Twin Deficits

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The expression "twin deficits" was coined by Martin Feldstein, a Harvard economist, to describe the situation of the United States in the 1980s. From 1982 to 1984, Martin Feldstein served as chairman of the Council of Economic Advisers and as chief economic advisor to President Ronald Reagan. At the time, he was very worried about the military expenditures that the Reagan policies were bringing about, and argued that these were the reason for the trade deficit, something that he was concerned about. He then argued that budget deficits and trade deficits were **twins**. The twin deficit hypothesis became very popular in policy discussions.

In section 4.1 of lecture 15 (available here), we saw that in increase in government spending $\Delta G > 0$ led to both an increase in the trade deficit through the increase in output $\Delta Y > 0$:

$$\Delta CA = -\frac{m_1}{1-(c_1+b_1-m_1)}\Delta G < 0$$

as well as, obviously, a decrease in public saving, so an increase in the deficit since $\Delta(T-G) = -\Delta G < 0$. Therefore, government spending was, at the time, supposed to lead to both a trade deficit and a budget deficit: a twin deficit.

Since then, twin deficits have been harder to see in the data: in particular, the United States has experienced strong budget surpluses in the late 1990s (during the presidency of Bill Clinton, from 1993 to 2001), together with a worsening trade balance. How can we make sense of that experience?

This note shows that, according to Keynesian economics, trade deficits may come together with budget deficits, but also with budget surpluses. In this respect, trade deficits are a better indicator of the importance of macroeconomic stimulus than budget deficit. You perhaps will not be surprised to learn that indeed, the policies of Bill Clinton were Keynesian, aggregate demand stimulating, even though the budget deficit was improving.

1 A small twist to the core model

In order to understand macroeconomic policy bettere develop a small extension of the models developed during the previous lectures. We allow for high income, and low income workers, who have low (for high income) or high (for low income) propensities to consume.

Output and consumption. Instead of assuming one type of consumer, with the average income Y and a given marginal propensity to consume c_1, we shall assume that the population is N and that there are 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 many times higher is the wage of high earners relative to that of low earners). They pay net taxes $\bar{t}$, and the MPC of the high income earners is lower on average $\bar{c}_1 < \underline{c}_1$:

$$\bar{c} = \bar{c}_0 + \bar{c}_1(\bar{y} - \bar{t})$$

We have:

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

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

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

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

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

Taxes. We assume that taxes depend on output, both for low income earners:

$$\underline{t} = \underline{t}_0 + t_1 \underline{y}$$

as well as for high income earners:

$$\bar{t} = \bar{t}_0 + t_1 \bar{y}$$

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

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

Total taxes are given by:

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

which, as a function of total income, is:

$$\boxed{T = \left(\underline{T}_0 + \bar{T}_0\right) + t_1 Y}.$$

Investment. Assume that investment depends on output, as in previous developments:

$$I = b_0 + b_1 Y$$

Exports and Imports. Exports and imports are given as a function of output and the real exchange rate by:

$$IM = \epsilon m_1 Y$$
$$X = \frac{x_1 Y^*}{\epsilon}$$

Total aggregate demand. Total demand is then:

$$\begin{aligned}
Z &= C + I + G - \frac{IM}{\epsilon} + X \\
&= \lambda N \underline{c} + (1-\lambda) N \bar{c} + b_0 + b_1 Y + G - m_1 Y + \frac{x_1 Y^*}{\epsilon} \\
&= \underbrace{\lambda N \underline{c}_0 + (1-\lambda) N \bar{c}_0}_{C_0} + \left(\underbrace{\frac{\lambda \underline{c}_1 + (1-\lambda)\gamma \bar{c}_1}{\lambda + (1-\lambda)\gamma}}_{c_1} + b_1 - m_1 \right) Y - \left[\lambda N \underline{c}_1 \underline{t} + (1-\lambda) N \bar{c}_1 \bar{t}\right] + b_0 + G + \frac{x_1 Y^*}{\epsilon}
\end{aligned}$$

We have denoted total baseline consumption C_0 by:

$$C_0 \equiv \lambda N \underline{c}_0 + (1-\lambda) N \bar{c}_0$$

We have also defined the average marginal propensity to consume (weighted by income) c_1 by:

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

We also have that:

$$\begin{aligned}
\lambda N \underline{c}_1 \underline{t} + (1-\lambda) N \bar{c}_1 \bar{t} &= \left(\lambda N \underline{c}_1 \underline{t}_0 + (1-\lambda) N \bar{c}_1 \bar{t}_0\right) + \frac{\lambda \underline{c}_1 + (1-\lambda)\gamma \bar{c}_1}{\lambda + (1-\lambda)\gamma} t_1 Y \\
&= \left(\underline{c}_1 \underline{T}_0 + \bar{c}_1 \bar{T}_0\right) + c_1 t_1 Y.
\end{aligned}$$

Therefore:

$$Z = C_0 + (c_1 - c_1 t_1 + b_1 - m_1) Y - \left(\underline{c}_1 \underline{T}_0 + \bar{c}_1 \bar{T}_0\right) + b_0 + G - m_1 Y + \frac{x_1 Y^*}{\epsilon}$$

then:

$$Z = \left[(\lambda \underline{c}_0 + (1-\lambda)\bar{c}_0) - \underline{c}_1 \underline{T}_0 - \bar{c}_1 \bar{T}_0\right] + \left[(1-t_1)c_1 + b_1 - m_1\right] Y + b_0 + G + \frac{x_1 Y^*}{\epsilon}$$

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

$$\boxed{Y = \underbrace{\frac{1}{1 - (1-t_1)c_1 - b_1 + m_1}}_{\text{Multiplier}} \underbrace{\left[C_0 - \underline{c}_1 \underline{T}_0 - \bar{c}_1 \bar{T}_0 + b_0 + G + \frac{x_1 Y^*}{\epsilon}\right]}_{\text{Autonomous Spending } z_0}}.$$

2 Income redistribution

Assume that transfers to the low income earners are increased, or taxes decreased, so that $\Delta \underline{T}_0 < 0$, but that taxes to the high income earners are increased at the same time. These transfers are assumed to be revenue neutral, so that $\Delta \underline{T}_0 + \Delta \bar{T}_0 = 0$. Using the formula for autonomous spending above:

$$z_0 = C_0 - \underline{c}_1 \underline{T}_0 - \bar{c}_1 \bar{T}_0 + b_0 + G + \frac{x_1 Y^*}{\epsilon},$$

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 to autonomous spending therefore leads to an increase in output:

$$\boxed{\Delta Y = \frac{\underline{c}_1 - \bar{c}_1}{1 - (1 - t_1) c_1 - b_1 + m_1} \Delta \bar{T}_0 > 0}.$$

Using the value for aggregate taxes:

$$T = \left(\underline{T}_0 + \bar{T}_0\right) + t_1 Y \quad \Rightarrow \quad \Delta T = \underbrace{\Delta \underline{T}_0 + \Delta \bar{T}_0}_{0} + t_1 \Delta Y.$$

Therefore:

$$\Delta T = t_1 \frac{\underline{c}_1 - \bar{c}_1}{1 - (1 - t_1) c_1 - b_1 + m_1} \Delta \bar{T}_0.$$

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

$$\boxed{\Delta (T - G) = t_1 \Delta Y = t_1 \frac{\underline{c}_1 - \bar{c}_1}{1 - (1 - t_1) c_1 - b_1 + m_1} \Delta \bar{T}_0}$$

We also get more investment, since $\Delta I = b_1 \Delta Y$:

$$\boxed{\Delta I = b_1 \Delta Y = b_1 \frac{\underline{c}_1 - \bar{c}_1}{1 - (1 - t_1) c_1 - b_1 + m_1} \Delta \bar{T}_0}$$

Finally, the change in the current account can be inferred directly through $\Delta CA = -\Delta \left(\frac{IM}{\epsilon}\right) = -m_1 \Delta Y$:

$$\boxed{\Delta CA = -m_1 \Delta Y = -m_1 \frac{\underline{c}_1 - \bar{c}_1}{1 - (1 - t_1) c_1 - b_1 + m_1} \Delta \bar{T}_0}$$

Private saving can be obtained using the identity:

$$CA = S + (T - G) - I \quad \Rightarrow \quad \Delta S = \Delta CA + \Delta I - \Delta (T - G)$$

Thus:

$$\Delta S = -m_1 \Delta Y + b_1 \Delta Y - t_1 \Delta Y$$
$$\Delta S = (-t_1 + b_1 - m_1) \Delta Y$$

Therefore, private saving change as follows:

$$\boxed{\Delta S = (-t_1 + b_1 - m_1)\,\Delta Y = (-t_1 + b_1 - m_1)\,\frac{\underline{c}_1 - \bar{c}_1}{1 - (1-t_1)\,c_1 - b_1 + m_1}\Delta \bar{T}_0}$$

Note that if $t_1 + m_1 > b_1$, then there is a fall in private saving. In other words, income redistribution leads to a fall in private saving, an increase in public saving (a reduction in the government deficit), a rise in investment, and a fall in the current account deficit.

3 Computing private saving S directly

Private saving was computed above using the current account identity $CA = S + (T - G) - I$. We may get at saving directly using agents' disposable income instead. The saving of a low income earner is denoted $\underline{s}$. Thus, $\underline{s}$ is such that

$$\begin{aligned}
\underline{s} &= \underline{y} - \underline{t} - \underline{c} \\
&= \underline{y} - \underline{t} - \big(\underline{c}_0 + \underline{c}_1(\underline{y} - \underline{t})\big) \\
&= -\underline{c}_0 + (1 - \underline{c}_1)\,(\underline{y} - \underline{t}) \\
\underline{s} &= -\underline{c}_0 - (1 - \underline{c}_1)\,\underline{t}_0 + (1 - \underline{c}_1)\,(1 - t_1)\,\underline{y}
\end{aligned}$$

Symmetrically, the saving of a high income earner is denoted $\bar{s}$ and is such that:

$$\bar{s} = -\bar{c}_0 - (1 - \bar{c}_1)\,\bar{t}_0 + (1 - \bar{c}_1)\,(1 - t_1)\,\bar{y}$$

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

$$\underline{S} = \lambda N \underline{s} \qquad \bar{S} = (1-\lambda) N \bar{s} \qquad \underline{S} + \bar{S} = S.$$

Therefore:

$$\begin{aligned}
S &= \lambda N \underline{s} + (1 - \lambda)\, N \bar{s} \\
S &= -C_0 - (1 - \underline{c}_1)\,\underline{T}_0 - (1 - \bar{c}_1)\,\bar{T}_0 + \frac{\lambda\,(1 - \underline{c}_1) + \gamma\,(1-\lambda)\,(1 - \bar{c}_1)}{\lambda + \gamma\,(1 - \lambda)}\,(1 - t_1)\,Y
\end{aligned}$$

We get:

$$S = -C_0 - (1 - \underline{c}_1)\,\underline{T}_0 - (1 - \bar{c}_1)\,\bar{T}_0 + (1 - c_1)(1 - t_1)Y$$

The change in saving is given by:

$$\begin{aligned}
\Delta S &= -\,(1 - \underline{c}_1)\,\Delta \underline{T}_0 - (1 - \bar{c}_1)\,\Delta \bar{T}_0 + (1 - c_1)(1 - t_1)\Delta Y \\
&= -\,(\underline{c}_1 - \bar{c}_1)\,\Delta \bar{T}_0 + \frac{(1 - c_1)(1 - t_1)}{1 - (1 - t_1)\,c_1 - b_1 + m_1}\,(\underline{c}_1 - \bar{c}_1)\,\Delta \bar{T}_0 \\
&= \frac{(1 - c_1)(1 - t_1) - 1 + (1 - t_1)\,c_1 + b_1 - m_1}{1 - (1 - t_1)\,c_1 - b_1 + m_1}\,(\underline{c}_1 - \bar{c}_1)\,\Delta \bar{T}_0 \\
\Delta S &= \frac{-t_1 + b_1 - m_1}{1 - (1 - t_1)\,c_1 - b_1 + m_1}\,(\underline{c}_1 - \bar{c}_1)\,\Delta \bar{T}_0 \\
&= (-t_1 + b_1 - m_1)\,\Delta Y
\end{aligned}$$

We thus arrive at the same expression as before, but using instead disposable income directly. From there, we may verify that the change in the current account is the same as the one obtained through changes in imports above:

$$\begin{aligned}\Delta CA &= \Delta S + \Delta\left(T - G\right) - \Delta I \\ &= \left(-t_1 + b_1 - m_1\right)\Delta Y + t_1 \Delta Y - b_1 \Delta Y \\ \Delta CA &= -m_1 \Delta Y\end{aligned}$$

Indeed, we arrive at the same expression.

Conclusion

This note has shown that, according to Keynesian economics, trade deficits may come together with budget deficits, but also with budget surpluses. In this respect, **trade deficits are a better indicator of the importance of macroeconomic stimulus** than budget deficit, and are a better indicator of whether a country is engaging into aggregate demand stimulating policies or not.

We have shown that a budget neutral tax cut for low income individuals, and tax increase for high income individuals, would leave the government aggregate saving unchanged, if nothing else changed. Because there are "automatic stabilizers", such that taxes depend on GDP, then the resulting rise in GDP can even raise aggregate taxes, and lead to a fiscal surplus. In this case, current account deficits can coexist together with a budget surplus. This was the case during most of the presidency of Bill Clinton.

An extreme example can be seen in the case of a fiscal stimulus in favor of high income individuals who have a marginal propensity to consume equal to zero. In this case, macroeconomically speaking, there would be an increase in private saving which is exactly offset by a decrease in public saving: everything would be as if the rich were buying the additional government debt created, and nothing else happened. These policies would not be aggregate demand stimulating (however, note that the rich do not have a MPC equal to zero).