



**Meptec September 2010
Forecast Luncheon :**



Recovery.....

Boom.....\$\$\$

Growth...???

**Jim Walker
VP, Semiconductor Manufacturing Research
September 8-9, 2010**

Semiconductor Market: Sept. 2010

Discussion Topics

- What is the strength of the economy?
- What is the latest outlook for the semiconductor market?
- What signs will indicate the industry will not overshoot?
- What is the latest forecast for capital equipment and spending?
- What is the outlook for outsourced semiconductor manufacturing services (foundry and SATS)?

Global Economy Improving Slowly

- World economy mixed
 - China, S.E. Asia, India - seeing strong growth
 - United States, Europe - drag on WW growth
- Consumer spending and sentiment stalling out
- Demand for durable goods slowing
- Manufacturing indexes increasing slower
- Current concerns
 - Consumer debt, Commercial debt, Real estate, Unemployment
 - Strength of back to school, Holiday spending

Confusing Signals

- **Current Data indicates Strength**
 - Booming Semis and Equipment Markets
 - Strong end user markets – especially PCs and cell phones
 - Increasing Capex
- **Announcements/Anecdotes Cause Concern**
 - Recovery growth slowing
 - Weakness in company announcements
 - SATS companies volume declines
 - Inventories increasing in the supply chain

Recent Announcements

- QLogic mentioned excess semiconductor inventory – clarify
- Hutchinson, Teradyne report weakness in HDD
- LSI says HDD outlook has weakened versus 3 months ago
- LSI guides storage semis lower in Q3 Q/Q due to inventory (largely SAN)
- PMC Sierra reports inventory correction at Chinese OEMs (likely Huawei and/or ZTE) – Netlogic reports Huawei moving to vendor managed inventory
- Mediatek reports an inventory correction in India and the Middle East. The inventory correction will continue into Q3
- Nvidia - lowers guidance
- Cisco - aggressive in ensuring we could procure components to meet customer delivery dates – also disappointed investors with revenue projection
- PC supply chain – SATS vendors report weakness, Taiwan ODMs reported 20% drop in units in July compared to June.

Are We Approaching a Revenue Peak? — Examining the Evidence

- Sequential quarterly growth has been amazingly strong the last five quarters.
- Intel revised its Q3 guidance downward, and several other semi companies have experienced weakness
- Slowdown reported in mid-June to mid-July – blamed on European fears; however going forward global economic recovery weakening
- We are at a turning point in front end and back end manufacturing utilization rates

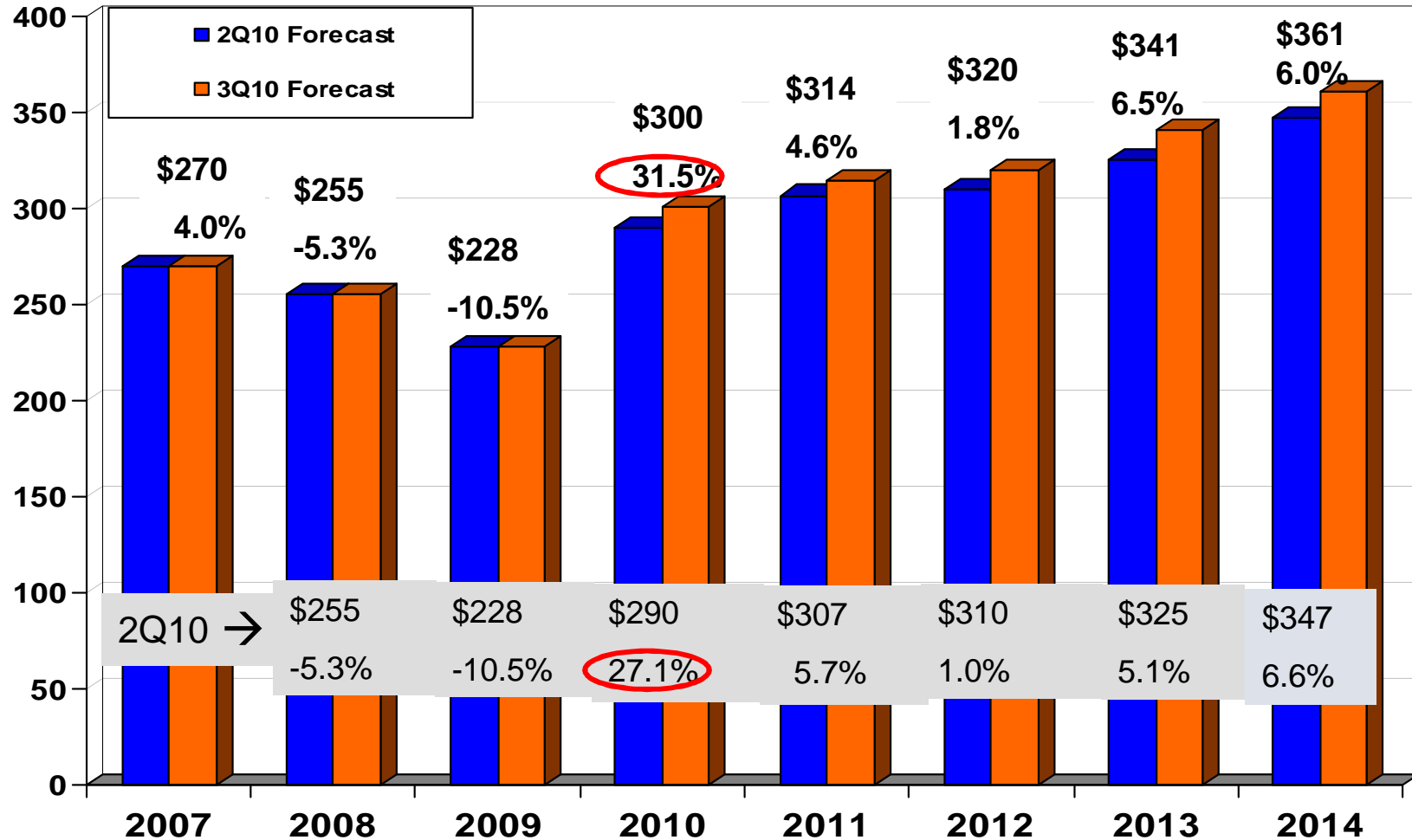
The key question is, “Will the slowdown cause an inventory adjustment?”

Key Assumptions

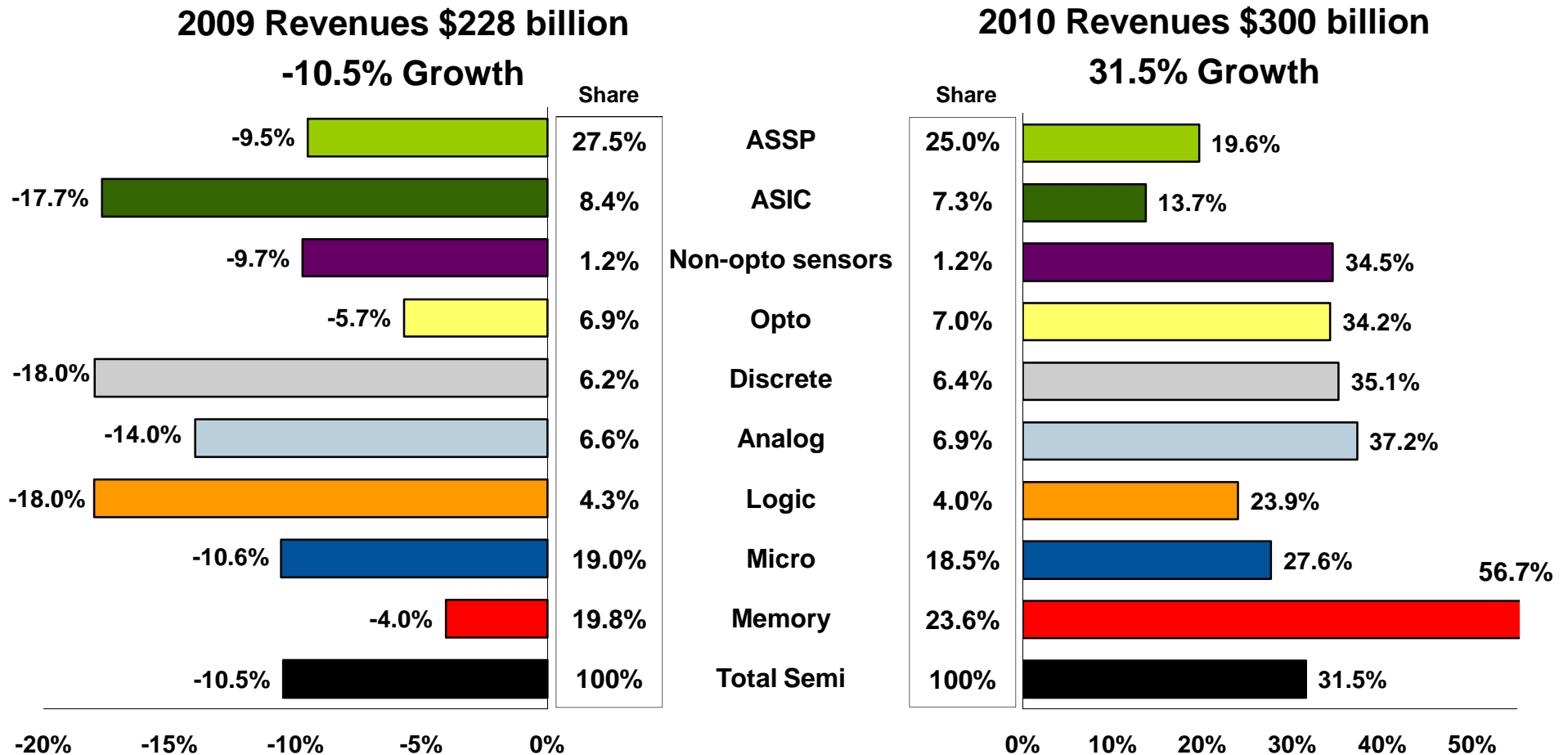
- PC's, and Smart Phones Grow 19%, and 15% respectively in 2010, 2011 PC growth 20.7%
- Media Tablets exceed expectations and grow to 10.5 million units
- Semiconductor Growth is expected to be 31.5% in 2010.
- Second half 2010 growth is expected to be below seasonal norms as semiconductor sales align with electronic system sales
- Capex is expected to increase 95% in 2010

Worldwide Semiconductor Revenue Forecast: Significant Improvement in 3Q10 Update

Billions of Dollars and Revenue Growth



Worldwide Semiconductor Forecast, 3Q10: Market Growth by Device, 2009 and 2010



Source: Gartner, August 2010
Semiconductor Forecast Worldwide--Forecast Database [SEQS-WW-DB-DATA]

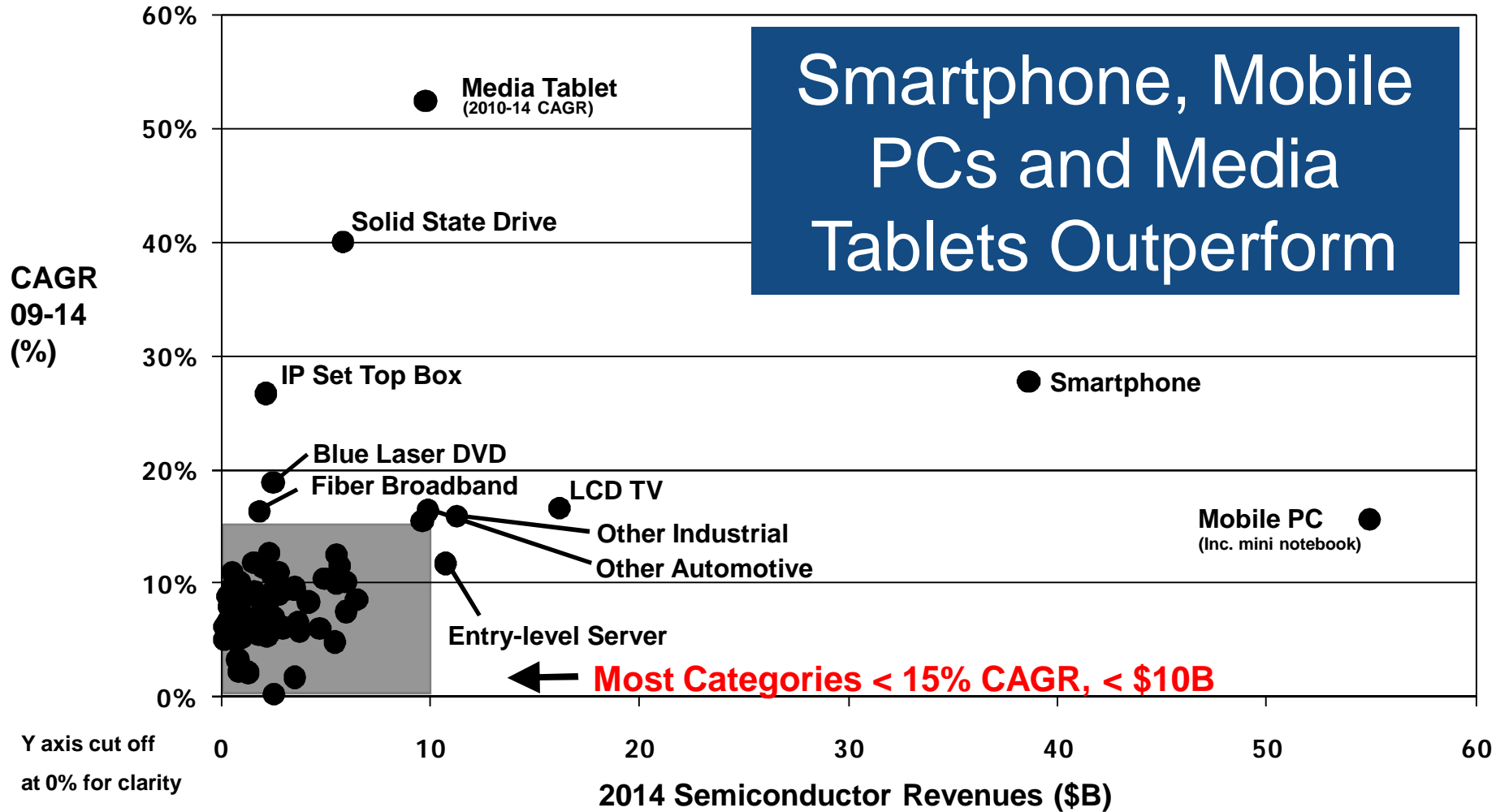
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Semiconductor 3Q10 Forecast Update: Device Revenue and Annual Growth

| Revenue (\$B) | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | CAGR |
|-----------------------|--------|-------|-------|--------|-------|-------|-------|
| Memory | 45.3 | 71.0 | 71.4 | 62.9 | 68.7 | 73.2 | 10.1% |
| Micro | 43.4 | 55.4 | 58.5 | 62.1 | 65.0 | 67.3 | 9.2% |
| Logic | 9.8 | 12.1 | 12.5 | 13.1 | 13.7 | 14.6 | 8.3% |
| ▪ Analog | 15.2 | 20.8 | 21.6 | 22.1 | 23.2 | 24.5 | 10.1% |
| ▪ Discrete | 14.2 | 19.2 | 19.3 | 19.3 | 19.8 | 20.6 | 7.7% |
| Opto | 15.7 | 21.1 | 23.6 | 25.9 | 28.1 | 31.0 | 14.6% |
| ASIC | 19.3 | 21.9 | 23.2 | 25.1 | 27.3 | 29.0 | 8.5% |
| ASSP | 62.8 | 75.1 | 79.9 | 84.3 | 89.1 | 94.5 | 8.5% |
| Non-optical Sensors | 2.7 | 3.6 | 4.2 | 5.0 | 5.6 | 6.2 | 18.1% |
| Annual Growth Rates % | | | | | | | |
| Memory | -4.0% | 56.7% | 0.7% | -11.9% | 9.2% | 6.5% | |
| Micro | -10.6% | 27.6% | 5.5% | 6.3% | 4.7% | 3.5% | |
| Logic | -18.0% | 23.9% | 3.3% | 4.8% | 4.4% | 6.2% | |
| Analog | -14.0% | 37.2% | 3.8% | 2.4% | 4.7% | 5.9% | |
| Discrete | -18.0% | 35.1% | 0.6% | 0.0% | 2.2% | 4.4% | |
| Opto | -5.7% | 34.2% | 11.8% | 9.7% | 8.6% | 10.4% | |
| ASIC | -17.7% | 13.7% | 6.0% | 7.9% | 8.8% | 6.2% | |
| ASSP | -9.5% | 19.6% | 6.4% | 5.6% | 5.7% | 6.0% | |
| Non-optical Sensors | -9.7% | 34.5% | 14.3% | 19.0% | 13.9% | 10.2% | |

Applications Driving Growth Through 2014

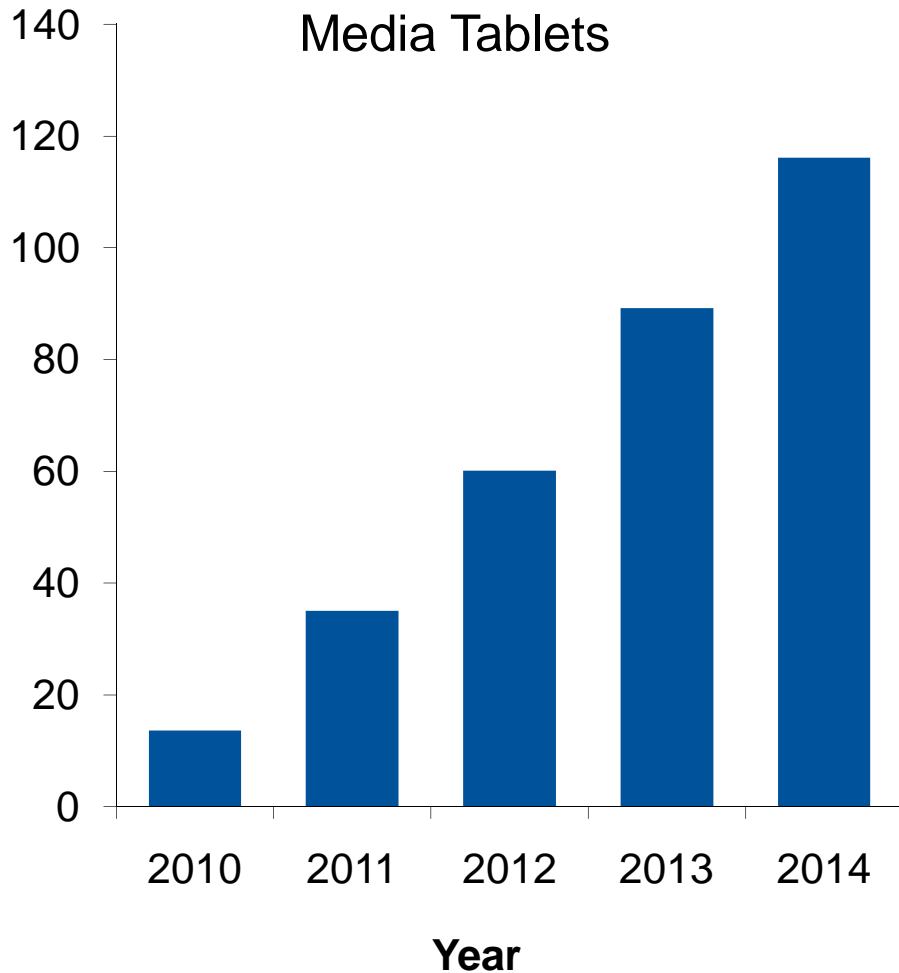
Smartphone, Mobile PCs and Media Tablets Outperform



Semiconductor 3Q10 Forecast Update: Application Revenue and Annual Growth

| Revenue (\$B) | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | CAGR |
|-----------------------|--------|-------|-------|-------|-------|-------|-------|
| Automotive | 15.7 | 21.4 | 21.6 | 23.2 | 24.3 | 25.6 | 10.4% |
| Communications | 59.4 | 72.6 | 76.7 | 79.2 | 85.2 | 89.7 | 8.6% |
| Consumer | 40.1 | 50.4 | 51.3 | 53.4 | 55.8 | 58.9 | 8.0% |
| Data Processing | 92.4 | 129.0 | 135.6 | 133.8 | 143.5 | 151.6 | 10.4% |
| Industrial | 17.9 | 23.5 | 25.7 | 26.9 | 28.3 | 31.3 | 11.8% |
| Mil/Aero | 2.8 | 3.4 | 3.4 | 3.3 | 3.5 | 3.7 | 5.7% |
| Annual Growth Rates % | | | | | | | |
| Automotive | -21.7% | 36.4% | 1.1% | 7.6% | 4.7% | 5.4% | |
| Communications | -10.3% | 22.3% | 5.6% | 3.3% | 7.6% | 5.3% | |
| Consumer | -13.4% | 25.6% | 1.7% | 4.1% | 4.5% | 5.7% | |
| Data Processing | -5.2% | 39.5% | 5.2% | -1.3% | 7.2% | 5.7% | |
| Industrial | -19.0% | 31.2% | 9.2% | 4.8% | 4.9% | 10.7% | |
| Mil/Aero | -5.2% | 21.0% | -1.6% | -1.0% | 4.5% | 7.1% | |

Media Tablets: The Next Killer Application



- Immediate adoption has been faster than expected
 - iPad surprisingly versatile.
 - Viable but expensive substitute for netbook.
 - OS limitations mean not a viable substitute for a full-featured PC
- OS and hardware evolution will make Media Tablets viable PC alternative in 2012
- The iPad has proven demand for 10" tablets. 7" tablets are likely to emerge as a more media-focused segment
- Early hints of strong interest from enterprises in media tablets.

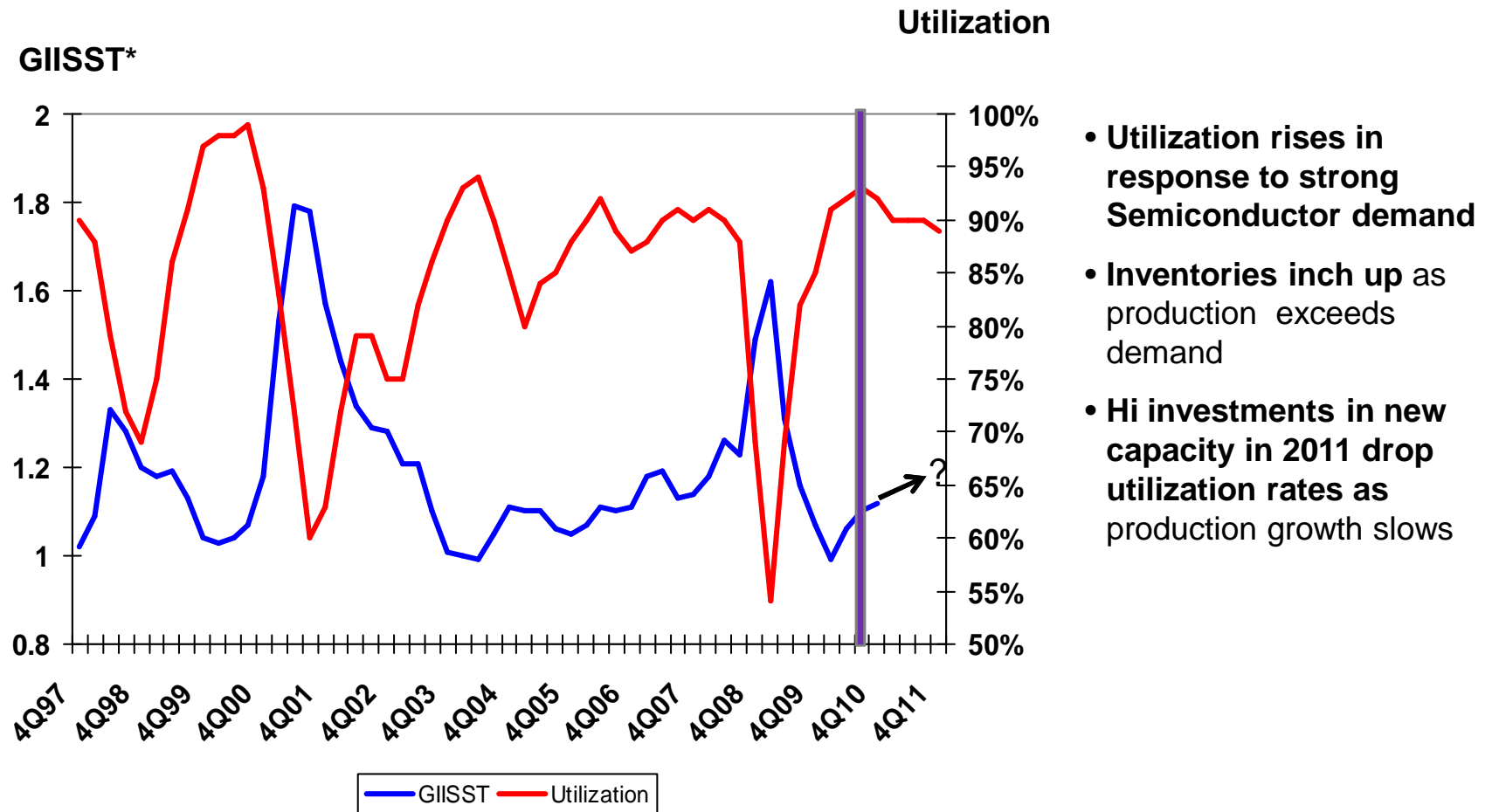
Summary of Semiconductor Device and Applications Market

- Semiconductor revenue still poised to hit record levels in 2010
- Most-likely 2010 growth 31.5%, down-side scenario possible
- PC supply chain showing most evidence of a correction, but other areas reported
- DRAM fastest growing device type in 2010
- Modest chip correction programmed in back-half 2010 and into 2011 as semiconductor growth re-aligns with system growth



 **Semiconductor Manufacturing:
Equipment and Capex**

Inventory Index vs. Utilization: Inventories Rise Pushes Utilization Down



- Utilization rises in response to strong Semiconductor demand
- Inventories inch up as production exceeds demand
- Hi investments in new capacity in 2011 drop utilization rates as production growth slows

*Gartner Index of Inventory Semiconductor Supply-chain Tracking

Source: Gartner Estimates (Aug 2010)

2010 Capital Spending Top 20: Strong Growth Across the Board

| 2010 Rank | Company | 2009 \$M | 2010 \$M | Change (%) | Share (%) |
|-----------|---|-----------------|-----------------|---------------|--------------|
| 1 | Samsung | 3,900.0 | 9,600.0 | 146.2 | 20.2 |
| 2 | TSMC Group | 2,671.0 | 5,250.0 | 96.6 | 11.1 |
| 3 | Intel | 4,500.0 | 4,900.0 | 8.9 | 10.3 |
| 4 | Globalfoundries | 550.0 | 2,600.0 | 372.7 | 5.5 |
| 5 | Hynix Semiconductor | 784.0 | 2,500.0 | 218.9 | 5.3 |
| 6 | Toshiba | 910.9 | 2,172.9 | 138.5 | 4.6 |
| 7 | Inotera Memory | 400.0 | 1,634.0 | 308.5 | 3.4 |
| 8 | United Microelectronics Group | 551.0 | 1,350.0 | 145.0 | 2.8 |
| 9 | Texas Instruments | 800.0 | 900.0 | 12.5 | 1.9 |
| 9 | SanDisk | 370.0 | 900.0 | 143.2 | 1.9 |
| 11 | Elpida Memory | 443.3 | 874.6 | 97.3 | 1.8 |
| 12 | Micron Technology | 500.0 | 800.0 | 60.0 | 1.7 |
| 13 | Nanya Technology | 446.0 | 780.0 | 74.9 | 1.6 |
| 14 | Rohm | 402.8 | 621.4 | 54.3 | 1.3 |
| 15 | IBM Microelectronics | 375.0 | 575.0 | 53.3 | 1.2 |
| 16 | Renesas Electronics (formerly NEC) | 317.8 | 571.5 | 79.8 | 1.2 |
| 17 | Advanced Semiconductor Engineering | 386.9 | 515.0 | 33.1 | 1.1 |
| 18 | STMicroelectronics | 451.0 | 500.0 | 10.9 | 1.1 |
| 19 | Siliconware Precision Company (SPIL) | 161.0 | 449.0 | 178.9 | 0.9 |
| 20 | Sony | 330.0 | 419.4 | 27.1 | 0.9 |
| | Top 20 Companies Total* | 19,250.8 | 37,912.7 | 96.9 | 79.8 |
| | Total Worldwide Capital Spending | 25,876.3 | 47,495.3 | 83.5 | 100.0 |
| | Top Companies (Percent) | 74.4 | 79.8 | | |

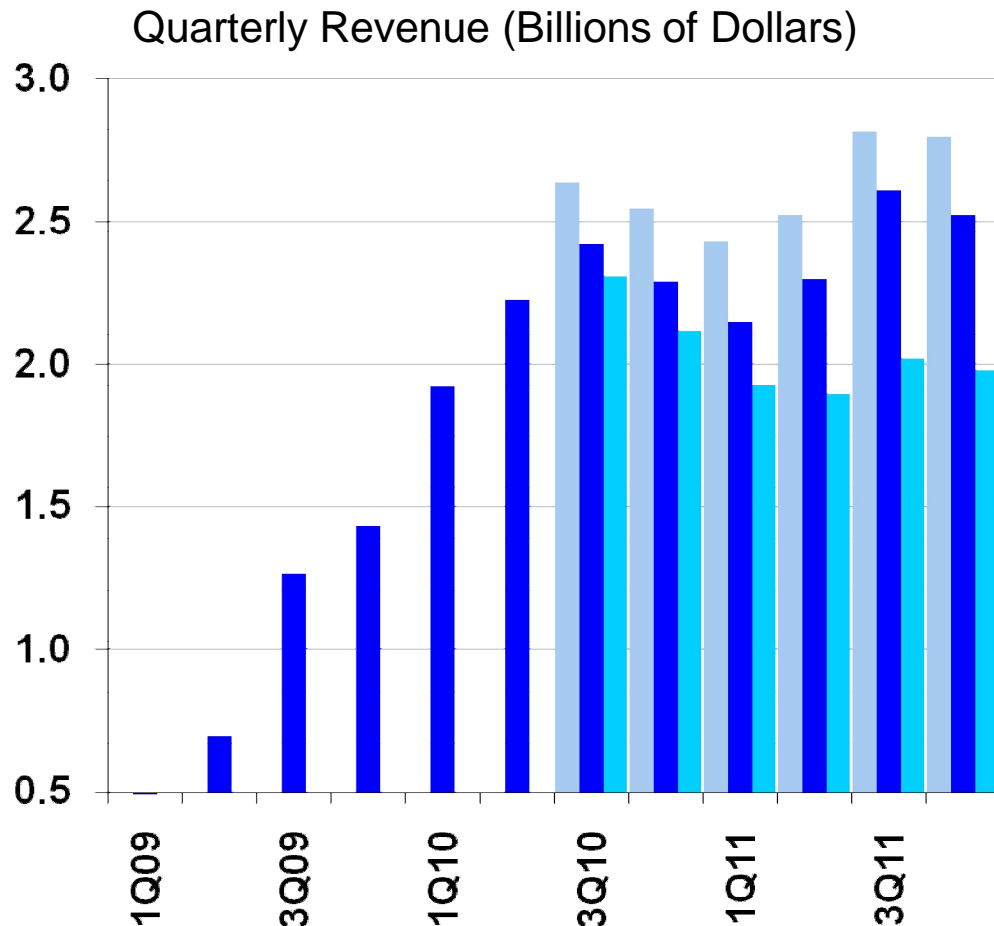
Top 20 % of Total

Memory: 41%

Foundry/SATS: 22%

IDMs: 17%

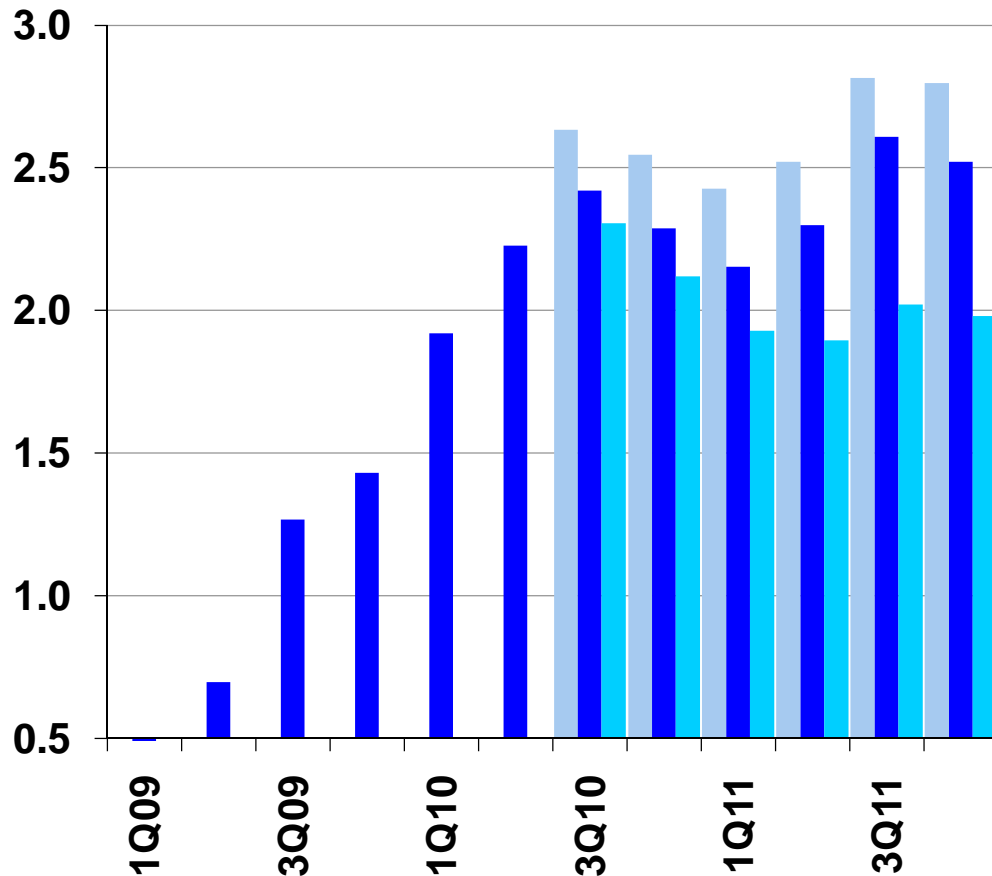
Back-End Equipment Market: Quarterly Revenue Forecast Scenarios



- After three years of market declines the BEE market is expected to surge with better than 130% growth in 2010.
- Growth for advanced packaging tooling will be solid. Memory ATE and copper wire bonders will be top performers.
- 2011 could be impacted by uncertainty of market conditions. Q4 2010 will provide clues to strength of 2011 market.

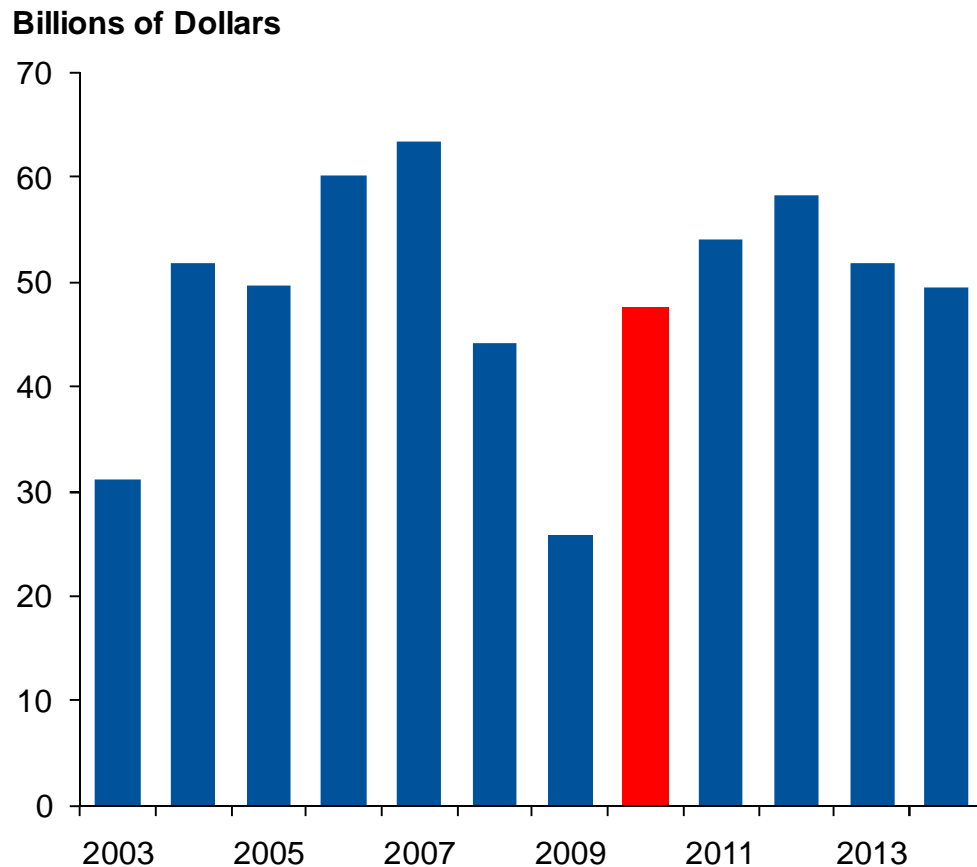
Back-End Equipment Market: Quarterly Revenue Forecast Scenarios

Quarterly Revenue (Billions of Dollars)



- After three years of market declines the BEE market is expected to surge with better than 130% growth in 2010.
- Growth for advanced packaging tooling will be solid. Memory ATE and copper wire bonders will be top performers.
- 2011 could be impacted by uncertainty of market conditions. Q4 2010 will provide clues to strength of 2011 market.

Capital Spending: Growth Returns in 2010 — But Risks Remain



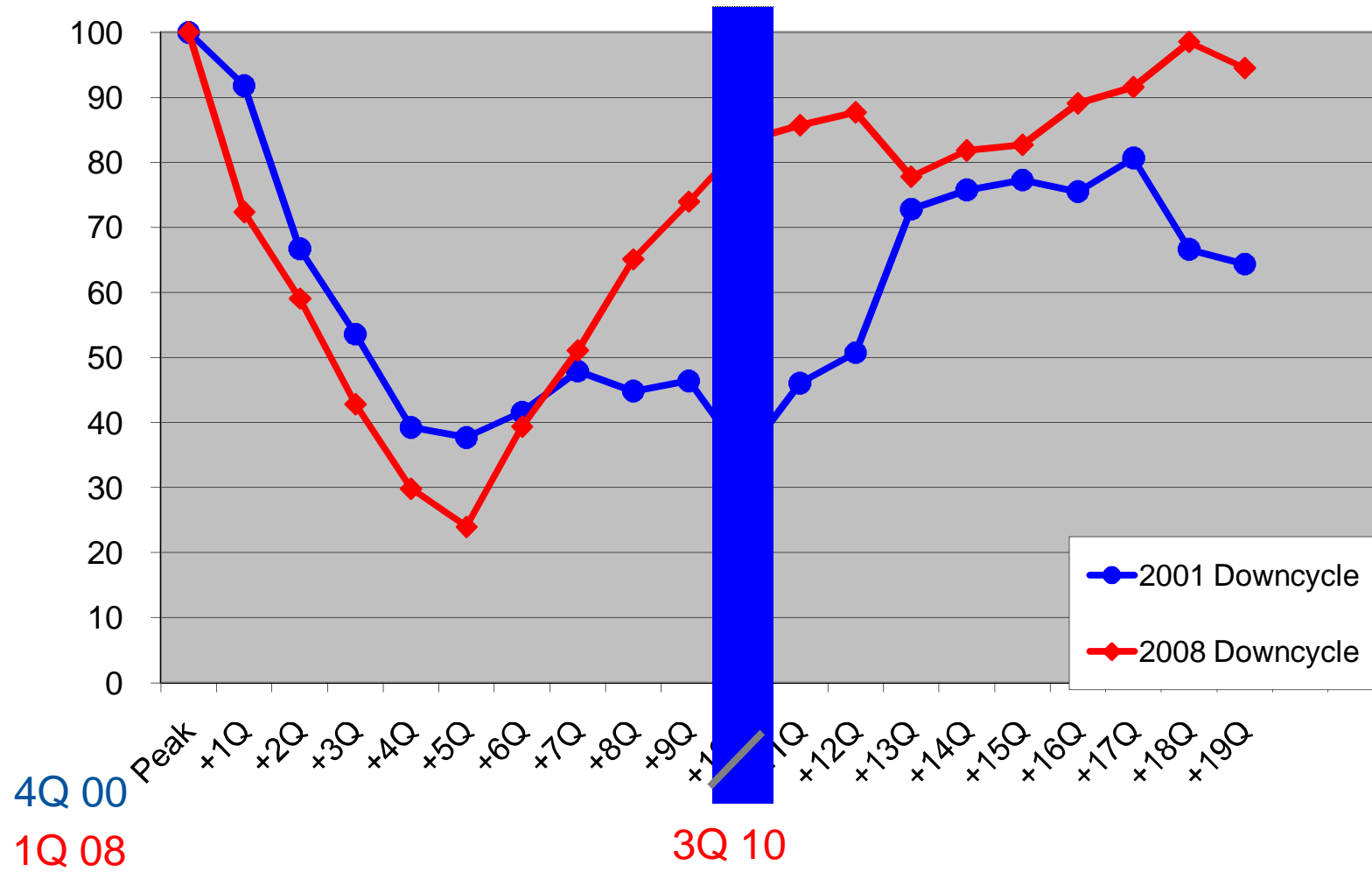
2010 spending up 83.5%, driven by move to 4x and 3x nm capabilities

New capacity spending begins in earnest in 2011

Current DRAM forecast shows weak 2012 — capital expenditure peak could be pulled into 2011

Source: Gartner (June 2010)

Comparing Industry Cycles 2001-3 vs 2008-10: Equipment Overheating Potential Rises in 2H '10



Supply-Side Fundamentals: Recovery Gaining Steam

- Inventory index returns to low normal range
 - Will fluctuate within normal range as semiconductor recovery continues
- Capex surges in 2010; growth slows in 2011 and 2012
 - Fewer serious players this time around than last
 - New fab construction starts again in 2010 on a limited basis as leaders jockey for market position
 - Memory overinvestment through 2012 drives 2013 downcycle
- Key questions looking forward:
 - Is the current surge in chip demand sustainable in the near term?
 - Will chip manufacturers respond to any hint of negative economic news with capex push-outs?
 - Which chip manufacturers will be able to invest, and which will go fables/"asset lite"?

Source: Gartner (June 2010)



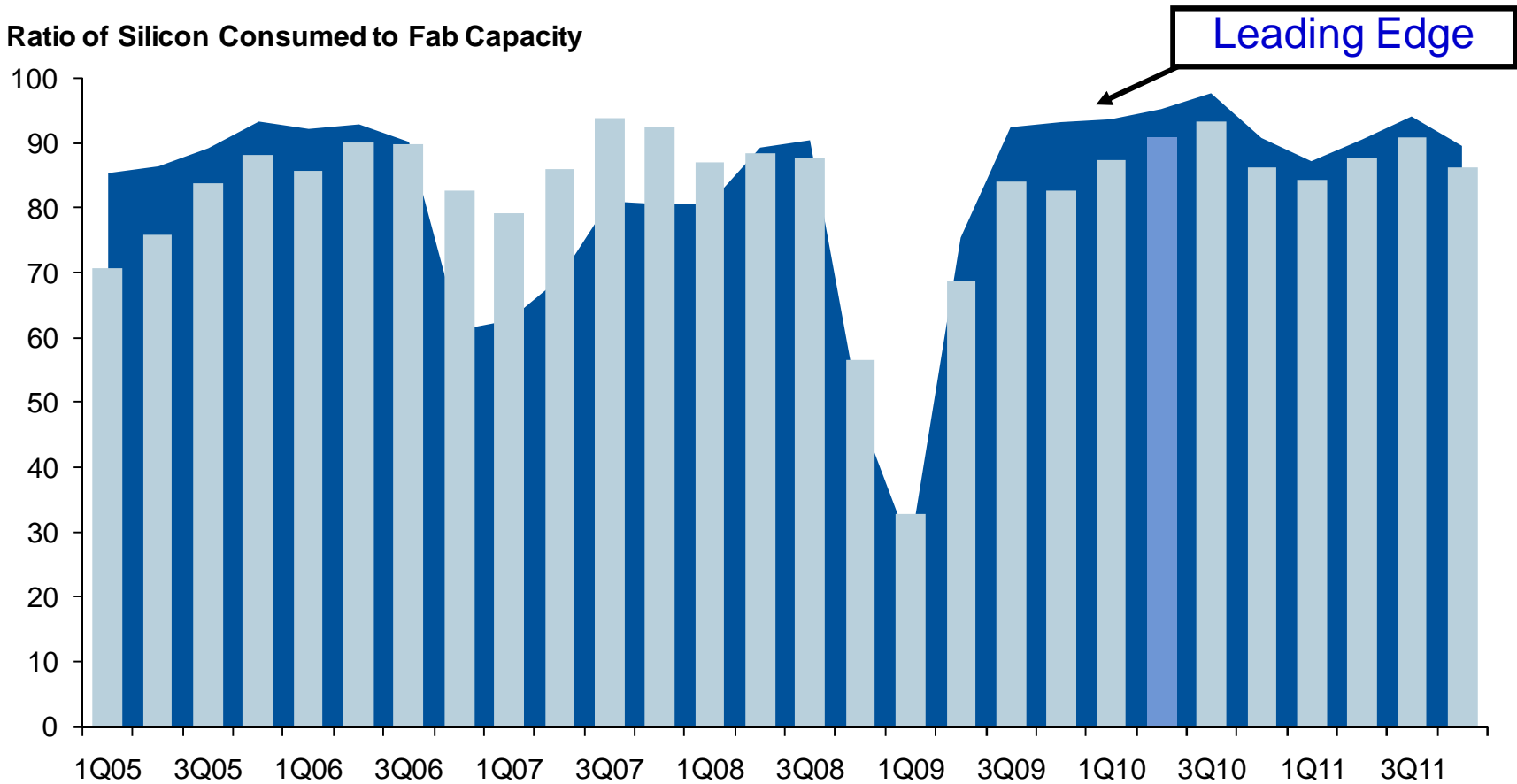
Semiconductor Manufacturing:



Outsourcing Services

Foundry Capacity Utilization

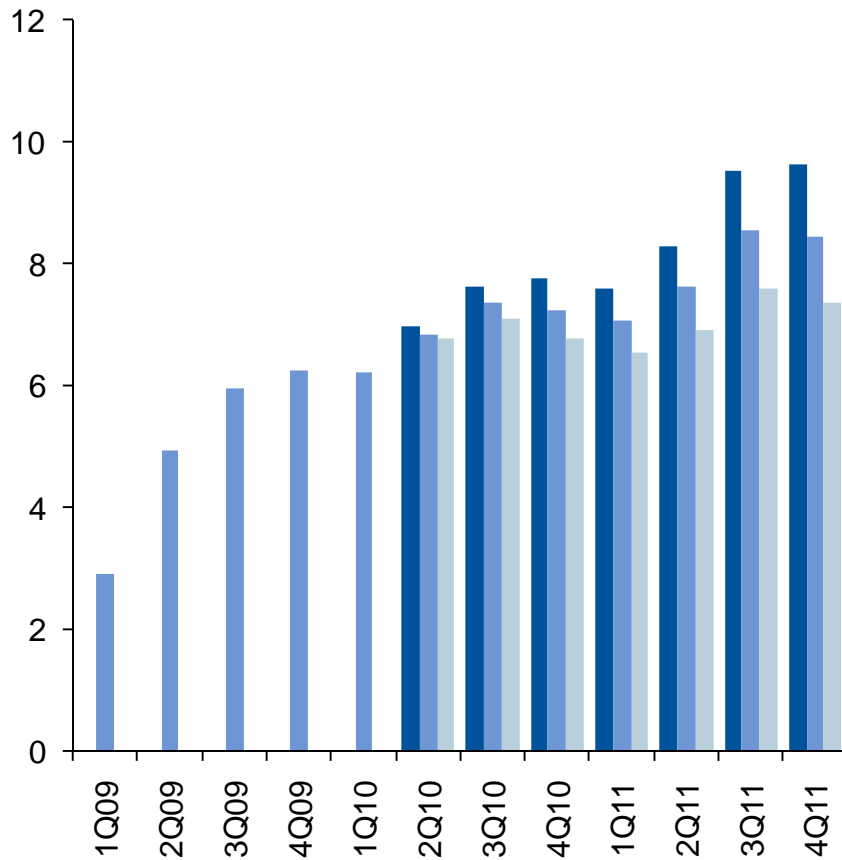
Ratio of Silicon Consumed to Fab Capacity



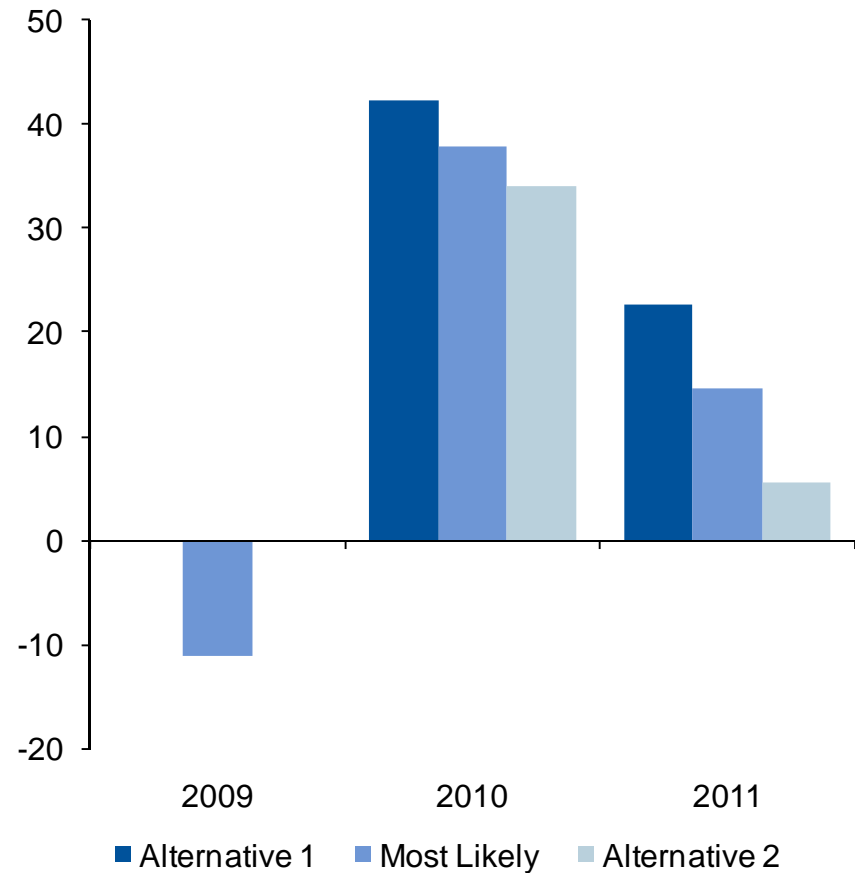
Note: Leading edge is defined as 65 nm and below.

Foundry Service Market: Quarterly Revenue Scenarios

Quarterly Revenue (\$B)

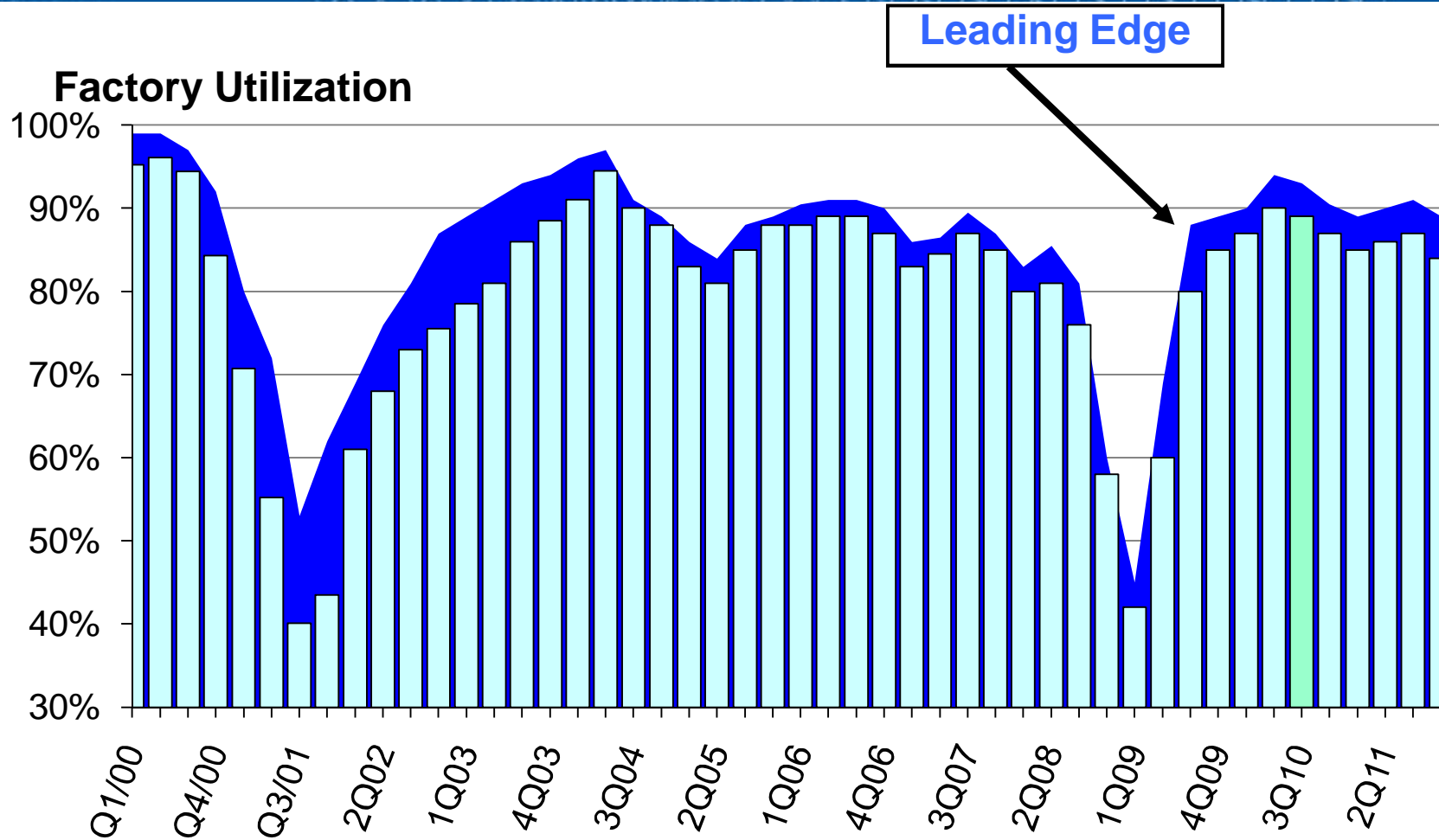


Annual Growth (%)



Source: Gartner (June 2010)

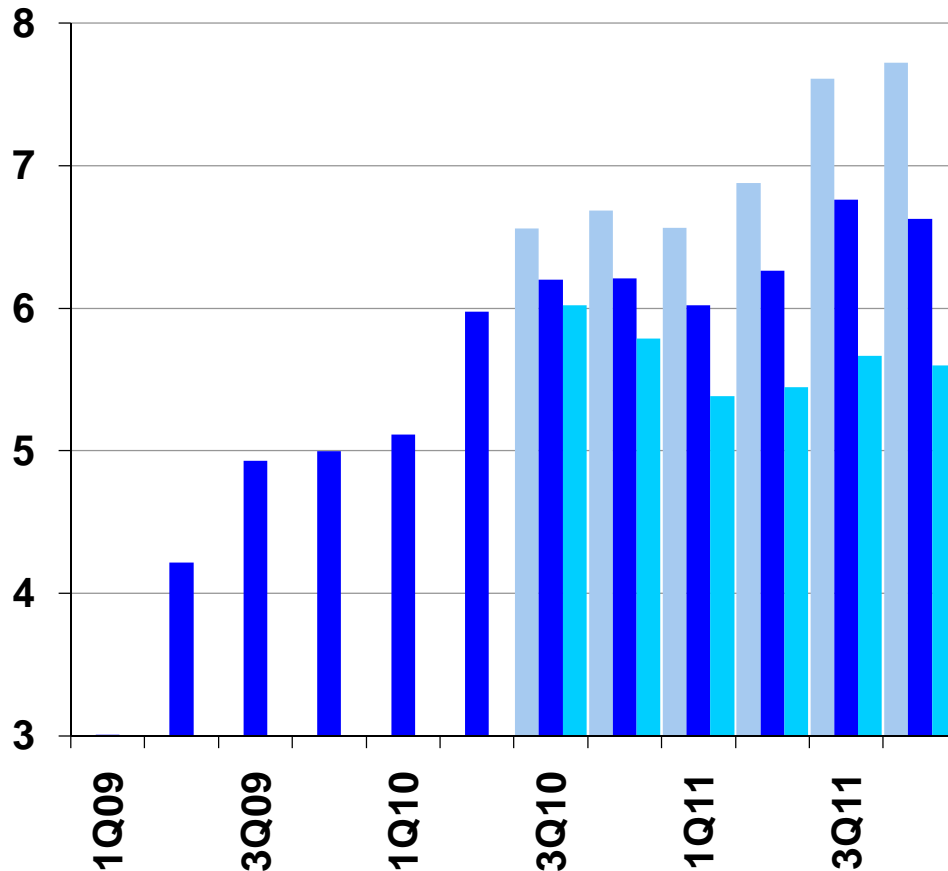
Dataquest P&A Utilization Index



Note: Leading edge is defined as BGA, CSP, flip chip, 3-D and SiP.

SATS Market: Quarterly Revenue Forecast Scenarios

Quarterly Revenue (Billions of Dollars)



- After declining 14.7% in 2009, the SATS market will expand by 37% this year.
- Industry capacity utilization is now above 85%, but has shown some signs of slowing over recent weeks.
- SATS vendors focusing on advanced packaging and copper bonding capacity. Memory assembly and test capacity is being expanded.

Worldwide Packaging/Test Market (Millions of USD)

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | CAGR 2009-2014 |
|---|----------|----------|----------|----------|----------|----------|----------|----------|-------------------|
| Worldwide Total Packaging and Test Market | 47,344.0 | 45,507.7 | 37,943.0 | 48,482.0 | 51,845.8 | 52,618.1 | 57,727.3 | 62,188.3 | 10.39% |
| Outsourcing Market (SATS) | 20,600.0 | 20,100.9 | 17,149.9 | 23,501.5 | 25,678.1 | 26,589.6 | 29,195.4 | 32,202.6 | 13.43% |
| Ratio of Outsourced Market | 43.5% | 44.2% | 45.2% | 48.5% | 49.5% | 50.5% | 50.6% | 51.8% | |
| SATS Growth Rate | 7.4% | -2.4% | -14.7% | 37.0% | 9.3% | 3.5% | 9.8% | 10.3% | |

Source: Gartner (Sept 2010)

SATS Market Share 2009 – Top 20

| 2009 Rank | 2008 Rank | Company | Region/Market | 2008 Revenue | 2009 Revenue | 2008 Market Share | 2009 Market Share | 2008-2009 Change |
|-----------|-----------|---|---------------|---------------|---------------|-------------------|-------------------|------------------|
| 1 | 1 | ASE | Taiwan | 2,952 | 2,547 | 14.7% | 14.9% | -13.7% |
| 2 | 2 | Amkor Technology | United States | 2,658 | 2,179 | 13.2% | 12.7% | -18.0% |
| 3 | 3 | SPIL | Taiwan | 1,918 | 1,761 | 9.5% | 10.3% | -8.2% |
| 4 | 4 | STATS ChipPAC | Singapore | 1,658 | 1,326 | 8.2% | 7.7% | -20.0% |
| 5 | 5 | Powertech Technology | Taiwan | 994 | 947 | 4.9% | 5.5% | -4.7% |
| 6 | 6 | UTAC | Singapore | 711 | 601 | 3.5% | 3.5% | -15.5% |
| 7 | 7 | ChipMOS Technologies | Taiwan | 519 | 380 | 2.6% | 2.2% | -26.7% |
| 8 | 11 | Jiangsu Changjiang Electronics Technology | China | 349 | 347 | 1.7% | 2.0% | -0.6% |
| 9 | 8 | King Yuan Electronics | Taiwan | 413 | 318 | 2.1% | 1.9% | -23.0% |
| 10 | 9 | Unisem | Malaysia | 373 | 300 | 1.9% | 1.7% | -19.6% |
| 11 | 10 | Carsem Semiconductor | Malaysia | 370 | 275 | 1.8% | 1.6% | -25.7% |
| 12 | 13 | Formosa Advanced Technologies | Taiwan | 323 | 271 | 1.6% | 1.6% | -16.1% |
| 13 | 14 | Greatek | Taiwan | 252 | 267 | 1.3% | 1.6% | 6.0% |
| 14 | 17 | AOI Electronics | Japan | 182 | 199 | 0.9% | 1.2% | 9.3% |
| 15 | 21 | Nantong Fujitsu Microelectronics | China | 173 | 181 | 0.9% | 1.1% | 4.6% |
| 16 | 20 | STS Semiconductor and Telecommunications | South Korea | 175 | 180 | 0.9% | 1.0% | 2.9% |
| 17 | 18 | Chipbond Technology | Taiwan | 176 | 170 | 0.9% | 1.0% | -3.4% |
| 18 | 16 | Walton Advanced Engineering | Taiwan | 190 | 168 | 0.9% | 1.0% | -11.4% |
| 19 | 50 | J-Devices* | Japan | 69 | 165 | 0.3% | 1.0% | 139.1% |
| 20 | 12 | Shinko Electric | Japan | 349 | 164 | 1.7% | 1.0% | -53.0% |
| | | Top 20 Total | | 14,804 | 12,747 | 73.6% | 74.3% | -13.9% |
| | | Other Companies | | 5,297 | 4,403 | 26.4% | 25.7% | -16.9% |
| | | Total Market | | 20,101 | 17,150 | 100.0% | 100.0% | -14.7% |

Note: Revenue in millions of USD

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SATS Market Highlights Q3 2010

- Slower rate of Capex spending Q3
 - PTI, SPIL, ASE
- Q3 (July/Aug) Revenue slowing vs. Q2
 - ASE = 2-3%; PTI = 1-2%; Walton = 1-2%; SPIL flat
- Utilization rates stable to down slightly
 - But still at 85-90% and above in July/Aug
- Gold Pricing causing rapid conversion to Copper
 - Margins impacted as gold hits all-time high
- Opportunities
 - LED Packaging
 - Discretes
 - Solar
 - Display driver/memory market comeback
 - WLP/bumping/redistribution growth
 - 3D Packaging and TSV

Forecast Growth Scorecard

| | 2009 | | | 2010 | | |
|------------------------------------|--------|--------|---------|--------|--------|----------|
| | -6 Mos | -3 Mos | Now | -6 Mos | -3 Mos | Now |
| Revenue Growth (%) | | | | | | |
| Global Real GDP | -2.1 | -2.0 | -2.0 ↔ | +3.0 | +3.5 | +3.6 ↑ |
| U.S. Real GDP | -2.4 | -2.4 | -2.6 ↓ | +3.0 | +3.5 | +2.8 ↓ |
| Elec. Equipment¹ | -11.3 | -10.7 | -11.3 ↓ | +8.6 | +12.3 | +12.9 ↑ |
| Semiconductor² | -9.6 | -10.5 | -10.5 ↔ | +19.9 | +27.1 | +31.5 ↑ |
| Foundry | -11.6 | -11.2 | -11.2 ↔ | +30.2 | +37.8 | +39.1 ↑ |
| SATS | -14.5 | -14.7 | -14.7 ↔ | +26.2 | +30.8 | +37.0 ↑ |
| Capital Spending | -41.1 | -41.2 | -41.2 ↔ | +55.9 | +83.5 | +95.9 ↑ |
| Equip. Spending | -45.6 | -45.8 | -45.8 ↔ | +76.1 | +113.2 | +122.1 ↑ |
| WFE | -46.4 | -47.4 | -47.4 ↔ | +76.7 | +113.3 | +119.9 ↑ |
| PAE | -40.4 | -32.3 | -32.3 ↔ | +75.7 | +104.7 | +123.4 ↑ |
| ATE | -46.1 | -53.0 | -53.0 ↔ | +72.0 | +133.1 | +144.0 ↑ |
| Silicon (MSI) | -17.7 | -17.0 | -17.0 ↔ | +29.5 | +34.3 | +38.7 ↑ |

¹ Production revenue

² Excluding solar

Source for GDP data: IHS Global Insight

Source: Gartner (September 2010)

Summary

- Macroeconomic picture continues to improve, but questions have arisen concerning recovery's strength.
- Semiconductor growth is 31.5% in 2010. PCs, cell phones and LEDs are key drivers.
- Capital spending is exploding for 2010
 - Spending remains strategic for technology, foundry and memory
 - For the first time, 2 SATS companies joining the top 20
- Equipment spending mostly on technology, foundry and memory
 - Fab growth expected in 2011 and 2012 due to ordering in 2010
 - Efficient use of money mandatory because capital intensity continues to decline
- Outsourcing market outpaces general semiconductor market
 - Globalfoundries giving TSMC a "run for the money"
 - "Adaptable manufacturing" enabled by packaging/assembly processes

Upcoming Gartner Semiconductor Events

- **Gartner Webinar: 3Q10 Semiconductor Manufacturing Forecast Update**, 9 September 2010 at 11:30 a.m. EST

This webinar is available to Gartner clients who are registered seatholders to the entitled services. For more information and to register, please visit

<http://my.gartner.com/portal/server.pt?open=512&objID=204&mode=2&PageID=3656584&resId=1423314>

- **Register Now – 16th Annual Asia Pacific Semiconductor Roadshow 2010**
 - [30 September 2010, The Westin Taipei, Taipei Taiwan](#)
 - [5 October 2010, Coex Intercontinental Seoul, Seoul, South Korea](#)
 - [7 October 2010, Intercontinental Hotel Singapore, Singapore](#)
- **Save the date – Gartner Semiconductor Briefing**, 4 November 2010
DoubleTree Hotel, San Jose, California

For more information, please contact Becky Tonnesen at becky.tonnesen@gartner.com