[](https://www.google.co.za/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjMj873uuzTAhUXOsAKHZBCB54QjRwIBw&url=http://www.systemicrisk.org.za/&psig=AFQjCNG3WRjQBuC7H2FO-2AHyXP59Sz3ig&ust=1494750837555561)

**GROUP 2**

**Research Project Submission**

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**Table of contents:**

**<Bla Bla will insert later>**

**Perhaps a list of figures and a list of Tables as well?**

**< we will decide later>**

# **Introduction**

This project will focus on a financial product called Exchange-Traded Funds (ETFs) and specifically equity-based ETFs. These ETFs are often created to represent a certain sector or index in the market and they can tailored to target certain fundamental factors. The three factors that will be considered in the scope of this project is the value, momentum and size of the underlying equities.

The goal of this project is to construct three ETFs based on the above-mentioned fundamental factors and then to constrain these ETFs to three individual criteria (namely; Market Capitalisation (market cap), Minimum Variance and Maximum Number of Bets). The ETFs shall be created based on the data of the JSE Top40 equities between 01 July 2003 and 31 August 2016.

Once the 12 ETFs have been created, an in depth discussion on their economic viability and performance takes place. The discussion is from the point of view of a Risk Manager working for a market-maker company.

# **Literature review**

## Fundamentals and market mechanics of Exchange Traded Funds (ETFs)

* Can hold a variety of stocks/bonds/commods but for this project we just look at equities
* Can track a certain sector or a certain aspect. E.g satrix Fini and JSE TOP40
* Creation units mechanism.
* Differences between ETF and mutual funds
* Helps retailers/individuals buy sectors without heavy transaction fees
* Tax benefits

Investing in too few stocks can often lead to a large variance in returns especially if the few selected equities all lie within the same sector of the market. For example if one were to invest in a few commodity based companies and due to a large strike on at a different companies mine, the market could have a sentimental shift on the commodity sector as a whole. This will lead to a general drop in share price for all the commodity-based companies.

A simple solution to this problem is the financial product called Exchange Traded Funds (ETFs). ETFs can hold a variety of underlying assets from equities, bonds, commodities and even derivatives. For the purpose of this project, we will only look at ETFs that hold a variety of equities.

These ETFs are typically based on a certain index, sector and/or aspect. An example of an ETF that is based on an index and a certain aspect is the JSE Top40. It represents the top 40 companies based on their market cap (number of shares in issue multiplied by the price of each share). An example of an ETF that is based on a sector and the same aspect is the Satrix Fini, which represents the top 15 financial companies by market cap.

One might think that since an ETF tracks a large number of shares that it would be very expensive (for the average individual) to but just one ETF, however this is not true at all. To understand why these ETFs do not cost a fortune one must understand the creation unit mechanism.

Looking at the JSE Top40 as an example, the ETF is weighted according to the proportions of each of the companies market cap’s relative to the market cap of all the top 40 stocks as a whole. This leads to arbitrary percentages such as 12.05% for a specific stock. In order to represent exactly 12.05% these ETF’s need to have thousands of shares within one ‘package’ (containing a fairly accurate proportion of each stock). This package is called the creation unit and is sold to an authorised participant (which is usually the market maker). The market maker then divides this creation unit into many segments, where each segment contains the correct proportions of the stocks (this leads to essentially selling fractions of shares). Since the creation unit has now been broken up into many smaller pieces, it can be listed on the stock exchange where it is bought and sold by investors/retailers. A depiction of this is seen in figure 1. [1]

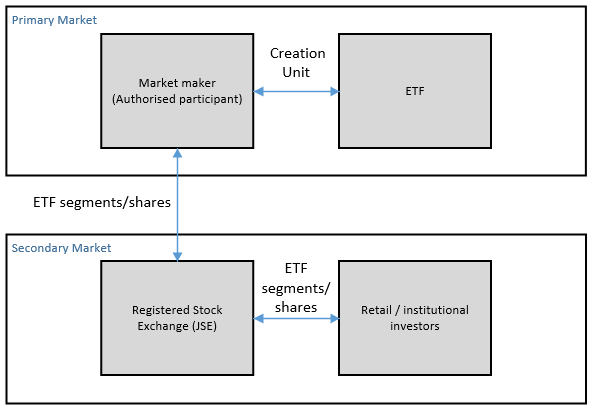


Figure - Diagram representing the flow of trade of an ETF

There are a few advantages that stem out of this creation unit process such as the much-reduced price of the underlying index. This leads to affordable shares that the average retailer/investor can trade without the burden of heavy transaction fees or the time needed to trade each of the underlying shares.

Another advantage to ETFs is the possible benefit of lower taxes when compared to investment funds such as a mutual fund. Mutual funds similarly try to track a chosen index but if one wants to invest through a mutual fund, one can only put in/take out their money at the end of trade, whereas since an ETF is listed on the exchange there is always someone willing to trade with you during the day. [1]

## The construction and maintenance of ETFs such as the JSE Top40

* (Market mechanics) rebalanced every 4months\*\*\*
* Rules of construction of ETFs such as the JSE top40\*\*\*

Sources:

<https://www.jse.co.za/content/JSERulesPoliciesandRegulationItems/FTSE%20JSE%20Ground%20Rules%20.pdf>

It is important to note that ETFs that are constructed with a specific aspect in mind and needs to constantly track that aspect. If that aspect (such as market capitalisation) changes with time then it makes sense that the ETF will need to be re-evaluated and reconstructed. In order to avoid tedious reconstructions and transaction fees, these ETF reconstructions are typically performed once every 3 months (quaterly)[insert reference]. Additionally there are a few rules to follow with the construction of an ETF as well as some indirect factors to consider.

The three main factors for the ETF construction/reconstruction are the eligibility, free float and liquidity of the underlying securities. Some of the core points of eligibility is that the security must trade on the JSE or on any other African Stock Exchange that adopts a trading system approved by the JSE and that all other ETFs or funds are not eligible to be included.

When there are multiple lines of equity capital (ie companies owned by a parent company or dual listed companies) then both lines/companies are listed and priced on the JSE provided that the secondary line’s/company’s market capitalisation is >=25% of the primary line’s/company’s market capitalisation. In this case, the two companies are treated as one and the company that is traded in ZAR will be chosen to be eligible. For example, Investec PLC and Investec Ltd are primary, secondary lines that are both listed on the JSE, and although Investec PLC has a larger market capitalisation, Investec Ltd is eligible and part of the JSE Top 40 index (Data taken from Bloomberg June 2008).

A companies free float is the amount of shares (as a percentage of the total number of shares) that is in issue and freely traded on the JSE. The shares that is not part of a company’s free float include shares that are directly owned by; state, regional, government, directors or any employees of the underlying company.

If a company A holds 10% or more of another company B’s total shares then the percentage owned by company A is rounded up to the nearest whole percent and restricted from the free float of company B. This ruling holds for secondary lines as well as wealth funds or former employees of the underlying company.

In order for a company to be eligible for inclusion to the index, it must have a free float of 15% or greater (exception to the rule seen at 4.3.4 of [JSE document reference number]). If the company meets the free float requirements then its market capitalisation weighting is based on the total number of shares multiplied by the corresponding free float factor.

The last key factor for consideration is the liquidity of the shares. Liquidity is important because with a lack of liquidity comes a large discrepancy in the fair price of the underlying stock and therefore the ETF. Note that although ETF reconstructions occur quarterly, liquidity is only reviewed annually (in December). The minimum liquidity required is for the security to be traded enough times such that 0.5% or more of the free float shares have been exchanged per month for 10 of the previous 12 months.

# Theoretical Background

Whatever that is?

* Weightings (include how too much of one stock is a bad thing in terms of diversification)\*\*\*
* Weightings (too small weightings/ too many stocks leads to excessive trade costs)\*\*\*

# Methodology

<description of work done>

%Capping at 10% market cap%

FTSE/JSE Capped Indices The Capped FTSE/JSE All-Share Index and the Capped FTSE/JSE Top 40 Index will have the same constituents as the FTSE/JSE All-Share Index and the FTSE/JSE Top 40 Index, thus requiring no additional criteria for inclusion. All corporate actions, index additions and index deletions will be applied as per the FTSE/JSE All-Share Index and the FTSE/JSE Top 40 Index. Constituent weights will be capped at 10% on a quarterly basis after the application of corporate actions.

Pg 28 of <https://www.jse.co.za/content/JSERulesPoliciesandRegulationItems/FTSE%20JSE%20Ground%20Rules%20.pdf>

For i = 1:40

If index\_weight(i) >0.1

Store = index\_weight(i);

Index\_weight(i) = 0.1;

Diff = Store – Index\_weight(i);

For j = 1:40

If i~=j

Index\_weight(j) =

# Results

# Conclusion and recommendation

<recommendations might not be needed>

Global Minimum Variance and 50% equally weighted, lead to best results(sharpe ratio)?? pg22 <http://docs.edhec-risk.com/ERI-Days-North-America-2013/documents/EDHEC-Risk_Position_Paper_Smart_Beta_2.0.pdf>

# Reference list

* [1] <https://core.ac.uk/download/pdf/6218589.pdf>
* [2] <https://www.jse.co.za/content/JSERulesPoliciesandRegulationItems/FTSE%20JSE%20Ground%20Rules%20.pdf>