

17. Consider two Bertrand competitors in the market for brie, François and Babette. The cheeses of François and Babette are differentiated, with the demand for François' cheese given by $q_F = 30 - p_F + p_B$, where q_F is the quantity François sells, p_F is the price François charges, and p_B is the price charged by Babette. The demand for Babette's cheese is similarly given as $q_B = 30 - p_B + p_F$.
- Find the Bertrand equilibrium prices and quantities for these two competitors.
 - Now consider a situation in which François sets his price first, and Babette responds. Follow procedures similar to those you used for Stackelberg quantity competition to solve for François' profit-maximizing price, quantity, and profit.
 - Solve for Babette's profit-maximizing price, quantity, and profit.
 - Was François' attempt to seize the first-mover advantage worthwhile?
 - Assuming that each competitor faces a marginal cost and fixed cost of zero, redo part (a) using calculus methods and confirm that your answers are the same as those solved algebraically.
 - Suppose that the demand for François' cheese changes to $q_F = 30 - 2p_F + p_B$ after he decreases advertising. Solve for the new differentiated Bertrand equilibrium using calculus.