Portfolio & Risk Advisory

Boxing against Green Shadows

Creation of a shadow benchmark makes SRI portfolios more efficient and easier to manage

SRI portfolio managers underestimate their level of skill (as measured by a Sharpe ratio) if they benchmark themselves against a broad market index rather than a "shadow" SRI portfolio.

Contents

Information for portfolio managers
The Portfolio & Risk Advisory Group would be more than happy to analyse your SRI portfolio and make suggestions about appropriate Shadow Benchmarking.

SRI portfolios bear higher risk than their conventional counterparts

Risk, where properly managed, is not necessarily a bad thing. However, risk taken without the expectation of incremental return is a bad idea.

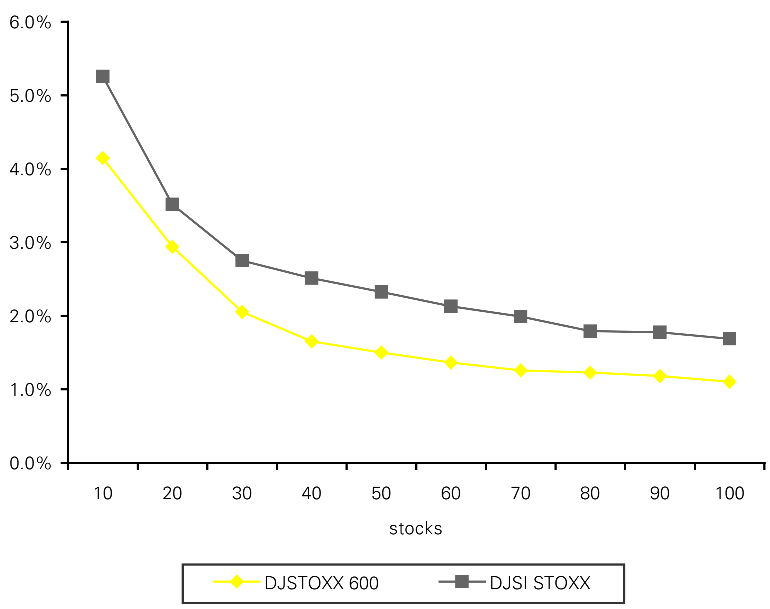
Positive screening is more about stock picking than style

We assert that positively screened benchmarks are likely to have lower factor risk - and correspondingly higher stock-specific risks - than negatively screened benchmarks.

Some SRI risk can be diversified away

By re-weighting the constituents of the SRI index so that they more closely resemble the style and theme risks of the market, the expected tracking error of the Shadow Benchmark can be substantially reduced. This leaves more of the risk budget available to the SRI portfolio manager for active decisions.

Tracking error to DJ STOXX 600



Source: Commerzbank Securities

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Introduction

SRI portfolios incur a higher level of risk that is difficult to manage with conventional risk management tools

First report

In our first report[1] on socially responsible investment (SRI) we used our proprietary equity portfolio analysis software to explore the risks faced by socially responsible investors. The main conclusions of this report were:

- SRI portfolios incur a higher level of risk by virtue of their socially responsible 'tilt'. This additional risk:
  - is not necessarily a bad thing but needs to be compensated for by a corresponding incremental return;
  - or may be compensated for by a 'good feeling', which is a form of utility as defined by economists; and
  - is typically at a higher level than most institutional owners of assets accept in their normal portfolios.
- A surpisingly large proportion of this risk (approximately two-thirds) arises from market-wide (rather than stock specific) factors; and
- Conventional risk models do not adequately capture the nature of the SRI risks and so pose a dilemma for a fund manager who wishes to practice risk management rather than risk measurement in a post-Myners environment.

We have had a considerable amount of interesting feedback from clients on this report. Firstly, it appears that very few SRI investors use the corresponding SRI index as a benchmark against which they measure and scrutinise the risks and returns of their investment portfolios. Usually, fund managers have their performance measured against a broad market index, plus some (varying) element of peer group comparison. We find this strange, invalid and somewhat worrying. Secondly, most portfolio managers represent that they follow a policy of positive screening and engagement rather than negative screening, thereby recognising that there are degrees of social responsibility in corporations. Therefore, the FTSE4Good index may not be the best comparison.

This report focuses on the relative apportionment of responsibility for the risk and return on an SRI portfolio between the fund manager and the owners of the assets

Second report

The focus of this second research paper is to analyse socially responsible investing in the context of the choice of benchmark and, consequentially, the relative apportionment of responsibility for the risk and return on an SRI portfolio between the fund manager and the owners of the assets.

Again (as in the first report), we are not attempting to answer the question: "Is it worthwhile to be a socially responsible investor?". Therefore, we are not making any statements on the return side of the risk/return equation. Instead we aim to investigate the relationship between the SRI benchmarks and their traditional more diversified counterparts.

Our study answers the following questions:

- Which benchmark to choose - a 'broad' or an SRI benchmark?
- Are there any more suitable alternatives?
- Are the investors aware of the differences arising from the choice of benchmark?
- What is the minimum tracking error the portfolio manager could achieve or, in other words, how close to the 'broad' benchmark can the SRI portfolio manager be?
- What portion of that tracking error could be managed away?

[1] Green with Envy, Commerzbank Securities, 18 March 2002

In section 2 of this paper, we look at the nature of the risks inherent in an SRI portfolio and discuss the different approaches to the nature of these risks, distinguishing between market measurable risk and other types of risk.

Throughout this report we use the Dow Jones STOXX Sustainability Index. This index series was launched in October 2001 by STOXX Ltd in co-operation with Dow Jones Indices and SAM Group – a brief comparison between these indices and the FTSE4 Good index series is covered in section 3.

Sections 4 and 5 cover the analysis first for the differences between the Dow Jones STOXX Sustainability Index and the 'broader' Dow Jones STOXX Index and secondly to derive a more appropriate alternative. The report concludes with a section on the practical implications for portfolio management including a discussion on risk budgeting.

Third report

We are currently working on a third report that we expect to publish in September. This research will look at the SRI scoring systems and investigate whether they can help explain the risk in portfolios and how they can be incorporated into a bespoke SRI risk management system.

Are SRI portfolios more risky?

It is conventional to measure risk relative to this benchmark - the tracking error of a portfolio is a measure of this relative risk

If we consider the benchmark of any investor, whatever it might be and covering whatever geographical regions or market sectors (or even a peer group of the fund manager's competitors), it is conventional to measure risk relative to this benchmark. The tracking error of a portfolio is a measure of this relative risk. Every investment decision which a manager makes (for whatever reason) to deviate from this benchmark - either by buying a stock or not buying a stock - adds (relative) risk to his portfolio and increases the tracking error. So, it is an inescapable mathematical fact that the SRI investor who chooses not to invest in certain companies - which do not pass his socially responsible screening process, however defined - will take more risk, and run a higher tracking error, compared with an investor who is not constrained by SRI criteria. Then, the only sensible questions are:

- how much more risk;
- what is the nature of those additional risks; and
- am I being adequately compensated for taking those risks.

These comparisons, by their nature, compare the SRI investor with a passive investor. It is clearly possible to construct active portfolios which are more risky than SRI portfolios. Indeed our analysis suggested that, taking a fairly representative SRI benchmark e.g. the DJSI STOXX Index or the FTSE4Good Europe Index, the risk of running a passive SRI index fund is broadly equivalent to the risk taken by a typical actively managed fund with the same benchmark. Similar results apply with different indices. It is likely that any additional investment decisions taken by an active SRI manager would add further to the riskiness of the portfolio on a relative basis to the index.

It is often argued, in our experience, that SRI portfolios are less risky than conventional portfolios. The argument goes as follows:

- non-SRI companies are running "risks" that are unsustainable in the long-term - these could be social, environmental, reputational or indeed any other non-balance sheet risk;
- as a result, investing in a portfolio of stocks with a higher than average awareness of these "risks" must be less risky.

Here we have to differentiate between the loose use of the word "risk" and its stricter mathematical definition as is normally used in finance. These arguments might very well identify a future source of excess return or indeed a mis-pricing of risk in the market place. However, when measuring (market) risk we are typically more interested in the co-movement of asset price returns rather than the probability of large one-off shocks in the future.

Risk taken without the expectation of incremental return is a bad idea - it reduces the efficiency of your portfolio as measured by the Sharpe or Information Ratio

Risk, where managed properly, is not necessarily a bad thing. However, risk taken without the expectation of incremental return is a bad idea - it reduces the efficiency of your portfolio as measured by the Sharpe or Information Ratio. If you believe that the incremental return generated by your SRI portfolio, over and above the market (and the management fees), will more than adequately compensate you for the additional risks you have incurred, your portfolio will be efficient. If you do not, you might be wiser to invest in a passive fund and give a proportion of the profits to charity, although this might not discharge your fiduciary responsibilities.

Indices

To reflect the investors' interest in the socially responsible investment a number of SRI indices have been launched - the most popular being Dow Jones Sustainability Indices and FTSE4Good series. FTSE4Good indices were covered in our previous research paper. Now we focus on the DJSI family. In this section we introduce the index family, describe the construction methodology and finally make a comparison with the FTSE4Good indices.

Index family

DJSI offer a set of global and a set of European indices, each of them consisting of a composite and a number of specialised indices.

DJSI World

The starting universes for the global benchmark DJSI World are the Dow Jones Global Indices. DJSI World are fully integrated with the DJGI, they share the same principles for calculating, reviewing and publishing the indices. The DJSI World constituents include the top 10% of the DJGI companies in terms of corporate sustainability. To construct the specialised indices, subsets of the composite index are formed, such that they exclude tobacco, alcohol, gambling, or armaments and firearms industry. A benchmark excluding all of the above mentioned industries is also available.

DJSI STOXX

DJSI STOXX are the European sustainability benchmarks, which include the leading 20% of the Dow Jones STOXX 600 Index. DJSI EURO STOXX is a regional subset, which tracks the corporate sustainability leaders in the Eurozone. From both composite benchmarks the respective subsets excluding all of the above listed industries are also available.

TABLE 1: **Dow Jones Sustainability Index Family**

	DJSI World	DJSI STOXX	DJSI EURO STOXX
Composite	✔	✔	✔
Ex Alcohol	✔		
Ex Tobacco	✔		
Ex Gambling	✔		
Ex Armaments and Firearms	✔		
Ex All	✔	✔	✔

Source: Commerzbank Securities

Construction methodology

Dow Jones Sustainability Indices are considered more advanced in terms of corporate sustainability assessment. They do not use the negative screening approach to constraint the starting universe. The methodology they apply is known as "best-in-class" approach.

The construction process includes several steps:

- **Industry Group Classification** - every company from the starting universe is assigned to one of the 64 industry groups. The corporate assessment within groups is more meaningful because these groups capture the sustainability characteristics of the specific industries.
- **Corporate Sustainability Assessment** - each company from the universe is evaluated according to the corporate sustainability assessment criteria and a corporate sustainability performance score is assigned.
- **Ranking within Industry Groups** - companies are ranked according to their sustainability scores.
- **Eligible Industry Groups and Eligible Companies** - the eligible industry groups are selected, according to the construction rules. Then the eligible companies within these groups are chosen.

- **Component Selection** - From each eligible industry group a certain percent of the companies (10% for the global and 20% for the European series) are selected for the SRI index.
- **Market Capitalisation Coverage** - A target market capitalisation for the individual market sectors / industry groups is reached by accordingly increasing the constituents of the indices.

A detailed discussion of the corporate sustainability criteria is a subject of the third SRI research paper.

DJSI and FTSE4Good comparison

FTSE4Good indices are based on negative screening; DJSI are based on positive screening

The main difference between the two SRI benchmarks is that FTSE4Good Indices are based on the exclusion methodology (negative screening) and DJSI are based on the "best-in-class" approach (positive screening).

Analysis

Data

The analysis is based on the Dow Jones STOXX 600 Index (the 'Broad Benchmark' in this report) and the sustainability index Dow Jones STOXX Sustainability Index (the 'SRI Benchmark') with constituents as of 31 May 2002.

Overview

The majority of SRI portfolio managers focus on the broad index benchmarks

Although many index providers already offer a range of SRI benchmarks, it seems that the majority of SRI portfolio managers largely ignore them. The majority of SRI funds are measured against the 'broad' benchmarks instead of the perhaps more appropriate SRI indices.

In this section of the report, we analyse the effects of measuring the performance of the SRI portfolio against the broad benchmark.

For the analysis we use our proprietary equity portfolio analysis software which is described in a previous research paper[2]. Our recently published report on SRI illustrates the flexibility of the software.

Basic risk characteristics

TABLE 2:
SRI Benchmark

Key statistics	
Tracking Error	2.75%
Portfolio Beta	1.08
Correlation	0.99

Source: Commerzbank Securities

The risk analysis shows that the DJSI STOXX has a tracking error of 2.75% against the DJ STOXX 600 as shown in Table 2. This tracking error is even higher than the one of FTSE4Good Europe vs. FTSE Europe (2.58%) which we analysed in the paper "Green with Envy".

This tracking error is further decomposed into factor risk and stock-specific risk (Table 3). Again, as we have shown in the first report, a substantial part of the risk comes from themes and styles (some 56%), not from stock specific effects. However, in the case of FTSE4Good it was even more dramatic - the styles and themes risk was almost two-thirds of the total risk. The reduced relative importance of factor risk is not surprising, given the index construction methodology.

TABLE 3: **SRI benchmark vs Broad Benchmark – basic risk characteristics**

Volatility breakdown	Total volatility	Factor risk	Stock-specific risk	R-Squared
Portfolio	18.17%	17.86%	3.30%	96.71%
Benchmark	16.68%	16.55%	2.10%	98.41%
Beta-neutral	2.41%	1.65%	1.76%	46.81%
Tracking error	2.75%	2.06%	1.82%	56.19%

Source: Commerzbank Securities

These basic risk characteristics show that the SRI Benchmark has a different risk profile than the Broad Benchmark. If risk and returns are measured against the Broad Benchmark - as is typically the case - the SRI portfolio manager is placed at an immediate disadvantage since the tracking error (2.75%) is already significant…, and no active investments positions have yet been taken.

Chart 4 on the back cover shows the dendrogram for the Broad Benchmark. The stocks in the SRI Benchmark are shaded in yellow. The width of each band is proportional to the market capitalisation of the company, i.e. the wider the band, the larger the market capitalisation. The (wide) unshaded areas contribute most to the tracking error. For a complete description of how to read a dendrogram refer to our earlier report[3].

[2] Equity Portfolio Analysis, Commerzbank Securities, January 2002
[3] Let's play Risk Invaders!, Commerzbank Securities, 9 January 2002

An alternative SRI benchmark

In Table 2 we show that the expected tracking error of DJ STOXX Sustainability Index measured against the DJ STOXX 600 index was 2.75%. Of this amount, just over one-half (actually 56.19%) can be attributable to market-wide themes and styles that potentially affect many stocks and therefore just less than one-half to pure stock selection effects that, by definition, affect only one stock. This expected tracking error is a function of both the stocks in the index and their relative weights to each other and the stocks in the benchmark.

The stock selection component of this risk cannot be diversified away and will always exist in the SRI benchmark. On the other hand, the effects of the market-wide themes and styles can be diversified and, potentially, can be eliminated. Based upon the stocks in the SRI benchmark it is possible to design a **Shadow Benchmark** that has a lower expected tracking error relative to the broad benchmark, merely by changing the weights of the stocks according to a quantitatively designed mathematical process.

The Shadow Benchmark is a more appropriate yardstick than the broad index against which the fund should be measured from a risk (and return) perspective

We believe that the **Shadow Benchmark** is a more appropriate yardstick than the broad index against which the fund should be measured from a risk (and return) perspective. Our reasons for this can be summarised as follows:

- in contrast to the broad benchmark, the SRI portfolio manager can replicate the Shadow Benchmark;
- in a clearly defined way, the Shadow Benchmark is efficient.

How we do it

We use our proprietary optimisation software to solve the optimisation problem - what should the weights of the SRI benchmark be in order to minimise the expected tracking error against the broad benchmark. This process will produce a portfolio with a lower expected tracking error than the SRI benchmark, typically the same stocks as in the SRI benchmark, but they will have different weights.

A detailed description of the optimisation is beyond the scope of this report. A forthcoming research note will cover this topic.

Results of the optimisation

Basic risk characteristics

The expected tracking error of the optimised Shadow Benchmark against the broad benchmark is 1.45% (Table 4). This is substantially lower than the directly comparable statistic for the SRI benchmark shown in Table 2 of 2.75%. In addition the portfolio beta has dropped from 1.08 to 1.00.

TABLE 4:
Shadow Benchmark

Key statistics	
Tracking Error	1.45%
Portfolio Beta	1.00
Correlation	1.00

Source: Commerzbank Securities

Table 5 shows the breakdown of this expected tracking error between the market-wide factors as opposed to the stock-specific element. As expected, through the optimisation process the factor risk (0.24%) has diminished substantially. Indeed, the proportion of the tracking error arising from factor risk (called the R-Squared) has changed dramatically from the 56.19% shown in Table 3 to only 2.71% shown in Table 5. This is also shown in Charts 1 and 2.

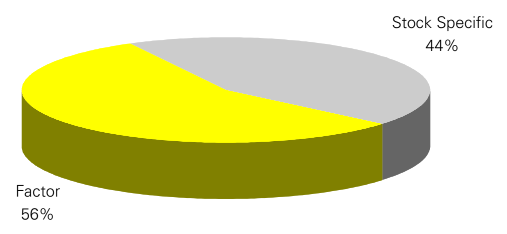
TABLE 5: **Optimised DJSI STOXX vs DJ STOXX 600 - basic risk characteristics**

Volatility breakdown	Total volatility	Factor risk	Stock-specific risk	R-Squared
Portfolio	16.81%	16.64%	2.44%	97.89%
Benchmark	16.68%	16.55%	2.10%	98.41%
Beta-neutral	1.45%	0.22%	1.43%	2.40%
Tracking error	1.45%	0.24%	1.43%	2.71%

Source: Commerzbank Securities

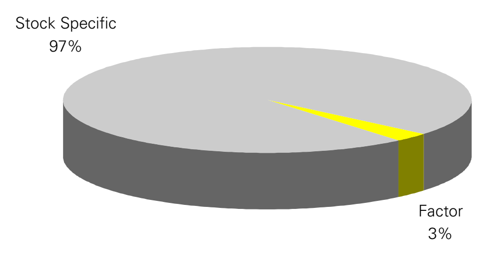
This means that almost all of the Factor Risk has been diversified away, leaving only the (undiversifiable) stock specific risk. It would be theoretically possible to diversify away all of the Factor Risk but there would need to be additional SRI stocks in the SRI benchmark.

CHART 1: **Breakdown of tracking error (by variance) for SRI Benchmark**



Source: Commerzbank Securities

CHART 2: **Breakdown of tracking error (by variance) for Shadow Portfolio**



Source: Commerzbank Securities

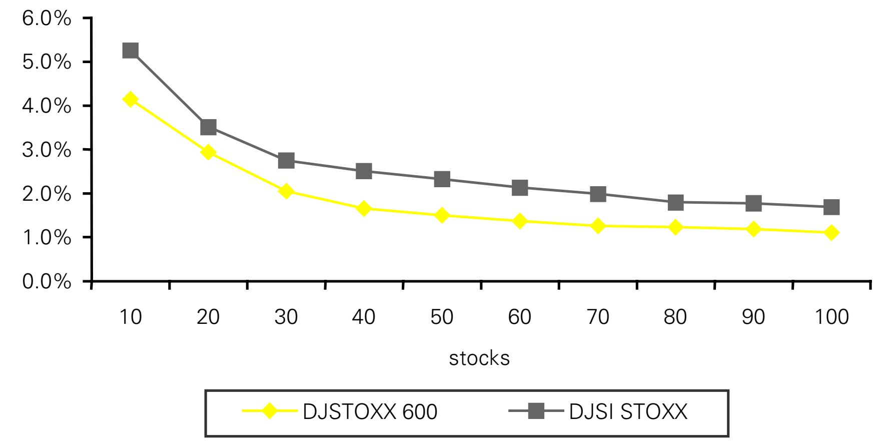
Practical management of SRI portfolios

Typically portfolio managers do not own all the stocks in the index

The portfolios we have looked at so far all contain holdings in every stock in the relevant index. Obviously, this is not practical from a fund management perspective except for the special case of fund managers pursuing an index-plus type strategy. Typically, fund managers will hold between 50 and 100 stocks in an actively managed portfolio.

Chart 3 illustrates the minimum tracking errors that can be achieved against the DJ STOXX 600 index with a given number of stocks. In the first instance, we can select from any stock in the DJ STOXX 600 universe and, in the second, we restrict ourselves to those stocks in the DJSI sustainable universe - this automatically puts the SRI investor in a disadvantaged position from a risk perspective.

CHART 3: **Tracking error to DJ STOXX 600**



Source: Commerzbank Securities

We constructed the portfolios in Chart 3 quantitatively using our in-house portfolio optimisation software. So, there is no "fund manager" input into the construction of any of these portfolios. But since these portfolios represent the minimum tracking error possible given the number of stocks and the selection universe, any actively managed portfolio must necessarily have a higher tracking error.

For example, a portfolio manager who chooses to hold a portfolio of 50 stocks in Europe cannot construct any portfolio with a tracking error of less than 1.50% and cannot construct an SRI portfolio with a tracking error of less that 2.33%. Therefore, the starting point for risk is at an 83bps premium over that for the conventional manager. Active risk will then be added by the tilting of these portfolios towards the fund managers' fundamental views.

These optimal portfolios can again be thought of as **shadow benchmarks** for the fund manager. Here the tracking error of the 50-stock optimal SRI portfolio of 2.33% compares with the 1.45% tracking error of an optimal portfolio selected from the entire DJSI universe (as modelled in the previous section).

Recommendation Definitions

Terms: BUY - 15% or more outperformance; ACCUMULATE - 5% to 15% outperformance; HOLD - 5% underperformance to 5% outperformance; REDUCE - 5% to 15% underperformance; SELL - 15% or more underperformance.

Period: During the forthcoming 12 months, at any time during that period and not necessarily just at the end of those 12 months.

Benchmarks

1. Stocks included in the Dow Jones STOXX index have their expected performance relative to this index. Commerzbank has no house forecast for this index, and thus a recommendation is made on the basis of absolute performance. Recommendations are adjusted accordingly as and when the index changes.

2. All other stocks are compared to their relevant local country index and Neuer Markt stocks are compared to the Neuer Markt Index.

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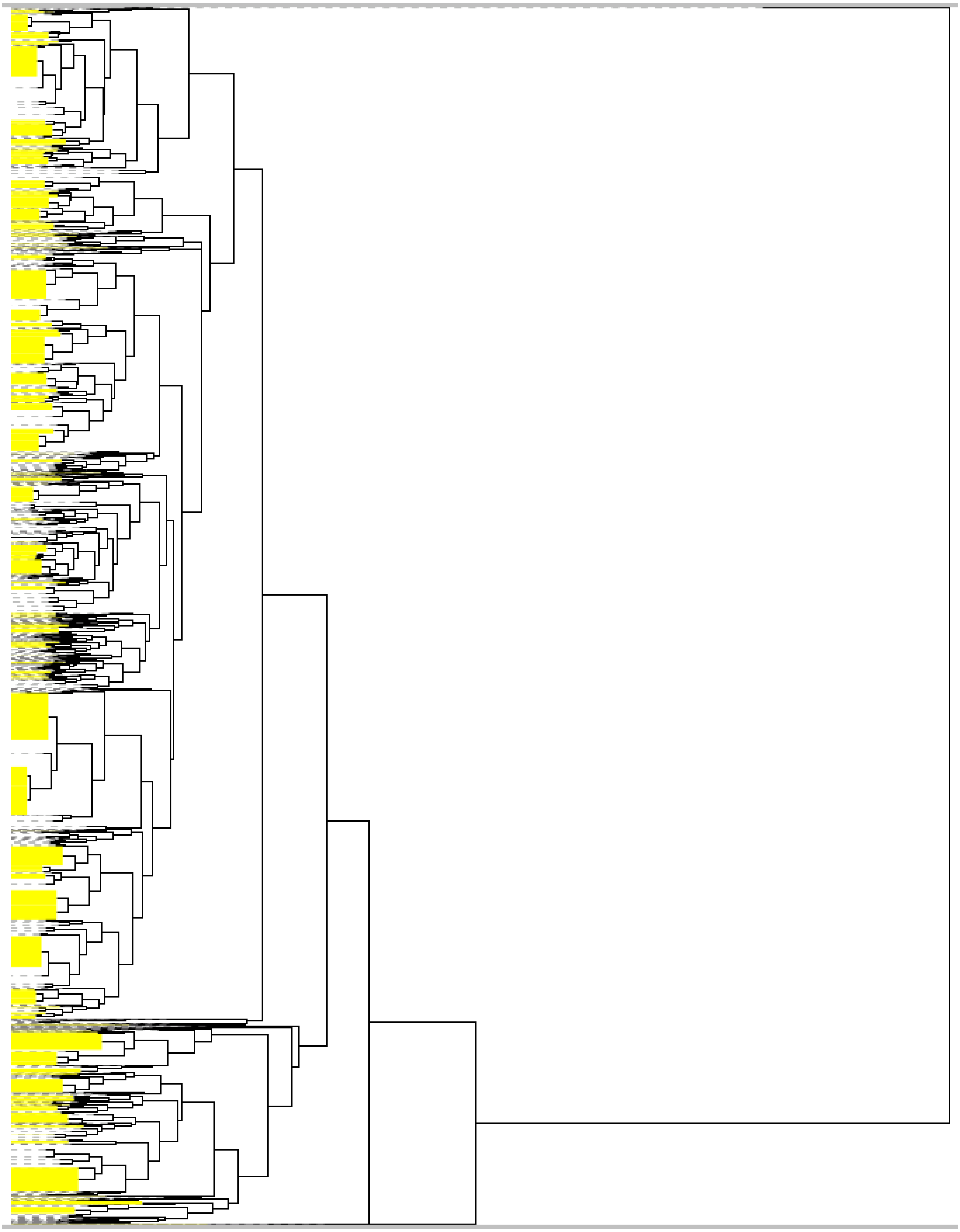
CHART 4: **DJ STOXX 600 Dendrogram**



Source: Commerzbank Securities