Superstars Make Even More!

How Much?

- Average CEO in a Fortune 500 company makes US$12 million
- *Forbes* estimated that Naomi Osaka made $37.4 million in 2020
- *Le Parisien* said Lionel Messi's salary at PSG is between $41 and $47 million
- Nicole Kidman made $22 million
- Dwayne Johnson, the highest paid actor in 2020, made $87.5 million
- Jacky Chan made $40 million
- J.K. Rowling earned $60 million last year

Basic Ingredients

- Consumers are willing to pay more for higher quality entertainment/service
- Low quality and low price substitutes are difficult to compete because:
  - consumers often have to pay a fixed time cost
  - price competition may give way to competition for attention
- Modern communications technology make the entire world market within reach
- So markets increasingly exhibit winner-take-all characteristics

Congestion

- But one cannot take the entire market; expanding the market will lead to "congestion effects"
  - replication is not completely costless and is not perfect—live performance may be more enjoyable than listening to a digital reproduction of a song on Spotify
  - some may claim that a smaller, more intimate concert is better than one held in a large stadium
  - consumers' tastes are different: catering to a larger market may require appealing to the lowest common denominator
- Congestion tends to limit the winner-take-all effect

The Economics of Superstars

- The value of a star's service to each consumer depends on her quality and the size of the market she serves:

$$p = h(q,m) = q - a\left(\frac{m}{q}\right)^b$$

  - higher quality stars (q) produce more valuable service
  - a larger market (m) reduces the value of the service (congestion effect)
  - congestion effects are less important when b is smaller
  - congestion effects are less important for high quality stars: $\partial h/\partial m = -ab(1/m)(m/q)^b$ becomes smaller (in absolute value) when q becomes larger

Market size

- The star chooses market size m to maximize total revenue:
$$R^* = \max_m pm = \left(q - a\left(\frac{m}{q}\right)^b\right)m$$
- The first-order condition is
$$\left(q - a\left(\frac{m}{q}\right)^b\right) + m\left(-ab\frac{1}{m}\left(\frac{m}{q}\right)^b\right) = 0$$
- This reduces to
$$m^* = \frac{q^{1+1/b}}{(a(b+1))^{1/b}}$$
- higher quality stars serve bigger markets
- higher quality stars serve much bigger markets when congestion is weak:
  - if $b = 1$, a star who is twice as good as another serves a market four times as large
  - if $b = 0.1$, a start who is twice as good serves a market more than 2000 times as large

Price of Service

- Substitute the optimal value m^* gives

$$p^* = h(q, m^*) = \left(q - a \left(\frac{m^*}{q} \right)^b \right) = q \left(\frac{b}{b+1} \right)$$

- Higher quality stars command a higher price p^* for their service despite congestion
- When congestion is weak, the prices are lower and less variable with respect to quality:
  - if $b = 1$, $p^* = (1/2)q$
  - if $b = 0.1$, $p^* = (1/11)q$

Superstar Earnings

- Superstars earn a lot more both because (1) they command a high price and (2) they serve a larger market
- Substitute p^* and m^* into the revenue function to get:

$$R^* = q\left(\frac{b}{b+1}\right)\left(\frac{q^{1+1/b}}{(a(b+1))^{1/b}}\right) = \frac{bq^{2+1/b}}{a^{1/b}(b+1)^{1+1/b}}$$

- If $b = 1$, a star twice as good as another earns eight times as much
- If $b = 0.1$, a star twice as good as another earns more than 4000 times as much