

Is there evidence of an anti commons tragedy in the smartphone industry?

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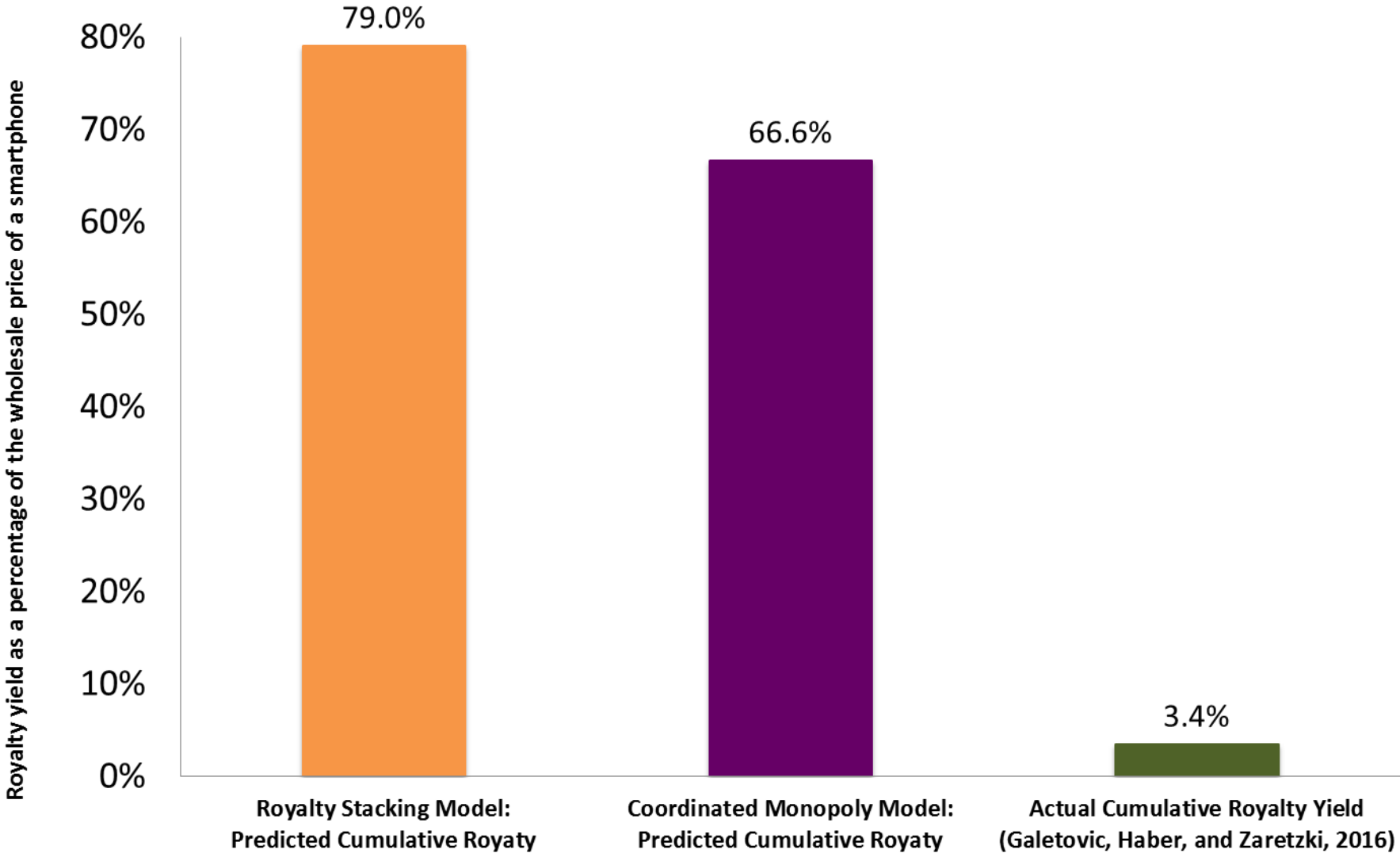
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The question

- The anti commons tragedy
 - There are too many owners of property rights
 - Holdout
 - Excessive prices
- Smartphones: excessive monopoly power granted by standards creates an anti commons tragedy
- In IT: royalty stacking (Cournot complements)
 - Each patent holder has monopoly power as conventionally understood in economics

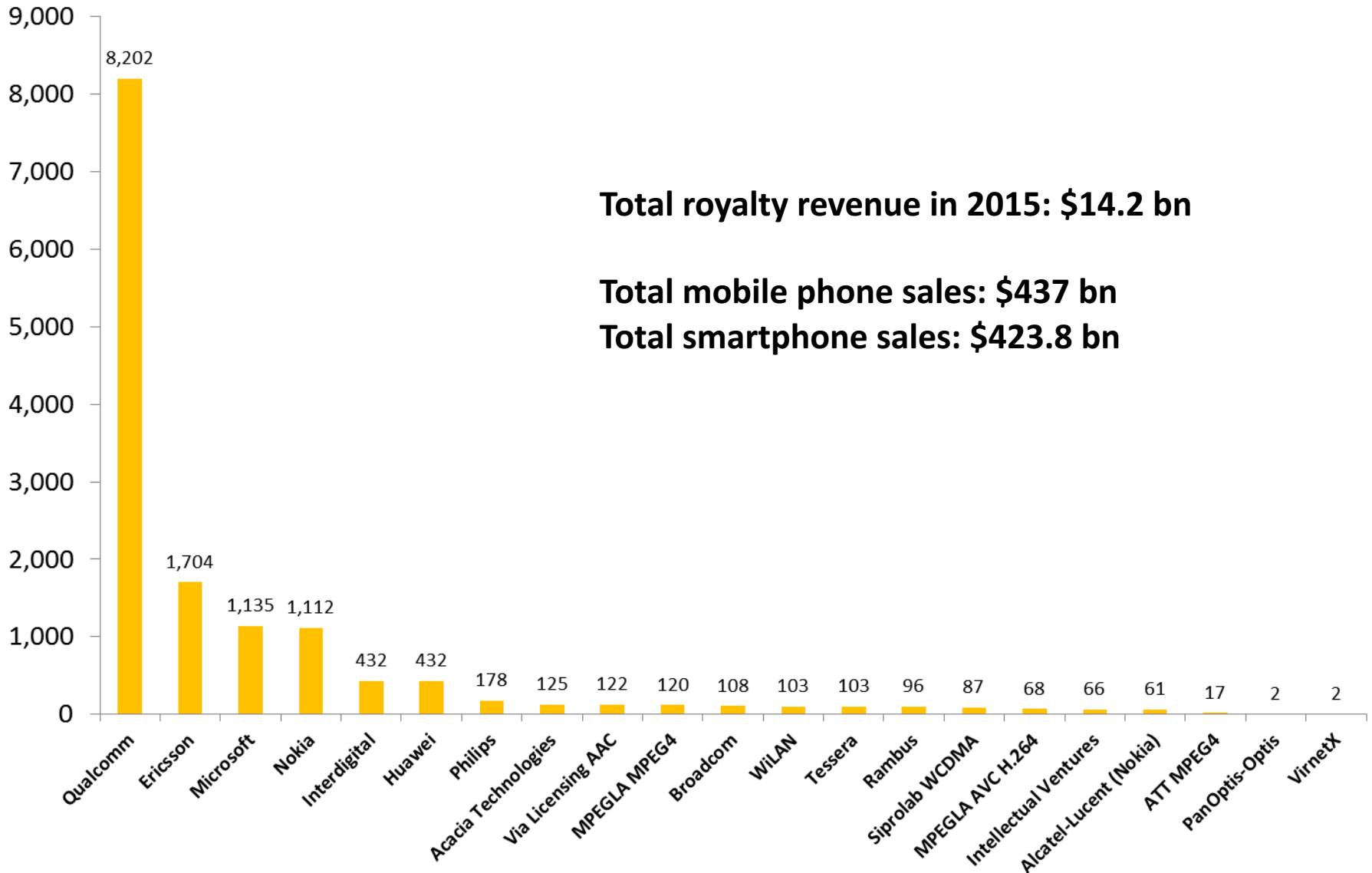
Royalty yield predicted by monopoly and the actual worldwide royalty yield in smartphones in 2015



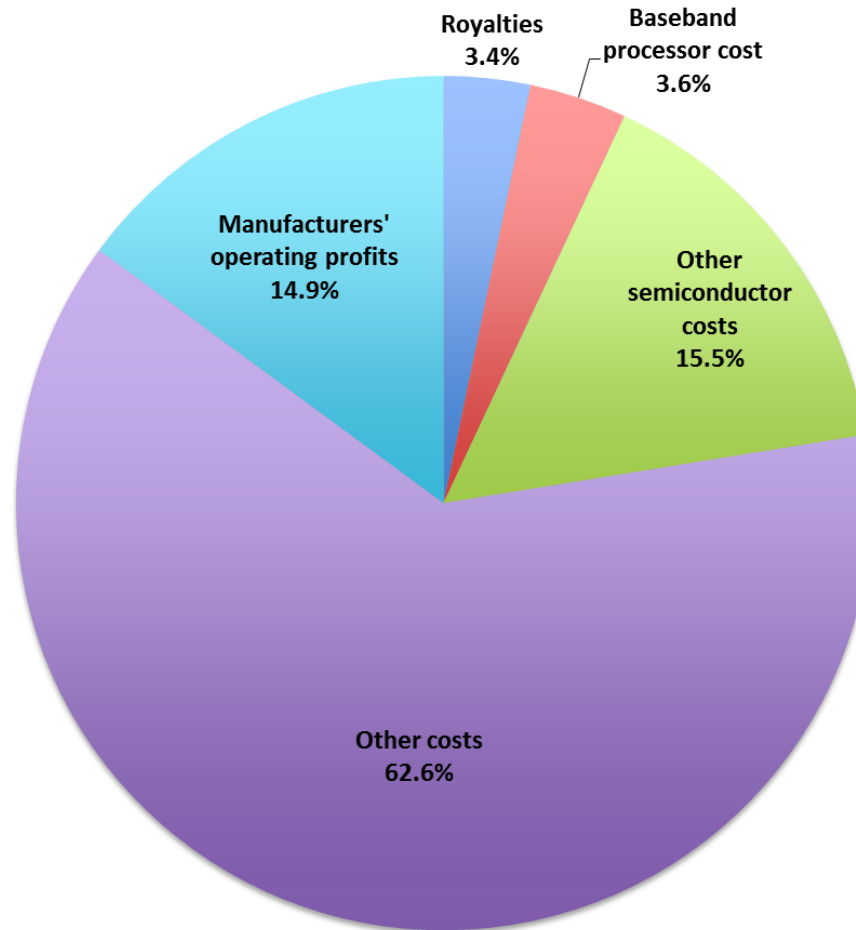
The method (1): “follow the money”

- Royalty deals are not public
- But royalties generate revenues; many are reported in the mandatory financial statements that licensors issue
- Add up royalties from financial statements and made educated guesses for the rest
- We identified 32 potential licensors (technology companies, PAEs and pools)
 - 11 had zero revenues
 - 21 had revenues ranging from \$2.4 mm to \$8.2 bn

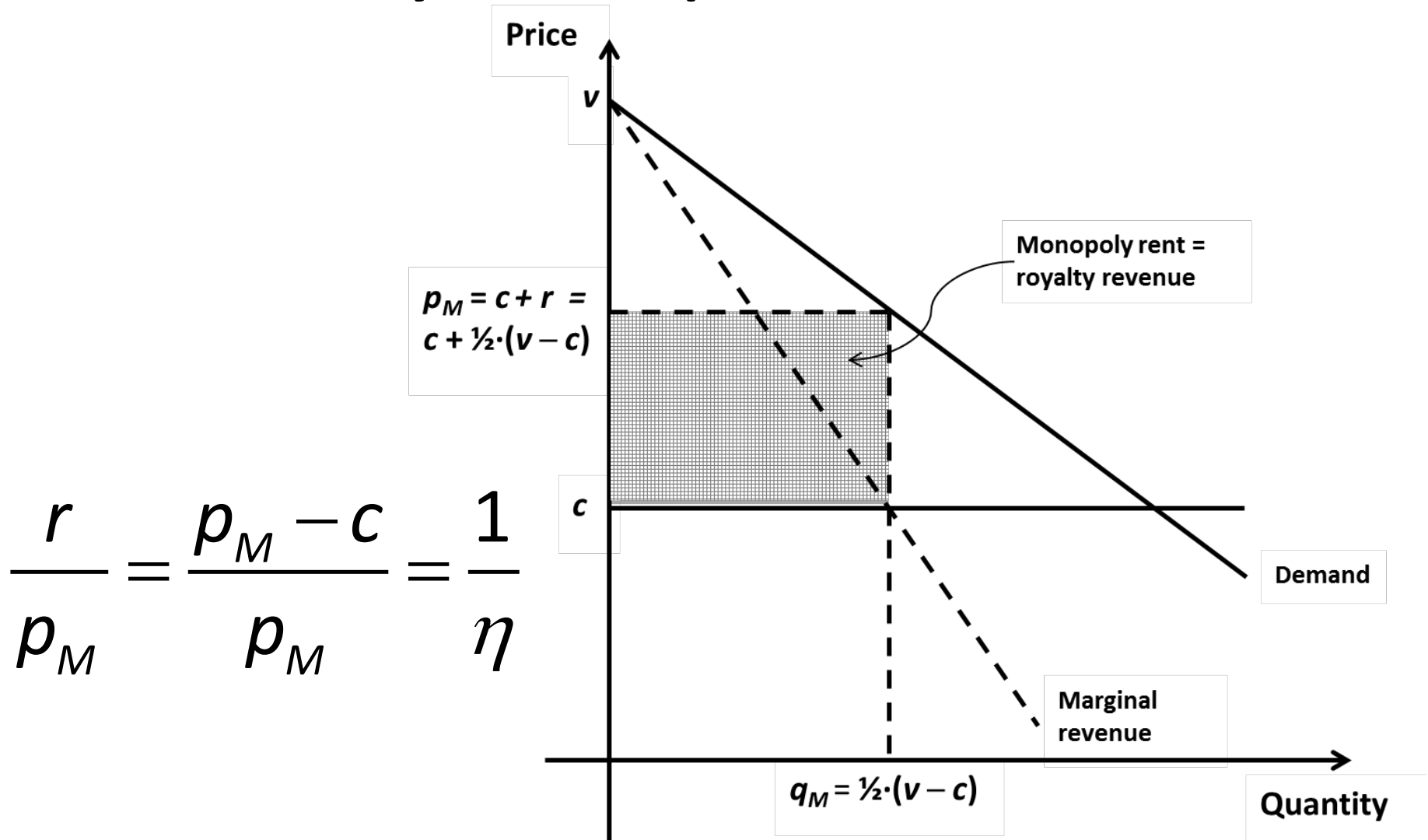
Royalty revenue by entity (in \$million, 2015)



The breakdown of smartphone wholesale revenue in 2015 (ASP = 100%)



The method (2): one demand curve in every market; patent holders see it

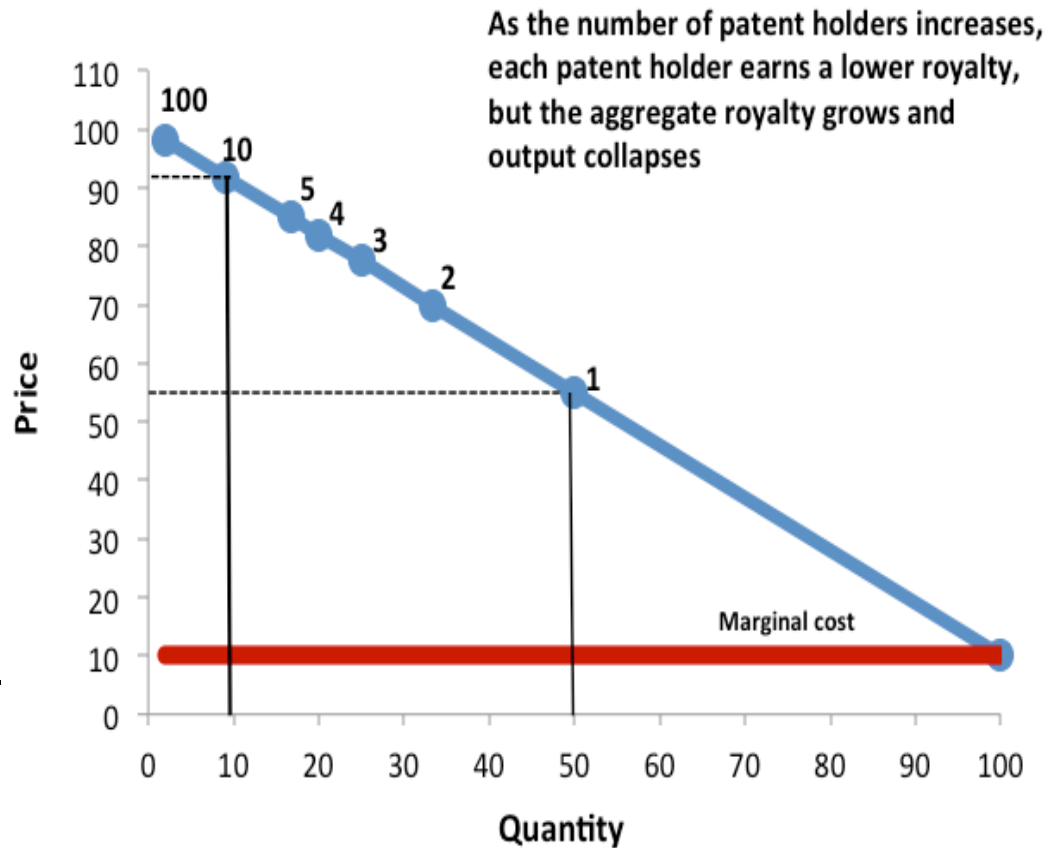


$$\frac{r}{p_M} = \frac{p_M - c}{p_M} = \frac{1}{\eta}$$

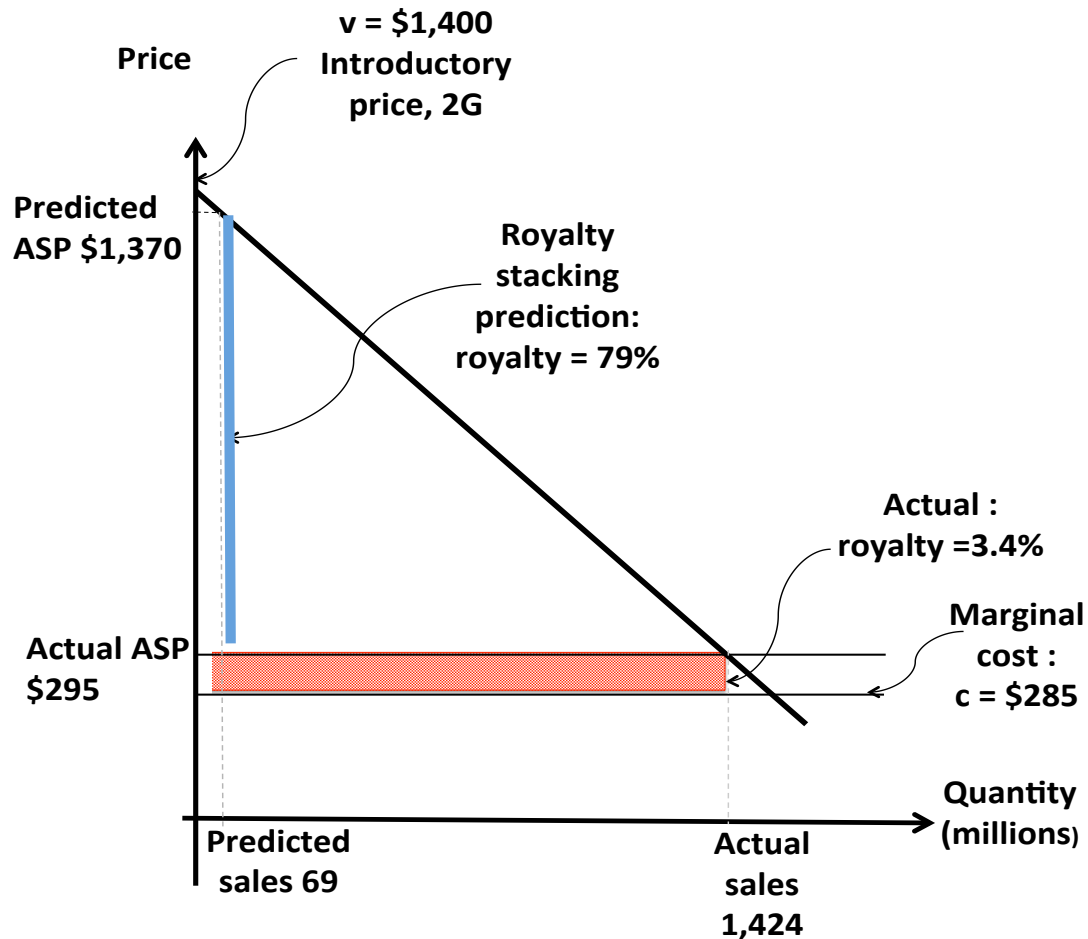
Royalty stacking is the exercise of market power repeated many times

With royalty stacking, the cumulative royalty rate would be high, but individual royalty rates would be low

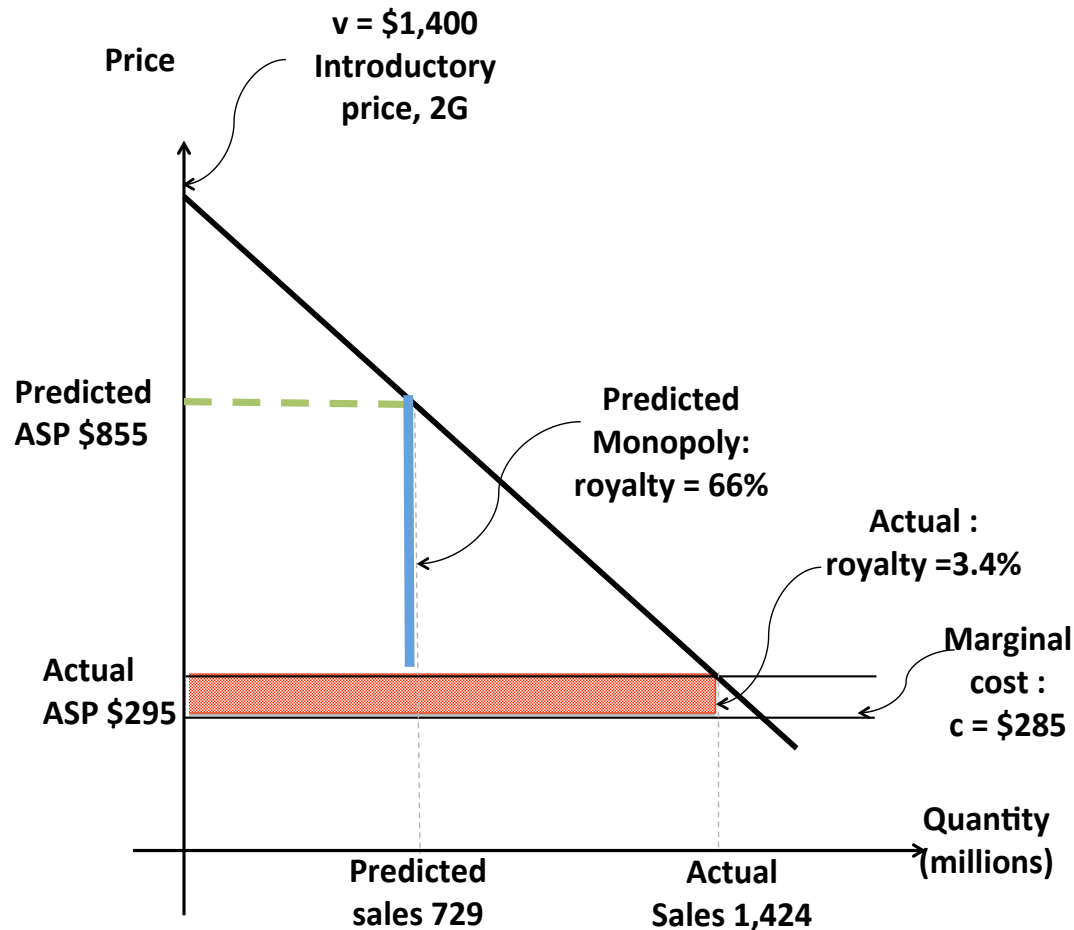
$$\frac{R}{p_{RS}} = \frac{p_{RS} - c}{p_{RS}} = \frac{21}{\eta}$$



The royalty stacking model predicts a royalty rate ≈ 24 times the actual cumulative royalty yield



A hypothetical single monopolist would have charged ≈ 20 times the actual cumulative royalty rate



Can you save monopoly and royalty stacking?

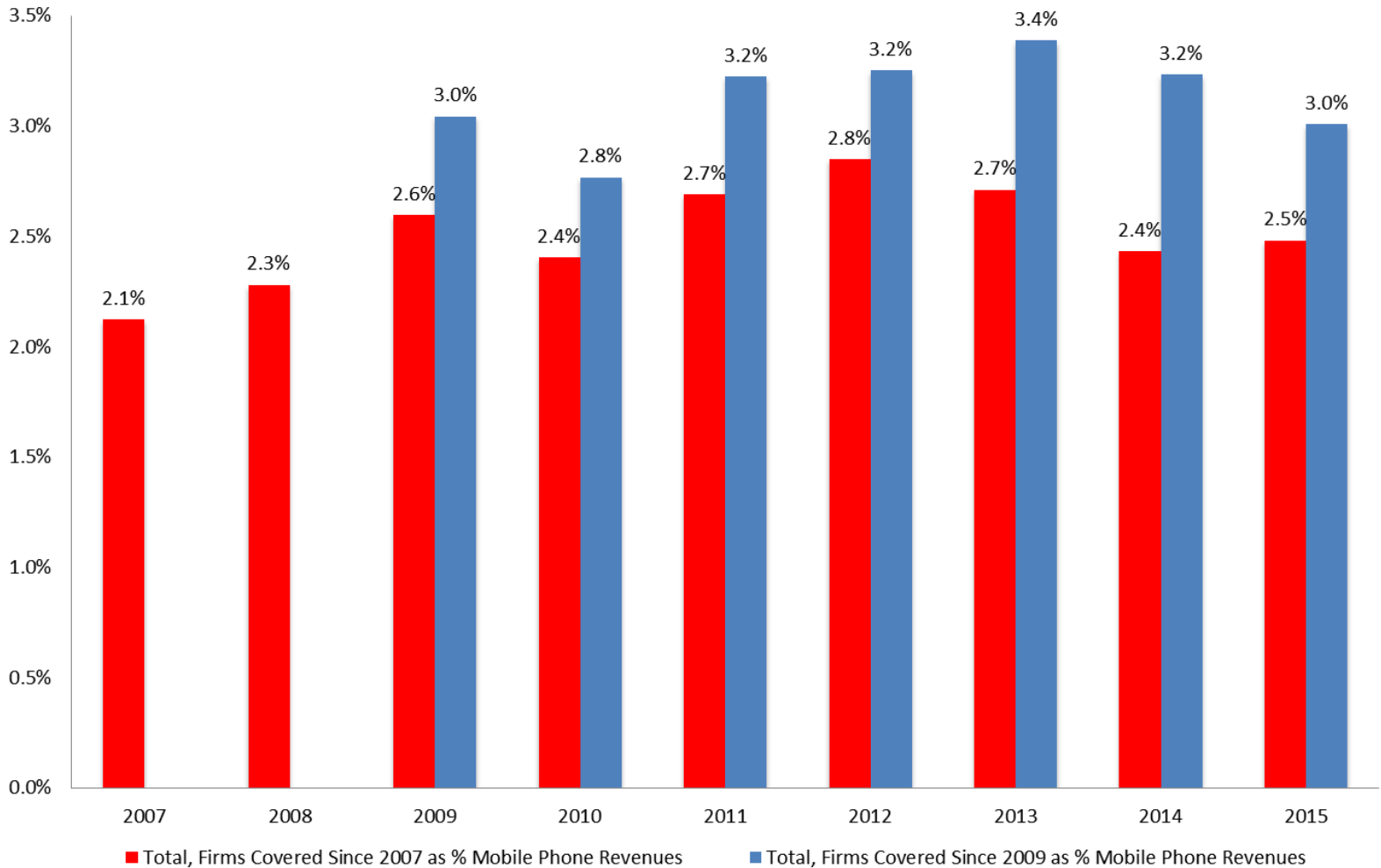
- 3.4% is optimal if
 - Monopoly: $\eta = 29$
 - Royalty stacking (21): $\eta = 617$
 - None of these parameters are believable
- Robustness
 - What if 30% evasion: 4.8%
 - + missed \$2 bn: 5.5%
 - + only Apple and Samsung pay: 7.4%

Conclusion

- Patent holders do not exercise monopoly power in the worldwide mobile phone industry, at least as economists commonly understand it (marginal cost = marginal revenue)
- There is no royalty stacking in the worldwide mobile phone industry
- If there is a monopoly problem, it must be confined to focused segments (geographical or in the product space)
- There is no anti commons problem

Thank you!

Royalties as percentage of value of smart and feature phones shipped, 2007-2015



Source: Galetovic, Haber and Zaretski (2016)