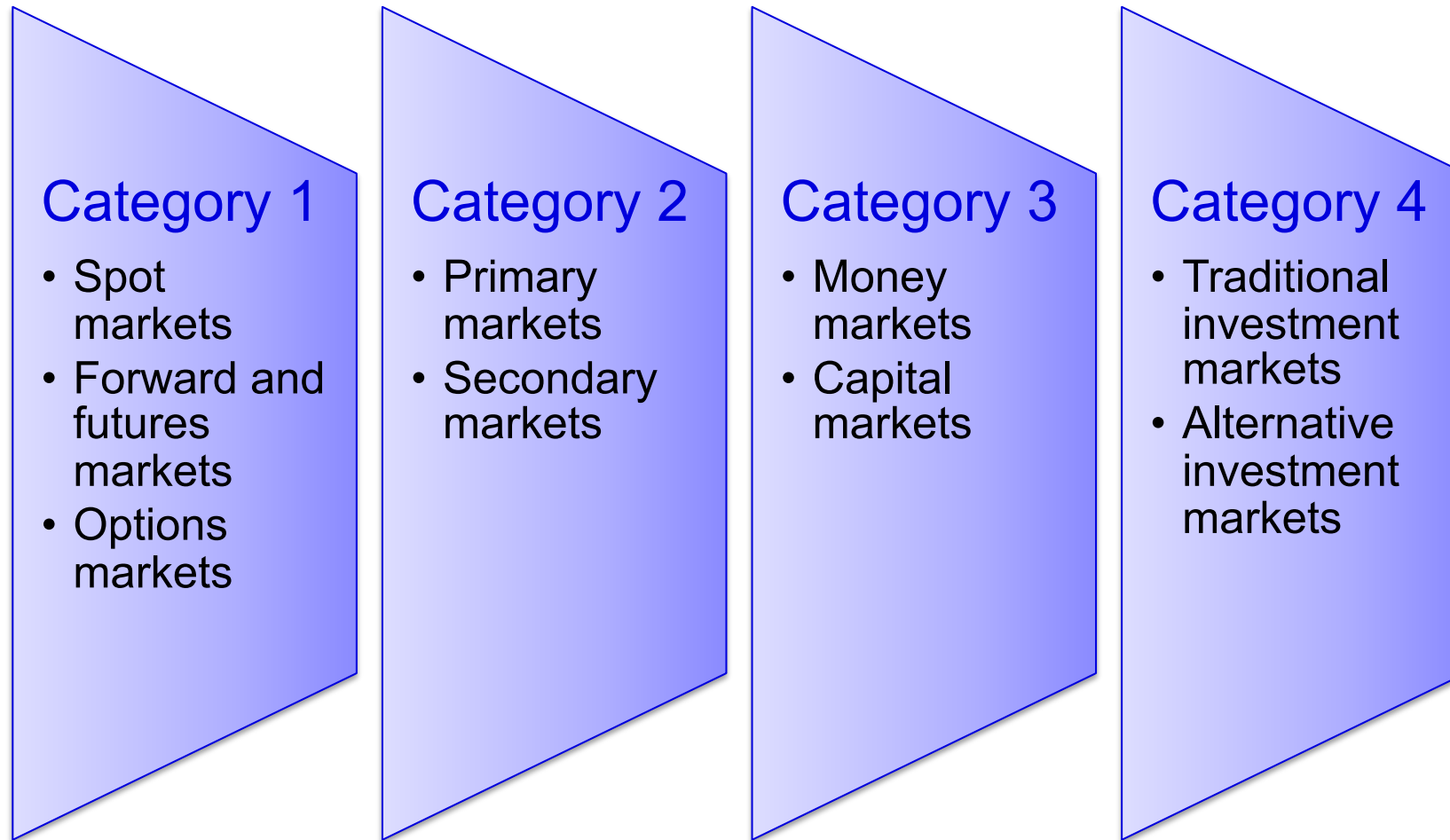


M U N I
E C O N

Financial Investments

Lecturer: Axel A. Araneda, Ph.D.

Reviewing the previous class



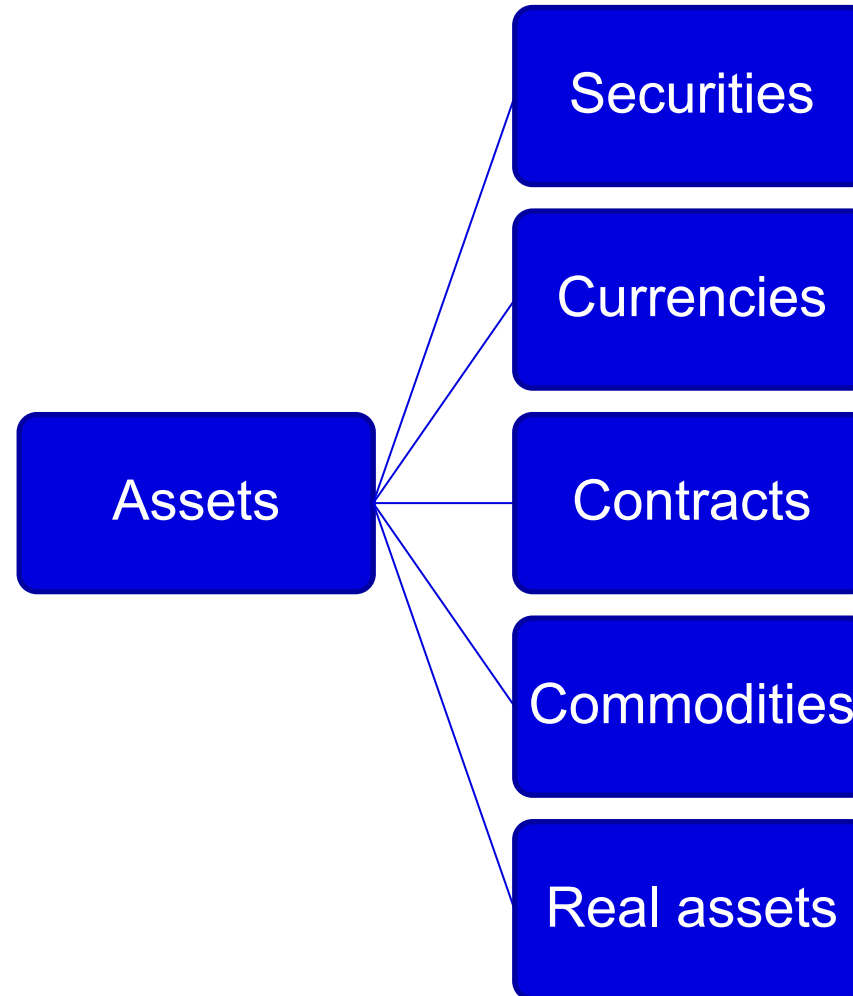
Reviewing the previous class



- Public offering: Initial public offering (IPO)
 - Public offering: Seasoned offering
 - Private placement
 - Shelf registration
 - DRPS or DRIPS
 - Rights offering

- Call markets
- Continuous markets


Reviewing the previous class



Reviewing the previous class



Reviewing the previous class



	Buying on margin
	Margin loan
	Call money rate
	Initial margin requirement
Levered Positions	Maintenance margin requirement
	Margin call
	Leverage ratio

Assignment 1

1. An online brokerage firm has set the minimum margin requirement at 55 percent. What is the maximum leverage ratio associated with a position financed by this minimum margin requirement?
 - The maximum leverage ratio is 1.82 equal to 100% position divided 55% equity. The maximum leverage ratio associated with a position financed by the minimum margin requirement is one divided by the minimum margin requirement.

Assignment 1

2. Jason Williams purchased 500 shares of a company at \$32 per share. The stock was bought on 75 percent margin. One month later, Williams had to pay interest on the amount borrowed at a rate of 2 percent per month. At that time, Williams received a dividend of \$0.50 per share. Immediately after that he sold the shares at \$28 per share. He paid commissions of \$10 on the purchase and \$10 on the sale of the stock. What was the rate of return on this investment for the one-month period?

- Total cost of the purchase: $\$16,000 = 500 * \32 .
- Equity invested: $\$12,000 = 0.75 * \$16,000$.
- Amount borrowed: $\$4,000 = 16,000 - 12,000$.
- Interest paid at month end: $\$80 = 0.02 * \$4,000$.
- Dividend received at month end: $\$250 = 500 * \0.50 .
- Proceeds on stock sale: $\$14,000 = 500 * \28 .
- Total commissions paid: $\$20 = \$10 + \$10$.
- Net gain/loss: $-\$1,850 = -16,000 - 80 + 250 + 14,000 - 20$.
- Initial investment: $\$12,010 = \$12,000 + 10$.
- Return: $-15.4\% = -\$1,850 / \$12,010$.

Assignment 1

3. The current price of a stock is \$25 per share. You have \$10,000 to invest. You borrow an additional \$10,000 from your broker and invest \$20,000 in the stock. If the maintenance margin is 30 percent, at what price will a margin call first occur?

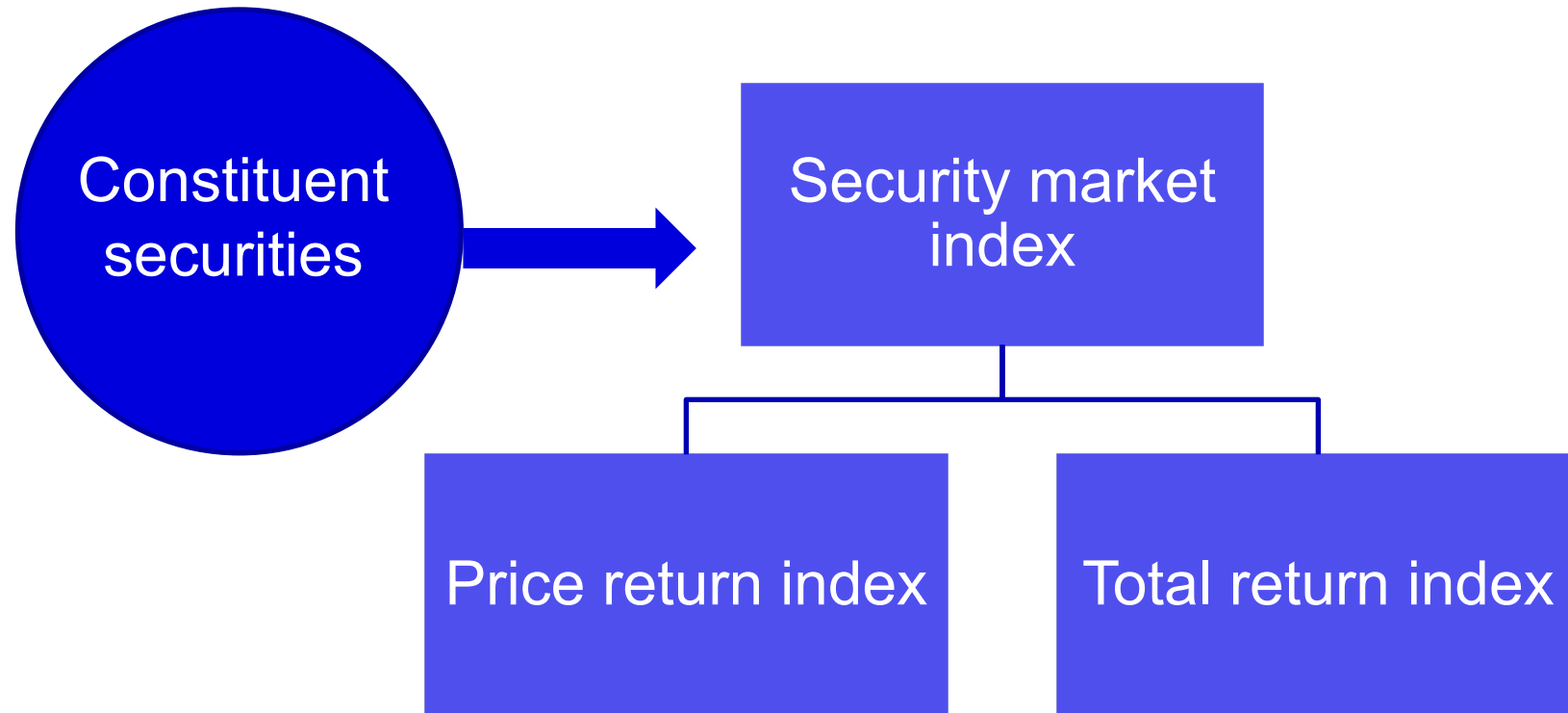
$$\frac{\text{Equity/Share}}{\text{Price/Share}} = \frac{12.50 + P - 25}{P} = 30\%$$

Lecture 2

Security Market Indices

- Description of Market Indices, Creation, Uses, Types, etc.

Description of a Security Market Index



Value of a price (return) index

$$V_{PR/I} = \frac{\sum_{i=1}^N n_i P_i}{D}$$

- $V_{PR/I}$ = the value of the price return index
- n_i = the number of units of constituent securities in the index
- N = the number of constituent securities in the index
- P_i = the unit price of constituent security i
- D = the value of the divisor

Calculation of Single-Period Price Return

$$PR_I = \frac{V_{PR/1} - V_{PR/0}}{V_{PR/0}} = \sum_{i=1}^N w_i PR_i = \sum_{i=1}^N w_i \left(\frac{P_{i1} - P_{i0}}{P_{i0}} \right)$$

- PR_I = the price return of index portfolio I
- PR_i = the price return of constituent security i
- w_i = the weight of security i
- P_{i1} = the price of constituent security i at the end of the period
- P_{i0} = the price of constituent security i at the beginning of the period

Example 1: Single-Period Price Return

Security	Beginning of Period Price (€)	Ending of Period Price (€)	Dividends per share (€)	Shares Outstanding
LMN	10.00	12.00	0.50	200
OPQ	25.00	24.00	1.00	100
RST	15.00	18.00	0.25	400
Divisor = 100				

$$V_{PR/0} = \frac{(200 \times 10) + (100 \times 25) + (400 \times 15)}{100} = 105.00$$

$$V_{PR/1} = \frac{(200 \times 12) + (100 \times 24) + (400 \times 18)}{100} = 120.00$$

$$PR_I = \frac{120.00 - 105.00}{105.00} \approx .1429 \approx 14.29\%$$

Calculation of Single-Period Total Return

$$TR_I = \frac{V_{PRI1} - V_{PRI0} + \text{Inc}_I}{V_{PRI0}}$$

$$TR_I = \sum_{i=1}^N w_i TR_i = \sum_{i=1}^N w_i \left(\frac{P_{1i} - P_{0i} + \text{Inc}_i}{P_{0i}} \right)$$

- TR_I = the total return of the index portfolio
- Inc_I = the total income from all securities in the index
- TR_i = the total return of the constituent security i
- Inc_i = the total income from security i

Example 2: Single-Period Total Return

Security	Beginning of Period Price (€)	Ending of Period Price (€)	Dividends per share (€)	Shares Outstanding
LMN	10.00	12.00	0.50	200
OPQ	25.00	24.00	1.00	100
RST	15.00	18.00	0.25	400
Divisor = 100				

$$\text{Inc}_I = [(200 \times 0.50) + (100 \times 1.00) + (400 \times 0.25)] \div 100 = 3.00$$

$$\text{TR}_I = \frac{120.00 - 105.00 + 3.00}{105.00} \approx .1714 \approx 17.14\%$$

Calculation of Index Values over Multiple Time Periods

$$V_{PR/T} = V_{PR/0} (1 + PR_{I1})(1 + PR_{I2}) \dots (1 + PR_{IT})$$
$$V_{TR/T} = V_{TR/0} (1 + TR_{I1})(1 + TR_{I2}) \dots (1 + TR_{IT})$$

The calculation of index values over multiple time periods requires geometrically linking the series of index returns.

Example 3: Multi-Period Index

Period	Return (%)	Calculation	Ending Value
0		$1,000(1.00)$	1,000.00
1	5.00	$1,000(1.05)$	1,050.00
2	3.00	$1,000(1.05)(1.03)$	1,081.50

Choices in Index Construction and Management

Which target market should the index represent?

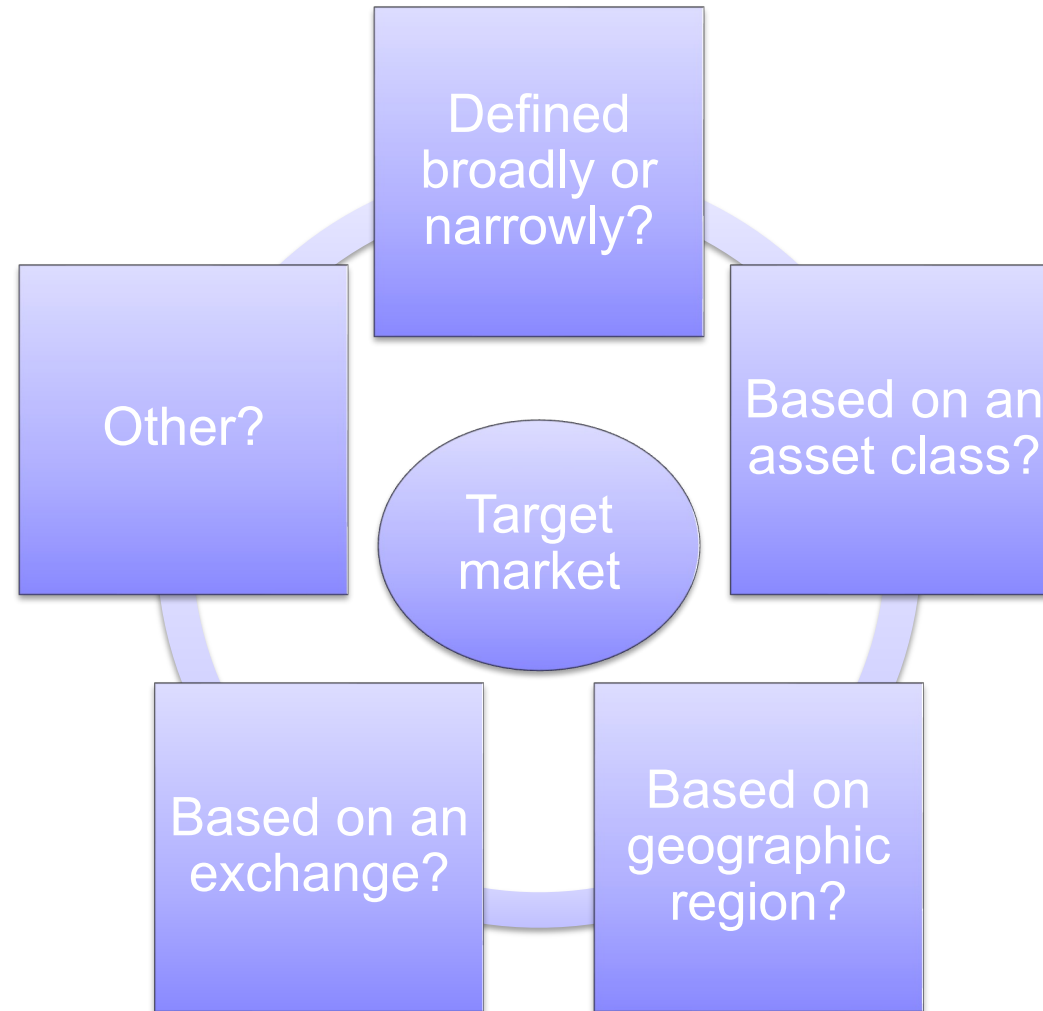
Which securities should be selected from that target market?

How much weight should be allocated to each security in the index?

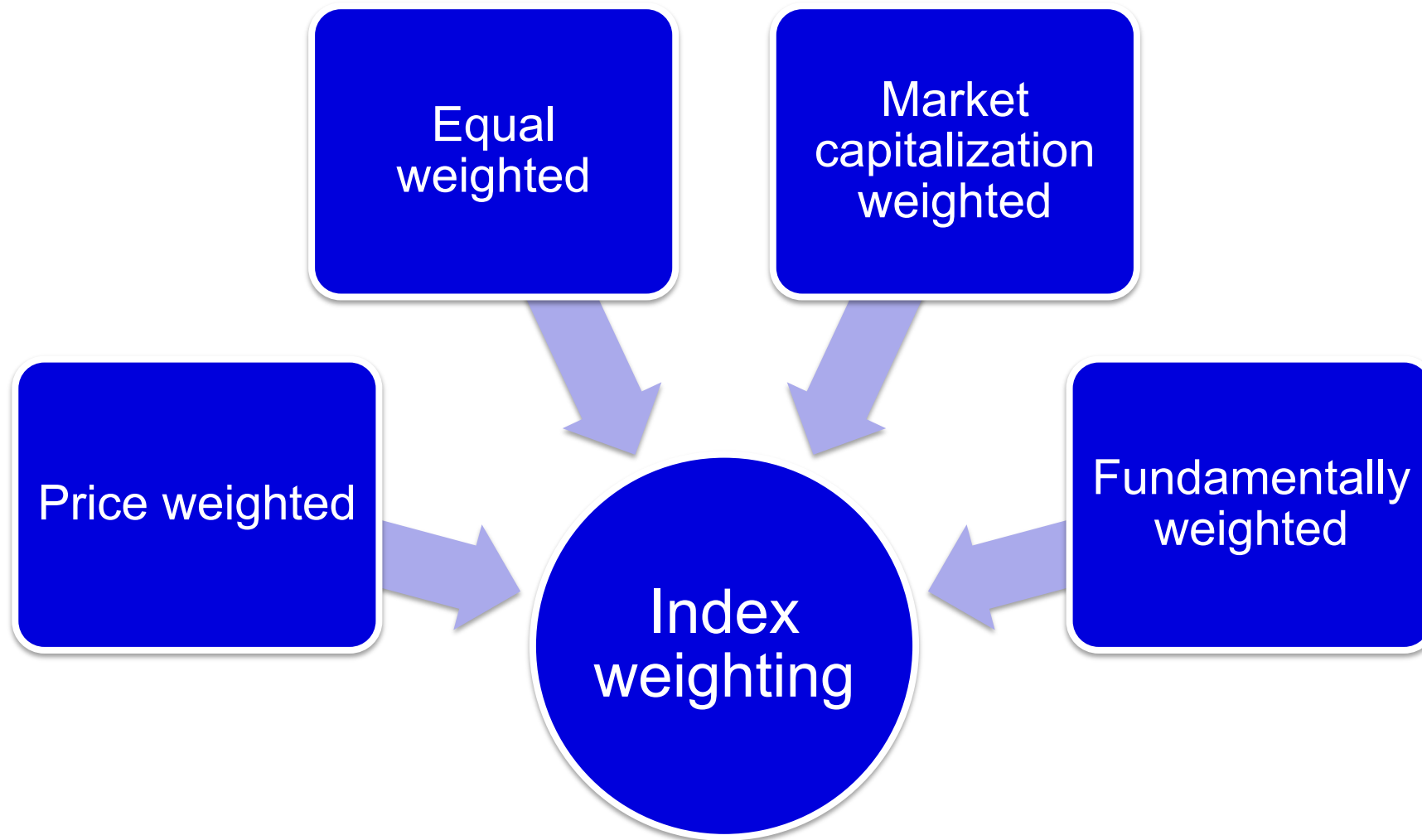
When should the index be rebalanced?

When should the security selection and weighting decision be re-examined?

Target Market Selection



Weighting Method in Index Construction



Weighting Schemes

Equally Weighted:

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

Price Weighted:

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

Market capitalization weighted:

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

Factor weighted:

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

Example 4: Price Weighted Index

Security	Shares in Index	BOP Price	Value (Shares x BOP Price)	BOP Weight %	EOP Price	Dividends Per Share	Value (Shares x EOP Price)	Total Dividends	Price Return %	Total Return %	BOP Weight x Price Return %	BOP Weight x Total Return %	EOP Weight %
A	1	50.00	50.00	49.26	55.00	0.75	55.00	0.75	10.00	11.50	4.93	5.66	52.38
B	1	25.00	25.00	24.63	22.00	0.10	22.00	0.10	-12.00	-11.60	-2.96	-2.86	20.95
C	1	12.50	12.50	12.32	8.00	0.00	8.00	0.00	-36.00	-36.00	-4.43	-4.43	7.62
D	1	10.00	10.00	9.85	14.00	0.05	14.00	0.05	40.00	40.50	3.94	3.99	13.33
E	1	4.00	4.00	3.94	6.00	0.00	6.00	0.00	50.00	50.00	1.97	1.97	5.72
Total			101.50	100			105.00	0.90			3.45	4.33	100.00
Index Value			20.30				21.00	0.18	3.45	4.33			

Divisor = 5

BOP = Beginning of period

EOP = End of period

Type of Index	BOP Value	Return %	EOP Value
Price Return	20.30	3.45	21.00
Total Return	20.30	4.33	21.18

Example 5: Equally Weighted Index

Security	Shares in Index	BOP Price	Value (Shares x BOP Price)	Weight %	EOP Price	Dividends Per Share	Value (Shares x EOP Price)	Total Dividends	Price Return %	Total Return %	Weight x Price Return %	Weight x Total Return %	EOP Weight %
A	40	50.00	2,000	20.00	55.00	0.75	2,200	30	10.00	11.50	2.00	2.30	19.93
B	80	25.00	2,000	20.00	22.00	0.10	1,760	8	-12.00	-11.60	-2.40	-2.32	15.94
C	160	12.50	2,000	20.00	8.00	0.00	1,280	0	-36.00	-36.00	-7.20	-7.20	11.60
D	200	10.00	2,000	20.00	14.00	0.05	2,800	10	40.00	40.50	8.00	8.10	25.36
E	500	4.00	2,000	20.00	6.00	0.00	3,000	0	50.00	50.00	10.00	10.00	27.17
Total			10,000	100.00			11,040	48			10.40	10.88	100.00
Index Value			1,000				1,104	4.80	10.40	10.88			

Divisor = 10

BOP = Beginning of period

EOP = End of period

Type of Index	BOP Value	Return %	EOP Value
Price Return	1,000.00	10.40	1,104.00
Total Return	1,000.00	10.88	1,108.80

Example 6: Market Capitalization Index

Stock	Shares Out- standing	BOP Price	BOP Market cap	BOP Weight %	EOP Price	Dividends Per Share	EOP Market cap	Total Dividends	Price Return %	Total Return %	BOP Weight x Price Return %	BOP Weight x Total Return %	EOP Weight %
A	3,000	50.00	150,000	26.29	55.00	0.75	165,000	2,250	10.00	11.50	2.63	3.02	28.50
B	10,000	25.00	250,000	43.82	22.00	0.10	220,000	1,000	-12.00	-11.60	-5.26	-5.08	38.00
C	5,000	12.50	62,500	10.96	8.00	0.00	40,000	0	-36.00	-36.00	-3.95	-3.95	6.91
D	8,000	10.00	80,000	14.02	14.00	0.05	112,000	400	40.00	40.50	5.61	5.68	19.34
E	7,000	4.00	28,000	4.91	6.00	0.00	42,000	0	50.00	50.00	2.46	2.46	7.25
Total			570,500	100.00			579,000	3,650			1.49	2.13	100.00
Index Value			1,000				1,014.90	6.40	1.49	2.13			

Divisor = 570.50

BOP = Beginning of period

EOP = End of period

Type of Index	BOP Value	Return %	EOP Value
Price Return	1,000.00	1.49	1,014.90
Total Return	1,000.00	2.13	1,021.30

Comparison: Market Capitalization Weighting vs Fundamental Weighting

– Assume a 2-stock Index, consisting of Stock A and Stock B:

Stock A

Earnings = €20

Market cap = €200

Market cap weight = 20%

Fundamental weight = 50%

Stock B

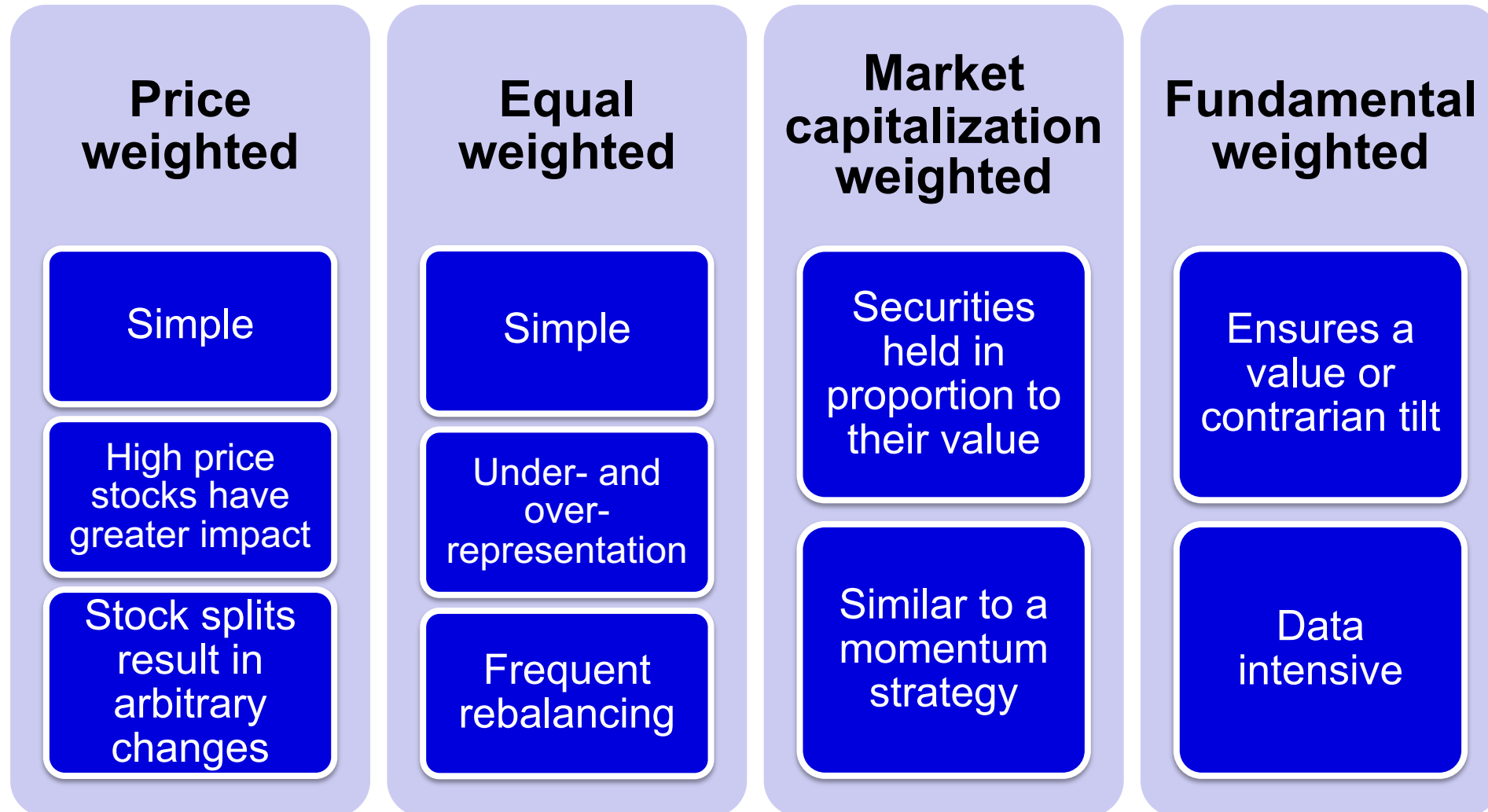
Earnings = €20

Market cap = €800

Market cap weight = 80%

Fundamental weight = 50%

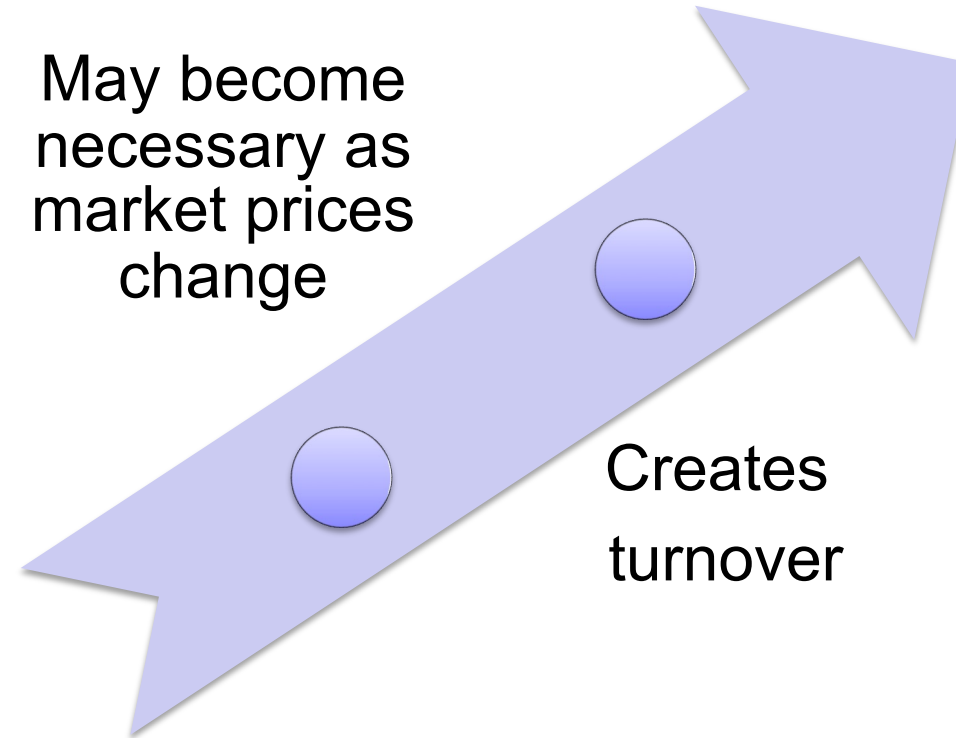
Weighting: Advantages and Disadvantages



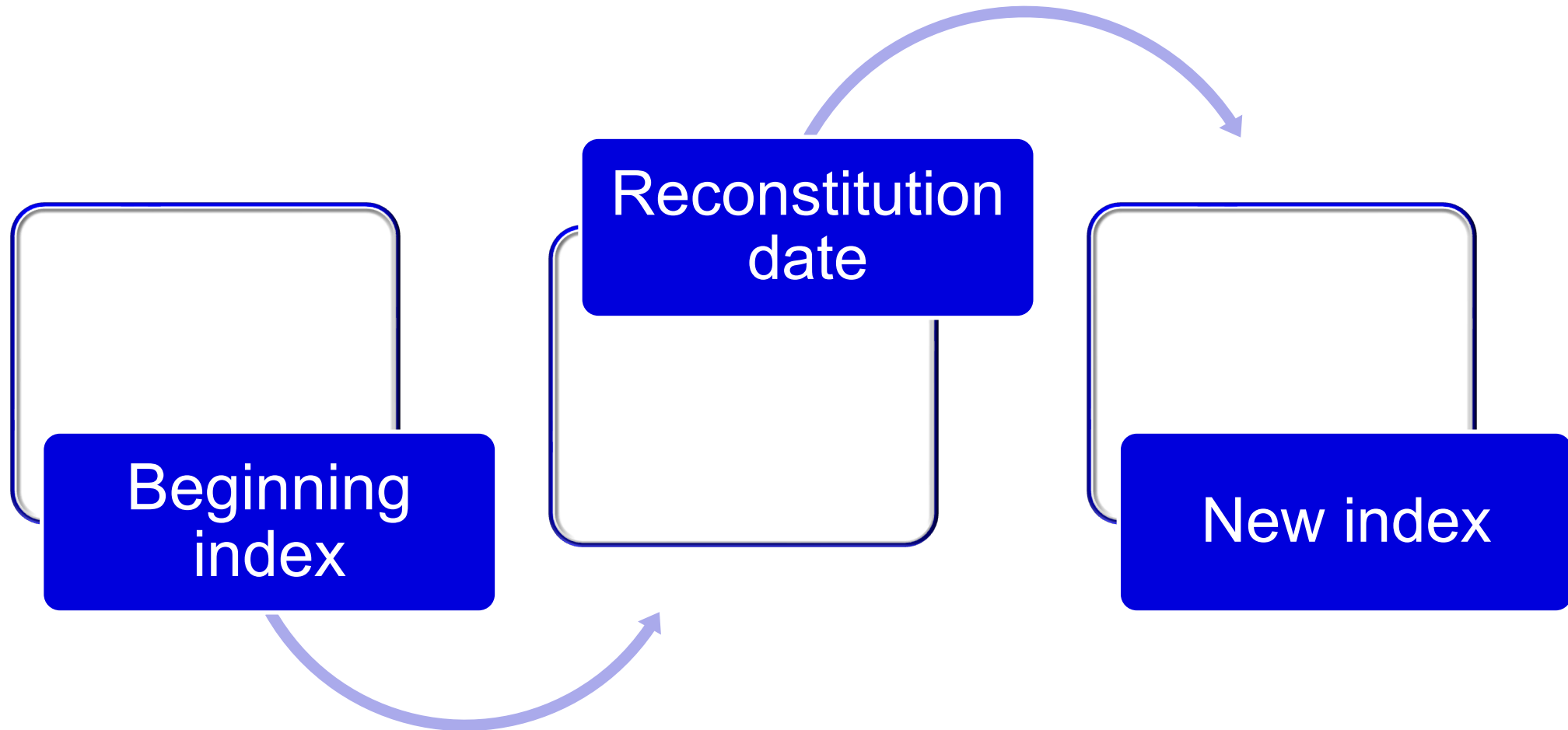
Rebalancing



May become
necessary as
market prices
change



Reconstitution



Use of Market Indexes

Estimation of market sentiment

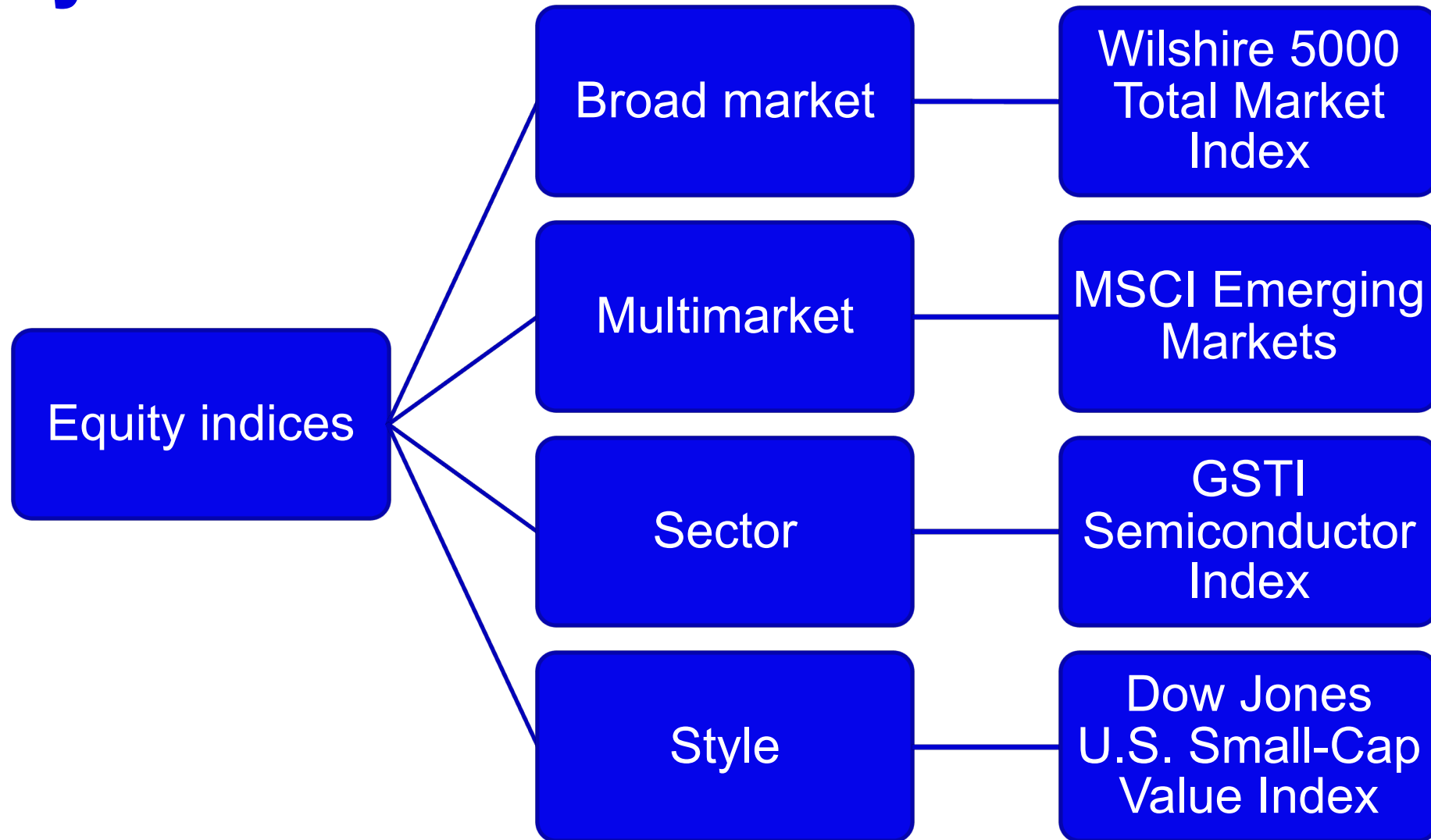
Proxies for measuring and modeling returns, systematic risk (beta), and risk-adjusted performance (alpha)

Proxies for asset classes in asset allocation models

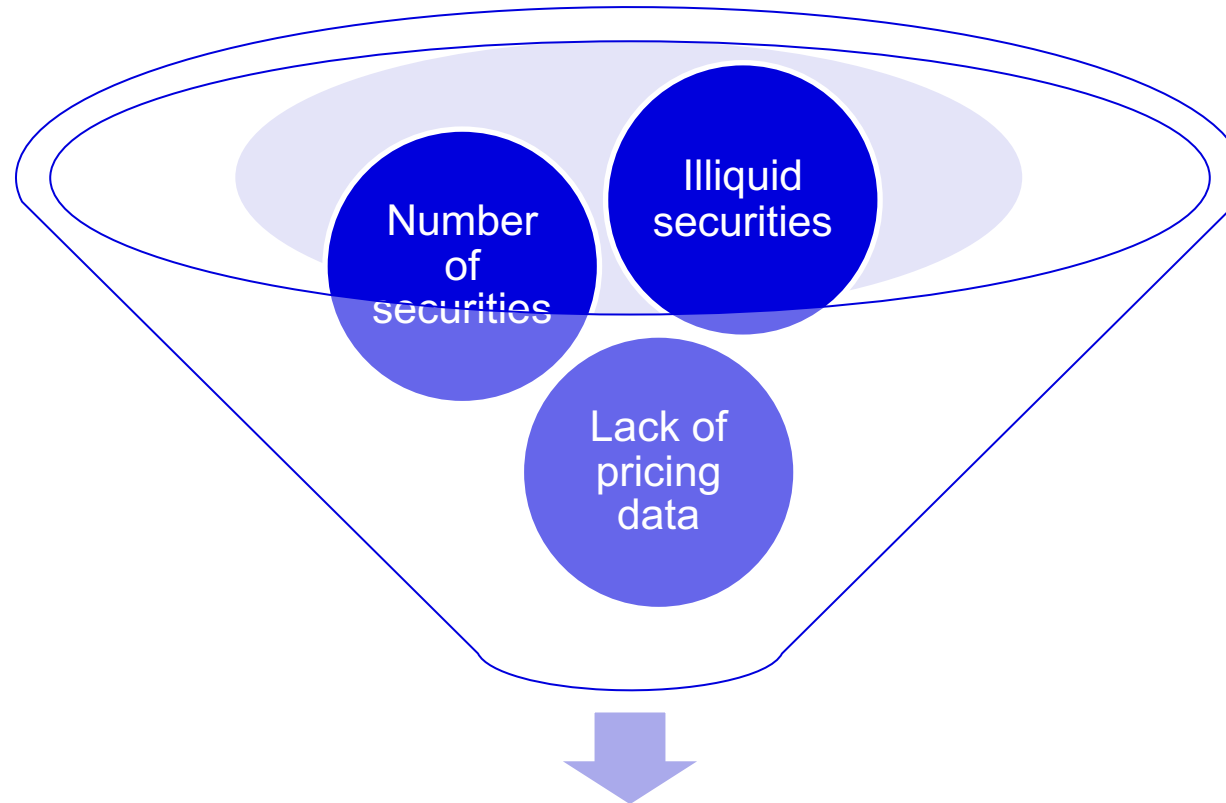
Benchmarks for actively managed portfolios (index is passive portfolio)

Model portfolios for such investment products as index funds and exchange-traded funds (ETFs)

Equity Indexes

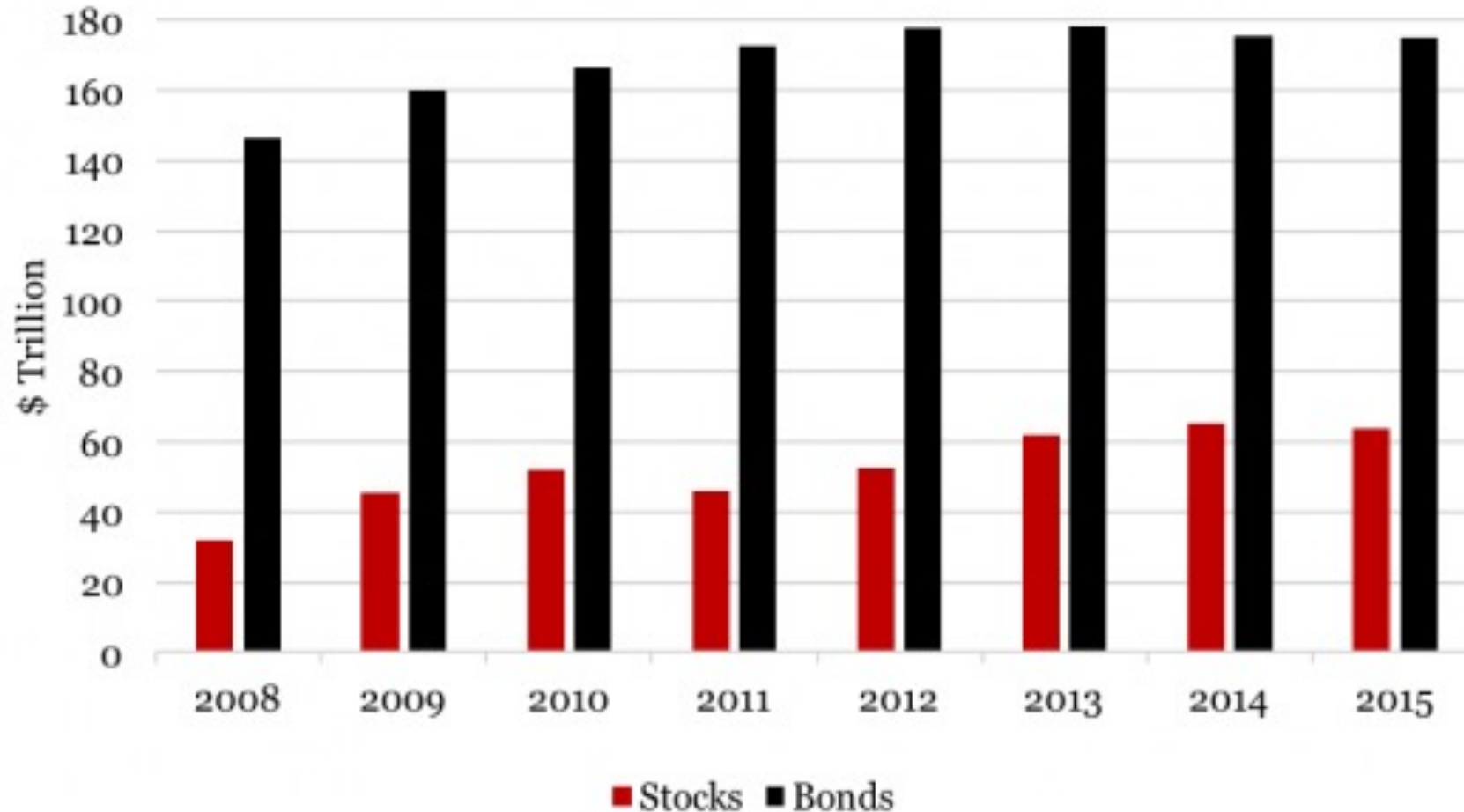


Challenges to Build a Fixed-Income Index



Fixed income index

Size: Global Stock Market vs Bond Market



Source: Bloomberg; Bank for International Settlements

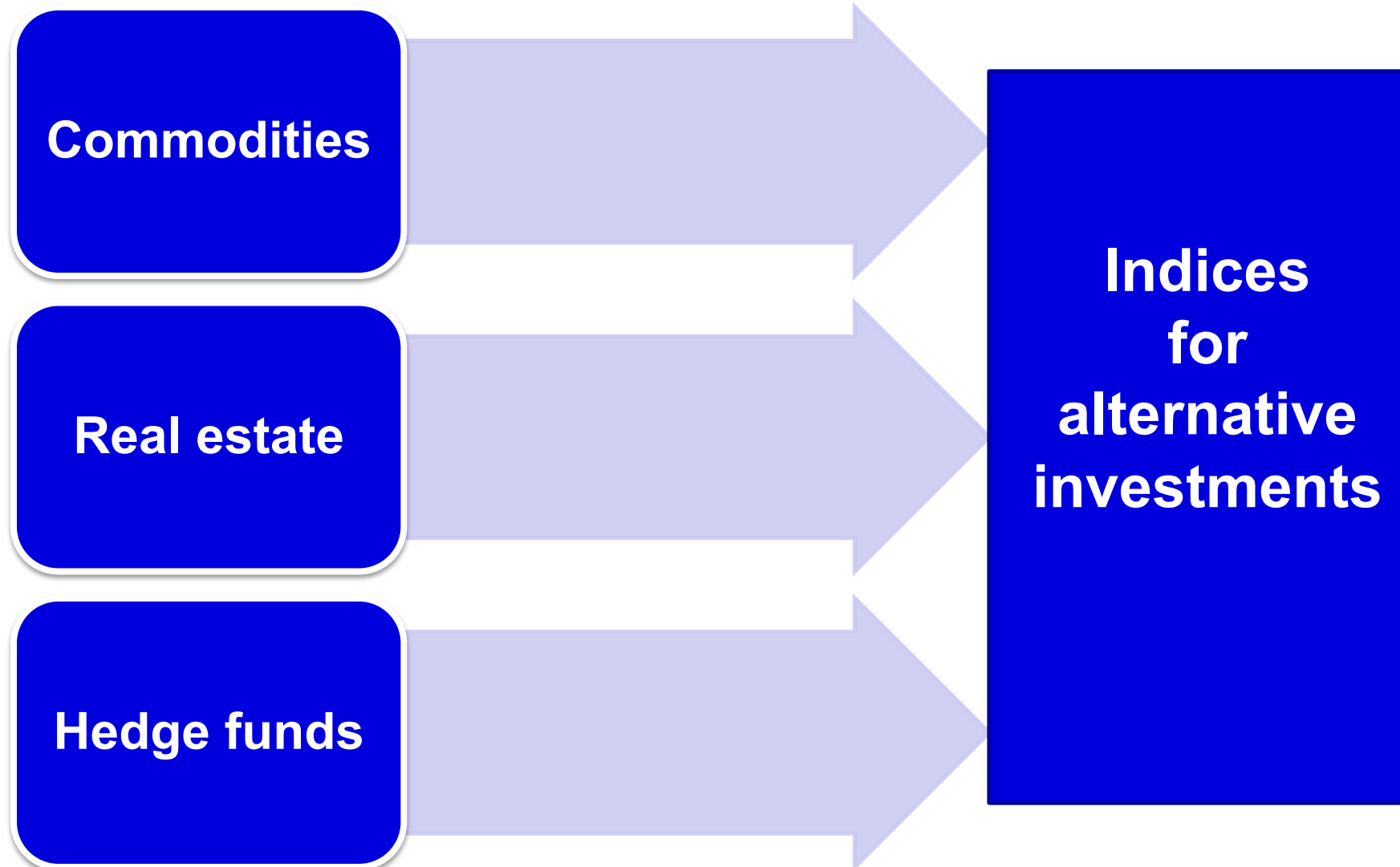
Note: 2015 bond market data as of Q3

www.truewealthpublishing.asia

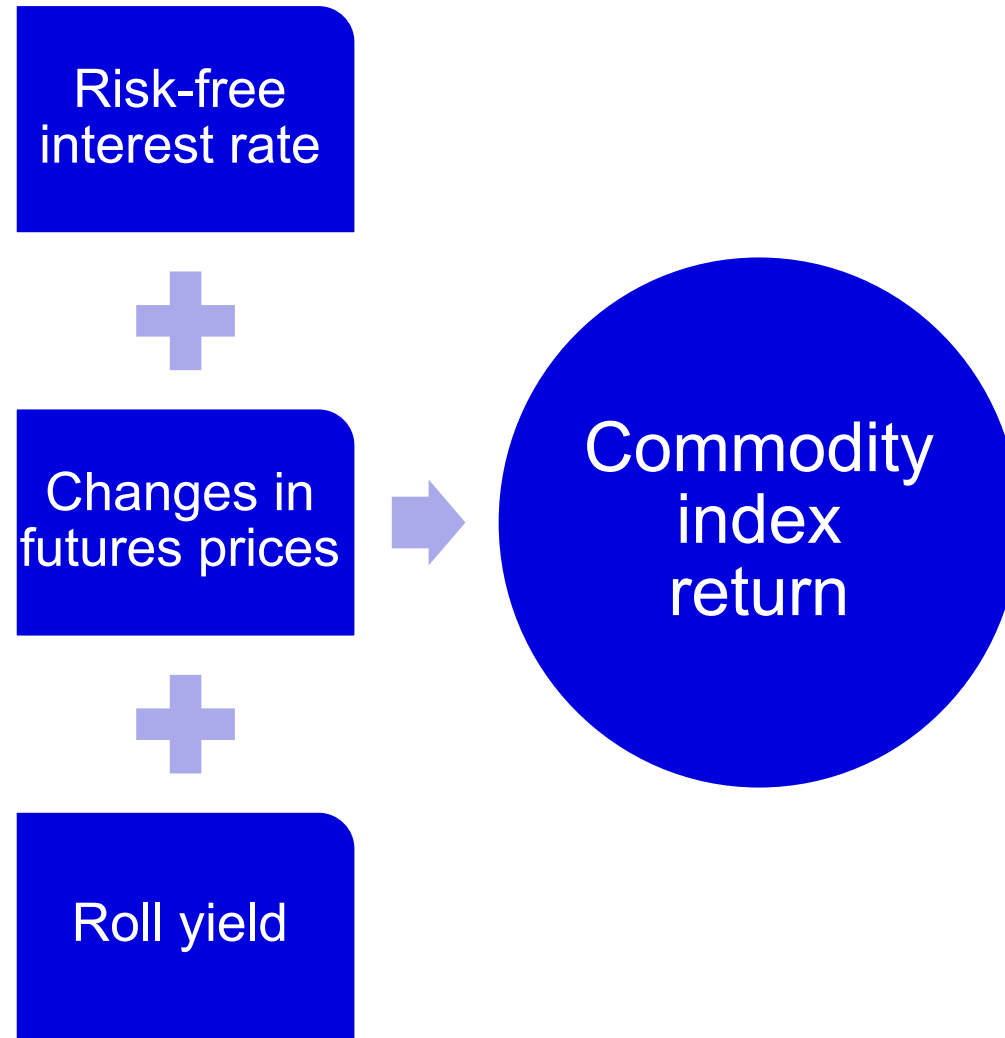
Fixed-Income Indices Classification

Market	Global			
	Regional			
	Country or currency zone			
Type	Corporate	Collateralized Securitized Mortgage- backed	Government agency	Government
Maturity	For example, 1–3, 3–5, 5–7, 7–10, 10+ years; short-term, medium-term, or long-term			
Credit quality	For example, AAA, AA, A, BBB, etc.; Aaa, Aa, A, Baa, etc.; investment grade, high yield			

Indices for Alternative Investments



Commodity Indices



Hedge Funds Indices


Hedge funds are private investment vehicles that typically use leverage and long and short investment strategies.



Research organizations maintain databases of hedge fund returns and summarize these returns into indices.



Most indices reflect performance on a broad global level or on a strategy level.



Most indices are equal weighted.