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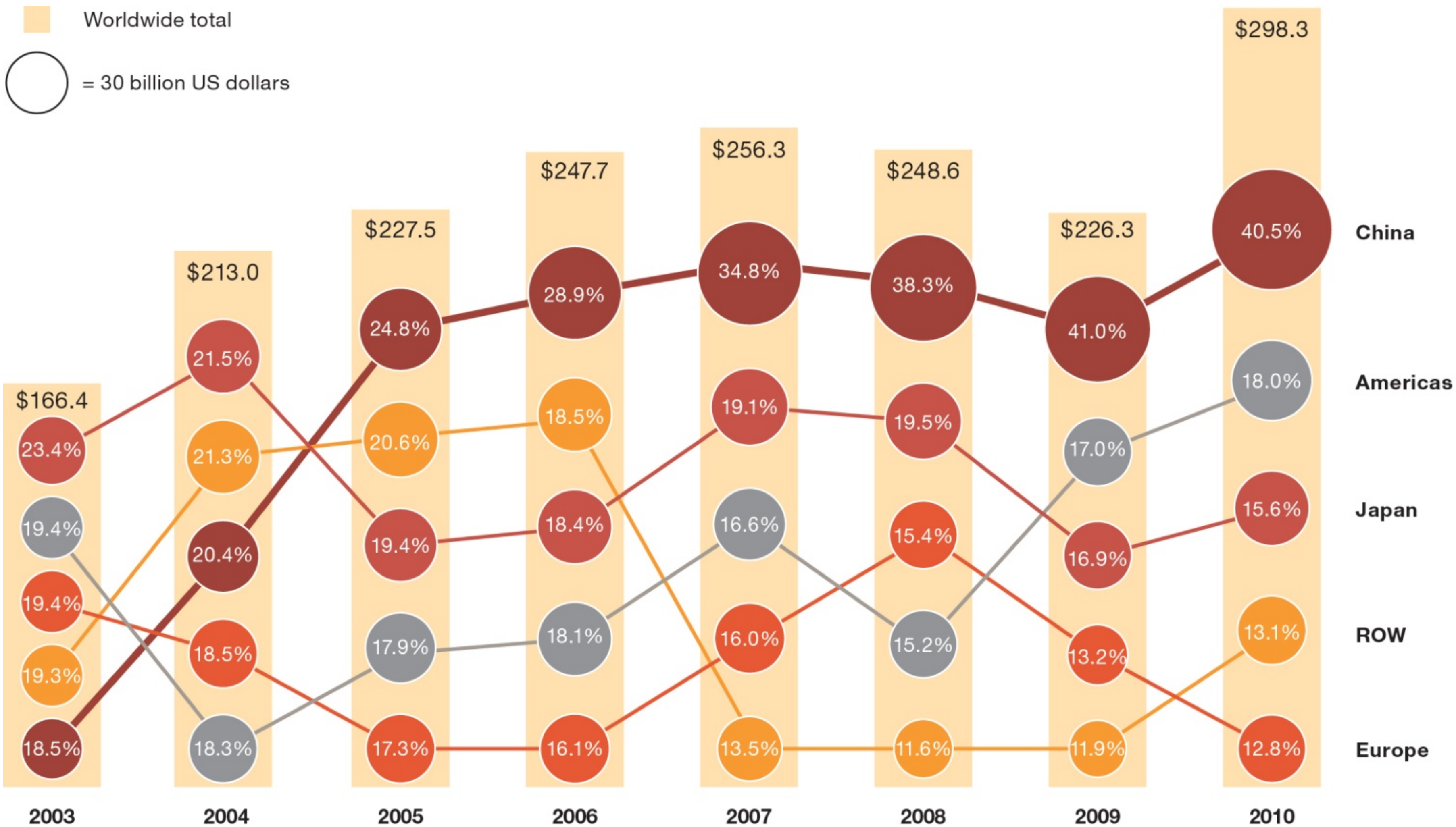
China's impact on the semiconductor industry: 2011 update

MEPTEC – January 2012

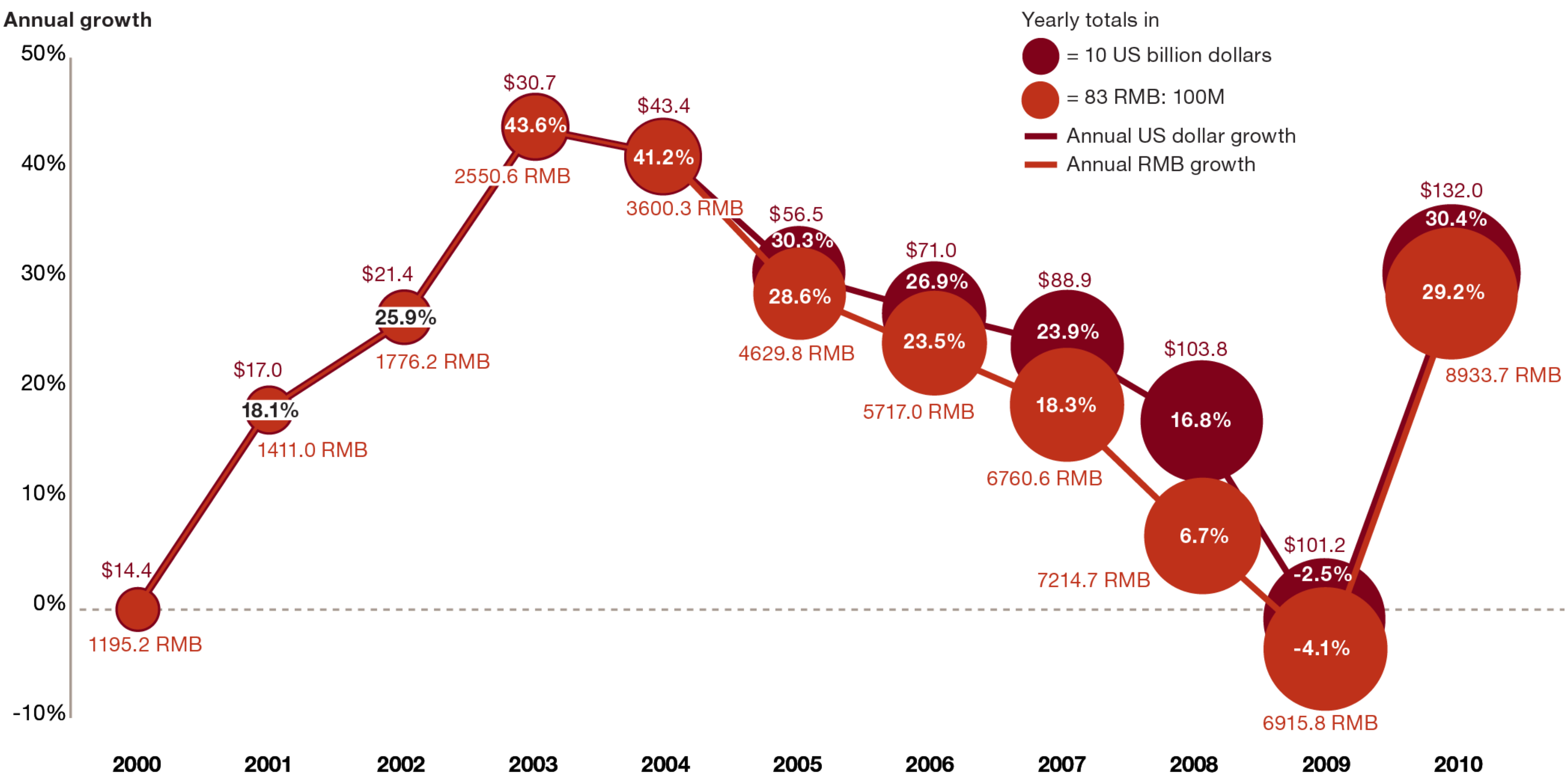
pwc

Worldwide semiconductor market by region, 2003-2010



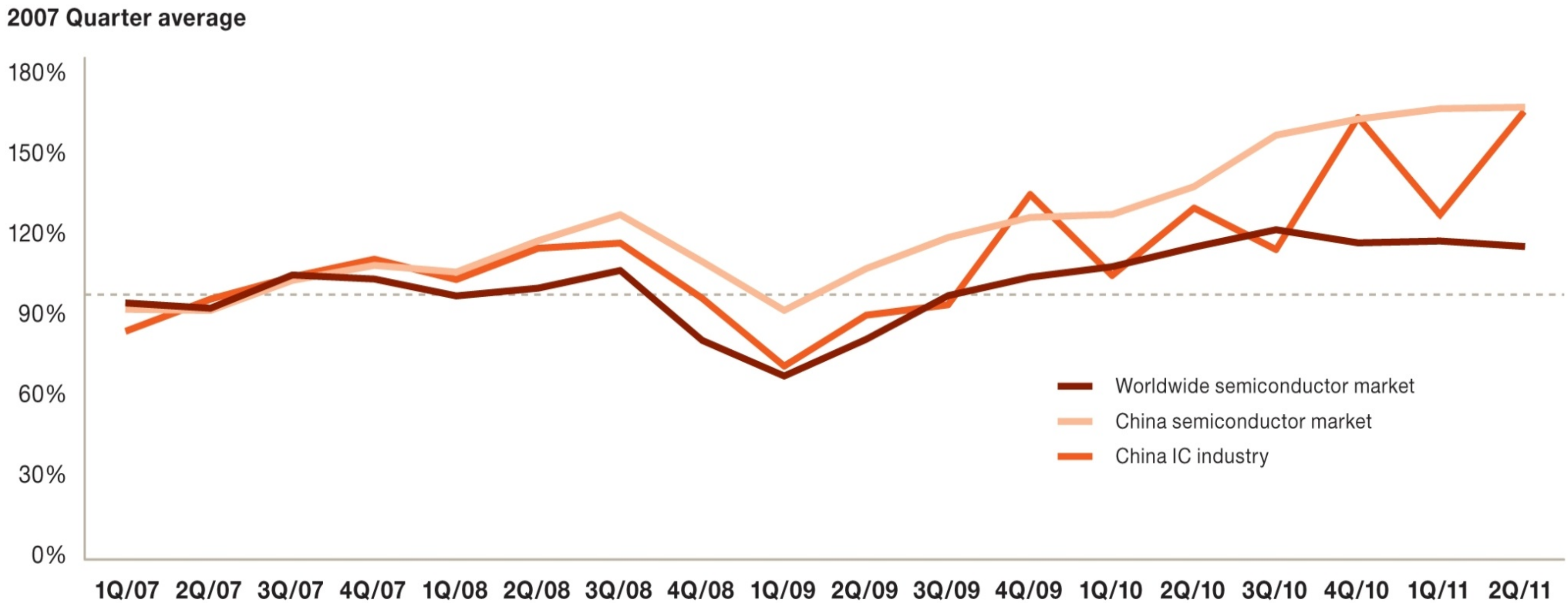
Source: SIA, CCID

China's semiconductor market growth, 2000-2010



Source: CCID, CSIA

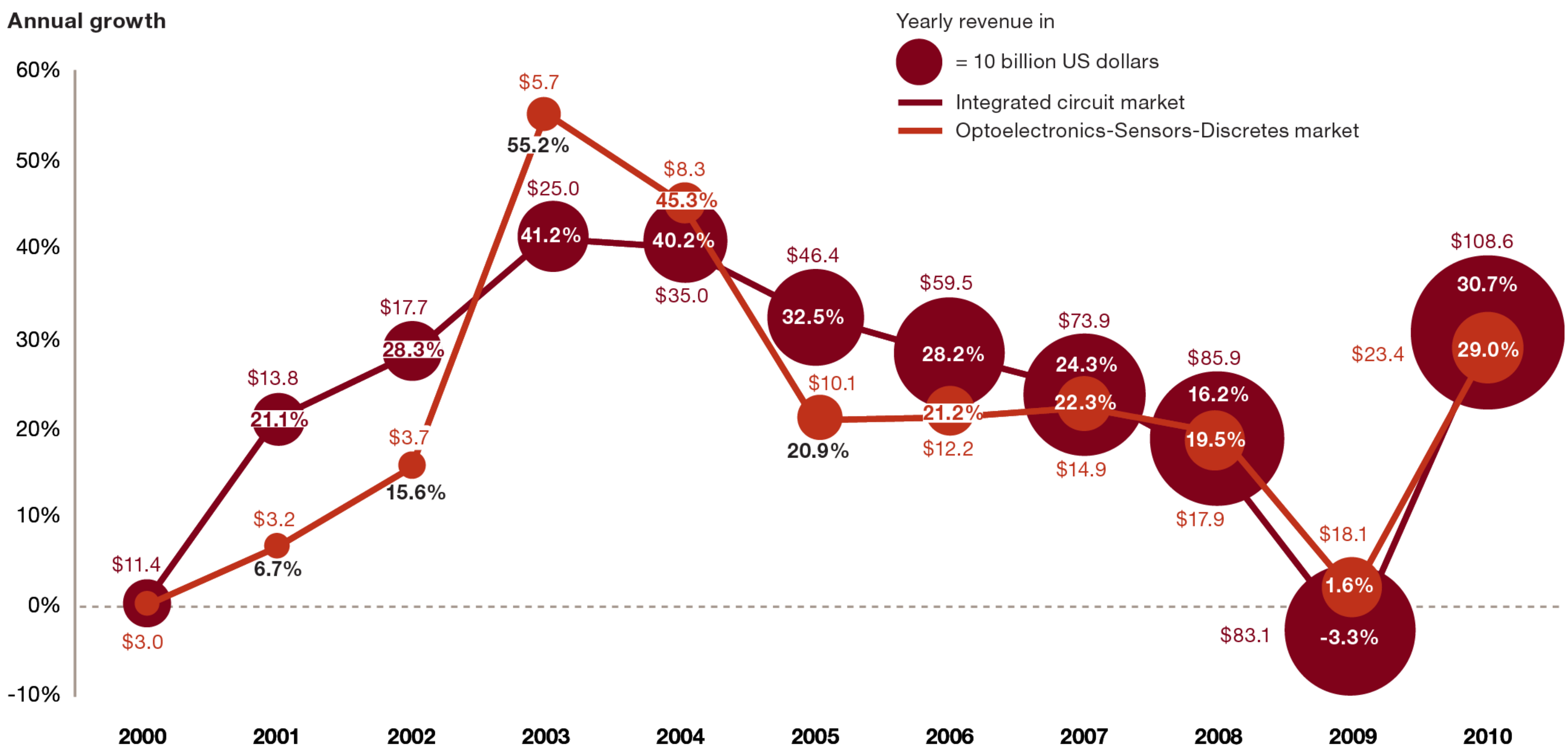
Comparison of China vs. worldwide semiconductor growth by quarter, 2007-2010



Note: Comparison of China semiconductor market and China IC industry growth versus worldwide semiconductor market by quarter 2007–2010 indexed against 2007 average quarter.

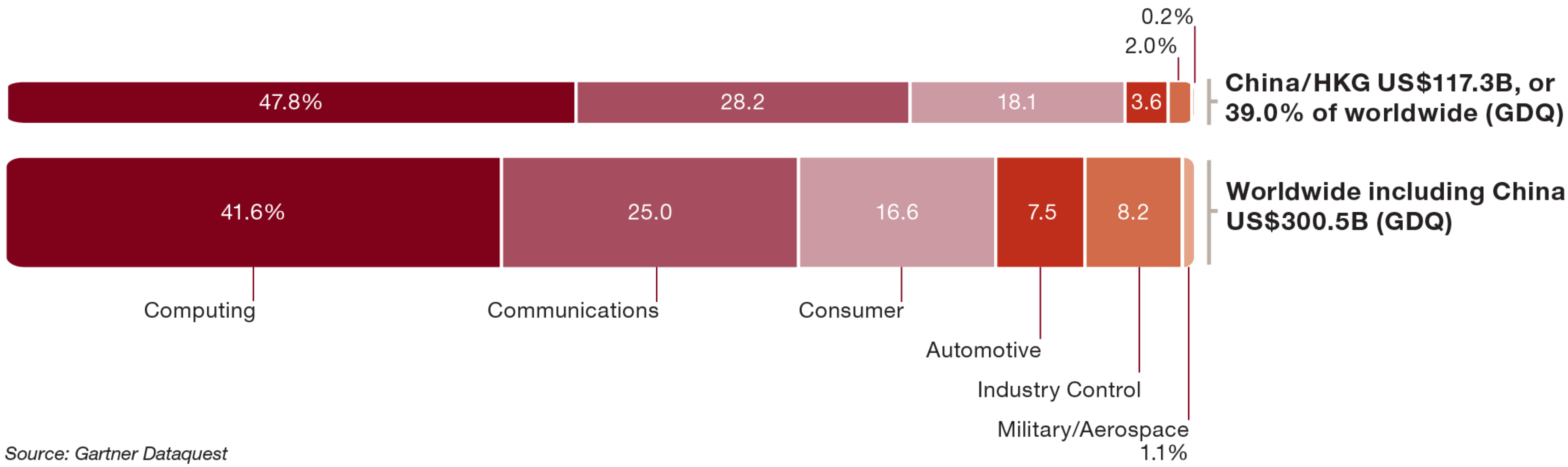
Source: SIA, CCID, CSIA Quarterly Reports

China's IC and O-S-D market growth, 2000-2010



Source: CCID, CSIA

China compared with worldwide semiconductor market by application, 2010



Source: Gartner Dataquest

Semiconductor suppliers to the Chinese market, 2009-2010

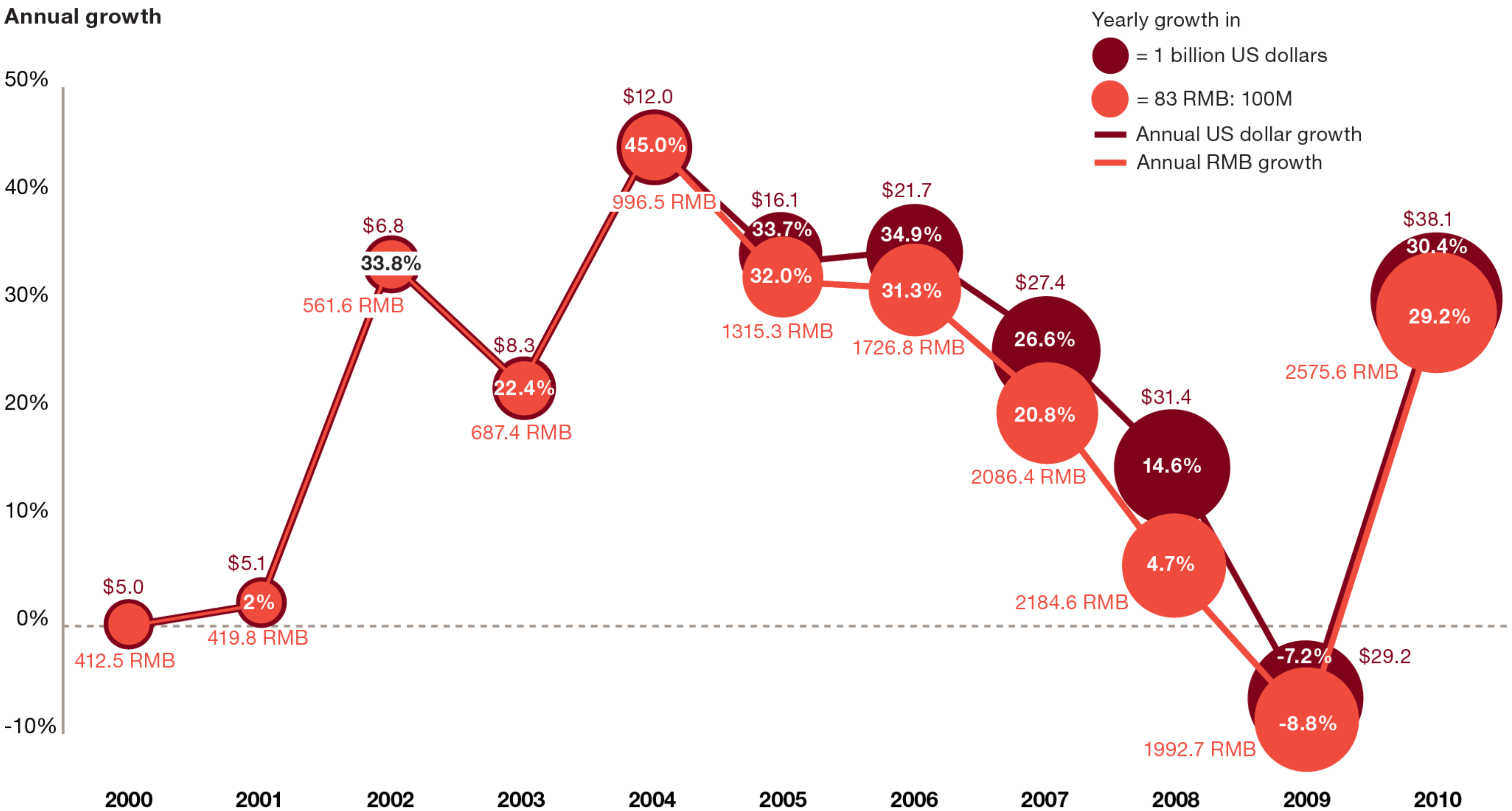
	Rank		Revenue in millions of US dollars						Market share
Company	**2009**	**2010**	**2009 IC**	**2010 IC**	**% Change**	**2009 Semi**	**2010 Semi**	**% Change**	
Intel	1	1	15,570	19,659	26.3%	15,570	19,659	26.3%	14.9%
Samsung	2	2	5,548	8,018	44.5%	5,681	8,175	43.9%	6.2%
Hynix	4	3	3,644	5,564	52.7%	3,644	5,564	52.7%	4.2%
Toshiba	3	4	3,231	4,138	28.1%	3,904	4,970	27.3%	3.8%
TI	7	5	3,127	4,248	35.8%	3,292	4,479	36.1%	3.4%
ST	5	6	2,704	3,305	22.2%	3,601	4,449	23.5%	3.4%
AMD	6	7	3,415	4,174	22.2%	3,415	4,174	22.2%	3.2%
NXP	8	8	2,281	2,965	30.0%	2,891	3,751	29.7%	2.8%
Renesas*	12	9	1,272	2,634	31.0%	1,716	3,484	32.6%	2.6%
NEC*	18		739			911			
Freescale	10	10	2,057	2,788	35.5%	2,436	3,233	32.7%	2.4%
Media Tek (MTK)	9	12	2,442	2,453	0.5%	2,442	2,453	0.5%	1.9%
Total Top 10			**44,019**	**57,493**	**30.6%**	**46,876**	**61,938**	**32.1%**	**46.9%**

Total Top 10 share of				
Chinese integrated circuit market	53.0%	52.9%		
Chinese semiconductor market			46.3%	46.9%

Note: Semi equals IC + Discrete (including LED) market.
** Renesas for 2010 is compared with Renesas + NEC for 2009 due to their merger.*

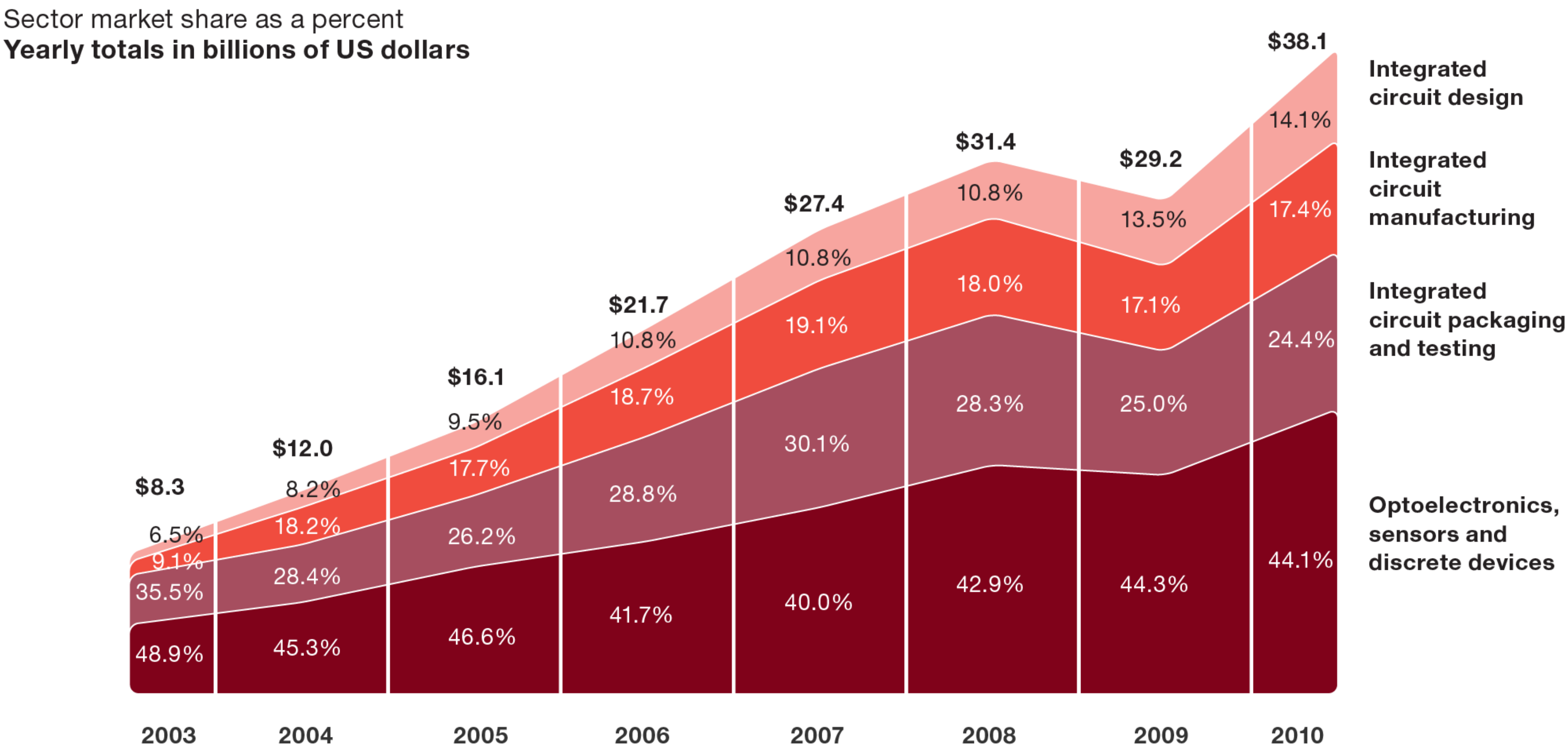
Source: CCID IC Market China 2010 & 2011 Conferences—Feb. 2010 & 2011

China's semiconductor industry revenues and growth, 2000-2010



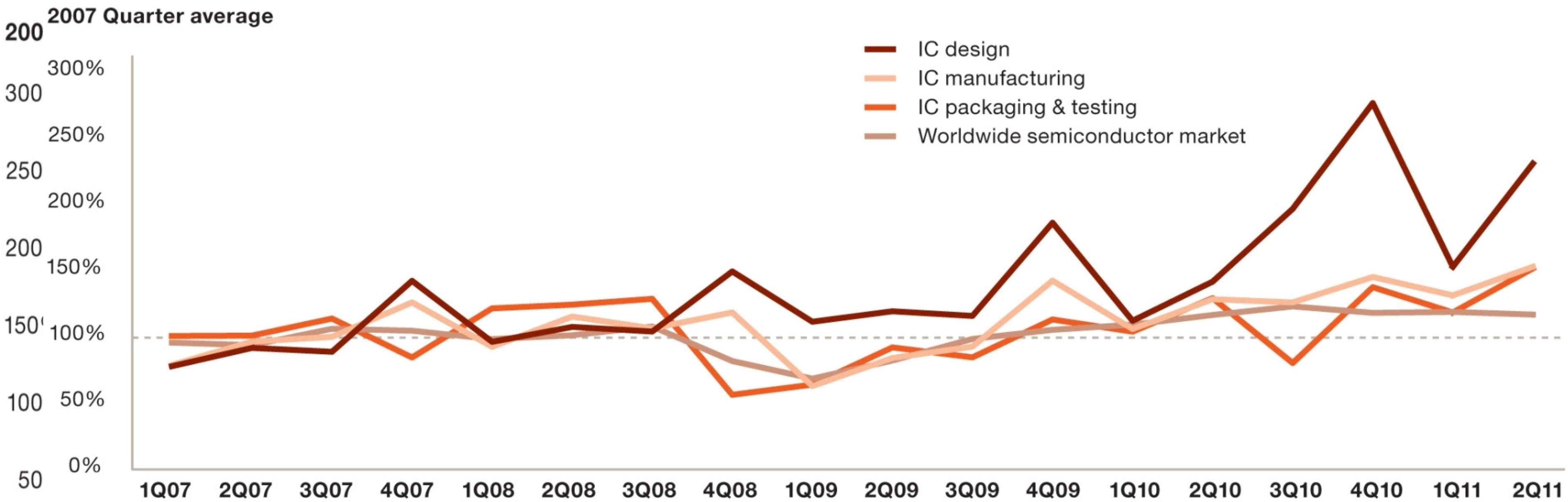
Source: CCID, CSIA

China's semiconductor industry by sector, 2003-2010



Source: CCID, CSIA, PwC 2004-2010

Comparison of China's IC industry sector growth by quarters, 2007-2010



Note: Comparison of China IC industry sectors versus worldwide semiconductor market growth by quarter 2007–2010 indexed against 2007 average quarter.

Source: CSIA, SIA Quarterly Reports

Note: Comparison of China IC industry sectors versus worldwide semiconductor market growth by quarter 2007–2010 indexed against 2007 average quarter.

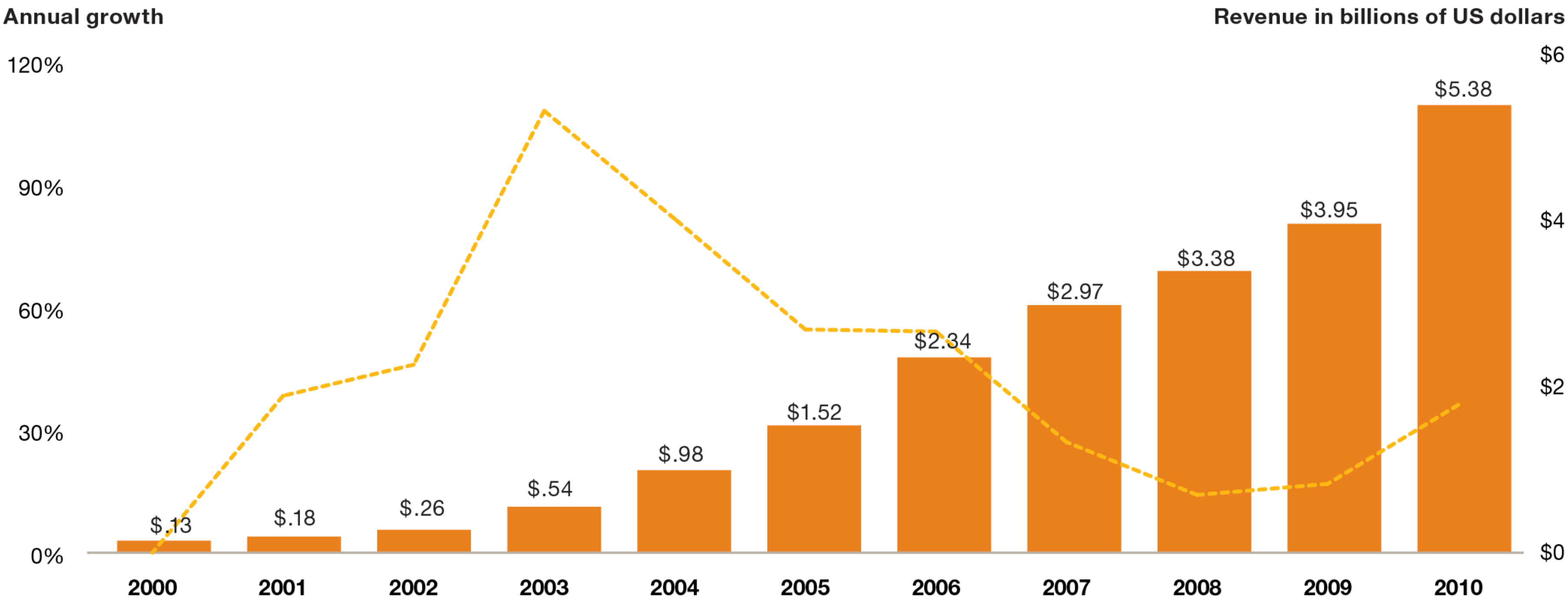
Source: CSIA, SIA Quarterly Reports

Major Chinese semiconductor manufacturers (including groups) in 2010

Name of company	Rank 2009	Rank 2010	Sales revenue (RMB:100M) 2009	Sales revenue (RMB:100M) 2010	Sales revenue (RMB:100M) Change	Sector	Sales revenue (US$M) 2009	Sales revenue (US$M) 2010	Sales revenue (US$M) Change
Intel Products (Shanghai & Chengdu) Co., Ltd.	1	**1**	122.96	186.13	51.4%	PT	1,800	2,750	52.8%
Hynix—Numonyx Semiconductor	2	**2**	106.39	137.86	29.6%	I	1,557	2,037	30.8%
SMIC (Semiconductor Manufacturing International Corp.)	3	**3**	73.09	104.60	43.1%	F	1,070	1,545	44.4%
Freescale Semiconductor (China) & (Suzhou) Co., Ltd.	4	**4**	65.98	85.29	29.3%	PT D	966	1,260	30.5%
RFMD (RF Micro Devices) (Beijing) Co., Ltd.	5	**5**	52.85	64.37	21.8%	PT	774	951	22.9%
XINCHAO Group	6	**6**	42.24	63.89	51.2%	PT	618	944	52.6%
China Resources Microelectronics (Holdings) Ltd.	8	**7**	36.86	45.30	22.9%	I DC D	540	669	24.0%
HiSilicon Technologies Co., Ltd.	7	**8**	39.11	44.16	12.9%	DF	572	652	14.0%
Natong Huada Microelectronics Group Co., Ltd.	13	**9**	27.20	41.81	53.7%	PT	398	618	55.1%
Renesas Semiconductor (Beijing & Suzhou) Co., Ltd.	9	**10**	32.89	39.83	21.1%	PT D	482	588	22.2%

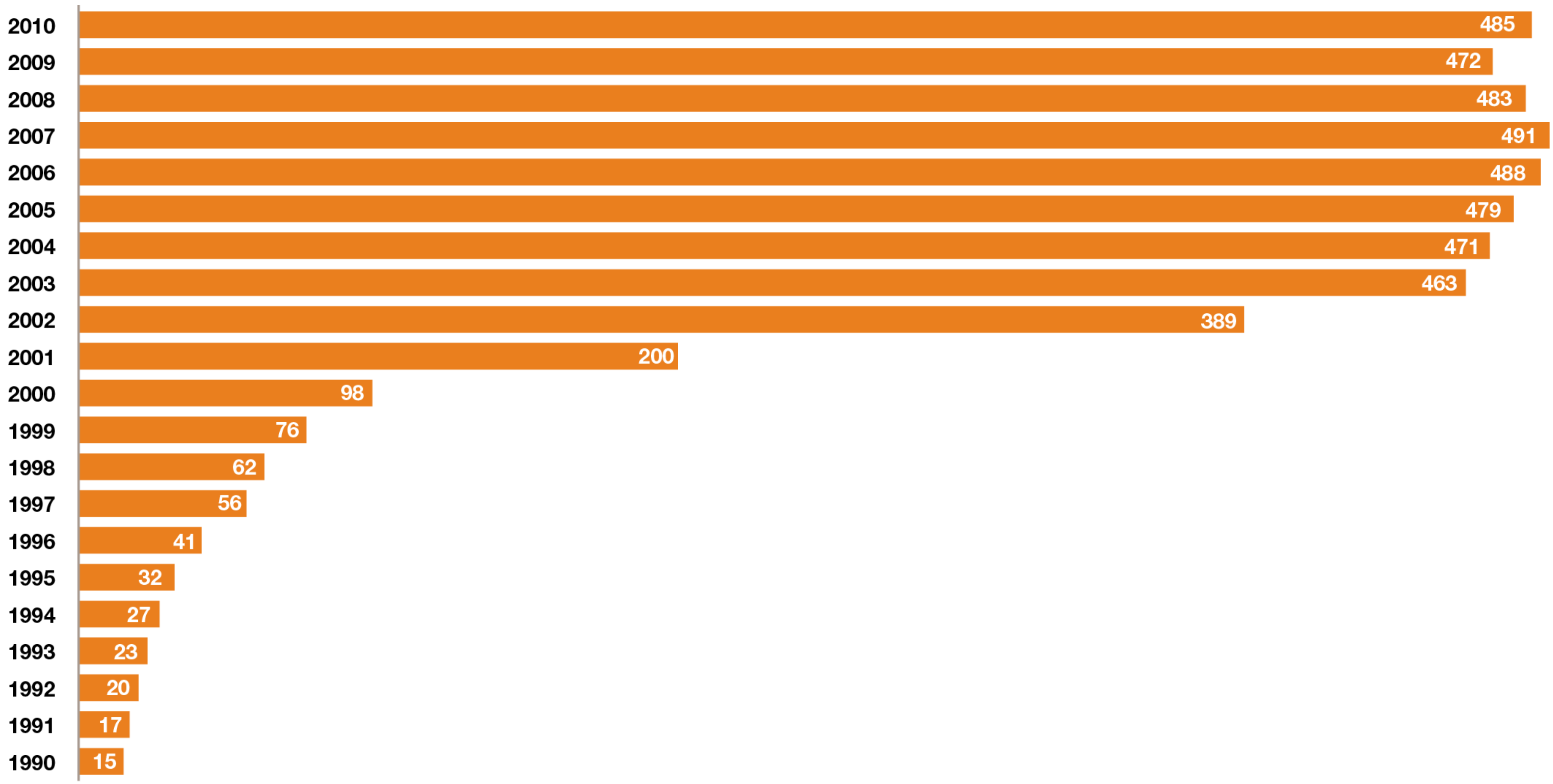
Source: CCID, CSIA, GDQ, PwC 2009-2011

China's IC design industry revenue and growth, 2000-2010



Source: CCID, CSIA

Number of IC design enterprises in China, 1990-2010

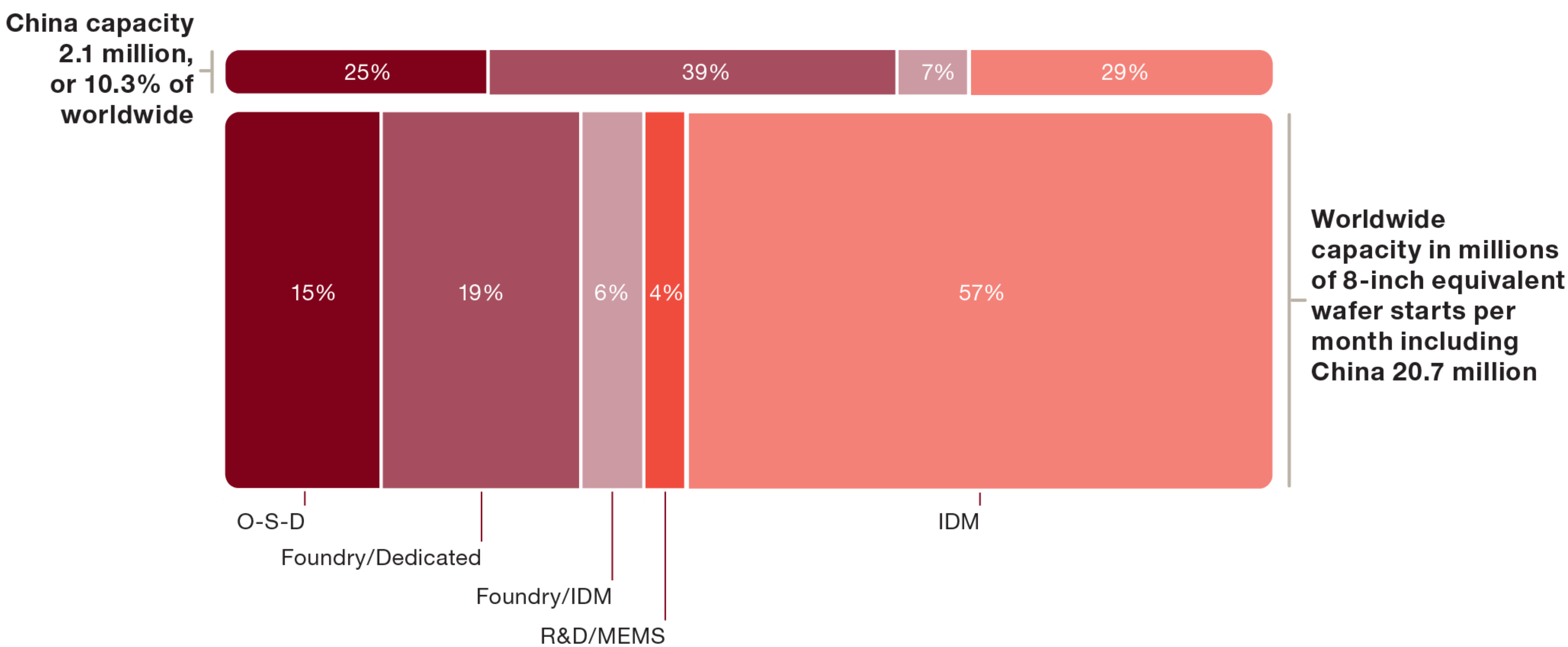


Source: CCID

Major Chinese semiconductor companies by revenue, 2010

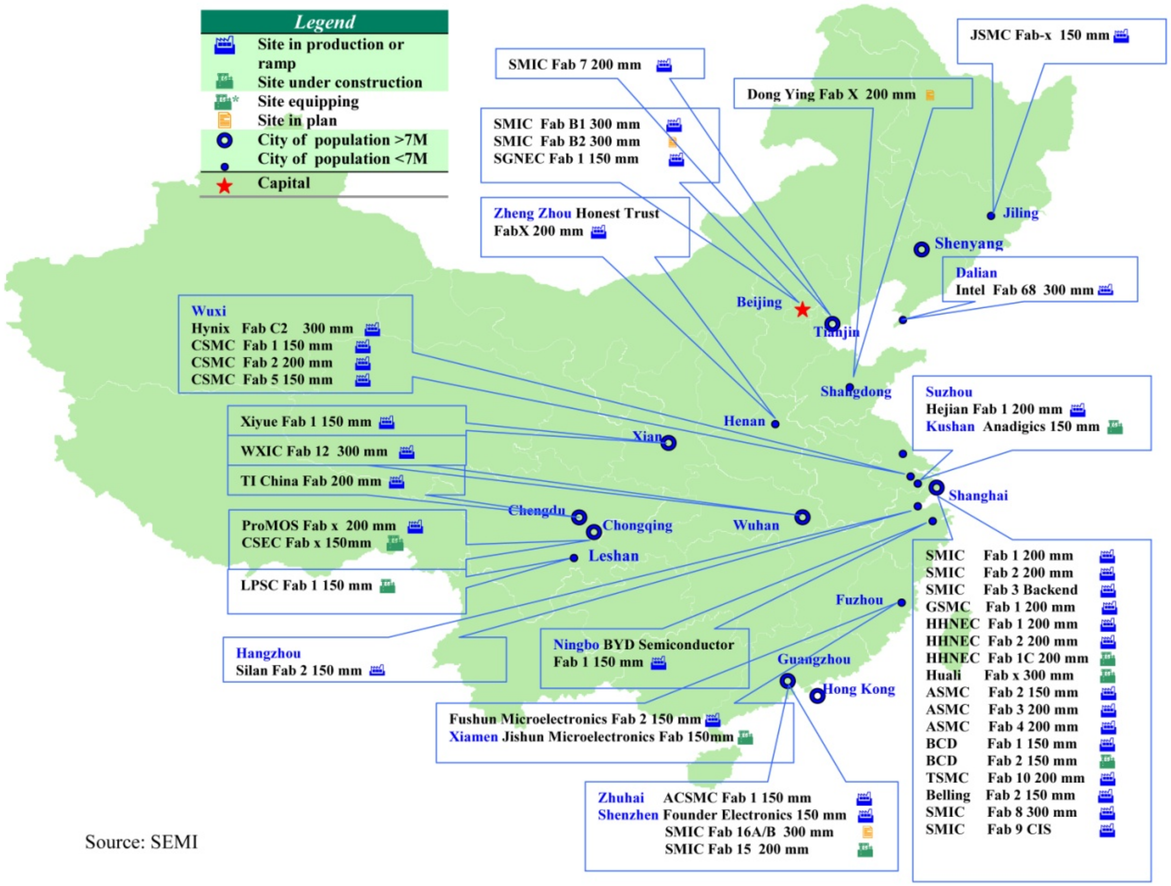
Name of company	Rank 2009	Rank 2010	Sales revenue (RMB:100M) 2009	Sales revenue (RMB:100M) 2010	Sales revenue (RMB:100M) Change	Sector	Sales revenue (US$M) 2009	Sales revenue (US$M) 2010	Sales revenue (US$M) Change
HiSilicon Technologies Co., Ltd.	1	1	39.11	44.16	12.9%	D F	572	652	14.0%
Spreadtrum Communications Inc.	7	2	7.18	25.00	248.3%	D F	105	369	251.5%
TianjIn ZhongHuan Semiconductor Co., Ltd.	10	3	5.89	15.02	155.0%	D C	86	222	157.4%
RDA Microelectronics, Inc.	6	4	8.09	12.81	58.4%	D F	118	189	59.9%
Wuxi China Resouces Huajian Microelectronics Co., Ltd.	5	5	8.30	11.39	37.2%	I D C	121	168	38.5%
Jilin Sino Microelectronics Co., Ltd.	2	6	10.88	11.00	1.1%	D C	159	163	2.1%
Hangzhou Silan Microelectronics Co., Ltd.	11	7	5.88	10.03	70.5%	D F	86	123	42.9%
Shenzhen ZTE Microelectronics Technology Co., Ltd.	3	8	9.88	10.00	1.2%	D F	145	148	2.2%
GalaxyCore Inc.		9	4.25	8.40	97.6%	D F	62	124	99.4%
Suzhou Good-Ark Electronics Co., Ltd.	13	10	5.55	8.33	50.0%	D C	81	123	51.4%

Current wafer fab capacity comparison, China and worldwide



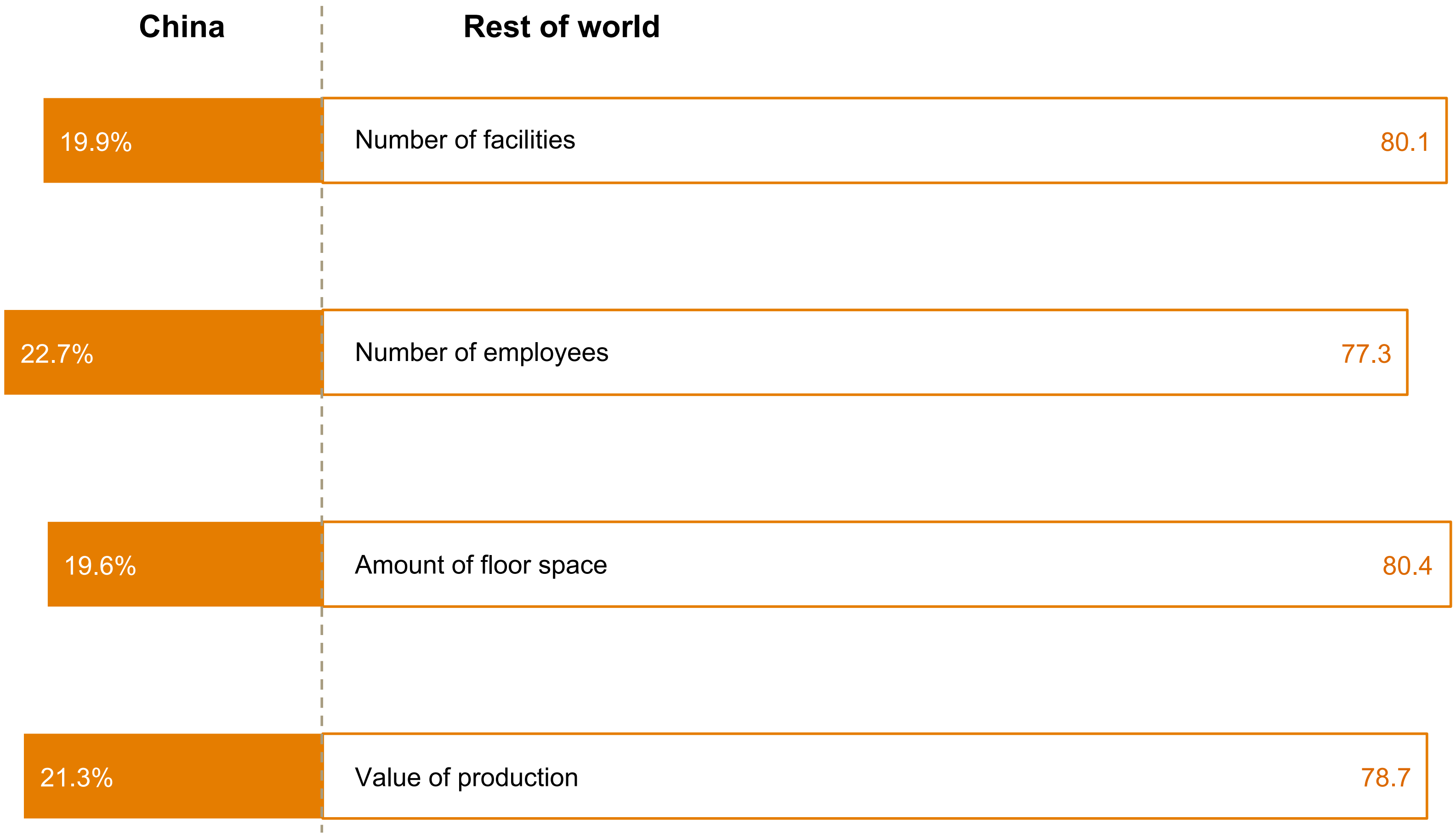
Source: SEMI Wafer Fab Watch May 2011

Semiconductor Wafer Fab & Foundry Plants in China



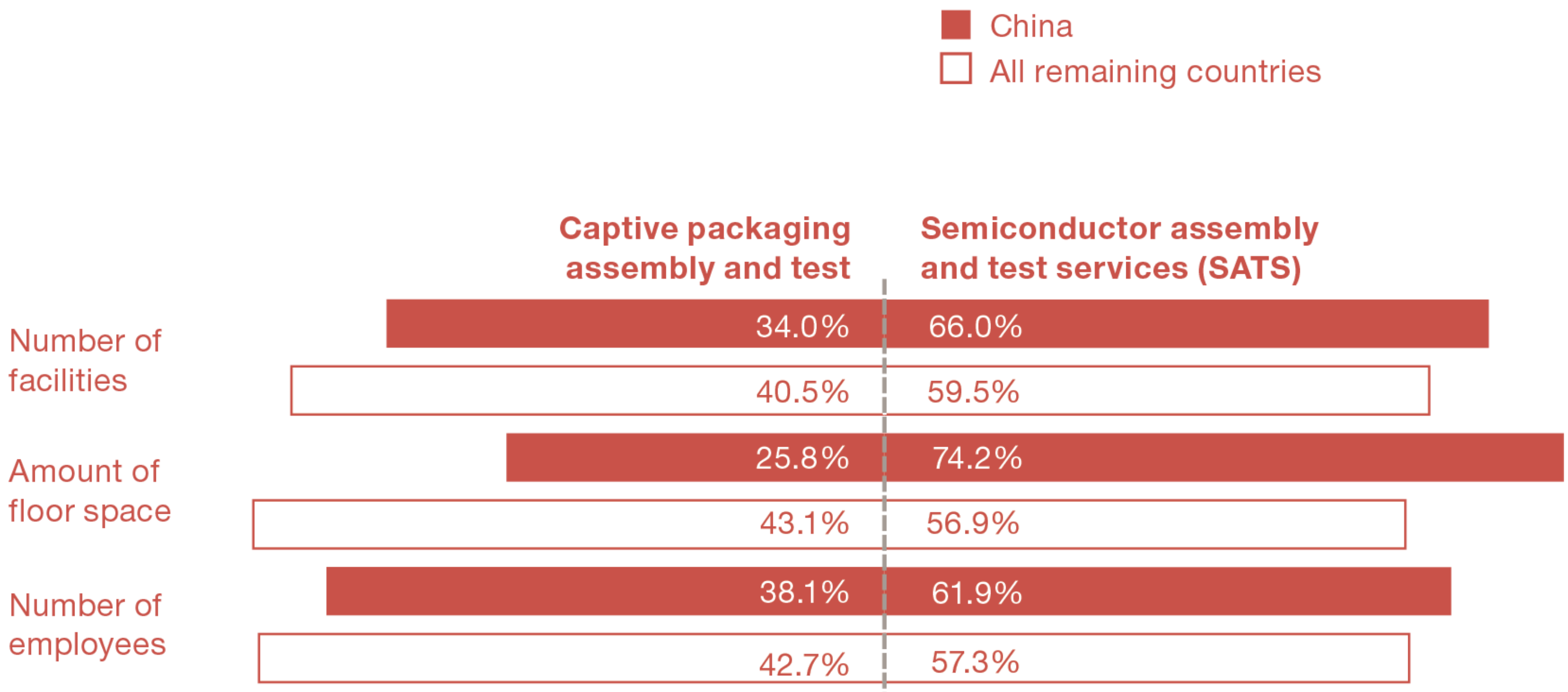
Source: SEMI

Comparison of China and all remaining countries' SPA&T resources, 2010



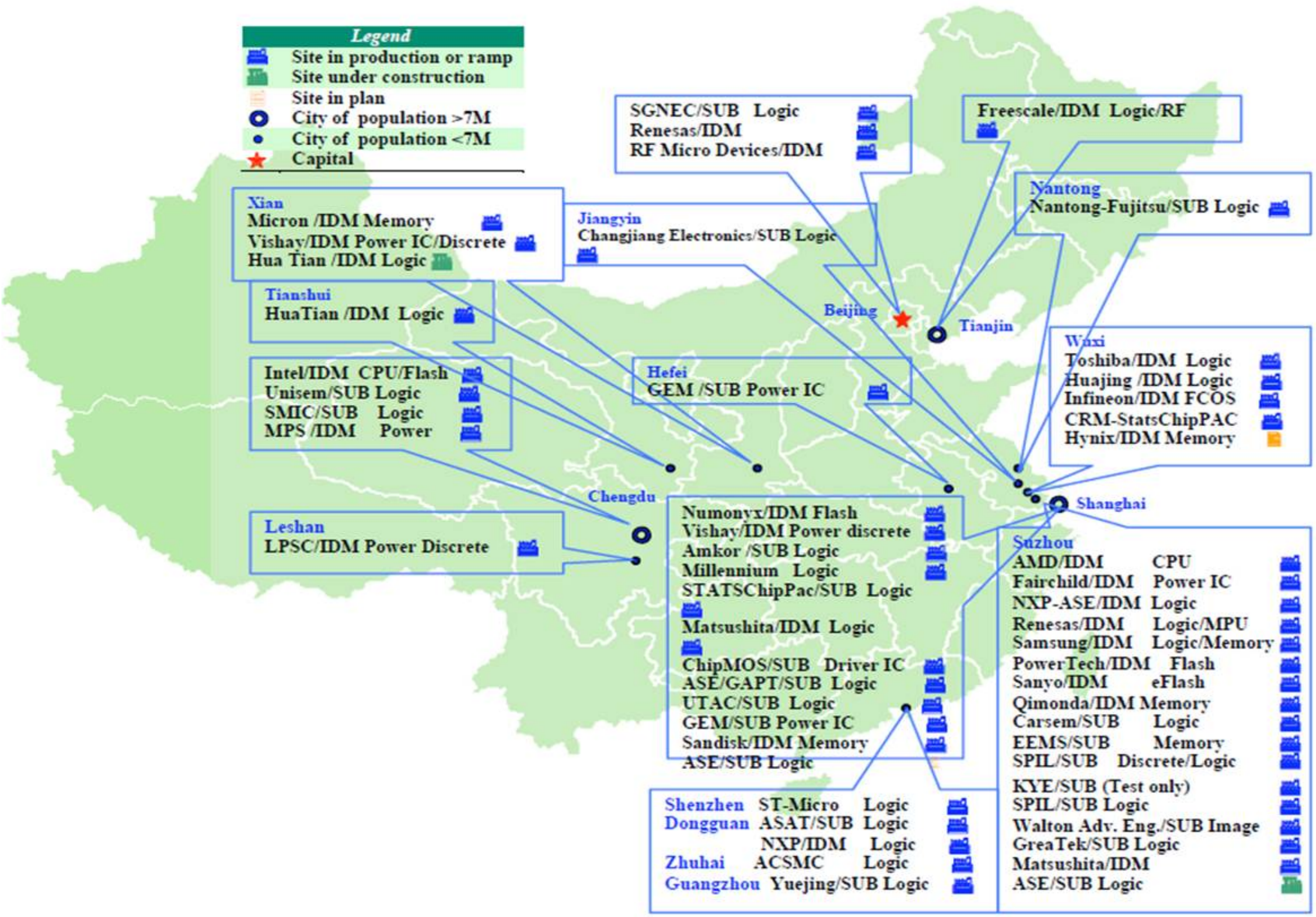
Source: Gartner Dataquest 2010

Comparison of China and all remaining countries' SATS share of SPA&T capacity, 2010



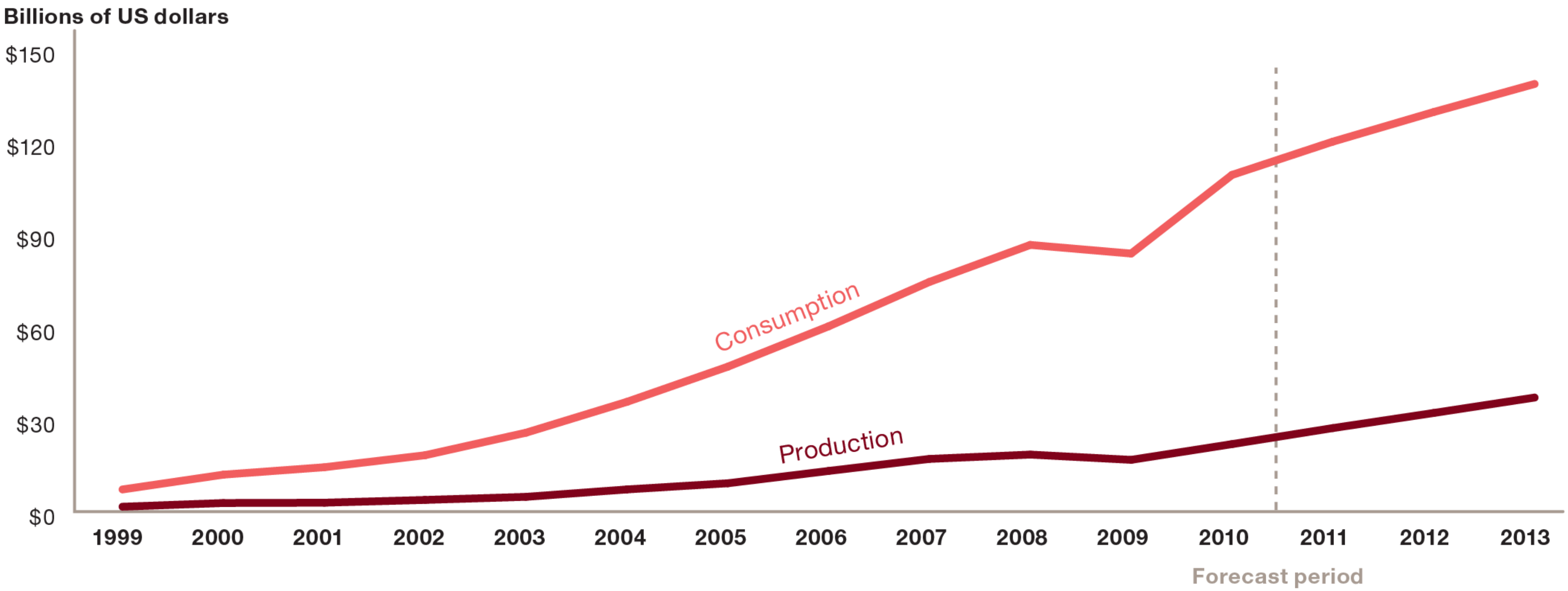
Source: Gartner Dataquest 2009

Semiconductor Packaging and Testing Plants in China



Source: SEMI China Semiconductor Packaging Market Outlook

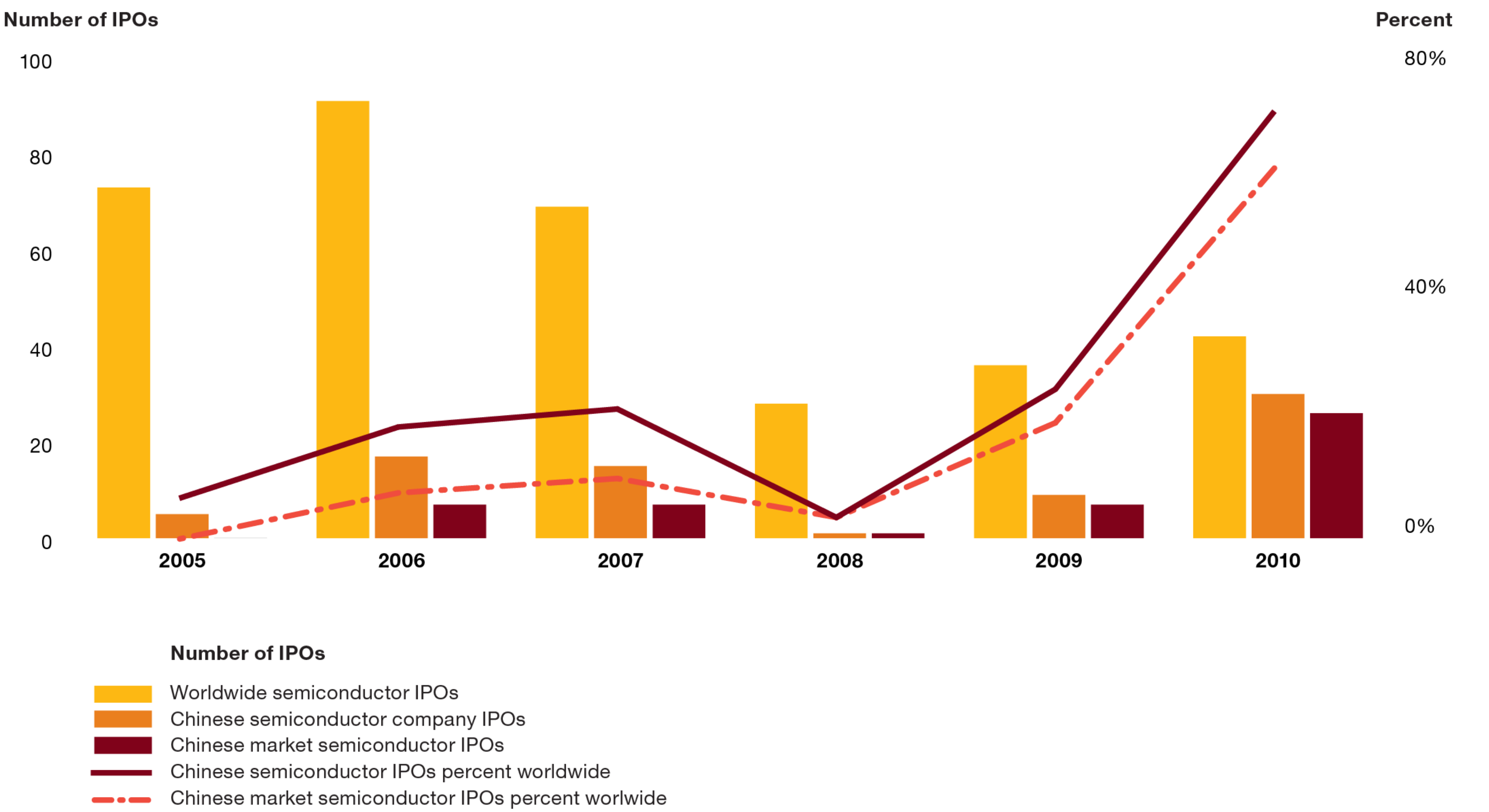
Comparison of China's IC consumption and production: 1999-2013



Actual annual average FX rates used for 1999–2010, & 2010 average FX rate used for forecast 2011–2013

Source: CCID, CISA, PwC 2004–2011

China versus worldwide semiconductor IPOs, 2005-2010



Source: Thomson Reuters 2010

Thank you.

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PwC's report "China's impact on the semiconductor industry 2011 update"

can be downloaded at

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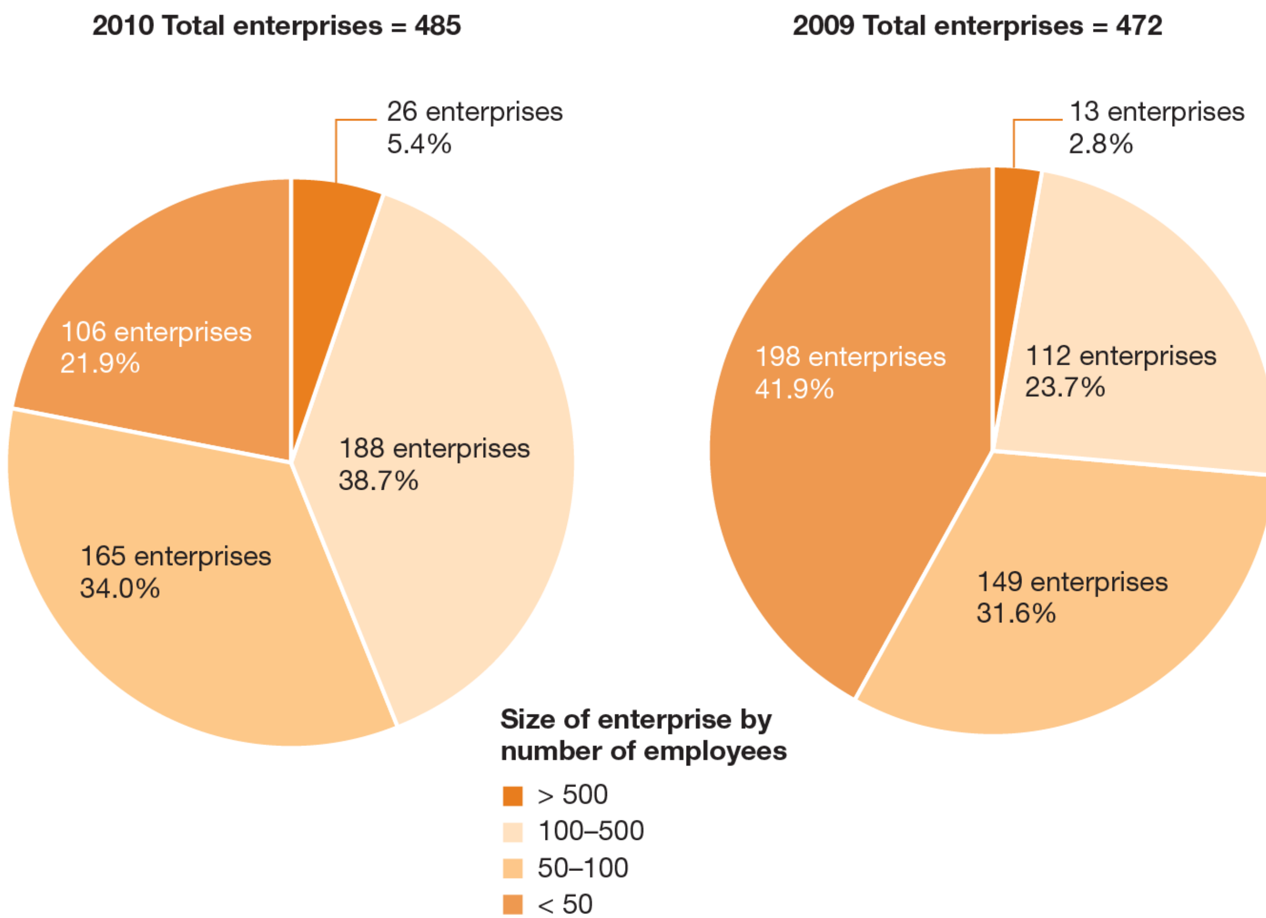
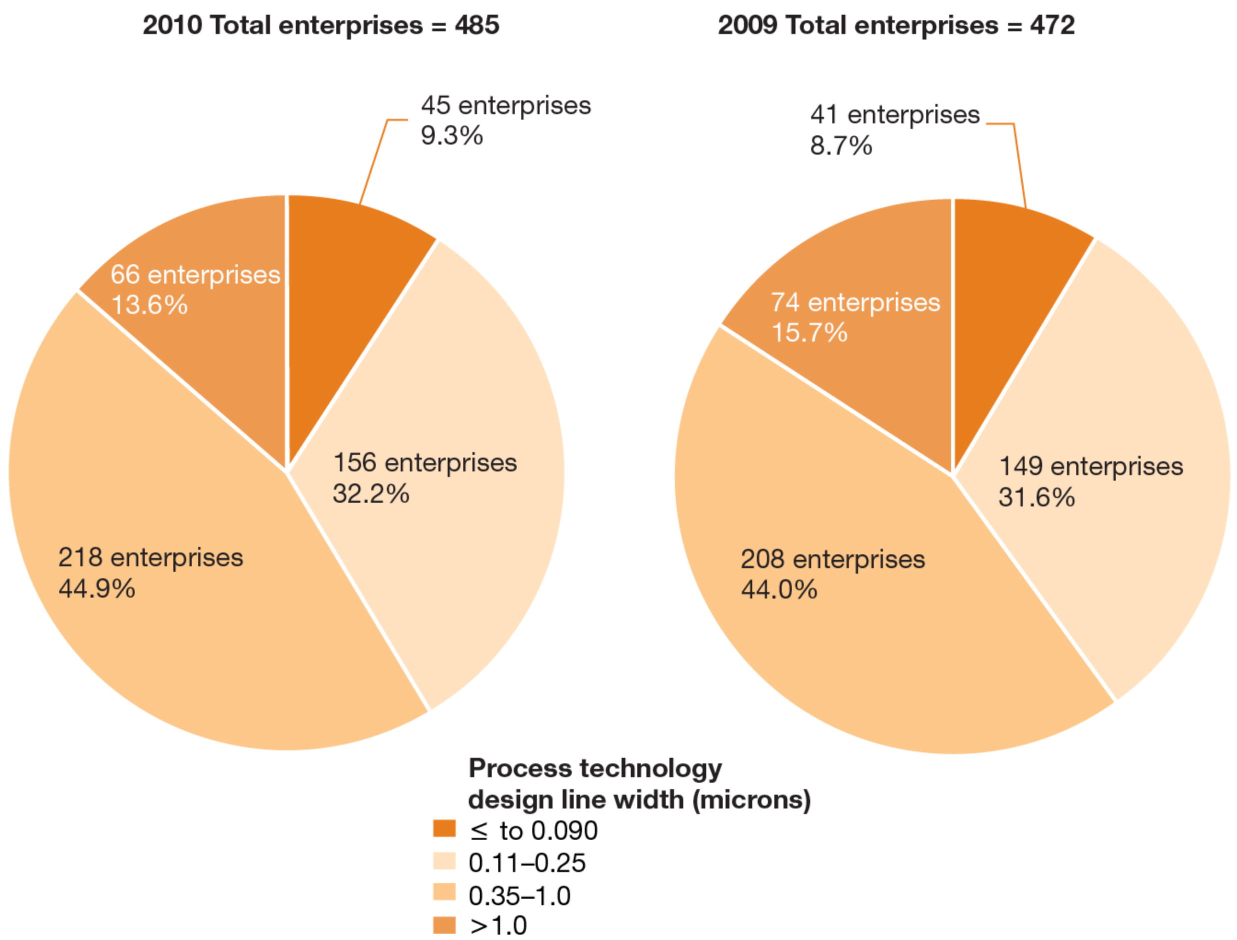
Addendum – Backup Slides

China's IC design enterprises by employee count, 2010 & 2009



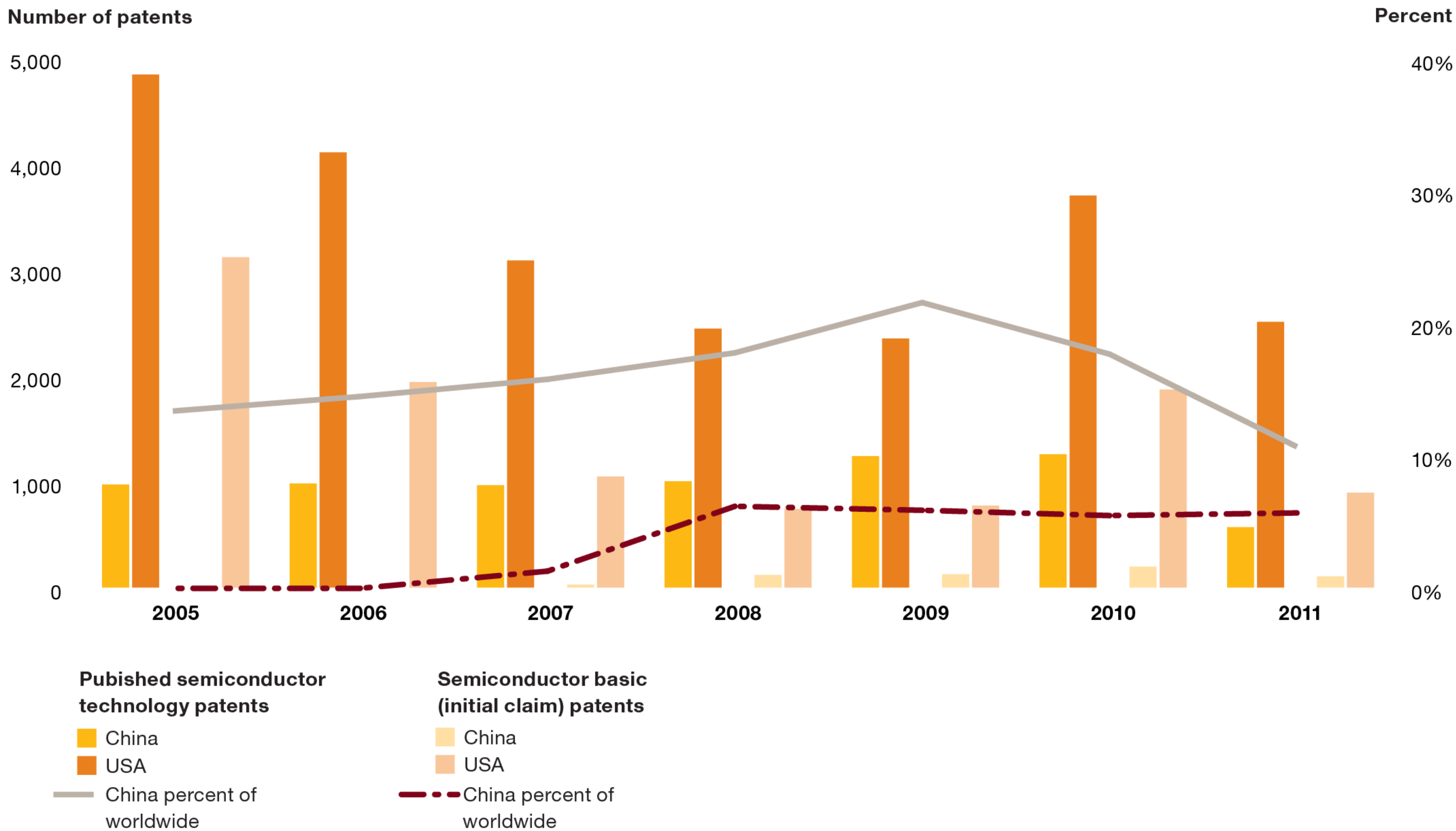
Source: CCID

China's IC design industry by process technology, 2010 & 2009



Source: CCID

China versus worldwide semiconductor patents, 2005-2010



Source: Derwent 2011

China versus worldwide semiconductor IPOs, 2005-2010

	2005	2006	2007	2008	2009	2010	1Q/11	2Q/11	Total 6 yrs 2005–10
Worldwide semiconductor IPOs									
Number of IPOs	73	91	69	28	36	42	3	3	339
Proceeds (US$ millions)	3,006.0	3,663.8	3,727.1	678.2	1,693.6	6,202.6	278.5	995.0	18971.3
Chinese semiconductor company IPOs									
Number of IPOs	5	17	15	1	9	30	1	1	77
% of worldwide	6.8%	18.7%	21.7%	3.6%	25.0%	71.4%	33.3%	33.3%	22.7%
Proceeds (US$ millions)	407.9	743.6	1,109.5	37.4	1,308.9	4,493.5	63.0	135.0	8100.9
% of worldwide	13.6%	20.3%	29.8%	5.5%	77.3%	72.4%	22.6%	13.6%	42.7%
Chinese market semiconductor IPOs									
Number of IPOs	0	7	7	1	7	26	0	1	48
% of worldwide	0.0%	7.7%	10.1%	3.6%	19.4%	61.9%	0.0%	33.3%	14.2%
Proceeds (US$ millions)	0.0	285.5	351.6	37.4	1,270.7	4,062.5	0.0	135.0	6007.7
% of worldwide	0.0%	7.8%	9.4%	5.5%	75.0%	65.5%	0.0%	13.6%	31.7%

Chinese semiconductor company = domiciled in China

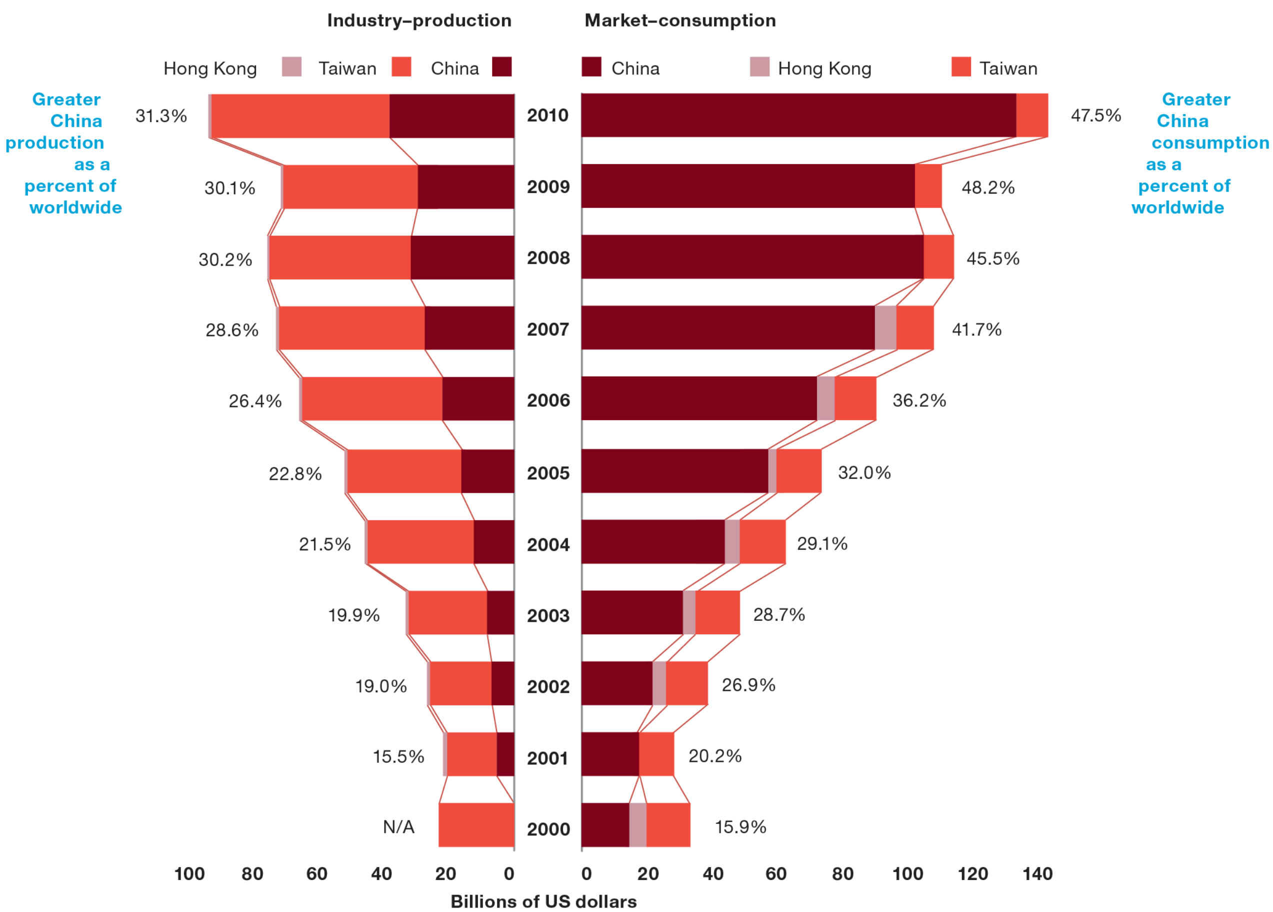
Source: Thomson Reuters 2010–2011

China's contribution to worldwide semiconductor value chain revenue, 2010

	Worldwide	China		
	Revenue	Sales	Consumption	China's role
Electronic Design Automation	4.2	N/A	0.31	Software user, not EDA producer
Semiconductor Intellectual Property	1.5	N/A	0.12	Licensees by IC design & foundries; not licensor
Equipment	39.5	0.10*	3.63	First-tier & wafer-fab buyer; used equipment favored; solar & second or third-tier producer
Materials	43.6	0.43*	4.15	First-tier buyer, solar and second or third tier producer
IDMs	224.7	18.9	99.6	Plant location for MNC IDMs' SPA&T & 3 fabs; local source of OSD and smaller IC IDMs
Fabless	73.6	5.4	32.4	Small but continually growing local capabilities
Foundries	30.2	3.2	13.4	Substantial; 21% worldwide foundry capacity by 2013
SATS	23.6	9.1	10.4	Substantial: about 25% worldwide SATS capacity
Totals	**440.9**	**36.6**	**164.01**	

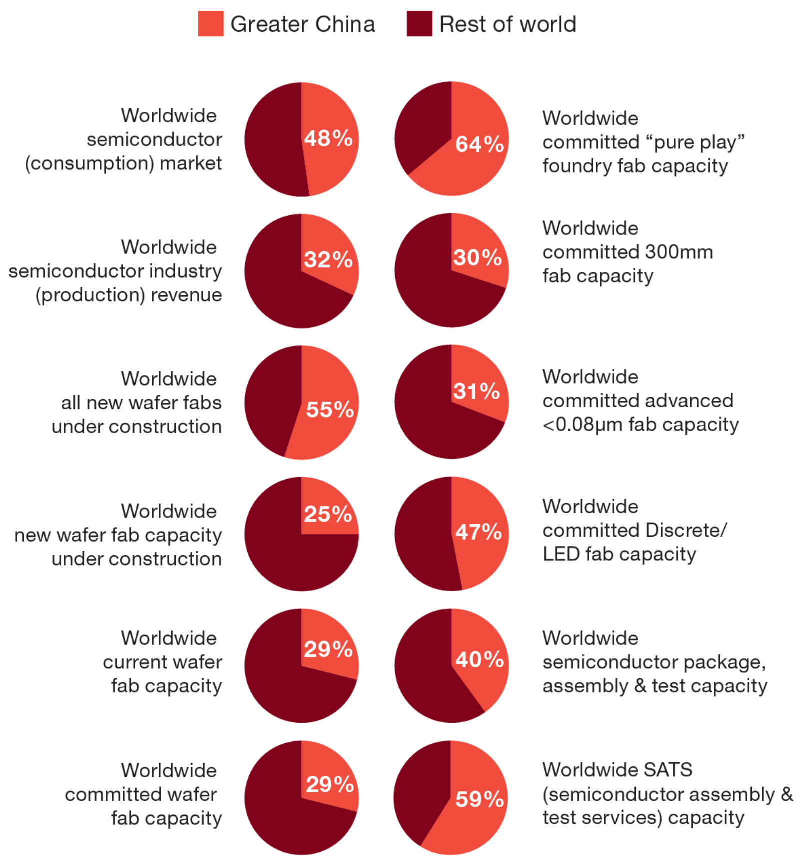
** Chinese domestic equipment and materials companies only, without local subsidiaries of foreign companies.*
Source: CSIA, EDAC, Gartner Dataquest, GSA, SEMI, PwC

Greater China share of the worldwide semiconductor industry, 2000-2010



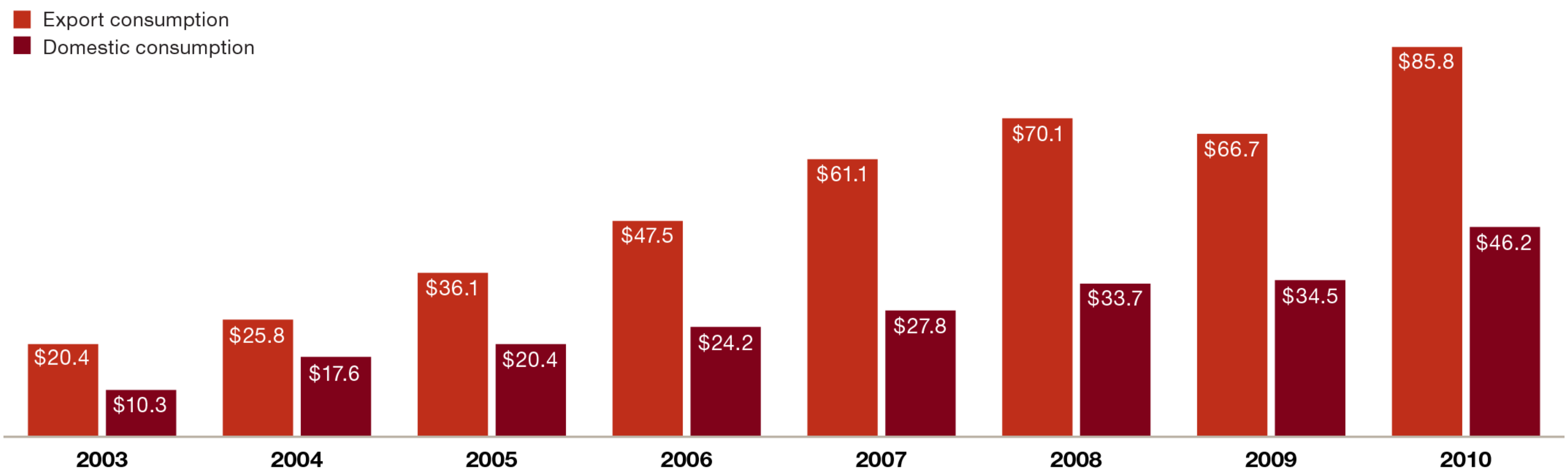
Source: CCID, Gartner Dataquest, ICI, TSIA, WSTS, PwC 2004–2011

Greater China represents, by 2010



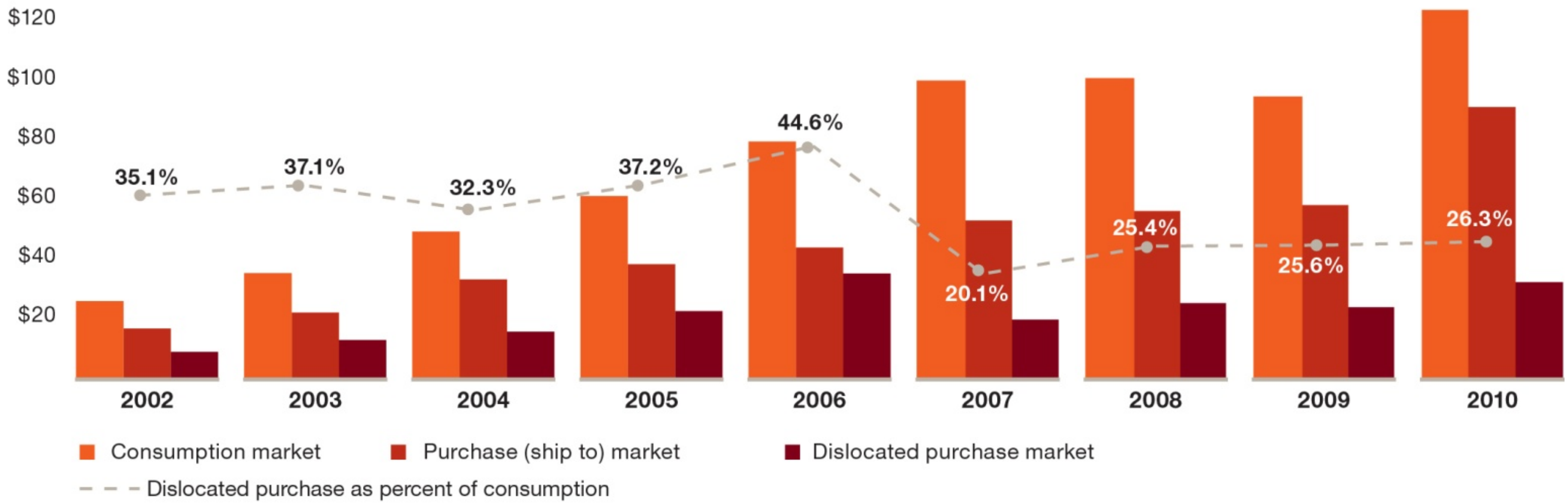
Source: CCID, Gartner Dataquest, ICI, SEMI World Fab Watch, TSIA, WSTS, PwC 2009

China's export and domestic semiconductor consumption markets



Source: Gartner Dataquest, PricewaterhouseCoopers 2009-2011

Analysis of China/Hong Kong consumption vs. purchase (sales to) semiconductor market history



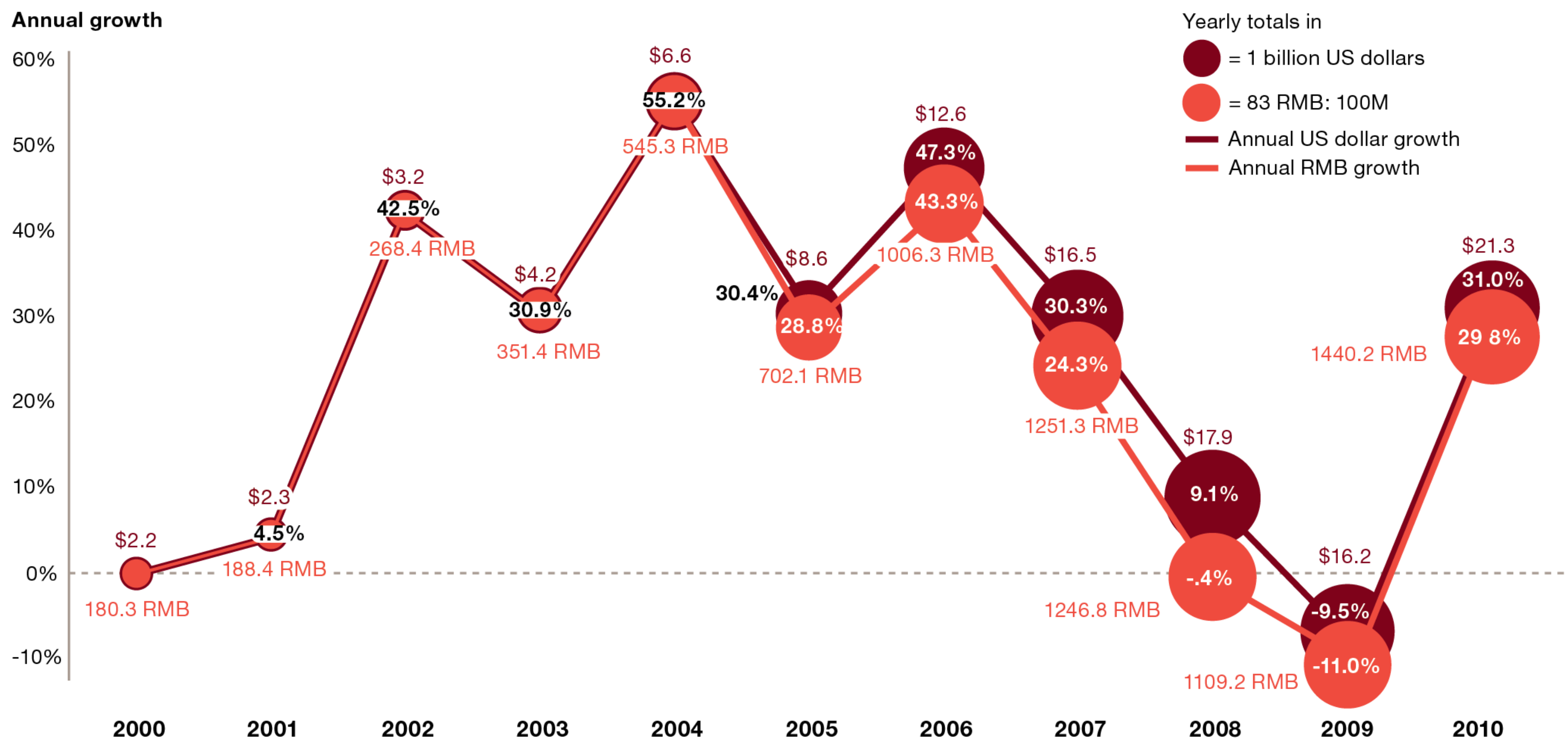
Source: Consumption market is based upon Gartner Dataquest Semiconductor Forecast Database. Purchase (ship to) market is based upon Gartner Dataquest Market Share Database through 2006. From 2007 Purchase TAM is based upon Gartner Dataquest Market Share OEM, IDM, and EMS Semiconductor Demand Worldwide, 2010: Database

Chinese top OEMs by revenue and semiconductor consumption 2009-2010 (US$B)

	Rank		Revenue			Semiconductor consumption (Design TAM)			Purchase TAM		
Name of company	**2009**	**2010**	**2009**	**2010**	**Change %**	**2009**	**2010**	**Change %**	**2009**	**2010**	**Change %**
Huawei	1	1	21.8	27.5	26.0%	2.3	3.4	49.0%	2.3	3.4	48.7%
Lenovo	3	2	16.6	21.6	30.1%	3.7	6.1	64.0%	2.8	4.6	67.4%
Haier	2	3	18.2	20.2	10.8%	0.3	0.4	41.2%	0.3	0.4	37.3%
Great Wall Technology	9	4	5.4	15.6	187.4%	0.1	0.2	25.6%	0.1	0.1	42.0%
ZTE	4	5	8.8	10.4	18.4%	1.5	2.1	41.0%	1.5	2.1	41.1%
Hisense	5	6	8.2	8.3	1.6%	0.3	0.3	-0.4%	0.3	0.3	-4.3%
Changhong	10	7	4.6	8.1	76.9%	0.2	0.2	9.3%	0.2	0.3	43.5%
Founder	7	8	6.4	7.8	22.3%	0.4	0.4	-6.1%	0.3	0.3	-9.7%
TCL	6	9	6.5	7.7	19.0%	0.6	0.8	52.3%	0.8	1.1	44.6%
BYD	8	10	5.8	6.9	20.1%	0.3	0.4	41.0%	0.3	0.3	3.0%
Total			**102.4**	**134.3**	**31.2%**	**9.5**	**14.2**	**48.7%**	**8.7**	**12.9**	**47.0%**
% Semi penetration						**9.3%**	**10.6%**				
Midea			6.9	11.1	60.7%						
Gree			6.2	9.0	45.8%						
Skyworth			2.9	3.1	6.2%	0.3	0.2			0.3	
Konka Group			1.9	2.5	31.1%	0.2	0.2			0.2	

Source: MIIT, Thomson Reuters, Gartner Dataquest 2009–2011

China's IC industry revenue and growth, 2000-2010



Source: CCID, CSIA

Selected recommendations

- Understand and leverage China's 12th FYP.
- Identify and engage in all opportunities to team with Chinese government agencies.
- Reassess company presence.
- Design for the local marketplace.
- Adapt to China's unique standards.
- Explore acquisition or partnering opportunities.
- Take advantage of China's emergence as a source of financial funding for semiconductor start-ups.
- Take advantage of China's National Major Science and Technology Project 02.
- Move mature products to China.
- Re-brand for mature markets.
- Keep an eye on local competition.

Selected recommendations (continued)

- Preempt O-S-D competition.
- Adapt to China's "dislocated" buying structure.
- Use Chinese foundries to gain pricing leverage while assuring future capacity.
- Adapt to the Corporate Income Tax and other business laws.
- Invest in effective human relations.
- Promote participation in global and local industry.