AXYS
Indices
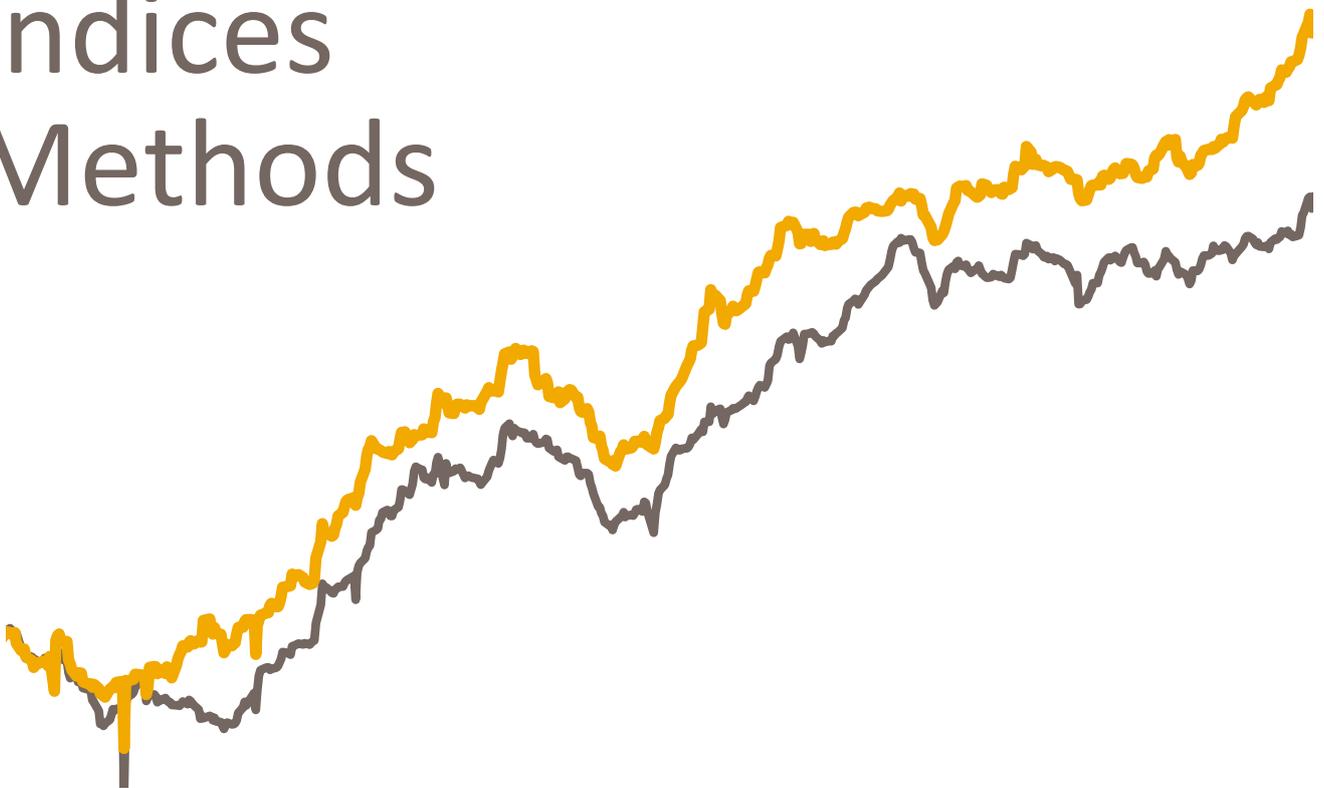# Methods

AXYS Indices Methods
A Comprehensive Guide

1. INTRODUCTION

This document describes the methods used to define and calculate the family of AXYS Liquid Indices (ALEX) and AXYS Total Market Indices (ATMI) using a consistent set of rules. The indices have been designed to measure the performance of equity securities listed in Mauritius as well as Mauritian companies listed overseas. AXYS has brought to life new indices for Mauritius; so as to enhance and offer alternate perspectives/benchmarks to cater for the increasingly sophisticated needs of both asset managers and investors.

2. LIQUID INDEX UNIVERSE

2.I. Types of Securities

As at September 30th 2015, the ALEX family coverage universe consists securities listed on the Stock Exchange of Mauritius (SEM).

Type of Security	Number
Equities	92
Pref. Shares	6
Options	1
Debentures	11
Exchange Traded Funds	3

Table 1. Types of Securities on the SEM

2.II. Industry Categorisation

Stocks within the ALEX family have been categorised into 10 overarching industries/sectors. AXYS adapted the Global Industry Classification Standard (GICS) as developed by MSCI and Standard & Poor's (S&P) for use in the Mauritian context. For instance, 'Travel & Leisure' and 'Property' are treated as fully fledged industries rather than sub-industries according to GICS.

The prevalence of legacy cross holdings as well as layers of holding companies, made the task of slotting companies into their respective industries vertiginous at times. For the non-obvious companies, our categorisation was made as follows:

1. Companies whose main purpose is to invest in securities and/or whose primary source of income

are dividends derived from listed companies are categorised as "Investment Holdings."

2. Companies where the ⟨NCA⟩ is less than a threshold level determined to be 34%[1] will be categorised as "Investment Holdings". ⟨NCA⟩ is defined as the weighted average of the Company-Level Non-Current Assets (NCAs) net of listed Subsidiaries, Associates & Joint Ventures (SAJVs) and Group-Level NCAs net of NCAs of each listed SAJV.

2. Companies with a single primary listed investment are categorised in-line with the underlying investment.

3. Companies where the majority of its investments/investment portfolio are/is not listed on an exchange are either categorised as "Multi-Sector Conglomerates" or "Multi-Sector Holdings". If the listed group runs the day-to-day operations of the investees, AXYS calls them "Conglomerates"; alternatively if the lines of business are treated as portfolio investments, AXYS call them "Holdings".

3. LIQUID INDEX ELIGIBILITY CRITERIA

3.I. Geography Requirement

Any Mauritian company listed on a recognised exchange or any company listed on the Stock Exchange of Mauritius will be eligible for selection.

3.II. Industry Requirement

All companies categorised as "Investment Holdings" will be ineligible for selection. The inclusion of "Investment Holdings" would result in the multiple counting of the underlying entities to varying degrees and are therefore left out.

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[1] Where 34% is defined as ⅔ of 51% which constitutes a significant stake of a majority

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3.III. Frequency Threshold

Companies must have traded in at least half (50%) of all trading sessions in the 52 weeks preceding each quarterly index review. By "trade" we mean that the stock must have traded on the exchange's board (should multiple boards exists) on which a trade is allowed to influence the share price.

3.IV. Liquidity Threshold

Companies must each have a minimum daily average value traded amounting to Rs200k in the 52 weeks preceding each quarterly index review.

3.V. Size Threshold

Companies must each have a minimum daily average market capitalisation amounting to Rs750M in the 52 weeks preceding each quarterly index review.

3.VI. Exclusions

All partially paid shares, preference shares (including convertibles and/or redeemables), fixed dividend shares, equity warrants, and debentures (including convertibles) will be ineligible for selection.

4. LIQUID INDEX ENGINEERING

4.I. AXYS Liquid 20 Index (ALEX 20)

At each quarterly index review, the eligible will be sorted in descending order starting with the most frequently traded stock. The twenty (20) most frequently traded stocks will be retained to constitute the ALEX 20. AXYS will not use float-adjusted market capitalisation to compute the index as the "true" number of free-floating shares are unknown given the prevalence of legacy holdings. AXYS will not apply any caps or limits on the weight a stock can have in this index.

4.II. AXYS Liquid Capped Composite 12 Index (ALCAPEX 12)

At each quarterly index reconstitution twelve (12) stocks will be retained from the eligible universe to constitute the ALCAPEX 12.

The weighting criteria for the index are set as follows:

1. No stock shall have an individual weight exceeding 15% of the index.

2. No industry shall a weight exceeding that of its adjusted weight in the Mauritian economy.

3. No industry shall have more than two constituents.

4. Where there are more than two eligible constituents, the two most frequently traded counters will be retained.

5. Where both an eligible constituent having passed the ⟨NCA⟩ test and any one or more of its Subsidiaries, Associates and/or Joint Ventures (SAJV) is/are also eligible, the SAJV will be selected in preference only if corresponding line items in the SAJV's Group Level Financial Statements effectively constitutes more than two-thirds of any two of the following line items of the holding's Group Level Financial Statements, namely, "*Revenue from External Customers*" and/or "*Earnings Before Interest and Taxes*" and/or "*Adjusted Profit after Taxes attributable to controlling shareholders*" and/or "*Non-Current Assets*".

6. Where there are more than one constituent per industry, the industry's weight will be distributed to the eligible constituents in direct proportion to both revenue and market capitalisation.

4.II.i. Weight Derivation
Deriving the weights to be applied to ALCAPEX 12 constituents is a recursive process.

First, we use Statistics Mauritius' (SM) National Accounts to determine the Mauritian GDP split. AXYS uses the five-year arithmetic mean as the base for each sector's share of GDP.
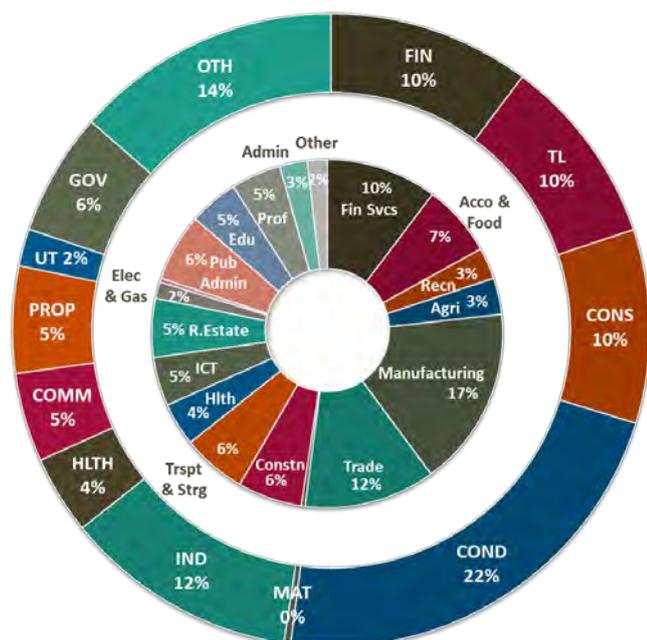
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Figure 1. Sectorial breakdown of Mauritian GDP

- LoB's share of total revenue
- LoB's share of profits
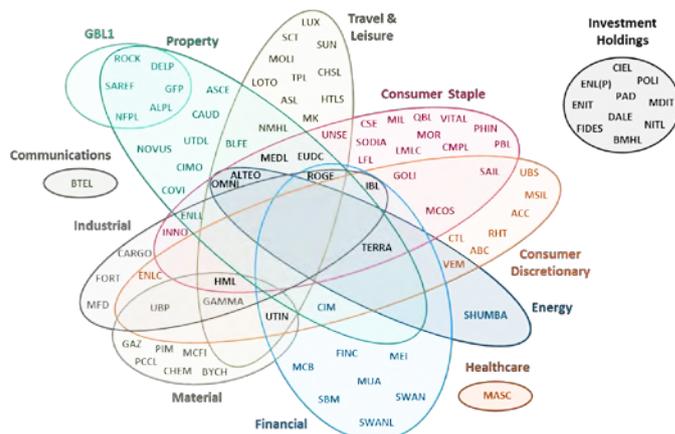
Figure 2. Sectoral categorisation of companies

Second, we map SM GDP categorisations onto our adapted GICS industries as tabulated below:

Sector	Weight [%]	SM Classification			
FIN	10.2	Financial svcs			
TL	9.6	Accomdatn & Food Svcs	Arts & Entertainment		
MSCH					
CONS	9.9	Agriculture	Manufacturing		
COND	22.3	Trade	Manufacturing		
MAT	0.3	Mining			
IND	11.9	Construction	Trnspt & Storage		
HLTH	4.0	Health & Social			
COMM	4.5	IT & Comm.			
PROP	5.5	Real Estate			
UT	1.9	Elec. & Gas	Water & Waste Mgmt		
GOV	6.3	Public admin. & Defense	Social Sec		
OTH	13.6	Prof. Svcs	Admin. Svcs	Education	Others
	100				

Table 2. Mapping GDP onto the adapted GICS

Third, we map eligible stocks onto their respective GICS sectors. The process of slotting Multi-sector conglomerates and holdings (MSCH) is non-trivial involving careful consideration of a plethora of factors which include:

- Lines of business (LoB)

4.II.ii. Original ALCAPEX 12 Selection process

Stocks were selected following the criteria stipulated in §4.2. However, with regards to Industrials and Utilities weights were distributed to the appropriate MSCH. Further, the Consumer Staples were also apportioned to retained sugar MSCH. With 60% of the financial sector's GDP being banking, it was deemed that an NBFI deserved representation in ALCAPEX 12. An exception was therefore made to accommodate both banks as omitting either MCB or SBM would be heresy.

Stock	Sector	Weight
MCB	FIN	8.18%
SBM	FIN	3.82%
CIM	FIN	2.36%
NMHL	TL	8.60%
LUX	TL	4.90%
IBL	MSCH	14.63%
ALTEO	MSCH	8.60%
TERRA	MSCH	14.26%
INNO	CONS	12.17%
CTL	COND	10.14%
UBP	MAT	3.86%
ENLL	PROP	7.66%

Table 3. The ALCAPEX 12 selection

5. AXYS TOTAL MARKET INDEX (ATMI)

5.I. ATMI Universe

The ATMI Universe and industry classification is identical to that of the ALEX family.

5.II. ATMI ELIGIBILITY CRITERIA

5.II.i. Geography Requirement

Any company listed on the Stock Exchange of Mauritius will be eligible for selection.

5.II.ii. Industry Requirement

Given the "all-inclusive" nature of a total market index, there shall be no industry restrictions for inclusion in the ATMI.

5.II.iii. Frequency Threshold

Given the "all-inclusive" nature of a total market index, there shall be no trade frequency requirement for inclusion in the ATMI.

5.II.iv. Liquidity Threshold

Given the "all-inclusive" nature of a total market index, there shall be no minimum daily trade value requirement for inclusion in the ATMI.

5.II.v. Size Threshold

Given the "all-inclusive" nature of a total market index, there shall be no market capitalisation restrictions for inclusion in the ATMI.

5.II.vi. Exclusions

All partially paid shares, preference shares (including convertibles and/or redeemables), fixed dividend shares, equity warrants, and debentures (including convertibles) will be ineligible for selection.

5.III. ATMI Engineering

All listed equities that are not excluded according to §5.3 shall be eligible for selection and remain in ATMI until the stock is de-listed or suspended as a result of the company being placed under administration or liquidation.

6. INDEX MAINTENANCE

6.I. Quarterly Reviews

At each quarterly review the eligible universe will be reviewed and stocks sorted in descending order, ie from the most liquid to the least liquid. The twenty most liquid stocks will be retained to constitute the ALEX 20.

6.I.i. Liquid Index Universe Adjustments

In the event that the number of eligible stocks drops below twenty (20), thresholds will be lowered in the order below then restored/reset prior to the next quarterly maintenance.

1. The Size Threshold will be lowered in steps of Rs50M but not below Rs500M until the eligible universe grows above 22 counters

2. If a Size Threshold of Rs500M does not push the number of eligible stocks above 22, the Liquidity Threshold will be lowered in steps of Rs25k but not below Rs100k until the eligible universe grows above 22 counters

3. If a Liquidity Threshold of Rs100k does not push the number of eligible stocks above 22, the Frequency Threshold will be lowered in steps of 100bps until the eligible universe grows to 23 stocks

6.I.ii. Capped Composite Constituent Adjustments

At each quarterly review, should ALCAPEX 12 constituents drop out of the eligibility universe they will be replaced by the most appropriate candidate using the procedures stipulated in §4.

In the event that a non ALCAPEX 12 company gains places in liquidity ranking and is a more appropriate choice for an

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industry than an existing ALCAPEX 12 constituent, it shall replace the constituent company in question.

6.II. Annual Rebalancing

Once per year (April), upon the publication of the National Accounts for the preceding calendar year (typically at the end of March) by SM, the weights allocated to each sector and each constituent shall be re-balanced in-line with the updated five year average.

In addition, the threshold for ⟨NCA⟩ will be reviewed annually to ensure eligibility of groups where some Subsidiaries, Associates and/or Joint Ventures are also listed.

6.III. Continuous Maintenance

6.III.i. Corporate Actions

Maintenance also includes as and when required adjustments to be made in the event of changes in the quantum of listed shares or corporate actions. Changes in number of shares (rights issues, new issuances, or share buy backs), and certain types special dividends & spin-offs require divisor adjustments; while other corporate actions such as stock splits/reverse splits and bonus issues only require simple adjustments to share price and number of shares. Cases when divisor adjustments are required are tabulated in §6.5.

6.III.ii. Corporate Actions on Dual Listings & GBL1s

Movement (New issues, buy-backs and/or transfers in and out of CDS) of shares on GBL1s and Dual Listed stocks shall be maintained on on-going basis; however the number of shares used in the computation for ALEX will be taken to be the shares at the CDS at each quarterly index review.

6.III.iii. Exceeding cap limits

Although we have set target weights for our capped indices, a constituent's weight in the index will vary on a day-to-day basis as a natural consequence of price changes.

Should a constituent's absolute deviation from its target weight exceed the 5.0% tolerance band – defined using empirical observations – imposed by the AIMC at its 5th

sitting in Jul-14 based, the weight factor shall be re-adjusted to bring its weight back in-line with the target weight.

Should an industry's absolute deviation from its cap limit exceed the 5.0% tolerance band – defined using empirical observations – imposed by the AIMC at its 5th sitting in Jul-14 based, the weight factor of its constituents shall be re-adjusted to bring the industry weight back in-line with its cap.

7. INDEX MATHEMATICS

7.I. AXYS Liquid 20 Index (ALEX 20)

We use the modified version of the *LasPeyres* Index formula as follows:

$$ALEX_{20} = \frac{\sum P_i N_i}{D}$$

Where N_i is the number of shares issued by company i except for dual-listed companies and GBL1 companies where N_i is the number of shares at the CDS. P_i is the daily VWAP rounded off to the nearest tick-size, and the divisor D was initially defined on the base date as:

$$D = \sum P_{i_0} N_{i_0}$$

The divisor has since been adjusted for corporate actions as follows:

$$D_{t+1} = D_t + \frac{\sum P_{i_t} N_{i_t} - \sum P_{i_{t-1}} N_{i_{t-1}}}{ALEX_{20_t}}$$

7.II. AXYS Capped Composite 12 Index (ALCAPEX 12)

We use the modified version of the *LasPeyres* Index formula as above with an additional weight factor f:

$$ALCAPEX_{12} = \frac{\sum f_i P_i N_i}{D}$$

Where N_i is the number of shares issued by company i except for dual-listed companies and GBL1 companies where N_i is the number of shares at the CDS. P_i is the daily VWAP rounded off to the nearest tick-size, and the divisor D was initially defined on the base date as:

$$D = \sum f_{i_0} P_{i_0} N_{i_0}$$

The divisor has since been adjusted for corporate actions as follows:

$$D_{t+1} = D_t + \frac{\sum f_{i_t} P_{i_t} N_{i_t} - \sum f_{i_{t-1}} P_{i_{t-1}} N_{i_{t-1}}}{ACEX_{12_t}}$$

7.III. ALCAPEX 12 weight calculations

A sector's weight is calculated as a function of GDP as follows:

$$w_{s_j} = \frac{GDP_j}{\sum GDP_j}$$

Where GDP_j is sourced from the "*Gross Domestic Product by industry group at current basic prices*" table of SM's National Accounts.

The weight of a company, where there are more than one constituent is calculated using:

$$w_{c_i} = \frac{w_{s_j}}{2} \left(\frac{R_i}{\sum R_i} + \frac{MC_i}{\sum MC_i} \right)$$

Where R_i is the company's revenue from its business within that sector, and MC_i is the company's average 52 week market capitalisation.

The re-cursive excess weight allocation process is conducted as many times as required using:

$$\omega_{c_i} = w_{c_i} \left(1 + \frac{w_{c_i} - w_{max}}{\sum w_{c_i}} \right)$$

Where ω_{c_i} is the new company weight.

7.IV. AXYS Total Market Index (ATMI)

We use the modified version of the *LasPeyres* Index formula as follows with a currency exchange rate X:

$$ATMI = \frac{\sum P_i N_i X_i}{D}$$

Where N_i is the number of shares issued by company i except for dual-listed companies and GBL1 companies where N_i is the number of shares at the CDS. P_i is the daily VWAP rounded off to the nearest tick-size, X_i is the exchange rate for a non-MUR denominated company, and the divisor D was initially defined on the base date as:

$$D = \sum P_{i_0} N_{i_0} X_{i_0}$$

The divisor has since been adjusted for corporate actions as follows:

$$D_{t+1} = D_t + \frac{\sum P_{i_t} N_{i_t} X_{i_t} - \sum P_{i_{t-1}} N_{i_{t-1}} X_{i_{t-1}}}{ATMI_t}$$

7.V. Avoidance of "Recursive" Constituents

The level of unlisted Non-Current Assets (NCA) used to estimate the level of "double-counting" will be calculated to be:

$$\langle NCA \rangle \equiv \left(\frac{NCA_{Co}}{NCA_{Gp}} \right) C + \left(1 - \frac{NCA_{Co}}{NCA_{Gp}} \right) G$$

Where C is Company-Level Non-Current Assets (NCAs) net of listed Subsidiaries, Associates & Joint Ventures (SAJVs) and G is Group-Level NCAs net of NCAs of each listed SAJV

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7.VI. Divisor Adjustments

Corp. Action	Comments	Divisor Adj.
Company Add/Del.	Change in market value from addition/deletion.	Yes
Change in No. of Shares	New issuances, repurchase or buy-backs alter the market value. Number of shares also adjusted.	Yes
Stock Split / Bonus	Change in number of shares coupled with price adjustment leads to no change in market value.	No
Spin-off	Spun-off company stays in index with no other addition/deletion results in no change to index market value.	No
Spin-off	Spun-off company leaves index and/or is replaced by another company would alter the index market value.	Yes
Special Dividend	When paying a special dividend (eg in specie), its share price is assumed to drop by the amount. The divisor adjustment reflects this drop in index market value.	Yes
Rights offering	Shareholder is offered to buy a proportional number of new shares as per the issue. The Divisor adjustment reflects increase in market cap which is the shares issued times the price paid.	Yes

Table 4. Corporate actions which trigger divisor change

8. INDEX GOVERNANCE

8.I. Index Management Committee

The AXYS Index Management Committee (AIMC) will be responsible for reviewing and approving changes made (if any) at the quarterly and annual reviews. The AIMC will also have the authority to improve the methodology for calculating the AXYS Liquid Index family.

The AIMC will be comprised of five members. Two of which will be from within AXYS, and three independent panel members to ensure strict adherence to the devised methods and on-going maintenance.

The AIMC quorum will have been been established with the presence of any four members. All decisions pertaining to Index Selection, Composition and Maintenance will require a simple majority vote, whereas any alterations to the rules underlying the indices or any amendment to the methods guide shall require a 75% majority.

8.II. Index Computation

AXYS indices will be calculated after market close upon receipt of official trade data from the Stock Exchange of Mauritius. Any Mauritius focused AXYS index will be computed in Mauritian Rupees. The MUR exchange rate used will be the mid-rate as provided by the Bank of Mauritius.

AXYS Indices will be computed to six (6) decimal places then rounded off to two (2) decimal places during dissemination.

For non-capped indices we shall also compute a Total Return Index. The daily return series is calculated using the cash dividends reinvested. Cash dividends are normally applied on the Ex-Date.

8.III. Index Dissemination

AXYS Indices will be available on AXYS's website www.axys-group.com as well as in the various AXYS Stockbroking market reviews.

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