In “Prices and the Winner’s Curse”, Bulow and Klemperer (BK) apply auction theory to explain seemingly irrational pricing behavior. In their model, if many bidders compete for a good with both private and common value components, then there exist conditions in which **expected prices can be raised by increasing supply or restricting demand**. In an auction setting, these cases may arise whenever increasing the number of units sold or reducing the number of bidders results in more aggressive bidding.

Interpreting BK’s results involves a brief reference to earlier research. Bulow and Roberts (1989) outline the similarities between the problem of optimal auction design and that of third degree price discrimination by a monopolist. For each bidder with valuation \( v_i \) drawn iid from \( F(v_i) \), define \( Q_i = 1 - F(v_i) \) as the bidders’ demand curve for the good being sold. Multiplying \( Q_i \) by \( P = v = F_i^{-1}(1-Q_i) \) and differentiating with respect to \( Q_i \) yields \( MR_i = v_i - \frac{1-F_i(v_i)}{f_i(v_i)} \). This expression is identical to the expected payment condition derived in Vickery (1961) and is often used to derive revenue equivalence for various auction formats. The connection between bidder MR and auction price is made by BK (1996), who prove that the expected auction price equals the expected marginal revenue of the winning bidder.

BK consider a conventional ascending bid English auction setting that allows variation in the number of bidders and the number of goods sold. Their basic model contains three risk-neutral bidders who observe an iid signal \( t_i \) drawn from a common distribution \( F(t_i) \). The expected value of each good to bidder \( i \) is given by:

\[
\begin{align*}
  v_1 &= (1+\alpha_1)t_1 + t_2 + t_3 \\
  v_2 &= t_1 + (1+\alpha_2)t_2 + t_3 \\
  v_3 &= t_1 + t_2 + (1+\alpha_3)t_3
\end{align*}
\]

Each good has a common value \( \sum t_i \) to each bidder \( i \) and a private value represented by \( \alpha_i \). This specification allows a comparison between a symmetric common value case, where all private values are equal \( (\alpha_1=\alpha_2=\alpha_3) \), and an asymmetric one in which one bidder has a stronger private preference \( (\alpha_1>\alpha_2=\alpha_3) \).

In both cases, the response of prices to changes in supply and demand depends on the winning bidders’ MR primarily through the assumed distribution of signals \( F(t_i) \). BK define the hazard rate \( h_i(t_i) = f(t_i)/(1-F(t_i)) \) so that \( MR_i = v_i - h_i^{-1}(t_i) \) and derive conditions
that depend crucially on whether h(i) is increasing or decreasing in t_i. To interpret their results, it is essential to recognize that increasing hazard rates imply that bidder MR also rises with t_i. In the symmetric case, the winner of the single-unit auction must have the highest signal t_i, and with increasing hazard rates therefore also has the highest MR. If two units are sold, the bidder with the second-highest signal t_i also wins the good, with the price determined by the MR of the second-highest bidder. Since MR_i > MR_j, the expected price in the 2-unit auction falls, which verifies the traditional inverse relationship between changes in supply and price.

On the demand side, the symmetric case with increasing hazard rate yields a similar intuitive result. Again, the winner of the single-unit auction will have the highest signal t_i and MR_i among N bidders. Increasing the number of bidders raises E[t_i | t_i wins], and increasing hazard rates ensures that MR_i must be increasing in the number of bidders. It follows that expected auction price rises with the number of bidders, thus confirming expected positive relationship between demand and price.

The expected relationship between expected prices and shifts in supply and demand change dramatically when bidders’ private values are allowed to differ. In these asymmetric cases, the winner’s curse faced by bidders in the single-unit auction is so severe that selling an additional unit may generate more aggressive bidding and increase price. In the two-unit auction, competition between bidders with the two highest signals forces the bidder with the highest signal to pay more than he would have in the single-unit case. In the single-unit auction, expected price equals the expected MR of a randomly drawn signal. In the two-unit case with increasing hazard rates, expected price equals the expected average MR of the bidders with the two highest signals, which BK show to be greater than that of a single randomly drawn signal. BK’s Proposition 2 summarizes the counterintuitive result: Expected price is higher/lower when two units are sold than when one unit is sold if hazard rates are increasing/decreasing in signals t_i.

On the demand side, the asymmetric case again produces unusual results when hazard rates are increasing. With N bidders for a single unit, expected price again equals the MR of a randomly selected bidder. Reducing the number of bidders limits the winner's curse faced by any single bidder and thus encourages aggressive bidding. With only two bidders, the bidder with the higher signal wins and since MR is increasing in
signals $t_i$, the expected price will exceed that in the N-bidder case. Clearly, a seller facing asymmetric bidders with increasing hazard rates will optimally limit the number of bidders in order to maximize expected revenue.