

Table 9.6 The Multiplier at Work

(1) Change in Intended Investment	(2) Change in Aggregate Demand (as <i>C</i> or <i>I</i> change) and in Output and Income (as firms respond to changes in <i>AD</i>)	(3) Change in Consumption $\Delta C = mpc \Delta Y$ $= .8 \times \text{Column (2)}$
1. Investors lose confidence. $\Delta I = -80$	2. Reduced investment spending leads directly to $\Delta AD = -80$. Producers respond to reduced demand for their goods by cutting back on production. $\Delta Y = -80$	3. Less production means less income. With income reduced by 80, households cut consumption by $mpc \Delta Y = .8 \times -80$ $\Delta C = -64$
	4. Lowered consumption spending means lowered AD $\Delta AD = -64$ Producers respond. $\Delta Y = -64$	5. Households cut consumption by $mpc \Delta Y = .8 \times -64$ $\Delta C = -51.2$
	6. $\Delta Y = -51.2$	7. $mpc \Delta Y = .8 \times -51.2$ $\Delta C = -40.96$
	8. $\Delta Y = -40.96$	9. $\Delta C = -32.77$
	10. $\Delta Y = -32.77$	11. $\Delta C = -26.21$
	etc.	etc.
	Sum of changes in Y $= -80 + -64 + -51.2 + -40.96 + -32.77 + \dots$ $= -400$	

In the first row, for example, the drop in intended investment (step 1) leads to an immediate drop in *AD* of 80 (step 2). Firms see inventories piling up, and cut back production by 80. But this decreases the amount of income going to households, since firms are now paying less in wages, interest, dividends, and rents. Consumers react (in step 3) to a change in income according the relationship $\Delta C = mpc \Delta Y$. With 80 less in income, they reduce their spending by 64. (How do they manage to keep their budget in line, when they have only reduced their spending by 64 but their income went down by 80? See if you can think of the answer before you check the footnote.*)

The second and later rows show how decreases in consumption decrease aggregate demand, output, and income, and thus depress consumption even further. Notice that in each round, the decrease in *Y* gets a little smaller. Fortunately, a convenient result from mathematics means that we don't need to calculate the sum of all these changes in *Y* by continuing to extend the table, row after row (in theory, forever—although the numbers get very tiny after a while).** A result

* They economize by reducing both consumption and saving. They reduce their saving by 16 (which corresponds to the remaining 20 percent of the income change).

** Column 2 of the table can be summarized as:

$$\begin{aligned} \Delta Y &= 1 + mpc \Delta \bar{I} + mpc (mpc \Delta \bar{I}) + mpc (mpc (mpc \Delta \bar{I})) + \dots \\ &= (1 + mpc + mpc^2 + mpc^3 + \dots) \Delta \bar{I} \end{aligned}$$

But the infinite series $(1 + x + x^2 + x^3 + \dots + x^\infty)$ where $x < 1$ can be simplified to $1/(1-x)$.