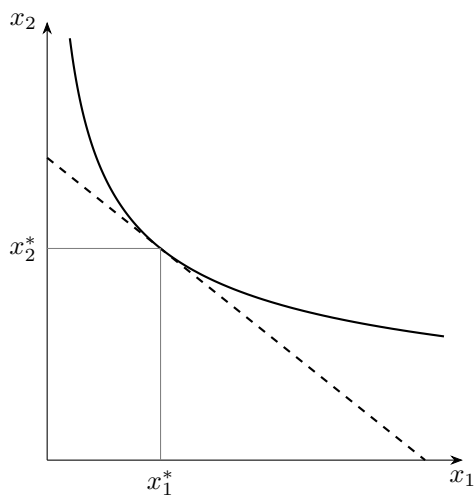
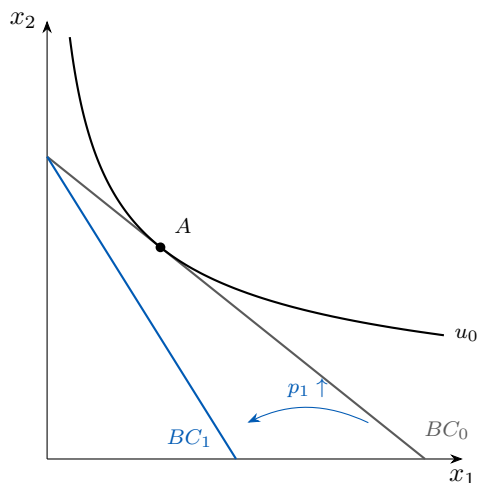


Original graph



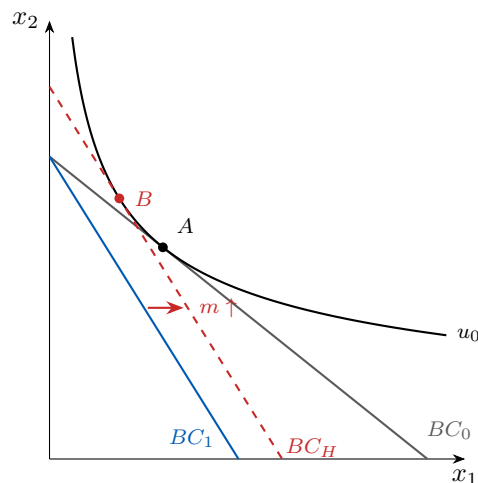
1. New budget constraint

1.1 New budget line



An increase in p_1 from p_1 to p'_1 rotates the budget line inwards around the x_2 -intercept m/p_2 . The new x_1 -intercept is m/p'_1 . The old budget line slope is $-p_1/p_2$, the new one is steeper $-p'_1/p_2$.

1.2 Compensated budget line

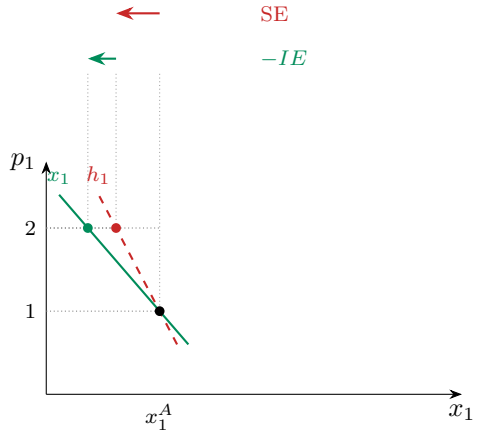
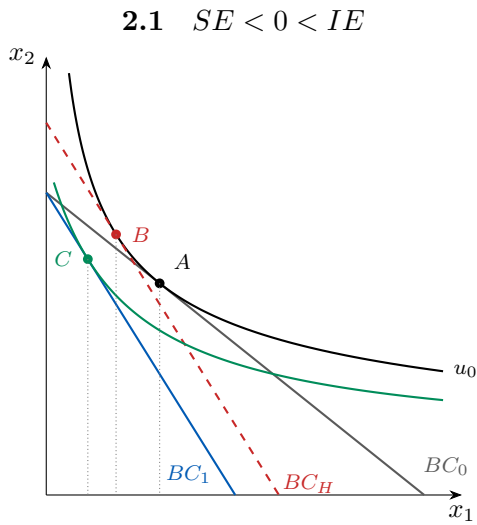


Give the consumer just enough income to reach the *old* utility u_0 at the *new* prices p'_1 . BC_H is shifted outwards until it touches the old indifference curve u_0 (at B). The compensated budget line BC_H (dashed red) is **parallel to the new budget line BC_1** : both have slope $-p'_1/p_2$, because both use the new prices.

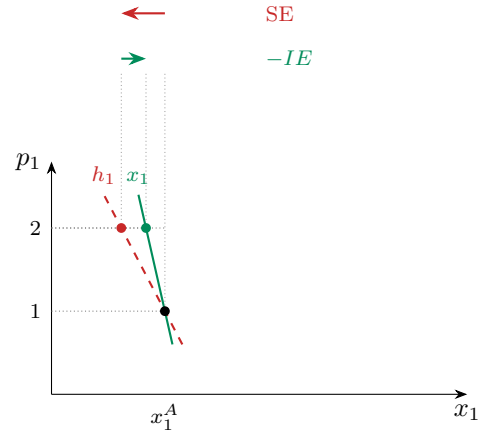
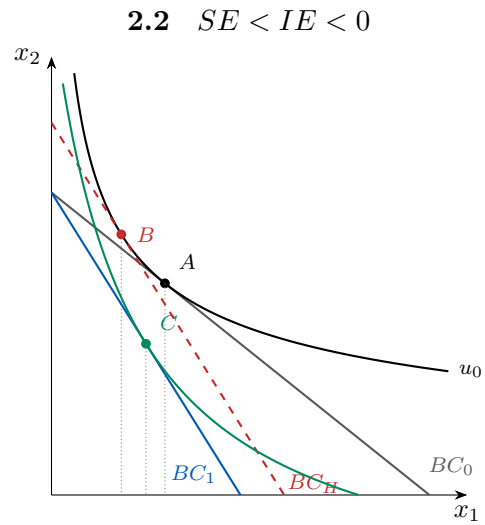
2. Decomposition (Hicks) and demand curves

A : initial optimum; B : optimum at new prices and old utility u_0 (compensated budget BC_H , dashed); C : new optimum. Slutsky: $\frac{\partial x_1}{\partial p_1} = SE - IE$ with $IE = x_1 \frac{\partial x_1}{\partial m}$. Hence $x_1^B - x_1^A$ reflects SE and $x_1^C - x_1^B$ reflects $-IE$.

Below each diagram, on the same x_1 -axis: dashed red is the Hicksian demand $h_1(p_1, u_0)$ (only SE , through A and B); solid green is the Marshallian demand $x_1(p_1, m)$ (SE and IE , through A and C). Both pass through A at $p_1 = 1$.

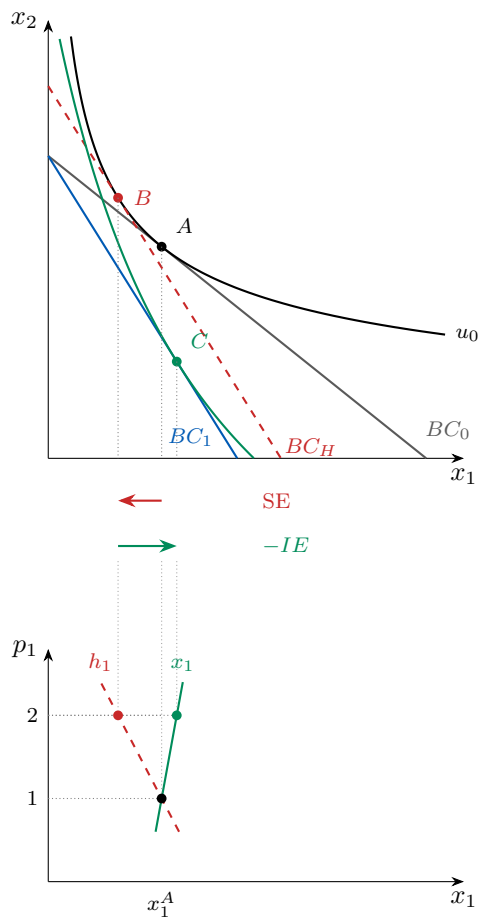


Normal good: less income $\Rightarrow$ less x_1 ;
both effects reduce x_1 .
Marshallian demand is flatter than Hicksian.



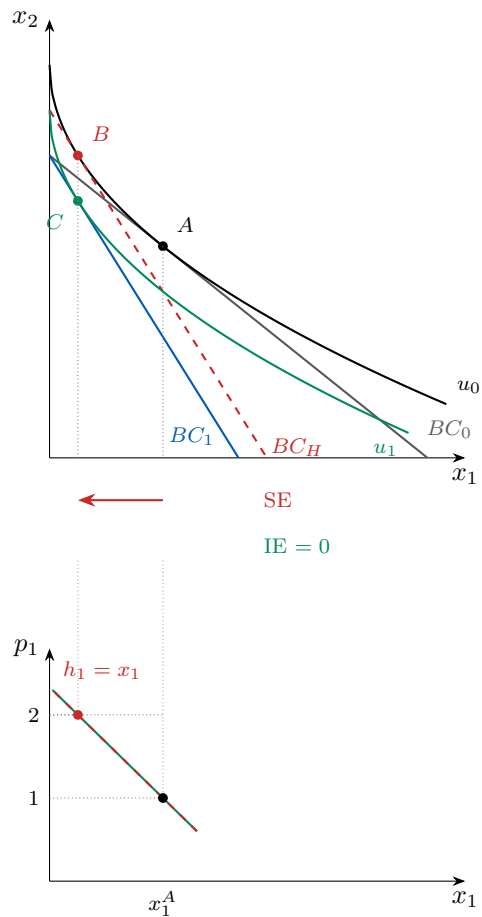
Inferior good: the income effect raises x_1 , but SE dominates.
Marshallian demand is steeper than Hicksian.

2.3 $IE < SE < 0$



Giffen good: the IE outweighs SE,
so x_1 rises when p_1 rises.
Marshallian demand slopes upward.

2.4 $SE < 0, IE = 0$



Neither normal nor inferior: quasi-linear
preferences, here $u = 2\sqrt{3}\sqrt{x_1} + x_2$;
ICs are vertical shifts of each other.
The two demand curves coincide.