Macro Problem Set 2

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1.

(a) https://stats.mom.gov.sg/Pages/Labour-Force-In-Singapore-2021.aspx

For residents aged fifteen years and over;

• In the labour force (residents)
This includes those that are employed and the unemployed seeking for jobs in the past four weeks.
June 2021: 2,397,800

• Unemployed workers (residents)
This includes those that are able to work but are not employed.
June 2021: 1,112,000

• Discouraged workers (residents)
This includes those that have been looking for a job in the past year but have given up after.
June 2021: 11,600

• Unavailable job seekers and available potential job seekers (residents)
According to this, available potential job seekers are people who are able to work but are not actively looking for a job (closest to the category “Not in the labour force”). Whereas unavailable job seekers are people who are not available/not able to work but are actively seeking
June 2021: 1,004,400 and 107,600

• Time-related under-employed workers (residents): part timers who are able and willing to engage in additional work, as a percentage of all employed persons
June 2021: 80,800

(b) The U-6 category in the United States

$$= \frac{employed + discouraged + other\ marginally\ attached + involuntary\ part\ time}{employed + unemployed + discouraged + other\ marginally\ attached + involuntary\ part\ time}$$

In Singapore, we could construct this indicator by taking the numbers of the “employed”, “unemployed”, “discouraged” from part (a). For the “involuntary part time” workers, we could use the value of “time-related under-employed workers”. As for “other marginally attached”,

we could use the total number of people not in the labour force and subtract the value of the "discouraged" to get the value of the "other marginally attached". With these values, we can then construct the U-6 indicator similar to the one used by the United States to measure the labour under-utilisation in Singapore. It may look something like the equation below:

$$= \frac{employed + discouraged + (labour\ force - discouraged) + time\text{–}related\ underemployed\ workers}{employed + unemployed + discouraged + (labour\ force - discouraged) + "time\text{–}related\ underemployed\ workers}$$

$$= \frac{employed + labour\ force + time\text{–}related\ underemployed\ workers}{employed + unemployed + labour\ force + time\text{–}related\ underemployed\ workers}$$

2.
(a)
https://www.channelnewsasia.com/commentary/ip-intellectual-property-vaccine-pfizer-moderna-biden-us-cost-1395206

Patents and copyrights are different types of methods to protect the intellectual property rights of an entity. They differ in these ways:
Patents give the right to exclude others from, or charge others for, the use of one's invention, valid for a set period (e.g. 5 years, 20 years).
Copyrights give the right to exclude others from, or charge others for, reproducing one's work, valid for a set period (e.g. 50 years, 100 years).
The author explains that patents are used as a "temporary monopoly" to reward innovators for their efforts and protect their work for a fixed time period.

(b)
In addition to the protection of the patent system, the government had to invest greatly to accelerate the production process of COVID-19 vaccines. With the promise of a patent, it incentivised pharmaceutical manufacturing companies, because without IP protection, vaccine manufacturers may guard their non-patentable knowledge to themselves. Beyond establishing property rights, the government could also invest in innovation by encouraging companies with grants or subsidies based on their proposals and ideas.

3.

a.

It is hard to answer as “countries differ a lot”, which means that there is not really a common factor that can lead to a huge jump in economic growth, because every country achieves massive growth in different ways. Furthermore, since every country has a different natural and socio-political condition, what a country does to achieve growth may not help much in the context of another country with a different situation. So, drawing generalisations is tricky.

Furthermore, since “countries only get rich once”, it is very hard to determine what causes a particular country to become rich as this process only happens once for the country. On a similar note, since “the process of development is so complex”, there are a lot of factors that can contribute towards a country becoming rich and thus it is possible that economists may have overlooked some key factors.

b.

The author writes about the various pieces of advice given to developing countries. One of them is “open your markets to trade” which can be categorised under the “openness” institutional condition. This is necessary as an exchange of trade, ideas, and FDI is needed in order for a country to develop

Another advice would be to “privatize state owned industries’, which can be categorised as market orientation institutional condition. In order for countries to develop, the government must be willing to let go of state-owned industries that are inefficient and making losses, and transfer ownership to the private sector which is known to be more efficient due to their profit-maximizing nature. This is important for growth as this profit-maximizing objective will drive competition and increase exchange of goods as well as new ideas from potential entrants that aim to break the industry’s Barriers to Entry.

Lastly, countries are advised not to “run big fiscal deficits”, which can be grouped under the Classical Model prescription of growth, as running big fiscal deficits could increase interest rates and this will in turn hurt businesses’ and households’ ability to save and invest in capital equipments that can improve productivity and efficiency

c.

Many of the countries talked about used industrial policy as a way to promote the growth of manufacturing industries. Unlike in some developing countries where this policy is oftentimes used to protect failing and inefficient state-owned firms, these industrial countries encourage private firms to export their products overseas so that they can “learn from experience”, discover technologies and try to become more efficient so that they can compete in the global market, and allow loss-making firms to exit the market. In short, these countries did not fall into the pitfalls of conducting industrial policy as the government only intervenes to encourage market competition and “export discipline” which would increase efficiency, as compared to subsidising firms in the industry just for the sake of keeping them alive.

4.
a.

2007 Values

GDP per capita in chained (2015) dollars = $\frac{291.3\ billion}{4.59\ million} = \$63,464$

Employment-population ratio = $\frac{2.63}{4.59} \times 100\% = 57.30\%$

2008 Values

GDP per capita in chained (2015) dollars = $\frac{296.8\ billion}{4.84\ million} = \$61,322$

Employment-population ratio = $\frac{2.86}{4.84} \times 100\% = 59.09\%$

2008 Growth Rates

GDP in chained (2015) dollars = $\frac{296.8-291.3}{291.3} \times 100\% = 1.89\%$

Population = $\frac{4.84-4.59}{4.59} \times 100\% = 5.45\%$

Employment = $\frac{2.86-2.63}{2.63} \times 100\% = 8.75\%$

Average hours worked per week = $\frac{46.3-46.3}{46.3} \times 100\% = 0.00\%$

GDP per capita in chained (2015) dollars = $\frac{61322-63464}{63464} \times 100\% = -3.38\%$

EPR = $\frac{59.09-57.30}{57.30} \times 100\% = 3.12\%$

b.
In 2008, growth rate for real GDP was positive and close to 2%, whereas real GDP per capita fell by -3.38%.

Of these two, politicians, the press, and the business community will most likely pay more attention to the real GDP per capita growth rates, as this is a more accurate indicator of incomes received by the average person in the country. This means that it is a more accurate reflection of the business climate/outlook in the economy; whenever GDP percap increases, the average income increases as well which would increase demand for certain goods and services (such as public transportation, housing, luxury and normal goods). In contrast, demand for inferior goods will fall

As such, politicians and the business community will pay attention to GDP percap growth rates more as compared to real GDP growth because it is correlated to demand for goods and so these parties can alter their policies and supplies to respond to forecasted changes in demand.

With regards to the press, the audience would want to know about GDP per capita as compared to the nation's GDP growth rate as GDP growth rate is too broad and does not have anything to do with their lives, but in contrast by knowing GDP per capita growth rates, the audience can compare their current incomes with incomes in the past in real terms, adjust their savings and consumption, and forecast future incomes. Hence, to provide more information to the public, the press will pay more attention to real GDP per capita growth rates.

Clearly, real GDP per capita growth rate is a better indicator of progress in living standards, as this is a direct indicator of the income the average person in the country receives. Average income is directly correlated with the average person's living standards, as higher income will mean that the average person can buy more goods and services which can improve their material and non-material living standards. Hence if real GDP growth rates is negative, it can be assumed that there is a fall in living standards, and vice versa.

c.

Using approximation

$g_{productivity} = g_{RGDP\ percap} - g_{EPR} - g_{Avg\ hours} = -3.38 - 3.12\% - 0.00\% = -6.50\%$

Using exact computation

2008 productivity = $\frac{RGDP\ percap}{EPR \times Avg.\ hours} = \frac{61{,}322}{59.09\% \times 46.3} = 2241.41$

2007 productivity = $\frac{RGDP\ percap}{EPR \times Avg.\ hours} = \frac{63{,}464}{57.30\% \times 46.3} = 2392.17$

$g_{productivity} = \frac{2241.41 - 2392.17}{2392.17} = -6.30\%$

The approximation is very close to the numbers obtained from exact computation (within 0.2%)

d.

The fall in real GDP per capita in 2008 was mainly due to the significant fall in productivity (-6.30%). Since Employment-Population Ratio (EPR) only increases by around half the amount of fall in productivity and the average working hours remains relatively unchanged, total national output fell.

Singapore could not continue to grow its real GDP per capita as productivity (output per unit labour) is decreasing. This could be due to the lower demand as a result of the 2008 financial crisis, which means that firms are not producing as much output as compared to previous years. Therefore, total output per worker falls.

e.

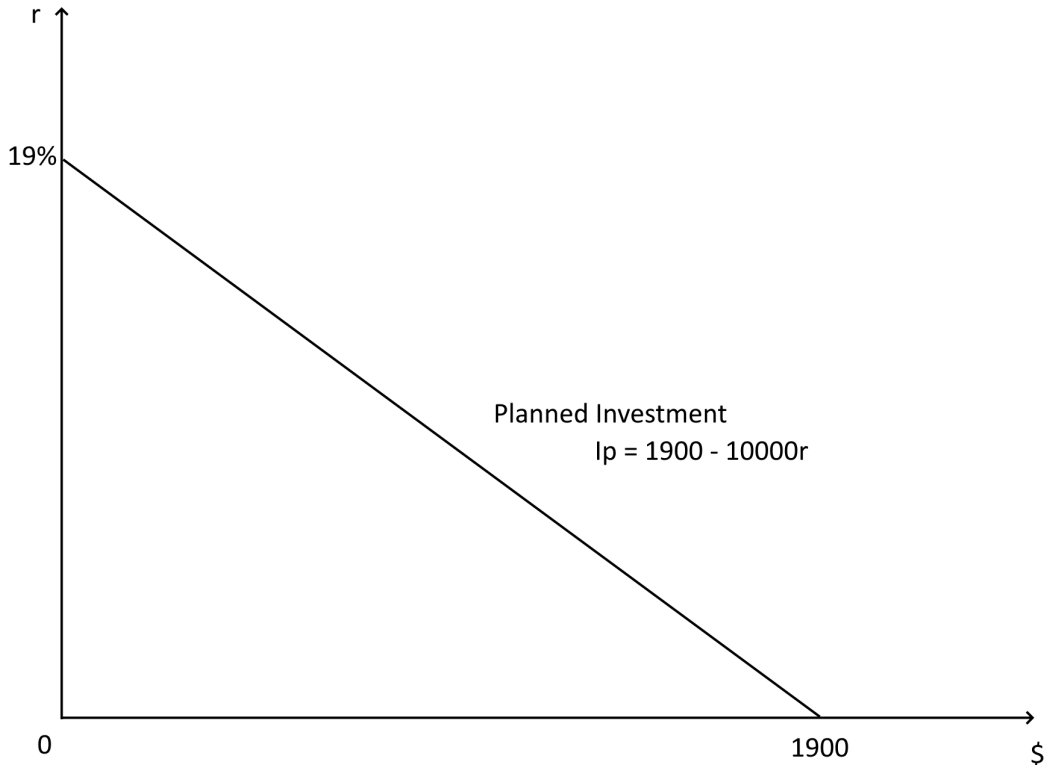
To achieve a more sustainable growth in real GDP per capita, there must be an increase in productivity. Definitely, increasing EPR and average working hours would not be sustainable.

To increase productivity, the Singapore government could sponsor workers to go on on-the-job training and retraining programmes, such as SkillsFuture, so that workers can become more efficient and can produce more output in a shorter time period. This can be argued as sustainable as workers have many opportunities to upskill themselves in different areas, and use these skills to improve productivity.

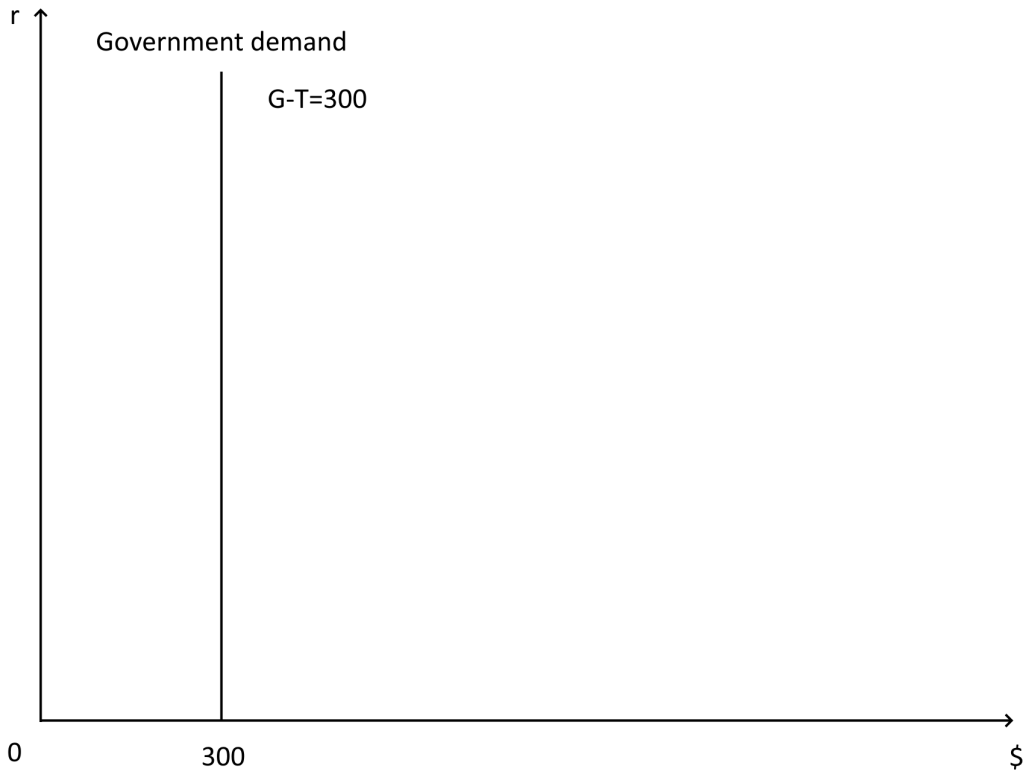
Singapore can also invest in more research to improve workers productivity (for example, novel methods/techniques and procedures that can increase efficiency and output). This could be done by subsidising research and giving grants to studies that have potential in improving productivity.

6.

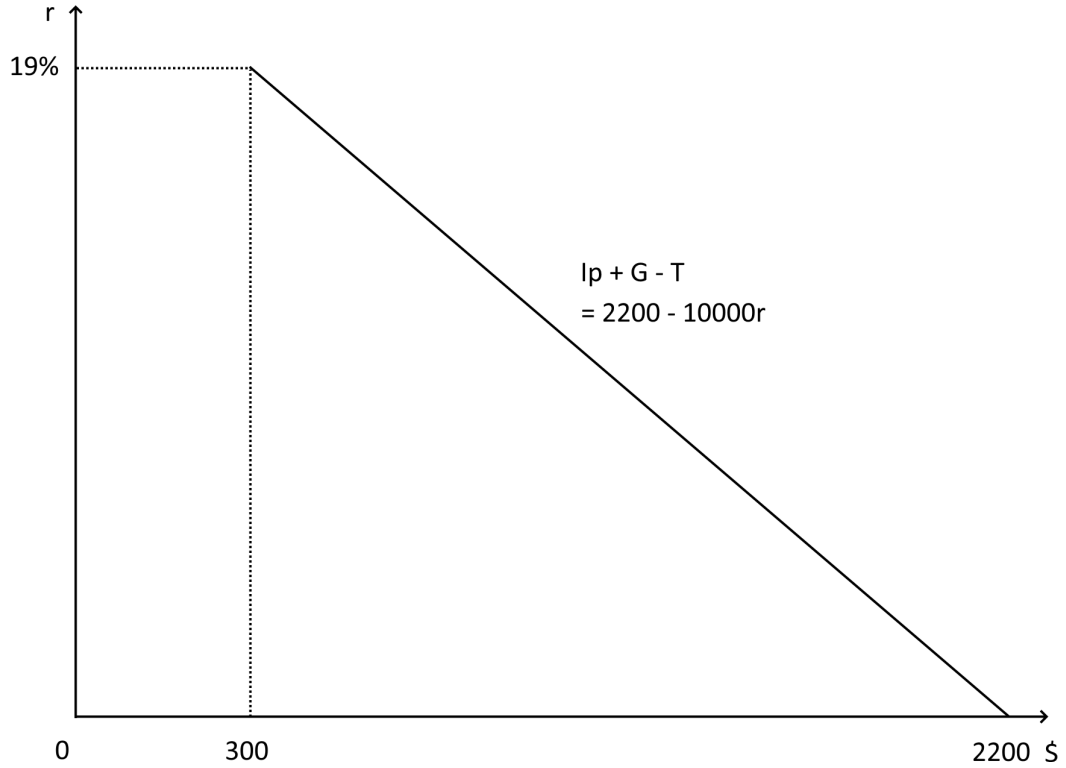
I^P = 1,900 – 10,000r



G - T = 600 - 300 = 300



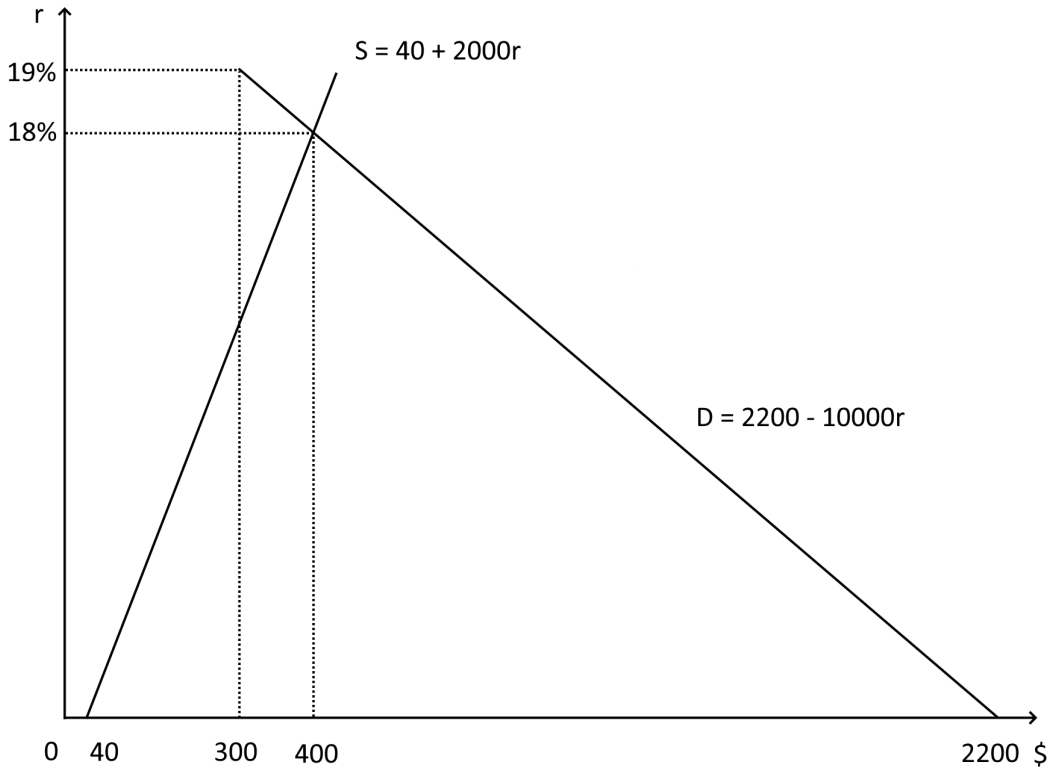
Combined demand in loanable funds market



Supply in the loanable funds market (savings)

S = $Y - T - C$

= 40 + 2000r (from part d)



a. C = 300 – 2,000r + 0.8(Y – T)
The coefficient for real interest rate is -2000. This means that when real interest rate increases, C will be reduced. This makes sense because higher real interest rates incentivises savings, hence a greater portion of the households' income will go into savings and a smaller portion of income will go into consumption.

The coefficient for disposable income is positive. This means that if households receive more income or governments reduce taxes, C will increase. This is also sensible because given the same real interest rate (and therefore the incentive to save is the same), if there is higher disposable income, both consumption and savings will increase.

At the current equilibrium:
C = 300 – 2,000r + 0.8(Y – T) (r from part e)
=300 - 360 + 0.8(2,000-300)
=1,300

b. A crucial assumption in the Classical Model is that all markets clear. Hence, the economy's equilibrium output and income level is equal.

c. Demand for loanable funds
= business demand (planned investment) + government demand (G - T)
= I^P + G - T
=1,900 - 10,000r + 300
=2,200 - 10,000r

d. Supply for loanable funds
=Disposable income - consumption
=Y - T - C
=2,000 - 300 - (300 - 2,000r + 0.8(2,000 - 300))
=1,700 - (1,660 - 2,000r)
=40 + 2,000r

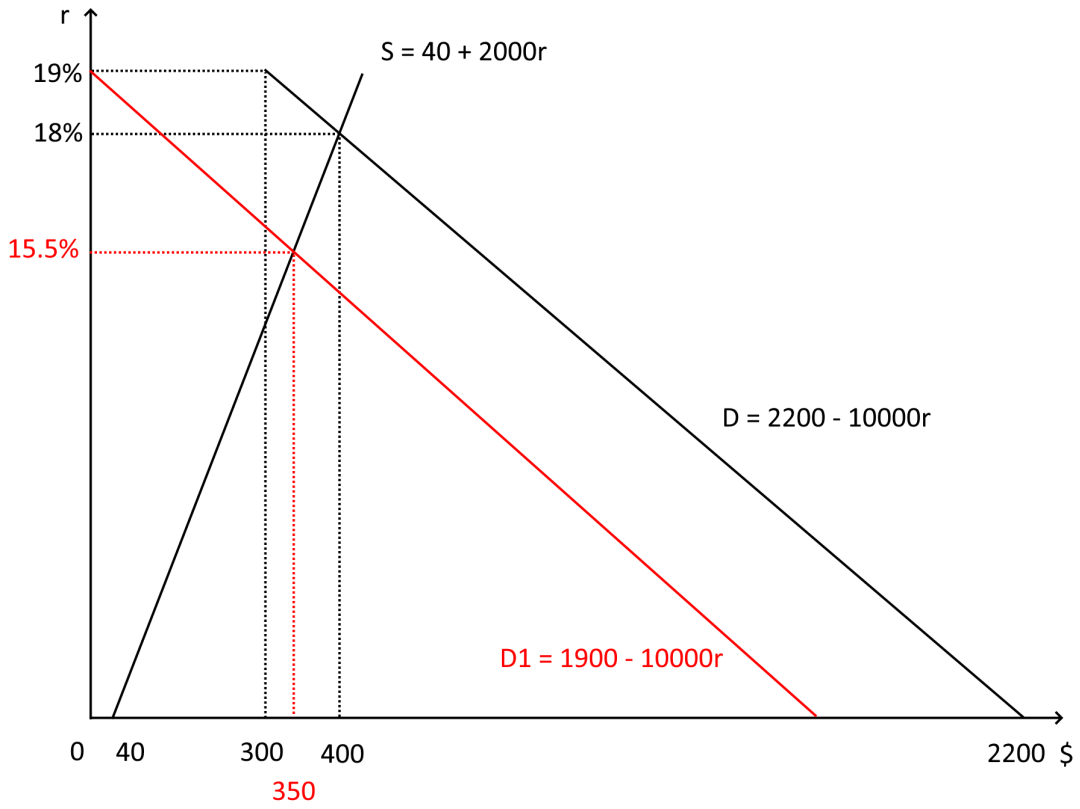
e. Since the market clears:
Demand for loanable funds = Supply for loanable funds
2,200 - 10,000r = 40 + 2,000r
2,160 = 12,000r
r = 0.18

Real interest rate is 18%

f. i

If G is reduced by 300, the demand for loanable funds will shift left by 300. Demand for loanable funds is now 1,900 - 10,000r.

1,900 - 10,000r = 40 + 2,000r
1,860 = 12,000r
r = 15.5%



At 15.5% real interest rate:

I^P = 1,900 – 10,000r
=1,900 - 1,550
=350

This is an increase of 350 - (1,900 - 10,000(0.18)) = 250 from when r was 18%. So planned investment increased by $250.

C = 300 – 2,000r + 0.8($Y - T$)
=300 - 310 + 0.8(2,000 - 300)
=1,350

This is an increase of 1,350 - 1,300 = 50 from when r was 18% (1,300 from part a). So consumption increased by $50

S = $Y - T - C$
=2,000 - 300 - 1,350
=350
=demand for loanable funds (only planned investment, since gvt is eliminating its deficit)

This is a decrease of 400 - 350 = 50, and the decrease in savings went into consumption.

In total, the spending components (consumption and planned investment) increased by 250 + 50 = 300, which is equivalent to the 300 reduction in govt spending. Say's Law must hold here, because we are assuming that the markets clear themselves and therefore the aggregate spending must be equal to the aggregate output.