


# Selling assets: When is the whole worth more than the sum of its parts?



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# How best to sell assets?

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- The typical view of a “corporate raider” is of someone who buys up a company and strips its assets
  - Value of assets individually is viewed as higher than that of firm as a whole
  - The 1970s and 1980s are often characterized as the period of the corporate raiders
  
- But firms regularly turn down opportunities to sell individual assets, preferring to find a buyer for the entire firm
  - This could be some form of managerial agency problem, although managers often lose their jobs when firms are sold

# A case in point: Blackberry Ltd.

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- ❑ In November 2013, Reuters reported that Blackberry (BB) had rebuffed proposals from several technology companies – including Microsoft and Apple – for various assets
- ❑ BB board argued that breaking up the assets was not in the best interest of the company's stakeholders
- ❑ Industry observers expressed surprise given BB's obvious need for cash and restructuring
- ❑ BB's decision suggests a view that the greatest value would not be obtained through a piecemeal sale
  - They continued to search for a sale of entire company, or a recapitalization

# Better to bundle or to sell individually?

## The role of competition

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- When potential buyers must decide whether to participate in a sale or not ...
  
- ... Then whether assets are sold individually or jointly affects this decision
  
- Competition for assets is thus endogenous to the way in which assets are sold
  - Consequently, the revenue from the sale is also endogenous to whether assets are sold individually or jointly

# The composition of possible buyers

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- ❑ Competition for assets should also depend on the *composition* of possible buyers
- ❑ For instance, suppose one buyer is efficient, so that (in expectation) he dominates other bidders
- ❑ This should reduce the incentive of other bidders to enter
  - Very generally, this reduces the auction price and, consequently, the revenue to the seller
- ❑ The composition of assets interacts with whether assets are bundled or sold separately
  - I.e., competition is endogenous to the composition of assets and to the way in which assets are sold

# Summary of results

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- Suppose that some buyers are *efficient*
  - In expectation, they value assets more than other *regular* buyers (i.e., they are dominant)
  
- Then:
  - When efficient buyers are not very dominant, selling assets individually is optimal and raises the most revenue
  - When efficient buyers are very dominant, selling assets jointly is optimal
  
- Why?
  - Bundling of assets attenuates reduction in competition associated with presence of efficient buyer(s)

# Model

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- One firm owns two assets, A and B
  
- For each asset there is a large number of potential buyers
  - One *efficient* buyer whose value  $y$  is drawn from distribution  $G(.|\varphi)$  with support in  $[0, 1]$ 
    - $G$  is decreasing in  $\varphi$  with  $\lim_{\varphi \rightarrow \infty} G(y|\varphi) = 0$  for all  $y < 1$
  
  - All other bidders are *regular* and have values  $x_k$  drawn from  $F(.)$ , where  $F(x) > G(x|\varphi)$  for all  $x \in (0, 1)$

# Model, continued

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- Sale takes place in two stages:
  - First, each buyer decides whether to incur cost  $c > 0$  to learn his value
  - Second, buyers that paid  $c$  can bid for asset in a second price auction
  
- Two possibilities for sale
  - Individual sales: Each asset is auctioned off separately. Total revenue is sum of revenue from each auction
  
  - Joint sales: Assets are bundled and sold together. Value to buyers is just the sum of their two individual values for each asset:  $X^i = x_A^i + x_B^i$



# An example

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- Suppose that the value of each asset can be either 0 or  $V$ 
  - For  $N$  regular buyers, the probability that  $x = V$  is  $p$
  - For an efficient buyer, this probability is  $\varphi > p$
- For individual asset sales, a regular buyer's profit when bidding for asset  $A$  is:

$$\pi_A = Vp(1-p)^{N-1}(1-\varphi)$$

- As  $\varphi \rightarrow 1$ , the profit  $\pi$  of a regular buyer becomes vanishingly small

For  $\varphi \rightarrow 1$ , we have  $\pi_A \rightarrow 0$

- This means that the number of regular buyers will also become vanishingly small => No competition for asset

# Example, continued

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- For joint sales, a regular buyer's profit is:

$$\pi_J = V \left( (1-p)^{2N} (1-\varphi)^2 p(2-p) + p^2 (1-p^2)^{N-1} (1-p\varphi)^2 \right)$$

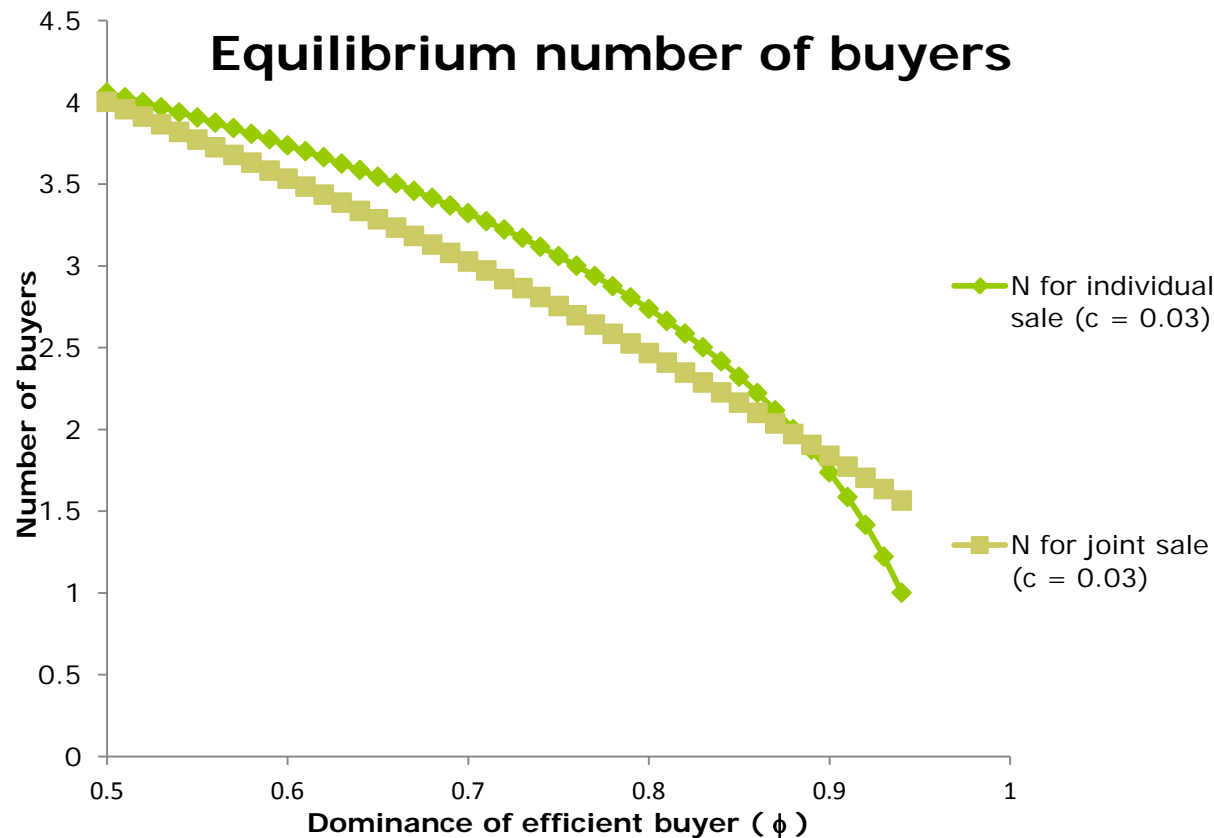
- Now, a regular buyer's profit is bounded above zero:

For  $\varphi \rightarrow 1$ , we have  $\pi_J \rightarrow V p^2 (1-p)^2 (1-p^2)^{N-1} > 0$

- Even if there is no chance of having the highest value for one asset, there is still a chance of having it for the other asset
- So there is always some incentive for regular buyers to enter => There is always some competition for bundled assets

# Example, concluded

- This can also be seen by plotting the equilibrium number of buyers as a function of  $\phi$ :



# A more formal analysis

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- Denote by  $\Pi_k$  the profit to an efficient buyer for asset  $k \in \{A, B\}$

$$\Pi_k = E \left[ \max \{ x_k^1, \dots, x_k^N, y^k \} \right] - E \left[ \max \{ x_k^1, \dots, x_k^N \} \right]$$

- All other (regular) buyers have profit  $\pi_k$

$$\pi_k = E \left[ \max \{ x_k^1, \dots, x_k^N, y^k \} \right] - E \left[ \max \{ x_k^1, \dots, x_k^{N-1}, y^k \} \right]$$

- Revenue for the seller is:

$$R_k = E \left[ \max \{ x_k^1, \dots, x_k^N, y^k \} \right] - \Pi_k - N\pi_k$$

- When assets are sold jointly, similar expressions obtain after replacing  $x_k^i$  with  $X^i = x_A^i + x_B^i$

# When efficient buyers are not that efficient

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- **Result:** For  $\varphi$  small, the total revenue from selling the assets individually,  $2R_k$ , is greater than from selling them jointly,  $R_j$
- Intuition: Sales mechanism (i.e., second price auction) allocates goods efficiently – to those that value them most
  - When selling individually, *each* asset is sold to buyer that has greatest value
  - When selling jointly, assets are sold to buyer that values them *together* the most
    - But this may be lower than sum of individual values to potentially different buyers

# As efficient buyers become more efficient ...

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- **Result:** Under free entry, the number of regular buyers is decreasing in  $\varphi$ , the dominance of the efficient buyer
  - Greater efficiency discourages entry of other buyers
- **Result:** Under free entry, seller revenue is decreasing in  $\varphi$  for both individual as well as joint asset sales
  - Endogenous reduction in competition leads to lower premiums for the seller

# Which form of sale is more affected?

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- Bundling the assets attenuates the effect of increased dominance ( $\varphi$ ) on buyer entry and seller revenue
- Joint sales are therefore optimal when the efficient buyers are very dominant
- **Result:** For  $\varphi$  large enough, the total revenue from selling the assets individually,  $2R_k$ , is less than from selling the assets together,  $R_j$ 
  - Why? When assets are sold jointly, regular buyer always has a chance of having highest value for at least one of the assets

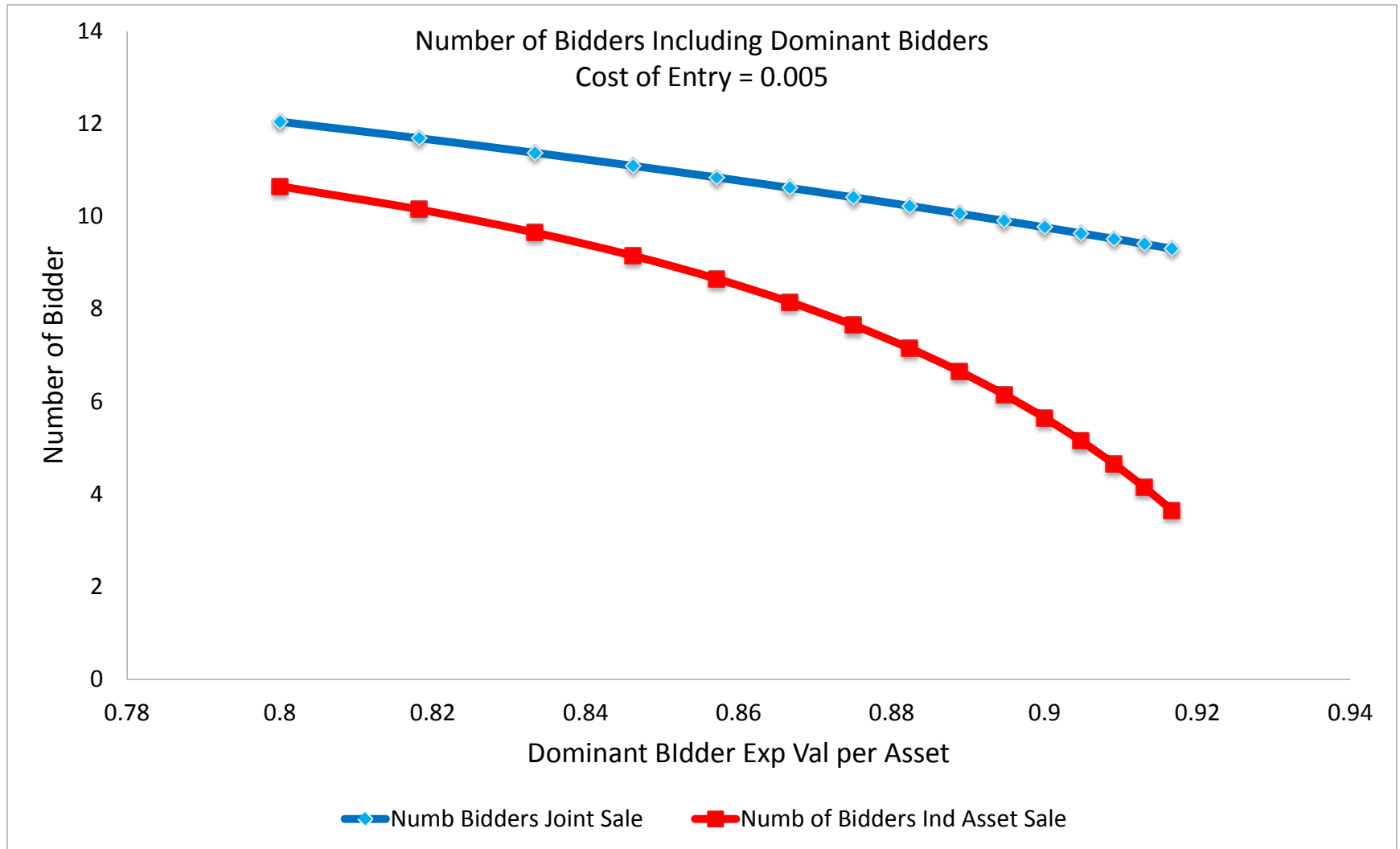
# Other (numerical) examples

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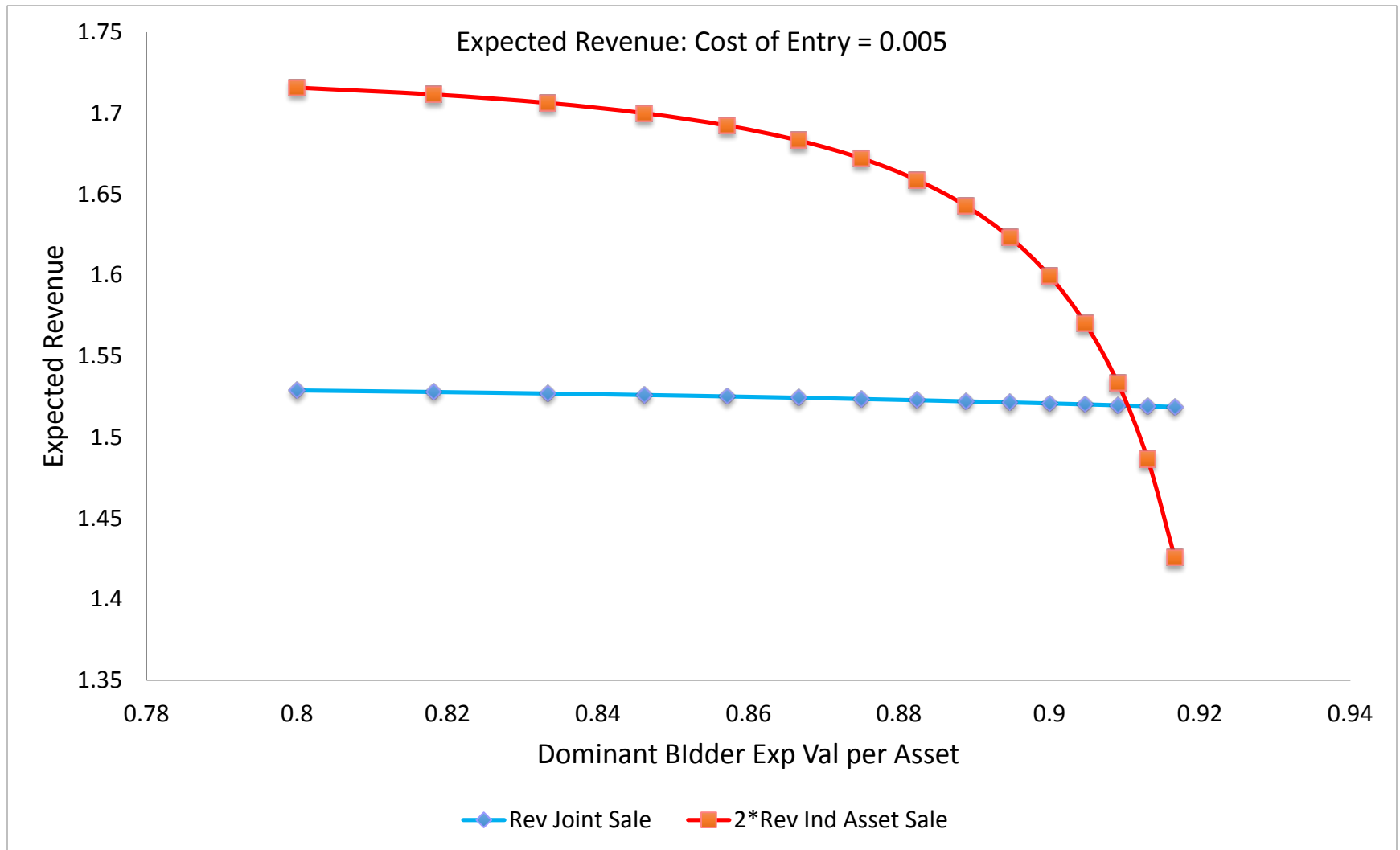
- Suppose that regular buyers' values are drawn from a uniform distribution:  $F(x) = x$
- An efficient buyer has a value  $y$  drawn from  $G(y) = y^{1+\varphi}$
- For the firm as a whole, a regular buyer simply has two draws from a uniform:  $X = x_A + x_B$
- An efficient buyer has value  $Z = y + x$  for the firm as whole



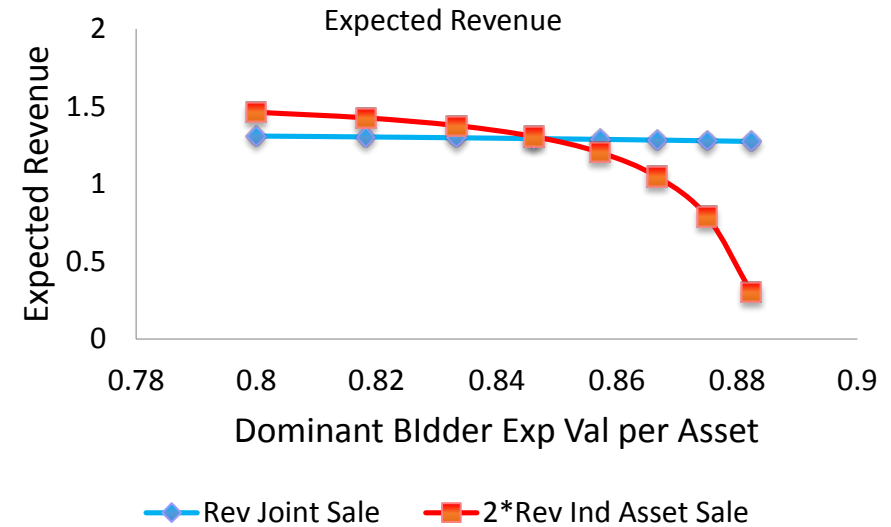
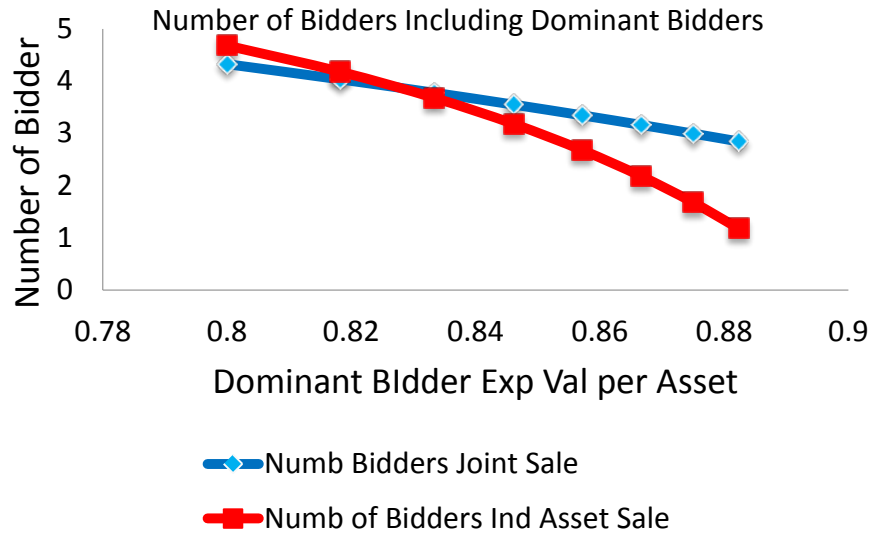
# Comparing individual sales of assets to joint sales – Number of buyers



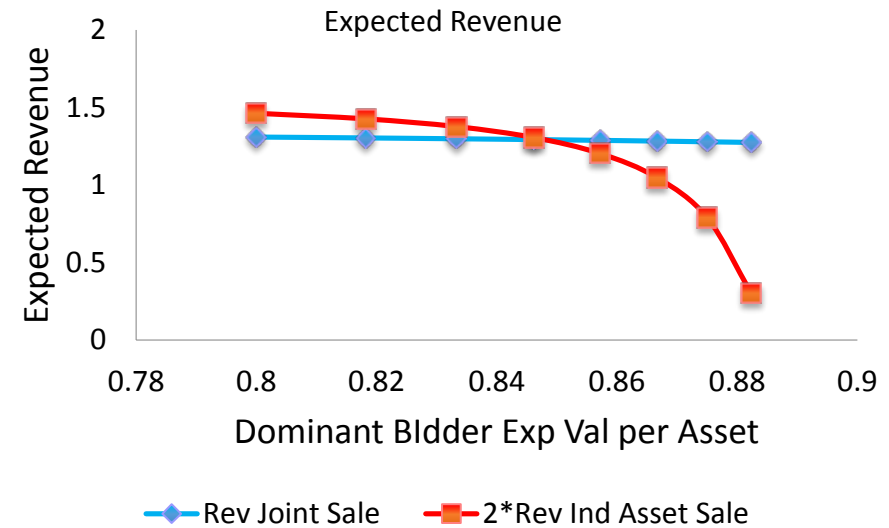
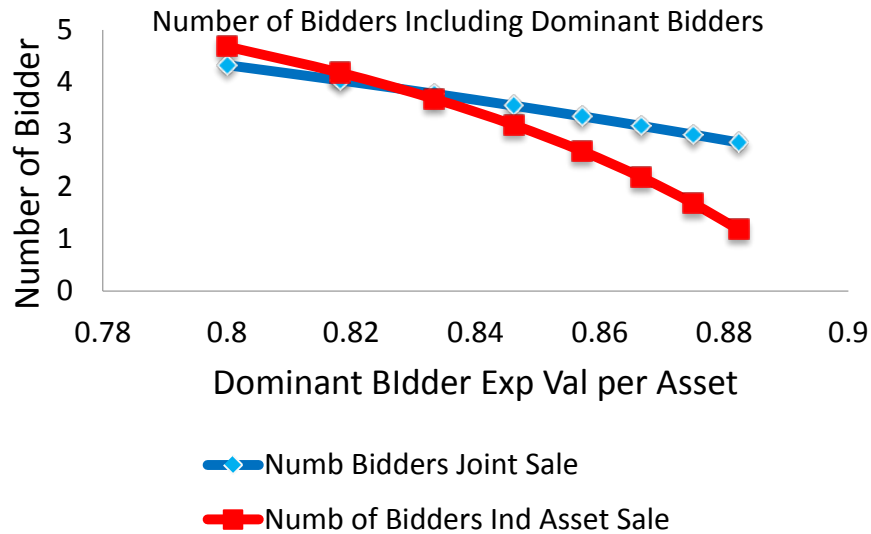
# Comparing individual sales of assets to joint sales – Expected revenue



# Raising the cost of entry (cost = 0.015)



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Threshold value of  $\phi$  shifts left – more likely that a joint asset sale is optimal

# Additional factors (to be developed)

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## □ Financial constraints

- More likely to be binding for joint asset sales than for individual sales
- But financial constraints may also affect bidding behavior, thus feeding back into prices and tightness of constraint

## □ Correlation in values

## □ Synergies in purchasing a set of assets rather than individual assets

# Conclusion

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- ❑ The degree of competition for assets being sold depends on whether assets are sold individually or bundled together and sold jointly
  
- ❑ Competition is also affected by the composition of potential buyers of the assets
  - The presence of efficient buyers deters the entry of other buyers
  - But this effect is attenuated when assets are sold jointly
  
- ❑ Our paper thus derives implications for whether it is optimal to bundle assets when selling them, or to sell them piecemeal as a way of extracting the highest value