

IC Market Recovery Outlook

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About IC Insights

IC Insights, Inc., based in Scottsdale, Arizona, is dedicated to providing high-quality, cost-effective market research for the integrated circuit industry. Founded in 1997, IC Insights offers coverage of global economic trends, the IC market forecast, capital spending and fab capacity trends, product market details, and technology trends, as well as complete IC company profiles and evaluations of emerging markets for ICs.

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The McCLEAN REPORT

An In-Depth Analysis and Forecast of the IC Industry

STRATEGIC REVIEWS

Extensive Profiles of the World's IC Manufacturers and Fabless Suppliers

EMERGING IC MARKETS

A Study of Future Market Opportunities for Integrated Circuits

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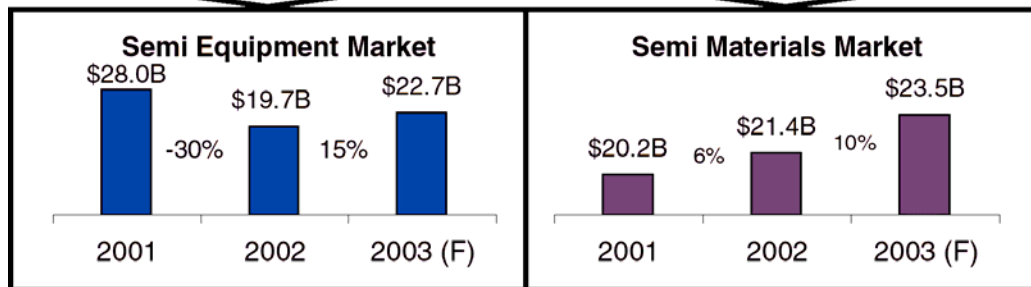
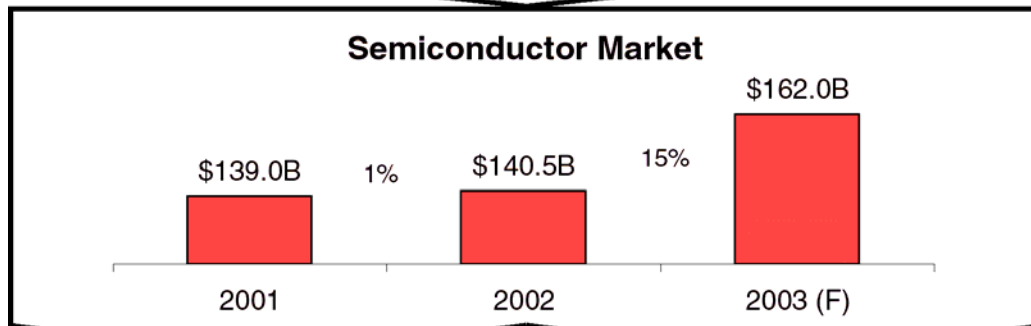
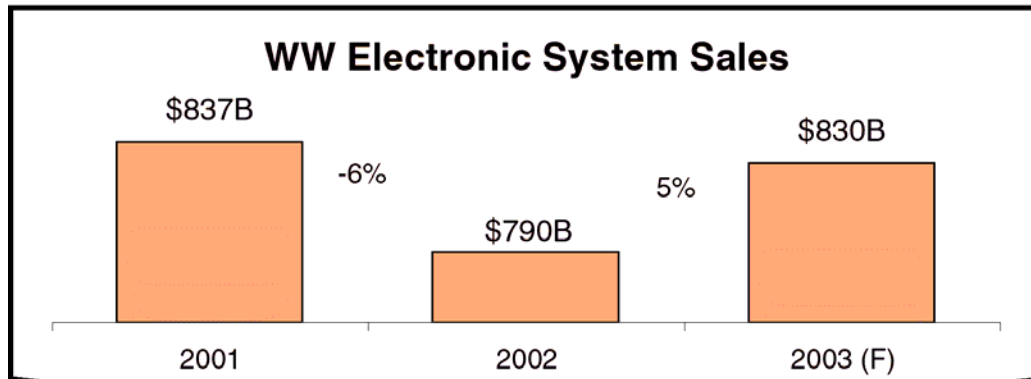


IC Insights' Presentation Outline

- * IC Industry Cycles and Market Forecast Assumptions
- * The Increasing Role of the IC Foundry
- * China's IC Production Outlook
- * Semiconductor Industry Capital Spending Trends
- * Summary/Questions

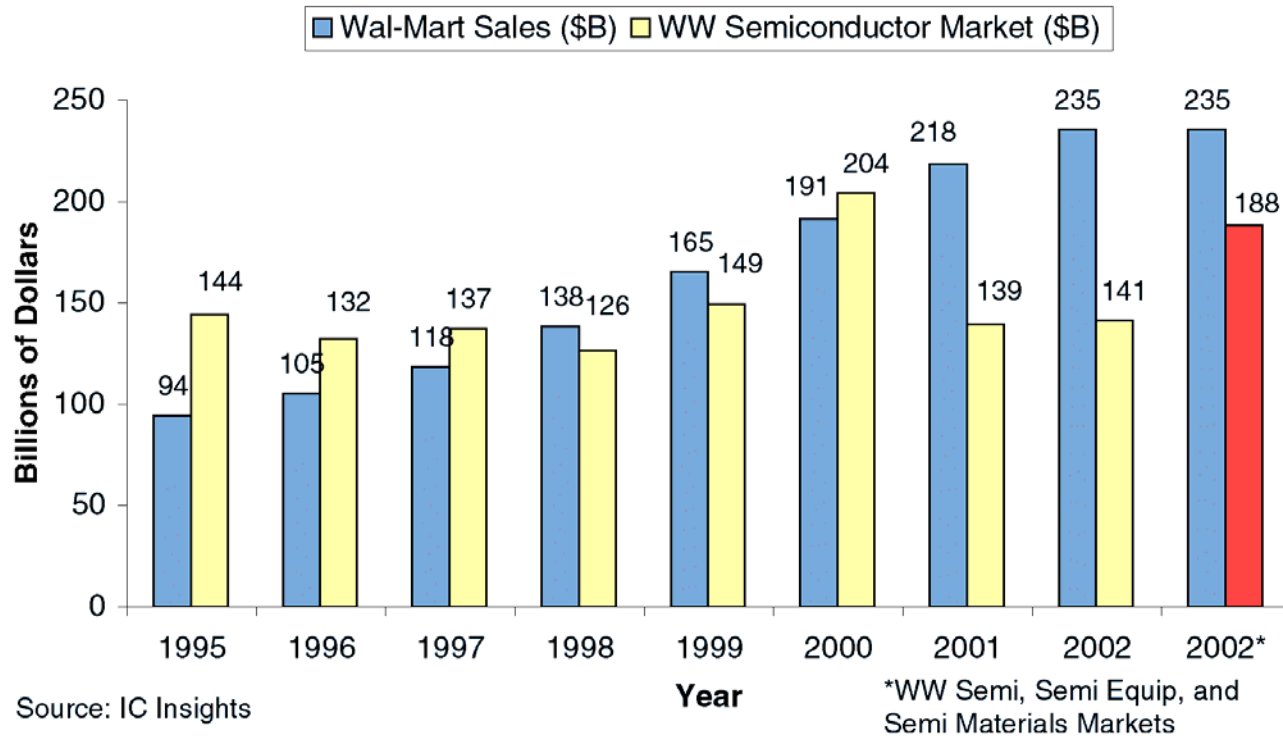
Source: IC Insights

Electronic Industry Interdependence

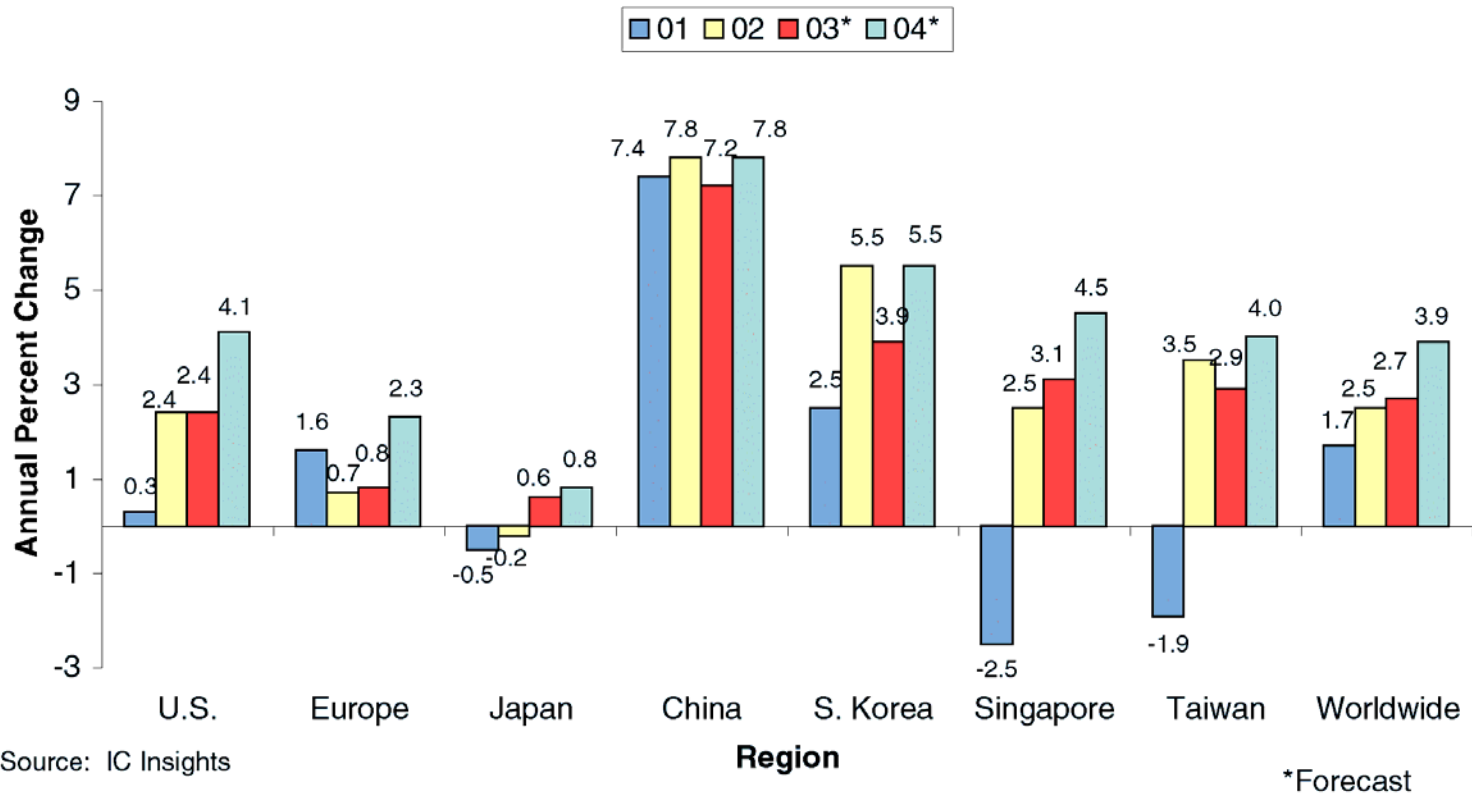


Source: IC Insights, SEMI

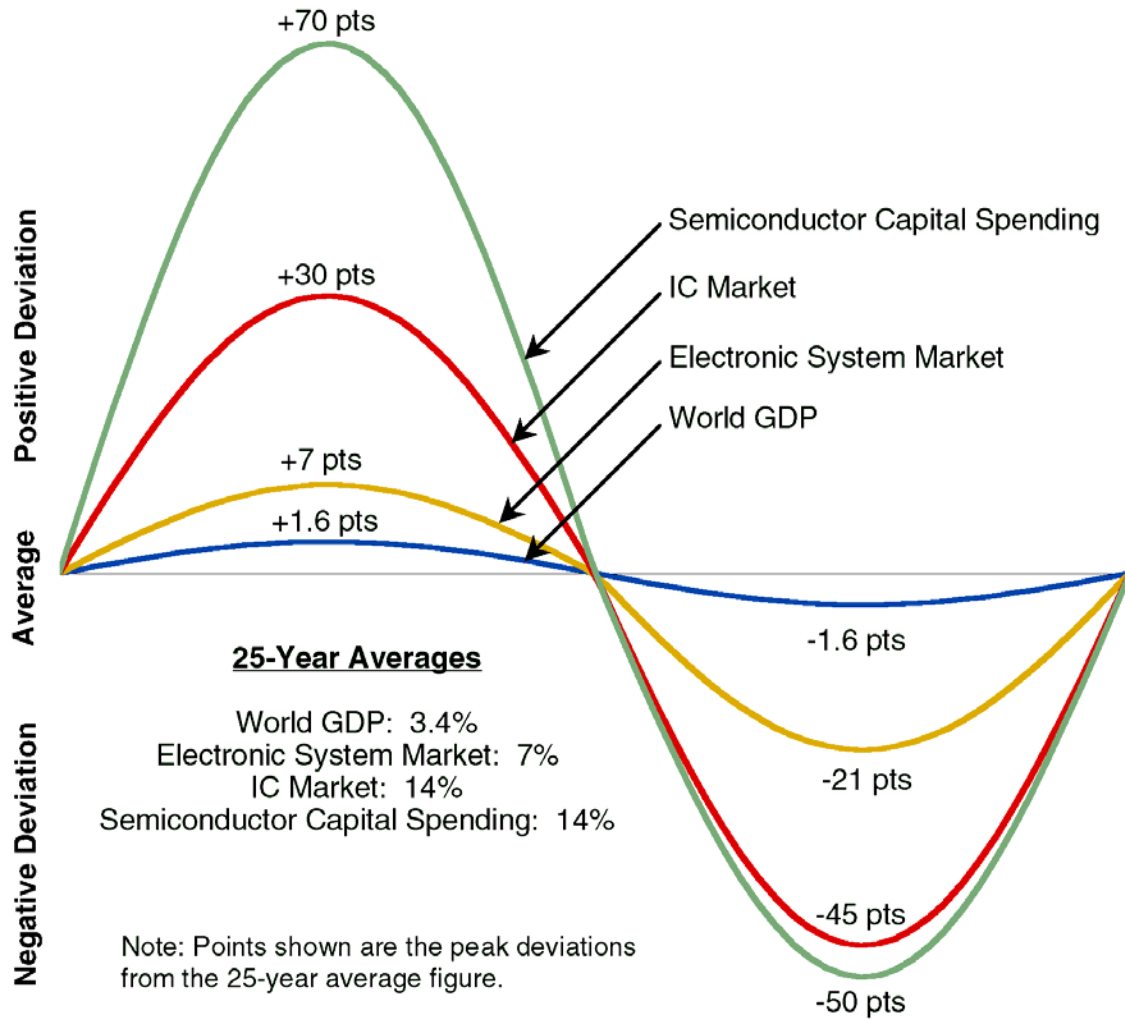
Wal-Mart Sales vs the WW Semiconductor Market



2001-2004 GDP Trends



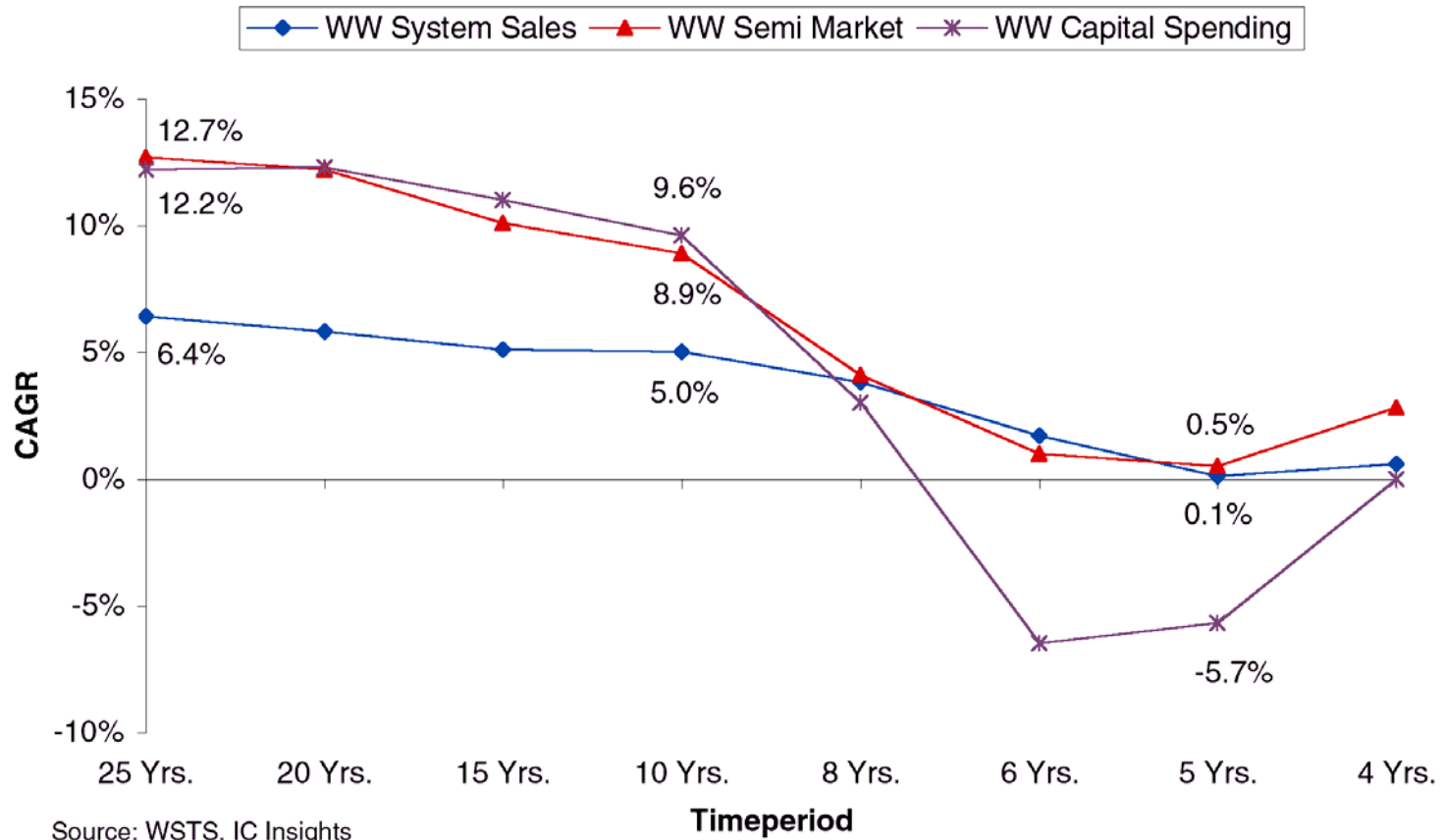
Cycle Amplitude Comparisons



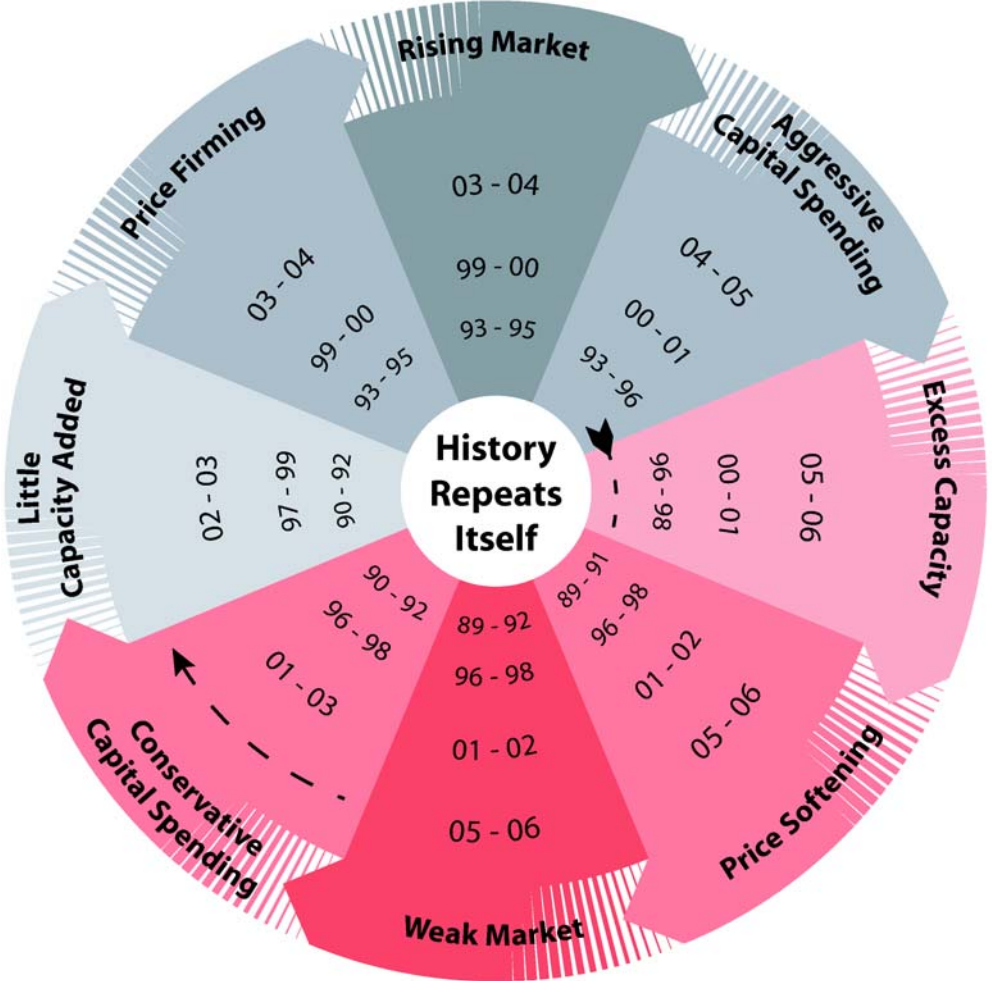
Source: IC Insights



CAGR Comparisons through 2002



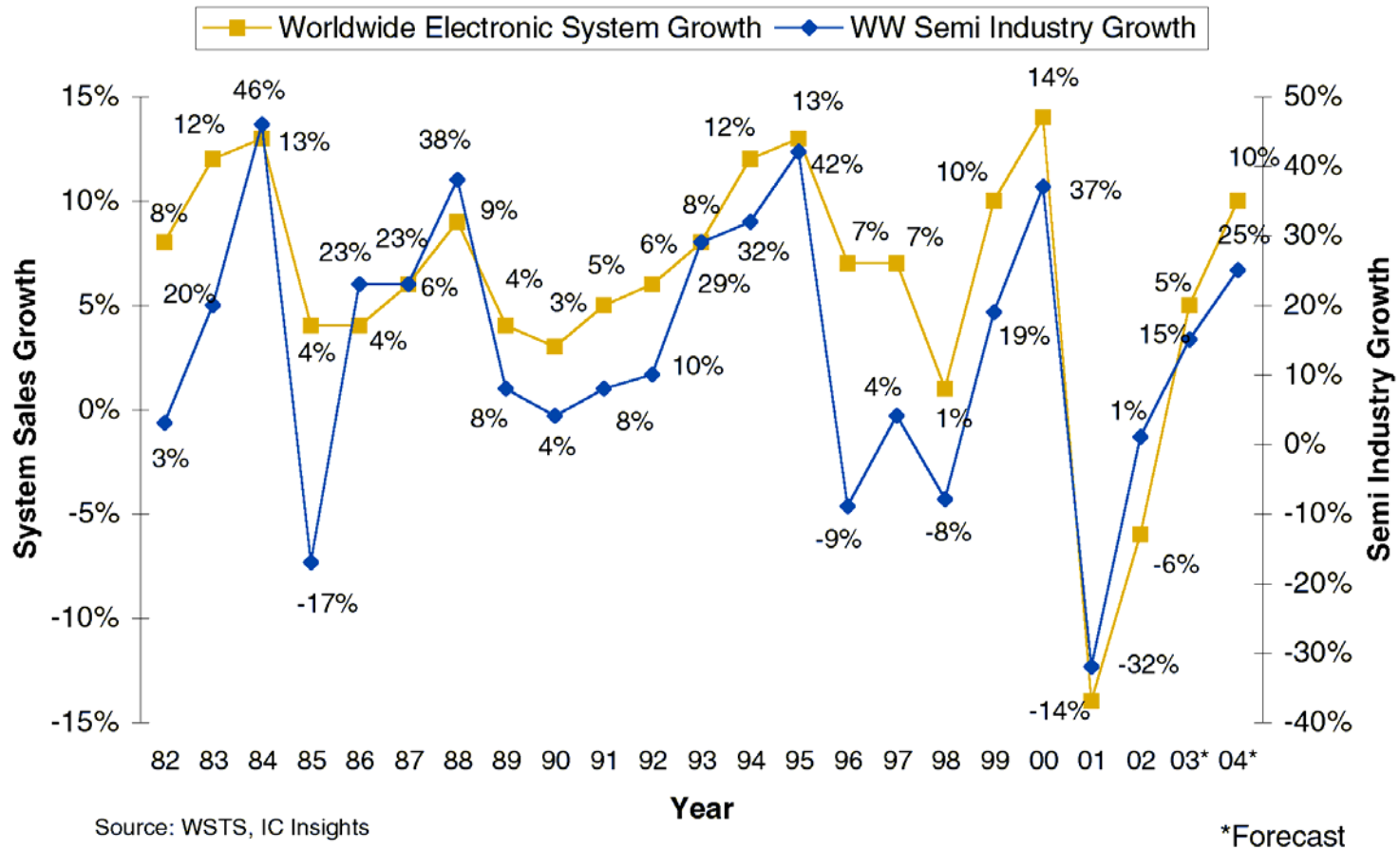
The IC Industry Cycle



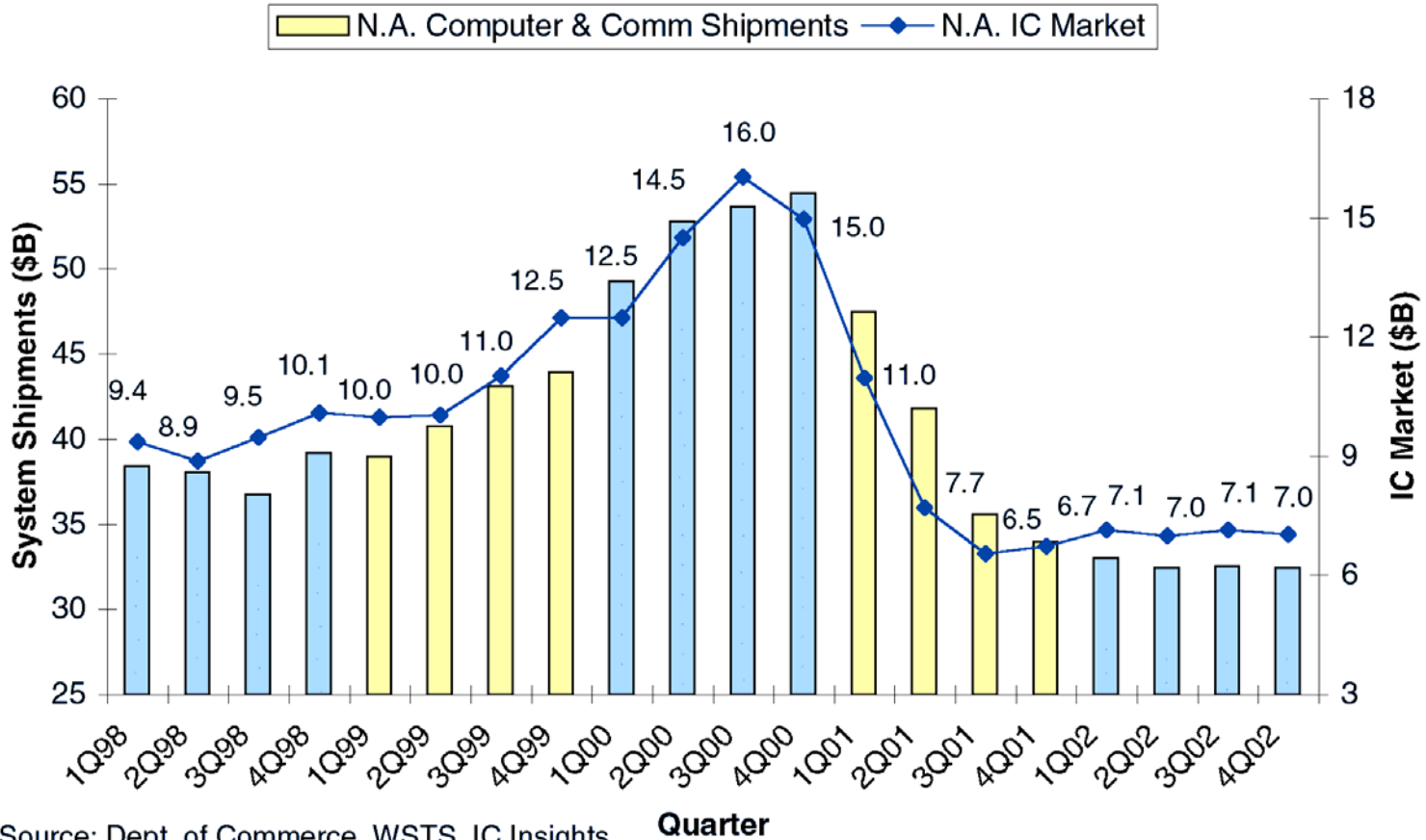
Source: IC Insights



Worldwide Electronic System Sales versus Worldwide Semiconductor Growth (1982-2004)

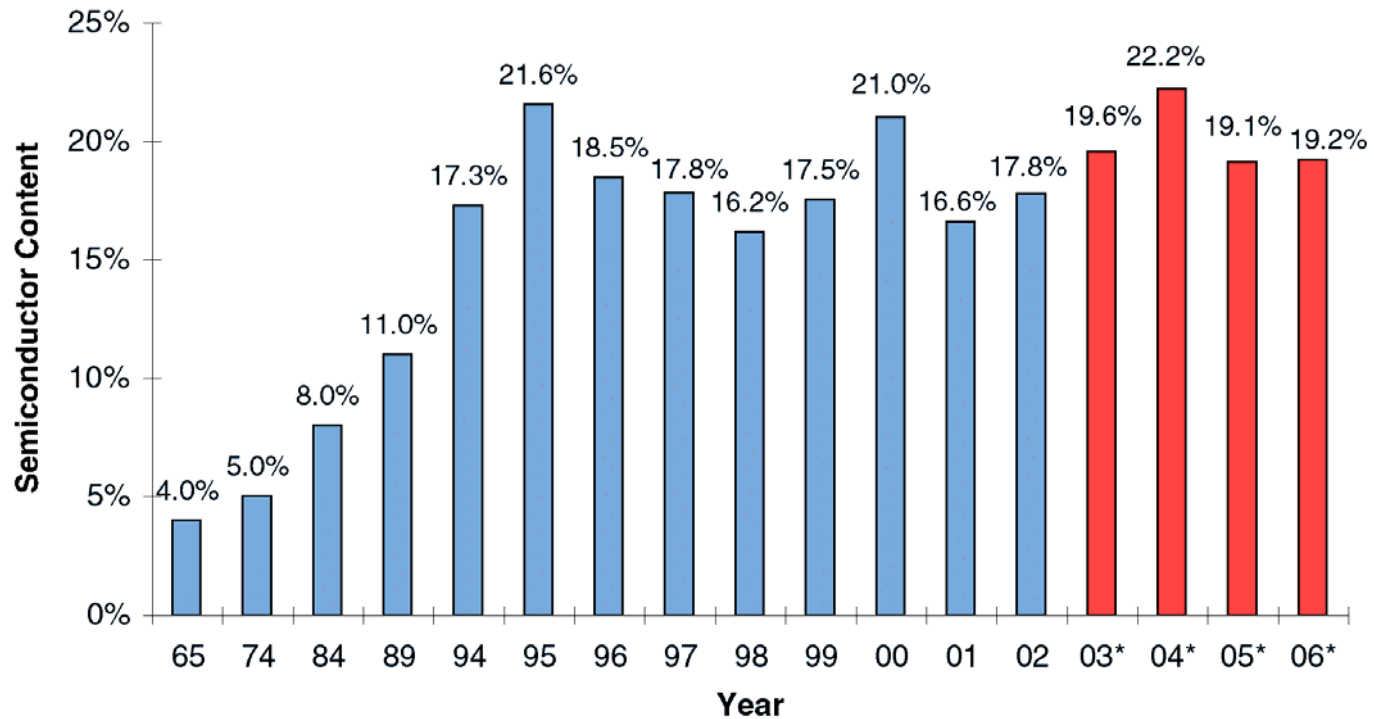


North American Computer & Communication System Shipments vs. IC Market (\$B)



Source: Dept. of Commerce, WSTS, IC Insights

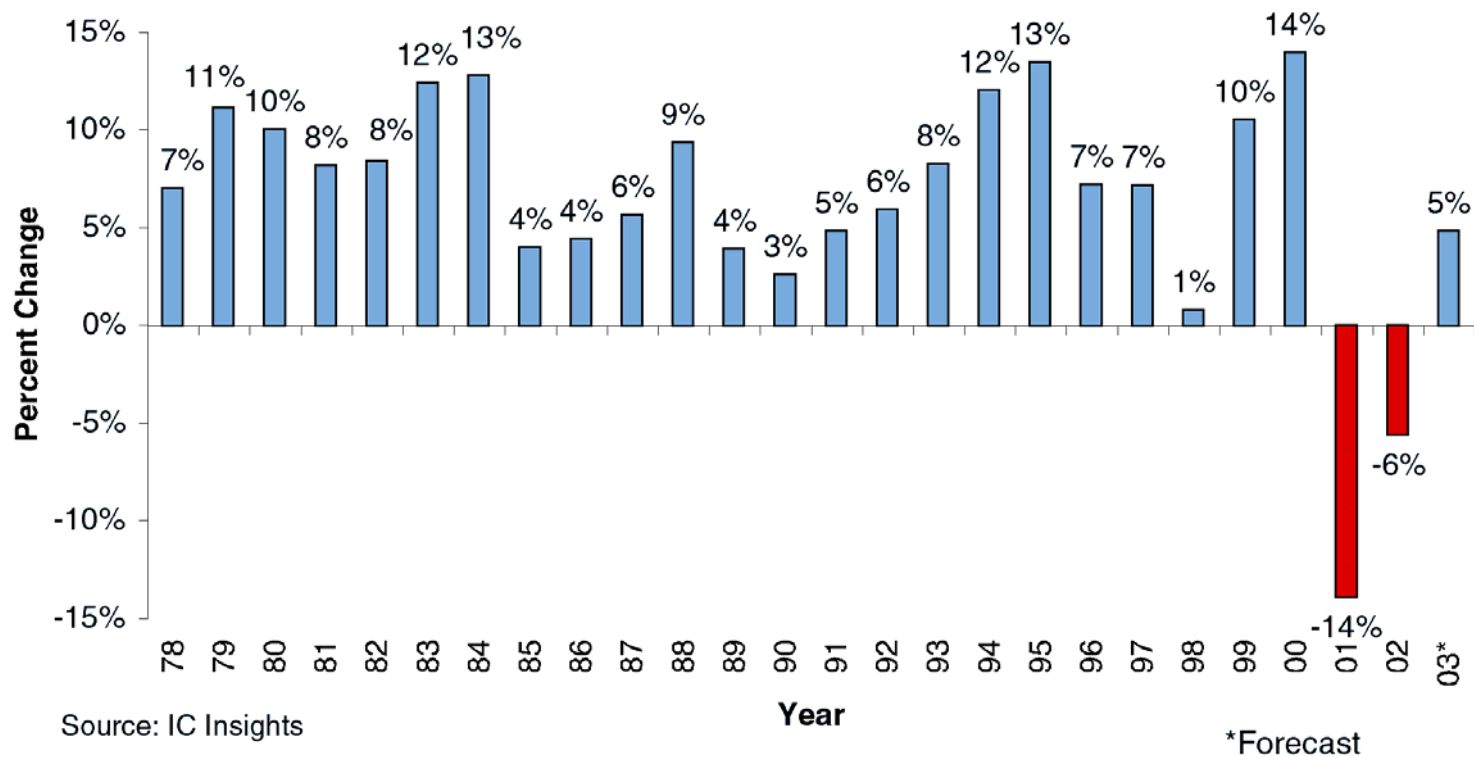
Electronic System Semiconductor Content



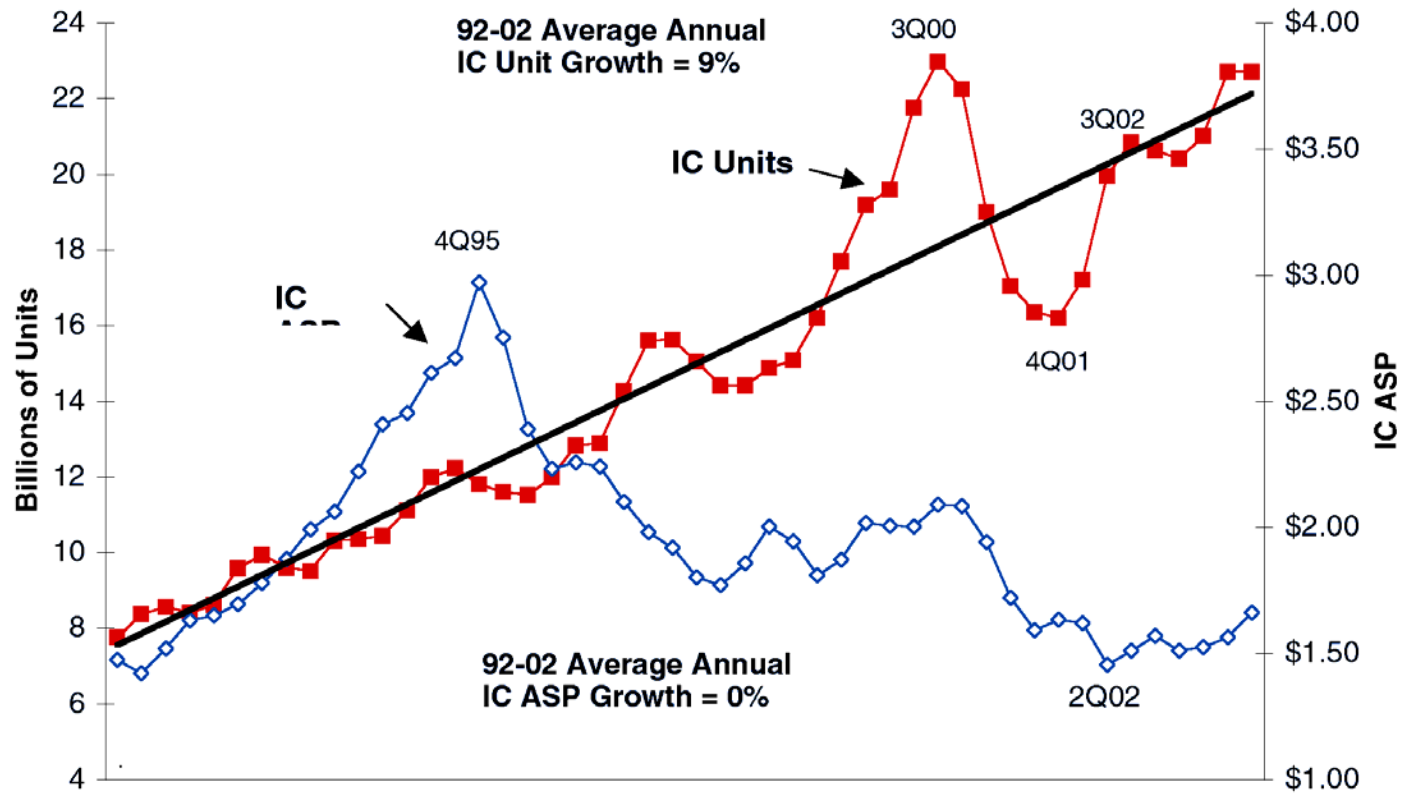
Source: STMicroelectronics, TI, IC Insights

*Forecast

Worldwide Electronic System Market Growth Rates (1978-2003)



1992-2003 Quarterly IC ASP and Unit Volumes



Source: WSTS, IC Insights

'03 Figures are Forecasts

IC Insights' IC Industry Forecast Assumptions for 2003 (as Viewed from March 2003)

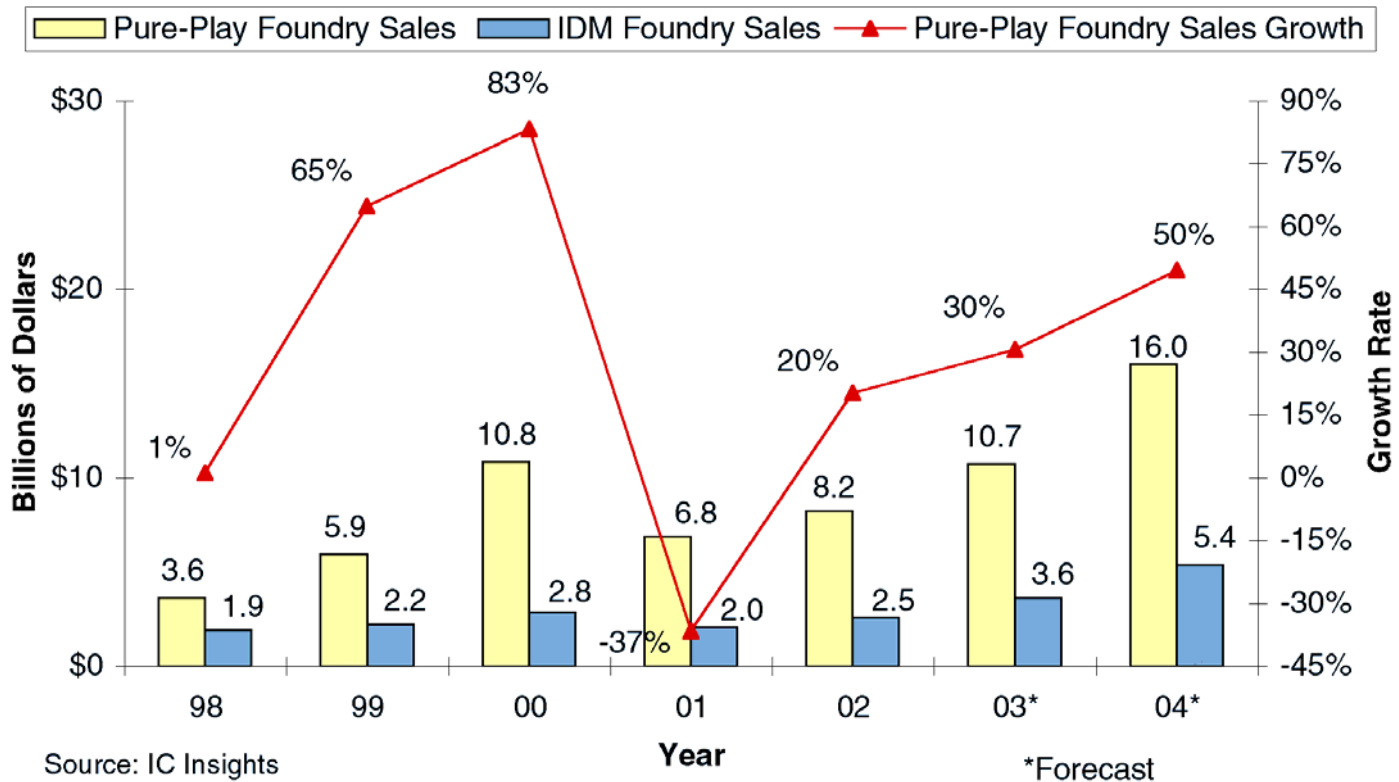
2003 Factors	<10% Growth	10% to 20% Growth	>20% Growth
Worldwide Economic Situation	<2.8% GDP Growth	2.8%-3.4% GDP Growth	>3.4% GDP Growth
Non-Japan Asian Economies GDP Growth	<4.5% GDP Growth	4.5%-5.5% GDP Growth	>5.5% GDP Growth
IC Capacity Situation	<85% Capacity Utilization	85%-90% Capacity Utilization	>90% Capacity Utilization
IC Unit Volume Shipments	<8% Increase	8%-13% Increase	>13% Increase
Worldwide Electronic System Sales	<4% Growth	4%-6% Growth	>6% Growth
2003/2002 IC ASP Change	<1% (ASP <\$1.55)	1% - 6% (ASP = \$1.55-\$1.62)	>6% (ASP >\$1.62)
Foreign Currency/U.S. Dollar Exchange Rate	Deflationary	Moderately Inflationary	Highly Inflationary
IC Insights' Forecasted Probability of Occurrence	25%	55%	20%

Source: IC Insights

Shaded = Current Expectations



1998-2004 IC Foundry Sales Forecast



Top Five 2002 IC Foundries

Rank	Company	Foundry Type	Location	Sales (\$M)
1	TSMC*	Pure-Play	Hsinchu	4,655
2	UMC	Pure-Play	Hsinchu	1,950
3	IBM	IDM	USA	520
4	Chartered**	Pure-Play	Singapore	445
5	Dongbu/Anam	Pure-Play	South Korea	310

Source: IC Insights

*Expected to have \$600M+ profit in '02.

**Expected to lose about \$400M in '02.

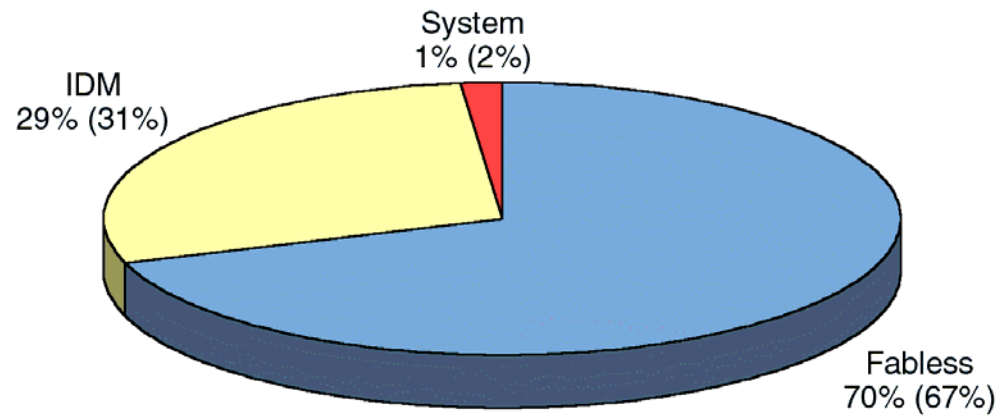
Foundry Technology vs Revenue per Wafer

Company	2002 $\leq 0.18\mu$ Sales (\$M)	$\leq 0.18\mu$ Percent of Total Sales	2002 Revenue per Wafer	2001 Revenue per Wafer
TSMC	\$2,375	51%*	\$1,760	\$1,728
UMC	\$610	31%	\$1,205	\$1,300
Chartered	\$140	31%	\$1,075	\$1,179

*30% of 4Q02 sales were $\leq 0.15\mu$.

Source: IC Insights

2002 Pure-Play Foundry Customer Makeup (\$8.2B)



Source: IC Insights

() = 2001 Share

Top Ten 2002 Fabless IC Suppliers (\$M)

2002 Rank	2001 Rank	Company	Location	2001	2002	% Change
1	1	Qualcomm	U.S.	1,395	1,942	39%
2	2	Nvidia	U.S.	1,275	1,915	50%
3	3	Xilinx	U.S.	1,149	1,125	-2%
4	5	Broadcom	U.S.	962	1,083	13%
5	10	MediaTek	Hsinchu	447	854	91%
6	4	VIA Technologies	Hsinchu	1,009	729	-28%
7	6	Altera	U.S.	839	712	-15%
8	9	ATI Technologies	Canada	480	645	34%
9	7	Conexant	U.S.	646	627	-3%
10	13	SanDisk	U.S.	317	493	56%
—	—	Top Ten Total	N/A	8,519	10,125	19%

Source: IC Insights

China's Foundry Competition

Company	Established Leaders
TSMC	Leading-edge technology, the "Intel" of foundries
UMC	Advanced technology, heading into 2003 at 58% utilization
IBM	Leading-edge technology, high-volume 300mm
Chartered	Heading into 2003 at 38% utilization
Company	Aggressive Relative Newcomers
Dongbu/Anam	Plans to invest \$1.0 billion in 2003 for 0.13 μ capability
1st Silicon	Aggressively seeking new business
Jazz	Spin-off from Conexant
Silterra	Aggressively seeking new business
Tower	Ramping new \$1.3B fab in 2003
Trecenti	Ramping 300mm foundry production
Communicant	Intel is a key investor
Company	IDM Expansions
Powerchip	Expanding from DRAM into foundry
Toshiba	Offering its 0.13 μ process to foundry customers
Hynix	Expanding from DRAM into foundry
Company	Each Other
SMIC, Grace, CSMC, ASMC, etc.	Will aggressively compete with each other for business

Source: IC Insights

China's 2005/2010 IC Production Outlook

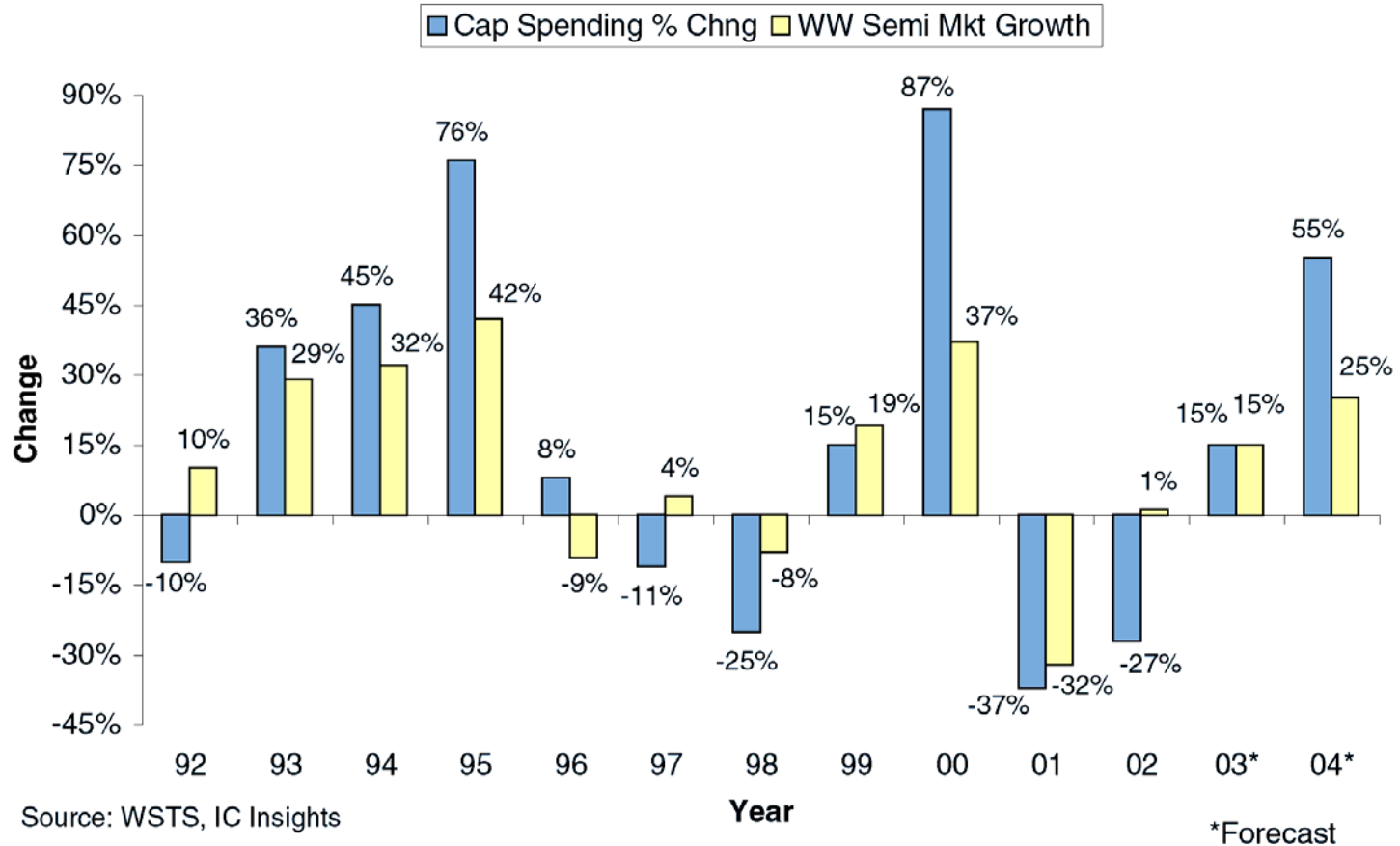
Company	Approx. Wafer Capacity/Yr (K, 200mm)	Capacity Utilization	Approx. Wafer Starts/Yr (200mm)	Revenue @ \$1,200/wafer (\$M)
SMIC	1,000	85%	850K	\$1,020
Grace	1,000	85%	850K	\$1,020
Hua Hong NEC	500	85%	425K	\$510
Shanghai Beiling	500	85%	425K	\$510
Motorola	300	85%	255K	\$305
Others*	800	85%	640K	\$770
Total 2005	4,100	85%	3.145M	\$4,135
2005 WW IC Market	—	—	—	\$154,298
China's 2005 Share	—	—	—	2.7%
2010 China IC Prod.	—	—	—	12,500**
2010 WW IC Market	—	—	—	\$250,000
China's 2010 Share	—	—	—	5.0%

Source: IC Insights, MII China

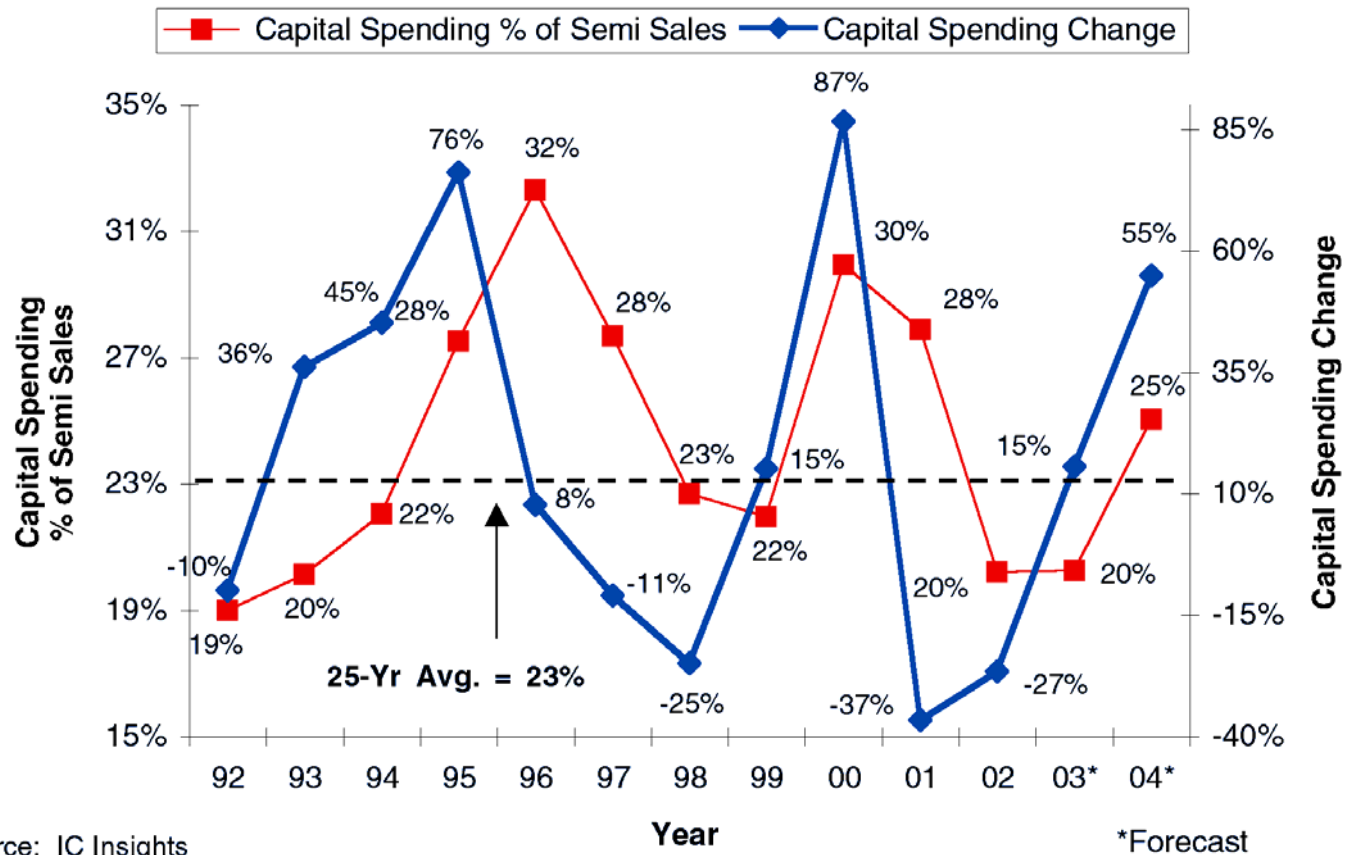
*Including ASMC, TSMC, HSMC, UMC, etc.

**Assumes a 25% 05-10 CAGR

Capital Spending versus Worldwide Semiconductor Market Growth (1992-2004)

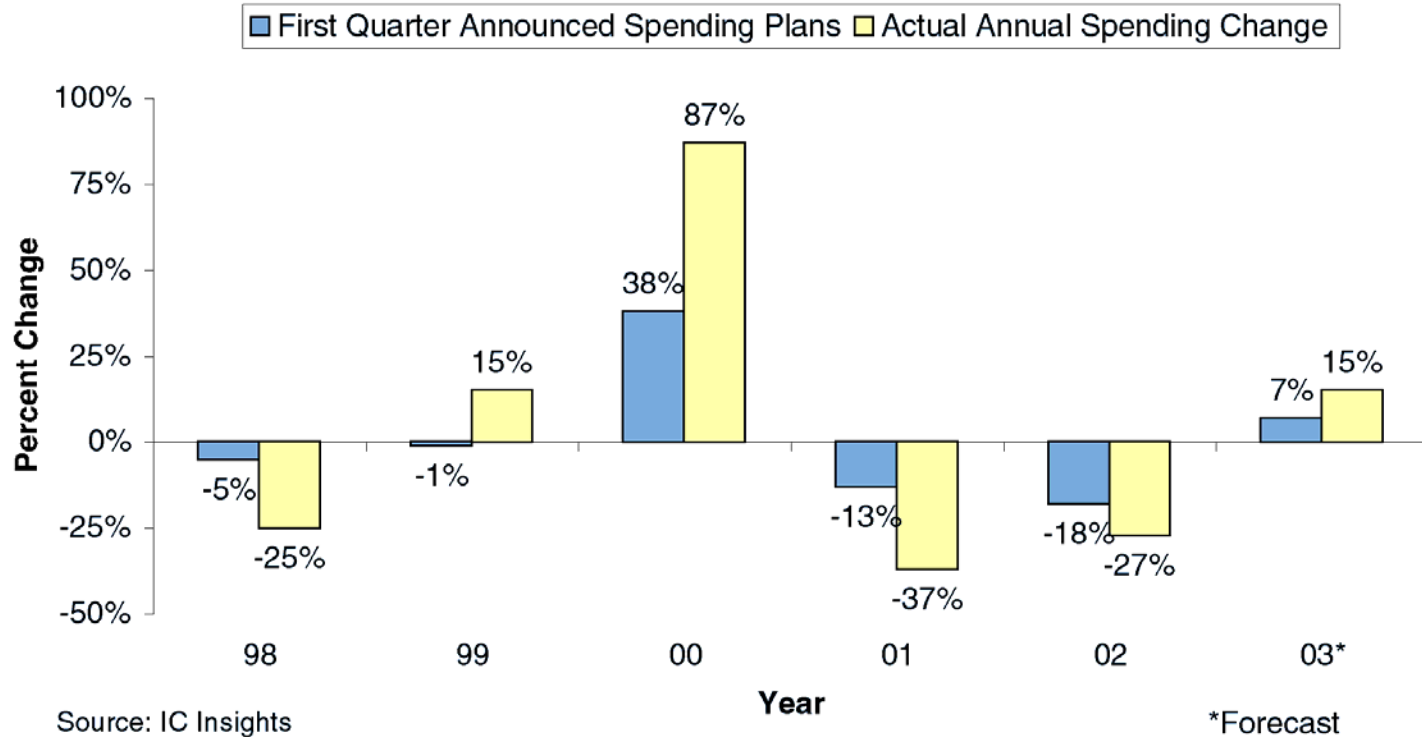


Semiconductor Capital Spending as a Percent of Semiconductor Sales (1992-2004)



Source: IC Insights

First Quarter Worldwide Semiconductor Capital Spending Plans vs Actual Annual Expenditures



Top 25 2003 Capital Spenders Ranked by 2003 Spending Budget as a Percent of 2002 IC Sales

Rank	Company	Headquarters	2003 (\$M, Budget)	2002 IC Sales (\$M)	03 Spending as a % of 02 IC Sales
1	Grace	China	750	0	N/A
2	SMIC	China	800	85	941%
3	Dongbu/Anam*	South Korea	450	310	145%
4	Elpida	Japan	750	610	123%
5	Nanya	Taiwan	670	886	76%
6	Samsung	South Korea	3,560	8,720	41%
7	Micron	U.S.	975	2,845	34%
8	Rohm	Japan	375	1,380	27%
9	TSMC	Taiwan	1,250	4,655	27%
10	Matsushita	Japan	600	2,320	26%
11	IBM	U.S.	900	3,500	26%
12	UMC Group	Taiwan	500	1,950	26%
13	AMD	U.S.	650	2,697	24%
14	Sharp	Japan	360	1,505	24%
15	Sony	Japan	570	2,520	23%
16	Infineon	Europe	990	4,481	22%
17	Hynix	South Korea	500	2,544	20%
18	ST	Europe	1,000	5,605	18%
19	Toshiba	Japan	840	4,823	17%
20	Intel	U.S.	3,700	24,084	15%
21	Fujitsu	Japan	400	2,980	13%
22	Renasas**	Japan	800	6,215	13%
23	NEC	Japan	550	4,450	12%
24	TI	U.S.	800	6,650	12%
25	Philips	Europe	350	3,482	10%
—	Top 25 Total	—	23,090	99,297	23%

*Dongbu and Anam IC sales combined for 2002.

**Hitachi and Mitsubishi IC sales combined for 2002.

Source: IC Insights, Company Reports

IC Insights' Summary

- ✦ IC unit volume shipments will continue to average 7%-9% growth/year.
- ✦ China will set the price for electronic system production, IC foundries will set the price for wafer processing — both will be deflationary.
- ✦ Chinese IC producers will “learn their economics lesson,” similar to Japanese and Korean companies. The Chinese are likely to be the last large group of “newcomers” to IC production.
- ✦ Foundries will increase IC production marketshare, but competition will be fierce. Likely to endure a period of “profitless prosperity.”
- ✦ Total share of a given market will continue to be limited to 100 points.
- ✦ Electronic system sales and IC industry cycles are forecast to continue, but with lower “average” growth rates during the cycles.
- ✦ An IC industry recovery has begun and is forecast to increase in intensity in 2003 and 2004.

Source: IC Insights