EPA143A – Macroeconomics for Policy Analysis
Week Three

KEYNESIAN MACRO-ECONOMICS

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LECTURE NOTE W-3

The required readings of Week 3 include:

- Lecture Note EPA143A Week 3.
- J. Crotty. 1994. "Are Keynesian Uncertainty and Macro-theory Compatible? Conventional Decision Making, Institutional Structures, and Conditional Stability in Keynesian Macro-models."
- S. Storm. 2019. Lost in Deflation: Why Italy's Woes Are a Warning to the Whole Eurozone. *International Journal of Political Economy* 48 (3): 195-237. Link: https://www.tandfonline.com/doi/full/10.1080/08911916.2019.1655943

Supportive videos:

- A general introduction: Robert Skidelsky on John Maynard Keynes (1936) *The General Theory of Employment, Interest and Money*: https://www.youtube.com/watch?v=qtAeINU3FKM
- James Crotty on the investment multiplier process: https://www.youtube.com/watch?v=KDB_ym6Vn-U&list=PL23FA2B2953732783&index=9
- James Crotty on Keynes: https://www.youtube.com/watch?v=Lq65xG5ZVmo

The Keynesian macro-model explained by Gerald Epstein:

- GDP: https://www.youtube.com/watch?v=GIehYSwQyBE&list=PL23FA2B2953732783&index=2
- Consumption: https://www.youtube.com/watch?v=RS2ozLPLXfU&list=PL23FA2B2953732783&index=3
- Investment: https://www.youtube.com/watch?v=tkayn1Cxq6A&list=PL23FA2B2953732783&index=4
- Keynesian macro-economic equilibrium: https://www.youtube.com/watch?v=gJGnn9HFg9Y&list=PL23FA2B2953732783&index=6
- Income-expenditure (macro-economic) equilibrium: https://www.youtube.com/watch?v=uIaFgllW_kU&list=PL23FA2B2953732783&index=7

Fiscal policy in the Keynesian model: https://www.youtube.com/watch?v=bGz4wA3m9KY

Lecture Note W-3 and the exercises are part of the exam materials.

KEYNESIAN MACRO-ECONOMICS

Introduction

The Keynesian macro-economic model will be presented using the circular flow of income. Before we go into the circular flow of income, we highlight the following key concepts and assumptions of the Keynesian model.

- In the Keynesian macro model, there is no in-built tendency toward 'full-employment' equilibrium. This means that there are no mechanisms to ensure that the macro-economic system converges to an outcome in which unemployment is zero and productive capacity is fully utilised. The economy normally operates at below-full-employment.
- Keynesian theory emphasizes the role of aggregate demand (and especially investment demand) as the key driver of economic growth. A considerable part of aggregate demand is autonomous (or exogenous), which means that it is not determined by economic variables. Most importantly, investment by firms depends mostly on the (subjective) expectations of entrepreneurs about the future state of the economy. These expectations are exogenous or autonomous.
- Investment means the purchase of new capital goods in order to expand production capacity. Expanding production capacity takes time: new factory buildings need to be built, new machines need to be installed, new logistics need to be developed, etc. Firms will invest (= increase production capacity) if and when they expect that demand for their products and/or services will increase in the (near) future. A firm will invest, if it anticipates a sufficiently large profit from a step-up in production (or from the production a new good) – the view is always forward, never backward. Keynes stressed that (business) expectations concern a fundamentally uncertain future; entrepreneurs, business executives and economic experts have no (objective) basis for what they expect will happen in the future. To understand this 'uncertainty', you can consider what has just happened: in January 2020 most firms were still making plans to invest, as they were thinking that the economy would continue to grow (as in the previous few years). However, only two months later, in March 2020, the economy is in freefall – investment plans are being cancelled or postponed; many firms face unprecedented declines in sales (as their markets have stopped working) and rather than investing, they are now struggling to keep in business.
- As Keynes stressed, the future is 'unknowable' – most likely things tomorrow will not be very different from what they are today, but there is much less stability (and predictability) when we are dealing with (say) developments over the next decade (which the horizon of business investment). Business leaders try to form a picture of the next 5-10 years, but do so taking into account what (economic) experts think and what other entrepreneurs do and think. Expectations are therefore inherently social – and

Keynes refers to 'animal spirits' to describe the motivations of business leaders and investors. As a result, expectations often become self-fulfilling prophecies: "I think the economy will soon go into a recession, because I appreciate your opinion and you think the economy will soon go into a recession, because you have been told that most experts think the economy will go into a recession … etc." (see Crotty). If 'animal spirits' are depressed, firms will postpone and cancel their investment projects; as a result of this (as we shall see below), the economy may go into a recession; business leaders will feel 'confirmed' in their expectations by what is happening, and they may postpone or cancel even more investment plans; etc. It also works the other way around: in a bout of optimism, or exalted 'animal spirits', firms will increase investment; the economy will grow, firms' profits will increase, and business leaders (again) feel that their expectations have been confirmed; businesses will raise investment even more, and economic activity will increase further; etc. For this reason, investment demand and aggregate demand are not stable, but tend to fluctuate – going up in periods of 'optimism' and going down in periods of 'depressed animal spirits'; these cyclical fluctuations are called 'business-cycles'.

- In the Keynesian approach, (business) investment is inherently volatile in a way that consumption is not. Consumption is stable and quite predictable, because households are found to consume a fixed proportion of their (disposable) income. Unlike investment (which is the driving force of the economy), private consumption is 'passive', a driven variable.
- The Keynesian approach rejects the neoclassical loanable funds market. In the Keynesian model, banks are money-creating institutions (and not just intermediaries). Banks can issue loans (to firms) without first having to mobilise deposits (savings). Banks can create money (*ex nihilo*) and doing so, they are able to pre-finance investment. We will look into this in Week 7. As a result, in the Keynesian macro model, money is not neutral. The classical dichotomy between the real sphere and the monetary sphere of the economy is rejected. The Keynesian macro-economic model describes what Keynes called a monetary-production economy.
- The central mechanism operating in the Keynesian macroeconomic model is the multiplier process (which is explained below). The multiplier process operates through the circular flow of income; it captures the following macroeconomic property: effective demand for goods & services leads to production; in the production process, value added (= income) is created; this income generates additional effective demand, which – again – leads to more production; etc.
- In the Keynesian model, fiscal policy (by government) can be used to keep (and steer) real GDP close to its full-employment level. In the Keynesian model, there is no crowding out of private expenditure by public expenditure (this goes counter to the neoclassical model).

- Monetary policy by the central bank is much less effective in steering real GDP than fiscal policy. The reason is that private investment is much more strongly influenced by (profit) expectations than by the real interest rate (the cost of capital).

We will start the explanation of the Keynesian macro-economic model by looking at private (business) investment.

Step 1: an increase in 'autonomous' private investment

For Keynes, private investment is the main determinant or driver of economic activity in a 'capitalist' economy. Private investment is also called 'capital accumulation' or the expansion of the economy's productive capacity as new capital goods (machines, robots, trucks) are added to the installed stock of capital goods. Let us enter the circular flow of income at the stage of business investment (see Figure 1). We assume that a number of firms expect that the demand for their products will increase in the near future; optimistic 'animal spirits' lead these firms to increase their investment by (say) €100 billion; this means that the demand for capital goods (machines, robots, trucks) increases by €100 billion. Before we continue through the circular flow, we must be clear about the following two things:

- we assume that these firms can pay for the new investment; that is, we assume that these firms can borrow €100 billion from banks to finance their purchase of the new capital goods. Banks are providing these firms with credit.
- we assume that the macro-economy is operating at less-than-full-employment. This means that the productive system has excess capacity; production can be increased in response to an increase in (investment) demand. This also means that there are unemployed workers who are able and willing to join these firms as demand and production begin to rise.

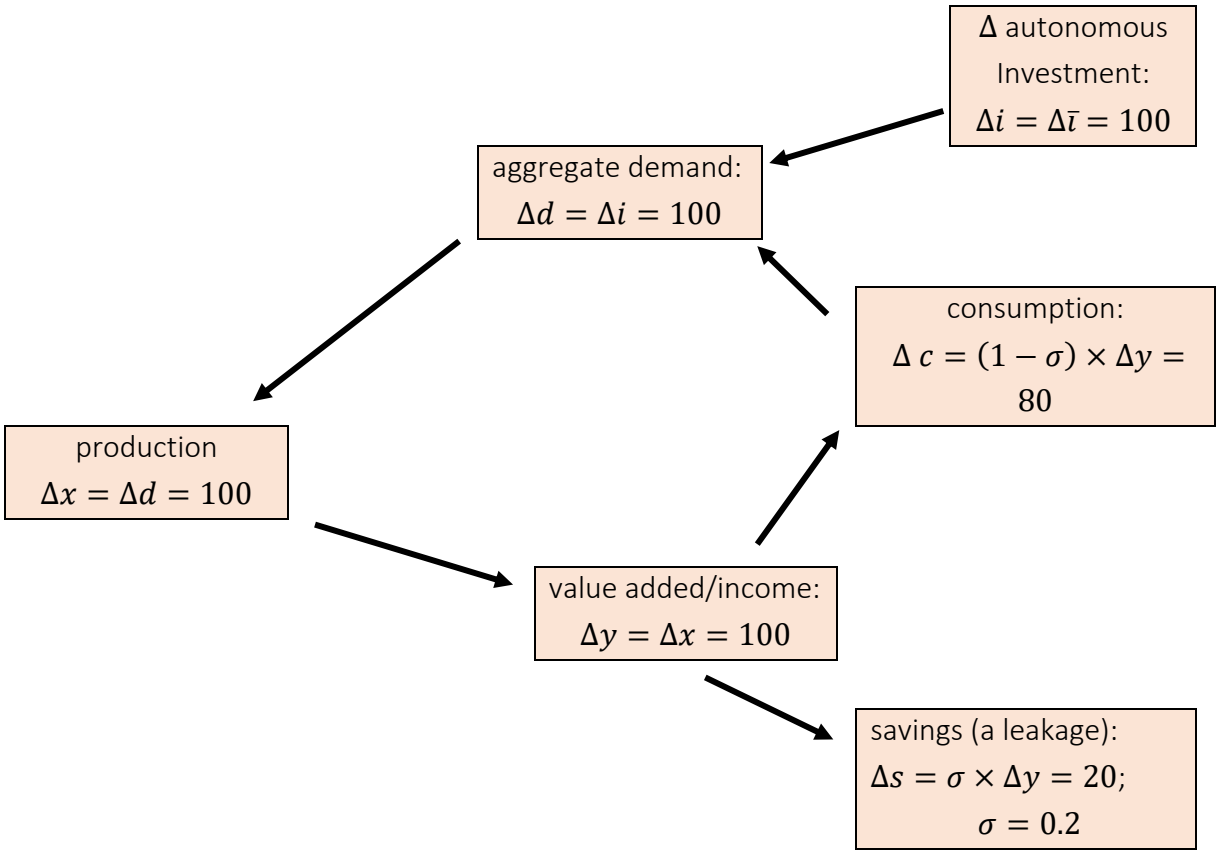
The increase in business investment of €100 billion leads to an increase in aggregate demand of €100 billion. In response to the increase in demand for capital goods, production in the capital-goods-producing industries will increase by €100 billion as well; output can increase, because the economy was operating at less-than-full-employment. As a result of the increase in production of capitals goods (machines, robots, trucks), firms and workers in the capital-goods-producing industries will create additional value added or income, worth €100 billion.

Real GDP (or *y*) has gone up by €100 billion. The extra income will be used for consumption and for savings. Keynes hypothesised that households habitually consume a (more or less) fixed proportion of their income, or alternatively, that they save a fixed proportion of their income. Let us denote the average proportion to save by the symbol σ. Savings *s* are therefore equal to $s = \sigma \times y$, and consumption *c* is: $c = (1 - \sigma) \times y$. Let us assume that σ = 0.2, or people save on average 20% of their incomes.

This then means (as shown in Figure 1) that consumption increases by €80 billion and savings rise by €20 billion, in response to the income growth of €100 billion. The savings constitute a leakage from the circular flow; as in the neoclassical model, the extra savings are deposited in banks. Consumption is part of aggregate demand *d*. Accordingly, the increase in consumption demand (of €80 billion) raises aggregate demand (by €80 billion). This is where the second and higher rounds of the Keynesian income multiplier process begins. These rounds are illustrated in Figure 2.

Figure 1

The circular flow of income: Keynesian model (first round)



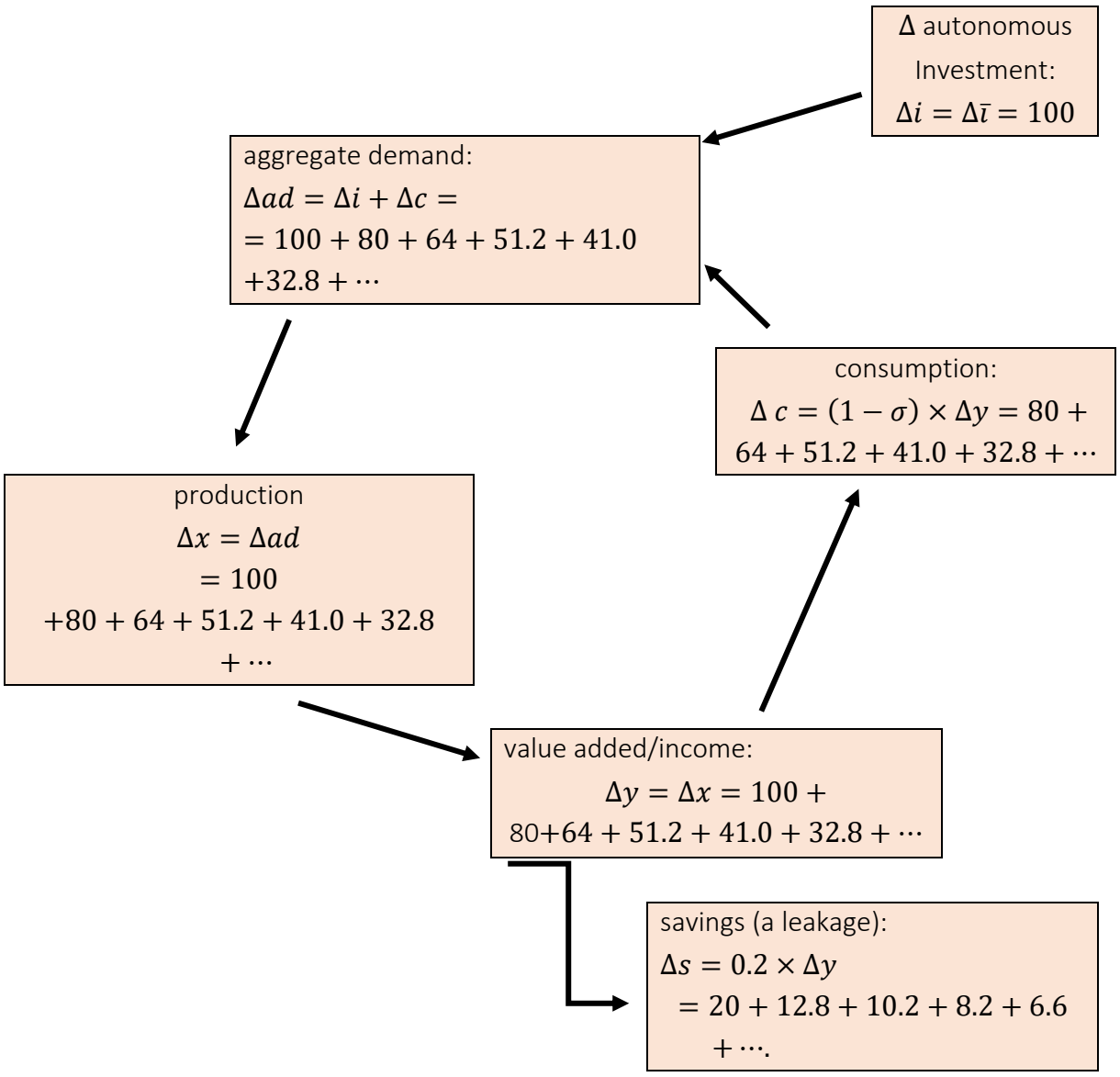
Step 2: the multiplier process

Consumption increases by €80 billion and this raises aggregate demand by €80 billion. Because the consumption demand is coming from households, it concerns final 'consumer goods' (such as food products, clothing, consumer electronics, bicycles, books, *etc*.). Higher demand for consumer goods will lead to higher production in the consumer-goods industries – and hence production *x* increases by €80 billion as well. Extra production leads to additional income creation, so *y* also increases by €80 billion. One-fifth of the extra income is deposited as savings

in banks (this is income leaking out of the circular flow), and 80% of the extra income (or €64 billion) is used for consumption – this is where the third round of demand → production → income generation → demand …. starts. In the third round, aggregate demand, output, and income all go up by €64 billion, which raises consumption by €51.2 billion. It should be clear by now that the initial increase in autonomous private investment has kick-started a process of production increases, leading to income increases, leading to demand increases, *etc.* – the Keynesian multiplier process.

Figure 2

The circular flow of income: Keynesian model (first, second and higher rounds)



sIn each new round, the increases in demand, production, and income become smaller and smaller – and at some point, the multiplier process will have petered out. What can we say about the final (eventual) impact on real GDP of the increase in autonomous investment of €100 billion? The answer is that once the multiplier process has been completed, real GDP will have increased by €500 billion. How do we know this?

To determine the eventual (complete) impact of Δi on real GDP or *y*, we can express the Keynesian circular flow of income in equation-form as follows (model I):

(1)	$d = c + i$	aggregate demand = consumption + investment
(2)	$c = (1 - \sigma) \times y$	real consumption is a function of real GDP
(3)	$s = \sigma \times y$	real savings are a fixed proportion σ of *y*
(4)	$i = i_0$	real investment is autonomous real investment i_0
(5)	$y = x = d$	real GDP is determined by real aggregate demand

Equation (5) is the condition of macroeconomic equilibrium: value added created in production (*x*), which must be equal to aggregate demand (*d*), determines real GDP (*y*). Substituting equations (1), (2) and (4) into (5), we obtain:

(6) $$y = x = d = c + i = (1 - \sigma) \times y + i_0 \;\rightarrow\; y^* = \frac{1}{\sigma} \times i_0 < y^{FE}$$

The reduced-form equation states that equilibrium (real) GDP is a function of the multiplier ($1/\sigma$) and autonomous real investment. We can write eq. (6) in first differences as follows:

(7) $$\Delta\, y^* = \frac{1}{\sigma} \times \Delta\, i_0$$

In our example, $\sigma = 0.2$. This means that the multiplier ($1/\sigma$) equals 5 (see the Appendix for a formal derivation of the multiplier.)

Suppose $\Delta\, i_0 = 100$ billion euro, then $\Delta\, y = 5 \times 100 = 500$ billion euro. What this means is that the initial increase in private investment sets in motion a cumulative process of economic expansion, which results in an increase in real GDP which is five times larger than the original impulse (to the system). The idea of a multiplier is simple. When a change in autonomous investment occurs, the money spent on workers' wages, materials, and the like will not stop there. The recipients of the first round of spending will engage in additional spending of their own. What they buy provides new jobs and incomes to others, and so initial bursts of spending create secondary, tertiary and higher-round bursts – until the effect is finally dissipated.

Keynes wrote his 'General Theory' to critique neoclassical economics. The revolutionary import of Keynes's macro-economic theory was that there is no self-correcting property or mechanism in the market economy to bring the level of economic activity back to 'full employment'. Keynes argued that a market economy tends towards an 'under-employment equilibrium' – a steady state featuring unemployed workers and unused production capacity. The reason is that the main driver or engine of economic activity – private investment as in eq. (6) – is overwhelmingly determined by the unstable expectations of corporate boards of directors, chief executives and small-business proprietors. There is no reason why the 'animal spirits' of business leaders would be such as to lead to a level of investment that is consistent with the full-employment level of economic activity (y^{FE}).

For Keynes, most of private investment is autonomous (*i.e.* determined by expectations) and not sensitive to variations in the real rate of interest. We have seen that private investment in the neoclassical model is (very) sensitive to the real rate of interest. Hence, if the supply of savings (loanable funds) increases – and more income exits the circular flow of income – banks will lower the real interest rate, and businesses will increase their investment; as a result, the full 'savings leakage' is used to finance business investment via the loanable funds market.

Keynes rejected the notion of the loanable funds market, because it does not capture the essential role (and ability) of banks to create new money, with which firms can finance their investments. There is no need for banks to first (ex-ante) mobilize 'savings' which can next (ex-post) be used to fund new investment. ('ex ante' means before the fact, 'ex post' means after the fact).

Central to the neoclassical approach is the savings-constraint: in order for investment to increase, households must first step up their savings. Raising savings will be 'good' for economic growth, because the increase in savings (loanable funds) will reduce the interest rate and thereby raise business investment (and growth). Keynes rejected this neoclassical logic on three grounds:

- business investment is not constrained by the availability of savings, because banks are money-creating institutions which can provide new money (as credit) to finance the investment plans.
- firm investment is not (very) sensitive to the real rate of interest; it is overwhelmingly determined by business expectations and confidence (see Crotty's article).
- a higher propensity to save constitutes a bigger leakage from the circular flow of income; this bigger leakage weakens the multiplier process and will reduce economic growth. Contrary to the neoclassical view, savings are a 'drain' on economic growth in the Keynesian approach. To illustrate this point: suppose that σ = 0.25 (instead of 0.2) in equation (6). If σ = 0.25, the multiplier (1/σ) is 4 (instead of 5). $\Delta\, i_0 = 100$ billion euro will now only create $\Delta\, y = 4 \times 100 = 400$ billion euro.

Keynes called this the 'paradox of thrift': while it might make sense for an individual to increase the propensity to save (for a pension or an expensive purchase of a durable consumer good), it will be counter-productive if everyone would do this. Let us go back to our example: if $\sigma = 0.2$, the multiplier ($1/\sigma$) is 5; if total autonomous demand is €1000 billion, real GDP will be 5000 billion euro and aggregate savings will equal €1000 billion. Suppose the propensity to save increases to $\sigma = 0.25$ because every citizen decides to save a bigger share of his/her income; the multiplier becomes 4; for the same amount of autonomous spending, real GDP will be euro 4000 billion; savings (remember that $\sigma = 0.25$) remain unchanged: €1000 billion. The thriftiness of the population fails to raise aggregate savings, but manages to generate a substantial decline in real GDP as a wholly unintended negative consequence. As Keynes emphasized, individual virtue at the microeconomic level can be a macroeconomic vice.

Keynes turned neoclassical logic (first we need savings in order to next finance investment) on its head. In the Keynesian model, what comes first is the increase in business investment $\Delta\, i_0$. This sets in motion a process of income creation, captured by the multiplier process; out of the income created, people will deposit a fixed proportion as savings in banks. In the new equilibrium, the investment drive has generated additional income and hence additional savings, in exactly the amount needed to match the investment. Or in macro-economic equilibrium, we have:

$$\Delta s = \sigma \times \Delta\, y^* = \sigma \times \frac{1}{\sigma} \times \Delta\, i_0 = \Delta\, i_0$$

For Keynes, $\Delta\, i_0$ comes first (ex-ante), while Δs follows as an outcome of the multiplier process (ex-post). Keynes thus rejects the neoclassical savings-constraint.

The Keynesian macro-model is often visualized in terms of a figure called the Keynesian cross – see Figure 3. On the horizontal axis, we have real GDP *y*; on the vertical axis, we measure aggregate demand *d*. The 45-degrees line represents macro-economic equilibrium, since it gives all combinations of real GDP and demand for which $ad = y$. The other curve portrays aggregate demand as a positive function of real income *y*; the slope of this curve is $(1 - \sigma) > 0$, because $0 < \sigma < 1$.

Macro-economic equilibrium (as in eq. (6)) occurs where the two curves intersect – which is in point A (the original macro equilibrium). It should be clear that any exogenous increase in autonomous investment i_0 will shift the aggregate demand-curve up – as indicated by the dashed curve (in blue). Real GDP increases as the macro equilibrium changes from point A to point B (in Figure 3).

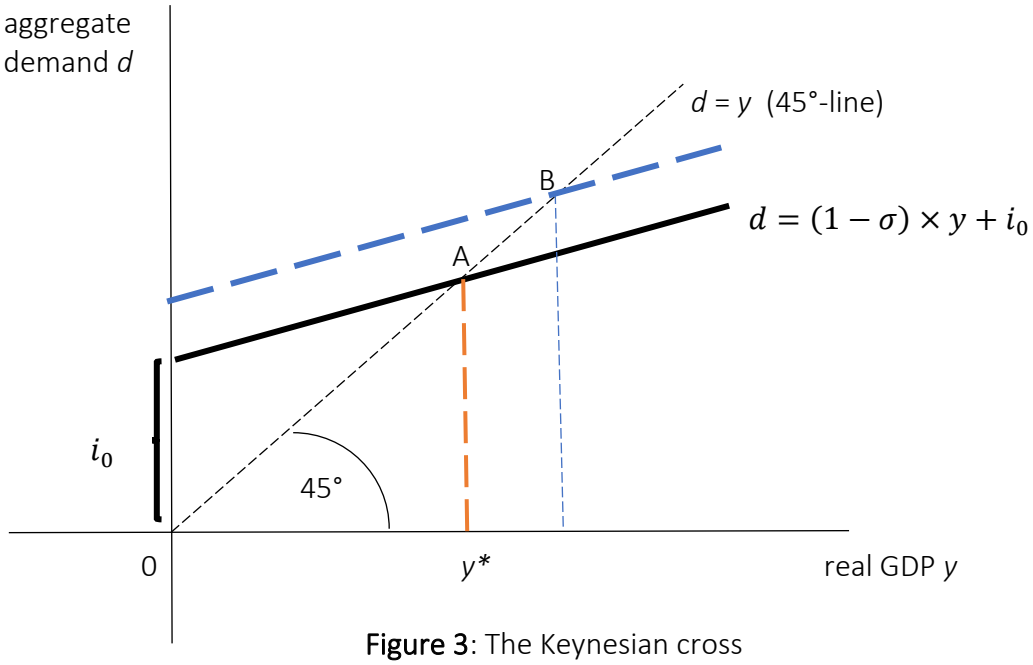


Figure 3: The Keynesian cross

Step 3: a more realistic multiplier

The value of the multiplier has been estimated to be around 1.5 to 2 (over the course of a year). This works downwards as well as upwards. Suppose there is a contraction in investment of €30 billion in 2020, the real GDP would decline by between €45-60 billion. And when investment rises by (say) €20 billion, real GDP would increase by between €30-40 billion.

The reason why the multiplier has a value of 1.5 to 2 in reality (instead of a value of 5, as in our model in step 2) can be understood by looking at the following example of a more realistic and more complicated Keynesian macro model (**model II**):

(1)	$d = c + g + i + e - m$	aggregate demand = consumption + government expenditure + investment + exports – imports
(2)	$c = (1-\sigma) \times y_D$	real consumption is a function of real <u>disposable</u> income
(3)	$y_D = (1-t) \times y$	real disposable income; *t* = the income tax rate
(4)	$i = i_0$	real investment is autonomous real investment i_0
(5)	$e = e_0$	real exports are exogenous real exports e_0
(6)	$m = \mu \times y$	real imports are a proportional function of *y*
(7)	$y = x = d$	real GDP is determined by real aggregate demand

The reduced-form for equilibrium real GDP is:

$$(8) \qquad y^* = \frac{1}{\sigma+t-(\sigma\times t)+\mu} \times [g + i_0 + e_0]$$

In this model, the multiplier is: $\frac{1}{\sigma+t-(\sigma\times t)+\mu}$. If we assume that σ = 0.2 (the average propensity to save out of disposable income is 20%), t = 0.2 (the average rate of income taxation is 20%) and μ = 0.25 (the average propensity to import is 25%), then the value of the multiplier is: $\frac{1}{0.2+0.2-(0.2\times 0.2)+0.25} = 1.64$.

In equation (8), equilibrium real income depends on the multiplier and on three items of autonomous demand: g or government current spending; i_0 or autonomous investment; and e_0 or exogenous export demand (which is the demand of the rest of the world for goods and services produced in our economy). Using eq. (8), we can define three different multipliers:

- $\frac{\Delta y^*}{\Delta g} = \frac{1}{\sigma+t-(\sigma\times t)+\mu} > 0$ the government spending (or fiscal) multiplier
- $\frac{\Delta y^*}{\Delta i_0} = \frac{1}{\sigma+t-(\sigma\times t)+\mu} > 0$ the (autonomous) investment multiplier
- $\frac{\Delta y^*}{\Delta e_0} = \frac{1}{\sigma+t-(\sigma\times t)+\mu} > 0$ the export multiplier

In this particular model, the three multipliers have the same magnitude.

Fiscal policy in the Keynesian model

What are the macroeconomic impacts of fiscal stimulus in the Keynesian model? To answer this question, we must first specify what fiscal stimulus means. Fiscal stimulus (or expansionary fiscal policy) can involve:

- An increase in public current expenditure (g)
- An increase in public investment (i_G)
- A reduction in (income) taxation.

Let us here consider a policy of increased public investment (higher i_G). Public investment is part of aggregate investment: $i_0 = i_P + i_G$, where $i_P =$ private investment. Going back to model II, we know that the reduced-form equation for equilibrium real GDP is:

(9) $$y^* = \frac{1}{\sigma + t - (\sigma \times t) + \mu} \times [g + i_G + i_P + e_0]$$

The impact of increased public investment (higher i_G) on real GDP therefore is:

(10) $$\frac{\Delta y^*}{\Delta i_G} = \frac{1}{\sigma + t - (\sigma \times t) + \mu} > 0$$

If we assume that σ = 0.2, t = 0.2and μ = 0.25, then the multiplier equals 1.64. This implies that a fiscal stimulus of €10 billion will – through the multiplier process – lead to a rise in real GDP of €16.4 billion – the original €10 billion plus an additional €6.4 billion from the multiplier. Investment (including public investment) 'leads' the economy.

What is important to recognise at this point is that the fiscal stimulus does not crowd out private expenditure – in contrast to what occurs in neoclassical theory. Why is there no crowding out of private expenditure by increased public spending in the Keynesian model? The answer is that, as Keynes argued, banks do not have to raise the interest rate to attract more savings (loanable funds) in order to be able to provide the state with funding for the increase in i_G. After all, banks can create new money and give the state a loan to finance the higher i_G. There is, in other words, no savings-constraint. We will discuss money creation by commercial banks in Week 7. A second factor is that the economy is operating less than full utilisation of capacity.

Because there is no crowding out, fiscal policy is effective in influencing the level of economic activity (real GDP). Suppose, for instance, that animal spirits are depressed and private investment i_P is down. This will depress equilibrium real GDP. In response to declining private investment, government can increase its spending – either g or i_G – or lower income taxation. Doing so amounts to adopting counter-cyclical fiscal policy – or fiscal stabilization policy.

Private investment tends to be volatile and cyclical. Periods of high private investment (associated with exalted animal spirits) are followed by periods of lowered or even depressed private investment (due to depressed animal spirits). The impact of fluctuating private investment on real GDP (and on employment and unemployment) is magnified by the multiplier – as we will by now understand. Fluctuations in private investment give rise to ups and downs in economic growth – or what economists call the business cycle. Business cycles last around 7-9 years.

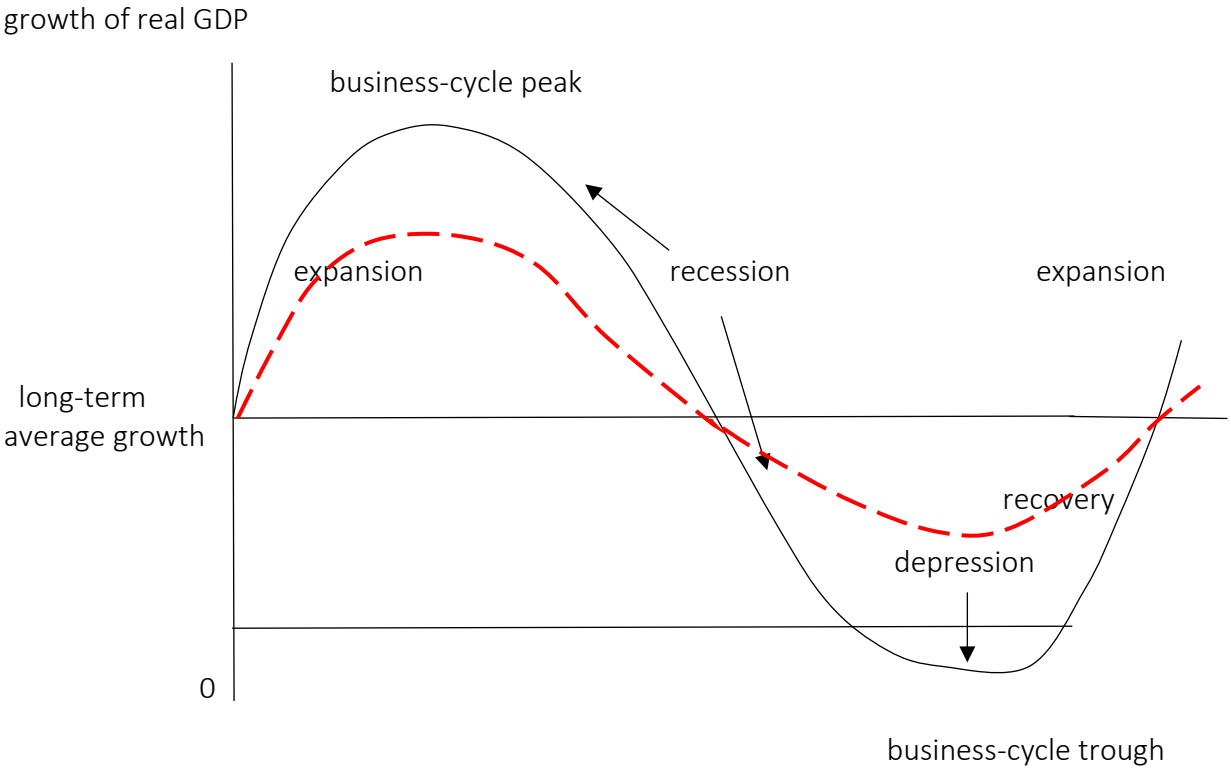


Figure 4: the business cycle

Counter-cyclical fiscal policy tries to dampen the business cycle, *i.e.* to reduce the amplitude of the usual upswings and downswings (see the black line in Figure 4). Timing is essential. The government has to step on the brake (cutting spending and/or raising taxation) in the upswing, when business investment rises rapidly and the economy may become 'overheated'. In contrast, the government has to increase its spending or lower taxation when the economy goes into the downswing (recession), because of depressed and falling private investment. An effective fiscal stabilization policy succeeds in reducing the amplitude of the business cycle – the red curve in Figure 4 is the dampened business cycle, after successful counter-cyclical fiscal policy. The government budget becomes an instrument to stabilize an inherently unstable economy by means of what Keynes called demand management.

Is there a moral in all this for the government budget? Yes, there are three lessons. First, a government budget deficit may be desirable in a downswing or a recession, because it helps to keep up aggregate demand and (through the multiplier process) economic activity; unemployment will increase less and more firms can remain in business than otherwise; recessions become less disruptive and costly to society. Second, a government budget surplus may be desirable in an upswing or a boom, because it will slow down growth and prevent the economy from over-heating. The economy is 'over-heated' when real GDP begins to approach

full-employment (maximum) real GDP; there will be excess demands for raw materials and energy, and prices of raw materials and energy will rise. Unemployment will be low and wages will start to increase. Inflation will (slowly) rise. To prevent accelerating inflation, a government budget surplus will lower aggregate demand and activity. The final lesson is that there is no justification in Keynesian economics for permanent government deficits and ever-rising public debts. The Keynesian idea is to have a budget deficit in the downswing and a budget surplus in the upswing – and a more or less balanced budget (= zero) over the whole business cycle.

Exercise W-3.1 concerns fiscal policy using a Keynesian macro model. It presents an analysis of the balanced-budget multiplier, which is a relevant notion in the context of our discussion so far.

The fiscal multiplier, public debt and fiscal austerity

Let us define the fiscal multiplier as follows: $\frac{\Delta y^*}{\Delta i_G} = \frac{1}{\sigma + t - (\sigma \times t) + \mu}$ and let us assume it takes a value of 1.64 (as in the example above). Suppose the government raises public investment by €10 billion, which it finances by borrowing from banks. Let us look at what happens to the public-debt-to-GDP ratio.

The fiscal stimulus will raise GDP by €16.4 billion (since the fiscal multiplier is 1.64). Because the public investment is completely financed by borrowing (= a government deficit), the public debt increases by €10 billion. Since the denominator (GDP) increases more than the nominator (public debt), the ratio public-debt-to-GDP will decline. In relative terms (*i.e.* compared to GDP), public indebtedness decreases, even if the state is borrowing more.

It also works the other way around. If the government cuts spending and runs a government budget surplus so as to pay back €10 billion of its loans, public debt will decline by €10 billion. But (real) GDP will decline by more – by €16.4 billion – and as a result the public-debt-to-GDP will increase. This result of fiscal austerity is the opposite of what was the intention of the government budget surplus. There is clear evidence that fiscal austerity has contributed to higher public-debt-to-GDP ratios in Greece and Italy during 2010-2016. The fiscal policy was counter-productive and worsened the economic situation – as the IMF has publicly acknowledged. See also Exercise W-3.2.

Monetary policy in the Keynesian model

In the Keynesian approach, money is 'endogenous' and not exogenous as in the neoclassical model; we will see in Week 7 what this means. For now, it is sufficient to know that since money is endogenous, the central bank cannot directly control money supply. Rather, the central bank can influence money supply only indirectly, by influencing money demand, using the interest rate *r* as its policy instrument. If the central bank wishes to reduce money supply, it will raise

the interest rate; as result, private investment will decline, real GDP will decline and money demand will decrease; because money demand goes down, money supply must go down as well.

Interest rate changes influence the real economy through private investment. So far, we have assumed that private investment is completely autonomous (*i.e.* determined by expectations). However, Keynes recognised that business investment is somewhat sensitive to the cost of capital (= the real interest rate *r*). If we take this interest-rate sensitivity into account, the real private investment function would look like this:

(11) $\quad i_P = i_{P0} - \theta\, r$

where $i_{P0} =$ real autonomous private investment (determined by animal spirits) and θ is the coefficient reflecting the extent to which business investment will be reduced in response to an increase in the real interest rate *r*. θ will be close to zero – indicating a rather limited interest-rate sensitivity of private investment.

Monetary policy is much less effective in influencing real GDP (and employment) than fiscal policy in the Keynesian macro approach. Suppose the economy finds itself in the upswing of the business cycle of Figure 4. Expectations are optimistic and business investment is high. To prevent the economy from overheating, the central bank decides to increase the (real) interest rate. What will be the impact on equilibrium real GDP? Let us use reduced-form equation (9) and substitute eq. (11) into eq. (9). We obtain:

(12) $\quad y^* = \frac{1}{\sigma + t - (\sigma \times t) + \mu} \times [g + i_G + i_{P0} - \theta r + e_0]$

The impact of a higher real interest rate on equilibrium real income then is:

(13) $\quad \frac{\Delta y^*}{\Delta r} = \frac{-\theta}{\sigma + t - (\sigma \times t) + \mu} < 0$

The increase in the real interest rate will lower real GDP, but if θ is very small, its impact on real GDP will be small (in absolute terms). In that case, the central bank would have to increase the rate of interest to very high rates in order to cools down the booming economy. Reducing public investment or public current spending would be easier and more effective.

The same problem occurs in a slump – as the economy goes into a recession (see Figure 4). Now the central bank may decide to reduce the real interest rate – credit would become cheaper and this may persuade firms to increase investment. However, there is a reason why the economy is sinking: entrepreneurs and business executives have pessimistic expectations about the future, animal spirits are depressed, and the outlook is gloomy. If no one is expecting growth to soon pick up, the propensity or inclination to invest will be very low – irrespective of the fact that credit is cheap. Even in the extreme case, when the central bank has lowered the interest rate to zero and firms can borrow for free, businesses will not invest (= expand their productive capacities) if they do not expect their markets to grow.

The ability of the central bank to stimulate economic activity in a recession (or worse) is often likened to our ability to push with a string. (It is easy to pull with a string, but impossible to push with it.) The central bank can lower the interest rate but it cannot (*a*) force banks to make loans if they do not wish to do so, or (*b*) force firms to borrow (in order to invest) if they don't want to do so. In a recession, banks may prefer to pile up unused reserves rather than issue risky new investment loans. Likewise, firms do not wish to borrow if the market outlook is grim.

Finally, note that if $\theta = 0$, private investment is not sensitive at all to the interest rate – and monetary policy is completely ineffective. This is not unrealistic. Actually, in the current corona-lockdown crisis, most businesses (except corporations such as Amazon, Facebook, Google and Zoom) are struggling to survive and investment plans have been shelved – notwithstanding the fact that the interest rate is (about) zero.

The liquidity trap

In his analysis of money and money demand, Keynes introduced the notion of 'liquidity preference'. Liquidity here refers to money (cash or electronic money in current accounts in banks) – any means of payment which is immediately usable ('liquid') and generally accepted without further transactions cost. Liquidity preference concerns the wish of households, firms or financial (bond market) investors to keep cash or money in bank current accounts. Keynes noted that the preference for liquidity tends to be relatively high in periods of economic and political uncertainty, times of crisis, and periods of drastic change. Why do keep people keep to their cash? Keeping cash is risky, cash does not generate any returns (whereas money invested in government bonds generates a rate of return), and with inflation, the purchasing power of the cash declines. So what explains a strong wish to keep liquidity?

Keynes's answer is that liquidity offers the owner of the cash flexibility; keeping cash means that one is keeping all options open; one could use the money to buy capital goods (machines) at the moment one feels confident that one's market is growing; one could purchase stock market shares at exactly the moment one desires (*i.e.* when the share price is low), or one could buy government bonds at the moment of one's choosing. One could also decide to stick to the cash – and postpone any spending decision or any speculative move. Likewise, a strong preference for liquidity ('cash') could originate from a precautionary motive: it is, after all, better to be safe (holding on to the cash) than sorry (losing it in some financial speculation). For these reasons, the liquidity preference will be higher in times of economic uncertainty and change, for instance when an economy is threatening to go into a recession.

Keynes argued that this unique property of money (the fact that holding on to cash endows the owner with substantial freedom to choose) tends to reinforce the tendencies to recession. Why? The reason is that if people hold on to cash/money, the leakage from the circular flow will become bigger; the propensity to save rises, the value of the multiplier goes down, and economic activity stagnates or falls. People may or may not deposit the money in banks; the

point is that they are not spending it, but instead are keeping it idle, unused – as liquidity. In consequence, liquidity preference works in a pro-cyclical (not anti-cyclical) manner: it will widen the amplitude of the business cycle (Figure 4).

In a real crisis (say, a depression or perhaps the corona-lockdown recession), strong liquidity preference can be disastrous – it can lock the economy into a liquidity trap. In such a trap, people keep to their cash, because they want to keep all options open. Poorer people do not spend, because they fear becoming unemployed; they want to keep some savings for the thoroughly rainy days which lie ahead. Richer people do not spend, because they see opportunities for speculation: the crisis may lower stock market prices, house prices and other asset prices, and the rich will prefer to keep to their liquidity to wait for the 'right moment' to buy. Firms are not investing, because animal spirits are depressed and the outlook is gloomy; they keep liquidity, because they may be able to take over other firms, as share prices go down. Taken together, banks are most likely flooded with savings, but because no one is willing to borrow, the liquidity is left idle.

As Keynes argued, the economy is caught in a liquidity trap: the propensity to save has gone up, the inclination to invest has gone down. The only way to escape from the liquidity trap is via expansionary fiscal policy by the state: the government can borrow, run a (temporary) budget deficit and increase public debt, in order to raise aggregate demand and get the economy out of the recession – making use of the multiplier process. Government takes on the responsibility for creating the volume of demand we need to get up to a satisfactory level of economic activity. Macro-economic demand management thus is an indispensable tool, because the economy is inherently subject to waves of optimism and pessimism and consequent booms and busts.

Investment and savings, once more

We have seen that in the Keynesian macro model, the equality between investment and savings holds ex-post. That is, investment (financed by credit) creates income (through the multiplier process) and savings, such that in equilibrium investment (ex-post) = savings (ex-post). This ex-post equality between investment and savings holds true in all variations of the Keynesian macro model.

We know from the circular flow of income that value added (in production) equals final demand, or: $y = c + g + i + e - m$. We also know that income *y* is used for consumption spending (*c*), paying income taxes (*t*) and savings (*s*), or: $y = c + t + s$. Hence, in equilibrium, the following ex-post equality must hold:

$$c + g + i + e - m = c + t + s$$

This equation can be re-arranged as follows:

$$i = s + (t - g) + (m - e) = s + s_G + s_F$$

On the left-hand-side we find investment *i* and on the right-hand-side we have 'total savings'. Total savings have three sources. A first source is private savings (*s*) by households and firms. The second source of savings is public (government) savings $s_G = t - g$, defined as the difference between income tax revenue *t* and public current expenditure *g*. If *g* > *t*, which may well be the case, public savings are negative; the government has a budget deficit.

The third source of aggregate savings is foreign savings $s_F = m - e$. Foreign savings are defined as the difference between the value of imports *m* and the value of exports *e*. We know that the trade balance of an economy is defined as (*e* – *m*); a country has a trade surplus if (*e* – *m*) > 0 and a trade deficit if (*e* – *m*) < 0. Suppose that the economy under consideration has a trade deficit: the value of its imports exceeds the value of its exports. The economy is paying more to producers abroad than it is earning by selling to foreign buyers. How does the economy at large pay for the excess of imports over exports? The answer is complicated, but one possibility is that the (excess) imports are financed by borrowing abroad – it is in this sense that a trade deficit can be seen as foreign savings, used to finance domestic investment. If a country has a trade surplus (*e* – *m*) > 0, then its foreign savings are negative: this country is lending to the rest of the world.

The equality $i = s + s_G + s_F$ must hold in equilibrium (*i.e.,* ex-post). Suppose that (autonomous) investment goes up for some reason. Higher investment will raise real GDP (through the multiplier process), and aggregate saving will and must rise. If the growth of real GDP raises imports, foreign savings $s_F = m - e$ will rise; an ex-ante trade surplus will become smaller, an ex-ante trade deficit will become larger in this case. If the growth of real GDP raises the revenues from income taxation, public savings $s_G = t - g$ will rise. The government budget balance improves. Finally, the growth of real GDP will also raise private savings, because disposable income will grow. This way, the step-up in private investment will generate a similar increase in aggregate savings ($= s + s_G + s_F$).

Table 1 presents empirical evidence on investment and the three sources of savings for selected Eurozone countries in 2019 (all variables are expressed as percentage of GDP). Investment (% of GDP) is high in Ireland, Hungary, Austria and France, and relatively low in Italy and Greece. The investment has created savings: private savings, public savings and foreign savings.

Private savings (% of GDP) are high in Ireland (30.9%), the Netherlands (26%) and Germany (24.4%), but low in Portugal (16.3%), Poland (17.8%) and Greece (10.5%).

Public savings (% of GDP) are positive in all countries except Spain; public savings (% of GDP) are high in Germany (4.4%), Hungary (4.8%) and the Netherlands (4.9%).

Finally, foreign savings are negative in most countries included in the table. This means that most countries in the table have a trade surplus (*e* – *m*) > 0. Foreign savings are very negative for Germany (-7% of GDP) and the Netherlands (-9.8% of GDP), which means these countries run very large trade surpluses. It also means that aggregate savings in the Netherlands and

Germany are much higher than national investment; both the Dutch and the Germans are creditors to the rest of the world. Greece, France, Hungary, Poland and Portugal have positive foreign savings; they have a trade deficit and are borrowing abroad.

Table 1

Investment-savings balances: selected Eurozone countries, 2019
(percentage of GDP)

	i	*s*	$s_G = t - g$	$s_F = m - e$
Germany	21.9	24.4	4.4	-7.0
Ireland	32.8	30.9	2.7	-0.8
Greece	14.0	10.5	2.7	0.8
Spain	20.7	23.6	-0.4	-2.4
France	23.8	22.2	1.1	0.4
Italy	17.5	19.6	0.9	-2.9
Hungary	29.1	23.1	4.8	1.2
The Netherlands	21.2	26.0	4.9	-9.8
Austria	25.5	23.9	3.9	-2.3
Poland	21.0	17.8	2.8	0.4
Portugal	19.0	16.3	2.3	0.4

Source: AMECO database.

Appendix: The derivation of the multiplier

Consider the following Keynesian macro-model (**model I**):

(1)	$d = c + i$	aggregate demand = consumption + investment
(2)	$c = (1 - \sigma) \times y$	real consumption is a function of real GDP
(3)	$s = \sigma \times y$	real savings are a fixed proportion σ of y
(4)	$i = i_0$	real investment is autonomous real investment i_0
(5)	$y = x = d$	real GDP is determined by real aggregate demand

Let us assume that $i_0 = 100$ and $\sigma = 0.2$. In the first round through the circular flow, demand, production and income will be 100; in the second round, demand, production and income will increase by 0.8 x 100 = 80; in the third round, demand, production and income will grow by 0.8 x 0.8 x 100 = 64; etc.

Accordingly, we can write:

$$\Delta y = 100 + 0.8 \times 100 + 0.8 \times 0.8 \times 100 + 0.8 \times 0.8 \times 0.8 \times 100 + \cdots.$$

or

$$\Delta y = 100 \times (1 + 0.8 + 0.8^2 + 0.8^3 + 0.8^4 + 0.8^5 + \cdots)$$

The expression $(1 + 0.8 + 0.8^2 + 0.8^3 + 0.8^4 + 0.8^5 + \cdots)$ is a geometric series with common ratio 0.8. The sum of this series of geometric progression is the multiplier:

$$(1 + 0.8 + 0.8^2 + 0.8^3 + 0.8^4 + 0.8^5 + \cdots) = \frac{1}{1-0.8} = 5$$

Lost in Deflation: Italy's structural economic crisis

Up until the early 1990s, Italy enjoyed decades of relatively robust economic growth, during which it managed to catch up in income with the other Eurozone nations (Figure 1). In 1960, Italy's per capita GDP (at constant 2010 prices) was 85% of French per capita GDP and 74% of (weighted average) per capita GDP in Belgium, France, Germany, and the Netherlands (the Euro-4). By the mid-1990s, Italy had almost caught up with France (Italian GDP per person equaled 97% of French per capita income) and also with the Euro-4 (Italian GDP per capita was 94% of per capita GDP in the Euro-4). But then a very steady decline began (see Figure 1)—erasing decades of (income) convergence.

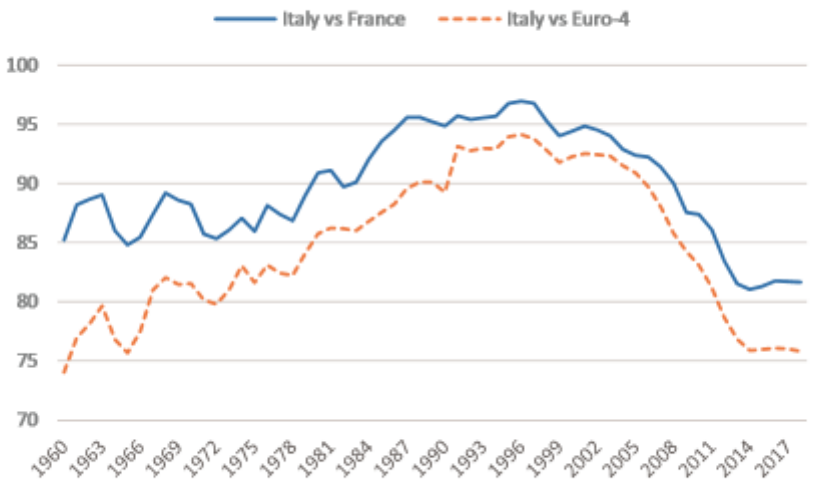


FIGURE 1 Three decades of "catching up," 25 years of "falling behind": real GDP per person in Italy relative to France/Euro-4, 1960–2018. *Source*: author's calculation based on AMECO data.

The key factor holding down the growth of the Italian economy is the lack of aggregate demand growth. Due to this structural 'demand insufficiency', capacity utilization in Italy is relatively low and this reduced the profit rate of economic activity. We must note that the profit share in Italy has increased over time, but the profit rate did not increase, but stayed constant and rather low. This can only be explained as a consequence of declining capacity utilization and declining demand growth.

To see this, recall that the real profit rate is a function of the following three variables:

$$\rho = \frac{real\ profits\ \Pi}{real\ capital\ stock\ K} = \frac{\Pi}{K} = \frac{\Pi}{\mathrm{y}} \times \frac{\mathrm{y}}{y^{FE}} \times \frac{y^{FE}}{\mathrm{K}} = \pi \times u \times \kappa$$

$\pi =$ the profit share (= 1 – the wage share); $u =$ capacity utilisation; and $\kappa =$the output-capital ratio at full capacity (which is constant). Normally, one would expect that the profit rate ρ will increase, if the profit share π goes up, because of a policy of real wage moderation.

In Italy, the profit share increased considerably, but the profit rate stayed unchanged (or even declined). The only cause of this is that capacity utilisation $u = \frac{y}{y^{FE}}$ did fall – and this is possible only due to a structural (long-term) decline in demand.

The structural causes of the structural demand deficiency are: (1) very low growth of real wages; declining real household incomes; (2) declining real public expenditure; fiscal austerity (the permanent primary fiscal surplus); and (3) poor export performance, partly due to the fact that the euro exchange rate is too high from the viewpoint of the Italian economy. Figure 18 (in the article) illustrates the argument – it summarizes the article in one scheme.

The crisis is called permanent, because the underlying causes are structural. The causes are not easy to remove and they are mutually reinforcing (see Figure 18). Low real wage growth reduces domestic demand growth and makes the economy more reliant on exports; it also lowers tax revenue and forces additional cuts in public spending; firms need to diversify and upgrade their production processes, but for this they must invest; slow growth means that they are hesitant to do the necessary investments. The lack of an own currency and the fact that the Italian state has to keep to fiscal policy rules which belong to Eurozone-membership mean that the Italian government has hardly any macro-economic policy space to improve the situation.

The Italian government has had primary fiscal surpluses for almost all years during 1990-2019. A primary fiscal balance is defined as the public expenditure excluding interest payments on public debt, minus public revenue. The Italian government hoped that it would be able to reduce the public-debt-to-GDP ratio by having fiscal surpluses (= positive public savings). This hope proved in vain.

Italy's fiscal policy is called fiscal consolidation (or fiscal austerity), which is defined as policies aimed at reducing government deficits and public debt accumulation. These consolidation plans and detailed measures are given as a per cent of nominal GDP. Fiscal consolidation will involve: (*a*) reductions in public spending (on public investment and government current expenditures including subsidies and wages and salaries of civil servants); (*b*) increases in public revenue (due to increases in taxation).

According to the Keynesian model, fiscal austerity may not work in reducing the public-debt-to-GDP ratio. This will be the case if the fiscal multiplier is larger than 1. We can see how this works by looking at the debt-dynamics equation

$$\Delta debt = fiscal\ deficit + (i - g) \times debt,$$

This equation states that public debt (as a percentage of GDP) will increase if the government has a primary fiscal deficit (as % of GDP) and if the nominal interest (paid by the government) is higher than the growth of nominal GDP.

Suppose the (Italian) government has a primary fiscal surplus of 3% of GDP (brought about mostly by reductions in public expenditure). This means it has a primary fiscal deficit of -3% of GDP; public debt (to GDP) will decline by 3 percentage points. However, the fiscal surplus of 3% of GDP will have a negative multiplier impact (> 1) on GDP which is bigger than 3 percentage points. Let us assume that the fiscal multiplier is 1⅓, then GDP will decline by 4%.

If the original debt-to-GDP ratio is (say) 120% (or 1.2), then in the debt-dynamics equation, we will get:

$$\Delta debt = -3\% + (i - \ -4\%) \times 1.2.$$

Hence, the debt-to-GDP ratio will increase – rather than decrease. Fiscal austerity backfired – and led to an increase in the public-debt-to-GDP ratio.