



# Stock Market Indices



# Agenda

## **01** Introduction to Index

Features of Securities market indices

## **02** Index Construction

Computation of index values

## **03** Index Management

Rebalancing and Reconstitution of Indices



# Introduction to Index

## Key Learning Outcome

- Describe security market index
- Uses and Types

# THE 40-YEAR MARKET JOURNEY

Here are some key milestones that defined the journey of Sensex over the years



Source Bloomberg

# Introduction

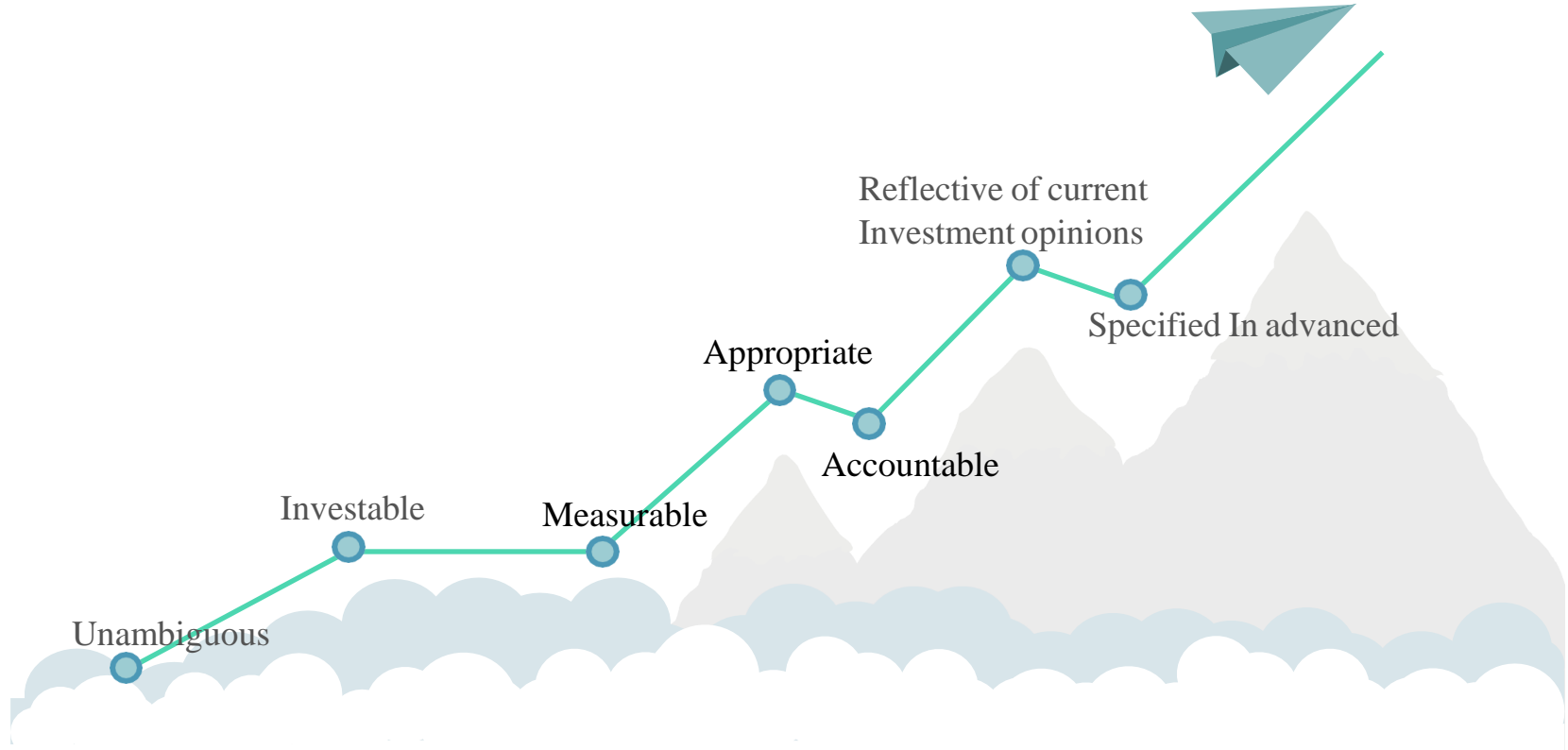
A security market index represents a given security market, market segment, or asset class.

For example: The Nifty 50 and the CRISIL Bond Index are common benchmarks for the Indian stock and bond markets, respectively.

## Usage

- Gauges of market sentiment;
- Proxies for measuring and modelling returns, systematic risk, and risk-adjusted performance; Proxies for asset classes in asset allocation models;
- Benchmarks for actively managed portfolios; and
- Model portfolios for such investment products as index funds and exchange-traded funds (ETFs).

# Properties of Valid Benchmark : Samurai



# Index Types

Equity

Represents market performance over the period of time

Fixed Income

Represents the wide variety of fixed-income securities, ranging from zero- coupon bonds to bonds with embedded options.

AIF

AIF includes commodities, real estate, and hedge funds

# Equity Index Type

Equity

Fixed  
Income

AIF



## Broad Market Indexes

As its name suggests, represents an entire given equity market and typically includes securities representing more than 90 percent of the selected market.



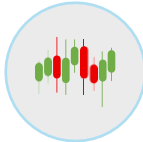
## Multi-Market Indexes

Usually comprise indexes from different countries and regions and are designed to represent multiple security markets. Multi-market indexes may represent multiple national markets,



## Sector Indexes

Represent and track different economic sectors—such as consumer goods, energy, finance, health care, and technology—on either a national, regional, or global basis.



## Style Indexes

Style indexes represent groups of securities classified according to market capitalisation, value, growth, or a combination of these characteristics.



# Equity Index : Example

## Broad Market Indexes: NIFTY 50

9,199.05 ↓ -71.85 -0.78%



**Broad Based Market Index**



**Top 50 Scrip selected**

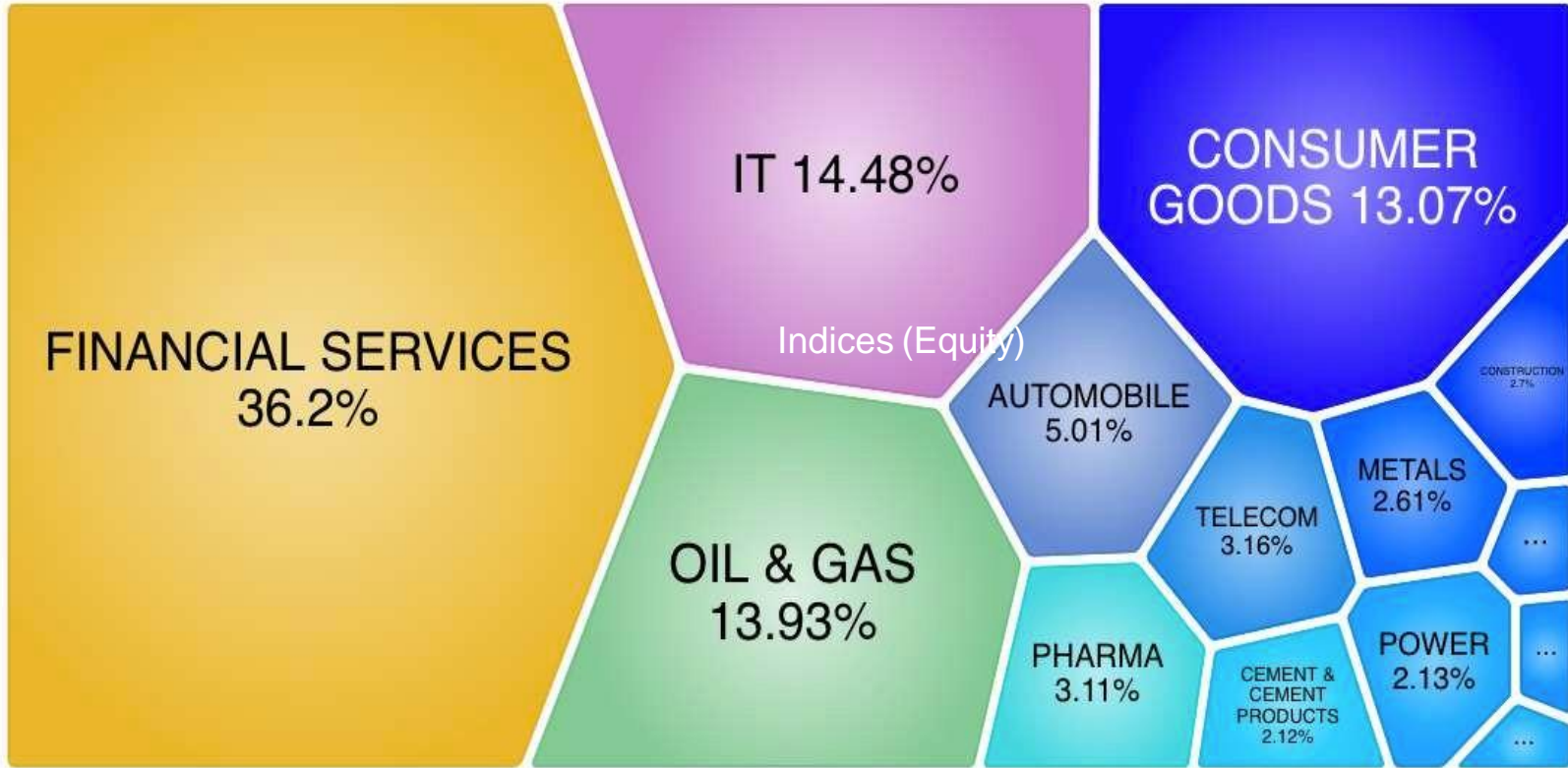


**Free float market capitalisation weighted index**

Indices (Equity)

# Equity Index

## Broad Market Indexes: NIFTY 50 Sectoral Allocation



Indices (Equity)

# Equity Index

## Sectoral Indices: NIFTY AUTO

5,519.00 ↓ -33.40 -0.60%



**Sectoral Index represent Auto Sector.**



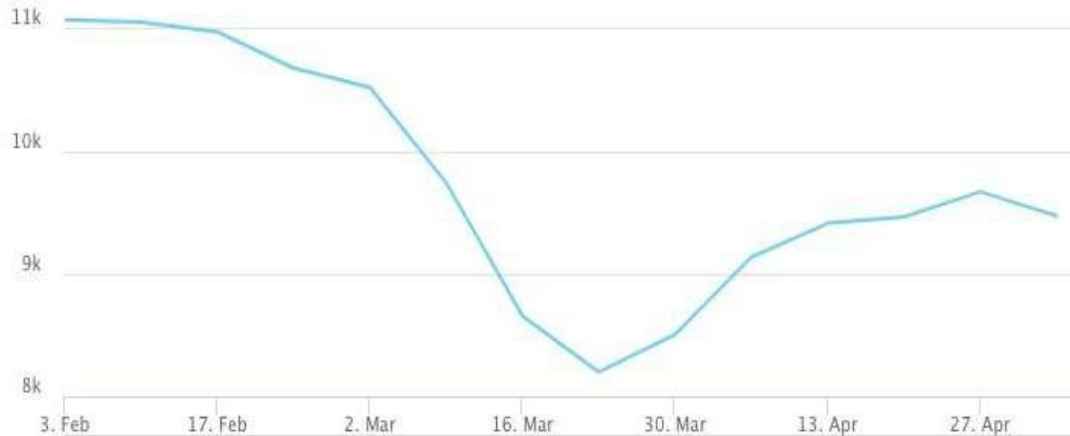
**Computed using free float market capitalisation method**

# Equity Index

## Style Indices: NIFTY Low Volatility 50

9415.19

Daily Weekly Monthly



**Index tracks the performance of the least volatile securities listed on NSE**



**Weights of securities in the index are assigned based on the volatility values. Least volatile security in the index gets the highest weight.**

# Equity Index- Multi Market

## MSCI ACWI Index market allocation

MSCI ACWI INDEX					
MSCI WORLD INDEX			MSCI EMERGING MARKETS INDEX		
DEVELOPED MARKETS			EMERGING MARKETS		
Americas	Europe & Middle East	Pacific	Americas	Europe, Middle East & Africa	Asia
Canada United States	Austria Belgium Denmark Finland France Germany Ireland Israel Italy Netherlands Norway Portugal Spain Sweden Switzerland United Kingdom	Australia Hong Kong Japan New Zealand Singapore	Argentina Brazil Chile Colombia Mexico Peru	Czech Republic Egypt Greece Hungary Poland Qatar Russia Saudi Arabia South Africa Turkey United Arab Emirates	China India Indonesia Korea Malaysia Pakistan Philippines Taiwan Thailand

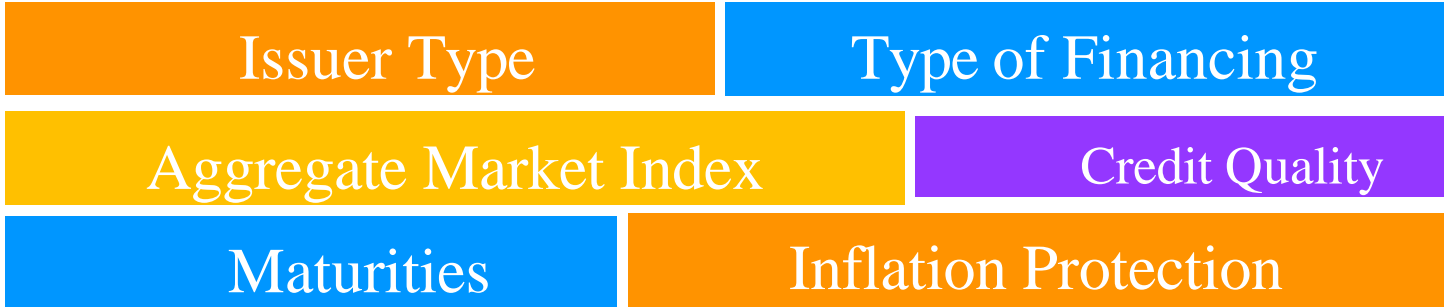
- MSCI’s flagship global equity index, is designed to represent performance of the full opportunity set of large- and mid-cap stocks across 23 developed and 26 emerging markets.
- It covers more than 3,000 constituents across 11 sectors and approximately 85% of the free float-adjusted market capitalisation in each market.

# Fixed-income Index Types

Equity

Similar to equiWes, fixed-income securiWes can be categorised according to the issuer’s economic sector, the issuer’s geographic region, or the economic development of the issuer’s geographic region. Fixed-income securiWes can also be classified along the various dimensions:

Fixed Income



AIF

Indices (Fixed Income)

# Fixed-income Index

## NIFTY G-SEC



Methodology	Total Return
No. of Constituents	Up to 3
Base Date	September 03, 2001
Base Value 1000	1000
Calculation Frequency	Daily - End of Day
Reconstitution Frequency	Monthly

NIFTY G-Sec Indices represent Government of India bonds across 6 distinct duration buckets. Up to 3 liquid securities, within each duration bucket, shall be eligible to be part of the indices.

1. NIFTY Ultra Short Duration G-Sec Index
2. NIFTY Low Duration G-Sec Index
3. NIFTY Short Duration G-Sec Index
4. NIFTY Medium Duration G-Sec Index
5. NIFTY Medium to Long Duration G-Sec Index
6. NIFTY Long Duration G-Sec Index

# Alternative Investments Index Types

Equity

Many investors seek to lower the risk or enhance the performance of their portfolios by investing in asset classes other than equities and fixed income. Interest in alternative assets and investment strategies has led to the creation of indexes designed to represent broad classes of alternative investments. Three of the most widely followed alternative investment classes are commodities, real estate, and hedge funds.

Fixed Income

Commodity Indexes

Real Estate Investment Trust Indexes

AIF

Hedge Fund Indexes

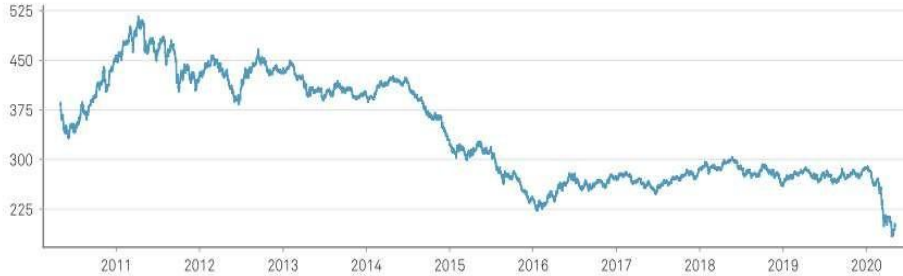
Indices (AIF)



# Alternative Investments Index Types

## DOW JONES COMMODITY INDEX

### Historical Performance



■ Dow Jones Commodity Index TR

The S&P GSCI is the first major investable commodity index.

It is designed with equally weighted sectors and liquidity-weighted commodities to facilitate the index's use as a well-diversified core beta index and as a building block for modified indices.

Indices (AI)

### Quick Facts

WEIGHTING METHOD	Capped
REBALANCING FREQUENCY	"Quarterly in January, April, July, and October"
ROLL FREQUENCY	Monthly
CALCULATION FREQUENCY	Real time
CALCULATION CURRENCIES	USD, AUD, CAD, CHF, EUR, GBP, JPY, SGD
LAUNCH DATE	October 26, 2011
FIRST VALUE DATE	January 8, 1999
REGULATORY AUTHORIZATION	European Union

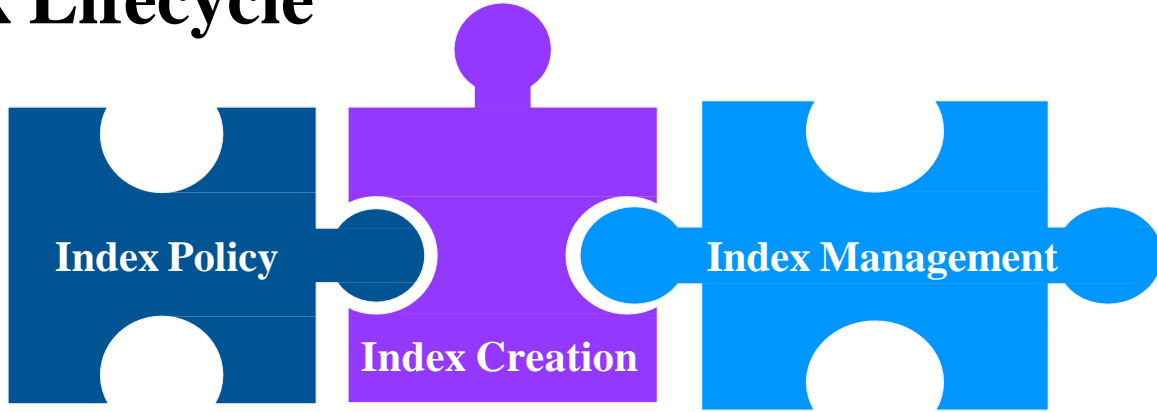


# Index Construction

## Key Learning Outcome

- Calculate and interpret the value,
- Price return, and Total return of an index
- Rebalancing and Reconstitution

# Index Lifecycle



1

## Target Market and Security Selection

The first decision in index construction is identifying the target market, market segment, or asset class that the index is intended to represent.

3

## Rebalancing and Reconstitution

Index management entails the questions: When should the index be rebalanced? and should the security selection and weighting decisions be re-examined?

2

## Index Weighting

The weighting decision determines how much of each security to include in the index and has a substantial impact on an index's value. Index providers use a number of methods to weight the constituent securities in an index.

# Price Weighted Index

- \* In a price-weighted stock index, each company's stock is weighted by its price per share.
- \* A price-weighted index can be used to track the average stock price of a given market or industry.

## Pros

- Easy to Compute and Manage
- Large well-established companies have a greater weight providing steady growth for

## Cons

- disadvantage of price weighting is that it results in arbitrary weights for each security. In particular, a stock split in any one security causes arbitrary changes in the weights of all the constituents' securities.

*formula:*

$$w_i^P = \frac{P_i}{\sum_{i=1}^N P_i}$$

In price weighting, the weight on each constituent security is determined by dividing its price by the sum of all the prices of the constituent securities.

# Price Weighted Index: Example

Stock	Stock Outstanding	Start Price	Start Value	Start Weight	End Price	Dividend Per Share	End Value	Total Dividend	Price Return	Total return	Start Weight * Price Ret	Start Weight * Total Ret	End Weight
A	1	50	50	57.14%	55.00	0.75	55	0.75	10.00%	11.50%	5.71%	6.57%	64.71%
B	1	25	25	28.57%	22.00	0.10	22	0.1	-12.00%	-11.60%	-3.43%	-3.31%	25.88%
C	1	12.5	12.5	14.29%	8.00		8	0	-36.00%	-36.00%	-5.14%	-5.14%	9.41%
Total			<b>87.5</b>	100.00%			<b>85</b>				-2.86%	-1.89%	100.00%

**Returns**

Initial Index Value	1000
End Index Value (Price Return)	971.43
End Index Value (Total Ret)	981.14

# Equal Weighted Index

An equal-weighted index fund, on the other hand, takes the same set of companies, and invests in them as equally as it can. An S&P 500 equally weighted index, for example, puts the same amount of money into Apple as it does into American Express.

## Pros

- They're more diversified, rather than heavily concentrated into just the largest companies of the index.
- Equal generally take a value-approach of investing. Easy to compute and monitor the index weight.

## Cons

- Higher turnover, leads to higher expense ratios and generally higher capital gains taxes. More volatile, and can fall more sharply during recessions.

*formula:*

$$w_i^E = \frac{1}{N}$$

This method assigns an equal weight to each constituent security at inception.

$w_i$  = fraction of the portfolio that is allocated to security  $i$  or weight of security  $i$

$N$  = number of securities in the index

# Equal Weighted Index : Example

Stock	Share In Index	Start Price	Start Value	Start Weight	End Price	Dividend Per Share	End Value	Total Dividend	Price Return	Total return	Start Weight * Price Ret	Start Weight * Total Ret	End Weight
A	40	50	2000	33.33%	55.00	0.75	2200	30	10.00%	11.50%	3.33%	3.83%	41.98%
B	80	25	2000	33.33%	22.00	0.10	1760	8	-12.00%	-11.60%	-4.00%	-3.87%	33.59%
C	160	12.5	2000	33.33%	8.00		1280	0	-36.00%	-36.00%	-12.00%	-12.00%	24.43%
Total			<b>6000</b>	100.00%			<b>5240</b>				-12.67%	-12.03%	100.00%

**Returns**

Initial Index Value	1000
End Index Value (Price Return)	873.33
End Index Value (Total Ret)	879.67

# Market-Capitalisation Weighted

A capitalisation weighted index is a type of market index with individual components that are weighted according to their total market capitalisation.

The components with a higher market cap carry a higher weighting percentage in the index. Conversely, the components with smaller market caps have lower weightings in the index.

## Pros

- Access to a wide a variety of companies both large and small
- Large well-established companies have a greater weighting providing steady growth for the index
- Small companies tend to have a lower weighting, which can reduce risk if the companies don't survive

## Cons

- As a stock price rises, a company can have an excessive amount of the weighting in an index
- Companies with larger weightings can have a disproportionate impact on the fund's performance
- Fund managers can often add shares of overvalued stocks assigning a larger weighting and create a bubble

*formula:*

$$w_i^M = \frac{Q_i P_i}{\sum_{i=1}^N Q_j P_j}$$

$w_i$  = fraction of the portfolio that is allocated to security  $i$  or weight of security  $i$

$Q_i$  = number of shares

outstanding of security  $i$ ,

$P_i$  = share price of

security  $i$ ,

$N$  = number of securities in the index



# Market- Capitalisation Weighted Index: Example

Stock	Stock Outstanding	Start Price	Start Market Cap	Start Weight	End Price	Dividend Per Share	End Market cap	Total Dividend	Price Return	Total return	Start Weight * Price Ret	Start Weight * Total Ret	End Weight
A	3000	50	150000	32.43%	55.00	0.75	165000	2250	10.00%	11.50%	3.24%	3.73%	38.82%
B	10000	25	250000	54.05%	22.00	0.10	220000	1000	-12.00%	-11.60%	-6.49%	-6.27%	51.76%
C	5000	12.5	62500	13.51%	8.00		40000	0	-36.00%	-36.00%	-4.86%	-4.86%	9.41%
Total			462500	100.00%			425000				-8.11%	-7.41%	100.00%

Initial Index Value	1000
End Index Value (Price Return)	918.92
End Index Value (Total Ret)	925.95

# Float-Adjusted Market-Capitalisation Weighted



the weight on each constituent security is determined by adjusting its market capitalisation for its market float.



market float is the number of shares of the constituent security that are available to the investing public.



Weighting method leads to overweighting stocks that have risen in price (and may be overvalued) and underweighting stocks that have declined in price (and may be undervalued).

**formula:**

$$w_i^M = \frac{f_i Q_i P_i}{\sum_{j=1}^N f_j Q_j P_j}$$

$f_i$  = fraction of shares outstanding in the market float,

$w_i$  = fraction of the portfolio that is allocated to security  $i$  or weight of security  $i$ ,

$Q_i$  = number of shares outstanding of security  $i$ ,

$P_i$  = share price of security  $i$ ,

$N$  = number of securities in the index

# Float-Adjusted Market-Capitalisation Index : Example

Stock	Stock Outstanding	% Share in Mkt Float	Shares in Index	Start Price	Start Market Cap	Start Weight	End Price	Dividend Per Share	End Market cap	Total Dividend	Price Return	Total return	Start Weight * Price Ret	Start Weight * Total Ret	End Weight
A	3000	100	3000	50	150000	39.34%	55.00	0.75	165000	2250	10.00%	11.50%	3.93%	4.52%	46.48%
B	10000	70	7000	25	175000	45.90%	22.00	0.10	154000	700	-12.00%	-11.60%	-5.51%	-5.32%	43.38%
C	5000	90	4500	12.5	56250	14.75%	8.00		36000	0	-36.00%	-36.00%	-5.31%	-5.31%	10.14%
Total					381250	100.00%			355000						
													<b>-6.89%</b>	<b>-6.11%</b>	<b>100.00%</b>

Initial Index Value	1000
End Index Value (Price Return)	931.15
End Index Value (Total Ret)	938.89

# Fundamental Weighted

◆ Attempts to address the disadvantages of market-capitalisation weighting by using measures of a company's fundamentals.

◆ Fundamental measures used for Index Construction includes

- \* Book value,
- \* Cash flow,
- \* Revenues,
- \* Earnings,
- \* Dividends, and
- \* Number of employees etc.

◆ Important property of fundamental weighting is that it leads to the indexes that have a “value” tilt.

◆ Fundamentally weighted indexes generally have a contrarian effect

*formula:*

$F_i$  denote a given fundamental size measure of company  $i$ , the fundamental weight on security  $i$  is:

$$w_i^F = \frac{F_i}{\sum_{j=1}^N F_j}$$



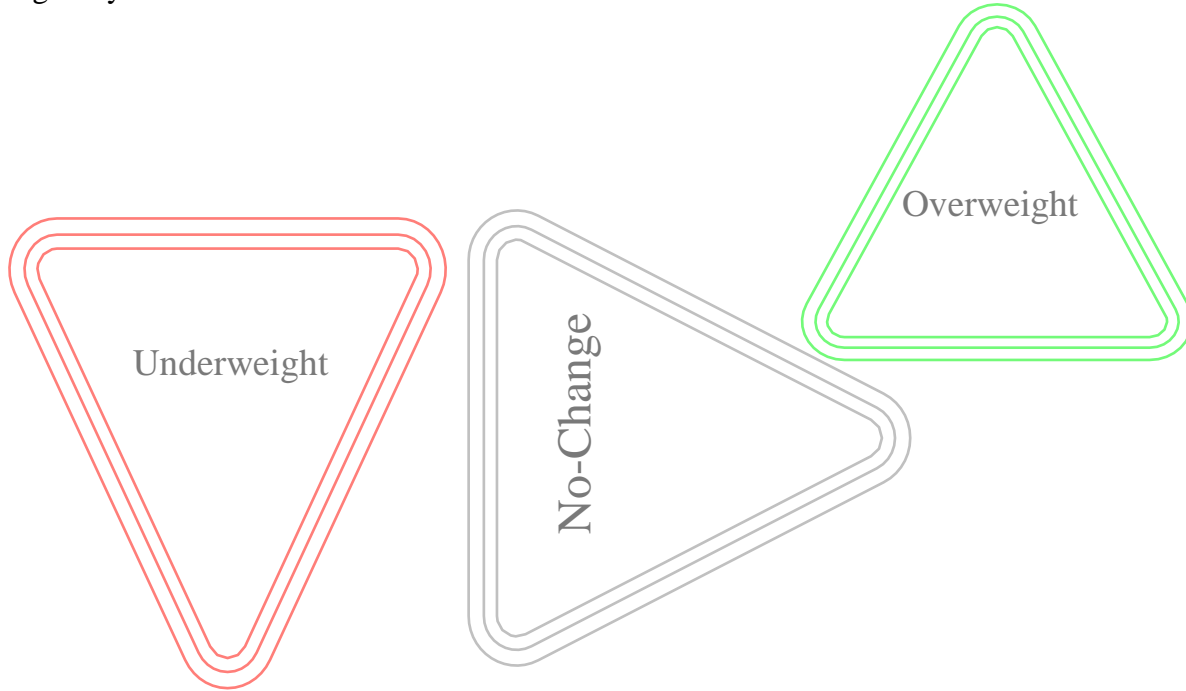
# Index Management

## Key Learning Outcome

- Describe Rebalancing & Reconstitution of an Index

# Index Management: Rebalancing

Rebalancing refers to adjusting the weights of the constituent securities in the index. To maintain the weight of each security consistent with the index's weighting policy, the index provider rebalances the index by adjusting the weights of the constituent securities on a regularly scheduled basis.



## Rebalancing

### Decisions

- ✓ Change the weight of Security
- ✓ Change the weight of Sector
- ✓ Overweight
- ✓ underweight
- ✓ unchanged

# Rebalancing of Equally Weighted Index : Example

Stock	Share In Index	Start Price	Start Value	Start Weight	End Price	Dividend Per Share	End Value	Total Dividend	Price Return	Total return	Start Weight * Price Ret	Start Weight * Total Ret	End Weight
A	40	50	2000	33.33%	55.00	0.75	2200	30	10.00%	11.50%	3.33%	3.83%	41.98%
B	80	25	2000	33.33%	22.00	0.10	1760	8	-12.00%	-11.60%	-4.00%	-3.87%	33.59%
C	160	12.5	2000	33.33%	8.00		1280	0	-36.00%	-36.00%	-12.00%	-12.00%	24.43%
Total			6000	100.00%			5240				-12.67%	-12.03%	100.00%

Transaction	Stock	New Price	Buy/ (Sell)	Rebalanced Value	Rebalanced
	A	1746.67		1746.67	33.33%
	B	1746.67	-13.33	1746.67	33.33%
	C	1746.67	466.67	1746.67	33.33%

The End Weight to reset to Initial Weight

Construction and Management

# Index Management: Reconstitution

Reconstitution is the process of changing the constituent securities in an index. It is similar to a portfolio manager deciding to change the securities in his or her portfolio. Reconstitution is part of the rebalancing cycle. The reconstitution date is the date on which index providers review the constituent securities, re-apply the initial criteria for inclusion in the index, and select which securities to retain, remove, or add.

## Key Concerns

**01** Turnover Ratio

**02** Frequency of Reconstitution



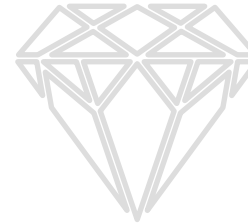
# Index Reconstitution



## Indices

### Governance & Monitoring

Index Governance to be followed for compliance and Transparency in Index value.



Change in the stock to maintain balanced representation of Market as per Index Objective and Policy.



### Quality

Ensure the quality of the stock in Index



### Index Policy

Adherence of the Index Policy



### Investible Weight Factors

IWF is in the required range of Index Policy

**Thank You**