

Supplement to  
The Competitive Effects of Transmission Capacity  
in a Deregulated Electricity Industry  
by Borenstein, Bushnell and Stoff  
July 2000

Footnote 14

Here we show that if a firm believes that it is facing inverse demand  $P(Q+k)$  and produces its optimal output response, this would necessarily cause the line to be congested (thus, confirming its belief that it faces inverse demand  $P(Q+k)$ ). Producing  $q_m^-(k)$  would cause the line to be congested in any circumstance in which a firm might choose to produce it. To see this, note that (1) at the quantity choice of the firm that just decongests the line, call this  $\tilde{q}$ ,  $\pi(\tilde{q}, k) = \Pi(\tilde{q}, q^n)$ , where  $q^n$  is the rival's output, and that (2)  $\pi(q, k) < \Pi(q, q^n) \quad \forall q > \tilde{q}$ . This means that if  $q_m^-(k)$  caused the line to be decongested, it would also generate lower profit (when calculated as if the line were congested) than a best response in the combined market, so the firm would never choose to produce  $q_m^-(k)$  in that case. Thus, if the firm ever chose to produce  $q_m^-(k)$ , on the assumption that it would lead to congestion on the line, that quantity would indeed congest the transmission line.