

ISFA STANDARD

Table of Contents

1	Part	2
1.1	Introduction	2
1.2	Overview	2
1.3	Definitions	3
1.4	Scope, Objectives, and Advantages of the Standards	4
1.5	Verification	5
1.6	Committee of Experts	5
2	Part	6
2.1	Input data: Recommendations	6
2.2	Recommendation Types	6
2.3	Recommendation Date	7
2.3.1	<i>Recommendation Interpretation</i>	7
2.3.2	<i>Market Recommendations</i>	8
2.4	Benchmarking	8
2.4.1	<i>Benchmark Determination</i>	8
2.4.2	<i>Customised Benchmark</i>	8
2.4.3	<i>Standardised Benchmark</i>	9
2.5	Calculation Methodology	9
2.5.1	<i>Passive Strategy</i>	9
2.5.2	<i>Recommendation Weighting</i>	9
2.5.3	<i>Beta Calculation</i>	10
2.5.4	<i>Rebalancing</i>	11
2.5.5	<i>Foreign Exchange Treatment</i>	11
2.5.6	<i>Cash Treatment</i>	11
2.5.7	<i>Transaction Costs and Taxes</i>	11
2.5.8	<i>Dividends</i>	11
2.5.9	<i>Value Added</i>	11
2.5.10	<i>Market data</i>	12
2.6	Disclosures	12
2.7	Presentation and reporting	12
	Appendix A	14
	Appendix B	15
	Appendix C	19
	Appendix D	22
	Appendix E	28

1 Part

1.1 Introduction

Analysts' stock recommendations are generally published in the form of buy, sell, or neutral recommendations. Contrary to the mandate of a money manager, the mandate of an analyst is often not very precise, and its periodicity not well defined (i.e. the expected frequency of giving the recommendations and assessment of their results). Although the analysts' reports are important tools in the investment decision process, the value added due to their recommendations is rarely measured properly, or systematically.

The proposed procedure places itself in the position of an investor. In the absence of analysts, an investor would have the choice between two passive portfolios:

- a market neutral portfolio, fully invested in cash or short term risk-free bonds,
- a stock index, fully invested in shares,

and all the combinations of these portfolios. From this perspective, the Information Standard for Analysts / Information System for Analysts (ISFA) has the purpose to set common rules to determine in a quantitative way whether the recommendations of the analysts add value or not.

ISFA starts with two passive portfolios, whose composition will be modified according to the recommendations of the analysts. The creation of a standard data entry and coding of the recommendations, with precise definitions of the corresponding operations on the market, enables the user:

- to conduct an internal and/or external analysis of an analyst's performance in comparison with predefined benchmarks,
- to aggregate these recommendations, as and when required, in order to create a universe of recommendations (of forecasts) and to carry out peer group analyses.

The process of measurement is standardised, transparent and fair.

1.2 Overview

Part I starts with some definitions and explains the scope, the objectives and advantages of the standards and explains who determines the standards.

Part II describes the functional methodology of the ISFA model and the standards for publishing results. It explains what data is needed and which benchmarks are used.

1.3 Definitions

Analyst	either an analyst, a group of analysts, or a set of recommendations issued by a group of analysts, which are received systematically.
Analyst portfolio	is the portfolio that deviates from the passive strategy because of the analyst's recommendations.
Analyst universe	the subset of the market analysed by an analyst, i.e. the set of securities on which an analyst issues recommendations.
Benchmark	the passive strategy followed by an investor in absence of an analyst. It can be 100% cash (market neutral portfolio) or 100% stock invested. (See 2.4.1)
Independent auditor	an independent auditor can be either ISFA or a neutral organisation, which is accepted by ISFA (for example also the national societies belonging to the European Federation of Financial Analysts Societies – EFFAS).
ISFA	Information System for Analysts
Market neutral portfolio	a risk-free portfolio
Passive strategy	The portfolio an investor has invested in, in absence of analyst recommendations. (See 2.5.1).
Risk-free rate	1-month LIBOR rate
Stock Index	<p>an index which shows the same style and risk as the corresponding analyst universe. It can be customised (i.e. it contains exactly the securities from the analyst universe) or can be standardised. Its purpose is twofold:</p> <ul style="list-style-type: none">• It can represent the passive strategy• It is used to weight the recommendations

1.4 Scope, Objectives, and Advantages of the Standards

ISFA aspires to be the leading institute of objective performance measurement of buy- and sell-side analysts. In order to compare the recommendations and to be in a position to rank and quantify them in an objective way, ISFA defines a standard on how the performance has to be measured. The standard allows effective comparison of financial analysts' performance and is not country specific. The performance calculated by the ISFA Standard does not consider transaction costs.

The ISFA Standard is transparent and consistent in its approach. However, since all the disclosed performance results are ex-post it does not guarantee an equal performance in future.

The objectives of ISFA are:

- to develop a measurement standard for the performance based on the recommendations given by financial analysts, and to compare them with their benchmark.
- to develop appropriate peer group universes to interpret this performance.
- to disclose the contribution of the analysts' recommendations to the investment decision process.

ISFA creates advantages for the public, the analysts and financial institutes:

Public

- Readers of company research reports benefit from a standardised information system for analysts by having a greater degree of confidence in the analysts' research reports.
- ISFA enables the public to evaluate objectively, methodically and transparently, which institutes or analysts have added value and which have destroyed value.

Analysts

- A standardised measurement system helps an analyst to be independent. This supports his integrity, credibility and reputation.
- The ISFA Standard precisely defines the mandate of the analyst.
- Often, the focus is only on the bad recommendations and the hits are neglected. The measurement of all the recommendations shows a more global picture.

Financial Institutes

- ISFA enables the direct measurement of an analyst's contribution by quantifying the return against a pre-defined benchmark and then comparing these results across analysts.
- ISFA facilitates the performance attribution.
- It is the intention of nationwide regulations to ensure that a financial analyst's reward is not dependent on the success of one or more specific transactions of the investment banking department. Therefore, alternative measurement systems are needed.

1.5 Verification

The primary purpose of verification is to establish that a firm claiming compliance with the ISFA Standard has adhered to the ISFA Standard.

Companies with an interest in publishing its performance figures in compliance with the ISFA Standard are required to ask for verification from an independent auditor. A company that is not verified by an independent auditor cannot claim that it is in compliance with the ISFA Standard.

All the information forwarded to an independent auditor has to be stored with the independent auditor and the measured institute for at least 10 years.

A separate agreement "ISFA - Measurement and Verification" defines the minimum procedures a company must follow when publishing its performance in compliance with the ISFA Standard.

1.6 Committee of Experts

The committee of experts ("CoE") has been formed to update, improve and promote the dissemination and the integrity of the standards. It links academics representatives with practitioners from the industry. A list of its current members is shown in Appendix A.

The members of the CoE are professionals proposed by national and international financial institutions or associations. The participation in the group is voluntary.

2 Part

2.1 Input data: Recommendations

A recommendation is defined by disclosing:

- the recommendation type
- the underlying security
- the recommendation date
- the reference stock index if the interpretation is not formulated in absolute terms
- the interpretation (if absolute, relative, risk-adjusted)
- the time horizon (this is not a compulsory requirement in ISFA)
- the targeted price (this is not a compulsory requirement in ISFA)

It is assumed that a recommendation is issued on a security traded on its main stock exchange and in local currency.

2.2 Recommendation Types

The possible recommendation types (e.g. buy, overperform, underweight, reduce) have to be disclosed, and have to be mapped to the standard types.

Standard Types	Mapped	Mapped	Mapped	Mapped
Strong buy				
Buy	Over-/ Outperform	Overweight	Accumulate	Add
Hold	Neutral		In-Line	
Reduce	Underperform	Underweight		
Sell				

2.3 Recommendation Date

A recommendation will be dated with the date the recommendation is published. Date of publication is either the day the independent auditor receives the recommendation or another date of publication, which can be proved by the measured institute (i.e. recommendation is published via Bloomberg, JCF, IBES, or another data provider accepted by ISFA). In case the recommendation is published before the closing of the respective stock exchange, the closing price of this day is taken. In case the recommendation is published after the closing of the respective stock exchange, the closing price of the following day is taken. Recommendations can be issued with at most daily frequency.

A recommendation has to be confirmed within a maximum interval of 120 days. If the issuing institute does not confirm a recommendation within this period then the underlying security is considered as being no longer covered by the institute anymore and the recommendation is put on hold.

2.3.1 Recommendation Interpretation

A recommendation can be issued in the following contexts:

Absolute terms The recommendation is measured against a market neutral position, i.e. cash.

$E[R_i] = E[\alpha_i] + R_f$ The analyst expects the stock to show an excess return (an alpha) with respect to the risk free interest rate R_f .

Relative terms The recommendation is measured against a pre-defined customised or standardised stock index.

$E[R_i] = E[\alpha_i] + E[R_{Bmk}]$ The analyst expects the stock to show an excess return with respect to the expected stock index return.

Risk-adjusted terms The recommendation is measured against a given stock index considering risk-adjusted returns.

$E[R_i] = E[\alpha_i] + R_f + \beta_i \cdot \{E[R_{Bmk}] - R_f\}$ The analyst expects the stock to show an excess return with respect to the expected risk adjusted stock index return.

Any recommendations issued in relative or risk adjusted terms must specify its corresponding stock index, which can be customised or standardised.

The first two interpretations [absolute and relative terms] are model-independent; the third one [risk-adjusted terms] is based on the CAPM-model. ISFA is able to measure all of the recommendations mentioned above. The applied recommendation interpretation depends on the mandate the analyst receives. A change in the interpretation (e.g. from relative to absolute) is only taken into account as of the beginning of the following measurement period.

2.3.2 Market Recommendations

A “Market recommendation” means a recommendation on the customised stock index. This recommendation is interpreted in absolute terms: a buy/sell recommendation means that the customised stock index is expected to generate positive/negative absolute returns.

2.4 Benchmarking

2.4.1 Benchmark Determination

The benchmark of an analyst can be 1) a market neutral portfolio or 2) a stock index. A stock index can be 2a) customised or 2b) standardised, depending on the mandate the analyst receives.

The weighting of the stocks in the stock index can be:

- **Capital weighted:** The weight of each stock is in proportion to its free float market capitalisation. Correspondingly, each recommendation is weighted in proportion to the security’s weight in the stock index. The idea is that the value added by an analyst is proportional to the market capitalisation of the security.
- **Equally weighted:** In the case of an equally weighted stock index, each security has the same weight. Hence, a recommendation on a security has the same weight. The idea is that the value added by an analyst is the same on a small-cap company as on a company with a large market capitalisation.

While assessing the performance of an analyst, one can give the same weight to all his/her recommendations, or a different weight, based upon the relative stock capitalisation in the stock index that is being used. ISFA calculates both indices, i.e. an equally weighted and a capital weighted index.

The standardised indices are publicly available indices. Most of them are capital weighted.

An appropriate standard index must show the same style and risk as the analyst universe.

2.4.2 Customised Benchmark

By using a customised benchmark (i.e. a customised stock index) the following instructions have to be followed:

- Customised benchmarks must include new securities on a timely and consistent basis.
- Terminated securities must be included in the historical record of the appropriate customised benchmark up to the last day that the security was under analysis.

- Securities must not be switched from one customised benchmark to another unless documented changes in the security's characteristics or the redefinition of the customised benchmarks make it appropriate. The historical record of the security must remain with the appropriate customised benchmark.
- Customised benchmarks may only include securities under analysis.
- In the case of multicurrency indices, the reference benchmark currency has to be specified.

2.4.3 Standardised Benchmark

By using a standardised stock index as benchmark the following instructions have to be followed:

- Recommendations on securities not contained in the corresponding index are not considered.
- Securities contained in the benchmark but not studied by the measured unit are recommended as 'neutral' by default.
- Multi-currency standardised stock indices (i.e. indices containing securities denominated in different currencies) which don't hedge the local currencies against the reference currency of the index are not suitable to be taken as benchmarks for the analyst, because the active positions of the analyst are hedged, but the securities in the benchmark are not. Hence this fact could cause a bias in the measurement of the value added.

2.5 Calculation Methodology

2.5.1 Passive Strategy

The passive strategy (i.e. the benchmark of the analyst) can be either:

- A Market neutral portfolio: a portfolio invested in the risk free asset
- A Stock index: a portfolio fully invested in stocks, i.e. in the risky assets

2.5.2 Recommendation Weighting

The analyst portfolio deviates from the passive strategy because of recommendations. The strengths of the deviation is regulated by the stock index. Let w_i be the weight of the security (i) in the stock index, PV the analyst portfolio value, β_i a parameter which depends on the interpretation of the recommendation, and α_i a parameter which depends on the sign of the recommendation. The positions taken because of the recommendation are:

- Security i: $\lambda \cdot w_i \cdot PV$
- Stock index: $-\lambda \cdot \beta_i \cdot w_i \cdot PV$
- Cash: $\lambda \cdot [\beta_i - 1] \cdot w_i \cdot PV$

where λ is equal to:

		1	strong buy
$\lambda =$	{	0.5	Buy
		0	Hold
		-0.5	Reduce
		-1	Sell

and β_i is equal to:

		Stock beta	RISK-ADJUSTED TERMS
$\beta_i =$	{	1	RELATIVE TERMS
		0	ABSOLUTE TERMS

The active weight taken because of the analyst's recommendation mirrors the weight of the security in the stock index.

For examples see Appendix D.

2.5.3 Beta Calculation

Stock betas are calculated by regressing the weekly excess returns of the security against the weekly excess returns of the stock index. We use 52 observations (1 year of data).

Further, to smoothen the noise in the beta calculation from historical data, since we know that the betas follow approximately a mean reverting pattern, we use the -Blume formula:

$$\beta_{Blume} = \frac{2}{3} \cdot \beta_{hist} + \frac{1}{3} \cdot 1$$

2.5.4 Rebalancing

The active position taken as a consequence of a recommendation is left unchanged (buy-and-hold strategy) until the recommendation changes. In case an equally weighted stock index is chosen as a benchmark, the passive strategy rebalances at each time-step, i.e. daily.

2.5.5 Foreign Exchange Treatment

Recommendations on securities denominated in a currency different to that of the benchmark are interpreted in local currency by default. This means that the active position taken in the foreign currency is hedged against the benchmark currency. The hedge is daily, i.e. the currency of the security is either bought or sold forward against the currency of the benchmark with a time horizon of 1 day and for an amount equal to the initial position in the security. If the position is maintained, the hedge is rolled over.

2.5.6 Cash Treatment

Cash investments are remunerated at the risk-free rate; borrowings are charged with the risk-free rate. For the calculation of costs and cash investments, the 1 month-LIBOR rate is used.

2.5.7 Transaction Costs and Taxes

Transaction costs are not considered, however turnover is calculated (see Appendix B, Report B and Appendix C3). Performance figures are computed before taxes.

The measurement of turnover must not have an impact on the number of recommendations issued by the analyst. The analyst may not be penalised through any measurement tools implemented by a third party. In addition, the turnover calculated by ISFA may be unrealistically high due to the strong bets taken and therefore not the right indicator for the true transaction costs.

2.5.8 Dividends

Dividends are reinvested in the stock index on the ex-date.

When there is an active position on a stock and the stock pays a dividend, the dividend is reinvested in the stock until the position is rebalanced.

2.5.9 Value Added

The Value added of an analyst over a given time-period is equal to the difference between the performance of the analyst portfolio and the performance of the corresponding benchmark.

2.5.10 Market data

All calculations have to be based on market values (not on cost basis). The sources of exchange rate should be the same for the analyst portfolio as well as for the benchmark.

2.6 Disclosures

The disclosures should enable a better understanding of the numbers provided in the presentation. They should bring the presentation in the proper context. Below are listed the minimum requirements; however, more information should be disclosed if this supports the understanding of the performance presentation.

To be compliant with the ISFA Standard each measured unit will be required to disclose the following information accompanied by its calculated performance.

- The definition of “measured unit”. (see Appendix B, Report A).
- A measured unit can be defined as a registered entity or an independently acting entity, subsidiary, or division.
- A definition of the research universe and its subsets including, for each subset, a description and the number of shares (see Appendix B, Report A).
- For each analyst universe with respect to which performance figures are published:
- The interpretation of recommendations and the calculation parameters (rebalancing, etc) used (see Appendix B, Report A and B).
- Any material events, which happened in the period the performance is measured (i.e. a recognised analyst leaves the firm).
- On request the source of market data used to perform the calculations (like free float factors, number of outstanding shares, exchange rates, etc.).

2.7 Presentation and reporting

After having defined the mandate of the analyst including his/her benchmark, determining the necessary disclosures, and calculating the performance according to the rules set above, the measured unit needs to present this information as defined hereafter.

For each analyst universe the following information must be reported:

1. A 5 year performance record of analyst portfolio and corresponding benchmark where possible; if not, since the start of measurement. Moreover, for each calendar year:

- a. Annual value-added (performance for periods of less than one year must not be annualised) (see Appendix B, Report B).
 - b. The number of securities in the corresponding stock index at the end of each period (see Appendix B, Report B).
 - c. The annualised tracking error of the analyst portfolio against the benchmark (see Appendix C4 & Appendix B, Report B). For periods less than one year the tracking error has to be reported over the same period as for the performance figures.
 - d. The information ratio (see Appendix B, Report B).
 - e. The average number of positive, neutral and negative recommendations over all recommendations (see Appendix B, Report B).
 - f. The coverage of the stock index (see Appendix C 1).
 - g. The average number of recommendations per security (see Appendix C 2).
 - h. The turnover ratio (see Appendix C 3).
2. Current year results have to be calculated with a quarterly frequency.
 3. The notes have to include the following (see Appendix B, Report B, Notes):
 - a. Name and description of the measured analyst universe and of the corresponding benchmark.
 - b. The starting date of measurement.
 - c. The analyst universe composition history (for customised stock indices only).
 4. The 5 year annualised compounded benchmark return or from start of being measured and the corresponding annualised compounded analyst portfolio return over the same period.
 5. The benchmark base currency.
 6. The stock index rebalancing style.
 7. The stock index weighting.
 8. The source of market data. Performance results of a past measured unit can only be linked to or used to represent the historical record of a newly measured unit if:
 - a. a change only in the measured unit's ownership or name occurs, or
 - b. the measured unit has all the supporting performance records to calculate the performance, and the recommendation-making process does not change substantially.

Performance results may only include recommendations issued during the measured period and forwarded to an independent auditor.

Appendix A

Prof. Rajna Gibson	University of Zurich, Chair of the Committee
Dr. Giuseppe Benelli	Chief Investment Officer, SwissRe
Prof. Elroy Dimson	London Business School
Dr. Jean-Claude Dufournet	Member of the board, SFAA, Chief Executive Officer, AZEK-CFPI
Dr. Gérard Huber	Head of Quantitative Research, Pictet & Cie
Dr. Werner Hug AWP	
Dr. Stefan Illmer	Head of Performance Measurement & Portfolio Analytics, Credit Suisse Asset Management
Prof. Philippe Jorion	University of California at Irvine
Serge Ledermann	Former President, SFAA, Head of Asset Management, Lombard Odier Darier Hentsch & Cie
Dr. François-Serge Lhabitant	Head of Quantitative Risk Management, Union Bancaire Privée,
Stephan Meier	President, SFAA, Executive Director, UBS Global Asset Management
Pierre Tissot	Head of Research, Lombard Odier Darier Hentsch & Cie

Appendix B

Report A: XYZ Investment Firm

XYZ Investment Firm is defined as an independent investment management firm that is not affiliated with any parent organization.

Universe Covered		Total number of securities with recommendations issued	Stock Index	Weighting (Capital/Equally)	Recommendations (Absolute/Relative/Risk Adjusted)
Sector	Region				
Banks and Financial Services	Europe	23	custom	capital	≠1
Aerospace and Defense	North America	5	MSCI US/Aerospace and defense	equally	≠1
Utilities	Europe	7	custom	N/a	=1
Biotechnology	USA	12	custom	N/a	=0
.....

Report B: XYZ Investment Firm Performance Results

Stock index: *custom Banks and Financials Services Europe*

Passive strategy: *Stock index invested.*

Capital Weighted, Not Rebalanced

January 1, 2000, through March 31, 2003

Value Added

Year/Quarter	2000	2001	2002	1Q.2003	...
Value Added	3.10%	-2.40%	-1.20%	2.30%	...
Benchmark Return	-4.90%	-18.60%	1.80%	-15.50%	...
Tracking Error	4.30%	8.20%	2.30%	3.20%	...
Information Ratio	0.72	-0.29	-0.52	0.72	...

Coverage & Number of Recommendations

Year/Quarter	2000	2001	2002	1Q.2003	...
Number Of Securities	22	24	24	23	...
Coverage %	100%	100%	100%	100%	
Average number of recommendations per security	4.3	6.2	3.1	1.3	...
Turnover	3.4	2.8	5.2	2.1	...

Recommendation Statistics

Year/Quarter	2000	2001	2002	1Q.2003	...
% of Buy and Strong Buy	79%	83%	60%	81%	...
% of Hold	12%	9%	23%	15%	...
% of Reduce and Sell	9%	8%	17%	4%	...

Notes:

9. XYZ Investment Firm "Banks and Financial Services Europe" stock index is a customised stock index that encompasses all the European Banks covered by XYZ.
10. The starting date of measurement is 1st January, 2000.
11. Benchmark: customised.

ISIN	NAME	ENTRY DATE	EXIT DATE
BE0003796134	DEXIA	1.7.01	
CH0012138530	CREDIT SUISSE	1.1.00	
CH0012032030	UBS NAMEN	1.1.00	
DE0008032004	COMMERZBANK	1.1.00	
DE0005140008	DEUTSCHE BANK NAMEN	1.1.00	
DE0008022005	HYPOVEREINSBANK	1.1.00	
ES0114050331	BANCO ZARAGOZANO	1.1.01	
ES0113211835	BBVA	1.1.00	
ES0113900J37	BSCH BCO SANTANDER CENTR	1.1.00	
FR0000131104	BNP PARIBAS	1.1.00	
FR0000184202	CREDIT LYONNAIS	1.1.00	
FR0000130809	SOCIETE GENERALE	1.1.00	
GRS015013006	ALPHA BANK	1.1.00	
GRS006013007	COMMERCIAL BANK GREECE	1.1.00	
GRS003013000	NATIONAL BANK OF GREECE	1.1.00	
IE0000197834	ALLIED IRISH BANKS	1.1.00	
IE0030606259	BANK IRELAND	1.1.00	
IT0001334587	BANCA MONTE PASCHI SIENA	1.1.00	
IT0001254884	BANCA NAZ LAVORO ORD	1.1.00	1.07.02
IT0003121495	CAPITALIA (BANCA ROMA)	1.1.00	
IT0000072618	INTESABCI ORD	1.1.00	
IT0001269361	SAN PAOLO - IMI	1.1.00	
NL0000301109	ABN AMRO HOLDING	1.1.00	
PTBES0AM0007	BANCO ESPIRITO SANTO	1.1.00	

12. Annualised compounded benchmark return from 1 January 2000 to 31 March 2003 is –11.76 percent; the corresponding annualised compounded analyst return over the same period is –11.29 percent.
13. The benchmark base currency is Euro.
14. The stock index is not rebalanced.
15. The stock index is capital weighted
16. The market data is taken from ISFA/MSCI.

Appendix C

1. Coverage

The coverage of a stock index (by an analyst) is defined as the sum of the weight of the securities in the stock index which are covered by the analyst. The weight takes into account the fraction of the period over which the securities are effectively analysed.

Example:

Security 1																				
Security 2																				
Security 3																				
Security 4																				
Security 5																				
	t0					t1			t2											tn

In the above example, if the stock index contains 5 securities and if the straight line represents the time period over which the security is covered, the coverage ratio of the stock index during the time-period going from t0 to tn is calculated as (wi,t is the weight of security i at time t in the stock index):

$$w_{1,t=t_0} \cdot \frac{t_n - t_0}{t_n - t_0} + w_{2,t=t_2} \cdot \frac{t_n - t_2}{t_n - t_0} + w_{3,t=t_0} \cdot \frac{t_1 - t_2}{t_n - t_0} + w_{4,t=t_0} \cdot \frac{t_n - t_0}{t_n - t_0} + w_{5,t=t_1} \cdot \frac{t_n - t_1}{t_n - t_0}$$

Depending on the weights used, the capital weighted or equally weighted coverage is shown.

2. Average number of recommendations per security

If a stock index and time-period are given, the average number of recommendations per security relative to this stock index is defined as the average number of recommendations given on the securities contained in the stock index during the given time-period, divided by the average number of securities contained in the stock index. The initial recommendations are also counted.

A neutral recommendation is counted as a recommendation; if there is no recommendation issued on a security (even if the effect is the same as a neutral recommendation) it is not counted.

Example:

A stock index contains five securities. The average number of recommendations per security for the time-period going from t0 to tn should be calculated. When a new recommendation on a security is issued, it is framed (see picture below); thereafter, it is copied forward (until a new recommendation is issued). The following symbols are used: ++ = strong buy; +=buy; 0=hold; -=reduce; --=sell.

Security 1		++	++	++	++	+	+	+	+	+	-	-	-
Security 2		0	0	0	-	-	-	-	-	-	-	-	-
Security 3		+	+	+	+	+	+	+	+	+	+	+	+
Security 4		-	-	-	-	0	0	0	0	0	0	0	0
Security 5		+	+	+	+	+	+	+	+	+	+	+	+
		t0			t1	t2	t3				t4		tn

There are:

	Number of recommendations
Security 1	3
Security 2	2
Security 3	1
Security 4	2
Security 5	1
TOTAL	9

Hence, the average number of recommendations per security is equal to $9/5=1.8$.

3. Turnover

The turnover of a portfolio measures the percentage of the portfolio that has been changed during a given time-period. It must be stressed that the obtained turnover needs to be applied with care (due to the underlying assumptions in the model) and can become quite big because of the large bets.

The measurement period lasts from t_0 to t_n , PV_0 is the analyst portfolio value at t_0 , E_{i,t_0} is the active position (exposure) of security i at t_0 and $E_{i,t}$ is the change in the active position (exposure) of security i at time t ; then the turnover is:

$$\text{Turnover} = \frac{1}{PV_0} \cdot \sum_{\text{security } i} (E_{i,t_0} + \sum_{t=t_0}^{t_n} \Delta E_{i,t})$$

4. Tracking Error

Tracking error is the standard deviation of the difference between the returns of the benchmark and the analyst portfolio.

$R_{P,t}$ is the portfolio and $R_{B,t}$ the benchmark return on day t . For each day the difference $R_t = R_{P,t} - R_{B,t}$ is calculated and the standard deviation is computed $=\text{stdev}(R_t)$ over the specified time-period (t_i to t_f). This is the daily tracking error measured over the period from initial date t_i to final date t_f .

This daily tracking error is then transformed into a $(t_f - t_i)$ tracking error $\hat{\sigma}$ using the formula $\hat{\sigma} = \sigma \cdot \sqrt{(t_f - t_i)}$, so that it can be compared to the excess return.

Appendix D

In the following examples the stock index is equally weighted and contains 5 securities [each security weights 20%]. For illustration purposes the initial value at t=0 is scaled to 100. The initial positions of the stock index in the single securities are as follows:

	Security 1	Security 2	Security 3	Security 4	Security 5	TOTAL
Invested amount	20	20	20	20	20	100

Depending on the analyst's recommendations, the passive strategy and the interpretation of the recommendations, the initial positions of the analyst portfolio are calculated, i.e. of the active portfolio. The analyst portfolio value is also indexed to an initial value of 100.

Example 1:

All analyst recommendations are neutral.

Solution 1:

If the passive strategy is 'market neutral' the analyst portfolio has following positions:

	Stock Index	Cash	TOTAL
Invested amount	0	100	100

If the passive strategy is 'stock index' the analyst portfolio has following positions:

	Stock Index	Cash	TOTAL
Invested amount	100	0	100

which is equal to the following position on the single securities:

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	20	20	20	20	20	0	100

Example 2:

The analyst issues a 'strong buy' recommendation on security 1 (all other being neutral). Assume that security 1's beta is 1.5.

Solution 2:

Below the analyst portfolio's positions are shown in different contexts:

A1) Passive strategy=stock index, $\beta=0$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	100	-20	100

A2) Passive strategy= stock index, $\beta=1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	80	0	100

A3) Passive strategy= stock index, $\beta \neq 1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	70	10	100

B1) Passive strategy=market neutral portfolio, $\beta=0$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	0	80	100

B2) Passive strategy= market neutral portfolio, $\beta=1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	-20	100	100

B3) Passive strategy= market neutral portfolio, $\beta \neq 1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	-30	110	100

Solution 2':

Instead of displaying the column 'Stock Index' the positions of the single securities are calculated:

A1) Passive strategy= stock index, $\beta = 0$

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	40	20	20	20	20	-20	100

A2) Passive strategy= stock index, $\beta = 1$

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	36	16	16	16	16	0	100

A3) Passive strategy= stock index, $\beta \neq 1$

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	34	14	14	14	14	10	100

B1) Passive strategy=market neutral portfolio, $\beta = 0$

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	20	0	0	0	0	80	100

B2) Passive strategy= market neutral portfolio, $\beta = 1$

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	16	-4	-4	-4	-4	100	100

B3) Passive strategy= market neutral portfolio, $\neq 1$

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash	TOTAL
Invested amount	14	-6	-6	-6	-6	110	100

All the active positions as a consequence of analyst's recommendations are financed internally, either via cash borrowings or by selling the stock index. There is no external contribution.

In addition, the value added is equal to the stock alpha multiplied by its weight in the stock index. The next example shows, based on the same recommendations as in example 2 and, given some security returns, the impact on the stock index and on the analyst's portfolio.

Example 3:

The analyst issues a 'strong buy' recommendation on security 1 (all other being neutral). Security 1's beta is 1.5.

From time $t=0$ to $t=1$ the securities and cash position show following returns:

	Security 1	Security 2	Security 3	Security 4	Security 5	Cash
Return from $t=0$ to $t=1$	5%	15%	10%	10%	10%	2%

Calculate the benchmark return RB, the analyst portfolio return RA and hence the value added $VA=RA-RB$.

Solution 3:

The stock index return is $20\% \cdot (5\% + 15\% + 10\% + 10\% + 10\%) = 10\%$

The analyst portfolio return depends on the context:

A1) Passive strategy= stock index, $= 0$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	100	-20	100

$RA = 20\% \cdot 5\% + 100\% \cdot 10\% - 20\% \cdot 2\% = 10.6\%$

$VA = 10.6\% - 10\% = 0.6\%$. This is equal to the over-performance of security 1 with respect to cash ($5\% - 2\% = 3\%$), multiplied by its weight (20%).

A2) Passive strategy= stock index, $\beta = 1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	80	0	100

$$RA = 20\% \cdot 5\% + 80\% \cdot 10\% = 9\%$$

$VA = 9\% - 10\% = -1\%$. This is equal to the under-performance of security 1 with respect to the benchmark ($5\% - 10\% = -5\%$), multiplied by its weight (20%).

A3) Passive strategy= stock index, $\beta \neq 1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	70	10	100

$$RA = 20\% \cdot 5\% + 70\% \cdot 10\% + 10\% \cdot 2\% = 8.2\%$$

$VA = 8.2\% - 10\% = -1.8\%$. Following the CAPM security 1 should perform: $E(R_1) = R_F + \beta \cdot (R_B - R_F) = 2\% + 1.5 \cdot (10\% - 2\%) = 14\%$, so its risk-adjusted under-performance is $(5\% - 14\%) = -9\%$. This multiplied by its weight (20%) results -1.8% .

B1) Passive strategy=market neutral portfolio, $\beta = 0$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	0	80	100

$$RA = 20\% \cdot 5\% + 80\% \cdot 2\% = 2.6\%$$

$VA = 2.6\% - 2\% = 0.6\%$. This is equal to the over-performance of security 1 with respect to cash ($5\% - 2\% = 3\%$), multiplied by its weight (20%).

B2) Passive strategy= market neutral portfolio, $\beta = 1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	-20	100	100

$$RA = 20\% \cdot 5\% - 20\% \cdot 10\% + 100\% \cdot 2\% = 1\%$$

$VA = 1\% - 2\% = -1\%$. This is equal to the under-performance of security 1 with respect to the stock index ($5\% - 10\% = -5\%$), multiplied by its weight (20%).

B3) Passive strategy= market neutral portfolio, $\neq 1$

	Security 1	Stock Index	Cash	TOTAL
Invested amount	20	-30	110	100

$$RA = 20\% \cdot 5\% - 30\% \cdot 10\% + 110\% \cdot 2\% = 0.2\%$$

$VA = 0.2\% - 2\% = -1.8\%$. Following the CAPM security 1 should perform:

$E(R_1) = R_F + \beta \cdot (R_B - R_F) = 2\% + 1.5 \cdot (10\% - 2\%) = 14\%$, so its risk-adjusted under-performance is $(5\% - 14\%) = -9\%$. This multiplied by its weight (20%) results -1.8% .

Appendix E

This appendix illustrates with an example the consequences of rebalancing. Assume that the stock index is equally weighted, contains 5 securities [each security weights 20%] and its initial value at $t=0$ is scaled to 100. The initial positions on the single securities in the stock index are as follows:

	Security 1	Security 2	Security 3	Security 4	Security 5	TOTAL
Position at $t=0$	20	20	20	20	20	100

Assume that the security returns from $t=0$ to $t=1$, and from $t=1$ to $t=2$ are as follows:

	Security 1	Security 2	Security 3	Security 4	Security 5	Stock Index
Return from $t=0$ to $t=1$	-50%	+50%	0%	0%	0%	0%
Return from $t=1$ to $t=2$	-50%	+50%	0%	0%	0%	0%

i.e. security 1 loses in two consecutive periods each time 50% and the opposite holds for security 2.

The stock index rebalances at each time-step; hence its position history looks as follows:

	Security 1	Security 2	Security 3	Security 4	Security 5	TOTAL
Position at begin t=0	20	20	20	20	20	100
Position at end t=0	10	30	20	20	20	100
REBALANCING						
Position at begin t=1	20	20	20	20	20	100
Position at end t=1	10	30	20	20	20	100
REBALANCING						
Position at begin t=2	20	20	20	20	20	100

Now, assume that the analyst's recommendations are as follows:

	Security 1	Security 2	Security 3	Security 4	Security 5
Recomm. for t=0 to t=1	++	0	0	0	0
Recomm. for t=1 to t=2	++	0	0	0	0

In following example 4 the positions and the value added of the analyst portfolio with and without rebalancing are calculated, limited only to the Passive strategy='stock index' and $\alpha = 1$. Remember that the analyst portfolio value is scaled to an initial value at t=0 of 100.

Example 4:

Under the above described context, calculate the analyst portfolio positions at t=0 and t=1, and the value added with and without rebalancing.

Solution 4 with rebalancing:

Given that the passive strategy is 'stock index', $\beta = 1$, and given a strong buy recommendation on security 1, the analyst's portfolio positions are as follows:

	Security 1	Stock index	Cash	TOTAL
Position at begin t=0	20	80	0	100
Position at end t=0	10	80	0	90
REBALANCING				
Position at begin t=1	18	72	0	90
Position at end t=1	9	72	0	81
REBALANCING				
Position at begin t=2	16.2	64.8	0	81

At the end of t=0 the active position on security 1 is not 20% anymore, but $\frac{10}{90} = 11.1\%$. Since there is rebalancing, the weight on this position at begin t=1 must mirror the weight of this security in the stock index, 20%. Hence the position has to be brought back to $90 \cdot 20\% = 18$.

The benchmark return over the whole period (from t=0 to t=2) is: $R_B = 0\%$. The analyst portfolio return is: $R_A = -19\%$, and hence the value added $VA = R_A - R_B = -19\%$.

The sub-periods value added are: $VA_{0,1} = -10\%$ (over an initial portfolio value $PV_0 = 100$); $VA_{1,2} = -10\%$ (over an initial portfolio value $PV_1 = 90$). By composing geometrically these value added, the result is $VA = (1 + VA_{0,1}) \cdot (1 + VA_{1,2}) - 1 = -19\%$.

Solution 4 without rebalancing:

The analyst's portfolio positions are as follows:

	Security 1	Stock index	Cash	TOTAL
Position at begin t=0	20	80	0	100
Position at end t=0	10	80	0	90
NO REBALANCING				
Position at begin t=1	10	80	0	90
Position at end t=1	5	80	0	85
NO REBALANCING				
Position at begin t=2	5	80	0	85

The benchmark return over the whole period (from t=0 to t=2) is: $RB=0\%$. The analyst portfolio return is: $RA= -15\%$, and hence the value added $VA=RA-RB = -15\%$.

This is equal to the under-performance of security 1 with respect to the benchmark over the whole period (from t=0 to t=2, equal to -75%) multiplied with the initial weight of security 1 in the stock index (20%).

As a consequence, below are listed some arguments pro and against rebalancing.

PROS:

- The benchmark (in case of an equally weighted stock index) rebalances at each time step. The rebalancing of the analyst portfolio is maintained in line with the benchmark.
- Maintaining a recommendation can be interpreted as having issued a new recommendation, even if it coincides with the old one. Hence, as with any new recommendation, the active weight of the security must mirror the security weight in the stock index, hence calling for rebalancing.
- The obtained value added over a whole period is the geometric composition of the value added of the sub-periods.

CONS:

- Rebalancing (at each time step, hence – in ISFA – daily) is against common practice in portfolio management. The transaction costs are inflated.
- The obtained value added over a whole period is not equal to the security over-performance multiplied by its initial weight. It is – as already seen before – the geometric composition of the sub-period value added. Hence its interpretation is more difficult.

A last question arises from the above example: do value added figures increase or decrease due to rebalancing?

Consider a two time period from $t=0$ to $t=2$. The stock index is equally weighted, contains 5 securities [each security weights 20%] and its initial value at $t=0$ is scaled to 100. There is an active recommendation only on security (i). R_{Bmk}^{0-1} (resp. R_{Bmk}^{1-2}) is the benchmark return from $t=0$ to $t=1$ (resp. from $t=1$ to $t=2$) and R_{Seci}^{0-1} , resp. R_{Seci}^{1-2} the corresponding returns for security (i).

From $t=0$ to $t=1$ we have two possibilities:

$R_{Seci}^{0-1} > R_{Bmk}^{0-1}$: security's (i) return has performed better than the stock index return.

In this case rebalancing causes a reduction of its weight (part of the security is sold). Hence in the following period good and bad bets are diminished in their effect.

$R_{Seci}^{0-1} < R_{Bmk}^{0-1}$: security's (i) return has performed worse than the stock index return.

In this case rebalancing causes an increase of its weight (part of the security is bought). Hence in the following period good and bad bets are increased in their effect.