Macro Problem Set 1

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2.
(a) As part of an ‘adjustment package’ for a future increase in taxes, the Singapore government decides to give $200 in cash each to 1 million families.

This is not accounted for in GDP under government expenditure in the expenditure approach as the government is transferring cash to households. Under government expenditure, we only consider government investment and consumption on goods and services.

(b) Marcus buys 10,000 shares of DBS Bank's stock at $10 per share, paying his stockbroker a 1% commission.

The action of buying shares is not accounted for in GDP because the money is not used on goods and services. However, the action of paying a commission to the stockbroker is accounted for under GDP but not when applying the expenditure approach. It is accounted for when applying the income (factor payments) approach.

(c) Students purchase 2,000 economics textbooks from the NUS Co-op at $50 apiece. 500 of the textbooks are drawn from the Co-op’s stock left-over from last year. The remaining books are freshly printed by its local supplier this year.

This is accounted for in GDP under private consumption as it involves the act of purchasing goods (i.e. textbooks). However, the 500 textbooks drawn from the previous year’s stock does not account for this year’s GDP.

(d) Omnidesk, a local maker of motorized standing desks, spends $20 million to purchase motors from an overseas supplier, and spends $10 million to build its own specialized tools to test the desks.

The expenditure on motors from an overseas supplier is accounted for in GDP under imports as the firm is purchasing goods that are produced abroad. While the money spent on equipment to build its own specialised tools is accounted for under private investments because it is expenditure on capital goods as components to produce a final good (i.e. specialised tools).

3.

| | Food | | Clothing | |
|---|---|---|---|---|
| Year | Quantity | Price ($) | Quantity | Price ($) |
| 2015 | 5,000 | 100 | 7,500 | 80 |
| 2016 | 6,000 | 110 | 8,000 | 150 |
| 2017 | 7,000 | 120 | 9,000 | 180 |

(a)
Nominal GDP for
2015: (5000 x $100) + (7500 x $80) = $1.1 million
2016: (6000 x $110) + (8000 x $150) = $1.86 million
2017: (7000 x $120) + (9000 x $180) = $2.46 million

(b)
Using the fixed based approach with 2015 as base year,
Real GDP in 2015: (5000 x $100) + (7500 x $80) = $1.1 million

Real GDP in 2016: (6000 x $100) + (8000 x $80) = $1.24 million
Growth rate in 2016 = (1240000 - 1100000)/1100000 x 100 = 12.7%

Real GDP in 2017: (7000 x $100) + (9000 x $80) = $1.42 million
Growth rate in 2017= (1420000 - 1240000)/1240000 x 100 = 14.5%

(c)
Using the fixed based approach with 2016 as base year,
Real GDP in 2015: (5000 x $110) + (7500 x $150) = $1.675 million
Growth rate in 2016: (1860000-1675000)/1675000 x 100 = 11.0%

Real GDP in 2016: (6000 x $110) + (8000 x $150) = $1.86 million

Real GDP in 2017: (7000 x $110) + (9000 x $150) = $2.12 million
Growth rate in 2017= (2120000 - 1860000)/1860000 x 100 = 14.0%

It shows that using base years that are more than a year apart from the current computed year can give varying results. The growth rate in 2017 when using 2015 (123.6%) and 2016 (14.0%) as base years give very different results. Hence, the dependence of growth rate results when using the fixed-base approach is not very reliable.

(d)
Using the chain linking approach,
Growth rate in 2016: (1240000 - 1100000)/1100000 x 100 = 12.7%
Growth rate in 2017: (2120000 - 1860000)/1860000 x 100 = 14.0%

Growth rate will remain the same even if the reference year is changed to 2016, because it is always based on the previous year.
In other words, the base year of the current year is always the previous year, so in a sense there is no base year to speak of as it changes depending on which year you are looking at.

For this case, we cannot really compute the growth rate for 2015 since we don't have the numbers for 2014, but we know that growth rate for 2017 is the same because it is still based on 2016 statistics.

Real GDP in 2015: (5000 x $100) + (7500 x $80) = $1.1 million
Real GDP in 2016: (6000 x $100) + (8000 x $80) = $1.24 million
Real GDP in 2017: (7000 x $110) + (9000 x $150) = $2.12 million

4.

(a)

CPI = 100 x $\frac{Cost\ of\ market\ basket\ in\ current\ year}{Cost\ of\ market\ basket\ in\ base\ year}$

For 2017: both the current year and base year is 2017. Hence CPI for 2017 will just be 100.

For 2018: CPI = 100 × $\frac{20\times6+25\times6}{20\times6+15\times6}$ = 100× $\frac{270}{210}$ = 128.57

The inflation rate for 2018 with 2017 as base year is 28.57%

(b)

Using 2018 as the base year, the CPI in 2018 will be 100.

For 2017: CPI = 100×$\frac{210}{270}$ = 81.48

The inflation rate for 2018 with 2018 as base year is 18.52%

This is different from using 2017 as base year.

(c)

The actual basket of goods in 2018 is not represented well by the chosen CPI basket. (11 shirts and 5 pencils VS 6 shirts and 6 pencils). This means that even as the price of pencils increased significantly (while the price of shirts remains unchanged), households bought fewer pencils.

Calculate inflation in 2018 using actual baskets (quantity consumed), with 2017 as base year:

For 2018: CPI = 100 × $\frac{20\times11+25\times5}{20\times8+15\times8}$ = 100× $\frac{345}{280}$ = 123.21

The actual change in cost of living is an increase of 23.21% (as compared to 28.57% derived from CPI with 2017 as base year)

5.
(a)
Suits Inflation rate = (1200-1000)/1000 x 100% = 20%
Meals inflation rate = (30-20)/20 x 100% = 50%

(b)
Overall inflation rate = $(\frac{300\times30+8\times1200}{300\times20+8\times1000} - 1) \times 100\% = 32.9\%$

(c)
Proportion of cost of meals in 2020 market basket = $\frac{300\times20}{300\times20+8\times1000} x100\% = 42.9\%$
Proportion of cost of suits in 2020 market basket = 1 - 42.9% = 57.1%

(d)
Overall CPI inflation rate has a direct relationship with the individual goods' inflation rates. If one good has a higher inflation rate compared to previous years, then CPI inflation rate is expected to increase also and vice versa.

However, each good has different contributions towards the overall inflation rate. Each good's contribution is weighted by the proportionate cost of each good in the CPI basket in the base year. For example, if the cost of good A has a high proportion in the CPI basket, then good A's individual inflation rate will have a significant impact on the overall inflation rate.

6.
(a)
Nominal i/r = (107000-100000)/100000 x 100% = 7%

(b)
Expected inflation rate = (103-100)/100 x 100% = 3%

(c)
Expected real i/r = Nominal i/r - Expected inflation rate = 7%- 3% = 4%

(d)
How much is $107000 in 2019 worth in 2018?
Real value = 107000 x 100/103 = $103883.5
Exact expected real i/r = (103883.5-100000)/100000 x 100% = 3.89%
The approximate solution is very close to the exact solution (with a very small difference of 0.11% = 0.0011)

(e)
Actual inflation rate = (105-100)/100 x 100% = 5%
Actual real i/r = Nominal i/r - Actual inflation rate = 7% - 5% = 2%

(f)
There was an unwanted redistribution of purchasing power. The lender (Ray) will be worse off as he receives less interest in real value than expected (expected real interest of 4% becomes 2%). The borrower (Chaeyeon) will be better off as he pays less interest in real terms than expected. Hence, Ray will have less purchasing power than expected and Chaeyeon will have more higher purchasing power than expected.

(g)
The two parties can have an indexation agreement at the time of borrowing so that the nominal interest rate will take into account actual inflation rate (Nominal i/r = real i/r + actual inflation rate), not expected inflation rate. Hence the real interest rate is always the same whatever the value of actual inflation rate is, preventing an unwanted redistribution of purchasing power.