

Memory Pricing: Myth, Math, and Reality (NAND pricing, DRAM pricing)

With the bottoming of the memory market and reports of price increases, People want to know how all these numbers pan out. No one knows for sure and wild reaction to news articles is adding to the speculation. But...there are some market forces and reasons why numbers vary

Some thoughts on pricing models

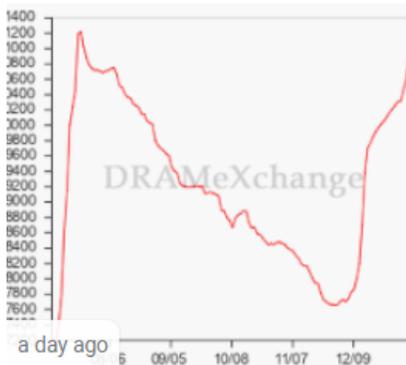
- Memory is a commodity. Period.
- DRAM exchange/ Inspectrum is usually directionally correct, but wrong in magnitude and in absolute numbers when comparing to actual company ASP
 - Spot pricing is open market and not related to what major customers pay
 - Customers react differently in magnitude to increases and decreases in exchange price
 - Even reported contract price is not REAL contract price and does not match company ASPs
 - Apple does not pay more in price because the exchange price increases unless they think they cannot get shipments. They prefer to get companies into a bidding war. When prices drop, large companies do expect suppliers to cut price.... With or without a pricing contract. And they usually do because it means there is excess supply
- Exchange prices and Analyst reports are often for a particular part. That part may increase in price but because it did people bought a different, cheaper part.
 - Hypothetical example: Hynix 256Gbit TLC, 64L NAND price increase 5%. But the recently introduced 512Gbit TLC, 96L Gbit is 15% lower price per Gbit. And the 512Gbit 96L QLC part is 20% low price per Gbit. End result: analyst reported NAND price went up. Hynix company ASP dropped 10%. Both are true.
 - Confirmation: In 2017/18 Micron did not report any annual NAND price increase. In fact, ASP dropped 7% in F2017, 8% in F2018. Similar data for other companies... Yet most people will still tell you NAND prices went up 30-50% during that time. DRAM did Increase 50% during that time for Micron. However all exchange prices show 100% price increase
- Actual Pricing is a response to market growth, Inventory, and customer relationships. We can discuss how to track these and some basic conversion factors from exchange price to ASP.
- The number one input to memory company profits is pricing.... so anything they can do (legally hopefully) to get pricing to increase will help memory

companies. Unfortunately or fortunately, they are just not very good a collusion! but there are legal tactics that they do all the time.

- Cost for each company matters. One model is that pricing always drops til at least one company loses money. Today, not all memory companies have the same cost. in 2021, there will be differences in cost with different leaders

Where are we today?:

A recent Dram Exchange DXI chart... WILD changes



- We had a shortage of NAND and DRAM through about Q4 2017 and Q3 2018 respectively. Since then both were in major oversupply. Inventory at customers and suppliers skyrocketed. Reports are that inventories are nearing target. Suppliers report shortages (shocking!) on some line items.
- Well publicized supply limitations (power outage, Fires, Japanese chemicals, Reduced wafer starts) have people optimistic on pricing. All of these require discussion to see if they matter and how much.
- Dramexchange has reported spot NAND price increases, We are just now seeing companies report modest price increase (they are ALL losing money in NAND so they need to increase price). Dramexchange has started to report spot DRAM price increases in the last 30 days.
- It is a cyclical commodity market

So lots of positive reports on pricing these days. The key is how much will companies see and will it last . We track all of the metrics and can discuss how these impact different companies

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