Lecture 9 - Redistributive Policies

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Introduction

Keynesian economics provides a mechanism through which more redistribution might actually increase output overall, at the same time as it reduces inequality. The idea that the economy suffers from a shortage of aggregate demand coming from increases in inequality has been put forward recently by mainstream academics such as Raghuram Rajan, former chief economist of the IMF, and now governor at the Bank of England (Rajan [2010]), as well as by Robert Reich, US Secretary of Labor from 1993 to 1997 (Reich [2011]).

The idea that the marginal propensity to consume is influenced by the distribution of income and wealth comes back to Keynes [1936]:

> Since the end of the nineteenth century significant progress towards the removal of very great disparities of wealth and income has been achieved through the instrument of direct taxation—income tax and surtax and death duties—especially in Great Britain. Many people would wish to see this process carried much further, but they are deterred by two considerations; partly by the fear of making skilful evasions too much worth while and also of diminishing unduly the motive towards risk-taking, but mainly, I think, by the belief that the growth of capital depends upon the strength of the motive towards individual saving and that for a large proportion of this growth we are dependent on the savings of the rich out of their superfluity. Our argument does not affect the first of these considerations. But it may considerably modify our attitude towards the second. For we have seen that, up to the point where full employment prevails, the growth of capital depends not at all on a low propensity to consume but is, on the contrary, held back by it; and only in conditions of full employment is a low propensity to consume conducive to the growth of capital. Moreover, experience suggests that in existing conditions saving by institutions and through sinking funds is more than adequate, and that measures for the redistribution of incomes in a way likely to raise the propensity to consume may prove positively favourable to the growth of capital.

This passage from Keynes [1936] is intuitive: as long as saving propensities are no longer an impediment to capital accumulation, redistributing income or wealth from low to high marginal propensity to consume

should lead to higher output. According to Keynes [1936], this is in fact one reason for restricting the increase in inequality:

> The State will have to exercise a guiding influence on the propensity to consume partly through its scheme of taxation. (...) Whilst, therefore, the enlargement of the functions of government, involved in the task of adjusting to one another the propensity to consume and the inducement to invest, would seem to a nineteenth-century publicist or to a contemporary American financier to be a terrific encroachment on individualism, I defend it, on the contrary, both as the only practicable means of avoiding the destruction of existing economic forms in their entirety and as the condition of the successful functioning of individual initiative.

During this lecture, we derive this result using the Keynesian model that was developed in lecture 7 and lecture 8. One appeal of writing the equations is that we are not able to prove these assertions qualitatively, but we are also able to understand how important they are quantitatively. As we go along, we therefore attempt to put some actual numbers on all these arguments, to get a sense of the orders of magnitude. We shall investigate two types of policies:

- Income redistribution, from high to low income earners.
- Deficit-financed decreases in taxes, on high income earners or low income earners, financed by public debt.

1 Redistributive Policies

A small modification of the goods market model underlying lecture 7 and lecture 8 are in order. Instead of assuming one type of consumer, with the average income Y and a given marginal propensity to consume c_1, we shall assume two types of workers:

- There is a fraction λ of low income earners, who earn income $\underline{y}$, pay net taxes $\underline{t}$, and the MPC of the low income earners is $\underline{c}_1$:
$$\underline{c} = \underline{c}_0 + \underline{c}_1(\underline{y} - \underline{t}).$$
- There is a fraction $1-\lambda$ of high income earners, they get an income $\bar{y} = \gamma \underline{y}$, where γ indexes inequality, pay net taxes $\bar{t}$, and the MPC of the high income earners is $\bar{c}_1 < \underline{c}_1$:
$$\bar{c} = \bar{c}_0 + \bar{c}_1(\bar{y} - \bar{t})$$

We have:

$$Y = \lambda \underline{y} + (1-\lambda)\gamma \underline{y} \quad \Rightarrow \quad \boxed{\underline{y} = \frac{1}{\lambda + (1-\lambda)\gamma} Y}$$

$$\boxed{\bar{y} = \gamma \underline{y} = \frac{\gamma}{\lambda + (1-\lambda)\gamma} Y}$$

The total income of the low income earners $\underline{Y}$ and the total income of the high income earners $\bar{Y}$ are such that:

$$\underline{Y} = \lambda \underline{y}, \qquad \bar{Y} = (1-\lambda)\bar{y}, \qquad \underline{Y} + \bar{Y} = Y$$
$$\underline{Y} = \frac{\lambda}{\lambda + (1-\lambda)\gamma} Y, \qquad \bar{Y} = \frac{(1-\lambda)\,\gamma}{\lambda + (1-\lambda)\gamma} Y.$$

Numerical Application: let's divide the population in two groups, the top 10% income share, and the bottom 90% income share, so that: $\lambda = 0.9$. Since the top 10% get approximately 50% of the income in the U.S., this implies that:

$$\frac{\lambda}{\lambda + (1-\lambda)\gamma} = 0.5 \quad \Rightarrow \quad \gamma = 9.$$

2 No Automatic Stabilizers

Assume that investment depends on output:

$$I = b_0 + b_1 Y$$

Total taxes are given by:

$$T = \lambda \underline{t} + (1-\lambda)\,\bar{t}.$$

Total taxes paid by the low income earners $\underline{T}$ and the total taxes paid by the high income earners $\bar{T}$ are such that:

$$\underline{T} = \lambda \underline{t}, \qquad \bar{T} = (1-\lambda)\,\bar{t}, \qquad \underline{T} + \bar{T} = T.$$

Total consumption by the low income earners $\underline{C}$ and total consumption by the high income earners $\bar{C}$ are such that:

$$\underline{C} = \lambda \underline{c} = \underline{C}_0 + \underline{c}_1 \left(\underline{Y} - \underline{T}\right), \qquad \bar{C} = \lambda \bar{c} = \bar{C}_0 + \bar{c}_1 \left(\bar{Y} - \bar{T}\right), \qquad \underline{C} + \bar{C} = C.$$

Total demand is then:

$$\begin{aligned} Z &= C + I + G \\ &= \underline{C} + \bar{C} + b_0 + b_1 Y + G \\ &= \lambda \underline{c} + (1-\lambda)\bar{c} + b_0 + b_1 Y + G \\ &= \left[\lambda \underline{c}_0 + (1-\lambda)\,\bar{c}_0\right] + \left(\frac{\lambda \underline{c}_1 + (1-\lambda)\,\gamma \bar{c}_1}{\lambda + (1-\lambda)\gamma} + b_1\right) Y - \left[\lambda \underline{c}_1 \underline{t} + (1-\lambda)\,\bar{c}_1 \bar{t}\right] + b_0 + G \\ Z &= \left[\lambda \underline{c}_0 + (1-\lambda)\,\bar{c}_0\right] + \left(\frac{\lambda \underline{c}_1 + (1-\lambda)\,\gamma \bar{c}_1}{\lambda + (1-\lambda)\gamma} + b_1\right) Y - \left[\underline{c}_1 \underline{T} + \bar{c}_1 \bar{T}\right] + b_0 + G. \end{aligned}$$

Define the average marginal propensity to consume as:

$$\boxed{c_1 = \frac{\lambda \underline{c}_1 + (1-\lambda)\,\gamma \bar{c}_1}{\lambda + (1-\lambda)\gamma}}.$$

Define the baseline level of consumption as:

$$c_0 = \lambda \underline{c}_0 + (1-\lambda)\,\bar{c}_0$$

Equating output to demand Z=Y gives the value for output:

$$\boxed{Y = \underbrace{\frac{1}{1-c_1-b_1}}_{\text{Multiplier}} \underbrace{\left[c_0 - \left(\underline{c}_1 \underline{T} + \bar{c}_1 \bar{T}\right) + b_0 + G\right]}_{\text{Autonomous Spending } z_0}}.$$

2.1 Income redistribution from high income to low income earners

Assume a budget neutral change in net taxes. Assume that transfers to the low income earners are increased, so that $\Delta \underline{T} < 0$, so that aggregate net taxes stay constant $\Delta T = 0$. Therefore, taxes on the high income earners are increased at the same time with $\Delta \bar{T} = -\Delta \underline{T} > 0$. This leads to a change in autonomous spending:

$$\Delta z_0 = -\underline{c}_1 \Delta \underline{T} - \bar{c}_1 \Delta \bar{T} \quad \Rightarrow \quad \Delta z_0 = (\underline{c}_1 - \bar{c}_1)\,\Delta \bar{T} > 0.$$

This impulse leads to an increase in output:

$$\boxed{\Delta Y = \frac{\underline{c}_1 - \bar{c}_1}{1-c_1-b_1} \Delta \bar{T}}.$$

2.2 Debt-financed tax cuts for high income earners

Assume tax cuts for high income earners $\Delta\bar{T} < 0$, then output increases:

$$\Delta Y = -\frac{\bar{c}_1}{1 - c_1 - b_1}\Delta\bar{T} > 0.$$

There is an increase in output and a government deficit.

2.3 Debt-financed tax cuts for the low income earners

Assume tax cuts for low income earners $\Delta\underline{T} < 0$, then output increases:

$$\Delta Y = -\frac{\underline{c}_1}{1 - c_1 - b_1}\Delta\underline{T} > 0.$$

There is an increase in output and a government deficit.

3 Automatic Stabilizers

Instead of assuming that taxes are fixed, we now assume that taxes depend on output, both for low income earners:

$$\underline{t} = \underline{t}_0 + \underline{t}_1\underline{y}$$

as well as for high income earners:

$$\bar{t} = \bar{t}_0 + \bar{t}_1\bar{y}.$$

Taxes paid by the low income earners $\underline{T}_0$ and taxes paid by the high income earners $\bar{T}_0$ are such that:

$$\underline{T}_0 = \lambda\underline{t}_0, \qquad \bar{T}_0 = (1-\lambda)\,\bar{t}_0, \qquad \underline{T}_0 + \bar{T}_0 = T_0.$$

Total taxes are given by:

$$T = \lambda\underline{t} + (1-\lambda)\,\bar{t},$$

which, as a function of total income, is:

$$\boxed{T = \left(\underline{T}_0 + \bar{T}_0\right) + \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}Y}.$$

Total demand is then:

$$\begin{aligned} Z &= C + I + G \\ &= \lambda\underline{c} + (1-\lambda)\bar{c} + b_0 + b_1 Y + G \\ Z &= \left[\lambda\underline{c}_0 + (1-\lambda)\,\bar{c}_0\right] + \left(\frac{\lambda\underline{c}_1 + (1-\lambda)\,\gamma\bar{c}_1}{\lambda + (1-\lambda)\gamma} + b_1\right)Y - \left[\lambda\underline{c}_1\underline{t} + (1-\lambda)\,\bar{c}_1\bar{t}\right] + b_0 + G \end{aligned}$$

We have:

$$\lambda\underline{c}_1\underline{t} + (1-\lambda)\,\bar{c}_1\bar{t} = \left(\lambda\underline{c}_1\underline{t}_0 + (1-\lambda)\,\bar{c}_1\bar{t}_0\right) + \frac{\lambda\underline{c}_1\underline{t}_1 + (1-\lambda)\,\gamma\bar{c}_1\bar{t}_1}{\lambda + (1-\lambda)\gamma}Y.$$

Therefore:

$$Z = \left[\lambda \underline{c}_0 + (1-\lambda)\,\bar{c}_0\right] + \frac{\lambda \underline{c}_1 + (1-\lambda)\,\gamma \bar{c}_1}{\lambda + (1-\lambda)\gamma} Y - \left[\lambda \underline{c}_1 \underline{t} + (1-\lambda)\,\bar{c}_1 \bar{t}\right] + b_0 + G$$

$$Z = \left[\lambda\left(\underline{c}_0 - \underline{c}_1 \underline{t}_0\right) + (1-\lambda)\left(\bar{c}_0 - \bar{c}_1 \bar{t}_0\right)\right] + \left(\frac{\lambda\left(1-\underline{t}_1\right)\underline{c}_1 + (1-\lambda)\,\gamma\left(1-\bar{t}_1\right)\bar{c}_1}{\lambda + (1-\lambda)\gamma} + b_1\right) Y + b_0 + G$$

The average marginal propensity to consume is given by:

$$\boxed{(1-t_1)\,c_1 = \frac{\lambda\left(1-\underline{t}_1\right)\underline{c}_1 + (1-\lambda)\,\gamma\left(1-\bar{t}_1\right)\bar{c}_1}{\lambda + (1-\lambda)\gamma}}.$$

Equating output to demand $Z = Y$ gives the value for output:

$$\boxed{Y = \underbrace{\frac{1}{1-(1-t_1)\,c_1 - b_1}}_{\text{Multiplier}} \underbrace{\left[(\lambda \underline{c}_0 + (1-\lambda)\,\bar{c}_0) - \underline{c}_1 \underline{T}_0 - \bar{c}_1 \bar{T}_0 + b_0 + G\right]}_{\text{Autonomous Spending } z_0}}.$$

3.1 Income redistribution from high income to low income earners

Assume a change in net taxes such that. Assume that transfers to the low income earners are increased, so that $\Delta \underline{T}_0 < 0$, so that $\Delta \underline{T}_0 + \Delta \bar{T}_0 = 0$. Therefore, taxes on the high income earners are increased at the same time with $\Delta \bar{T}_0 = -\Delta \underline{T}_0 > 0$. This leads to a change in autonomous spending:

$$\Delta z_0 = -\underline{c}_1 \Delta \underline{T}_0 - \bar{c}_1 \Delta \bar{T}_0 \quad \Rightarrow \quad \Delta z_0 = \left(\underline{c}_1 - \bar{c}_1\right) \Delta \bar{T}_0 > 0.$$

This impulse leads to an increase in output:

$$\boxed{\Delta Y = \frac{\underline{c}_1 - \bar{c}_1}{1-(1-t_1)\,c_1 - b_1} \Delta \bar{T}_0 > 0}.$$

Using the value for aggregate taxes:

$$T = \left(\underline{T}_0 + \bar{T}_0\right) + \frac{\lambda \underline{t}_1 + (1-\lambda)\,\gamma \bar{t}_1}{\lambda + (1-\lambda)\gamma} Y.$$

$$\Delta T = \underbrace{\Delta \underline{T}_0 + \Delta \bar{T}_0}_{0} + \frac{\lambda \underline{t}_1 + (1-\lambda)\,\gamma \bar{t}_1}{\lambda + (1-\lambda)\gamma} \Delta Y.$$

Finally:

$$\Delta T = \frac{\lambda \underline{t}_1 + (1-\lambda)\,\gamma \bar{t}_1}{\lambda + (1-\lambda)\gamma} \frac{\underline{c}_1 - \bar{c}_1}{1-(1-t_1)\,c_1 - b_1} \Delta \bar{T}_0.$$

Thus, public saving increase, there is a reduction in the deficit, in public debt, and therefore:

$$\boxed{\Delta\left(T - G\right) = \frac{\lambda \underline{t}_1 + (1-\lambda)\,\gamma \bar{t}_1}{\lambda + (1-\lambda)\gamma} \frac{\underline{c}_1 - \bar{c}_1}{1-(1-t_1)\,c_1 - b_1} \Delta \bar{T}_0}$$

3.2 Debt-financed tax cuts for high income earners

Assume tax cuts for high income earners $\Delta\bar{T}_0 < 0$, then output increases:

$$\Delta Y = -\frac{\bar{c}_1}{1-(1-t_1)\,c_1 - b_1}\Delta\bar{T}_0 > 0.$$

The impact on aggregate taxes is however ambiguous:

$$\Delta T = \underbrace{\Delta\bar{T}_0}_{=0} + \Delta\underline{T}_0 + \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}\Delta Y$$

$$\Delta T = \left(1 - \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}\frac{\bar{c}_1}{1-(1-t_1)\,c_1 - b_1}\right)\Delta\bar{T}_0$$

Therefore, the impact on public saving is similarly ambiguous:

$$\boxed{\Delta\left(T-G\right) = \left(1 - \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}\frac{\bar{c}_1}{1-(1-t_1)\,c_1 - b_1}\right)\Delta\bar{T}_0}$$

There is an increase in output and, depending on parameters, there can be a government surplus or a government deficit.

3.3 Debt-financed tax cuts for the low income earners

Assume tax cuts for low income earners $\Delta\underline{T}_0 < 0$, then output increases:

$$\Delta Y = -\frac{\underline{c}_1}{1-(1-t_1)\,c_1 - b_1}\Delta\underline{T}_0 > 0.$$

The impact on aggregate taxes is however ambiguous:

$$\Delta T = \Delta\underline{T}_0 + \underbrace{\Delta\bar{T}_0}_{=0} + \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}\Delta Y$$

$$\Delta T = \left(1 - \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}\frac{\underline{c}_1}{1-(1-t_1)\,c_1 - b_1}\right)\Delta\underline{T}_0$$

Therefore, the impact on public saving is similarly ambiguous:

$$\boxed{\Delta\left(T-G\right) = \left(1 - \frac{\lambda\underline{t}_1 + (1-\lambda)\,\gamma\bar{t}_1}{\lambda + (1-\lambda)\gamma}\frac{\underline{c}_1}{1-(1-t_1)\,c_1 - b_1}\right)\Delta\underline{T}_0}$$

There is an increase in output and, depending on parameters, there can be a government surplus or a government deficit.

References

John Maynard Keynes. *The General Theory of Employment, Interest, and Money*. 1936. ISBN 81-269-0591-3.

Raghuram G. Rajan. *Fault Lines: How Hidden Fractures Still Threaten the World Economy*. Princeton University Press, May 2010. ISBN 978-1-4008-3421-1.

Robert B. Reich. *Aftershock: The Next Economy and America's Future*. Vintage Books, 2011. ISBN 978-0-307-47633-3.