedge Fund 4	5.004
EU Hedge Fund 4	4.532	US Hedge Fund 42	5.002
US Hedge Fund 18	4.512	US Hedge Fund 18	4.968
EU Hedge Fund 19	4.321	EU Hedge Fund 19	4.500
EU Hedge Fund 13	4.059	US Hedge Fund 43	4.493
US Hedge Fund 43	4.059	US Hedge Fund 56	4.348
US Hedge Fund 56	4.045	EU Hedge Fund 3	4.294
EU Hedge Fund 3	3.791	EU Hedge Fund 13	4.216
US Hedge Fund 4	3.764	US Hedge Fund 4	3.952
EU Hedge Fund 12	3.731	EU Hedge Fund 12	3.881
EU Hedge Fund 11	3.710	EU Hedge Fund 11	3.846
EU Hedge Fund 2	3.625	US Hedge Fund 23	3.804
US Hedge Fund 10	3.578	EU Hedge Fund 2	3.779
EU Hedge Fund 18	3.523	US Hedge Fund 10	3.722
US Hedge Fund 23	3.516	EU Hedge Fund 18	3.666
EU Hedge Fund 17	3.348	EU Hedge Fund 15	3.588
EU Hedge Fund 15	3.304	EU Hedge Fund 17	3.484
EU Hedge Fund 1	3.300	EU Hedge Fund 1	3.448
US Hedge Fund 74	3.233	US Hedge Fund 35	3.365
US Hedge Fund 75	3.225	EU Hedge Fund 14	3.361
US Hedge Fund 35	3.163	EU Hedge Fund 16	3.353
US Hedge Fund 64	3.160	US Hedge Fund 74	3.339
EU Hedge Fund 31	3.140	US Hedge Fund 75	3.331
EU Hedge Fund 16	3.104	US Hedge Fund 64	3.305
EU Hedge Fund 14	3.084	US Hedge Fund 76	3.288
US Hedge Fund 76	3.075	EU Hedge Fund 31	3.239
EU Hedge Fund 32	3.003	EU Hedge Fund 32	3.106
DAX	2.944	US Hedge Fund 65	3.070
US Hedge Fund 65	2.932	EU Hedge Fund 20	3.051
EU Hedge Fund 20	2.914	EU Hedge Fund 34	3.035
US Hedge Fund 77	2.872	US Hedge Fund 36	3.027
EU Hedge Fund 34	2.758	US Hedge Fund 77	2.999
CAC 40	2.755	US Hedge Fund 50	2.955
US Hedge Fund 36	2.747	US Hedge Fund 30	2.830
US Hedge Fund 50	2.679	US Hedge Fund 52	2.809
EU Hedge Fund 9	2.655	US Hedge Fund 20	2.800
US Hedge Fund 52	2.609	EU Hedge Fund 9	2.774
US Hedge Fund 30	2.584	US Hedge Fund 84	2.728
US Hedge Fund 20	2.574	EU Hedge Fund 10	2.656
EU Hedge Fund 10	2.533	US Hedge Fund 16	2.637
US Hedge Fund 84	2.502	EU Hedge Fund 35	2.390
US Hedge Fund 16	2.479	US Hedge Fund 22	2.357
US Hedge Fund 22	2.191	EU Hedge Fund 29	2.337
EU Hedge Fund 35	2.120	US Hedge Fund 39	2.272
US Hedge Fund 81	2.075	US Hedge Fund 81	2.216
US Hedge Fund 39	2.013	CAC 40	2.205
EU Hedge Fund 29	1.915	DAX	2.123
US Hedge Fund 9	1.850	US Hedge Fund 9	2.001
US Hedge Fund 72	1.749	EU Hedge Fund 36	1.947
EU Hedge Fund 36	1.682	US Hedge Fund 72	1.829
US Hedge Fund 61	1.654	US Hedge Fund 61	1.795
US Hedge Fund 80	1.640	US Hedge Fund 80	1.766
US Hedge Fund 19	1.594	US Hedge Fund 19	1.761
US Hedge Fund 2	1.562	EU Hedge Fund 30	1.725
US Hedge Fund 14	1.537	US Hedge Fund 2	1.697
US Hedge Fund 15	1.510	US Hedge Fund 14	1.618
US Hedge Fund 69	1.400	US Hedge Fund 15	1.591
EU Hedge Fund 30	1.389	US Hedge Fund 70	1.539
EU Hedge Fund 8	1.351	US Hedge Fund 11	1.534
US Hedge Fund 11	1.282	EU Hedge Fund 8	1.533
US Hedge Fund 40	1.268	US Hedge Fund 71	1.504
US Hedge Fund 63	1.244	US Hedge Fund 69	1.468
US Hedge Fund 33	1.177	US Hedge Fund 63	1.388

US Hedge Fund 60	1.167	US Hedge Fund 40	1.384
EU Hedge Fund 28	1.146	S&P 500	1.337
S&P 500	1.144	US Hedge Fund 60	1.314
US Hedge Fund 70	1.132	US Hedge Fund 73	1.313
US Hedge Fund 71	1.100	US Hedge Fund 33	1.311
US Hedge Fund 54	1.089	EU Hedge Fund 28	1.289
EU Hedge Fund 21	1.081	EU Hedge Fund 38	1.251
EU Hedge Fund 27	1.071	EU Hedge Fund 27	1.218
US Hedge Fund 29	1.036	US Hedge Fund 21	1.210
EU Hedge Fund 33	1.017	US Hedge Fund 54	1.210
EU Hedge Fund 38	1.005	EU Hedge Fund 21	1.208
US Hedge Fund 73	0.995	EU Hedge Fund 33	1.160
US Hedge Fund 68	0.981	US Hedge Fund 49	1.146
US Hedge Fund 49	0.967	US Hedge Fund 68	1.138
EU Hedge Fund 26	0.953	US Hedge Fund 29	1.121
US Hedge Fund 21	0.927	EU Hedge Fund 26	1.100
US Hedge Fund 48	0.875	US Hedge Fund 59	1.067
US Hedge Fund 51	0.871	US Hedge Fund 51	1.050
US Hedge Fund 59	0.825	US Hedge Fund 48	0.937
US Hedge Fund 3	0.759	EU Hedge Fund 37	0.922
US Hedge Fund 45	0.721	US Hedge Fund 45	0.862
US Hedge Fund 53	0.702	US Hedge Fund 3	0.847
US Hedge Fund 13	0.692	US Hedge Fund 57	0.842
US Hedge Fund 82	0.665	EU Hedge Fund 23	0.836
EU Hedge Fund 23	0.661	US Hedge Fund 53	0.811
US Hedge Fund 83	0.659	US Hedge Fund 82	0.797
EU Hedge Fund 37	0.635	US Hedge Fund 83	0.791
US Hedge Fund 67	0.632	US Hedge Fund 13	0.791
US Hedge Fund 62	0.623	US Hedge Fund 62	0.763
US Hedge Fund 66	0.611	US Hedge Fund 58	0.748
US Hedge Fund 57	0.593	US Hedge Fund 67	0.732
US Hedge Fund 37	0.517	US Hedge Fund 66	0.714
US Hedge Fund 55	0.475	US Hedge Fund 37	0.598
Dow Jones	0.473	US Hedge Fund 55	0.587
US Hedge Fund 78	0.470	EU Hedge Fund 22	0.587
US Hedge Fund 58	0.434	US Hedge Fund 78	0.532
US Hedge Fund 38	0.410	Dow Jones	0.520
EU Hedge Fund 22	0.404	US Hedge Fund 38	0.495
US Hedge Fund 1	0.317	US Hedge Fund 1	0.445
US Hedge Fund 8	0.285	US Hedge Fund 8	0.368
US Hedge Fund 7	0.248	US Hedge Fund 7	0.330
US Hedge Fund 34	0.174	US Hedge Fund 34	0.240
US Hedge Fund 17	-0.151	US Hedge Fund 17	-0.048
US Hedge Fund 25	-0.330	US Hedge Fund 25	-0.204
US Hedge Fund 28	-0.365	US Hedge Fund 28	-0.238
US Hedge Fund 26	-0.367	US Hedge Fund 26	-0.241
US Hedge Fund 27	-0.414	US Hedge Fund 27	-0.291
EU Hedge Fund 25	-0.459	EU Hedge Fund 25	-0.306
US Hedge Fund 12	-0.582	US Hedge Fund 12	-0.464
US Hedge Fund 24	-0.895	US Hedge Fund 24	-0.820
US Hedge Fund 79	-1.069	US Hedge Fund 79	-0.961
US Hedge Fund 44	-1.136	US Hedge Fund 44	-0.973

Source: Compiled by author.

Table U: Results from the Sortino ratio – ranked from best to worst (Based on risk-free rates: During financial crisis period)

EU Risk-free rate		US Risk-free rate	
Name	Estimate	Name	Estimate
US Hedge Fund 79	4.092	EU Hedge Fund 23	5.054
US Hedge Fund 57	3.931	EU Hedge Fund 22	4.856
EU Hedge Fund 25	3.869	US Hedge Fund 57	4.725
US Hedge Fund 78	3.788	US Hedge Fund 79	4.720
EU Hedge Fund 23	3.751	US Hedge Fund 78	4.233
EU Hedge Fund 22	3.599	EU Hedge Fund 25	4.184
US Hedge Fund 32	3.041	US Hedge Fund 32	3.400
EU Hedge Fund 8	2.357	US Hedge Fund 70	2.818
US Hedge Fund 70	1.999	EU Hedge Fund 8	2.765
US Hedge Fund 71	1.910	US Hedge Fund 71	2.711
EU Hedge Fund 30	1.810	EU Hedge Fund 29	2.547
EU Hedge Fund 29	1.796	EU Hedge Fund 30	2.540
US Hedge Fund 60	1.627	US Hedge Fund 60	1.926
US Hedge Fund 61	1.544	US Hedge Fund 61	1.828
US Hedge Fund 63	1.522	US Hedge Fund 63	1.817
US Hedge Fund 74	1.483	US Hedge Fund 74	1.703
US Hedge Fund 75	1.441	US Hedge Fund 30	1.679
US Hedge Fund 30	1.356	US Hedge Fund 75	1.660
US Hedge Fund 62	1.290	US Hedge Fund 44	1.657
US Hedge Fund 12	1.247	US Hedge Fund 31	1.643
US Hedge Fund 31	1.056	US Hedge Fund 62	1.597
US Hedge Fund 44	0.963	EU Hedge Fund 3	1.565
US Hedge Fund 6	0.934	EU Hedge Fund 4	1.557
US Hedge Fund 72	0.619	US Hedge Fund 12	1.493
US Hedge Fund 5	0.599	US Hedge Fund 6	1.134
US Hedge Fund 33	0.572	US Hedge Fund 39	1.058
US Hedge Fund 19	0.502	US Hedge Fund 33	0.786
EU Hedge Fund 4	0.447	US Hedge Fund 5	0.771
US Hedge Fund 39	0.416	US Hedge Fund 19	0.758
EU Hedge Fund 3	0.412	US Hedge Fund 72	0.708
US Hedge Fund 48	0.324	US Hedge Fund 25	0.649
US Hedge Fund 20	0.306	EU Hedge Fund 34	0.626
EU Hedge Fund 34	0.206	US Hedge Fund 20	0.564
US Hedge Fund 25	0.167	US Hedge Fund 58	0.534
EU Hedge Fund 36	0.116	US Hedge Fund 36	0.531
US Hedge Fund 38	0.113	EU Hedge Fund 36	0.527
US Hedge Fund 15	0.103	US Hedge Fund 48	0.415
US Hedge Fund 14	0.073	EU Hedge Fund 35	0.409
US Hedge Fund 21	0.038	US Hedge Fund 15	0.347
US Hedge Fund 37	0.035	US Hedge Fund 14	0.317
US Hedge Fund 40	0.029	US Hedge Fund 68	0.282
US Hedge Fund 81	0.011	US Hedge Fund 81	0.260
EU Hedge Fund 35	0.008	US Hedge Fund 38	0.256
US Hedge Fund 66	0.001	US Hedge Fund 27	0.254
US Hedge Fund 55	-0.025	US Hedge Fund 59	0.244
EU Hedge Fund 17	-0.033	US Hedge Fund 21	0.241
EU Hedge Fund 38	-0.050	US Hedge Fund 28	0.224
EU Hedge Fund 33	-0.075	EU Hedge Fund 28	0.203
US Hedge Fund 84	-0.084	EU Hedge Fund 27	0.200
EU Hedge Fund 28	-0.089	US Hedge Fund 55	0.199
US Hedge Fund 36	-0.101	US Hedge Fund 26	0.198
US Hedge Fund 68	-0.104	EU Hedge Fund 33	0.183
US Hedge Fund 16	-0.109	US Hedge Fund 66	0.181
EU Hedge Fund 27	-0.110	US Hedge Fund 40	0.180
US Hedge Fund 73	-0.119	US Hedge Fund 37	0.172
US Hedge Fund 8	-0.148	US Hedge Fund 84	0.159
EU Hedge Fund 26	-0.188	EU Hedge Fund 38	0.143
US Hedge Fund 7	-0.204	EU Hedge Fund 17	0.142
US Hedge Fund 3	-0.206	EU Hedge Fund 26	0.106
EU Hedge Fund 37	-0.219	US Hedge Fund 16	0.104
US Hedge Fund 50	-0.222	US Hedge Fund 73	0.078
US Hedge Fund 64	-0.223	US Hedge Fund 11	0.047
US Hedge Fund 22	-0.224	US Hedge Fund 64	0.043
US Hedge Fund 27	-0.228	US Hedge Fund 65	0.037
US Hedge Fund 65	-0.228	US Hedge Fund 8	0.028
US Hedge Fund 59	-0.237	US Hedge Fund 23	0.011
US Hedge Fund 58	-0.245	US Hedge Fund 50	-0.010
US Hedge Fund 23	-0.250	US Hedge Fund 22	-0.019
US Hedge Fund 28	-0.257	US Hedge Fund 7	-0.029
EU Hedge Fund 20	-0.259	EU Hedge Fund 37	-0.030
US Hedge Fund 26	-0.293	EU Hedge Fund 20	-0.081
US Hedge Fund 13	-0.318	US Hedge Fund 3	-0.097
US Hedge Fund 1	-0.328	US Hedge Fund 41	-0.124
US Hedge Fund 69	-0.340	US Hedge Fund 42	-0.165

US Hedge Fund 45	-0.398	US Hedge Fund 76	-0.181
US Hedge Fund 41	-0.446	US Hedge Fund 1	-0.196
US Hedge Fund 76	-0.454	EU Hedge Fund 12	-0.208
US Hedge Fund 35	-0.468	US Hedge Fund 13	-0.213
US Hedge Fund 42	-0.485	US Hedge Fund 69	-0.214
US Hedge Fund 49	-0.490	US Hedge Fund 45	-0.216
US Hedge Fund 11	-0.492	US Hedge Fund 43	-0.255
DAX	-0.492	US Hedge Fund 49	-0.278
US Hedge Fund 9	-0.493	US Hedge Fund 51	-0.300
US Hedge Fund 53	-0.494	US Hedge Fund 82	-0.301
US Hedge Fund 18	-0.506	US Hedge Fund 9	-0.301
US Hedge Fund 29	-0.506	US Hedge Fund 35	-0.314
EU Hedge Fund 12	-0.507	US Hedge Fund 83	-0.317
US Hedge Fund 51	-0.512	EU Hedge Fund 2	-0.331
EU Hedge Fund 31	-0.539	EU Hedge Fund 1	-0.332
US Hedge Fund 43	-0.559	US Hedge Fund 53	-0.351
EU Hedge Fund 32	-0.599	EU Hedge Fund 16	-0.368
US Hedge Fund 82	-0.602	US Hedge Fund 18	-0.374
US Hedge Fund 52	-0.603	US Hedge Fund 29	-0.383
US Hedge Fund 54	-0.615	EU Hedge Fund 31	-0.402
US Hedge Fund 83	-0.620	EU Hedge Fund 32	-0.409
US Hedge Fund 24	-0.623	US Hedge Fund 54	-0.422
EU Hedge Fund 1	-0.636	DAX	-0.426
EU Hedge Fund 2	-0.640	US Hedge Fund 52	-0.434
US Hedge Fund 10	-0.659	EU Hedge Fund 5	-0.449
EU Hedge Fund 5	-0.690	US Hedge Fund 24	-0.455
US Hedge Fund 56	-0.709	EU Hedge Fund 6	-0.471
EU Hedge Fund 6	-0.718	EU Hedge Fund 7	-0.478
EU Hedge Fund 7	-0.724	US Hedge Fund 56	-0.497
US Hedge Fund 77	-0.732	US Hedge Fund 10	-0.520
US Hedge Fund 4	-0.771	EU Hedge Fund 21	-0.558
US Hedge Fund 17	-0.773	US Hedge Fund 47	-0.558
EU Hedge Fund 16	-0.833	US Hedge Fund 46	-0.566
EU Hedge Fund 21	-0.856	US Hedge Fund 77	-0.599
Dow Jones	-0.932	EU Hedge Fund 15	-0.605
EU Hedge Fund 18	-0.973	EU Hedge Fund 14	-0.620
US Hedge Fund 34	-0.990	US Hedge Fund 4	-0.638
S&P 500	-0.996	US Hedge Fund 17	-0.724
EU Hedge Fund 15	-1.014	EU Hedge Fund 10	-0.789
EU Hedge Fund 19	-1.016	EU Hedge Fund 18	-0.823
EU Hedge Fund 14	-1.029	EU Hedge Fund 19	-0.828
EU Hedge Fund 10	-1.044	EU Hedge Fund 9	-0.842
CAC 40	-1.052	EU Hedge Fund 24	-0.850
EU Hedge Fund 9	-1.093	S&P 500	-0.856
US Hedge Fund 47	-1.133	US Hedge Fund 34	-0.857
EU Hedge Fund 24	-1.138	US Hedge Fund 67	-1.045
US Hedge Fund 46	-1.142	US Hedge Fund 80	-1.098
US Hedge Fund 80	-1.262	US Hedge Fund 2	-1.129
US Hedge Fund 2	-1.275	EU Hedge Fund 13	-1.194
US Hedge Fund 67	-1.323	CAC 40	-1.199
EU Hedge Fund 13	-1.477	Dow Jones	-1.314
EU Hedge Fund 11	-1.599	EU Hedge Fund 11	-1.319

Source: Compiled by author.

Table V: Results from the Sortino ratio – ranked from best to worst (Based on risk-free rates: Post-financial crisis period)

EU Risk-free rate		US Risk-free rate	
Name	Estimate	Name	Estimate
US Hedge Fund 40	13.463	US Hedge Fund 40	14.174
EU Hedge Fund 11	8.159	EU Hedge Fund 11	10.682
EU Hedge Fund 13	6.958	EU Hedge Fund 13	9.087
US Hedge Fund 78	5.764	US Hedge Fund 70	8.921
US Hedge Fund 70	4.105	US Hedge Fund 71	8.457
US Hedge Fund 28	3.785	US Hedge Fund 78	6.887
US Hedge Fund 71	3.780	US Hedge Fund 28	4.460
EU Hedge Fund 12	3.171	EU Hedge Fund 12	4.425
US Hedge Fund 31	1.546	US Hedge Fund 84	2.938
US Hedge Fund 64	1.540	US Hedge Fund 39	2.852
US Hedge Fund 45	1.425	US Hedge Fund 31	2.766
US Hedge Fund 84	1.371	US Hedge Fund 64	2.434
US Hedge Fund 39	1.347	US Hedge Fund 68	2.047
US Hedge Fund 65	1.271	US Hedge Fund 65	2.015
US Hedge Fund 29	1.172	US Hedge Fund 32	1.924
US Hedge Fund 10	1.092	US Hedge Fund 45	1.838
US Hedge Fund 22	0.892	US Hedge Fund 10	1.799
US Hedge Fund 13	0.871	US Hedge Fund 29	1.513
US Hedge Fund 38	0.792	EU Hedge Fund 21	1.336
EU Hedge Fund 21	0.572	US Hedge Fund 22	1.295
EU Hedge Fund 5	0.528	US Hedge Fund 13	1.210
US Hedge Fund 52	0.521	US Hedge Fund 20	1.158
US Hedge Fund 20	0.515	US Hedge Fund 38	1.158
US Hedge Fund 53	0.478	EU Hedge Fund 5	1.146
US Hedge Fund 33	0.457	EU Hedge Fund 6	1.054
EU Hedge Fund 6	0.447	EU Hedge Fund 7	0.991
US Hedge Fund 54	0.412	US Hedge Fund 35	0.962
US Hedge Fund 55	0.409	US Hedge Fund 55	0.924
US Hedge Fund 1	0.407	US Hedge Fund 33	0.920
US Hedge Fund 48	0.407	US Hedge Fund 52	0.914
EU Hedge Fund 7	0.387	US Hedge Fund 41	0.891
US Hedge Fund 35	0.386	US Hedge Fund 1	0.859
US Hedge Fund 37	0.318	US Hedge Fund 53	0.829
US Hedge Fund 9	0.200	US Hedge Fund 48	0.824
US Hedge Fund 56	0.197	US Hedge Fund 42	0.782
US Hedge Fund 19	0.169	US Hedge Fund 9	0.778
US Hedge Fund 17	0.136	US Hedge Fund 54	0.776
Dow Jones	0.103	US Hedge Fund 19	0.749
EU Hedge Fund 37	0.053	US Hedge Fund 59	0.712
US Hedge Fund 73	0.037	US Hedge Fund 56	0.703
US Hedge Fund 6	-0.001	US Hedge Fund 37	0.683
US Hedge Fund 5	-0.054	US Hedge Fund 43	0.642
US Hedge Fund 66	-0.058	EU Hedge Fund 8	0.631
US Hedge Fund 8	-0.060	EU Hedge Fund 37	0.598
EU Hedge Fund 8	-0.080	US Hedge Fund 57	0.580
US Hedge Fund 76	-0.092	EU Hedge Fund 1	0.578
US Hedge Fund 50	-0.108	US Hedge Fund 76	0.551
S&P 500	-0.144	Dow Jones	0.523
EU Hedge Fund 38	-0.145	US Hedge Fund 81	0.464
US Hedge Fund 3	-0.155	US Hedge Fund 17	0.459
US Hedge Fund 7	-0.162	EU Hedge Fund 2	0.443
US Hedge Fund 80	-0.194	US Hedge Fund 50	0.406
US Hedge Fund 81	-0.196	EU Hedge Fund 38	0.384
US Hedge Fund 2	-0.217	US Hedge Fund 73	0.354
US Hedge Fund 41	-0.221	US Hedge Fund 27	0.348
US Hedge Fund 42	-0.292	US Hedge Fund 6	0.343
US Hedge Fund 82	-0.293	US Hedge Fund 66	0.336
US Hedge Fund 27	-0.302	US Hedge Fund 25	0.291
US Hedge Fund 83	-0.321	US Hedge Fund 8	0.276
DAX	-0.322	S&P 500	0.266
US Hedge Fund 25	-0.356	US Hedge Fund 26	0.250
US Hedge Fund 59	-0.369	US Hedge Fund 5	0.247
US Hedge Fund 32	-0.370	US Hedge Fund 12	0.229
US Hedge Fund 68	-0.372	US Hedge Fund 82	0.184
US Hedge Fund 30	-0.391	US Hedge Fund 7	0.167
US Hedge Fund 26	-0.392	EU Hedge Fund 30	0.162
US Hedge Fund 72	-0.392	US Hedge Fund 83	0.160
US Hedge Fund 69	-0.398	US Hedge Fund 80	0.124
EU Hedge Fund 1	-0.398	US Hedge Fund 3	0.109
US Hedge Fund 43	-0.406	EU Hedge Fund 29	0.103
US Hedge Fund 46	-0.477	US Hedge Fund 2	0.096
US Hedge Fund 47	-0.477	US Hedge Fund 46	0.034
US Hedge Fund 12	-0.490	US Hedge Fund 47	0.034
US Hedge Fund 57	-0.498	US Hedge Fund 30	-0.038

EU Hedge Fund 9	-0.498	DAX	-0.051
EU Hedge Fund 2	-0.508	EU Hedge Fund 19	-0.097
EU Hedge Fund 10	-0.535	US Hedge Fund 69	-0.118
US Hedge Fund 18	-0.550	US Hedge Fund 18	-0.121
US Hedge Fund 23	-0.596	US Hedge Fund 23	-0.146
EU Hedge Fund 19	-0.599	EU Hedge Fund 9	-0.188
EU Hedge Fund 17	-0.621	US Hedge Fund 72	-0.200
US Hedge Fund 21	-0.674	EU Hedge Fund 10	-0.232
EU Hedge Fund 30	-0.761	EU Hedge Fund 17	-0.257
EU Hedge Fund 20	-0.783	US Hedge Fund 16	-0.287
US Hedge Fund 16	-0.795	US Hedge Fund 21	-0.300
EU Hedge Fund 29	-0.852	US Hedge Fund 24	-0.344
US Hedge Fund 34	-0.876	EU Hedge Fund 20	-0.386
US Hedge Fund 67	-0.915	US Hedge Fund 67	-0.411
US Hedge Fund 15	-0.930	EU Hedge Fund 33	-0.515
US Hedge Fund 14	-0.942	EU Hedge Fund 3	-0.549
EU Hedge Fund 33	-1.004	EU Hedge Fund 15	-0.556
US Hedge Fund 24	-1.009	US Hedge Fund 34	-0.575
US Hedge Fund 49	-1.088	EU Hedge Fund 16	-0.588
US Hedge Fund 51	-1.097	EU Hedge Fund 4	-0.596
EU Hedge Fund 25	-1.131	EU Hedge Fund 14	-0.598
CAC 40	-1.232	US Hedge Fund 15	-0.615
EU Hedge Fund 18	-1.237	US Hedge Fund 14	-0.629
EU Hedge Fund 36	-1.263	US Hedge Fund 36	-0.704
EU Hedge Fund 34	-1.288	US Hedge Fund 58	-0.734
EU Hedge Fund 15	-1.316	US Hedge Fund 49	-0.776
EU Hedge Fund 35	-1.320	US Hedge Fund 51	-0.784
EU Hedge Fund 14	-1.329	EU Hedge Fund 36	-0.822
EU Hedge Fund 16	-1.334	EU Hedge Fund 25	-0.832
US Hedge Fund 77	-1.529	EU Hedge Fund 34	-0.848
US Hedge Fund 4	-1.592	EU Hedge Fund 35	-0.881
US Hedge Fund 74	-1.723	EU Hedge Fund 18	-0.895
US Hedge Fund 75	-1.724	US Hedge Fund 11	-0.971
EU Hedge Fund 31	-1.805	EU Hedge Fund 24	-1.000
EU Hedge Fund 32	-1.905	CAC 40	-1.053
EU Hedge Fund 24	-1.911	US Hedge Fund 77	-1.128
US Hedge Fund 58	-1.995	US Hedge Fund 4	-1.187
US Hedge Fund 36	-1.998	US Hedge Fund 75	-1.347
US Hedge Fund 11	-2.019	US Hedge Fund 74	-1.347
EU Hedge Fund 28	-2.111	EU Hedge Fund 31	-1.389
EU Hedge Fund 27	-2.150	EU Hedge Fund 32	-1.401
EU Hedge Fund 26	-2.176	EU Hedge Fund 28	-1.470
US Hedge Fund 60	-2.178	EU Hedge Fund 27	-1.492
US Hedge Fund 63	-2.206	EU Hedge Fund 26	-1.538
US Hedge Fund 61	-2.225	US Hedge Fund 60	-1.721
US Hedge Fund 62	-2.281	US Hedge Fund 62	-1.748
EU Hedge Fund 3	-2.401	US Hedge Fund 63	-1.751
EU Hedge Fund 4	-2.522	US Hedge Fund 61	-1.786
EU Hedge Fund 23	-2.610	EU Hedge Fund 23	-1.931
EU Hedge Fund 22	-2.620	EU Hedge Fund 22	-1.935
US Hedge Fund 79	-2.917	US Hedge Fund 44	-2.108
US Hedge Fund 44	-2.923	US Hedge Fund 79	-2.111

Source: Compiled by author.

Table W: Results from the Omega ratio: Ranked from best to worst

Pre-financial crisis period		During financial crisis period		Post-financial crisis period	
EU Risk-free rate	US Risk-free rate	EU Risk-free rate	US Risk-free rate	EU Risk-free rate	US Risk-free rate
US Hedge Fund 6	US Hedge Fund 6	US Hedge Fund 32	US Hedge Fund 79	EU Hedge Fund 11	US Hedge Fund 40
US Hedge Fund 32	US Hedge Fund 32	US Hedge Fund 79	US Hedge Fund 32	US Hedge Fund 40	EU Hedge Fund 11
US Hedge Fund 47	US Hedge Fund 47	EU Hedge Fund 23	EU Hedge Fund 23	EU Hedge Fund 13	EU Hedge Fund 13
US Hedge Fund 5	US Hedge Fund 5	EU Hedge Fund 22	US Hedge Fund 57	US Hedge Fund 70	US Hedge Fund 70
US Hedge Fund 41	US Hedge Fund 46	US Hedge Fund 57	EU Hedge Fund 22	US Hedge Fund 71	US Hedge Fund 71
US Hedge Fund 46	US Hedge Fund 41	EU Hedge Fund 25	EU Hedge Fund 25	US Hedge Fund 78	US Hedge Fund 78
EU Hedge Fund 6	EU Hedge Fund 6	EU Hedge Fund 30	US Hedge Fund 78	EU Hedge Fund 12	US Hedge Fund 28
US Hedge Fund 42	US Hedge Fund 42	US Hedge Fund 78	EU Hedge Fund 30	US Hedge Fund 28	EU Hedge Fund 12
EU Hedge Fund 24	EU Hedge Fund 24	EU Hedge Fund 29	EU Hedge Fund 29	US Hedge Fund 64	US Hedge Fund 31
EU Hedge Fund 7	EU Hedge Fund 7	EU Hedge Fund 8	EU Hedge Fund 8	US Hedge Fund 31	US Hedge Fund 39
US Hedge Fund 31	EU Hedge Fund 5	US Hedge Fund 70	US Hedge Fund 70	US Hedge Fund 39	US Hedge Fund 84
US Hedge Fund 43	US Hedge Fund 31	US Hedge Fund 71	US Hedge Fund 71	US Hedge Fund 65	US Hedge Fund 64
EU Hedge Fund 5	US Hedge Fund 43	US Hedge Fund 74	US Hedge Fund 74	US Hedge Fund 84	US Hedge Fund 32
EU Hedge Fund 4	EU Hedge Fund 4	US Hedge Fund 30	US Hedge Fund 30	US Hedge Fund 45	US Hedge Fund 65
EU Hedge Fund 3	EU Hedge Fund 3	US Hedge Fund 75	US Hedge Fund 75	US Hedge Fund 10	US Hedge Fund 68
US Hedge Fund 18	US Hedge Fund 18	US Hedge Fund 60	EU Hedge Fund 4	EU Hedge Fund 21	US Hedge Fund 45
EU Hedge Fund 13	EU Hedge Fund 13	US Hedge Fund 44	US Hedge Fund 44	EU Hedge Fund 5	US Hedge Fund 10
EU Hedge Fund 19	EU Hedge Fund 19	EU Hedge Fund 3	EU Hedge Fund 3	US Hedge Fund 29	US Hedge Fund 29
US Hedge Fund 76	US Hedge Fund 76	EU Hedge Fund 4	US Hedge Fund 60	US Hedge Fund 22	US Hedge Fund 22
US Hedge Fund 56	US Hedge Fund 56	US Hedge Fund 31	US Hedge Fund 63	US Hedge Fund 20	EU Hedge Fund 21
US Hedge Fund 4	US Hedge Fund 4	US Hedge Fund 61	US Hedge Fund 31	US Hedge Fund 38	EU Hedge Fund 5
EU Hedge Fund 11	EU Hedge Fund 11	US Hedge Fund 63	US Hedge Fund 61	EU Hedge Fund 6	US Hedge Fund 38
EU Hedge Fund 15	EU Hedge Fund 16	US Hedge Fund 39	US Hedge Fund 39	US Hedge Fund 13	US Hedge Fund 20
EU Hedge Fund 16	EU Hedge Fund 15	US Hedge Fund 62	US Hedge Fund 62	EU Hedge Fund 7	EU Hedge Fund 6
EU Hedge Fund 18	US Hedge Fund 35	US Hedge Fund 6	US Hedge Fund 6	US Hedge Fund 33	US Hedge Fund 13
US Hedge Fund 35	US Hedge Fund 18	US Hedge Fund 12	US Hedge Fund 12	US Hedge Fund 35	EU Hedge Fund 7
EU Hedge Fund 12	EU Hedge Fund 12	US Hedge Fund 19	US Hedge Fund 58	US Hedge Fund 68	US Hedge Fund 35
EU Hedge Fund 14	US Hedge Fund 30	US Hedge Fund 33	US Hedge Fund 33	US Hedge Fund 52	US Hedge Fund 33
US Hedge Fund 30	EU Hedge Fund 14	US Hedge Fund 5	US Hedge Fund 19	US Hedge Fund 32	US Hedge Fund 41
EU Hedge Fund 2	EU Hedge Fund 2	US Hedge Fund 20	US Hedge Fund 72	US Hedge Fund 1	US Hedge Fund 52
EU Hedge Fund 17	EU Hedge Fund 17	EU Hedge Fund 34	US Hedge Fund 5	US Hedge Fund 9	US Hedge Fund 1
EU Hedge Fund 9	EU Hedge Fund 9	US Hedge Fund 72	US Hedge Fund 20	US Hedge Fund 41	US Hedge Fund 53
US Hedge Fund 23	US Hedge Fund 23	US Hedge Fund 25	US Hedge Fund 36	US Hedge Fund 53	US Hedge Fund 55
US Hedge Fund 36	US Hedge Fund 36	US Hedge Fund 36	EU Hedge Fund 34	US Hedge Fund 55	US Hedge Fund 37
EU Hedge Fund 1	EU Hedge Fund 1	EU Hedge Fund 36	US Hedge Fund 68	US Hedge Fund 37	US Hedge Fund 42
US Hedge Fund 50	US Hedge Fund 50	US Hedge Fund 68	US Hedge Fund 25	EU Hedge Fund 37	US Hedge Fund 54
EU Hedge Fund 10	US Hedge Fund 20	EU Hedge Fund 35	EU Hedge Fund 36	US Hedge Fund 54	US Hedge Fund 9
US Hedge Fund 20	EU Hedge Fund 10	US Hedge Fund 48	US Hedge Fund 48	US Hedge Fund 19	US Hedge Fund 59
US Hedge Fund 77	US Hedge Fund 77	US Hedge Fund 15	EU Hedge Fund 35	US Hedge Fund 42	EU Hedge Fund 37
US Hedge Fund 10	US Hedge Fund 10	US Hedge Fund 58	US Hedge Fund 15	US Hedge Fund 56	US Hedge Fund 19
EU Hedge Fund 34	EU Hedge Fund 34	US Hedge Fund 14	US Hedge Fund 59	US Hedge Fund 48	US Hedge Fund 48
EU Hedge Fund 29	EU Hedge Fund 29	US Hedge Fund 21	US Hedge Fund 14	US Hedge Fund 59	US Hedge Fund 43
US Hedge Fund 64	US Hedge Fund 70	US Hedge Fund 38	EU Hedge Fund 28	US Hedge Fund 43	US Hedge Fund 56
EU Hedge Fund 20	US Hedge Fund 64	US Hedge Fund 66	EU Hedge Fund 27	Dow Jones	Dow Jones
US Hedge Fund 84	EU Hedge Fund 20	US Hedge Fund 81	US Hedge Fund 38	EU Hedge Fund 38	US Hedge Fund 17
CAC 40	US Hedge Fund 84	EU Hedge Fund 27	US Hedge Fund 21	US Hedge Fund 17	US Hedge Fund 57
US Hedge Fund 70	US Hedge Fund 71	EU Hedge Fund 28	US Hedge Fund 66	US Hedge Fund 81	EU Hedge Fund 38
US Hedge Fund 74	CAC 40	EU Hedge Fund 38	US Hedge Fund 81	US Hedge Fund 76	US Hedge Fund 76
US Hedge Fund 75	US Hedge Fund 74	US Hedge Fund 37	EU Hedge Fund 38	EU Hedge Fund 1	EU Hedge Fund 1
EU Hedge Fund 35	EU Hedge Fund 35	US Hedge Fund 59	EU Hedge Fund 26	EU Hedge Fund 8	EU Hedge Fund 8
US Hedge Fund 52	US Hedge Fund 75	US Hedge Fund 55	US Hedge Fund 11	US Hedge Fund 6	US Hedge Fund 81
US Hedge Fund 71	US Hedge Fund 52	EU Hedge Fund 33	US Hedge Fund 27	US Hedge Fund 57	US Hedge Fund 6
EU Hedge Fund 30	EU Hedge Fund 32	US Hedge Fund 84	US Hedge Fund 37	US Hedge Fund 50	US Hedge Fund 50
DAX	DAX	US Hedge Fund 27	US Hedge Fund 28	US Hedge Fund 66	US Hedge Fund 73
US Hedge Fund 16	EU Hedge Fund 30	US Hedge Fund 28	US Hedge Fund 55	US Hedge Fund 73	US Hedge Fund 66
US Hedge Fund 65	US Hedge Fund 16	US Hedge Fund 40	EU Hedge Fund 33	EU Hedge Fund 2	US Hedge Fund 27
EU Hedge Fund 32	EU Hedge Fund 31	EU Hedge Fund 17	US Hedge Fund 26	US Hedge Fund 5	US Hedge Fund 5
EU Hedge Fund 31	US Hedge Fund 65	EU Hedge Fund 26	US Hedge Fund 40	US Hedge Fund 27	EU Hedge Fund 2
US Hedge Fund 81	US Hedge Fund 81	US Hedge Fund 11	US Hedge Fund 84	US Hedge Fund 8	US Hedge Fund 25
US Hedge Fund 39	US Hedge Fund 39	US Hedge Fund 26	EU Hedge Fund 17	US Hedge Fund 3	US Hedge Fund 8
EU Hedge Fund 36	EU Hedge Fund 36	US Hedge Fund 16	US Hedge Fund 16	S&P 500	S&P 500
US Hedge Fund 11	US Hedge Fund 11	US Hedge Fund 73	US Hedge Fund 64	US Hedge Fund 25	US Hedge Fund 3
US Hedge Fund 22	US Hedge Fund 58	US Hedge Fund 64	US Hedge Fund 65	US Hedge Fund 7	US Hedge Fund 26
EU Hedge Fund 21	US Hedge Fund 22	US Hedge Fund 65	US Hedge Fund 73	EU Hedge Fund 30	US Hedge Fund 82
US Hedge Fund 73	EU Hedge Fund 38	US Hedge Fund 8	EU Hedge Fund 37	US Hedge Fund 80	US Hedge Fund 7
EU Hedge Fund 38	EU Hedge Fund 21	EU Hedge Fund 37	US Hedge Fund 8	US Hedge Fund 82	US Hedge Fund 12
US Hedge Fund 58	US Hedge Fund 9	US Hedge Fund 50	US Hedge Fund 23	US Hedge Fund 26	US Hedge Fund 80
US Hedge Fund 9	US Hedge Fund 73	US Hedge Fund 23	US Hedge Fund 50	US Hedge Fund 2	US Hedge Fund 83
US Hedge Fund 19	US Hedge Fund 19	US Hedge Fund 3	US Hedge Fund 7	US Hedge Fund 83	US Hedge Fund 2
US Hedge Fund 80	US Hedge Fund 14	US Hedge Fund 7	US Hedge Fund 22	US Hedge Fund 12	EU Hedge Fund 30
US Hedge Fund 68	US Hedge Fund 49	US Hedge Fund 22	US Hedge Fund 41	EU Hedge Fund 29	EU Hedge Fund 29
US Hedge Fund 14	US Hedge Fund 80	US Hedge Fund 41	US Hedge Fund 3	US Hedge Fund 69	US Hedge Fund 47

US Hedge Fund 49	US Hedge Fund 68	EU Hedge Fund 20	US Hedge Fund 42	DAX	US Hedge Fund 46
US Hedge Fund 15	US Hedge Fund 15	US Hedge Fund 42	EU Hedge Fund 20	US Hedge Fund 47	DAX
US Hedge Fund 72	US Hedge Fund 72	US Hedge Fund 69	EU Hedge Fund 12	US Hedge Fund 46	US Hedge Fund 69
US Hedge Fund 2	US Hedge Fund 2	US Hedge Fund 76	US Hedge Fund 76	US Hedge Fund 72	US Hedge Fund 30
EU Hedge Fund 37	EU Hedge Fund 37	EU Hedge Fund 12	US Hedge Fund 69	EU Hedge Fund 3	US Hedge Fund 72
S&P 500	S&P 500	US Hedge Fund 47	US Hedge Fund 43	EU Hedge Fund 4	US Hedge Fund 18
EU Hedge Fund 8	US Hedge Fund 51	US Hedge Fund 46	US Hedge Fund 1	US Hedge Fund 30	EU Hedge Fund 19
EU Hedge Fund 33	EU Hedge Fund 8	US Hedge Fund 1	US Hedge Fund 13	US Hedge Fund 18	EU Hedge Fund 9
US Hedge Fund 51	EU Hedge Fund 33	US Hedge Fund 13	EU Hedge Fund 16	EU Hedge Fund 19	US Hedge Fund 23
EU Hedge Fund 28	EU Hedge Fund 28	EU Hedge Fund 16	US Hedge Fund 49	EU Hedge Fund 9	EU Hedge Fund 17
US Hedge Fund 40	US Hedge Fund 40	US Hedge Fund 49	US Hedge Fund 45	US Hedge Fund 23	EU Hedge Fund 10
US Hedge Fund 59	US Hedge Fund 59	US Hedge Fund 43	US Hedge Fund 51	EU Hedge Fund 10	US Hedge Fund 24
US Hedge Fund 21	EU Hedge Fund 27	US Hedge Fund 51	EU Hedge Fund 2	EU Hedge Fund 17	US Hedge Fund 21
US Hedge Fund 61	US Hedge Fund 21	US Hedge Fund 45	US Hedge Fund 47	US Hedge Fund 24	US Hedge Fund 16
EU Hedge Fund 27	US Hedge Fund 69	US Hedge Fund 2	EU Hedge Fund 1	US Hedge Fund 16	EU Hedge Fund 20
US Hedge Fund 69	US Hedge Fund 33	US Hedge Fund 82	US Hedge Fund 18	US Hedge Fund 21	US Hedge Fund 67
US Hedge Fund 33	US Hedge Fund 54	EU Hedge Fund 1	US Hedge Fund 82	EU Hedge Fund 20	US Hedge Fund 34
US Hedge Fund 54	US Hedge Fund 61	US Hedge Fund 18	US Hedge Fund 46	EU Hedge Fund 15	EU Hedge Fund 15
EU Hedge Fund 26	EU Hedge Fund 26	DAX	US Hedge Fund 83	US Hedge Fund 36	EU Hedge Fund 33
US Hedge Fund 29	US Hedge Fund 45	US Hedge Fund 35	US Hedge Fund 35	US Hedge Fund 58	EU Hedge Fund 16
US Hedge Fund 45	US Hedge Fund 63	US Hedge Fund 9	DAX	EU Hedge Fund 16	EU Hedge Fund 3
US Hedge Fund 63	US Hedge Fund 57	US Hedge Fund 53	US Hedge Fund 9	US Hedge Fund 34	EU Hedge Fund 14
EU Hedge Fund 23	US Hedge Fund 29	US Hedge Fund 83	US Hedge Fund 53	US Hedge Fund 67	US Hedge Fund 4
US Hedge Fund 57	EU Hedge Fund 23	EU Hedge Fund 32	US Hedge Fund 29	EU Hedge Fund 33	US Hedge Fund 15
US Hedge Fund 60	US Hedge Fund 60	US Hedge Fund 29	EU Hedge Fund 32	EU Hedge Fund 14	US Hedge Fund 14
US Hedge Fund 48	US Hedge Fund 66	EU Hedge Fund 31	EU Hedge Fund 15	US Hedge Fund 15	US Hedge Fund 36
US Hedge Fund 13	US Hedge Fund 13	EU Hedge Fund 15	EU Hedge Fund 5	CAC 40	CAC 40
US Hedge Fund 66	US Hedge Fund 48	EU Hedge Fund 5	EU Hedge Fund 31	US Hedge Fund 14	EU Hedge Fund 36
US Hedge Fund 82	US Hedge Fund 83	US Hedge Fund 24	EU Hedge Fund 14	EU Hedge Fund 36	EU Hedge Fund 34
US Hedge Fund 83	US Hedge Fund 53	EU Hedge Fund 6	EU Hedge Fund 6	US Hedge Fund 49	US Hedge Fund 58
US Hedge Fund 53	US Hedge Fund 82	EU Hedge Fund 14	US Hedge Fund 54	EU Hedge Fund 34	US Hedge Fund 49
US Hedge Fund 3	US Hedge Fund 1	US Hedge Fund 54	EU Hedge Fund 7	US Hedge Fund 51	EU Hedge Fund 35
US Hedge Fund 1	Dow Jones	EU Hedge Fund 7	US Hedge Fund 24	EU Hedge Fund 35	US Hedge Fund 51
EU Hedge Fund 22	EU Hedge Fund 22	US Hedge Fund 52	US Hedge Fund 52	EU Hedge Fund 24	EU Hedge Fund 25
Dow Jones	US Hedge Fund 3	US Hedge Fund 21	EU Hedge Fund 21	EU Hedge Fund 25	EU Hedge Fund 18
US Hedge Fund 67	US Hedge Fund 55	US Hedge Fund 10	US Hedge Fund 10	EU Hedge Fund 18	EU Hedge Fund 24
US Hedge Fund 62	US Hedge Fund 62	US Hedge Fund 56	US Hedge Fund 56	US Hedge Fund 11	US Hedge Fund 11
US Hedge Fund 55	US Hedge Fund 67	EU Hedge Fund 10	EU Hedge Fund 10	US Hedge Fund 77	US Hedge Fund 77
US Hedge Fund 37	US Hedge Fund 37	US Hedge Fund 17	EU Hedge Fund 9	US Hedge Fund 75	US Hedge Fund 75
US Hedge Fund 78	US Hedge Fund 78	US Hedge Fund 77	US Hedge Fund 77	US Hedge Fund 74	US Hedge Fund 74
US Hedge Fund 38	US Hedge Fund 38	EU Hedge Fund 9	US Hedge Fund 17	US Hedge Fund 4	US Hedge Fund 4
US Hedge Fund 25	US Hedge Fund 8	US Hedge Fund 4	US Hedge Fund 4	US Hedge Fund 60	US Hedge Fund 60
US Hedge Fund 8	US Hedge Fund 25	EU Hedge Fund 19	EU Hedge Fund 19	US Hedge Fund 62	US Hedge Fund 62
US Hedge Fund 28	US Hedge Fund 7	EU Hedge Fund 24	EU Hedge Fund 18	US Hedge Fund 63	US Hedge Fund 63
EU Hedge Fund 25	US Hedge Fund 28	EU Hedge Fund 18	EU Hedge Fund 24	US Hedge Fund 61	US Hedge Fund 61
US Hedge Fund 7	EU Hedge Fund 25	US Hedge Fund 67	CAC 40	EU Hedge Fund 27	EU Hedge Fund 32
US Hedge Fund 26	US Hedge Fund 26	Dow Jones	Dow Jones	EU Hedge Fund 28	EU Hedge Fund 27
US Hedge Fund 17	US Hedge Fund 17	CAC 40	US Hedge Fund 67	EU Hedge Fund 32	EU Hedge Fund 28
US Hedge Fund 34	US Hedge Fund 34	US Hedge Fund 34	US Hedge Fund 34	EU Hedge Fund 26	EU Hedge Fund 26
US Hedge Fund 27	US Hedge Fund 27	S&P 500	S&P 500	EU Hedge Fund 31	EU Hedge Fund 31
US Hedge Fund 12	US Hedge Fund 12	EU Hedge Fund 13	EU Hedge Fund 13	EU Hedge Fund 22	EU Hedge Fund 22
US Hedge Fund 44	US Hedge Fund 44	US Hedge Fund 80	US Hedge Fund 80	EU Hedge Fund 23	EU Hedge Fund 23
US Hedge Fund 24	US Hedge Fund 24	EU Hedge Fund 11	EU Hedge Fund 11	US Hedge Fund 44	US Hedge Fund 79
US Hedge Fund 79	US Hedge Fund 79	US Hedge Fund 2	US Hedge Fund 2	US Hedge Fund 79	US Hedge Fund 44

⁺Note: The hedge funds and indices are ranked according to the lowest negative returns and highest positive returns (combined as one ranking).

Source: Compiled by author.

Table X: Results from the Calmar ratio: Ranked from best to worst

Pre-financial crisis period		During financial crisis period		Post-financial crisis period	
Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 47	3.031	EU Hedge Fund 22	2.155	US Hedge Fund 40	5.064
US Hedge Fund 41	2.922	EU Hedge Fund 23	2.115	US Hedge Fund 78	3.989
EU Hedge Fund 24	2.916	US Hedge Fund 78	1.904	EU Hedge Fund 11	3.394
US Hedge Fund 42	2.911	EU Hedge Fund 8	1.818	EU Hedge Fund 13	3.360
US Hedge Fund 32	2.894	US Hedge Fund 57	1.772	US Hedge Fund 70	2.714
EU Hedge Fund 7	2.892	US Hedge Fund 79	1.756	US Hedge Fund 71	2.659
US Hedge Fund 46	2.886	EU Hedge Fund 4	1.616	EU Hedge Fund 12	2.036
EU Hedge Fund 5	2.879	EU Hedge Fund 3	1.576	US Hedge Fund 84	1.805
EU Hedge Fund 6	2.765	US Hedge Fund 61	1.437	US Hedge Fund 39	1.765
US Hedge Fund 43	2.715	US Hedge Fund 60	1.410	US Hedge Fund 31	1.520
US Hedge Fund 6	2.543	US Hedge Fund 63	1.358	US Hedge Fund 29	1.297
US Hedge Fund 4	2.514	US Hedge Fund 70	1.316	US Hedge Fund 64	1.258
US Hedge Fund 5	2.501	EU Hedge Fund 30	1.313	US Hedge Fund 65	1.225
EU Hedge Fund 4	2.495	US Hedge Fund 71	1.295	US Hedge Fund 32	1.154
EU Hedge Fund 18	2.383	EU Hedge Fund 29	1.269	US Hedge Fund 45	1.133
EU Hedge Fund 19	2.337	US Hedge Fund 74	1.240	US Hedge Fund 38	1.052
EU Hedge Fund 12	2.319	US Hedge Fund 75	1.223	US Hedge Fund 10	1.012
EU Hedge Fund 3	2.283	US Hedge Fund 32	1.212	US Hedge Fund 22	1.008
EU Hedge Fund 29	2.276	US Hedge Fund 62	1.199	US Hedge Fund 68	0.908
US Hedge Fund 18	2.235	EU Hedge Fund 25	1.048	US Hedge Fund 20	0.809
DAX	2.234	US Hedge Fund 31	0.943	US Hedge Fund 41	0.793
US Hedge Fund 77	2.228	US Hedge Fund 39	0.934	EU Hedge Fund 21	0.753
EU Hedge Fund 15	2.185	US Hedge Fund 12	0.864	EU Hedge Fund 5	0.739
US Hedge Fund 30	2.106	US Hedge Fund 44	0.790	US Hedge Fund 35	0.739
EU Hedge Fund 2	2.081	US Hedge Fund 19	0.723	US Hedge Fund 13	0.731
EU Hedge Fund 14	2.071	US Hedge Fund 33	0.665	US Hedge Fund 42	0.720
EU Hedge Fund 16	2.070	US Hedge Fund 20	0.650	EU Hedge Fund 6	0.686
EU Hedge Fund 1	1.979	US Hedge Fund 6	0.631	US Hedge Fund 1	0.682
US Hedge Fund 23	1.946	US Hedge Fund 30	0.612	US Hedge Fund 53	0.664
US Hedge Fund 10	1.918	US Hedge Fund 72	0.598	US Hedge Fund 33	0.652
EU Hedge Fund 13	1.894	US Hedge Fund 5	0.559	EU Hedge Fund 7	0.649
US Hedge Fund 39	1.878	US Hedge Fund 36	0.550	US Hedge Fund 43	0.636
EU Hedge Fund 32	1.838	US Hedge Fund 25	0.537	US Hedge Fund 52	0.624
US Hedge Fund 31	1.831	US Hedge Fund 58	0.503	US Hedge Fund 54	0.613
US Hedge Fund 35	1.816	US Hedge Fund 59	0.481	US Hedge Fund 9	0.589
EU Hedge Fund 34	1.814	EU Hedge Fund 34	0.417	US Hedge Fund 55	0.586
US Hedge Fund 70	1.800	US Hedge Fund 27	0.399	US Hedge Fund 56	0.517
US Hedge Fund 50	1.789	US Hedge Fund 11	0.398	US Hedge Fund 19	0.509
US Hedge Fund 56	1.778	EU Hedge Fund 27	0.398	US Hedge Fund 57	0.499
US Hedge Fund 20	1.771	EU Hedge Fund 28	0.383	US Hedge Fund 28	0.454
EU Hedge Fund 31	1.767	US Hedge Fund 28	0.374	US Hedge Fund 59	0.409
US Hedge Fund 71	1.711	US Hedge Fund 26	0.372	EU Hedge Fund 1	0.384
EU Hedge Fund 38	1.706	EU Hedge Fund 36	0.366	Dow Jones	0.364
US Hedge Fund 76	1.698	US Hedge Fund 55	0.349	US Hedge Fund 81	0.342
CAC 40	1.696	US Hedge Fund 81	0.343	US Hedge Fund 37	0.331
EU Hedge Fund 20	1.681	US Hedge Fund 48	0.339	US Hedge Fund 48	0.318
EU Hedge Fund 17	1.636	EU Hedge Fund 35	0.320	EU Hedge Fund 2	0.292
US Hedge Fund 81	1.621	US Hedge Fund 66	0.308	US Hedge Fund 73	0.289
US Hedge Fund 15	1.588	EU Hedge Fund 26	0.305	US Hedge Fund 76	0.286
EU Hedge Fund 35	1.579	US Hedge Fund 68	0.305	EU Hedge Fund 37	0.270
US Hedge Fund 65	1.564	US Hedge Fund 84	0.277	US Hedge Fund 6	0.268
US Hedge Fund 36	1.557	US Hedge Fund 15	0.269	US Hedge Fund 17	0.266
US Hedge Fund 64	1.552	US Hedge Fund 14	0.256	US Hedge Fund 27	0.264
US Hedge Fund 14	1.537	EU Hedge Fund 17	0.234	EU Hedge Fund 8	0.262
EU Hedge Fund 11	1.512	US Hedge Fund 38	0.231	US Hedge Fund 66	0.259
US Hedge Fund 16	1.448	US Hedge Fund 40	0.211	US Hedge Fund 50	0.249
EU Hedge Fund 36	1.445	US Hedge Fund 16	0.193	US Hedge Fund 25	0.223
EU Hedge Fund 9	1.426	EU Hedge Fund 38	0.190	US Hedge Fund 8	0.219
US Hedge Fund 22	1.379	US Hedge Fund 37	0.185	US Hedge Fund 5	0.198
US Hedge Fund 72	1.363	US Hedge Fund 21	0.175	US Hedge Fund 26	0.191
US Hedge Fund 75	1.352	US Hedge Fund 50	0.169	S&P 500	0.184
EU Hedge Fund 10	1.350	US Hedge Fund 23	0.160	EU Hedge Fund 38	0.158
US Hedge Fund 19	1.340	US Hedge Fund 8	0.158	EU Hedge Fund 30	0.154
US Hedge Fund 74	1.327	EU Hedge Fund 33	0.145	US Hedge Fund 7	0.138
US Hedge Fund 9	1.301	US Hedge Fund 64	0.134	US Hedge Fund 12	0.133
US Hedge Fund 52	1.258	US Hedge Fund 65	0.131	US Hedge Fund 82	0.132
S&P 500	1.252	US Hedge Fund 41	0.129	US Hedge Fund 83	0.115
US Hedge Fund 49	1.204	US Hedge Fund 73	0.118	US Hedge Fund 80	0.109
EU Hedge Fund 30	1.195	US Hedge Fund 7	0.109	EU Hedge Fund 29	0.105
US Hedge Fund 84	1.192	US Hedge Fund 42	0.095	US Hedge Fund 2	0.087
US Hedge Fund 59	1.182	EU Hedge Fund 37	0.080	US Hedge Fund 3	0.062
US Hedge Fund 51	1.155	US Hedge Fund 22	0.073	US Hedge Fund 46	0.026
US Hedge Fund 11	1.155	EU Hedge Fund 20	0.056	US Hedge Fund 47	0.026
US Hedge Fund 21	1.148	US Hedge Fund 76	0.053	US Hedge Fund 30	-0.022
US Hedge Fund 58	1.132	EU Hedge Fund 12	0.043	DAX	-0.024
EU Hedge Fund 37	1.123	EU Hedge Fund 16	0.031	EU Hedge Fund 19	-0.048

US Hedge Fund 73	1.069	US Hedge Fund 43	0.012	US Hedge Fund 69	-0.075
US Hedge Fund 54	1.049	US Hedge Fund 3	0.000	US Hedge Fund 18	-0.077
EU Hedge Fund 21	1.026	US Hedge Fund 82	-0.023	US Hedge Fund 23	-0.119
US Hedge Fund 33	0.980	US Hedge Fund 45	-0.030	US Hedge Fund 72	-0.131
EU Hedge Fund 33	0.970	US Hedge Fund 83	-0.033	EU Hedge Fund 9	-0.132
EU Hedge Fund 8	0.966	EU Hedge Fund 2	-0.036	US Hedge Fund 24	-0.151
US Hedge Fund 29	0.952	EU Hedge Fund 1	-0.041	EU Hedge Fund 10	-0.163
US Hedge Fund 69	0.951	US Hedge Fund 69	-0.045	EU Hedge Fund 17	-0.166
US Hedge Fund 13	0.922	US Hedge Fund 1	-0.049	US Hedge Fund 21	-0.231
US Hedge Fund 45	0.918	US Hedge Fund 47	-0.058	EU Hedge Fund 20	-0.235
US Hedge Fund 80	0.868	US Hedge Fund 49	-0.065	US Hedge Fund 16	-0.252
US Hedge Fund 2	0.866	US Hedge Fund 46	-0.067	EU Hedge Fund 3	-0.290
US Hedge Fund 53	0.848	US Hedge Fund 51	-0.081	EU Hedge Fund 4	-0.318
US Hedge Fund 68	0.843	US Hedge Fund 13	-0.084	EU Hedge Fund 33	-0.335
Dow Jones	0.827	US Hedge Fund 35	-0.128	US Hedge Fund 67	-0.362
US Hedge Fund 57	0.789	US Hedge Fund 9	-0.131	EU Hedge Fund 14	-0.370
EU Hedge Fund 23	0.783	DAX	-0.172	EU Hedge Fund 15	-0.374
US Hedge Fund 55	0.767	EU Hedge Fund 21	-0.173	EU Hedge Fund 16	-0.395
US Hedge Fund 40	0.765	EU Hedge Fund 15	-0.179	US Hedge Fund 58	-0.401
US Hedge Fund 66	0.758	US Hedge Fund 29	-0.180	US Hedge Fund 34	-0.435
US Hedge Fund 61	0.735	US Hedge Fund 53	-0.180	US Hedge Fund 36	-0.466
US Hedge Fund 82	0.708	US Hedge Fund 18	-0.182	US Hedge Fund 15	-0.487
US Hedge Fund 83	0.707	EU Hedge Fund 14	-0.186	US Hedge Fund 14	-0.501
US Hedge Fund 67	0.698	US Hedge Fund 56	-0.188	US Hedge Fund 49	-0.649
US Hedge Fund 1	0.680	EU Hedge Fund 5	-0.195	US Hedge Fund 51	-0.657
US Hedge Fund 48	0.648	US Hedge Fund 52	-0.198	EU Hedge Fund 36	-0.660
EU Hedge Fund 22	0.638	US Hedge Fund 54	-0.199	CAC 40	-0.682
US Hedge Fund 3	0.627	EU Hedge Fund 6	-0.202	EU Hedge Fund 34	-0.684
US Hedge Fund 63	0.615	EU Hedge Fund 7	-0.204	EU Hedge Fund 18	-0.700
US Hedge Fund 62	0.601	US Hedge Fund 24	-0.214	EU Hedge Fund 25	-0.704
EU Hedge Fund 28	0.569	EU Hedge Fund 32	-0.217	EU Hedge Fund 35	-0.716
EU Hedge Fund 27	0.555	US Hedge Fund 77	-0.263	EU Hedge Fund 24	-0.784
US Hedge Fund 60	0.554	EU Hedge Fund 10	-0.264	US Hedge Fund 77	-0.818
EU Hedge Fund 26	0.539	US Hedge Fund 4	-0.283	US Hedge Fund 11	-0.841
US Hedge Fund 8	0.488	EU Hedge Fund 31	-0.283	US Hedge Fund 60	-0.873
US Hedge Fund 7	0.470	US Hedge Fund 10	-0.289	EU Hedge Fund 31	-0.879
US Hedge Fund 78	0.460	EU Hedge Fund 9	-0.312	US Hedge Fund 63	-0.901
US Hedge Fund 38	0.457	EU Hedge Fund 19	-0.495	US Hedge Fund 61	-0.918
US Hedge Fund 37	0.444	Dow Jones	-0.520	US Hedge Fund 62	-0.934
US Hedge Fund 34	0.366	US Hedge Fund 67	-0.524	EU Hedge Fund 32	-0.939
US Hedge Fund 17	0.296	EU Hedge Fund 18	-0.527	US Hedge Fund 74	-0.942
EU Hedge Fund 25	0.249	S&P 500	-0.546	US Hedge Fund 75	-0.945
US Hedge Fund 25	0.221	EU Hedge Fund 13	-0.571	US Hedge Fund 4	-0.959
US Hedge Fund 28	0.213	CAC 40	-0.609	EU Hedge Fund 28	-1.220
US Hedge Fund 26	0.203	EU Hedge Fund 24	-0.637	EU Hedge Fund 23	-1.238
US Hedge Fund 27	0.163	US Hedge Fund 34	-0.644	EU Hedge Fund 22	-1.259
US Hedge Fund 12	0.046	US Hedge Fund 17	-0.682	EU Hedge Fund 26	-1.285
US Hedge Fund 44	-0.082	US Hedge Fund 80	-0.728	EU Hedge Fund 27	-1.308
US Hedge Fund 24	-0.310	US Hedge Fund 2	-0.729	US Hedge Fund 79	-1.434
US Hedge Fund 79	-0.355	EU Hedge Fund 11	-0.795	US Hedge Fund 44	-1.714

Source: Compiled by author.

Table Y: Results from the Sortino ratio – ranked from best to worst (Based on the indices, respectively: Pre-financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 5	2.797	US Hedge Fund 5	1.725	US Hedge Fund 6	7.203	US Hedge Fund 5	8.664
US Hedge Fund 6	2.500	US Hedge Fund 6	1.605	US Hedge Fund 5	7.009	US Hedge Fund 6	8.147
EU Hedge Fund 6	1.998	EU Hedge Fund 6	1.541	EU Hedge Fund 7	4.481	EU Hedge Fund 6	4.678
EU Hedge Fund 7	1.943	EU Hedge Fund 7	1.458	EU Hedge Fund 6	4.455	EU Hedge Fund 7	4.572
EU Hedge Fund 5	1.840	EU Hedge Fund 5	1.354	EU Hedge Fund 5	4.307	EU Hedge Fund 5	4.430
EU Hedge Fund 31	1.320	EU Hedge Fund 31	0.989	EU Hedge Fund 31	2.510	US Hedge Fund 32	3.596
US Hedge Fund 75	1.252	US Hedge Fund 75	0.886	US Hedge Fund 10	2.471	US Hedge Fund 4	3.048
EU Hedge Fund 32	1.206	EU Hedge Fund 32	0.854	EU Hedge Fund 13	2.459	EU Hedge Fund 13	2.923
US Hedge Fund 74	1.184	US Hedge Fund 74	0.804	EU Hedge Fund 32	2.434	US Hedge Fund 56	2.878
EU Hedge Fund 11	0.965	EU Hedge Fund 11	0.506	US Hedge Fund 75	2.414	US Hedge Fund 10	2.850
EU Hedge Fund 13	0.894	EU Hedge Fund 13	0.365	EU Hedge Fund 11	2.413	EU Hedge Fund 17	2.840
EU Hedge Fund 12	0.805	US Hedge Fund 10	0.361	EU Hedge Fund 17	2.393	EU Hedge Fund 2	2.829
EU Hedge Fund 19	0.791	EU Hedge Fund 12	0.328	US Hedge Fund 74	2.351	EU Hedge Fund 19	2.806
EU Hedge Fund 17	0.786	EU Hedge Fund 17	0.305	US Hedge Fund 4	2.310	EU Hedge Fund 12	2.742
US Hedge Fund 10	0.769	EU Hedge Fund 18	0.297	EU Hedge Fund 18	2.290	US Hedge Fund 75	2.740
EU Hedge Fund 18	0.685	EU Hedge Fund 19	0.252	EU Hedge Fund 12	2.282	EU Hedge Fund 18	2.729
EU Hedge Fund 2	0.626	EU Hedge Fund 2	0.163	EU Hedge Fund 19	2.262	US Hedge Fund 74	2.690
US Hedge Fund 4	0.540	US Hedge Fund 4	0.068	EU Hedge Fund 2	2.246	EU Hedge Fund 11	2.685
EU Hedge Fund 1	0.463	EU Hedge Fund 1	0.036	US Hedge Fund 64	2.183	EU Hedge Fund 31	2.675
US Hedge Fund 64	0.437	US Hedge Fund 72	0.000	EU Hedge Fund 1	2.040	EU Hedge Fund 32	2.635
US Hedge Fund 77	0.342	US Hedge Fund 64	-0.006	US Hedge Fund 65	1.905	EU Hedge Fund 1	2.608
US Hedge Fund 65	0.335	EU Hedge Fund 20	-0.043	EU Hedge Fund 20	1.880	US Hedge Fund 64	2.545
EU Hedge Fund 20	0.309	US Hedge Fund 65	-0.061	US Hedge Fund 77	1.842	US Hedge Fund 65	2.356
US Hedge Fund 72	0.269	EU Hedge Fund 9	-0.080	EU Hedge Fund 24	1.807	US Hedge Fund 77	2.328
EU Hedge Fund 9	0.268	US Hedge Fund 77	-0.083	EU Hedge Fund 10	1.670	EU Hedge Fund 24	2.309
EU Hedge Fund 10	0.232	US Hedge Fund 69	-0.089	US Hedge Fund 31	1.639	US Hedge Fund 18	2.256
US Hedge Fund 69	0.152	EU Hedge Fund 10	-0.108	US Hedge Fund 56	1.617	US Hedge Fund 23	2.248
US Hedge Fund 14	0.120	US Hedge Fund 14	-0.141	EU Hedge Fund 9	1.585	EU Hedge Fund 20	2.241
US Hedge Fund 15	0.088	US Hedge Fund 15	-0.180	US Hedge Fund 35	1.561	EU Hedge Fund 4	2.239
US Hedge Fund 16	-0.148	US Hedge Fund 16	-0.465	US Hedge Fund 32	1.494	US Hedge Fund 31	2.215
EU Hedge Fund 24	-0.162	US Hedge Fund 48	-0.493	US Hedge Fund 16	1.389	US Hedge Fund 35	2.103
US Hedge Fund 48	-0.250	US Hedge Fund 29	-0.678	US Hedge Fund 23	1.383	US Hedge Fund 41	2.031
US Hedge Fund 35	-0.290	US Hedge Fund 81	-0.744	US Hedge Fund 18	1.298	EU Hedge Fund 3	1.988
US Hedge Fund 81	-0.420	US Hedge Fund 80	-0.752	US Hedge Fund 72	1.205	US Hedge Fund 42	1.972
US Hedge Fund 29	-0.431	US Hedge Fund 22	-0.781	US Hedge Fund 41	1.157	US Hedge Fund 47	1.961
US Hedge Fund 22	-0.441	US Hedge Fund 78	-0.786	EU Hedge Fund 4	1.149	EU Hedge Fund 9	1.933
US Hedge Fund 61	-0.542	US Hedge Fund 35	-0.791	US Hedge Fund 76	1.146	US Hedge Fund 52	1.867
US Hedge Fund 80	-0.549	EU Hedge Fund 24	-0.802	US Hedge Fund 52	1.144	US Hedge Fund 16	1.860
US Hedge Fund 78	-0.579	US Hedge Fund 2	-0.847	EU Hedge Fund 16	1.139	EU Hedge Fund 10	1.838
US Hedge Fund 9	-0.589	US Hedge Fund 61	-0.859	US Hedge Fund 22	1.133	US Hedge Fund 76	1.827
US Hedge Fund 31	-0.627	US Hedge Fund 3	-0.863	US Hedge Fund 42	1.105	US Hedge Fund 43	1.810
US Hedge Fund 3	-0.636	US Hedge Fund 9	-0.887	EU Hedge Fund 15	1.092	US Hedge Fund 20	1.743
EU Hedge Fund 15	-0.651	US Hedge Fund 40	-0.973	US Hedge Fund 20	1.084	EU Hedge Fund 15	1.653
US Hedge Fund 40	-0.657	US Hedge Fund 52	-1.066	US Hedge Fund 81	1.074	US Hedge Fund 46	1.643
US Hedge Fund 52	-0.661	EU Hedge Fund 15	-1.108	US Hedge Fund 14	1.015	US Hedge Fund 30	1.585
EU Hedge Fund 16	-0.683	US Hedge Fund 54	-1.110	US Hedge Fund 15	0.974	US Hedge Fund 22	1.557
US Hedge Fund 2	-0.722	US Hedge Fund 34	-1.114	EU Hedge Fund 14	0.974	EU Hedge Fund 14	1.555
US Hedge Fund 56	-0.774	US Hedge Fund 33	-1.114	US Hedge Fund 84	0.957	EU Hedge Fund 34	1.555
EU Hedge Fund 14	-0.821	EU Hedge Fund 16	-1.137	US Hedge Fund 30	0.954	EU Hedge Fund 16	1.551
US Hedge Fund 54	-0.853	US Hedge Fund 8	-1.176	US Hedge Fund 69	0.951	US Hedge Fund 84	1.536
US Hedge Fund 37	-0.887	US Hedge Fund 37	-1.177	US Hedge Fund 43	0.938	US Hedge Fund 81	1.510
US Hedge Fund 20	-0.899	US Hedge Fund 7	-1.194	EU Hedge Fund 3	0.917	US Hedge Fund 72	1.487
US Hedge Fund 13	-0.918	US Hedge Fund 67	-1.212	EU Hedge Fund 34	0.871	US Hedge Fund 50	1.419
US Hedge Fund 19	-0.922	US Hedge Fund 66	-1.228	US Hedge Fund 50	0.848	US Hedge Fund 61	1.335
US Hedge Fund 34	-0.932	US Hedge Fund 61	-1.237	US Hedge Fund 61	0.846	US Hedge Fund 14	1.275
US Hedge Fund 84	-0.943	EU Hedge Fund 21	-1.240	US Hedge Fund 80	0.830	US Hedge Fund 36	1.267
US Hedge Fund 67	-0.981	US Hedge Fund 53	-1.240	US Hedge Fund 2	0.717	US Hedge Fund 80	1.266
US Hedge Fund 33	-0.987	US Hedge Fund 19	-1.289	US Hedge Fund 36	0.702	US Hedge Fund 15	1.249
US Hedge Fund 8	-0.987	EU Hedge Fund 14	-1.293	US Hedge Fund 9	0.701	EU Hedge Fund 35	1.239
EU Hedge Fund 21	-0.990	US Hedge Fund 56	-1.379	US Hedge Fund 40	0.567	US Hedge Fund 2	1.177
US Hedge Fund 63	-0.994	US Hedge Fund 38	-1.396	EU Hedge Fund 35	0.483	US Hedge Fund 69	1.168
US Hedge Fund 7	-1.005	US Hedge Fund 76	-1.398	US Hedge Fund 29	0.481	US Hedge Fund 9	1.150
US Hedge Fund 66	-1.014	EU Hedge Fund 28	-1.406	US Hedge Fund 19	0.477	US Hedge Fund 39	1.149
US Hedge Fund 76	-1.025	US Hedge Fund 20	-1.424	US Hedge Fund 48	0.477	US Hedge Fund 40	0.954
US Hedge Fund 23	-1.036	US Hedge Fund 63	-1.428	US Hedge Fund 39	0.391	US Hedge Fund 19	0.948
US Hedge Fund 60	-1.053	US Hedge Fund 55	-1.433	US Hedge Fund 63	0.330	EU Hedge Fund 36	0.926
US Hedge Fund 36	-1.060	EU Hedge Fund 33	-1.443	US Hedge Fund 54	0.311	US Hedge Fund 63	0.810
US Hedge Fund 38	-1.081	US Hedge Fund 84	-1.453	EU Hedge Fund 21	0.263	US Hedge Fund 29	0.735
US Hedge Fund 53	-1.167	US Hedge Fund 83	-1.453	US Hedge Fund 33	0.262	EU Hedge Fund 8	0.729
EU Hedge Fund 33	-1.176	US Hedge Fund 36	-1.455	US Hedge Fund 60	0.214	US Hedge Fund 33	0.718
US Hedge Fund 30	-1.215	US Hedge Fund 23	-1.462	EU Hedge Fund 36	0.208	US Hedge Fund 48	0.690
US Hedge Fund 55	-1.231	US Hedge Fund 33	-1.463	US Hedge Fund 3	0.208	US Hedge Fund 54	0.685
US Hedge Fund 50	-1.236	US Hedge Fund 82	-1.469	EU Hedge Fund 8	0.194	EU Hedge Fund 21	0.681
US Hedge Fund 82	-1.236	US Hedge Fund 60	-1.530	EU Hedge Fund 28	0.192	US Hedge Fund 60	0.676

US Hedge Fund 18	-1.245	EU Hedge Fund 26	-1.613	EU Hedge Fund 33	0.167	EU Hedge Fund 28	0.662
EU Hedge Fund 28	-1.254	EU Hedge Fund 27	-1.619	US Hedge Fund 47	0.126	EU Hedge Fund 27	0.651
US Hedge Fund 83	-1.260	US Hedge Fund 45	-1.636	EU Hedge Fund 27	0.119	EU Hedge Fund 33	0.600
US Hedge Fund 41	-1.276	US Hedge Fund 62	-1.687	US Hedge Fund 78	0.090	EU Hedge Fund 29	0.552
US Hedge Fund 42	-1.327	US Hedge Fund 1	-1.777	US Hedge Fund 13	0.087	US Hedge Fund 68	0.520
US Hedge Fund 62	-1.355	US Hedge Fund 50	-1.780	US Hedge Fund 53	0.036	US Hedge Fund 11	0.507
US Hedge Fund 39	-1.356	EU Hedge Fund 8	-1.815	US Hedge Fund 67	0.027	EU Hedge Fund 26	0.492
US Hedge Fund 45	-1.361	US Hedge Fund 30	-1.836	US Hedge Fund 37	0.019	US Hedge Fund 3	0.473
EU Hedge Fund 34	-1.371	EU Hedge Fund 34	-1.854	EU Hedge Fund 26	0.013	US Hedge Fund 13	0.417
EU Hedge Fund 27	-1.405	US Hedge Fund 18	-1.887	US Hedge Fund 68	-0.013	US Hedge Fund 49	0.399
US Hedge Fund 43	-1.460	US Hedge Fund 41	-1.932	US Hedge Fund 66	-0.014	US Hedge Fund 53	0.377
EU Hedge Fund 8	-1.461	US Hedge Fund 39	-1.939	US Hedge Fund 49	-0.097	US Hedge Fund 67	0.364
EU Hedge Fund 26	-1.485	US Hedge Fund 42	-1.979	US Hedge Fund 38	-0.099	EU Hedge Fund 30	0.359
US Hedge Fund 68	-1.522	US Hedge Fund 17	-2.003	US Hedge Fund 82	-0.104	US Hedge Fund 51	0.330
EU Hedge Fund 35	-1.621	US Hedge Fund 24	-2.004	US Hedge Fund 83	-0.110	US Hedge Fund 78	0.303
EU Hedge Fund 4	-1.684	US Hedge Fund 68	-2.028	US Hedge Fund 46	-0.129	US Hedge Fund 37	0.303
US Hedge Fund 1	-1.702	EU Hedge Fund 35	-2.087	US Hedge Fund 45	-0.142	EU Hedge Fund 38	0.303
US Hedge Fund 17	-1.722	US Hedge Fund 49	-2.087	US Hedge Fund 51	-0.167	US Hedge Fund 66	0.303
US Hedge Fund 49	-1.755	US Hedge Fund 43	-2.104	US Hedge Fund 55	-0.173	US Hedge Fund 82	0.293
US Hedge Fund 51	-1.816	US Hedge Fund 51	-2.144	US Hedge Fund 62	-0.178	US Hedge Fund 45	0.285
EU Hedge Fund 23	-1.843	EU Hedge Fund 36	-2.357	US Hedge Fund 8	-0.193	US Hedge Fund 83	0.264
US Hedge Fund 24	-1.932	EU Hedge Fund 23	-2.553	US Hedge Fund 11	-0.212	US Hedge Fund 62	0.219
EU Hedge Fund 36	-1.948	EU Hedge Fund 22	-2.558	US Hedge Fund 34	-0.217	US Hedge Fund 38	0.197
US Hedge Fund 32	-1.965	US Hedge Fund 27	-2.575	US Hedge Fund 7	-0.222	US Hedge Fund 55	0.161
EU Hedge Fund 3	-2.023	US Hedge Fund 25	-2.613	EU Hedge Fund 29	-0.278	EU Hedge Fund 23	0.156
US Hedge Fund 59	-2.036	EU Hedge Fund 4	-2.651	EU Hedge Fund 23	-0.370	US Hedge Fund 21	0.153
EU Hedge Fund 22	-2.049	US Hedge Fund 59	-2.655	EU Hedge Fund 30	-0.398	US Hedge Fund 59	0.136
US Hedge Fund 25	-2.166	US Hedge Fund 26	-2.659	US Hedge Fund 1	-0.398	US Hedge Fund 73	0.105
US Hedge Fund 27	-2.204	US Hedge Fund 28	-2.710	US Hedge Fund 21	-0.561	US Hedge Fund 8	0.069
US Hedge Fund 26	-2.210	US Hedge Fund 21	-2.808	EU Hedge Fund 22	-0.572	US Hedge Fund 71	0.067
US Hedge Fund 28	-2.247	US Hedge Fund 32	-2.824	EU Hedge Fund 38	-0.589	US Hedge Fund 70	0.052
US Hedge Fund 11	-2.296	US Hedge Fund 12	-2.839	US Hedge Fund 73	-0.626	US Hedge Fund 7	0.038
EU Hedge Fund 38	-2.421	US Hedge Fund 73	-2.906	US Hedge Fund 59	-0.632	US Hedge Fund 34	0.008
EU Hedge Fund 29	-2.427	EU Hedge Fund 25	-2.915	US Hedge Fund 17	-0.708	US Hedge Fund 1	0.000
US Hedge Fund 12	-2.468	US Hedge Fund 79	-3.021	US Hedge Fund 57	-0.717	US Hedge Fund 57	-0.022
US Hedge Fund 21	-2.542	EU Hedge Fund 3	-3.086	US Hedge Fund 71	-0.917	EU Hedge Fund 22	-0.035
US Hedge Fund 57	-2.558	US Hedge Fund 57	-3.194	US Hedge Fund 70	-0.922	EU Hedge Fund 37	-0.067
EU Hedge Fund 25	-2.614	EU Hedge Fund 38	-3.206	US Hedge Fund 25	-1.007	US Hedge Fund 58	-0.279
US Hedge Fund 79	-2.616	US Hedge Fund 11	-3.276	EU Hedge Fund 37	-1.020	US Hedge Fund 17	-0.364
EU Hedge Fund 30	-2.625	EU Hedge Fund 29	-3.287	US Hedge Fund 26	-1.043	US Hedge Fund 25	-0.609
EU Hedge Fund 37	-2.972	EU Hedge Fund 30	-3.305	US Hedge Fund 28	-1.048	US Hedge Fund 26	-0.645
US Hedge Fund 44	-3.391	US Hedge Fund 44	-3.683	US Hedge Fund 27	-1.068	US Hedge Fund 28	-0.647
US Hedge Fund 73	-3.517	EU Hedge Fund 37	-3.823	US Hedge Fund 58	-1.085	US Hedge Fund 27	-0.682
US Hedge Fund 58	-3.679	US Hedge Fund 58	-4.522	US Hedge Fund 24	-1.205	EU Hedge Fund 25	-0.768
US Hedge Fund 71	-3.772	US Hedge Fund 71	-4.620	US Hedge Fund 12	-1.226	US Hedge Fund 12	-0.815
US Hedge Fund 70	-3.909	US Hedge Fund 70	-4.765	EU Hedge Fund 25	-1.244	US Hedge Fund 24	-0.972
US Hedge Fund 47	-4.065	US Hedge Fund 47	-5.824	US Hedge Fund 79	-1.608	US Hedge Fund 79	-1.249
US Hedge Fund 46	-4.332	US Hedge Fund 46	-6.174	US Hedge Fund 44	-1.767	US Hedge Fund 44	-1.413

Source: Compiled by author.

Table Z: Results from the Sortino ratio – ranked from best to worst (Based on the indices, respectively: During financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 32	11.641	US Hedge Fund 32	8.640	US Hedge Fund 79	8.082	EU Hedge Fund 23	8.154
US Hedge Fund 79	7.623	US Hedge Fund 79	5.550	EU Hedge Fund 23	7.133	EU Hedge Fund 22	8.127
US Hedge Fund 47	6.618	EU Hedge Fund 22	4.558	EU Hedge Fund 22	7.129	US Hedge Fund 79	7.454
US Hedge Fund 46	6.599	EU Hedge Fund 23	4.284	US Hedge Fund 47	6.778	US Hedge Fund 47	6.309
EU Hedge Fund 23	6.504	US Hedge Fund 6	4.087	US Hedge Fund 46	6.759	US Hedge Fund 46	6.289
EU Hedge Fund 22	6.457	EU Hedge Fund 25	4.044	US Hedge Fund 57	6.587	US Hedge Fund 57	5.993
US Hedge Fund 57	5.455	US Hedge Fund 57	3.970	US Hedge Fund 78	6.402	US Hedge Fund 78	5.913
EU Hedge Fund 29	5.189	US Hedge Fund 71	3.024	US Hedge Fund 70	5.718	US Hedge Fund 70	5.086
US Hedge Fund 70	5.013	EU Hedge Fund 29	2.959	US Hedge Fund 71	5.590	US Hedge Fund 71	4.964
EU Hedge Fund 3	4.982	EU Hedge Fund 30	2.953	EU Hedge Fund 25	5.250	EU Hedge Fund 25	4.755
US Hedge Fund 58	4.981	US Hedge Fund 70	2.931	US Hedge Fund 58	5.172	US Hedge Fund 32	4.647
US Hedge Fund 71	4.896	US Hedge Fund 78	2.926	US Hedge Fund 32	5.007	US Hedge Fund 58	4.402
US Hedge Fund 39	4.857	EU Hedge Fund 8	2.727	EU Hedge Fund 30	4.927	EU Hedge Fund 30	4.354
EU Hedge Fund 25	4.819	US Hedge Fund 30	2.582	EU Hedge Fund 3	4.893	EU Hedge Fund 29	4.171
EU Hedge Fund 4	4.809	EU Hedge Fund 3	2.365	EU Hedge Fund 4	4.798	EU Hedge Fund 3	4.149
EU Hedge Fund 30	4.661	EU Hedge Fund 4	2.316	US Hedge Fund 59	4.769	EU Hedge Fund 4	4.024
EU Hedge Fund 34	4.359	US Hedge Fund 39	2.308	EU Hedge Fund 29	4.706	US Hedge Fund 39	4.011
EU Hedge Fund 8	4.219	US Hedge Fund 60	2.222	US Hedge Fund 39	4.619	US Hedge Fund 30	3.735
US Hedge Fund 59	4.212	US Hedge Fund 58	2.103	US Hedge Fund 6	4.411	EU Hedge Fund 8	3.718
US Hedge Fund 30	4.074	US Hedge Fund 12	2.064	EU Hedge Fund 8	4.302	US Hedge Fund 59	3.559
EU Hedge Fund 36	4.012	US Hedge Fund 63	2.061	US Hedge Fund 30	4.142	US Hedge Fund 44	3.342
US Hedge Fund 78	4.006	US Hedge Fund 61	2.012	US Hedge Fund 36	3.851	US Hedge Fund 36	3.233
US Hedge Fund 36	3.945	US Hedge Fund 47	1.958	US Hedge Fund 11	3.835	US Hedge Fund 11	3.183
US Hedge Fund 11	3.829	US Hedge Fund 62	1.956	US Hedge Fund 31	3.752	US Hedge Fund 6	3.181
EU Hedge Fund 35	3.827	US Hedge Fund 46	1.939	US Hedge Fund 64	3.617	US Hedge Fund 31	3.090
US Hedge Fund 6	3.326	US Hedge Fund 59	1.914	US Hedge Fund 65	3.468	US Hedge Fund 60	2.957
US Hedge Fund 31	3.206	US Hedge Fund 74	1.878	EU Hedge Fund 38	3.393	US Hedge Fund 63	2.862
US Hedge Fund 60	3.196	US Hedge Fund 75	1.857	US Hedge Fund 60	3.226	US Hedge Fund 61	2.762
EU Hedge Fund 27	3.190	US Hedge Fund 31	1.835	US Hedge Fund 63	3.150	US Hedge Fund 62	2.674
US Hedge Fund 25	3.154	US Hedge Fund 36	1.816	EU Hedge Fund 27	3.096	EU Hedge Fund 34	2.609
US Hedge Fund 65	3.130	US Hedge Fund 44	1.675	EU Hedge Fund 34	3.062	US Hedge Fund 33	2.508
US Hedge Fund 64	3.101	US Hedge Fund 19	1.509	US Hedge Fund 82	3.047	EU Hedge Fund 36	2.431
US Hedge Fund 82	3.064	US Hedge Fund 25	1.481	US Hedge Fund 83	3.038	US Hedge Fund 74	2.428
US Hedge Fund 83	3.042	US Hedge Fund 11	1.421	US Hedge Fund 61	3.034	US Hedge Fund 75	2.407
US Hedge Fund 63	2.979	US Hedge Fund 65	1.395	US Hedge Fund 62	2.969	US Hedge Fund 12	2.373
US Hedge Fund 61	2.877	US Hedge Fund 33	1.261	US Hedge Fund 44	2.963	EU Hedge Fund 35	2.338
US Hedge Fund 12	2.872	US Hedge Fund 5	1.254	US Hedge Fund 81	2.925	US Hedge Fund 25	2.228
US Hedge Fund 44	2.848	US Hedge Fund 20	1.196	US Hedge Fund 25	2.921	US Hedge Fund 28	1.989
US Hedge Fund 62	2.844	US Hedge Fund 28	1.101	US Hedge Fund 66	2.896	US Hedge Fund 41	1.972
US Hedge Fund 28	2.811	US Hedge Fund 27	1.083	EU Hedge Fund 36	2.864	US Hedge Fund 26	1.929
US Hedge Fund 74	2.650	US Hedge Fund 26	1.049	EU Hedge Fund 35	2.774	US Hedge Fund 27	1.925
US Hedge Fund 75	2.632	US Hedge Fund 64	1.038	US Hedge Fund 74	2.711	US Hedge Fund 42	1.911
US Hedge Fund 27	2.550	US Hedge Fund 68	1.024	EU Hedge Fund 16	2.694	US Hedge Fund 68	1.896
US Hedge Fund 26	2.501	US Hedge Fund 81	0.919	US Hedge Fund 75	2.688	US Hedge Fund 19	1.803
US Hedge Fund 76	2.374	US Hedge Fund 72	0.901	US Hedge Fund 28	2.664	EU Hedge Fund 16	1.755
US Hedge Fund 55	2.298	EU Hedge Fund 34	0.890	US Hedge Fund 26	2.609	US Hedge Fund 43	1.742
US Hedge Fund 68	2.298	EU Hedge Fund 27	0.876	US Hedge Fund 27	2.582	US Hedge Fund 5	1.697
US Hedge Fund 19	2.272	US Hedge Fund 55	0.869	US Hedge Fund 12	2.523	US Hedge Fund 64	1.669
US Hedge Fund 81	2.246	US Hedge Fund 15	0.857	US Hedge Fund 5	2.507	US Hedge Fund 20	1.630
US Hedge Fund 20	2.142	EU Hedge Fund 28	0.849	US Hedge Fund 33	2.422	US Hedge Fund 65	1.629
US Hedge Fund 41	2.111	US Hedge Fund 14	0.837	EU Hedge Fund 15	2.419	US Hedge Fund 81	1.576
US Hedge Fund 15	2.087	EU Hedge Fund 36	0.808	EU Hedge Fund 14	2.401	EU Hedge Fund 27	1.536
US Hedge Fund 14	2.075	US Hedge Fund 21	0.794	US Hedge Fund 68	2.360	EU Hedge Fund 15	1.528
EU Hedge Fund 12	2.054	EU Hedge Fund 26	0.753	EU Hedge Fund 37	2.149	EU Hedge Fund 14	1.513
US Hedge Fund 42	2.038	EU Hedge Fund 35	0.753	EU Hedge Fund 12	2.140	US Hedge Fund 66	1.511
US Hedge Fund 23	1.948	US Hedge Fund 84	0.748	US Hedge Fund 19	2.060	EU Hedge Fund 28	1.490
US Hedge Fund 43	1.874	US Hedge Fund 82	0.722	US Hedge Fund 76	2.045	EU Hedge Fund 33	1.459
EU Hedge Fund 28	1.834	US Hedge Fund 76	0.721	US Hedge Fund 20	1.952	EU Hedge Fund 26	1.431
EU Hedge Fund 16	1.824	EU Hedge Fund 12	0.715	US Hedge Fund 16	1.924	US Hedge Fund 76	1.397
EU Hedge Fund 26	1.781	EU Hedge Fund 33	0.712	EU Hedge Fund 28	1.921	EU Hedge Fund 12	1.376
US Hedge Fund 5	1.675	US Hedge Fund 83	0.701	EU Hedge Fund 26	1.872	US Hedge Fund 15	1.354
US Hedge Fund 84	1.640	US Hedge Fund 16	0.672	US Hedge Fund 15	1.819	US Hedge Fund 14	1.337
EU Hedge Fund 33	1.628	US Hedge Fund 48	0.627	US Hedge Fund 55	1.787	US Hedge Fund 84	1.332
EU Hedge Fund 15	1.607	EU Hedge Fund 16	0.619	US Hedge Fund 14	1.762	US Hedge Fund 16	1.315
EU Hedge Fund 14	1.586	US Hedge Fund 23	0.590	EU Hedge Fund 33	1.747	US Hedge Fund 21	1.289
US Hedge Fund 16	1.553	US Hedge Fund 41	0.556	US Hedge Fund 22	1.709	US Hedge Fund 23	1.280
US Hedge Fund 33	1.540	EU Hedge Fund 38	0.532	US Hedge Fund 21	1.652	US Hedge Fund 82	1.280
US Hedge Fund 21	1.355	US Hedge Fund 40	0.528	US Hedge Fund 23	1.641	US Hedge Fund 83	1.270
EU Hedge Fund 17	1.250	EU Hedge Fund 17	0.526	US Hedge Fund 41	1.640	US Hedge Fund 55	1.238
EU Hedge Fund 2	1.245	US Hedge Fund 66	0.524	US Hedge Fund 42	1.598	US Hedge Fund 22	1.171
EU Hedge Fund 1	1.225	US Hedge Fund 42	0.517	US Hedge Fund 84	1.584	US Hedge Fund 72	1.140
US Hedge Fund 72	1.207	US Hedge Fund 38	0.498	US Hedge Fund 38	1.550	EU Hedge Fund 2	1.124
EU Hedge Fund 21	1.175	US Hedge Fund 73	0.454	EU Hedge Fund 2	1.446	EU Hedge Fund 38	1.068
US Hedge Fund 8	1.134	US Hedge Fund 8	0.440	US Hedge Fund 43	1.444	EU Hedge Fund 1	1.007

EU Hedge Fund 38	1.107	US Hedge Fund 22	0.435	EU Hedge Fund 1	1.432	US Hedge Fund 8	0.990
US Hedge Fund 22	1.094	EU Hedge Fund 1	0.430	US Hedge Fund 8	1.425	US Hedge Fund 40	0.985
EU Hedge Fund 6	1.082	EU Hedge Fund 2	0.429	US Hedge Fund 50	1.379	US Hedge Fund 50	0.974
EU Hedge Fund 5	1.080	US Hedge Fund 43	0.415	EU Hedge Fund 5	1.375	US Hedge Fund 38	0.956
US Hedge Fund 73	1.067	US Hedge Fund 37	0.409	US Hedge Fund 56	1.353	EU Hedge Fund 17	0.951
EU Hedge Fund 7	1.061	US Hedge Fund 50	0.404	EU Hedge Fund 6	1.346	US Hedge Fund 73	0.935
US Hedge Fund 38	1.058	US Hedge Fund 7	0.385	US Hedge Fund 7	1.337	US Hedge Fund 7	0.913
US Hedge Fund 66	1.046	EU Hedge Fund 15	0.364	EU Hedge Fund 7	1.337	EU Hedge Fund 21	0.888
US Hedge Fund 50	0.984	EU Hedge Fund 37	0.357	US Hedge Fund 45	1.264	US Hedge Fund 48	0.865
EU Hedge Fund 20	0.977	EU Hedge Fund 14	0.347	US Hedge Fund 72	1.239	EU Hedge Fund 20	0.838
US Hedge Fund 37	0.931	EU Hedge Fund 20	0.309	EU Hedge Fund 21	1.206	EU Hedge Fund 37	0.833
US Hedge Fund 48	0.926	US Hedge Fund 45	0.188	US Hedge Fund 54	1.145	US Hedge Fund 37	0.829
EU Hedge Fund 37	0.921	US Hedge Fund 49	0.181	EU Hedge Fund 17	1.141	EU Hedge Fund 5	0.819
US Hedge Fund 40	0.912	US Hedge Fund 9	0.166	US Hedge Fund 40	1.127	EU Hedge Fund 6	0.818
US Hedge Fund 7	0.900	US Hedge Fund 51	0.163	US Hedge Fund 73	1.058	EU Hedge Fund 7	0.810
EU Hedge Fund 24	0.888	US Hedge Fund 3	0.159	EU Hedge Fund 20	1.000	US Hedge Fund 56	0.768
US Hedge Fund 9	0.863	EU Hedge Fund 21	0.154	US Hedge Fund 37	0.990	US Hedge Fund 49	0.668
US Hedge Fund 45	0.780	EU Hedge Fund 5	0.139	US Hedge Fund 48	0.967	US Hedge Fund 9	0.657
US Hedge Fund 54	0.773	EU Hedge Fund 6	0.134	US Hedge Fund 9	0.904	US Hedge Fund 45	0.652
US Hedge Fund 49	0.773	EU Hedge Fund 7	0.125	EU Hedge Fund 24	0.899	US Hedge Fund 51	0.647
US Hedge Fund 51	0.745	US Hedge Fund 1	0.111	US Hedge Fund 49	0.834	US Hedge Fund 54	0.611
US Hedge Fund 56	0.706	US Hedge Fund 69	0.077	US Hedge Fund 52	0.817	EU Hedge Fund 24	0.507
EU Hedge Fund 32	0.640	US Hedge Fund 54	0.040	US Hedge Fund 51	0.814	EU Hedge Fund 10	0.472
US Hedge Fund 67	0.567	EU Hedge Fund 32	0.040	EU Hedge Fund 10	0.745	EU Hedge Fund 32	0.464
EU Hedge Fund 10	0.563	US Hedge Fund 35	0.040	EU Hedge Fund 32	0.737	US Hedge Fund 1	0.459
US Hedge Fund 1	0.562	US Hedge Fund 13	0.034	US Hedge Fund 67	0.698	US Hedge Fund 3	0.433
US Hedge Fund 3	0.505	US Hedge Fund 56	0.008	EU Hedge Fund 13	0.680	US Hedge Fund 69	0.407
EU Hedge Fund 9	0.502	US Hedge Fund 53	-0.011	US Hedge Fund 53	0.659	US Hedge Fund 35	0.405
US Hedge Fund 35	0.497	US Hedge Fund 52	-0.030	US Hedge Fund 1	0.626	EU Hedge Fund 9	0.403
US Hedge Fund 52	0.481	US Hedge Fund 24	-0.049	EU Hedge Fund 9	0.615	US Hedge Fund 24	0.397
EU Hedge Fund 13	0.481	US Hedge Fund 18	-0.060	US Hedge Fund 35	0.570	US Hedge Fund 53	0.373
US Hedge Fund 69	0.473	EU Hedge Fund 31	-0.068	US Hedge Fund 24	0.551	US Hedge Fund 52	0.350
US Hedge Fund 24	0.456	US Hedge Fund 29	-0.077	US Hedge Fund 3	0.541	US Hedge Fund 67	0.318
US Hedge Fund 53	0.430	EU Hedge Fund 10	-0.139	US Hedge Fund 69	0.526	US Hedge Fund 13	0.302
US Hedge Fund 18	0.386	US Hedge Fund 10	-0.165	EU Hedge Fund 31	0.461	US Hedge Fund 18	0.295
US Hedge Fund 13	0.375	EU Hedge Fund 24	-0.172	US Hedge Fund 18	0.448	EU Hedge Fund 13	0.293
EU Hedge Fund 31	0.336	EU Hedge Fund 9	-0.202	EU Hedge Fund 11	0.447	EU Hedge Fund 31	0.245
US Hedge Fund 29	0.319	US Hedge Fund 77	-0.243	US Hedge Fund 13	0.415	US Hedge Fund 29	0.220
EU Hedge Fund 11	0.296	US Hedge Fund 4	-0.275	US Hedge Fund 10	0.359	US Hedge Fund 10	0.192
EU Hedge Fund 19	0.260	EU Hedge Fund 19	-0.344	EU Hedge Fund 19	0.357	EU Hedge Fund 19	0.144
US Hedge Fund 10	0.257	US Hedge Fund 67	-0.368	US Hedge Fund 29	0.353	EU Hedge Fund 11	0.114
US Hedge Fund 77	0.146	EU Hedge Fund 18	-0.392	US Hedge Fund 77	0.195	US Hedge Fund 77	0.056
US Hedge Fund 4	0.114	US Hedge Fund 34	-0.476	US Hedge Fund 4	0.165	US Hedge Fund 4	0.025
EU Hedge Fund 18	0.024	EU Hedge Fund 13	-0.542	EU Hedge Fund 18	0.104	EU Hedge Fund 18	-0.090
US Hedge Fund 34	-0.084	US Hedge Fund 17	-0.586	US Hedge Fund 34	-0.032	US Hedge Fund 34	-0.161
US Hedge Fund 80	-0.166	EU Hedge Fund 11	-0.668	US Hedge Fund 80	-0.197	US Hedge Fund 80	-0.273
US Hedge Fund 2	-0.278	US Hedge Fund 80	-0.685	US Hedge Fund 2	-0.240	US Hedge Fund 2	-0.380
US Hedge Fund 17	-0.424	US Hedge Fund 2	-0.739	US Hedge Fund 17	-0.412	US Hedge Fund 17	-0.467

Source: Compiled by author.

Table AA: Results from the Sortino ratio – ranked from best to worst (Based on the indices, respectively: Post-financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 40	13.664	US Hedge Fund 40	8.660	US Hedge Fund 40	11.186	US Hedge Fund 40	10.132
US Hedge Fund 84	8.163	EU Hedge Fund 13	5.890	US Hedge Fund 28	5.058	US Hedge Fund 28	3.635
US Hedge Fund 32	8.123	EU Hedge Fund 11	4.849	EU Hedge Fund 11	4.029	EU Hedge Fund 11	3.422
EU Hedge Fund 11	7.233	US Hedge Fund 84	3.358	EU Hedge Fund 13	3.382	EU Hedge Fund 13	2.856
US Hedge Fund 68	7.008	US Hedge Fund 28	3.236	US Hedge Fund 78	3.127	US Hedge Fund 78	2.775
US Hedge Fund 70	6.438	US Hedge Fund 70	3.061	US Hedge Fund 84	2.199	EU Hedge Fund 12	1.772
US Hedge Fund 71	6.432	US Hedge Fund 71	3.003	US Hedge Fund 70	1.945	US Hedge Fund 84	1.214
EU Hedge Fund 13	5.911	US Hedge Fund 78	2.973	US Hedge Fund 71	1.869	US Hedge Fund 70	1.187
US Hedge Fund 28	5.751	EU Hedge Fund 12	2.894	EU Hedge Fund 12	1.752	US Hedge Fund 71	1.100
US Hedge Fund 78	5.704	US Hedge Fund 31	2.287	US Hedge Fund 64	1.734	US Hedge Fund 45	1.077
US Hedge Fund 31	4.710	US Hedge Fund 64	2.038	US Hedge Fund 31	1.424	US Hedge Fund 29	1.023
EU Hedge Fund 12	4.503	US Hedge Fund 68	2.002	US Hedge Fund 45	1.266	US Hedge Fund 64	0.947
EU Hedge Fund 3	4.357	US Hedge Fund 65	1.954	US Hedge Fund 29	1.246	US Hedge Fund 31	0.933
EU Hedge Fund 4	4.110	US Hedge Fund 39	1.811	US Hedge Fund 65	1.170	US Hedge Fund 65	0.850
EU Hedge Fund 21	4.084	US Hedge Fund 32	1.792	US Hedge Fund 39	1.138	US Hedge Fund 13	0.811
US Hedge Fund 39	4.058	US Hedge Fund 45	1.505	US Hedge Fund 13	1.080	US Hedge Fund 22	0.714
EU Hedge Fund 30	3.894	US Hedge Fund 29	1.450	US Hedge Fund 22	1.012	US Hedge Fund 38	0.702
EU Hedge Fund 29	3.715	EU Hedge Fund 21	1.440	EU Hedge Fund 21	0.970	US Hedge Fund 39	0.634
US Hedge Fund 36	3.581	EU Hedge Fund 5	1.263	US Hedge Fund 38	0.935	US Hedge Fund 10	0.609
US Hedge Fund 59	3.509	US Hedge Fund 41	1.224	US Hedge Fund 10	0.872	EU Hedge Fund 21	0.470
US Hedge Fund 41	3.476	US Hedge Fund 10	1.186	US Hedge Fund 52	0.672	US Hedge Fund 52	0.389
US Hedge Fund 42	3.383	EU Hedge Fund 6	1.158	US Hedge Fund 20	0.603	US Hedge Fund 53	0.369
US Hedge Fund 43	3.364	US Hedge Fund 38	1.113	US Hedge Fund 53	0.565	US Hedge Fund 33	0.322
US Hedge Fund 58	3.325	US Hedge Fund 22	1.108	US Hedge Fund 55	0.533	US Hedge Fund 20	0.308
US Hedge Fund 64	3.122	EU Hedge Fund 7	1.105	US Hedge Fund 48	0.523	US Hedge Fund 54	0.303
US Hedge Fund 65	3.067	US Hedge Fund 42	1.084	EU Hedge Fund 5	0.513	EU Hedge Fund 5	0.296
US Hedge Fund 10	3.037	US Hedge Fund 13	1.020	US Hedge Fund 35	0.504	US Hedge Fund 48	0.284
US Hedge Fund 57	2.948	US Hedge Fund 43	0.931	US Hedge Fund 54	0.502	US Hedge Fund 1	0.256
US Hedge Fund 29	2.680	US Hedge Fund 20	0.838	US Hedge Fund 1	0.501	EU Hedge Fund 6	0.235
US Hedge Fund 11	2.641	US Hedge Fund 52	0.837	US Hedge Fund 33	0.475	US Hedge Fund 37	0.229
EU Hedge Fund 5	2.525	US Hedge Fund 35	0.806	EU Hedge Fund 6	0.453	US Hedge Fund 55	0.228
US Hedge Fund 20	2.458	US Hedge Fund 1	0.792	US Hedge Fund 37	0.448	EU Hedge Fund 7	0.192
US Hedge Fund 52	2.408	US Hedge Fund 53	0.787	EU Hedge Fund 7	0.415	US Hedge Fund 35	0.164
EU Hedge Fund 6	2.402	US Hedge Fund 54	0.734	US Hedge Fund 68	0.375	US Hedge Fund 56	0.078
EU Hedge Fund 7	2.373	US Hedge Fund 33	0.686	US Hedge Fund 32	0.350	US Hedge Fund 17	0.059
US Hedge Fund 45	2.323	US Hedge Fund 55	0.680	US Hedge Fund 9	0.338	US Hedge Fund 9	0.053
US Hedge Fund 81	2.289	US Hedge Fund 59	0.675	US Hedge Fund 56	0.294	US Hedge Fund 19	0.033
US Hedge Fund 35	2.264	US Hedge Fund 37	0.657	US Hedge Fund 19	0.285	US Hedge Fund 73	-0.028
EU Hedge Fund 1	2.239	US Hedge Fund 9	0.651	US Hedge Fund 17	0.229	EU Hedge Fund 37	-0.046
US Hedge Fund 13	2.204	US Hedge Fund 48	0.647	EU Hedge Fund 37	0.184	US Hedge Fund 6	-0.076
US Hedge Fund 19	2.201	US Hedge Fund 19	0.588	US Hedge Fund 41	0.149	US Hedge Fund 66	-0.114
US Hedge Fund 76	2.165	US Hedge Fund 57	0.576	US Hedge Fund 73	0.143	US Hedge Fund 5	-0.121
EU Hedge Fund 2	2.109	US Hedge Fund 56	0.561	US Hedge Fund 76	0.132	US Hedge Fund 8	-0.135
US Hedge Fund 33	2.083	EU Hedge Fund 37	0.530	EU Hedge Fund 8	0.103	EU Hedge Fund 8	-0.162
US Hedge Fund 38	2.078	EU Hedge Fund 1	0.470	US Hedge Fund 6	0.100	US Hedge Fund 50	-0.166
US Hedge Fund 22	2.040	US Hedge Fund 81	0.447	US Hedge Fund 42	0.076	US Hedge Fund 3	-0.191
US Hedge Fund 56	2.015	EU Hedge Fund 8	0.447	US Hedge Fund 66	0.066	US Hedge Fund 76	-0.195
US Hedge Fund 9	2.006	US Hedge Fund 17	0.425	US Hedge Fund 8	0.054	US Hedge Fund 80	-0.228
US Hedge Fund 12	1.941	EU Hedge Fund 2	0.380	US Hedge Fund 5	0.054	EU Hedge Fund 38	-0.230
US Hedge Fund 27	1.894	US Hedge Fund 6	0.366	US Hedge Fund 50	0.051	US Hedge Fund 7	-0.233
US Hedge Fund 50	1.873	US Hedge Fund 76	0.356	US Hedge Fund 81	0.036	US Hedge Fund 2	-0.246
US Hedge Fund 25	1.851	US Hedge Fund 12	0.338	EU Hedge Fund 38	0.029	US Hedge Fund 81	-0.264
EU Hedge Fund 24	1.851	US Hedge Fund 50	0.335	US Hedge Fund 59	0.010	US Hedge Fund 82	-0.299
US Hedge Fund 26	1.814	US Hedge Fund 27	0.334	EU Hedge Fund 1	-0.035	US Hedge Fund 83	-0.321
US Hedge Fund 48	1.773	EU Hedge Fund 38	0.325	US Hedge Fund 43	-0.037	US Hedge Fund 30	-0.383
US Hedge Fund 55	1.712	US Hedge Fund 73	0.314	US Hedge Fund 7	-0.043	EU Hedge Fund 1	-0.406
EU Hedge Fund 38	1.684	US Hedge Fund 66	0.297	US Hedge Fund 3	-0.058	US Hedge Fund 41	-0.416
US Hedge Fund 53	1.659	US Hedge Fund 25	0.293	US Hedge Fund 80	-0.071	US Hedge Fund 72	-0.426
US Hedge Fund 54	1.656	EU Hedge Fund 30	0.279	US Hedge Fund 27	-0.072	US Hedge Fund 69	-0.427
US Hedge Fund 1	1.625	US Hedge Fund 5	0.260	US Hedge Fund 57	-0.090	US Hedge Fund 27	-0.431
US Hedge Fund 37	1.609	US Hedge Fund 8	0.249	US Hedge Fund 2	-0.094	US Hedge Fund 46	-0.473
EU Hedge Fund 8	1.592	US Hedge Fund 26	0.245	US Hedge Fund 82	-0.104	US Hedge Fund 47	-0.473
US Hedge Fund 23	1.586	EU Hedge Fund 29	0.236	EU Hedge Fund 2	-0.119	EU Hedge Fund 2	-0.475
EU Hedge Fund 37	1.538	US Hedge Fund 82	0.224	US Hedge Fund 83	-0.125	US Hedge Fund 42	-0.482
EU Hedge Fund 19	1.428	US Hedge Fund 83	0.200	US Hedge Fund 25	-0.127	EU Hedge Fund 9	-0.484
US Hedge Fund 82	1.389	US Hedge Fund 7	0.166	US Hedge Fund 26	-0.165	US Hedge Fund 25	-0.489
US Hedge Fund 83	1.373	US Hedge Fund 80	0.158	US Hedge Fund 30	-0.210	US Hedge Fund 26	-0.525
US Hedge Fund 8	1.302	US Hedge Fund 2	0.131	US Hedge Fund 12	-0.215	US Hedge Fund 59	-0.536
US Hedge Fund 6	1.253	US Hedge Fund 3	0.121	US Hedge Fund 46	-0.234	EU Hedge Fund 10	-0.542
US Hedge Fund 67	1.229	US Hedge Fund 46	0.088	US Hedge Fund 47	-0.234	EU Hedge Fund 19	-0.548
US Hedge Fund 16	1.219	US Hedge Fund 47	0.088	US Hedge Fund 69	-0.279	US Hedge Fund 18	-0.551
US Hedge Fund 17	1.192	US Hedge Fund 30	0.013	US Hedge Fund 18	-0.281	US Hedge Fund 57	-0.551
US Hedge Fund 66	1.185	EU Hedge Fund 19	-0.017	EU Hedge Fund 19	-0.308	EU Hedge Fund 17	-0.567
EU Hedge Fund 15	1.180	US Hedge Fund 18	-0.039	US Hedge Fund 72	-0.319	US Hedge Fund 12	-0.583

US Hedge Fund 24	1.162	US Hedge Fund 69	-0.065	EU Hedge Fund 9	-0.328	US Hedge Fund 23	-0.583
EU Hedge Fund 16	1.155	US Hedge Fund 23	-0.083	EU Hedge Fund 10	-0.347	US Hedge Fund 43	-0.608
US Hedge Fund 73	1.137	EU Hedge Fund 9	-0.142	EU Hedge Fund 17	-0.388	US Hedge Fund 16	-0.633
US Hedge Fund 46	1.118	EU Hedge Fund 17	-0.150	US Hedge Fund 21	-0.411	US Hedge Fund 21	-0.651
US Hedge Fund 47	1.118	US Hedge Fund 72	-0.175	US Hedge Fund 23	-0.439	EU Hedge Fund 20	-0.661
EU Hedge Fund 14	1.113	EU Hedge Fund 10	-0.182	US Hedge Fund 16	-0.451	US Hedge Fund 68	-0.758
US Hedge Fund 5	0.989	US Hedge Fund 21	-0.192	EU Hedge Fund 20	-0.492	US Hedge Fund 32	-0.766
US Hedge Fund 80	0.964	US Hedge Fund 16	-0.201	US Hedge Fund 24	-0.635	US Hedge Fund 15	-0.819
US Hedge Fund 7	0.939	US Hedge Fund 24	-0.212	EU Hedge Fund 30	-0.662	US Hedge Fund 14	-0.825
US Hedge Fund 2	0.915	EU Hedge Fund 3	-0.233	US Hedge Fund 67	-0.668	US Hedge Fund 34	-0.897
US Hedge Fund 18	0.861	EU Hedge Fund 20	-0.243	US Hedge Fund 34	-0.696	US Hedge Fund 67	-0.925
US Hedge Fund 3	0.814	EU Hedge Fund 4	-0.247	EU Hedge Fund 29	-0.718	US Hedge Fund 24	-0.946
US Hedge Fund 30	0.758	US Hedge Fund 67	-0.321	US Hedge Fund 15	-0.720	EU Hedge Fund 15	-0.984
EU Hedge Fund 33	0.730	EU Hedge Fund 16	-0.374	US Hedge Fund 14	-0.727	EU Hedge Fund 25	-0.993
EU Hedge Fund 17	0.638	EU Hedge Fund 14	-0.389	EU Hedge Fund 33	-0.772	EU Hedge Fund 16	-1.000
US Hedge Fund 21	0.637	US Hedge Fund 34	-0.391	EU Hedge Fund 15	-0.773	EU Hedge Fund 14	-1.015
EU Hedge Fund 20	0.618	EU Hedge Fund 33	-0.405	EU Hedge Fund 16	-0.794	EU Hedge Fund 18	-1.018
EU Hedge Fund 10	0.588	EU Hedge Fund 15	-0.432	US Hedge Fund 49	-0.807	US Hedge Fund 49	-1.026
US Hedge Fund 69	0.578	US Hedge Fund 36	-0.621	EU Hedge Fund 14	-0.814	EU Hedge Fund 33	-1.031
EU Hedge Fund 9	0.553	EU Hedge Fund 36	-0.627	US Hedge Fund 51	-0.814	US Hedge Fund 51	-1.034
US Hedge Fund 44	0.316	EU Hedge Fund 34	-0.650	EU Hedge Fund 18	-0.835	EU Hedge Fund 36	-1.073
US Hedge Fund 72	0.305	EU Hedge Fund 18	-0.656	EU Hedge Fund 25	-0.873	EU Hedge Fund 34	-1.094
EU Hedge Fund 36	0.272	US Hedge Fund 58	-0.670	EU Hedge Fund 36	-0.875	EU Hedge Fund 35	-1.124
EU Hedge Fund 27	0.272	US Hedge Fund 49	-0.671	EU Hedge Fund 34	-0.896	US Hedge Fund 77	-1.218
EU Hedge Fund 28	0.253	EU Hedge Fund 35	-0.678	EU Hedge Fund 35	-0.926	US Hedge Fund 4	-1.310
EU Hedge Fund 34	0.250	US Hedge Fund 51	-0.679	US Hedge Fund 77	-1.046	EU Hedge Fund 29	-1.345
US Hedge Fund 15	0.228	EU Hedge Fund 25	-0.687	US Hedge Fund 4	-1.130	EU Hedge Fund 30	-1.368
EU Hedge Fund 35	0.222	EU Hedge Fund 24	-0.702	EU Hedge Fund 31	-1.333	US Hedge Fund 75	-1.550
US Hedge Fund 34	0.217	US Hedge Fund 14	-0.875	US Hedge Fund 75	-1.376	US Hedge Fund 74	-1.554
US Hedge Fund 14	0.204	US Hedge Fund 15	-0.884	US Hedge Fund 74	-1.379	EU Hedge Fund 31	-1.559
EU Hedge Fund 26	0.173	US Hedge Fund 77	-0.968	EU Hedge Fund 32	-1.515	US Hedge Fund 60	-1.774
US Hedge Fund 49	0.052	US Hedge Fund 4	-1.035	EU Hedge Fund 4	-1.557	US Hedge Fund 63	-1.797
US Hedge Fund 51	0.043	US Hedge Fund 75	-1.101	EU Hedge Fund 3	-1.567	EU Hedge Fund 32	-1.813
US Hedge Fund 79	0.034	US Hedge Fund 74	-1.107	US Hedge Fund 60	-1.569	US Hedge Fund 61	-1.832
EU Hedge Fund 18	0.021	EU Hedge Fund 27	-1.132	US Hedge Fund 63	-1.593	US Hedge Fund 62	-1.873
EU Hedge Fund 25	-0.033	EU Hedge Fund 28	-1.134	US Hedge Fund 61	-1.631	EU Hedge Fund 27	-2.173
EU Hedge Fund 22	-0.041	US Hedge Fund 11	-1.181	US Hedge Fund 62	-1.636	EU Hedge Fund 23	-2.185
EU Hedge Fund 23	-0.052	EU Hedge Fund 26	-1.196	EU Hedge Fund 24	-1.671	EU Hedge Fund 22	-2.219
US Hedge Fund 77	-0.057	US Hedge Fund 60	-1.239	EU Hedge Fund 27	-1.815	EU Hedge Fund 24	-2.224
EU Hedge Fund 32	-0.070	US Hedge Fund 62	-1.239	US Hedge Fund 36	-1.830	EU Hedge Fund 28	-2.242
US Hedge Fund 4	-0.104	EU Hedge Fund 31	-1.240	US Hedge Fund 11	-1.848	EU Hedge Fund 26	-2.316
EU Hedge Fund 31	-0.257	US Hedge Fund 63	-1.265	EU Hedge Fund 23	-1.871	US Hedge Fund 11	-2.487
US Hedge Fund 62	-0.259	EU Hedge Fund 32	-1.281	EU Hedge Fund 28	-1.876	EU Hedge Fund 4	-2.496
US Hedge Fund 75	-0.290	US Hedge Fund 61	-1.304	EU Hedge Fund 22	-1.899	EU Hedge Fund 3	-2.522
US Hedge Fund 74	-0.293	EU Hedge Fund 23	-1.399	EU Hedge Fund 26	-1.951	US Hedge Fund 36	-2.671
US Hedge Fund 60	-0.380	EU Hedge Fund 22	-1.413	US Hedge Fund 58	-2.172	US Hedge Fund 44	-3.057
US Hedge Fund 63	-0.409	US Hedge Fund 44	-1.866	US Hedge Fund 44	-2.562	US Hedge Fund 58	-3.145
US Hedge Fund 61	-0.467	US Hedge Fund 79	-2.136	US Hedge Fund 79	-2.792	US Hedge Fund 79	-3.271

Source: Compiled by author.

Table BB: Results from the Treynor ratio – ranked from best to worst (Based on the indices, respectively: Pre-financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 79	1.615	US Hedge Fund 84	14.276	US Hedge Fund 64	2.376	US Hedge Fund 64	7.577
US Hedge Fund 75	0.922	US Hedge Fund 64	0.834	US Hedge Fund 65	2.052	US Hedge Fund 65	6.378
US Hedge Fund 74	0.893	US Hedge Fund 65	0.758	US Hedge Fund 5	1.465	US Hedge Fund 32	1.887
US Hedge Fund 64	0.725	US Hedge Fund 75	0.742	US Hedge Fund 75	1.380	EU Hedge Fund 6	1.730
US Hedge Fund 5	0.696	US Hedge Fund 74	0.694	US Hedge Fund 74	1.279	EU Hedge Fund 5	1.687
US Hedge Fund 69	0.684	US Hedge Fund 5	0.662	US Hedge Fund 6	1.093	US Hedge Fund 75	1.627
US Hedge Fund 65	0.656	US Hedge Fund 6	0.560	EU Hedge Fund 32	0.909	EU Hedge Fund 7	1.611
US Hedge Fund 6	0.607	EU Hedge Fund 31	0.458	EU Hedge Fund 31	0.897	US Hedge Fund 74	1.429
US Hedge Fund 84	0.591	US Hedge Fund 69	0.433	EU Hedge Fund 6	0.826	US Hedge Fund 5	1.263
EU Hedge Fund 31	0.553	EU Hedge Fund 6	0.431	EU Hedge Fund 5	0.786	EU Hedge Fund 32	1.022
US Hedge Fund 48	0.547	EU Hedge Fund 32	0.415	EU Hedge Fund 7	0.786	EU Hedge Fund 31	0.992
US Hedge Fund 10	0.512	EU Hedge Fund 7	0.409	EU Hedge Fund 11	0.748	US Hedge Fund 6	0.888
EU Hedge Fund 32	0.484	EU Hedge Fund 5	0.405	EU Hedge Fund 13	0.742	EU Hedge Fund 13	0.801
US Hedge Fund 4	0.477	EU Hedge Fund 11	0.379	US Hedge Fund 4	0.727	EU Hedge Fund 11	0.691
US Hedge Fund 72	0.476	US Hedge Fund 10	0.367	US Hedge Fund 69	0.592	US Hedge Fund 69	0.676
EU Hedge Fund 6	0.448	US Hedge Fund 72	0.355	US Hedge Fund 77	0.579	US Hedge Fund 4	0.667
US Hedge Fund 61	0.428	US Hedge Fund 48	0.331	US Hedge Fund 72	0.559	EU Hedge Fund 10	0.665
EU Hedge Fund 7	0.427	US Hedge Fund 79	0.318	EU Hedge Fund 2	0.547	EU Hedge Fund 2	0.645
EU Hedge Fund 5	0.419	US Hedge Fund 4	0.316	EU Hedge Fund 10	0.538	EU Hedge Fund 33	0.639
EU Hedge Fund 11	0.414	EU Hedge Fund 13	0.313	EU Hedge Fund 12	0.535	EU Hedge Fund 9	0.637
US Hedge Fund 14	0.393	US Hedge Fund 37	0.310	EU Hedge Fund 1	0.515	EU Hedge Fund 1	0.607
US Hedge Fund 15	0.381	US Hedge Fund 14	0.293	EU Hedge Fund 33	0.511	US Hedge Fund 72	0.602
US Hedge Fund 37	0.366	US Hedge Fund 61	0.291	EU Hedge Fund 9	0.510	US Hedge Fund 61	0.582
US Hedge Fund 77	0.357	US Hedge Fund 15	0.285	US Hedge Fund 61	0.476	EU Hedge Fund 12	0.581
US Hedge Fund 40	0.349	EU Hedge Fund 10	0.276	US Hedge Fund 14	0.447	US Hedge Fund 77	0.576
EU Hedge Fund 13	0.333	US Hedge Fund 77	0.276	EU Hedge Fund 17	0.439	US Hedge Fund 14	0.544
EU Hedge Fund 10	0.306	US Hedge Fund 49	0.261	US Hedge Fund 15	0.434	US Hedge Fund 22	0.542
US Hedge Fund 78	0.300	EU Hedge Fund 9	0.244	US Hedge Fund 48	0.427	US Hedge Fund 15	0.528
US Hedge Fund 63	0.293	EU Hedge Fund 12	0.238	US Hedge Fund 10	0.427	US Hedge Fund 10	0.512
US Hedge Fund 60	0.279	US Hedge Fund 78	0.230	EU Hedge Fund 18	0.412	EU Hedge Fund 37	0.509
EU Hedge Fund 12	0.274	US Hedge Fund 51	0.229	US Hedge Fund 22	0.399	EU Hedge Fund 17	0.468
US Hedge Fund 38	0.271	EU Hedge Fund 2	0.228	US Hedge Fund 80	0.361	EU Hedge Fund 18	0.432
EU Hedge Fund 9	0.268	US Hedge Fund 40	0.226	US Hedge Fund 2	0.330	US Hedge Fund 48	0.431
EU Hedge Fund 2	0.257	EU Hedge Fund 38	0.224	EU Hedge Fund 20	0.328	EU Hedge Fund 38	0.392
EU Hedge Fund 17	0.245	US Hedge Fund 81	0.218	US Hedge Fund 79	0.315	US Hedge Fund 37	0.384
EU Hedge Fund 8	0.241	EU Hedge Fund 1	0.212	US Hedge Fund 78	0.307	US Hedge Fund 80	0.372
EU Hedge Fund 1	0.238	EU Hedge Fund 17	0.201	EU Hedge Fund 8	0.306	US Hedge Fund 78	0.369
US Hedge Fund 49	0.233	US Hedge Fund 22	0.196	EU Hedge Fund 19	0.306	US Hedge Fund 63	0.357
US Hedge Fund 29	0.222	EU Hedge Fund 37	0.194	US Hedge Fund 63	0.285	US Hedge Fund 81	0.356
US Hedge Fund 81	0.221	EU Hedge Fund 18	0.182	US Hedge Fund 60	0.273	EU Hedge Fund 20	0.351
US Hedge Fund 80	0.219	US Hedge Fund 63	0.180	US Hedge Fund 81	0.253	US Hedge Fund 60	0.339
US Hedge Fund 16	0.218	US Hedge Fund 80	0.179	US Hedge Fund 29	0.251	US Hedge Fund 2	0.338
US Hedge Fund 22	0.215	US Hedge Fund 38	0.176	US Hedge Fund 37	0.242	EU Hedge Fund 19	0.335
US Hedge Fund 51	0.206	US Hedge Fund 60	0.170	EU Hedge Fund 38	0.235	US Hedge Fund 29	0.322
EU Hedge Fund 18	0.202	US Hedge Fund 29	0.162	US Hedge Fund 40	0.235	US Hedge Fund 40	0.296
EU Hedge Fund 20	0.187	EU Hedge Fund 20	0.155	EU Hedge Fund 34	0.231	US Hedge Fund 79	0.284
US Hedge Fund 2	0.181	US Hedge Fund 2	0.152	US Hedge Fund 16	0.224	EU Hedge Fund 34	0.266
US Hedge Fund 3	0.179	US Hedge Fund 16	0.152	EU Hedge Fund 35	0.201	US Hedge Fund 11	0.251
US Hedge Fund 13	0.172	EU Hedge Fund 19	0.142	US Hedge Fund 3	0.194	US Hedge Fund 23	0.250
US Hedge Fund 30	0.169	EU Hedge Fund 33	0.140	US Hedge Fund 9	0.184	US Hedge Fund 16	0.247
EU Hedge Fund 19	0.161	US Hedge Fund 3	0.124	US Hedge Fund 31	0.182	EU Hedge Fund 8	0.238
US Hedge Fund 12	0.154	EU Hedge Fund 8	0.124	EU Hedge Fund 37	0.182	US Hedge Fund 3	0.231
EU Hedge Fund 38	0.153	US Hedge Fund 12	0.124	US Hedge Fund 67	0.181	US Hedge Fund 38	0.228
US Hedge Fund 33	0.147	US Hedge Fund 23	0.116	US Hedge Fund 23	0.176	EU Hedge Fund 35	0.222
EU Hedge Fund 62	0.144	US Hedge Fund 76	0.113	EU Hedge Fund 28	0.175	US Hedge Fund 67	0.221
US Hedge Fund 76	0.142	US Hedge Fund 41	0.110	EU Hedge Fund 36	0.170	US Hedge Fund 9	0.216
US Hedge Fund 31	0.141	US Hedge Fund 9	0.110	US Hedge Fund 38	0.168	EU Hedge Fund 28	0.215
US Hedge Fund 56	0.140	US Hedge Fund 42	0.108	EU Hedge Fund 15	0.160	US Hedge Fund 31	0.205
US Hedge Fund 35	0.138	US Hedge Fund 35	0.107	EU Hedge Fund 24	0.159	EU Hedge Fund 24	0.193
US Hedge Fund 52	0.136	US Hedge Fund 31	0.104	US Hedge Fund 13	0.157	EU Hedge Fund 36	0.191
US Hedge Fund 41	0.135	US Hedge Fund 43	0.102	EU Hedge Fund 27	0.152	EU Hedge Fund 27	0.184
US Hedge Fund 42	0.135	US Hedge Fund 30	0.100	EU Hedge Fund 16	0.151	EU Hedge Fund 21	0.180
US Hedge Fund 23	0.132	US Hedge Fund 52	0.096	US Hedge Fund 68	0.151	US Hedge Fund 36	0.176
US Hedge Fund 43	0.126	EU Hedge Fund 34	0.094	US Hedge Fund 52	0.150	US Hedge Fund 35	0.173
US Hedge Fund 67	0.124	US Hedge Fund 13	0.094	US Hedge Fund 56	0.148	EU Hedge Fund 26	0.172
US Hedge Fund 54	0.122	US Hedge Fund 56	0.094	US Hedge Fund 35	0.147	EU Hedge Fund 15	0.165
US Hedge Fund 9	0.117	US Hedge Fund 67	0.091	EU Hedge Fund 14	0.147	US Hedge Fund 62	0.163
US Hedge Fund 68	0.110	US Hedge Fund 68	0.087	EU Hedge Fund 21	0.144	US Hedge Fund 13	0.162
US Hedge Fund 20	0.106	US Hedge Fund 36	0.087	US Hedge Fund 36	0.143	US Hedge Fund 52	0.158
EU Hedge Fund 34	0.102	US Hedge Fund 62	0.086	EU Hedge Fund 26	0.141	EU Hedge Fund 16	0.155
US Hedge Fund 19	0.099	US Hedge Fund 54	0.082	US Hedge Fund 76	0.138	EU Hedge Fund 14	0.152
EU Hedge Fund 24	0.097	US Hedge Fund 20	0.082	US Hedge Fund 62	0.132	US Hedge Fund 56	0.151
US Hedge Fund 36	0.097	EU Hedge Fund 35	0.082	US Hedge Fund 33	0.127	US Hedge Fund 76	0.147
US Hedge Fund 33	0.094	EU Hedge Fund 28	0.079	US Hedge Fund 54	0.123	US Hedge Fund 33	0.145

EU Hedge Fund 28	0.092	EU Hedge Fund 21	0.078	US Hedge Fund 19	0.115	US Hedge Fund 19	0.140
US Hedge Fund 18	0.092	EU Hedge Fund 24	0.074	US Hedge Fund 12	0.115	US Hedge Fund 20	0.137
US Hedge Fund 53	0.089	US Hedge Fund 19	0.074	US Hedge Fund 30	0.112	US Hedge Fund 30	0.135
EU Hedge Fund 35	0.089	US Hedge Fund 18	0.073	US Hedge Fund 20	0.112	US Hedge Fund 54	0.133
US Hedge Fund 45	0.089	US Hedge Fund 11	0.072	US Hedge Fund 49	0.103	US Hedge Fund 49	0.130
EU Hedge Fund 27	0.085	US Hedge Fund 33	0.071	US Hedge Fund 11	0.103	US Hedge Fund 68	0.129
US Hedge Fund 50	0.084	EU Hedge Fund 27	0.071	US Hedge Fund 45	0.101	US Hedge Fund 8	0.125
EU Hedge Fund 21	0.084	EU Hedge Fund 15	0.070	US Hedge Fund 53	0.097	US Hedge Fund 51	0.120
EU Hedge Fund 15	0.080	EU Hedge Fund 16	0.068	EU Hedge Fund 4	0.096	EU Hedge Fund 4	0.117
EU Hedge Fund 16	0.079	EU Hedge Fund 36	0.067	US Hedge Fund 51	0.095	US Hedge Fund 66	0.117
EU Hedge Fund 37	0.077	US Hedge Fund 50	0.065	US Hedge Fund 8	0.093	US Hedge Fund 45	0.116
US Hedge Fund 66	0.074	EU Hedge Fund 14	0.064	US Hedge Fund 66	0.091	US Hedge Fund 7	0.115
EU Hedge Fund 36	0.073	EU Hedge Fund 26	0.062	US Hedge Fund 18	0.088	EU Hedge Fund 3	0.111
EU Hedge Fund 26	0.072	US Hedge Fund 53	0.061	EU Hedge Fund 3	0.088	US Hedge Fund 53	0.103
US Hedge Fund 1	0.071	US Hedge Fund 66	0.056	US Hedge Fund 41	0.088	US Hedge Fund 12	0.102
EU Hedge Fund 14	0.071	US Hedge Fund 45	0.055	US Hedge Fund 42	0.085	US Hedge Fund 34	0.101
US Hedge Fund 82	0.068	US Hedge Fund 82	0.050	US Hedge Fund 7	0.085	US Hedge Fund 39	0.097
US Hedge Fund 8	0.063	US Hedge Fund 8	0.050	US Hedge Fund 39	0.084	US Hedge Fund 41	0.092
US Hedge Fund 83	0.062	US Hedge Fund 83	0.047	US Hedge Fund 50	0.083	US Hedge Fund 42	0.089
US Hedge Fund 39	0.062	US Hedge Fund 39	0.046	US Hedge Fund 34	0.083	US Hedge Fund 21	0.089
US Hedge Fund 34	0.061	US Hedge Fund 34	0.045	US Hedge Fund 21	0.083	US Hedge Fund 50	0.088
US Hedge Fund 11	0.057	US Hedge Fund 7	0.043	US Hedge Fund 43	0.082	US Hedge Fund 82	0.086
US Hedge Fund 7	0.055	US Hedge Fund 21	0.042	US Hedge Fund 82	0.073	US Hedge Fund 43	0.086
US Hedge Fund 55	0.051	EU Hedge Fund 4	0.041	US Hedge Fund 83	0.071	US Hedge Fund 18	0.085
US Hedge Fund 21	0.048	US Hedge Fund 55	0.039	US Hedge Fund 55	0.064	US Hedge Fund 83	0.085
EU Hedge Fund 4	0.042	EU Hedge Fund 3	0.037	US Hedge Fund 1	0.055	US Hedge Fund 55	0.074
EU Hedge Fund 3	0.038	US Hedge Fund 1	0.030	EU Hedge Fund 29	0.052	US Hedge Fund 58	0.069
US Hedge Fund 73	0.027	EU Hedge Fund 29	0.023	EU Hedge Fund 30	0.048	US Hedge Fund 1	0.055
EU Hedge Fund 29	0.027	EU Hedge Fund 30	0.020	US Hedge Fund 59	0.033	EU Hedge Fund 29	0.054
US Hedge Fund 59	0.024	US Hedge Fund 59	0.018	US Hedge Fund 58	0.028	EU Hedge Fund 30	0.052
EU Hedge Fund 30	0.022	US Hedge Fund 73	0.017	US Hedge Fund 73	0.027	US Hedge Fund 59	0.039
US Hedge Fund 71	0.013	US Hedge Fund 58	0.014	US Hedge Fund 71	0.026	US Hedge Fund 71	0.029
US Hedge Fund 70	0.012	US Hedge Fund 71	0.010	US Hedge Fund 70	0.024	US Hedge Fund 70	0.027
US Hedge Fund 58	0.011	US Hedge Fund 70	0.010	US Hedge Fund 25	-0.021	US Hedge Fund 73	0.025
US Hedge Fund 46	-0.046	US Hedge Fund 46	-0.024	US Hedge Fund 17	-0.022	US Hedge Fund 25	-0.026
EU Hedge Fund 25	-0.047	US Hedge Fund 25	-0.029	US Hedge Fund 28	-0.025	US Hedge Fund 28	-0.030
US Hedge Fund 25	-0.056	US Hedge Fund 47	-0.029	US Hedge Fund 26	-0.025	US Hedge Fund 26	-0.031
US Hedge Fund 47	-0.058	US Hedge Fund 28	-0.031	US Hedge Fund 27	-0.032	US Hedge Fund 46	-0.037
US Hedge Fund 28	-0.061	US Hedge Fund 26	-0.032	US Hedge Fund 46	-0.044	US Hedge Fund 27	-0.039
US Hedge Fund 26	-0.061	US Hedge Fund 27	-0.037	US Hedge Fund 47	-0.050	US Hedge Fund 17	-0.040
US Hedge Fund 57	-0.065	US Hedge Fund 57	-0.046	US Hedge Fund 57	-0.063	US Hedge Fund 47	-0.041
US Hedge Fund 17	-0.067	EU Hedge Fund 22	-0.058	EU Hedge Fund 25	-0.066	US Hedge Fund 57	-0.072
US Hedge Fund 27	-0.073	EU Hedge Fund 25	-0.067	EU Hedge Fund 22	-0.093	EU Hedge Fund 25	-0.123
EU Hedge Fund 22	-0.097	US Hedge Fund 17	-0.080	US Hedge Fund 44	-0.116	US Hedge Fund 44	-0.147
US Hedge Fund 44	-0.141	US Hedge Fund 44	-0.089	EU Hedge Fund 23	-0.141	EU Hedge Fund 22	-0.164
EU Hedge Fund 23	-0.175	EU Hedge Fund 23	-0.105	US Hedge Fund 24	-0.282	EU Hedge Fund 23	-0.279
US Hedge Fund 32	-0.252	US Hedge Fund 32	-0.188	US Hedge Fund 32	-0.564	US Hedge Fund 24	-0.401
US Hedge Fund 24	-0.311	US Hedge Fund 24	-0.225	US Hedge Fund 84	-0.705	US Hedge Fund 84	-1.240

Source: Compiled by author.

Table CC: Results from the Treynor ratio – ranked from best to worst (Based on the indices, respectively: During financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 74	0.524	US Hedge Fund 32	4.906	EU Hedge Fund 30	2.047	US Hedge Fund 44	57.152
US Hedge Fund 75	0.513	EU Hedge Fund 29	3.153	EU Hedge Fund 25	0.602	EU Hedge Fund 21	3.685
EU Hedge Fund 25	0.502	US Hedge Fund 57	0.835	US Hedge Fund 57	0.548	US Hedge Fund 74	1.147
US Hedge Fund 72	0.480	US Hedge Fund 74	0.458	US Hedge Fund 74	0.546	US Hedge Fund 75	1.072
US Hedge Fund 57	0.345	US Hedge Fund 75	0.446	US Hedge Fund 72	0.535	EU Hedge Fund 30	0.953
US Hedge Fund 61	0.266	US Hedge Fund 72	0.439	US Hedge Fund 75	0.523	EU Hedge Fund 25	0.731
US Hedge Fund 71	0.261	EU Hedge Fund 25	0.404	US Hedge Fund 48	0.347	US Hedge Fund 72	0.641
US Hedge Fund 48	0.260	US Hedge Fund 48	0.234	US Hedge Fund 61	0.331	US Hedge Fund 57	0.618
US Hedge Fund 60	0.254	US Hedge Fund 61	0.213	US Hedge Fund 60	0.311	US Hedge Fund 61	0.436
US Hedge Fund 70	0.253	US Hedge Fund 30	0.204	US Hedge Fund 44	0.301	US Hedge Fund 60	0.421
US Hedge Fund 63	0.239	US Hedge Fund 60	0.200	US Hedge Fund 63	0.295	US Hedge Fund 63	0.397
US Hedge Fund 78	0.209	US Hedge Fund 63	0.189	EU Hedge Fund 29	0.289	US Hedge Fund 48	0.367
US Hedge Fund 62	0.201	US Hedge Fund 78	0.186	US Hedge Fund 30	0.265	US Hedge Fund 62	0.345
EU Hedge Fund 30	0.191	US Hedge Fund 62	0.153	US Hedge Fund 62	0.252	US Hedge Fund 30	0.306
US Hedge Fund 30	0.187	US Hedge Fund 71	0.152	US Hedge Fund 78	0.248	US Hedge Fund 78	0.305
EU Hedge Fund 29	0.144	US Hedge Fund 70	0.147	US Hedge Fund 6	0.165	EU Hedge Fund 29	0.295
US Hedge Fund 6	0.141	US Hedge Fund 6	0.123	US Hedge Fund 5	0.132	US Hedge Fund 6	0.191
US Hedge Fund 5	0.107	US Hedge Fund 5	0.094	US Hedge Fund 33	0.105	US Hedge Fund 5	0.154
US Hedge Fund 33	0.080	US Hedge Fund 33	0.074	US Hedge Fund 38	0.072	US Hedge Fund 33	0.132
US Hedge Fund 44	0.054	US Hedge Fund 44	0.040	US Hedge Fund 19	0.069	US Hedge Fund 19	0.087
US Hedge Fund 19	0.042	US Hedge Fund 19	0.038	US Hedge Fund 20	0.051	US Hedge Fund 38	0.086
US Hedge Fund 38	0.039	US Hedge Fund 38	0.034	US Hedge Fund 37	0.051	US Hedge Fund 20	0.065
US Hedge Fund 31	0.027	US Hedge Fund 31	0.024	US Hedge Fund 31	0.048	US Hedge Fund 31	0.061
US Hedge Fund 20	0.026	US Hedge Fund 20	0.023	US Hedge Fund 15	0.045	US Hedge Fund 15	0.061
US Hedge Fund 84	0.023	US Hedge Fund 84	0.022	US Hedge Fund 14	0.041	US Hedge Fund 37	0.060
EU Hedge Fund 33	0.016	EU Hedge Fund 33	0.019	US Hedge Fund 40	0.041	US Hedge Fund 14	0.056
US Hedge Fund 37	0.013	EU Hedge Fund 34	0.012	US Hedge Fund 21	0.038	US Hedge Fund 40	0.048
EU Hedge Fund 34	0.013	US Hedge Fund 37	0.011	US Hedge Fund 68	0.037	US Hedge Fund 21	0.045
US Hedge Fund 15	0.011	US Hedge Fund 15	0.010	US Hedge Fund 81	0.028	US Hedge Fund 68	0.044
US Hedge Fund 14	0.008	US Hedge Fund 14	0.007	US Hedge Fund 25	0.023	US Hedge Fund 81	0.039
EU Hedge Fund 36	0.007	EU Hedge Fund 36	0.007	US Hedge Fund 66	0.023	US Hedge Fund 66	0.028
US Hedge Fund 39	0.007	US Hedge Fund 40	0.005	US Hedge Fund 39	0.018	US Hedge Fund 25	0.028
US Hedge Fund 40	0.007	US Hedge Fund 39	0.005	US Hedge Fund 55	0.017	US Hedge Fund 39	0.024
US Hedge Fund 21	0.006	US Hedge Fund 21	0.005	EU Hedge Fund 34	0.016	EU Hedge Fund 34	0.020
US Hedge Fund 25	0.006	US Hedge Fund 25	0.005	US Hedge Fund 73	0.013	US Hedge Fund 58	0.020
EU Hedge Fund 4	0.003	EU Hedge Fund 4	0.003	EU Hedge Fund 33	0.013	US Hedge Fund 55	0.020
EU Hedge Fund 3	0.003	EU Hedge Fund 3	0.003	US Hedge Fund 36	0.012	US Hedge Fund 36	0.019
US Hedge Fund 81	0.001	US Hedge Fund 81	0.001	US Hedge Fund 58	0.012	US Hedge Fund 73	0.018
EU Hedge Fund 35	0.001	EU Hedge Fund 35	0.001	US Hedge Fund 16	0.011	EU Hedge Fund 33	0.015
US Hedge Fund 66	0.000	US Hedge Fund 66	0.000	EU Hedge Fund 36	0.009	US Hedge Fund 16	0.013
US Hedge Fund 55	-0.002	US Hedge Fund 55	-0.002	US Hedge Fund 27	0.008	EU Hedge Fund 36	0.012
US Hedge Fund 36	-0.002	US Hedge Fund 36	-0.002	US Hedge Fund 28	0.007	US Hedge Fund 27	0.010
US Hedge Fund 59	-0.005	US Hedge Fund 58	-0.004	US Hedge Fund 26	0.006	US Hedge Fund 28	0.009
EU Hedge Fund 17	-0.005	EU Hedge Fund 17	-0.005	US Hedge Fund 59	0.006	US Hedge Fund 26	0.008
US Hedge Fund 58	-0.005	US Hedge Fund 59	-0.005	US Hedge Fund 64	0.005	US Hedge Fund 59	0.007
EU Hedge Fund 28	-0.006	EU Hedge Fund 28	-0.005	US Hedge Fund 8	0.004	US Hedge Fund 64	0.006
EU Hedge Fund 27	-0.006	EU Hedge Fund 27	-0.006	US Hedge Fund 65	0.004	US Hedge Fund 8	0.005
US Hedge Fund 27	-0.007	US Hedge Fund 27	-0.006	EU Hedge Fund 4	0.004	US Hedge Fund 65	0.005
US Hedge Fund 28	-0.008	US Hedge Fund 28	-0.007	EU Hedge Fund 3	0.003	EU Hedge Fund 4	0.004
EU Hedge Fund 38	-0.009	EU Hedge Fund 38	-0.007	US Hedge Fund 11	0.001	EU Hedge Fund 3	0.004
US Hedge Fund 68	-0.009	US Hedge Fund 26	-0.008	US Hedge Fund 23	0.001	US Hedge Fund 23	0.002
US Hedge Fund 26	-0.009	US Hedge Fund 68	-0.008	EU Hedge Fund 35	0.001	US Hedge Fund 11	0.002
US Hedge Fund 16	-0.011	US Hedge Fund 16	-0.010	US Hedge Fund 50	-0.001	EU Hedge Fund 35	0.001
US Hedge Fund 26	-0.012	EU Hedge Fund 26	-0.011	US Hedge Fund 22	-0.002	US Hedge Fund 50	-0.001
EU Hedge Fund 11	-0.013	US Hedge Fund 11	-0.011	US Hedge Fund 7	-0.005	US Hedge Fund 22	-0.003
US Hedge Fund 73	-0.017	US Hedge Fund 73	-0.014	EU Hedge Fund 17	-0.005	US Hedge Fund 7	-0.006
EU Hedge Fund 16	-0.020	US Hedge Fund 47	-0.017	EU Hedge Fund 28	-0.006	EU Hedge Fund 17	-0.006
US Hedge Fund 47	-0.021	US Hedge Fund 46	-0.017	EU Hedge Fund 27	-0.007	EU Hedge Fund 28	-0.008
US Hedge Fund 46	-0.021	EU Hedge Fund 16	-0.019	EU Hedge Fund 38	-0.007	EU Hedge Fund 27	-0.009
US Hedge Fund 8	-0.023	US Hedge Fund 8	-0.020	US Hedge Fund 76	-0.009	EU Hedge Fund 38	-0.009
US Hedge Fund 23	-0.024	US Hedge Fund 23	-0.021	US Hedge Fund 47	-0.011	US Hedge Fund 76	-0.011
US Hedge Fund 50	-0.024	US Hedge Fund 50	-0.021	US Hedge Fund 41	-0.011	US Hedge Fund 41	-0.011
US Hedge Fund 76	-0.027	US Hedge Fund 76	-0.024	US Hedge Fund 46	-0.011	US Hedge Fund 47	-0.012
EU Hedge Fund 15	-0.028	US Hedge Fund 22	-0.026	EU Hedge Fund 26	-0.013	US Hedge Fund 46	-0.013
EU Hedge Fund 14	-0.028	EU Hedge Fund 15	-0.026	US Hedge Fund 42	-0.015	US Hedge Fund 42	-0.015
US Hedge Fund 64	-0.029	EU Hedge Fund 14	-0.027	US Hedge Fund 82	-0.016	EU Hedge Fund 26	-0.017
US Hedge Fund 65	-0.031	US Hedge Fund 64	-0.027	US Hedge Fund 83	-0.017	US Hedge Fund 82	-0.020
US Hedge Fund 22	-0.031	US Hedge Fund 82	-0.029	EU Hedge Fund 16	-0.023	US Hedge Fund 83	-0.021
US Hedge Fund 82	-0.033	US Hedge Fund 65	-0.029	US Hedge Fund 43	-0.024	US Hedge Fund 43	-0.024
US Hedge Fund 83	-0.033	US Hedge Fund 7	-0.029	US Hedge Fund 45	-0.026	EU Hedge Fund 16	-0.026
US Hedge Fund 7	-0.033	US Hedge Fund 83	-0.029	EU Hedge Fund 15	-0.031	US Hedge Fund 45	-0.031
EU Hedge Fund 2	-0.035	EU Hedge Fund 20	-0.033	EU Hedge Fund 14	-0.031	EU Hedge Fund 15	-0.036
EU Hedge Fund 1	-0.036	EU Hedge Fund 37	-0.033	EU Hedge Fund 37	-0.033	EU Hedge Fund 14	-0.036
EU Hedge Fund 20	-0.037	EU Hedge Fund 2	-0.034	US Hedge Fund 3	-0.033	US Hedge Fund 3	-0.040

US Hedge Fund 41	-0.037	EU Hedge Fund 1	-0.035	EU Hedge Fund 20	-0.039	EU Hedge Fund 37	-0.041
EU Hedge Fund 37	-0.040	US Hedge Fund 41	-0.042	US Hedge Fund 84	-0.039	US Hedge Fund 84	-0.042
US Hedge Fund 42	-0.041	US Hedge Fund 42	-0.047	US Hedge Fund 9	-0.043	EU Hedge Fund 20	-0.044
US Hedge Fund 43	-0.050	US Hedge Fund 45	-0.051	US Hedge Fund 56	-0.043	US Hedge Fund 56	-0.050
US Hedge Fund 45	-0.055	EU Hedge Fund 24	-0.052	US Hedge Fund 54	-0.044	US Hedge Fund 54	-0.052
EU Hedge Fund 6	-0.057	EU Hedge Fund 6	-0.053	EU Hedge Fund 2	-0.044	EU Hedge Fund 2	-0.055
EU Hedge Fund 12	-0.057	EU Hedge Fund 5	-0.053	EU Hedge Fund 1	-0.046	US Hedge Fund 9	-0.057
EU Hedge Fund 24	-0.058	EU Hedge Fund 7	-0.054	US Hedge Fund 1	-0.050	EU Hedge Fund 1	-0.057
EU Hedge Fund 5	-0.058	US Hedge Fund 43	-0.056	EU Hedge Fund 12	-0.050	EU Hedge Fund 12	-0.059
EU Hedge Fund 7	-0.058	EU Hedge Fund 12	-0.057	US Hedge Fund 49	-0.054	US Hedge Fund 1	-0.061
US Hedge Fund 54	-0.064	US Hedge Fund 54	-0.058	US Hedge Fund 52	-0.055	US Hedge Fund 49	-0.063
US Hedge Fund 56	-0.069	US Hedge Fund 56	-0.060	US Hedge Fund 51	-0.058	US Hedge Fund 52	-0.064
US Hedge Fund 9	-0.073	EU Hedge Fund 22	-0.061	US Hedge Fund 35	-0.060	US Hedge Fund 51	-0.068
US Hedge Fund 3	-0.075	US Hedge Fund 3	-0.066	EU Hedge Fund 5	-0.064	US Hedge Fund 35	-0.075
EU Hedge Fund 32	-0.081	US Hedge Fund 9	-0.067	EU Hedge Fund 6	-0.064	EU Hedge Fund 6	-0.078
US Hedge Fund 52	-0.082	EU Hedge Fund 23	-0.069	EU Hedge Fund 7	-0.065	EU Hedge Fund 5	-0.079
EU Hedge Fund 22	-0.085	US Hedge Fund 52	-0.073	EU Hedge Fund 24	-0.067	EU Hedge Fund 7	-0.080
US Hedge Fund 49	-0.087	EU Hedge Fund 32	-0.073	US Hedge Fund 53	-0.071	US Hedge Fund 53	-0.083
US Hedge Fund 1	-0.090	US Hedge Fund 1	-0.085	US Hedge Fund 13	-0.073	EU Hedge Fund 24	-0.084
US Hedge Fund 51	-0.091	US Hedge Fund 35	-0.085	US Hedge Fund 24	-0.083	US Hedge Fund 13	-0.087
EU Hedge Fund 10	-0.096	US Hedge Fund 49	-0.086	EU Hedge Fund 32	-0.088	US Hedge Fund 24	-0.100
EU Hedge Fund 23	-0.098	EU Hedge Fund 10	-0.089	US Hedge Fund 67	-0.089	US Hedge Fund 67	-0.102
US Hedge Fund 35	-0.098	US Hedge Fund 51	-0.091	US Hedge Fund 29	-0.098	EU Hedge Fund 32	-0.108
US Hedge Fund 53	-0.101	US Hedge Fund 53	-0.091	EU Hedge Fund 22	-0.101	US Hedge Fund 29	-0.118
EU Hedge Fund 9	-0.103	EU Hedge Fund 9	-0.098	EU Hedge Fund 10	-0.111	EU Hedge Fund 22	-0.118
US Hedge Fund 67	-0.104	US Hedge Fund 24	-0.098	EU Hedge Fund 9	-0.119	EU Hedge Fund 10	-0.134
US Hedge Fund 24	-0.107	US Hedge Fund 67	-0.100	EU Hedge Fund 23	-0.119	US Hedge Fund 10	-0.136
EU Hedge Fund 19	-0.113	US Hedge Fund 13	-0.104	US Hedge Fund 10	-0.120	US Hedge Fund 18	-0.138
US Hedge Fund 13	-0.113	EU Hedge Fund 19	-0.107	US Hedge Fund 18	-0.129	EU Hedge Fund 23	-0.139
US Hedge Fund 29	-0.137	US Hedge Fund 29	-0.119	EU Hedge Fund 19	-0.130	EU Hedge Fund 9	-0.144
EU Hedge Fund 13	-0.143	EU Hedge Fund 31	-0.127	EU Hedge Fund 31	-0.138	EU Hedge Fund 19	-0.148
EU Hedge Fund 31	-0.145	US Hedge Fund 10	-0.135	US Hedge Fund 77	-0.154	EU Hedge Fund 31	-0.169
EU Hedge Fund 11	-0.149	EU Hedge Fund 18	-0.155	US Hedge Fund 4	-0.161	US Hedge Fund 77	-0.188
US Hedge Fund 10	-0.155	EU Hedge Fund 13	-0.160	EU Hedge Fund 13	-0.168	US Hedge Fund 4	-0.196
EU Hedge Fund 18	-0.166	US Hedge Fund 18	-0.165	US Hedge Fund 69	-0.172	EU Hedge Fund 13	-0.201
US Hedge Fund 18	-0.188	EU Hedge Fund 11	-0.173	EU Hedge Fund 11	-0.176	EU Hedge Fund 18	-0.208
US Hedge Fund 77	-0.192	EU Hedge Fund 21	-0.175	EU Hedge Fund 18	-0.183	EU Hedge Fund 11	-0.212
US Hedge Fund 4	-0.198	US Hedge Fund 77	-0.177	US Hedge Fund 80	-0.184	US Hedge Fund 80	-0.217
US Hedge Fund 79	-0.218	US Hedge Fund 4	-0.183	US Hedge Fund 34	-0.192	US Hedge Fund 69	-0.222
EU Hedge Fund 21	-0.222	US Hedge Fund 69	-0.196	US Hedge Fund 2	-0.231	US Hedge Fund 34	-0.242
US Hedge Fund 34	-0.230	US Hedge Fund 34	-0.208	US Hedge Fund 79	-0.284	US Hedge Fund 2	-0.276
US Hedge Fund 69	-0.234	US Hedge Fund 80	-0.225	US Hedge Fund 32	-0.668	US Hedge Fund 79	-0.386
US Hedge Fund 80	-0.240	US Hedge Fund 79	-0.239	EU Hedge Fund 21	-0.680	US Hedge Fund 12	-0.561
US Hedge Fund 2	-0.298	US Hedge Fund 2	-0.281	US Hedge Fund 71	-0.747	US Hedge Fund 32	-0.778
EU Hedge Fund 8	-0.535	EU Hedge Fund 8	-0.453	US Hedge Fund 12	-0.750	US Hedge Fund 71	-0.951
US Hedge Fund 12	-0.869	EU Hedge Fund 30	-0.736	US Hedge Fund 70	-0.836	EU Hedge Fund 8	-1.172
US Hedge Fund 17	-1.545	US Hedge Fund 12	-1.022	EU Hedge Fund 8	-0.899	US Hedge Fund 70	-1.208
US Hedge Fund 32	-2.021	US Hedge Fund 17	-1.380	US Hedge Fund 17	-1.272	US Hedge Fund 17	-1.655

Source: Compiled by author.

Table DD: Results from the Treynor ratio – ranked from best to worst (Based on the indices, respectively: Post-financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 40	8.059	US Hedge Fund 40	19.114	US Hedge Fund 40	11.956	US Hedge Fund 40	14.627
EU Hedge Fund 11	2.186	US Hedge Fund 28	1.107	US Hedge Fund 28	1.697	EU Hedge Fund 13	3.551
US Hedge Fund 28	1.294	US Hedge Fund 45	0.258	EU Hedge Fund 13	1.190	US Hedge Fund 28	2.000
EU Hedge Fund 13	0.414	EU Hedge Fund 11	0.224	US Hedge Fund 45	0.333	US Hedge Fund 45	0.405
US Hedge Fund 45	0.350	US Hedge Fund 29	0.195	US Hedge Fund 29	0.227	US Hedge Fund 29	0.262
US Hedge Fund 29	0.206	US Hedge Fund 13	0.191	US Hedge Fund 13	0.201	US Hedge Fund 38	0.230
US Hedge Fund 13	0.178	EU Hedge Fund 13	0.180	EU Hedge Fund 8	0.200	US Hedge Fund 13	0.230
US Hedge Fund 38	0.154	US Hedge Fund 38	0.148	US Hedge Fund 38	0.199	EU Hedge Fund 8	0.229
US Hedge Fund 78	0.146	EU Hedge Fund 33	0.146	US Hedge Fund 79	0.192	US Hedge Fund 78	0.197
EU Hedge Fund 33	0.106	US Hedge Fund 78	0.135	US Hedge Fund 78	0.171	US Hedge Fund 79	0.197
US Hedge Fund 22	0.104	EU Hedge Fund 12	0.108	US Hedge Fund 22	0.140	US Hedge Fund 65	0.160
US Hedge Fund 65	0.097	US Hedge Fund 22	0.091	US Hedge Fund 65	0.137	US Hedge Fund 22	0.158
US Hedge Fund 64	0.085	US Hedge Fund 65	0.076	EU Hedge Fund 12	0.123	EU Hedge Fund 12	0.140
EU Hedge Fund 12	0.082	US Hedge Fund 53	0.073	US Hedge Fund 64	0.120	US Hedge Fund 64	0.140
US Hedge Fund 53	0.071	US Hedge Fund 64	0.068	EU Hedge Fund 21	0.103	EU Hedge Fund 37	0.134
US Hedge Fund 44	0.070	US Hedge Fund 52	0.064	US Hedge Fund 53	0.101	EU Hedge Fund 21	0.119
US Hedge Fund 48	0.064	US Hedge Fund 48	0.063	US Hedge Fund 48	0.101	US Hedge Fund 48	0.118
US Hedge Fund 52	0.063	US Hedge Fund 57	0.061	US Hedge Fund 37	0.100	US Hedge Fund 37	0.117
US Hedge Fund 37	0.058	US Hedge Fund 54	0.059	EU Hedge Fund 37	0.096	US Hedge Fund 53	0.116
US Hedge Fund 54	0.057	US Hedge Fund 10	0.058	US Hedge Fund 52	0.089	EU Hedge Fund 5	0.102
US Hedge Fund 10	0.055	US Hedge Fund 37	0.058	EU Hedge Fund 5	0.087	US Hedge Fund 52	0.101
EU Hedge Fund 21	0.053	US Hedge Fund 44	0.057	US Hedge Fund 54	0.087	US Hedge Fund 54	0.100
US Hedge Fund 12	0.045	US Hedge Fund 1	0.044	EU Hedge Fund 6	0.082	EU Hedge Fund 6	0.096
US Hedge Fund 33	0.043	US Hedge Fund 33	0.043	US Hedge Fund 17	0.079	US Hedge Fund 17	0.095
US Hedge Fund 1	0.043	US Hedge Fund 12	0.038	EU Hedge Fund 7	0.077	EU Hedge Fund 7	0.090
EU Hedge Fund 5	0.038	EU Hedge Fund 21	0.035	US Hedge Fund 10	0.074	US Hedge Fund 10	0.081
EU Hedge Fund 6	0.033	US Hedge Fund 17	0.034	US Hedge Fund 33	0.071	US Hedge Fund 33	0.081
US Hedge Fund 17	0.033	US Hedge Fund 31	0.033	US Hedge Fund 44	0.067	EU Hedge Fund 33	0.077
US Hedge Fund 31	0.030	EU Hedge Fund 5	0.030	EU Hedge Fund 33	0.067	US Hedge Fund 1	0.076
US Hedge Fund 55	0.029	US Hedge Fund 55	0.029	US Hedge Fund 1	0.066	US Hedge Fund 44	0.073
EU Hedge Fund 7	0.028	EU Hedge Fund 6	0.026	EU Hedge Fund 38	0.052	EU Hedge Fund 38	0.067
US Hedge Fund 20	0.026	US Hedge Fund 20	0.026	US Hedge Fund 55	0.050	US Hedge Fund 55	0.057
US Hedge Fund 35	0.018	EU Hedge Fund 7	0.023	US Hedge Fund 20	0.046	US Hedge Fund 20	0.051
US Hedge Fund 70	0.017	US Hedge Fund 35	0.019	US Hedge Fund 31	0.041	US Hedge Fund 31	0.046
US Hedge Fund 71	0.016	US Hedge Fund 39	0.016	US Hedge Fund 35	0.036	US Hedge Fund 9	0.042
US Hedge Fund 39	0.015	US Hedge Fund 70	0.014	US Hedge Fund 73	0.036	US Hedge Fund 73	0.041
US Hedge Fund 9	0.014	US Hedge Fund 71	0.013	US Hedge Fund 9	0.036	US Hedge Fund 35	0.041
US Hedge Fund 56	0.012	US Hedge Fund 56	0.012	US Hedge Fund 56	0.033	US Hedge Fund 56	0.037
US Hedge Fund 19	0.008	US Hedge Fund 9	0.012	US Hedge Fund 70	0.028	US Hedge Fund 70	0.032
EU Hedge Fund 37	0.008	US Hedge Fund 19	0.009	US Hedge Fund 19	0.028	US Hedge Fund 19	0.031
US Hedge Fund 73	0.004	EU Hedge Fund 37	0.007	US Hedge Fund 71	0.027	US Hedge Fund 71	0.030
US Hedge Fund 68	-0.002	US Hedge Fund 73	0.004	US Hedge Fund 6	0.027	US Hedge Fund 6	0.030
US Hedge Fund 6	-0.003	US Hedge Fund 68	-0.002	US Hedge Fund 39	0.025	US Hedge Fund 39	0.028
US Hedge Fund 41	-0.004	US Hedge Fund 6	-0.003	US Hedge Fund 5	0.020	US Hedge Fund 5	0.022
US Hedge Fund 42	-0.006	US Hedge Fund 41	-0.004	EU Hedge Fund 1	0.019	EU Hedge Fund 1	0.022
US Hedge Fund 32	-0.006	US Hedge Fund 42	-0.006	US Hedge Fund 8	0.019	US Hedge Fund 8	0.022
US Hedge Fund 76	-0.007	US Hedge Fund 59	-0.006	US Hedge Fund 66	0.017	US Hedge Fund 66	0.020
US Hedge Fund 59	-0.007	US Hedge Fund 32	-0.007	EU Hedge Fund 2	0.015	EU Hedge Fund 2	0.018
US Hedge Fund 43	-0.008	US Hedge Fund 76	-0.007	US Hedge Fund 76	0.013	US Hedge Fund 12	0.015
US Hedge Fund 50	-0.009	US Hedge Fund 43	-0.008	US Hedge Fund 12	0.012	US Hedge Fund 76	0.015
US Hedge Fund 66	-0.009	US Hedge Fund 50	-0.009	US Hedge Fund 50	0.011	US Hedge Fund 50	0.012
US Hedge Fund 81	-0.011	US Hedge Fund 66	-0.009	EU Hedge Fund 30	0.009	EU Hedge Fund 30	0.009
EU Hedge Fund 1	-0.012	US Hedge Fund 81	-0.010	US Hedge Fund 32	0.007	US Hedge Fund 32	0.008
US Hedge Fund 5	-0.013	EU Hedge Fund 1	-0.011	US Hedge Fund 81	0.006	US Hedge Fund 81	0.007
US Hedge Fund 8	-0.013	EU Hedge Fund 8	-0.012	US Hedge Fund 41	0.006	US Hedge Fund 41	0.007
EU Hedge Fund 4	-0.014	US Hedge Fund 8	-0.012	EU Hedge Fund 29	0.006	EU Hedge Fund 29	0.006
EU Hedge Fund 3	-0.014	US Hedge Fund 5	-0.013	US Hedge Fund 68	0.005	US Hedge Fund 42	0.005
EU Hedge Fund 2	-0.015	EU Hedge Fund 4	-0.013	US Hedge Fund 42	0.004	US Hedge Fund 68	0.005
EU Hedge Fund 8	-0.016	EU Hedge Fund 3	-0.014	US Hedge Fund 59	0.003	US Hedge Fund 59	0.004
EU Hedge Fund 38	-0.018	EU Hedge Fund 2	-0.015	US Hedge Fund 43	0.002	US Hedge Fund 43	0.003
US Hedge Fund 82	-0.022	EU Hedge Fund 38	-0.018	US Hedge Fund 27	0.002	US Hedge Fund 27	0.002
US Hedge Fund 27	-0.022	US Hedge Fund 82	-0.021	US Hedge Fund 7	0.002	US Hedge Fund 7	0.002
US Hedge Fund 83	-0.023	US Hedge Fund 27	-0.022	US Hedge Fund 25	-0.001	US Hedge Fund 25	-0.001
US Hedge Fund 25	-0.026	US Hedge Fund 36	-0.023	US Hedge Fund 26	-0.003	US Hedge Fund 82	-0.004
US Hedge Fund 26	-0.029	US Hedge Fund 83	-0.023	US Hedge Fund 82	-0.003	US Hedge Fund 26	-0.004
US Hedge Fund 36	-0.029	US Hedge Fund 25	-0.027	EU Hedge Fund 3	-0.003	EU Hedge Fund 3	-0.004
US Hedge Fund 7	-0.032	US Hedge Fund 26	-0.029	EU Hedge Fund 4	-0.003	EU Hedge Fund 4	-0.004
US Hedge Fund 80	-0.036	US Hedge Fund 7	-0.029	US Hedge Fund 80	-0.005	US Hedge Fund 80	-0.005
EU Hedge Fund 24	-0.037	EU Hedge Fund 29	-0.034	US Hedge Fund 83	-0.005	US Hedge Fund 83	-0.006
EU Hedge Fund 30	-0.039	EU Hedge Fund 30	-0.034	US Hedge Fund 3	-0.005	US Hedge Fund 3	-0.006
EU Hedge Fund 29	-0.041	US Hedge Fund 80	-0.035	EU Hedge Fund 19	-0.008	EU Hedge Fund 19	-0.009
EU Hedge Fund 19	-0.041	EU Hedge Fund 19	-0.038	US Hedge Fund 2	-0.009	US Hedge Fund 2	-0.010
US Hedge Fund 2	-0.042	US Hedge Fund 2	-0.040	US Hedge Fund 36	-0.017	US Hedge Fund 36	-0.020
US Hedge Fund 3	-0.055	US Hedge Fund 58	-0.042	US Hedge Fund 57	-0.017	EU Hedge Fund 24	-0.022

US Hedge Fund 23	-0.055	US Hedge Fund 23	-0.045	EU Hedge Fund 24	-0.020	US Hedge Fund 57	-0.026
US Hedge Fund 30	-0.056	EU Hedge Fund 24	-0.047	US Hedge Fund 46	-0.024	US Hedge Fund 46	-0.028
US Hedge Fund 16	-0.057	US Hedge Fund 16	-0.054	US Hedge Fund 47	-0.024	US Hedge Fund 47	-0.028
US Hedge Fund 18	-0.059	US Hedge Fund 46	-0.056	US Hedge Fund 30	-0.028	US Hedge Fund 30	-0.033
US Hedge Fund 84	-0.061	US Hedge Fund 47	-0.056	US Hedge Fund 23	-0.029	US Hedge Fund 23	-0.034
US Hedge Fund 67	-0.064	US Hedge Fund 30	-0.060	EU Hedge Fund 15	-0.031	EU Hedge Fund 15	-0.038
EU Hedge Fund 15	-0.073	US Hedge Fund 3	-0.061	EU Hedge Fund 16	-0.032	US Hedge Fund 18	-0.039
EU Hedge Fund 16	-0.074	US Hedge Fund 11	-0.063	US Hedge Fund 18	-0.033	EU Hedge Fund 16	-0.040
US Hedge Fund 46	-0.074	EU Hedge Fund 15	-0.063	EU Hedge Fund 9	-0.034	EU Hedge Fund 9	-0.040
US Hedge Fund 47	-0.074	EU Hedge Fund 16	-0.064	EU Hedge Fund 14	-0.036	EU Hedge Fund 17	-0.042
EU Hedge Fund 17	-0.080	US Hedge Fund 18	-0.064	EU Hedge Fund 17	-0.038	EU Hedge Fund 14	-0.045
US Hedge Fund 58	-0.080	EU Hedge Fund 14	-0.069	US Hedge Fund 16	-0.039	US Hedge Fund 16	-0.046
EU Hedge Fund 14	-0.082	EU Hedge Fund 9	-0.069	US Hedge Fund 58	-0.041	EU Hedge Fund 20	-0.052
EU Hedge Fund 9	-0.082	US Hedge Fund 67	-0.070	EU Hedge Fund 10	-0.045	EU Hedge Fund 10	-0.052
EU Hedge Fund 20	-0.085	EU Hedge Fund 10	-0.079	EU Hedge Fund 20	-0.047	US Hedge Fund 58	-0.053
US Hedge Fund 21	-0.086	US Hedge Fund 21	-0.080	US Hedge Fund 67	-0.053	US Hedge Fund 67	-0.063
EU Hedge Fund 10	-0.093	US Hedge Fund 84	-0.082	US Hedge Fund 24	-0.056	US Hedge Fund 21	-0.065
US Hedge Fund 24	-0.103	EU Hedge Fund 17	-0.087	US Hedge Fund 11	-0.056	US Hedge Fund 24	-0.067
US Hedge Fund 11	-0.117	EU Hedge Fund 20	-0.093	US Hedge Fund 21	-0.057	US Hedge Fund 11	-0.070
EU Hedge Fund 32	-0.145	US Hedge Fund 15	-0.125	US Hedge Fund 69	-0.093	US Hedge Fund 69	-0.110
US Hedge Fund 15	-0.147	US Hedge Fund 14	-0.128	US Hedge Fund 84	-0.094	US Hedge Fund 84	-0.130
US Hedge Fund 14	-0.151	EU Hedge Fund 32	-0.132	EU Hedge Fund 28	-0.121	EU Hedge Fund 28	-0.140
EU Hedge Fund 22	-0.152	US Hedge Fund 24	-0.135	EU Hedge Fund 32	-0.121	EU Hedge Fund 22	-0.146
US Hedge Fund 4	-0.153	US Hedge Fund 34	-0.158	EU Hedge Fund 36	-0.125	EU Hedge Fund 32	-0.146
US Hedge Fund 77	-0.158	EU Hedge Fund 22	-0.162	EU Hedge Fund 27	-0.126	EU Hedge Fund 18	-0.146
EU Hedge Fund 23	-0.160	US Hedge Fund 4	-0.164	US Hedge Fund 15	-0.127	US Hedge Fund 15	-0.146
US Hedge Fund 34	-0.161	EU Hedge Fund 25	-0.167	EU Hedge Fund 26	-0.127	EU Hedge Fund 27	-0.147
US Hedge Fund 69	-0.162	EU Hedge Fund 23	-0.168	EU Hedge Fund 22	-0.128	EU Hedge Fund 26	-0.148
EU Hedge Fund 18	-0.164	US Hedge Fund 77	-0.170	EU Hedge Fund 34	-0.129	US Hedge Fund 14	-0.150
EU Hedge Fund 31	-0.171	EU Hedge Fund 31	-0.172	US Hedge Fund 4	-0.130	US Hedge Fund 4	-0.150
EU Hedge Fund 25	-0.175	US Hedge Fund 69	-0.174	US Hedge Fund 14	-0.130	EU Hedge Fund 36	-0.151
US Hedge Fund 72	-0.191	EU Hedge Fund 18	-0.183	EU Hedge Fund 18	-0.132	US Hedge Fund 34	-0.152
EU Hedge Fund 28	-0.194	US Hedge Fund 49	-0.197	US Hedge Fund 34	-0.132	EU Hedge Fund 23	-0.155
EU Hedge Fund 27	-0.198	US Hedge Fund 51	-0.199	US Hedge Fund 77	-0.134	US Hedge Fund 77	-0.156
EU Hedge Fund 26	-0.201	US Hedge Fund 72	-0.207	EU Hedge Fund 35	-0.135	EU Hedge Fund 34	-0.156
US Hedge Fund 49	-0.206	EU Hedge Fund 36	-0.239	EU Hedge Fund 23	-0.135	EU Hedge Fund 35	-0.164
US Hedge Fund 51	-0.208	EU Hedge Fund 34	-0.244	US Hedge Fund 72	-0.142	EU Hedge Fund 25	-0.164
EU Hedge Fund 36	-0.244	US Hedge Fund 75	-0.246	EU Hedge Fund 25	-0.144	US Hedge Fund 72	-0.167
US Hedge Fund 75	-0.245	US Hedge Fund 74	-0.246	EU Hedge Fund 31	-0.145	EU Hedge Fund 31	-0.167
US Hedge Fund 74	-0.245	US Hedge Fund 79	-0.248	US Hedge Fund 49	-0.163	US Hedge Fund 49	-0.191
EU Hedge Fund 34	-0.249	EU Hedge Fund 35	-0.251	US Hedge Fund 51	-0.165	US Hedge Fund 51	-0.193
EU Hedge Fund 35	-0.256	US Hedge Fund 62	-0.359	US Hedge Fund 75	-0.205	US Hedge Fund 75	-0.242
US Hedge Fund 62	-0.267	US Hedge Fund 60	-0.408	US Hedge Fund 74	-0.206	US Hedge Fund 74	-0.243
US Hedge Fund 60	-0.318	US Hedge Fund 63	-0.414	US Hedge Fund 62	-0.304	US Hedge Fund 62	-0.347
US Hedge Fund 63	-0.322	EU Hedge Fund 28	-0.420	US Hedge Fund 60	-0.361	US Hedge Fund 60	-0.412
US Hedge Fund 61	-0.344	EU Hedge Fund 26	-0.435	US Hedge Fund 63	-0.366	US Hedge Fund 63	-0.417
US Hedge Fund 57	-0.592	EU Hedge Fund 27	-0.440	US Hedge Fund 61	-0.396	US Hedge Fund 61	-0.452
US Hedge Fund 79	-6.200	US Hedge Fund 61	-0.444	EU Hedge Fund 11	-2.338	EU Hedge Fund 11	-1.097

Source: Compiled by author.

Table EE: Results from the Jensen's alpha– ranked from best to worst (Based on the indices, respectively: Pre-financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
EU Hedge Fund 3	0.247	US Hedge Fund 70	0.313	US Hedge Fund 70	0.080	US Hedge Fund 73	0.057
EU Hedge Fund 4	0.247	US Hedge Fund 71	0.299	US Hedge Fund 73	0.080	US Hedge Fund 18	0.054
US Hedge Fund 70	0.219	EU Hedge Fund 4	0.298	US Hedge Fund 71	0.078	US Hedge Fund 70	0.053
US Hedge Fund 71	0.211	EU Hedge Fund 3	0.296	US Hedge Fund 42	0.077	US Hedge Fund 42	0.053
EU Hedge Fund 29	0.187	EU Hedge Fund 24	0.267	US Hedge Fund 41	0.077	US Hedge Fund 41	0.053
EU Hedge Fund 30	0.185	EU Hedge Fund 29	0.247	US Hedge Fund 43	0.076	US Hedge Fund 43	0.052
EU Hedge Fund 24	0.182	EU Hedge Fund 30	0.241	US Hedge Fund 50	0.076	US Hedge Fund 50	0.052
EU Hedge Fund 14	0.182	EU Hedge Fund 14	0.233	US Hedge Fund 18	0.076	US Hedge Fund 71	0.052
EU Hedge Fund 15	0.176	EU Hedge Fund 15	0.230	US Hedge Fund 59	0.072	US Hedge Fund 59	0.049
EU Hedge Fund 16	0.173	EU Hedge Fund 16	0.228	EU Hedge Fund 4	0.071	EU Hedge Fund 29	0.049
EU Hedge Fund 19	0.160	US Hedge Fund 73	0.216	EU Hedge Fund 3	0.070	EU Hedge Fund 4	0.047
US Hedge Fund 59	0.149	US Hedge Fund 59	0.212	EU Hedge Fund 24	0.068	EU Hedge Fund 30	0.047
US Hedge Fund 39	0.145	US Hedge Fund 39	0.211	US Hedge Fund 35	0.068	US Hedge Fund 35	0.047
US Hedge Fund 58	0.144	EU Hedge Fund 19	0.206	EU Hedge Fund 29	0.067	EU Hedge Fund 3	0.047
US Hedge Fund 50	0.141	US Hedge Fund 50	0.198	US Hedge Fund 30	0.067	US Hedge Fund 56	0.046
EU Hedge Fund 18	0.138	US Hedge Fund 18	0.190	US Hedge Fund 20	0.067	EU Hedge Fund 24	0.046
US Hedge Fund 18	0.137	US Hedge Fund 35	0.183	US Hedge Fund 39	0.066	US Hedge Fund 39	0.046
US Hedge Fund 35	0.131	US Hedge Fund 56	0.179	EU Hedge Fund 30	0.065	US Hedge Fund 30	0.046
EU Hedge Fund 20	0.131	US Hedge Fund 31	0.178	US Hedge Fund 56	0.062	EU Hedge Fund 16	0.046
US Hedge Fund 73	0.129	US Hedge Fund 20	0.175	US Hedge Fund 76	0.062	US Hedge Fund 76	0.046
US Hedge Fund 20	0.126	EU Hedge Fund 20	0.174	US Hedge Fund 19	0.062	US Hedge Fund 20	0.046
US Hedge Fund 36	0.124	US Hedge Fund 52	0.172	US Hedge Fund 52	0.061	EU Hedge Fund 14	0.046
US Hedge Fund 31	0.123	EU Hedge Fund 18	0.172	EU Hedge Fund 16	0.061	US Hedge Fund 52	0.045
US Hedge Fund 9	0.123	US Hedge Fund 19	0.170	EU Hedge Fund 14	0.061	EU Hedge Fund 15	0.045
EU Hedge Fund 17	0.122	EU Hedge Fund 17	0.163	EU Hedge Fund 15	0.061	US Hedge Fund 19	0.044
EU Hedge Fund 21	0.120	US Hedge Fund 36	0.155	US Hedge Fund 31	0.059	US Hedge Fund 31	0.044
EU Hedge Fund 34	0.120	US Hedge Fund 33	0.153	US Hedge Fund 58	0.058	US Hedge Fund 54	0.043
US Hedge Fund 19	0.119	US Hedge Fund 30	0.151	US Hedge Fund 83	0.058	EU Hedge Fund 19	0.043
EU Hedge Fund 36	0.118	US Hedge Fund 9	0.148	US Hedge Fund 82	0.058	US Hedge Fund 53	0.043
EU Hedge Fund 35	0.118	US Hedge Fund 16	0.147	EU Hedge Fund 19	0.058	US Hedge Fund 16	0.043
US Hedge Fund 52	0.116	EU Hedge Fund 34	0.146	US Hedge Fund 54	0.057	US Hedge Fund 82	0.043
US Hedge Fund 56	0.116	US Hedge Fund 54	0.146	US Hedge Fund 55	0.057	US Hedge Fund 83	0.043
EU Hedge Fund 1	0.114	US Hedge Fund 55	0.146	US Hedge Fund 16	0.057	US Hedge Fund 55	0.043
US Hedge Fund 23	0.113	US Hedge Fund 76	0.145	US Hedge Fund 36	0.057	US Hedge Fund 33	0.042
EU Hedge Fund 2	0.113	EU Hedge Fund 21	0.145	US Hedge Fund 53	0.056	US Hedge Fund 36	0.041
EU Hedge Fund 12	0.112	EU Hedge Fund 35	0.144	US Hedge Fund 28	0.056	US Hedge Fund 1	0.041
US Hedge Fund 11	0.111	US Hedge Fund 83	0.143	US Hedge Fund 66	0.056	EU Hedge Fund 20	0.041
US Hedge Fund 33	0.110	EU Hedge Fund 36	0.143	US Hedge Fund 26	0.056	US Hedge Fund 28	0.041
US Hedge Fund 76	0.108	US Hedge Fund 66	0.143	US Hedge Fund 25	0.055	US Hedge Fund 9	0.041
EU Hedge Fund 26	0.108	US Hedge Fund 53	0.142	US Hedge Fund 23	0.055	US Hedge Fund 26	0.041
US Hedge Fund 41	0.107	US Hedge Fund 23	0.142	US Hedge Fund 27	0.055	US Hedge Fund 25	0.041
US Hedge Fund 55	0.106	EU Hedge Fund 1	0.142	US Hedge Fund 33	0.055	US Hedge Fund 27	0.041
US Hedge Fund 42	0.105	EU Hedge Fund 12	0.140	US Hedge Fund 9	0.054	EU Hedge Fund 18	0.041
US Hedge Fund 43	0.105	EU Hedge Fund 2	0.140	EU Hedge Fund 20	0.053	US Hedge Fund 66	0.041
EU Hedge Fund 28	0.105	US Hedge Fund 42	0.140	EU Hedge Fund 21	0.052	EU Hedge Fund 17	0.040
EU Hedge Fund 27	0.105	US Hedge Fund 41	0.140	US Hedge Fund 1	0.052	US Hedge Fund 68	0.040
US Hedge Fund 66	0.104	US Hedge Fund 82	0.140	EU Hedge Fund 18	0.051	US Hedge Fund 23	0.040
US Hedge Fund 83	0.103	US Hedge Fund 43	0.139	US Hedge Fund 49	0.051	EU Hedge Fund 21	0.040
EU Hedge Fund 7	0.103	US Hedge Fund 58	0.138	US Hedge Fund 51	0.051	US Hedge Fund 45	0.040
EU Hedge Fund 5	0.103	EU Hedge Fund 26	0.137	US Hedge Fund 81	0.051	US Hedge Fund 10	0.039
EU Hedge Fund 9	0.102	EU Hedge Fund 27	0.135	US Hedge Fund 10	0.051	US Hedge Fund 13	0.039
EU Hedge Fund 6	0.102	EU Hedge Fund 28	0.133	EU Hedge Fund 17	0.051	US Hedge Fund 49	0.039
EU Hedge Fund 13	0.101	US Hedge Fund 28	0.129	US Hedge Fund 11	0.050	US Hedge Fund 51	0.039
US Hedge Fund 16	0.101	US Hedge Fund 26	0.129	US Hedge Fund 45	0.050	US Hedge Fund 21	0.039
US Hedge Fund 82	0.099	US Hedge Fund 25	0.128	EU Hedge Fund 27	0.048	EU Hedge Fund 12	0.038
US Hedge Fund 54	0.098	US Hedge Fund 27	0.127	US Hedge Fund 29	0.048	EU Hedge Fund 35	0.038
US Hedge Fund 53	0.097	US Hedge Fund 45	0.126	US Hedge Fund 40	0.048	US Hedge Fund 81	0.038
US Hedge Fund 21	0.094	EU Hedge Fund 9	0.123	US Hedge Fund 21	0.048	EU Hedge Fund 27	0.038
US Hedge Fund 30	0.093	US Hedge Fund 1	0.121	US Hedge Fund 44	0.048	EU Hedge Fund 36	0.038
EU Hedge Fund 10	0.093	EU Hedge Fund 7	0.121	EU Hedge Fund 26	0.048	EU Hedge Fund 34	0.038
EU Hedge Fund 32	0.092	EU Hedge Fund 13	0.120	US Hedge Fund 13	0.048	US Hedge Fund 3	0.038
EU Hedge Fund 11	0.092	EU Hedge Fund 5	0.119	US Hedge Fund 3	0.047	EU Hedge Fund 26	0.038
US Hedge Fund 2	0.091	EU Hedge Fund 6	0.118	EU Hedge Fund 34	0.047	US Hedge Fund 40	0.038
US Hedge Fund 81	0.091	US Hedge Fund 44	0.115	EU Hedge Fund 28	0.047	EU Hedge Fund 11	0.038
US Hedge Fund 22	0.091	US Hedge Fund 2	0.115	EU Hedge Fund 35	0.047	US Hedge Fund 29	0.038
EU Hedge Fund 25	0.090	EU Hedge Fund 32	0.114	EU Hedge Fund 36	0.047	US Hedge Fund 44	0.038
EU Hedge Fund 31	0.087	US Hedge Fund 21	0.114	EU Hedge Fund 12	0.047	EU Hedge Fund 28	0.038
US Hedge Fund 80	0.087	US Hedge Fund 77	0.114	US Hedge Fund 8	0.047	US Hedge Fund 6	0.038
US Hedge Fund 77	0.086	US Hedge Fund 29	0.112	US Hedge Fund 7	0.047	US Hedge Fund 77	0.037
US Hedge Fund 45	0.083	US Hedge Fund 13	0.112	US Hedge Fund 15	0.046	EU Hedge Fund 1	0.037
US Hedge Fund 6	0.083	EU Hedge Fund 10	0.112	US Hedge Fund 68	0.046	US Hedge Fund 15	0.037
US Hedge Fund 29	0.083	US Hedge Fund 80	0.110	US Hedge Fund 14	0.046	EU Hedge Fund 2	0.037
US Hedge Fund 7	0.083	EU Hedge Fund 31	0.110	EU Hedge Fund 1	0.046	US Hedge Fund 72	0.037
US Hedge Fund 68	0.082	EU Hedge Fund 11	0.109	EU Hedge Fund 2	0.046	US Hedge Fund 2	0.037

US Hedge Fund 8	0.082	US Hedge Fund 22	0.109	EU Hedge Fund 7	0.046	US Hedge Fund 14	0.037
US Hedge Fund 67	0.080	US Hedge Fund 4	0.108	US Hedge Fund 34	0.045	US Hedge Fund 80	0.037
EU Hedge Fund 33	0.080	US Hedge Fund 11	0.108	EU Hedge Fund 5	0.045	US Hedge Fund 34	0.037
US Hedge Fund 5	0.079	US Hedge Fund 7	0.107	EU Hedge Fund 6	0.045	US Hedge Fund 8	0.037
US Hedge Fund 15	0.079	US Hedge Fund 67	0.107	EU Hedge Fund 9	0.045	EU Hedge Fund 8	0.037
US Hedge Fund 14	0.079	US Hedge Fund 3	0.107	US Hedge Fund 62	0.045	US Hedge Fund 4	0.037
US Hedge Fund 44	0.078	US Hedge Fund 8	0.106	US Hedge Fund 72	0.044	US Hedge Fund 7	0.037
US Hedge Fund 10	0.077	US Hedge Fund 68	0.106	US Hedge Fund 67	0.044	US Hedge Fund 58	0.037
US Hedge Fund 3	0.077	US Hedge Fund 15	0.105	EU Hedge Fund 10	0.044	EU Hedge Fund 31	0.037
US Hedge Fund 26	0.077	US Hedge Fund 10	0.105	US Hedge Fund 80	0.044	EU Hedge Fund 9	0.037
US Hedge Fund 28	0.076	US Hedge Fund 14	0.104	US Hedge Fund 24	0.044	US Hedge Fund 48	0.037
US Hedge Fund 4	0.076	US Hedge Fund 81	0.103	US Hedge Fund 2	0.044	EU Hedge Fund 13	0.037
US Hedge Fund 25	0.076	US Hedge Fund 72	0.099	EU Hedge Fund 31	0.044	US Hedge Fund 62	0.037
US Hedge Fund 27	0.076	US Hedge Fund 6	0.097	US Hedge Fund 77	0.044	US Hedge Fund 67	0.037
US Hedge Fund 72	0.075	EU Hedge Fund 8	0.097	EU Hedge Fund 11	0.044	EU Hedge Fund 10	0.037
US Hedge Fund 34	0.073	US Hedge Fund 34	0.096	US Hedge Fund 22	0.043	EU Hedge Fund 32	0.037
US Hedge Fund 13	0.071	EU Hedge Fund 33	0.091	EU Hedge Fund 32	0.043	US Hedge Fund 69	0.036
US Hedge Fund 24	0.069	US Hedge Fund 5	0.091	EU Hedge Fund 13	0.043	US Hedge Fund 5	0.036
US Hedge Fund 1	0.066	US Hedge Fund 24	0.091	US Hedge Fund 69	0.043	US Hedge Fund 22	0.036
US Hedge Fund 75	0.066	US Hedge Fund 62	0.089	US Hedge Fund 38	0.043	US Hedge Fund 24	0.036
US Hedge Fund 74	0.066	US Hedge Fund 40	0.087	US Hedge Fund 48	0.042	US Hedge Fund 63	0.036
US Hedge Fund 65	0.064	US Hedge Fund 63	0.085	US Hedge Fund 63	0.042	US Hedge Fund 60	0.036
US Hedge Fund 40	0.064	US Hedge Fund 69	0.085	US Hedge Fund 60	0.042	US Hedge Fund 38	0.035
US Hedge Fund 62	0.063	US Hedge Fund 60	0.084	US Hedge Fund 4	0.042	US Hedge Fund 11	0.035
EU Hedge Fund 8	0.063	EU Hedge Fund 25	0.082	US Hedge Fund 6	0.042	US Hedge Fund 61	0.035
US Hedge Fund 64	0.063	US Hedge Fund 74	0.081	EU Hedge Fund 25	0.041	US Hedge Fund 78	0.035
US Hedge Fund 69	0.062	US Hedge Fund 61	0.081	US Hedge Fund 37	0.041	US Hedge Fund 74	0.035
US Hedge Fund 63	0.062	US Hedge Fund 75	0.080	US Hedge Fund 61	0.041	EU Hedge Fund 7	0.035
US Hedge Fund 61	0.062	US Hedge Fund 48	0.079	US Hedge Fund 78	0.040	EU Hedge Fund 6	0.035
EU Hedge Fund 37	0.062	US Hedge Fund 78	0.071	EU Hedge Fund 8	0.040	EU Hedge Fund 5	0.035
US Hedge Fund 60	0.061	US Hedge Fund 65	0.066	US Hedge Fund 5	0.039	US Hedge Fund 75	0.035
US Hedge Fund 78	0.059	US Hedge Fund 38	0.065	US Hedge Fund 74	0.039	US Hedge Fund 37	0.034
US Hedge Fund 48	0.059	US Hedge Fund 64	0.064	US Hedge Fund 75	0.039	EU Hedge Fund 25	0.034
EU Hedge Fund 38	0.058	US Hedge Fund 51	0.059	US Hedge Fund 17	0.038	EU Hedge Fund 33	0.034
US Hedge Fund 51	0.057	US Hedge Fund 49	0.059	EU Hedge Fund 38	0.038	EU Hedge Fund 38	0.033
US Hedge Fund 49	0.057	US Hedge Fund 37	0.058	EU Hedge Fund 37	0.037	US Hedge Fund 17	0.033
US Hedge Fund 17	0.056	US Hedge Fund 17	0.056	EU Hedge Fund 33	0.037	EU Hedge Fund 37	0.032
US Hedge Fund 84	0.053	EU Hedge Fund 38	0.054	US Hedge Fund 65	0.035	US Hedge Fund 32	0.032
US Hedge Fund 38	0.053	EU Hedge Fund 37	0.049	US Hedge Fund 64	0.034	US Hedge Fund 65	0.032
US Hedge Fund 37	0.052	US Hedge Fund 84	0.039	US Hedge Fund 84	0.026	US Hedge Fund 64	0.032
US Hedge Fund 79	0.033	US Hedge Fund 79	0.007	US Hedge Fund 32	0.025	US Hedge Fund 84	0.030
EU Hedge Fund 23	0.022	EU Hedge Fund 23	0.005	US Hedge Fund 79	0.022	EU Hedge Fund 23	0.029
EU Hedge Fund 22	0.019	EU Hedge Fund 22	0.000	EU Hedge Fund 23	0.021	EU Hedge Fund 22	0.028
US Hedge Fund 12	0.012	US Hedge Fund 12	-0.001	US Hedge Fund 12	0.021	US Hedge Fund 79	0.026
US Hedge Fund 57	0.008	US Hedge Fund 57	-0.013	EU Hedge Fund 22	0.020	US Hedge Fund 12	0.025
US Hedge Fund 32	0.004	US Hedge Fund 32	-0.018	US Hedge Fund 57	0.014	US Hedge Fund 57	0.024
US Hedge Fund 47	-0.053	US Hedge Fund 47	-0.182	US Hedge Fund 47	-0.016	US Hedge Fund 47	0.003
US Hedge Fund 46	-0.063	US Hedge Fund 46	-0.198	US Hedge Fund 46	-0.018	US Hedge Fund 46	0.003

Source: Compiled by author.

Table FF: Results from the Jensen's alpha– ranked from best to worst (Based on the indices, respectively: During financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
EU Hedge Fund 22	0.156	EU Hedge Fund 22	0.122	EU Hedge Fund 22	0.144	EU Hedge Fund 22	0.116
US Hedge Fund 79	0.146	EU Hedge Fund 23	0.113	EU Hedge Fund 23	0.129	EU Hedge Fund 23	0.106
EU Hedge Fund 23	0.142	US Hedge Fund 79	0.090	EU Hedge Fund 33	0.123	EU Hedge Fund 33	0.103
EU Hedge Fund 33	0.104	US Hedge Fund 84	0.069	US Hedge Fund 79	0.104	US Hedge Fund 79	0.070
US Hedge Fund 84	0.094	EU Hedge Fund 33	0.069	US Hedge Fund 84	0.072	US Hedge Fund 84	0.060
EU Hedge Fund 8	0.079	EU Hedge Fund 8	0.064	EU Hedge Fund 8	0.066	EU Hedge Fund 8	0.057
US Hedge Fund 12	0.062	US Hedge Fund 12	0.051	US Hedge Fund 32	0.064	US Hedge Fund 32	0.051
US Hedge Fund 32	0.057	EU Hedge Fund 30	0.048	US Hedge Fund 12	0.045	US Hedge Fund 12	0.047
US Hedge Fund 71	0.011	EU Hedge Fund 29	0.041	EU Hedge Fund 30	0.038	EU Hedge Fund 21	0.045
US Hedge Fund 70	0.009	US Hedge Fund 32	0.039	US Hedge Fund 71	0.034	EU Hedge Fund 30	0.034
US Hedge Fund 17	0.008	US Hedge Fund 57	0.032	US Hedge Fund 70	0.033	US Hedge Fund 71	0.029
US Hedge Fund 69	0.003	US Hedge Fund 17	0.023	EU Hedge Fund 21	0.027	US Hedge Fund 70	0.027
US Hedge Fund 75	-0.001	US Hedge Fund 69	0.019	EU Hedge Fund 29	0.011	US Hedge Fund 44	0.020
US Hedge Fund 74	-0.001	US Hedge Fund 74	0.017	US Hedge Fund 44	-0.005	EU Hedge Fund 29	0.017
EU Hedge Fund 21	-0.001	US Hedge Fund 75	0.017	US Hedge Fund 69	-0.011	US Hedge Fund 74	0.003
EU Hedge Fund 30	-0.002	US Hedge Fund 48	0.017	US Hedge Fund 57	-0.014	US Hedge Fund 75	0.002
US Hedge Fund 48	-0.004	US Hedge Fund 72	0.015	US Hedge Fund 17	-0.016	US Hedge Fund 69	0.001
US Hedge Fund 57	-0.006	US Hedge Fund 71	0.015	US Hedge Fund 48	-0.021	US Hedge Fund 17	-0.002
US Hedge Fund 72	-0.007	EU Hedge Fund 21	0.014	US Hedge Fund 74	-0.024	US Hedge Fund 57	-0.005
EU Hedge Fund 29	-0.016	US Hedge Fund 70	0.013	US Hedge Fund 75	-0.025	EU Hedge Fund 25	-0.009
US Hedge Fund 38	-0.026	US Hedge Fund 30	0.006	US Hedge Fund 72	-0.026	US Hedge Fund 48	-0.011
US Hedge Fund 37	-0.026	US Hedge Fund 18	0.003	EU Hedge Fund 25	-0.031	US Hedge Fund 72	-0.012
US Hedge Fund 18	-0.026	US Hedge Fund 38	0.003	US Hedge Fund 68	-0.040	US Hedge Fund 61	-0.018
US Hedge Fund 61	-0.027	US Hedge Fund 37	0.002	US Hedge Fund 61	-0.041	US Hedge Fund 62	-0.018
US Hedge Fund 62	-0.028	US Hedge Fund 61	-0.001	US Hedge Fund 30	-0.043	US Hedge Fund 60	-0.019
US Hedge Fund 60	-0.030	US Hedge Fund 51	-0.003	US Hedge Fund 62	-0.044	US Hedge Fund 63	-0.019
US Hedge Fund 63	-0.031	US Hedge Fund 49	-0.003	US Hedge Fund 60	-0.044	US Hedge Fund 68	-0.022
US Hedge Fund 30	-0.036	US Hedge Fund 60	-0.004	US Hedge Fund 63	-0.045	US Hedge Fund 30	-0.024
EU Hedge Fund 25	-0.040	US Hedge Fund 63	-0.004	US Hedge Fund 18	-0.048	EU Hedge Fund 31	-0.028
US Hedge Fund 3	-0.042	US Hedge Fund 62	-0.004	US Hedge Fund 51	-0.055	EU Hedge Fund 36	-0.029
US Hedge Fund 44	-0.046	US Hedge Fund 3	-0.006	US Hedge Fund 49	-0.056	EU Hedge Fund 34	-0.031
US Hedge Fund 51	-0.047	US Hedge Fund 13	-0.007	US Hedge Fund 38	-0.057	EU Hedge Fund 35	-0.031
US Hedge Fund 49	-0.047	US Hedge Fund 1	-0.008	US Hedge Fund 37	-0.057	US Hedge Fund 18	-0.032
US Hedge Fund 13	-0.047	EU Hedge Fund 12	-0.008	EU Hedge Fund 31	-0.060	US Hedge Fund 51	-0.033
EU Hedge Fund 31	-0.049	US Hedge Fund 65	-0.008	US Hedge Fund 3	-0.064	US Hedge Fund 38	-0.033
US Hedge Fund 1	-0.051	EU Hedge Fund 25	-0.010	US Hedge Fund 13	-0.065	US Hedge Fund 37	-0.033
US Hedge Fund 65	-0.053	US Hedge Fund 64	-0.010	EU Hedge Fund 36	-0.066	US Hedge Fund 49	-0.033
EU Hedge Fund 38	-0.054	EU Hedge Fund 31	-0.010	EU Hedge Fund 13	-0.068	EU Hedge Fund 13	-0.035
US Hedge Fund 77	-0.055	US Hedge Fund 2	-0.011	EU Hedge Fund 35	-0.069	US Hedge Fund 3	-0.036
US Hedge Fund 40	-0.055	US Hedge Fund 77	-0.011	EU Hedge Fund 34	-0.070	US Hedge Fund 73	-0.037
US Hedge Fund 68	-0.055	US Hedge Fund 4	-0.012	US Hedge Fund 40	-0.070	EU Hedge Fund 11	-0.038
US Hedge Fund 64	-0.056	EU Hedge Fund 13	-0.013	US Hedge Fund 77	-0.071	US Hedge Fund 13	-0.039
US Hedge Fund 4	-0.056	US Hedge Fund 68	-0.013	US Hedge Fund 4	-0.073	US Hedge Fund 14	-0.039
EU Hedge Fund 37	-0.056	EU Hedge Fund 11	-0.013	US Hedge Fund 1	-0.073	US Hedge Fund 15	-0.040
US Hedge Fund 2	-0.057	US Hedge Fund 42	-0.013	EU Hedge Fund 11	-0.073	US Hedge Fund 77	-0.041
EU Hedge Fund 12	-0.057	US Hedge Fund 41	-0.013	US Hedge Fund 73	-0.073	US Hedge Fund 1	-0.042
US Hedge Fund 29	-0.059	US Hedge Fund 43	-0.014	US Hedge Fund 21	-0.076	US Hedge Fund 4	-0.042
US Hedge Fund 21	-0.060	US Hedge Fund 80	-0.016	US Hedge Fund 10	-0.077	EU Hedge Fund 37	-0.042
US Hedge Fund 10	-0.061	US Hedge Fund 29	-0.017	US Hedge Fund 29	-0.078	US Hedge Fund 40	-0.043
US Hedge Fund 35	-0.062	US Hedge Fund 40	-0.017	US Hedge Fund 14	-0.079	EU Hedge Fund 38	-0.043
US Hedge Fund 34	-0.066	EU Hedge Fund 37	-0.017	US Hedge Fund 15	-0.079	US Hedge Fund 23	-0.044
US Hedge Fund 80	-0.066	EU Hedge Fund 38	-0.017	EU Hedge Fund 12	-0.080	EU Hedge Fund 12	-0.045
US Hedge Fund 5	-0.067	US Hedge Fund 10	-0.017	US Hedge Fund 24	-0.081	EU Hedge Fund 32	-0.046
US Hedge Fund 6	-0.070	US Hedge Fund 34	-0.018	EU Hedge Fund 17	-0.081	US Hedge Fund 34	-0.047
US Hedge Fund 33	-0.071	US Hedge Fund 44	-0.018	US Hedge Fund 34	-0.083	US Hedge Fund 29	-0.047
US Hedge Fund 53	-0.073	US Hedge Fund 35	-0.019	US Hedge Fund 2	-0.084	US Hedge Fund 21	-0.047
US Hedge Fund 24	-0.074	US Hedge Fund 33	-0.020	EU Hedge Fund 37	-0.085	US Hedge Fund 81	-0.048
US Hedge Fund 22	-0.076	US Hedge Fund 21	-0.020	US Hedge Fund 65	-0.085	US Hedge Fund 65	-0.048
US Hedge Fund 7	-0.076	US Hedge Fund 5	-0.021	EU Hedge Fund 38	-0.085	US Hedge Fund 24	-0.049
US Hedge Fund 9	-0.076	US Hedge Fund 24	-0.022	US Hedge Fund 5	-0.086	US Hedge Fund 35	-0.049
US Hedge Fund 73	-0.077	US Hedge Fund 53	-0.023	US Hedge Fund 35	-0.086	EU Hedge Fund 17	-0.049
US Hedge Fund 81	-0.079	US Hedge Fund 6	-0.023	EU Hedge Fund 18	-0.086	US Hedge Fund 9	-0.049
EU Hedge Fund 13	-0.079	US Hedge Fund 9	-0.023	US Hedge Fund 42	-0.087	EU Hedge Fund 9	-0.050
US Hedge Fund 8	-0.079	EU Hedge Fund 36	-0.024	US Hedge Fund 6	-0.087	EU Hedge Fund 10	-0.050
EU Hedge Fund 17	-0.080	US Hedge Fund 81	-0.026	EU Hedge Fund 32	-0.087	US Hedge Fund 10	-0.050
US Hedge Fund 43	-0.083	EU Hedge Fund 35	-0.026	US Hedge Fund 41	-0.087	US Hedge Fund 2	-0.051
US Hedge Fund 41	-0.083	EU Hedge Fund 34	-0.026	US Hedge Fund 43	-0.087	US Hedge Fund 64	-0.051
US Hedge Fund 42	-0.083	US Hedge Fund 7	-0.026	US Hedge Fund 53	-0.088	US Hedge Fund 33	-0.051
US Hedge Fund 15	-0.084	EU Hedge Fund 17	-0.027	US Hedge Fund 7	-0.089	US Hedge Fund 7	-0.052
US Hedge Fund 14	-0.084	US Hedge Fund 15	-0.027	US Hedge Fund 64	-0.089	EU Hedge Fund 18	-0.053
EU Hedge Fund 11	-0.086	US Hedge Fund 14	-0.027	EU Hedge Fund 10	-0.089	US Hedge Fund 5	-0.054
EU Hedge Fund 36	-0.086	US Hedge Fund 8	-0.028	EU Hedge Fund 9	-0.089	US Hedge Fund 8	-0.055
US Hedge Fund 66	-0.086	US Hedge Fund 66	-0.028	US Hedge Fund 33	-0.090	US Hedge Fund 53	-0.055
EU Hedge Fund 35	-0.089	EU Hedge Fund 18	-0.029	US Hedge Fund 23	-0.092	US Hedge Fund 6	-0.055

EU Hedge Fund 32	-0.090	US Hedge Fund 73	-0.029	US Hedge Fund 8	-0.092	EU Hedge Fund 20	-0.057
EU Hedge Fund 34	-0.090	US Hedge Fund 22	-0.030	EU Hedge Fund 20	-0.093	US Hedge Fund 80	-0.058
EU Hedge Fund 18	-0.090	EU Hedge Fund 32	-0.031	US Hedge Fund 9	-0.093	US Hedge Fund 78	-0.061
US Hedge Fund 45	-0.091	US Hedge Fund 45	-0.031	US Hedge Fund 80	-0.093	US Hedge Fund 22	-0.061
EU Hedge Fund 20	-0.092	EU Hedge Fund 20	-0.032	US Hedge Fund 81	-0.097	US Hedge Fund 20	-0.066
US Hedge Fund 23	-0.095	EU Hedge Fund 9	-0.034	US Hedge Fund 78	-0.102	US Hedge Fund 19	-0.066
US Hedge Fund 78	-0.099	EU Hedge Fund 10	-0.035	US Hedge Fund 22	-0.103	US Hedge Fund 58	-0.066
EU Hedge Fund 9	-0.100	US Hedge Fund 23	-0.035	EU Hedge Fund 19	-0.106	EU Hedge Fund 19	-0.067
EU Hedge Fund 10	-0.101	US Hedge Fund 67	-0.038	US Hedge Fund 67	-0.110	US Hedge Fund 42	-0.067
US Hedge Fund 52	-0.104	US Hedge Fund 78	-0.038	US Hedge Fund 20	-0.113	US Hedge Fund 43	-0.067
US Hedge Fund 50	-0.106	US Hedge Fund 52	-0.041	US Hedge Fund 19	-0.114	US Hedge Fund 41	-0.068
US Hedge Fund 16	-0.110	US Hedge Fund 50	-0.042	US Hedge Fund 66	-0.114	EU Hedge Fund 5	-0.068
US Hedge Fund 67	-0.111	EU Hedge Fund 19	-0.043	US Hedge Fund 50	-0.117	EU Hedge Fund 1	-0.069
US Hedge Fund 20	-0.113	US Hedge Fund 16	-0.044	EU Hedge Fund 5	-0.119	EU Hedge Fund 7	-0.069
US Hedge Fund 19	-0.116	US Hedge Fund 20	-0.045	EU Hedge Fund 7	-0.120	US Hedge Fund 66	-0.069
EU Hedge Fund 19	-0.117	US Hedge Fund 19	-0.045	US Hedge Fund 45	-0.120	EU Hedge Fund 6	-0.069
US Hedge Fund 56	-0.121	EU Hedge Fund 5	-0.049	EU Hedge Fund 6	-0.121	EU Hedge Fund 28	-0.070
EU Hedge Fund 5	-0.126	EU Hedge Fund 7	-0.051	US Hedge Fund 16	-0.123	EU Hedge Fund 2	-0.071
US Hedge Fund 54	-0.127	EU Hedge Fund 6	-0.051	EU Hedge Fund 1	-0.123	US Hedge Fund 67	-0.073
EU Hedge Fund 7	-0.128	US Hedge Fund 54	-0.052	US Hedge Fund 52	-0.125	EU Hedge Fund 26	-0.073
EU Hedge Fund 6	-0.129	US Hedge Fund 56	-0.053	EU Hedge Fund 2	-0.126	US Hedge Fund 50	-0.075
EU Hedge Fund 28	-0.136	EU Hedge Fund 28	-0.057	EU Hedge Fund 28	-0.132	EU Hedge Fund 27	-0.075
US Hedge Fund 55	-0.137	EU Hedge Fund 26	-0.060	US Hedge Fund 54	-0.135	US Hedge Fund 16	-0.076
EU Hedge Fund 26	-0.141	EU Hedge Fund 1	-0.061	EU Hedge Fund 26	-0.136	US Hedge Fund 45	-0.077
EU Hedge Fund 27	-0.146	US Hedge Fund 55	-0.062	EU Hedge Fund 27	-0.139	US Hedge Fund 52	-0.082
US Hedge Fund 25	-0.153	EU Hedge Fund 2	-0.063	US Hedge Fund 55	-0.142	US Hedge Fund 54	-0.088
EU Hedge Fund 1	-0.155	EU Hedge Fund 27	-0.063	US Hedge Fund 56	-0.149	US Hedge Fund 55	-0.092
EU Hedge Fund 2	-0.157	US Hedge Fund 76	-0.076	US Hedge Fund 58	-0.156	US Hedge Fund 36	-0.094
US Hedge Fund 76	-0.162	US Hedge Fund 82	-0.077	US Hedge Fund 25	-0.160	US Hedge Fund 31	-0.097
US Hedge Fund 58	-0.164	US Hedge Fund 83	-0.077	US Hedge Fund 31	-0.162	US Hedge Fund 56	-0.099
US Hedge Fund 82	-0.165	US Hedge Fund 25	-0.080	EU Hedge Fund 24	-0.170	EU Hedge Fund 24	-0.099
US Hedge Fund 83	-0.166	US Hedge Fund 58	-0.084	US Hedge Fund 82	-0.174	US Hedge Fund 25	-0.104
US Hedge Fund 26	-0.170	EU Hedge Fund 24	-0.086	US Hedge Fund 26	-0.175	US Hedge Fund 82	-0.104
US Hedge Fund 27	-0.171	US Hedge Fund 31	-0.087	US Hedge Fund 83	-0.175	US Hedge Fund 83	-0.105
US Hedge Fund 28	-0.176	US Hedge Fund 27	-0.088	US Hedge Fund 27	-0.176	US Hedge Fund 26	-0.114
US Hedge Fund 31	-0.179	US Hedge Fund 26	-0.088	US Hedge Fund 28	-0.180	US Hedge Fund 27	-0.115
EU Hedge Fund 24	-0.188	US Hedge Fund 28	-0.091	US Hedge Fund 36	-0.192	US Hedge Fund 11	-0.116
US Hedge Fund 36	-0.193	US Hedge Fund 36	-0.096	US Hedge Fund 76	-0.203	US Hedge Fund 28	-0.116
US Hedge Fund 11	-0.203	US Hedge Fund 11	-0.101	US Hedge Fund 11	-0.204	US Hedge Fund 76	-0.135
EU Hedge Fund 14	-0.257	EU Hedge Fund 14	-0.117	EU Hedge Fund 16	-0.243	US Hedge Fund 59	-0.152
EU Hedge Fund 15	-0.257	EU Hedge Fund 15	-0.117	EU Hedge Fund 14	-0.248	US Hedge Fund 39	-0.157
EU Hedge Fund 16	-0.261	EU Hedge Fund 16	-0.119	EU Hedge Fund 15	-0.248	EU Hedge Fund 16	-0.169
US Hedge Fund 39	-0.277	US Hedge Fund 59	-0.132	US Hedge Fund 59	-0.250	EU Hedge Fund 15	-0.169
US Hedge Fund 47	-0.278	US Hedge Fund 46	-0.161	US Hedge Fund 47	-0.252	EU Hedge Fund 14	-0.169
US Hedge Fund 46	-0.279	US Hedge Fund 47	-0.161	US Hedge Fund 46	-0.253	US Hedge Fund 47	-0.177
US Hedge Fund 59	-0.285	US Hedge Fund 39	-0.170	US Hedge Fund 39	-0.262	US Hedge Fund 46	-0.177
EU Hedge Fund 4	-0.401	EU Hedge Fund 4	-0.191	EU Hedge Fund 4	-0.356	EU Hedge Fund 4	-0.247
EU Hedge Fund 3	-0.419	EU Hedge Fund 3	-0.198	EU Hedge Fund 3	-0.372	EU Hedge Fund 3	-0.256

Source: Compiled by author.

Table GG: Results from the Jensen's alpha– ranked from best to worst (Based on the indices, respectively: Post-financial crisis period)

CAC 40		DAX		S&P 500		Dow Jones	
Name	Estimate	Name	Estimate	Name	Estimate	Name	Estimate
US Hedge Fund 44	0.325	US Hedge Fund 44	0.218	US Hedge Fund 44	0.244	US Hedge Fund 44	0.189
EU Hedge Fund 33	0.151	US Hedge Fund 12	0.099	US Hedge Fund 79	0.108	EU Hedge Fund 4	0.153
US Hedge Fund 12	0.139	US Hedge Fund 84	0.074	US Hedge Fund 84	0.103	EU Hedge Fund 3	0.149
US Hedge Fund 84	0.128	US Hedge Fund 57	0.067	US Hedge Fund 12	0.096	EU Hedge Fund 24	0.094
US Hedge Fund 79	0.039	EU Hedge Fund 33	0.066	EU Hedge Fund 4	0.094	US Hedge Fund 79	0.090
US Hedge Fund 57	0.037	US Hedge Fund 40	0.039	EU Hedge Fund 3	0.091	US Hedge Fund 84	0.069
EU Hedge Fund 11	0.032	EU Hedge Fund 27	0.027	EU Hedge Fund 24	0.055	US Hedge Fund 12	0.068
US Hedge Fund 40	0.028	US Hedge Fund 28	0.027	US Hedge Fund 57	0.038	EU Hedge Fund 1	0.051
US Hedge Fund 28	0.016	EU Hedge Fund 28	0.026	EU Hedge Fund 1	0.032	EU Hedge Fund 2	0.050
EU Hedge Fund 8	0.000	EU Hedge Fund 26	0.026	EU Hedge Fund 2	0.032	EU Hedge Fund 12	0.049
EU Hedge Fund 13	-0.005	EU Hedge Fund 8	0.023	EU Hedge Fund 12	0.030	EU Hedge Fund 19	0.042
US Hedge Fund 69	-0.012	EU Hedge Fund 36	0.019	EU Hedge Fund 19	0.026	EU Hedge Fund 31	0.039
US Hedge Fund 45	-0.016	EU Hedge Fund 35	0.019	EU Hedge Fund 16	0.025	EU Hedge Fund 16	0.038
US Hedge Fund 72	-0.023	EU Hedge Fund 34	0.019	EU Hedge Fund 15	0.025	EU Hedge Fund 15	0.038
US Hedge Fund 17	-0.025	US Hedge Fund 69	0.017	EU Hedge Fund 31	0.024	EU Hedge Fund 32	0.037
US Hedge Fund 3	-0.026	EU Hedge Fund 37	0.016	EU Hedge Fund 32	0.024	EU Hedge Fund 30	0.037
EU Hedge Fund 35	-0.027	EU Hedge Fund 38	0.014	EU Hedge Fund 14	0.024	EU Hedge Fund 22	0.037
EU Hedge Fund 36	-0.027	EU Hedge Fund 11	0.013	EU Hedge Fund 5	0.023	EU Hedge Fund 20	0.036
EU Hedge Fund 34	-0.027	US Hedge Fund 72	0.012	EU Hedge Fund 7	0.023	EU Hedge Fund 29	0.036
EU Hedge Fund 37	-0.033	US Hedge Fund 3	0.011	EU Hedge Fund 22	0.023	EU Hedge Fund 5	0.036
US Hedge Fund 46	-0.037	US Hedge Fund 17	0.010	EU Hedge Fund 6	0.022	EU Hedge Fund 7	0.036
US Hedge Fund 47	-0.037	US Hedge Fund 61	0.008	EU Hedge Fund 20	0.022	EU Hedge Fund 14	0.036
US Hedge Fund 38	-0.040	US Hedge Fund 24	0.008	EU Hedge Fund 23	0.021	EU Hedge Fund 6	0.036
EU Hedge Fund 21	-0.041	EU Hedge Fund 13	0.007	EU Hedge Fund 30	0.021	EU Hedge Fund 23	0.035
US Hedge Fund 13	-0.042	US Hedge Fund 60	0.007	EU Hedge Fund 18	0.021	EU Hedge Fund 18	0.035
US Hedge Fund 37	-0.042	US Hedge Fund 63	0.007	EU Hedge Fund 29	0.021	EU Hedge Fund 25	0.033
US Hedge Fund 48	-0.043	US Hedge Fund 62	0.006	EU Hedge Fund 25	0.020	EU Hedge Fund 17	0.033
US Hedge Fund 61	-0.044	EU Hedge Fund 18	0.005	EU Hedge Fund 26	0.020	EU Hedge Fund 26	0.032
EU Hedge Fund 38	-0.045	EU Hedge Fund 17	0.005	EU Hedge Fund 28	0.020	EU Hedge Fund 28	0.032
US Hedge Fund 60	-0.047	US Hedge Fund 45	0.003	EU Hedge Fund 17	0.020	US Hedge Fund 57	0.030
US Hedge Fund 63	-0.047	US Hedge Fund 13	0.003	EU Hedge Fund 9	0.019	EU Hedge Fund 27	0.030
US Hedge Fund 24	-0.048	EU Hedge Fund 20	0.002	EU Hedge Fund 27	0.019	EU Hedge Fund 9	0.030
EU Hedge Fund 27	-0.053	EU Hedge Fund 21	0.002	EU Hedge Fund 10	0.018	EU Hedge Fund 21	0.029
US Hedge Fund 62	-0.054	EU Hedge Fund 23	0.001	EU Hedge Fund 21	0.018	EU Hedge Fund 10	0.029
EU Hedge Fund 28	-0.056	EU Hedge Fund 10	0.000	EU Hedge Fund 34	0.016	EU Hedge Fund 36	0.024
EU Hedge Fund 26	-0.056	EU Hedge Fund 25	0.000	EU Hedge Fund 36	0.016	EU Hedge Fund 34	0.024
US Hedge Fund 29	-0.056	US Hedge Fund 37	-0.001	EU Hedge Fund 35	0.016	EU Hedge Fund 35	0.024
US Hedge Fund 73	-0.057	US Hedge Fund 38	-0.001	EU Hedge Fund 38	0.015	EU Hedge Fund 38	0.022
US Hedge Fund 11	-0.057	EU Hedge Fund 22	-0.001	EU Hedge Fund 37	0.013	EU Hedge Fund 37	0.017
US Hedge Fund 7	-0.059	EU Hedge Fund 9	-0.001	US Hedge Fund 40	0.011	US Hedge Fund 40	0.014
US Hedge Fund 8	-0.059	EU Hedge Fund 12	-0.002	EU Hedge Fund 8	0.005	EU Hedge Fund 8	0.008
US Hedge Fund 49	-0.059	US Hedge Fund 79	-0.002	EU Hedge Fund 13	0.005	US Hedge Fund 28	0.006
US Hedge Fund 51	-0.059	US Hedge Fund 48	-0.002	US Hedge Fund 28	-0.001	EU Hedge Fund 13	0.003
US Hedge Fund 65	-0.061	EU Hedge Fund 30	-0.003	EU Hedge Fund 11	-0.001	EU Hedge Fund 11	-0.007
US Hedge Fund 5	-0.062	EU Hedge Fund 31	-0.005	EU Hedge Fund 33	-0.015	US Hedge Fund 69	-0.017
US Hedge Fund 2	-0.063	EU Hedge Fund 29	-0.007	US Hedge Fund 69	-0.033	US Hedge Fund 72	-0.021
US Hedge Fund 80	-0.065	EU Hedge Fund 14	-0.007	US Hedge Fund 72	-0.038	US Hedge Fund 45	-0.024
US Hedge Fund 34	-0.066	US Hedge Fund 73	-0.008	US Hedge Fund 61	-0.042	US Hedge Fund 17	-0.024
US Hedge Fund 53	-0.068	EU Hedge Fund 15	-0.009	US Hedge Fund 60	-0.043	US Hedge Fund 61	-0.024
US Hedge Fund 75	-0.068	US Hedge Fund 5	-0.009	US Hedge Fund 63	-0.044	EU Hedge Fund 33	-0.025
US Hedge Fund 74	-0.068	EU Hedge Fund 16	-0.010	US Hedge Fund 3	-0.045	US Hedge Fund 60	-0.025
EU Hedge Fund 10	-0.068	EU Hedge Fund 6	-0.010	US Hedge Fund 45	-0.045	US Hedge Fund 3	-0.026
EU Hedge Fund 9	-0.071	US Hedge Fund 29	-0.010	US Hedge Fund 17	-0.045	US Hedge Fund 63	-0.026
US Hedge Fund 54	-0.072	US Hedge Fund 46	-0.010	US Hedge Fund 62	-0.048	US Hedge Fund 62	-0.028
US Hedge Fund 6	-0.075	US Hedge Fund 47	-0.010	US Hedge Fund 38	-0.054	US Hedge Fund 38	-0.033
US Hedge Fund 1	-0.077	EU Hedge Fund 7	-0.011	US Hedge Fund 37	-0.056	US Hedge Fund 37	-0.033
US Hedge Fund 64	-0.077	EU Hedge Fund 5	-0.011	US Hedge Fund 48	-0.061	US Hedge Fund 48	-0.037
US Hedge Fund 58	-0.077	EU Hedge Fund 32	-0.011	US Hedge Fund 13	-0.064	US Hedge Fund 13	-0.040
US Hedge Fund 14	-0.078	US Hedge Fund 49	-0.011	US Hedge Fund 65	-0.070	US Hedge Fund 65	-0.043
US Hedge Fund 52	-0.079	US Hedge Fund 51	-0.011	US Hedge Fund 5	-0.075	US Hedge Fund 46	-0.045
US Hedge Fund 30	-0.079	US Hedge Fund 53	-0.012	US Hedge Fund 46	-0.075	US Hedge Fund 47	-0.045
US Hedge Fund 15	-0.079	US Hedge Fund 2	-0.013	US Hedge Fund 47	-0.075	US Hedge Fund 24	-0.046
US Hedge Fund 22	-0.081	US Hedge Fund 74	-0.013	US Hedge Fund 29	-0.076	US Hedge Fund 29	-0.048
EU Hedge Fund 30	-0.081	US Hedge Fund 75	-0.013	US Hedge Fund 73	-0.077	US Hedge Fund 5	-0.048
US Hedge Fund 66	-0.082	US Hedge Fund 8	-0.013	US Hedge Fund 24	-0.077	US Hedge Fund 49	-0.049
EU Hedge Fund 17	-0.082	US Hedge Fund 7	-0.013	US Hedge Fund 34	-0.078	US Hedge Fund 51	-0.049
EU Hedge Fund 25	-0.083	US Hedge Fund 54	-0.013	US Hedge Fund 7	-0.078	US Hedge Fund 73	-0.049
EU Hedge Fund 29	-0.084	US Hedge Fund 34	-0.013	US Hedge Fund 8	-0.079	US Hedge Fund 34	-0.049
EU Hedge Fund 18	-0.084	US Hedge Fund 80	-0.014	US Hedge Fund 49	-0.079	US Hedge Fund 7	-0.051
US Hedge Fund 9	-0.085	US Hedge Fund 30	-0.015	US Hedge Fund 51	-0.079	US Hedge Fund 8	-0.051
US Hedge Fund 21	-0.085	US Hedge Fund 1	-0.015	US Hedge Fund 53	-0.081	US Hedge Fund 64	-0.052
US Hedge Fund 33	-0.086	EU Hedge Fund 19	-0.015	US Hedge Fund 64	-0.083	US Hedge Fund 53	-0.052
EU Hedge Fund 14	-0.087	US Hedge Fund 6	-0.016	US Hedge Fund 54	-0.084	US Hedge Fund 74	-0.053
EU Hedge Fund 6	-0.088	US Hedge Fund 52	-0.018	US Hedge Fund 14	-0.084	US Hedge Fund 75	-0.053

EU Hedge Fund 7	-0.089	US Hedge Fund 18	-0.020	US Hedge Fund 15	-0.085	US Hedge Fund 14	-0.054
EU Hedge Fund 5	-0.089	EU Hedge Fund 2	-0.022	US Hedge Fund 2	-0.085	US Hedge Fund 54	-0.054
US Hedge Fund 18	-0.091	US Hedge Fund 66	-0.022	US Hedge Fund 74	-0.086	US Hedge Fund 15	-0.054
EU Hedge Fund 20	-0.092	US Hedge Fund 33	-0.023	US Hedge Fund 75	-0.086	US Hedge Fund 2	-0.055
US Hedge Fund 25	-0.093	EU Hedge Fund 1	-0.024	US Hedge Fund 22	-0.086	US Hedge Fund 6	-0.056
EU Hedge Fund 23	-0.093	US Hedge Fund 65	-0.024	US Hedge Fund 6	-0.086	US Hedge Fund 80	-0.056
US Hedge Fund 26	-0.093	US Hedge Fund 25	-0.025	US Hedge Fund 80	-0.087	US Hedge Fund 22	-0.057
US Hedge Fund 27	-0.096	US Hedge Fund 26	-0.026	US Hedge Fund 30	-0.092	US Hedge Fund 30	-0.059
EU Hedge Fund 15	-0.096	US Hedge Fund 77	-0.026	US Hedge Fund 52	-0.093	US Hedge Fund 52	-0.061
EU Hedge Fund 16	-0.097	US Hedge Fund 27	-0.026	US Hedge Fund 33	-0.096	US Hedge Fund 66	-0.062
EU Hedge Fund 22	-0.100	US Hedge Fund 21	-0.026	US Hedge Fund 1	-0.097	US Hedge Fund 33	-0.063
US Hedge Fund 77	-0.102	US Hedge Fund 14	-0.029	US Hedge Fund 66	-0.098	US Hedge Fund 1	-0.064
EU Hedge Fund 31	-0.104	US Hedge Fund 22	-0.029	US Hedge Fund 21	-0.103	US Hedge Fund 21	-0.067
US Hedge Fund 23	-0.104	US Hedge Fund 15	-0.030	US Hedge Fund 18	-0.104	US Hedge Fund 18	-0.067
EU Hedge Fund 32	-0.108	US Hedge Fund 4	-0.030	US Hedge Fund 67	-0.112	US Hedge Fund 58	-0.068
US Hedge Fund 4	-0.111	US Hedge Fund 64	-0.033	US Hedge Fund 9	-0.113	US Hedge Fund 11	-0.069
US Hedge Fund 55	-0.111	US Hedge Fund 9	-0.034	US Hedge Fund 77	-0.114	US Hedge Fund 9	-0.071
US Hedge Fund 10	-0.119	US Hedge Fund 10	-0.035	US Hedge Fund 11	-0.117	US Hedge Fund 67	-0.071
US Hedge Fund 56	-0.120	US Hedge Fund 55	-0.036	US Hedge Fund 58	-0.121	US Hedge Fund 77	-0.074
US Hedge Fund 76	-0.124	US Hedge Fund 67	-0.038	US Hedge Fund 4	-0.123	US Hedge Fund 4	-0.080
EU Hedge Fund 19	-0.125	US Hedge Fund 19	-0.039	US Hedge Fund 55	-0.125	US Hedge Fund 16	-0.081
US Hedge Fund 16	-0.126	EU Hedge Fund 24	-0.040	US Hedge Fund 16	-0.127	US Hedge Fund 55	-0.084
US Hedge Fund 67	-0.130	US Hedge Fund 56	-0.040	US Hedge Fund 23	-0.129	US Hedge Fund 23	-0.084
US Hedge Fund 19	-0.133	US Hedge Fund 76	-0.043	US Hedge Fund 10	-0.132	US Hedge Fund 56	-0.089
US Hedge Fund 20	-0.134	US Hedge Fund 50	-0.046	US Hedge Fund 56	-0.132	US Hedge Fund 50	-0.092
EU Hedge Fund 12	-0.136	US Hedge Fund 20	-0.046	US Hedge Fund 50	-0.135	US Hedge Fund 10	-0.093
US Hedge Fund 50	-0.138	US Hedge Fund 16	-0.048	US Hedge Fund 20	-0.138	US Hedge Fund 25	-0.093
US Hedge Fund 82	-0.138	US Hedge Fund 23	-0.049	US Hedge Fund 19	-0.139	US Hedge Fund 26	-0.094
US Hedge Fund 83	-0.139	US Hedge Fund 82	-0.050	US Hedge Fund 76	-0.141	US Hedge Fund 76	-0.095
US Hedge Fund 81	-0.151	US Hedge Fund 83	-0.051	US Hedge Fund 26	-0.143	US Hedge Fund 27	-0.095
EU Hedge Fund 2	-0.158	US Hedge Fund 11	-0.051	US Hedge Fund 25	-0.143	US Hedge Fund 20	-0.096
EU Hedge Fund 1	-0.159	US Hedge Fund 35	-0.054	US Hedge Fund 82	-0.144	US Hedge Fund 19	-0.096
US Hedge Fund 35	-0.162	US Hedge Fund 32	-0.057	US Hedge Fund 27	-0.145	US Hedge Fund 82	-0.098
US Hedge Fund 78	-0.165	US Hedge Fund 81	-0.059	US Hedge Fund 83	-0.146	US Hedge Fund 83	-0.099
US Hedge Fund 32	-0.181	US Hedge Fund 31	-0.069	US Hedge Fund 35	-0.160	US Hedge Fund 78	-0.108
US Hedge Fund 31	-0.198	US Hedge Fund 78	-0.071	US Hedge Fund 78	-0.160	US Hedge Fund 35	-0.109
US Hedge Fund 36	-0.274	US Hedge Fund 58	-0.074	US Hedge Fund 81	-0.170	US Hedge Fund 81	-0.115
EU Hedge Fund 24	-0.284	US Hedge Fund 39	-0.122	US Hedge Fund 31	-0.221	US Hedge Fund 31	-0.156
US Hedge Fund 59	-0.290	US Hedge Fund 42	-0.127	US Hedge Fund 32	-0.271	US Hedge Fund 32	-0.171
US Hedge Fund 42	-0.294	US Hedge Fund 43	-0.128	US Hedge Fund 42	-0.280	US Hedge Fund 42	-0.189
US Hedge Fund 43	-0.296	US Hedge Fund 41	-0.129	US Hedge Fund 43	-0.282	US Hedge Fund 43	-0.190
US Hedge Fund 41	-0.301	EU Hedge Fund 3	-0.129	US Hedge Fund 59	-0.282	US Hedge Fund 59	-0.193
US Hedge Fund 39	-0.307	EU Hedge Fund 4	-0.134	US Hedge Fund 41	-0.288	US Hedge Fund 41	-0.194
US Hedge Fund 70	-0.332	US Hedge Fund 59	-0.139	US Hedge Fund 70	-0.293	US Hedge Fund 36	-0.202
US Hedge Fund 71	-0.334	US Hedge Fund 36	-0.165	US Hedge Fund 71	-0.295	US Hedge Fund 70	-0.206
EU Hedge Fund 3	-0.475	US Hedge Fund 70	-0.184	US Hedge Fund 39	-0.301	US Hedge Fund 71	-0.207
EU Hedge Fund 4	-0.495	US Hedge Fund 71	-0.186	US Hedge Fund 36	-0.302	US Hedge Fund 39	-0.211
US Hedge Fund 68	-0.522	US Hedge Fund 68	-0.225	US Hedge Fund 68	-0.395	US Hedge Fund 68	-0.293

Source: Compiled by author.

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English language editing

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12 April 2014

To whom it may concern

This is to confirm that I, the undersigned, have language edited the completed research of Wilhelmine Helena Brand for the Magister Commercii in Risk Management thesis entitled: *The evaluation of US and European hedge funds and associated international markets: a risk – performance measure approach.*

The responsibility of implementing the recommended language changes rests with the author of the thesis.

Yours truly,

A handwritten signature in black ink, appearing to read 'L. Scott', with a stylized, cursive script.

Linda Scott