

April 9, 2010 – From the Front Lines: DRAM Bubbles: Will the next time be different?

DRAM Bubbles: Will the next time be different? This has become one of the most controversial topics of the year. Some believe that DRAM producers are smarter and have learned from the past. But if there is anything to learn from the history of DRAM bubbles, it's that producers don't learn from history. To a great degree it's more a matter of the financial community overfunding the expansion of competition, and thus capacity, than it is one of producers learning from the past. The reason why DRAMs tend to be so brutal is that the market is highly price inelastic. In other words, expanding capacity into slowing or falling market demand hammers prices down.

The chart below shows monthly DRAM pricing from 2005 through 2009 in nano-dollars-per-bit versus Giga-bits per MPU shipped. I chose to normalize volumes to MPU shipments, because this removes overall market growth in end-demand from the picture. The years 2005, 2006, and 2007 look like the classic DRAM bubbles. In 2005 and 2007 sales growth dropped, but utilization stayed high, as production and capacity soared. The result was that prices collapsed by 40 to 70% — each more than 5 nano\$-per-bit. In 2006, the DRAM sales and utilization soared, but production growth matched that of 2005's. The result was that price per bit stayed tightly within a 2 nano\$-per-bit range. In 2008, sales growth collapsed by 23%. Utilization dropped, but production still grew by over 20% and capacity by almost 30%. Price per bit did stay within a 2 nano\$-per-bit range, but at such low levels, the decline was 55%.

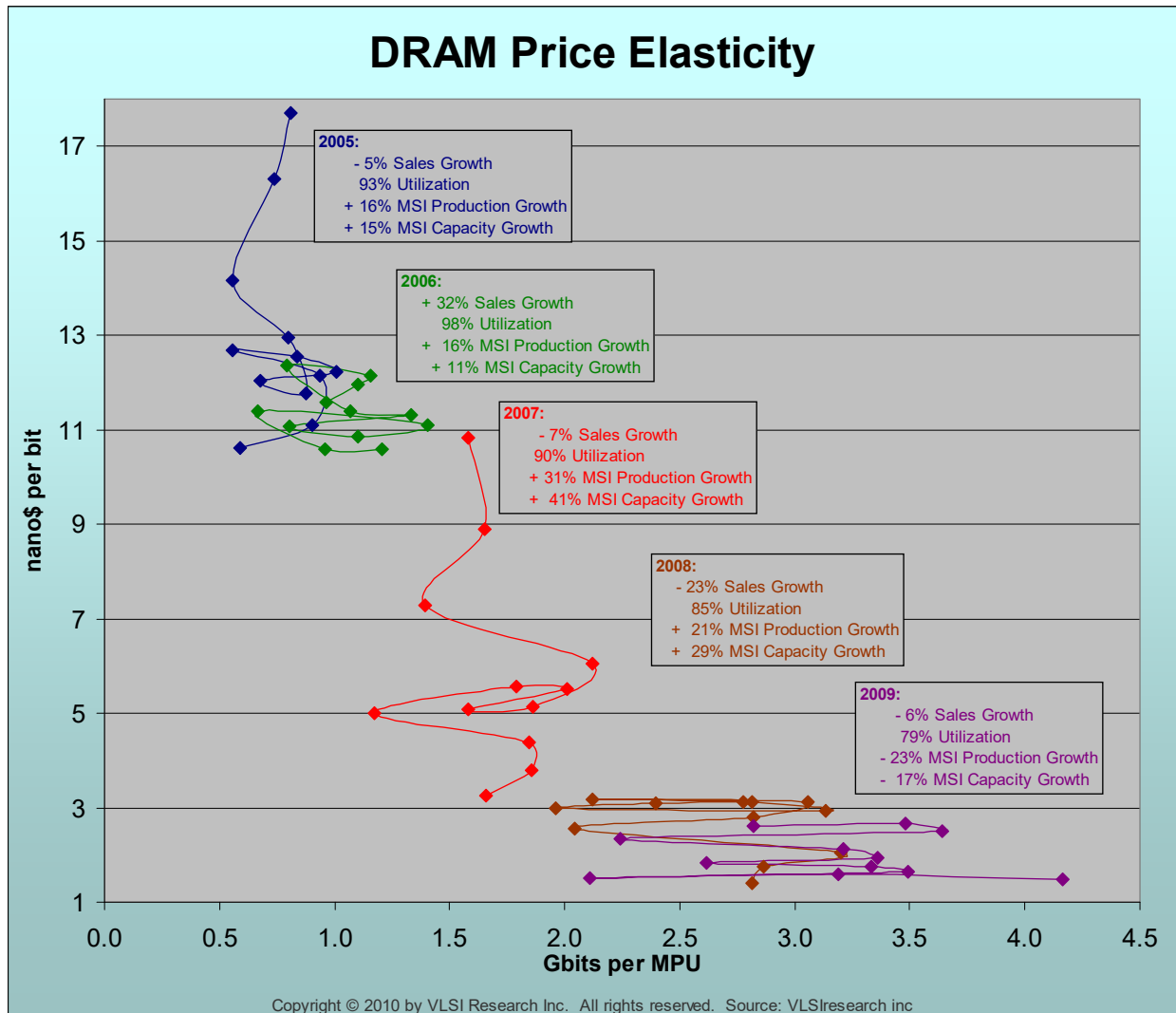
The real change came in 2009, when for the first time in five years, DRAM production and capacity were both cut — and they were dramatic cuts. Moreover, utilization was cut sharply as well. The result was that, even though sales declined by 6% for the year, price-per-bit rose by 77% from January to December. It was also a year in which DRAM suppliers returned to profitability despite a decline in sales, which is probably the first time in history that this happened without price collusion.

I would say that the big decision-making difference in 2009, by DRAM producers, was that it was clearly profit centric rather than market share centric. Of course, few had the cash to buy market share via expansion. But Samsung did, and they

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did not attempt to buy share. They didn't even build fab shells to be ready to jump on an upturn.



With financial markets loosening up, we may well get back into an era where money freely flows into capacity expansion. So the bubble sign to look for is if equipment orders and expansion plans start to grow out of hand relative market growth. This could have been seen in 2006, because chip makers began to aggressively build shells, for which capacity would not be realized for at least two years.

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