The Cobweb Model

Introduction

The Cobweb Model challenges the tendency to assume that a supply and demand model "obviously" converges to equilibrium at the intersection of the two curves. In fact, convergence to equilibrium in an economic model may or may not occur.

The mechanism featured in the Cobweb Model is a lagged response of supply to the market price. For example, in an agricultural crop this period's supply might depend on the amount planted in the previous period and, hence, the previous period's price. An unusually high price in period 1 can lead to a large supply in period 2, which then causes a low price in period 2 and smaller amounts planted. The stage is then set for a higher price in period 3 and an oscillation between low and high prices.

Deeper analysis of this process than the simulations here ventures into the issues raised by rational expectations. At that level, it is not obvious that farmers who find themselves in a cobweb pattern of oscillations would not see that their supply strategy leads to systematic mistakes.

The Model

The Demand Curve is given by

$$P = 2 + (20 + QS - 3 Y) / alpha,$$

where the Demand Curve slope alpha determines the stability of the process. If alpha < -5, then the process is stable. To the extent that alpha > -5 the process is unstable.

$$QS = -10 + beta (P[t-1] - 2) + 2 WX$$

The supply curve slope beta is always set to 5.

The EconModel simulations apply these two equations sequentially in the "Traditional Cobweb Model" case. The resulting process, which takes two periods to go through both equations, has the advantage of drawing the traditional cobweb diagram that shows the sequential equilibria.

The "Simultaneous Cobweb Model" show the oscillations when both adjustments occur each period.

Exercises

1. Run the simulations for the Traditional Cobweb Model and alpha equal to -6.0, -5.0, -4.0, and -3.5. Draw the diagrams for the sequential equilibria.

2. How does the stability of the process depend on alpha?

3. Click on the "Home" icon to reach the initial title page. Select "The Simultaneous Cobweb Mode." Run those simulations, which alternate between the upper-left and lower-right corners of the previous diagram.

4. Again, how does the stability of the process depend on alpha?