Slutsky equation

$$\frac{\Delta x_1}{\Delta p_1} = \frac{\Delta x_1^s}{\Delta p_1} - \frac{\Delta x_1^m}{\Delta m} x_1$$

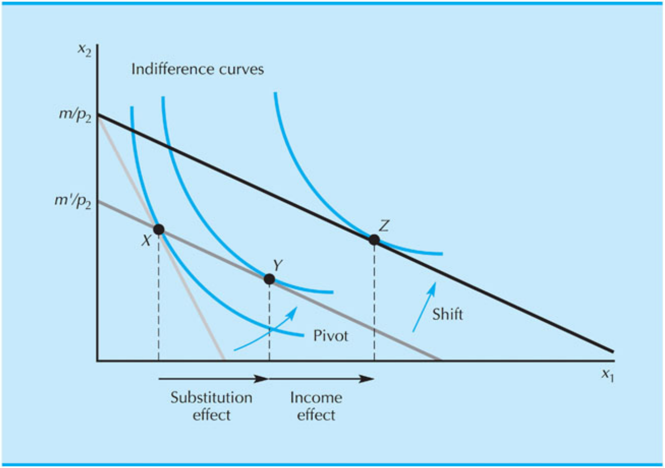

Figure 8.2

Slutsky equation revisited

$$\frac{\Delta x_1}{\Delta p_1} = \frac{\Delta x_1^s}{\Delta p_1} + (\omega_1 - x_1)\frac{\Delta x_1^m}{\Delta m}$$

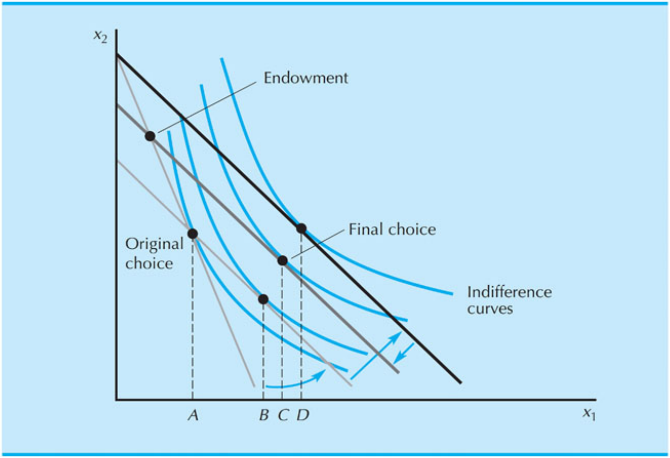

Figure 9.7

Slutsky equation revisited

Note that it is identically true that

$$\frac{x_1(p_1', m'') - x_1(p_1, m)}{\Delta p_1} =$$

$$
\begin{aligned}
&+ \frac{x_1(p_1', m') - x_1(p_1, m)}{\Delta p_1} \quad \text{(substitution effect)} \\
&- \frac{x_1(p_1', m') - x_1(p_1', m)}{\Delta p_1} \quad \text{(ordinary income effect)} \\
&+ \frac{x_1(p_1', m'') - x_1(p_1', m)}{\Delta p_1} \quad \text{(endowment income effect).}
\end{aligned}
$$

(Just cancel out identical terms with opposite signs on the right-hand side.)

By definition of the ordinary income effect,

$$\Delta p_1 = \frac{m' - m}{x_1}$$

and by definition of the endowment income effect,

$$\Delta p_1 = \frac{m'' - m}{\omega_1}.$$

Slutsky equation revisited

By definition of the ordinary income effect,

$$\Delta p_1 = \frac{m' - m}{x_1}$$

and by definition of the endowment income effect,

$$\Delta p_1 = \frac{m'' - m}{\omega_1}.$$

Making these replacements gives us a Slutsky equation of the form

$$\frac{x_1(p_1', m'') - x_1(p_1, m)}{\Delta p_1} =$$

$$\begin{aligned}
&+ \frac{x_1(p_1', m') - x_1(p_1, m)}{\Delta p_1} \quad \text{(substitution effect)} \\
&- \frac{x_1(p_1', m') - x_1(p_1', m)}{m' - m} x_1 \quad \text{(ordinary income effect)} \\
&+ \frac{x_1(p_1', m'') - x_1(p_1', m)}{m'' - m} \omega_1 \quad \text{(endowment income effect).}
\end{aligned}$$

Writing this in terms of Δs, we have

$$\frac{\Delta x_1}{\Delta p_1} = \frac{\Delta x_1^s}{\Delta p_1} - \frac{\Delta x_1^m}{\Delta m} x_1 + \frac{\Delta x_1^w}{\Delta m} \omega_1.$$