MONASH University

Information Technology

FIT1006
Business Information Analysis

Lecture 13 (Part 2)
Index Numbers

Topics covered:

Done last week

- Simple indices – and the problem with these
- Aggregate indices – Laspeyres, Paasche and Fisher
- Changing the base of an index
- Chaining indices
- The Consumer Price Index (CPI)

Will look at this today

Class exercise in groups

The prices of certain commodities and the quantities consumed per month are given for 1992 and 2010. Calculate the Fisher Price Index.

Item	Quantity 1992	Quantity 2010	Cost 1992	Cost 2010
A	3	4	4.00	5.00
B	2	1	20.00	40.00

$$I_{0,t}^{LP} = \frac{\sum q_0 p_t}{\sum q_0 p_0} 100$$

$$I_{0,t}^{PP} = \frac{\sum q_t p_t}{\sum q_t p_0} 100$$

$$I_{0,t}^{FP} = \sqrt{I_{0,t}^{LP} \times I_{0,t}^{PP}}$$

https://flux.qa (Feed code: SJ6KGV)

Question 4

The prices of certain commodities and the quantities consumed per month are given for 1992 and 2010.

Item	Quantity 1992	Quantity 2010	Cost 1992	Cost 2010
A	3	4	4.00	5.00
B	2	1	20.00	40.00

The Laspeyres calculation is

A. (3 × 4 + 2 × 20) / (3 × 5 + 2 × 40)

B. (3 × 5 + 2 × 40) / (3 × 4 + 2 × 20)

C. (4 × 4 + 1 × 20) / (4 × 5 + 1 × 40)

D. (4 × 5 + 1 × 40) / (4 × 4 + 1 × 20)

$$I_{0,t}^{LP} = \frac{\sum q_0 p_t}{\sum q_0 p_0} 100$$

https://flux.qa (Feed code: SJ6KGV)

Question 5

The prices of certain commodities and the quantities consumed per month are given for 1992 and 2010.

Item	Quantity 1992	Quantity 2010	Cost 1992	Cost 2010
A	3	4	4.00	5.00
B	2	1	20.00	40.00

The Paasche calculation is

A. (3 × 4 + 2 × 20) / (3 × 5 + 2 × 40)

B. (3 × 5 + 2 × 40) / (3 × 4 + 2 × 20)

C. (4 × 4 + 1 × 20) / (4 × 5 + 1 × 40)

D. (4 × 5 + 1 × 40) / (4 × 4 + 1 × 20)

$$I_{0,t}^{PP} = \frac{\sum q_t p_t}{\sum q_t p_0} 100$$

Class exercise in groups… answers

The prices of certain commodities and the quantities consumed per month are given for 1992 and 2010. Calculate the Fisher Price Index.

Item	Quantity 1992	Quantity 2010	Cost 1992	Cost 2010
A	3	4	4.00	5.00
B	2	1	20.00	40.00

$$I_{0,t}^{LP} = \frac{\sum q_0 p_t}{\sum q_0 p_0} 100$$

$$I_{0,t}^{PP} = \frac{\sum q_t p_t}{\sum q_t p_0} 100$$

$$I_{0,t}^{FP} = \sqrt{I_{0,t}^{LP} \times I_{0,t}^{PP}}$$

Laspeyres	Num	95
	Den	52
	Index	1.827
Paasche	Num	60
	Den	36
	Index	1.667
Fisher		1.745

The Consumer Price Index

- The Australian Consumer Price Index is a general indicator of the rate of change in prices paid by household consumers for the goods and services they buy.
- The CPI measures the changes in the cost of living, not absolute costs. Note the new series (16^{th}) now reports costs
- The CPI is also used as an index for many wage agreements, pensions and rental costs etc.

Composition of the CPI

- The CPI is composed of a basket of goods and services with weights based on patterns of household expenditure in each of the capital cities.
- The prices of goods and services are collected at regular intervals at across a range of outlets in order to obtain indicative values for goods with volatile prices (such as fruit and vegetables, petrol etc.)
- The prices are also collected in each of the major cities, and the index is then weighted for the population proportion in each city.
- Prior to 2018, the composition of the CPI is reviewed every 5 years or so to reflect changing consumption patterns. Since 2018, it's now done annually.

Reading the CPI

Latest release (March 2021)
https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/latest-release

- Cover/Front
  - Shows highlights and trends, Changes in indices, Treasury's estimate of inflation.
- All groups index numbers
  - Shows the all groups indices for each of the capital cities. This shows the movement of the price index over a period of years.
- Changes in groups.
- Composition of groups.

Motivating Problem

- Petrol cost, on average, 130 cents per litre in Melbourne in 2007.
- What should the average price of petrol be now to maintain parity with the 2007 price?
- Chain index at 2011 – 12 and use Dec 2011 and Dec 2015 index values in Melbourne.

$$\$1.30 * 176.8 / 159.6 * 108.3 / 100 = \$1.56$$

Some old data … CPI (All groups)

1 ALL GROUPS CPI, Index numbers(a)

$1.30 * 176.8 / 159.6 * 108.3 / 100 = $1.56

Period	Sydney	Melbourne	Brisbane	Adelaide
2007-08	160.9	159.6	164.8	164.4
2008-09	165.8	164.1	171.0	169.7
2009-10	169.7	167.5	175.5	173.4
2010-11	174.8	173.0	181.4	178.9
2007				
December	159.5	158.5	163.4	163.1
2008				
March	161.7	160.6	165.6	165.5
June	164.1	162.5	168.4	167.6
September	165.9	164.4	170.8	169.8
December	165.5	163.5	170.4	169.3
2009				
March	165.6	163.9	170.8	169.3
June	166.3	164.4	171.8	170.3
September	168.1	165.4	174.1	172.1
December	169.1	166.4	174.7	172.7
2010				
March	170.5	168.5	176.0	173.7
June	171.1	169.5	177.3	175.0
September	172.5	170.5	179.1	176.6
December	173.1	171.5	180.0	177.1
2011				
March	175.9	174.4	182.3	180.0
June	177.6	175.6	184.1	181.8
September	178.8	176.7	184.7	183.6
December	178.7	176.8	184.4	183.5

1 ALL GROUPS CPI, Index numbers(a)

Period	Sydney	Melbourne	Brisbane	Adelaide	Perth
2011-12	100.0	100.0	100.0	100.0	100.0
2012-13	102.6	102.2	102.0	102.1	102.2
2013-14	105.2	105.0	104.9	104.7	105.3
2014-15	107.3	106.5	106.8	106.3	107.2
2011					
December	99.8	99.9	99.7	100.0	99.8
2012					
March	99.9	99.9	99.9	99.9	100.0
June	100.5	100.4	100.5	100.2	100.5
September	102.2	101.6	101.6	101.7	101.6
December	102.3	102.0	101.9	102.1	101.9
2013					
March	102.7	102.4	102.0	102.1	102.4
June	103.1	102.6	102.5	102.3	103.0
September	104.3	104.0	103.8	103.7	104.2
December	105.0	104.8	104.6	104.4	104.9
2014					
March	105.6	105.3	105.2	105.1	105.6
June	106.0	105.9	105.8	105.5	106.4
September	106.6	106.1	106.5	105.9	106.9
December	106.8	106.3	106.7	106.2	107.0
2015					
March	107.3	106.4	106.7	106.3	107.1
June	108.3	107.1	107.4	106.8	107.7
September	108.6	107.6	108.1	107.1	108.1
December	108.9	108.3	108.5	107.3	108.6

More Information ...

- Visit the Australian Bureau of Statistics web site:
  - http://www.abs.gov.au/
  - Access to most ABS publications is free!
- Further Reading: (CPI - March 2021 release)
  - 6401.01 - Consumer Price Index (most recent)
  - Further information about the CPI is contained in Consumer Price Index: Concepts, Sources and Methods (cat. no. 6461.0)
  - A Guide to the Consumer Price Index: 17th Series 2017, January 2018
  - Consumer Price Index: 17th Series Weighting Pattern, November 2017
  - Information Paper: Introduction of the 17th Series Australian Consumer Price Index, 2017, November 2017

Necessary Skills

- Know how to:
  - Calculate Laspeyres, paasche and Fisher indices;
  - Change the base of an index;
  - Chain indices;
- Have a general idea of how the CPI is constructed and used.

Reading/Questions (Selvanathan)

- Reading:
  - 7th Ed. Chapter 18.
- Questions:
  - 7th Ed. Questions: 18.1, 18.3, 18.4, 18.9, 18.14, 18.17.