

Company

8 July 2010 | 72 pages

Taiwan Semiconductor Back-end

Initiating Coverage: All About Costs; PTI Top Pick

- Initiate coverage of Taiwan semi back-end sector** — We initiate on ASE and PTI as Buys with targets of NT\$34 and NT\$130, respectively, amid attractive valuations below 8-year mean P/B. PTI is our top back-end pick on its strong earnings growth. We initiate on SPIL and Chipbond as Holds; we note continuing margin headwinds for SPIL and expect its valuation premium over ASE to erode sharply, while most positives for Chipbond look to have been priced in with the shares trading at the high end of their historical P/B range.
- Cost-cutting initiatives change competitive landscape** — OSAT names are working to minimize the impact from high gold prices by either reducing gold consumption or eliminating gold usage entirely. ASE is the leader in wire bonding based cost-cutting initiatives, e.g. copper wire bonding, aQFN, high-density packaging, and wafer level fan-outs. SPIL is following, but we believe SPIL will struggle to catch up, and we think the market is underestimating the difficulties SPIL faces when migrating to copper and other lower-cost solutions.
- PTI continues to decouple from DRAM cyclical** — PTI has been outperforming the Taiwan DRAM sector due to its 1) stable revenue and earnings contribution from key customers, 2) Kingston's flexible business model working as a good fab filler to PTI during the downturn, and 3) high asset turnover, less capital intensity and lean OpEx. The company has displayed stronger cash flow generation and profitability vs. Taiwan's loss-making DRAM companies. Leveraging its tight utilization and lean cost structure, PTI should benefit from the severe DRAM supply shortage we forecast in 3Q10.
- Gold bumpers gain back pricing power** — After its consolidation with IST, Chipbond has regained pricing power; in addition to passing all gold price hikes on to customers, it successfully raised prices in 2Q10. While driver IC makers won't let Chipbond be the single source in Taiwan, favorable pricing should keep ChipMOS – the No.2 supplier – viable, but with lean margins. Chipbond's shares have outperformed peers YTD on the structural changes in the industry, but see think the positives are priced in, leaving valuations stretched.

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Ticker	Rating		Target Price		Current Year Earnings Estimates		Next Year Earnings Estimates	
	Old	New	Old	New	Old	New	Old	New
2311.TW	NA	1M	NA	NT\$34.00	NA	NT\$3.31	NA	NT\$3.61
2325.TW	NA	2L	NA	NT\$37.00	NA	NT\$2.53	NA	NT\$2.82
6147.TWO	NA	2L	NA	NT\$50.00	NA	NT\$5.14	NA	NT\$5.26
6239.TW	NA	1L	NA	NT\$130.00	NA	NT\$10.77	NA	NT\$11.99

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

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Executive Summary

Initiating coverage

We initiate on the Taiwan semiconductor back-end sector, also known as the outsourced semiconductor assembly and testing (OSAT) sector, with coverage of **Advanced Semiconductor Engineering (ASE)**, **Siliconware Precision Industries (SPIL)**, **Powertech Technology (PTI)** and **Chipbond Technology**. We assign Buy ratings to ASE and PTI, and Hold ratings to SPIL and Chipbond. PTI is our top pick in the back-end sector on its attractive earnings growth outlook.

From a semiconductor industry top-down perspective, we prefer the foundry segment over the back-end because of back-end's deteriorating ROIC from new technology adoptions.

Cost-cutting initiatives drive the changes

Unlike most of time during the past decade, OSAT companies nowadays not only have to focus on improving operation efficiency and profitability, but also have to stay on top of new technology developments. The rising pricing pressure from end-components and skyrocketing gold price are significantly changing the industry's competitive landscape. Companies in general are focusing more on cost-cutting initiatives in order to squeeze more profit from the deteriorating cost structure. Replacing gold with copper in wire bonding is the most significant approach used by price-sensitive fabless and IDM companies, while other technologies such as aQFN, fan-out and high density packaging to achieve further cost reductions are also seeing broader use.

Early movers are gaining momentum

ASE is the leading OSAT company using copper wire bonding technology. The company has gained momentum since 2009 by rebating partial cost savings from copper replacement to customers. By doing so, ASE has gained market share and has forced competitors to follow its pricing strategy. Meanwhile, we believe competitor Amkor is leading peers in wafer level package as well as flip-chip based package, which totally eliminate the use of gold wires. Both ASE and Amkor outperformed peers in terms of both earnings and share price from 2009 due to their leadership in new technologies.

Revenue growth and ROIC constrained by copper wire bonding

As most of the OSAT companies are sharing the material cost savings from copper adoption with customers, the average selling price of copper wire bonding is 10-15% lower than gold wire bonding, which implies lower revenue growth for the industry in general. At the same time, migration to copper wire bonding takes higher invested capital due to the lower productivity of copper wire bonders. In sum, OSAT companies are making less ROIC on copper than gold. While most OSAT companies claim they would be able to maintain an equal or better bottom line from the copper migration, we believe ASP contraction and lower revenue growth are inevitable, and therefore see copper adoption as a long-term negative for the OSAT industry. Only the first mover can benefit from pushing copper with market share gains. Followers would lose the edge on the lower ROIC if they fail to grab new share. As such, our investment philosophy for the OSAT sector is to focus on the leaders who are gaining share.

Investment strategy: ASE should continue outperform SPIL

We prefer ASE to SPIL on its technology leadership in low-cost solutions. We believe that the market has discounted ASE's valuation due to its less transparent financial status, ambiguous investment strategies, higher gearing and smaller cash dividend yield. However, we believe that ASE's endeavors in technology development are paying off. ASE is expanding market share and should be able to sustain decent margins over time, in our view. SPIL, on the other hand, is facing continuous pricing pressure from customers and competitors. We believe that SPIL's valuation premium to ASE is unsustainable (1.7x vs 1.5x 2010E BVPS), and P/E of 14.2x FY10E, a huge premium to ASE (7.9x), PTI (8.6x) and Chipbond (8.9x). We believe the market's high expectations that SPIL will play catch-up are not likely to materialize in 2010, and the favorable valuation on SPIL is not sustainable in the face of continuous pricing and margin pressure. However, significant downside is less likely with the support of 7% cash dividend yield.

Memory back-end performance continues to decouple from chip makers

PTI has been able to deliver stable gross margins and strong earning growth in the past decade, even as the overall memory industry experienced volatile up and down cycles – some companies were even out of the market during the cyclical downturn. PTI's stronger growth was driven by: 1) stable revenue and earning contribution from key customers (and key investors as well); 2) Kingston's flexible business model to work as a good fab filler to PTI during the downturn; 3) high asset turnover, less capital intensity (compared to DRAM makers) and lean OpEx levels. We have Buy rating on PTI, which is our top pick in the back-end sector. We believe PTI should benefit from the severe DRAM supply shortage we forecast in 3Q10. One minor mitigating factor is PTI's aggressiveness in logic back-end, which we see as a slight negative due to severe pricing pressure in the logic back-end segment and PTI's lack of economic scale in the area.

Consolidation in LCD driver IC back-end brings back pricing power

Chipbond is the key beneficiary of industry consolidation and pricing power strengthening. The company is now the No.1 bumping and COF/COG LCD driver IC back-end company worldwide. The increasing pricing power helps to keep the second-biggest supplier viable in the market. The stable pricing should serve as an earnings growth driver for Chipbond because of its lean cost structure and economies of scale. Chipbond's share price has outperformed sector peers YTD, reflecting the beneficial structural changes in the industry. However, we believe these positives are all priced in, leaving valuations stretched.

Attractive valuation for ASE and PTI

Semiconductor back-end stocks are trading at lower valuations relative to semi peers. Despite improving business fundamentals, ASE and PTI are still trading below their 8-year mean forward P/B. Except for Chipbond's share price boost from industry consolidation, ASE, SPIL and PTI have been underperforming YTD. We believe the share price weakness is due to concerns about deteriorating ROIC and seasonality peaking out in 2Q10 – which are not justifiable in our view. We like ASE and PTI based on their solid business momentum and attractive valuations, while we suggest avoiding SPIL on its deteriorating business fundamentals and stretched valuations, and Chipbond on its demanding valuations.

Valuation: Back-end Trading at Discounted Valuation to Semi Peers

Attractive valuations for ASE and PTI

Figure 1. YTD Share Price Performance

	YTD	YTD relative to market
ASE	-10%	-2%
SPIL	-17%	-9%
PTI	-14%	-6%
Chipbond	54%	62%

Source: Citi Investment Research and Analysis.
*Year to 2010/7/7

Semiconductor back-end stocks are trading at lower valuations relative to semi peers. Back-end's average 2010E P/E of 9.0x is lower than foundry's 14.1x, and IDM's 12.8x; the average 2010E P/B of 1.9x is also lower than IDM's 2.8x and fabless' 2.4x. ASE and PTI are even trading below their 8-year mean forward P/B.

Except for Chipbond's share price boost from industry consolidation, ASE, SPIL and PTI have been underperforming YTD. We believe the share price weakness is due to concerns on deteriorating ROIC and seasonality peaking out in 2Q10 – which are not justifiable in our view.

We like ASE and PTI based on their solid business momentum and attractive valuations. We suggest avoiding SPIL on its deteriorating business fundamentals and stretched valuations, and Chipbond on its demanding valuations.

Figure 2. Valuation Comparison: Global Semiconductor Companies

Ticker	Company	Rating	Price 7/7/2010	TP	Upside %	Mkt Cap (US\$m)	P/E			P/B			ROE (%)			Div. Yield(%)	
							2009	2010E	2011E	2009	2010E	2011E	2009	2010E	2011E	2009	2010E
2303.TW	UMC	1L TWD	14.7	16	9%	5,925	48.1	9.2	9.2	0.9	0.8	0.8	1.9	9.2	9.0	3.3	7.7
2330.TW	TSMC	1L TWD	59.5	80	34%	47,835	17.3	10.5	9.5	3.1	2.7	2.5	18.2	27.5	27.1	5.0	6.7
5347.TWO	Vanguard	2L TWD	13.5	14.6	8%	703	254.5	22.5	15.8	1.1	1.1	1.0	0.4	4.9	6.6	3.0	3.7
Foundry average							106.6	14.1	11.5	1.7	1.5	1.4	6.9	13.9	14.2	3.8	6.0
2311.TW	ASE	1M TWD	26.1	34	30%	4,446	20.0	7.9	7.2	1.9	1.5	1.3	9.4	19.2	18.5	1.5	5.0
2325.TW	SPIL	2L TWD	35.9	37	3%	3,472	12.7	14.2	12.7	1.8	1.8	1.7	13.9	12.6	13.5	7.2	5.6
6239.TW	PTI	1L TWD	93.0	130	40%	2,033	12.5	8.6	7.8	2.5	2.0	1.7	19.6	23.1	22.5	3.8	5.2
6147.TWO	Chipbond	2L TWD	45.8	50	9%	833	41.1	8.9	8.7	2.4	2.0	1.8	5.7	20.2	20.9	-	6.0
AMKR.US	AMKR	3S USD	5.2	7.5	45%	954	10.5	5.2	7.3	3.2	2.2	1.7	50.3	53.7	26.8	-	-
OSAT average							19.4	9.0	8.7	2.3	1.9	1.7	19.8	25.8	20.4	2.5	4.4
AMD.US	AMD	1S USD	7.0	12	70%	4,740	15.5	13.6	8.7	7.2	5.0	2.8	108.5	47.0	44.2	-	-
INTC.US	Intel	1M USD	19.5	30	54%	108,392	25.0	10.3	9.7	2.6	2.5	2.4	10.9	25.0	25.1	2.9	3.2
STM.CH	STMicro	1H USD	8.0	11	37%	7,401	(11.2)	17.0	10.5	0.8	0.8	0.8	- 13.7	6.8	8.0	1.1	1.1
TXN.US	TI	1M USD	23.1	31	34%	28,258	20.3	10.2	9.9	3.0	2.9	2.9	15.4	29.0	29.3	1.9	1.9
IDM average							12.4	12.8	9.7	3.4	2.8	2.2	30.3	27.0	26.7	1.5	1.6
BRCM.US	Broadcom	1H USD	33.5	40	19%	16,547	262.4	19.7	17.4	4.3	3.4	2.8	1.7	21.0	20.4	-	1.0
NVDA.US	nVidia	1S USD	10.1	20	97%	5,802	(112.3)	(66.2)	9.5	2.3	2.1	1.7	- 1.0	- 2.7	20.8	-	-
ONNN.US	Omnivision	2S USD	6.3	9	43%	2,711	23.0	6.4	5.7	2.6	1.8	1.4	7.3	30.0	25.8	-	-
QCOM.US	Qualcomm	1M USD	32.7	45	38%	53,558	19.3	14.5	14.3	2.6	2.4	2.1	8.3	14.0	13.2	2.0	2.2
2454.TW	Mediatek	NR TWD	448.0	NR		15,157	13.5	11.6									
Fabless average							41.2	-2.8	11.7	3.0	2.4	2.0	4.1	15.6	20.1	0.5	0.8

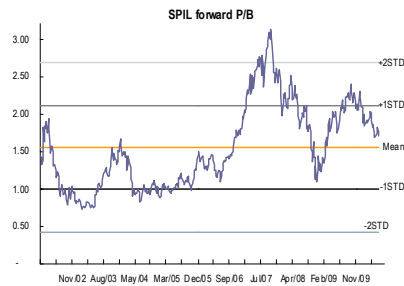
Source: Citi Investment Research and Analysis estimates; IBES consensus for MediaTek

Figure 3. ASE Forward P/B Range



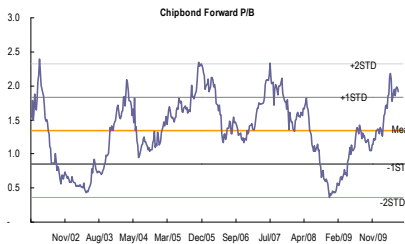
Source: Citi Investment Research and Analysis

Figure 4. SPIL Forward P/B Range



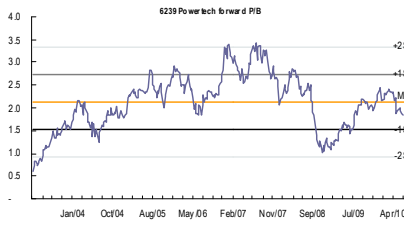
Source: Citi Investment Research and Analysis

Figure 5. Chipbond Forward P/B Range



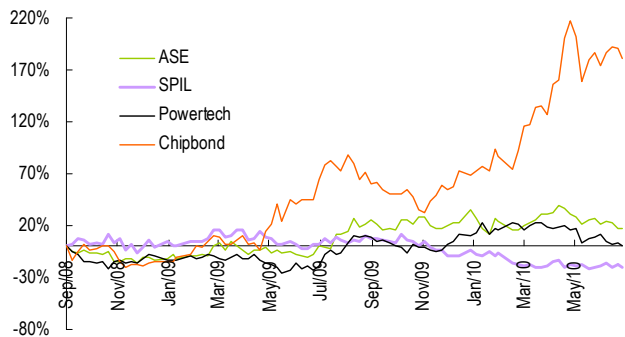
Source: Citi Investment Research and Analysis

Figure 6. PTI Forward P/B Range



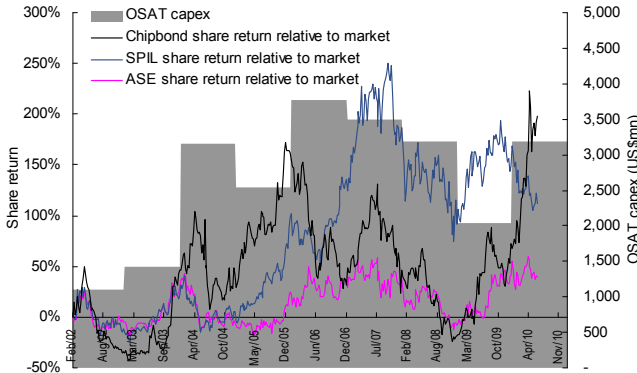
Source: Citi Investment Research and Analysis

Figure 7. OSAT Share Price Return Relative to Taixex (post crisis)



Source: Citi Investment Research and Analysis

Figure 8. OSAT Share Return vs. OSAT Industry Capex

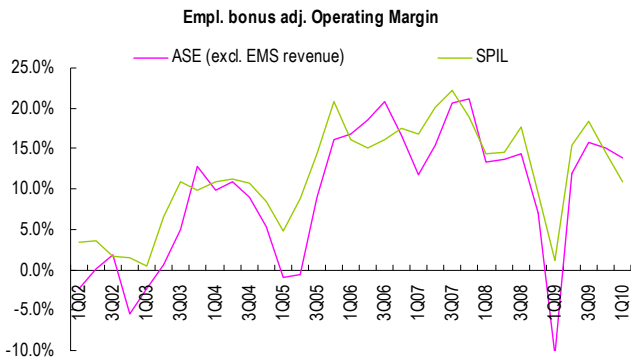


Source: Citi Investment Research and Analysis

SPIL's valuation premium to ASE should diminish

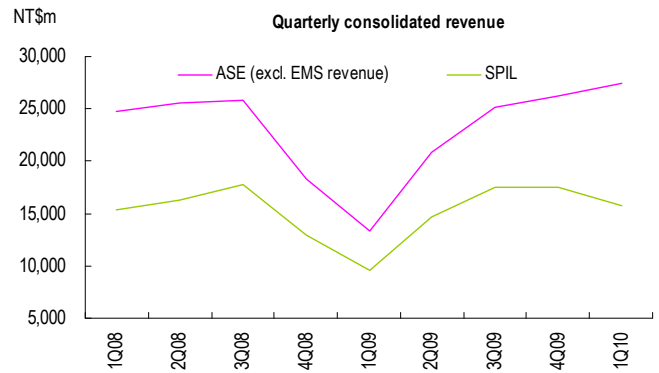
In recent years, SPIL usually generated higher operating margin due to its operational efficiency. However, the market share gains by ASE have been so significant that ASE started to achieve higher margin from 4Q09 – and we don't expect the gap to narrow in 2010. Hence the market's high expectations for SPIL to catch up, which are reflected in its valuation premium to ASE (1.8x vs. 1.5x), are not justified, in our view. We expect the valuation premium to disappear soon.

Figure 9. Operating Margin Comparison: ASE and SPIL



Source: Citi Investment Research and Analysis

Figure 10. ASE's Share Gain Is Obvious Throughout 2009



Source: Citi Investment Research and Analysis

Back-end Industry Outlook

Figure 11. Global OSAT Companies Market Share, 2009

1 ASE	14.9%
2 Amkor	12.7%
3 SPIL	10.3%
4 STATS ChipPAC	7.7%
5 PTI	5.5%
6 UTAC	3.5%
7 ChipMOS	2.2%
8 Jiangsu Changjiang Electronics	2.0%
9 KYEC	1.9%
10 Unisem	1.7%
Top 10 Total	62.4%

Source: Gartner (April, 2010)

Sustainable semiconductor unit growth into 2015

According Gartner forecasts, the semiconductor industry is expected to grow at 4% CAGR from 2010 to 2013E to a total revenue of US\$325bn, whereas TSMC during its 2010 AGM in June provided a more optimistic growth outlook of 7% 2011-2016E CAGR. Meanwhile, overall semiconductor unit growth is expected to outgrow the semiconductor industry by 5 ppt in CAGR during the same period of time because of continued ASP reduction of IC devices. On top of the semiconductor growth assumption, the OSAT sector is expected to grow at 9% CAGR from 2010 to 2013E, driven by overall industry growth as well as increasing IDM outsourcing.

Figure 12. Semiconductor Consumption, OSAT Market and Semiconductor Unit Growth

	2006	2007	2008	2009	2010	2011	2012	2013	2010-2013CAGR
Semiconductor consumption (US\$bn)*	259	270	255	228	290	307	310	325	3.9%
YoY	10%	4%	-5%	-10%	27%	6%	1%	5%	
OSAT market (US\$bn)*	19	21	20	17	22	25	26	28	7.5%
YoY		7%	-2%	-15%	31%	12%	2%	9%	
Semi. Device ASP**	1.9	1.8	1.7	1.7	1.6	1.5	1.4	1.4	
YoY		-7%	-7%	0%	-5%	-5%	-5%	-5%	
Semiconductor device unit (bn)**	135	150	153	138	184	205	218	241	9.4%
YoY		12%	2%	-10%	34%	11%	6%	11%	

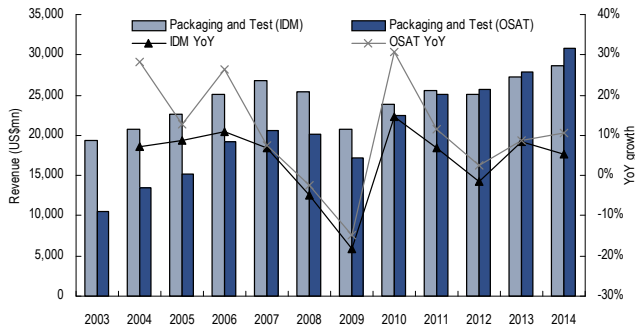
Source: *Gartner (Jun 2010), **Citi Investment Research and Analysis, and 2006-2009 units are based on Gartner numbers

Taiwan-based OSAT companies gaining market share

ASE is the sector leader with market share of 14.9% worldwide in 2009, followed by Amkor (12.7%), SPIL (10.3%), Stats ChipPAC (7.7%) and Powertech (5.5%). In past three years, Taiwan-based OSAT (ASE, SPIL, PTI) gained market share at the expense of Amkor, Stats ChipPAC and ChipMOS. Going forward, we believe the trend will continue thanks to ASE's and SPIL's early moves on copper replacement and PTI's continuing solid operation.

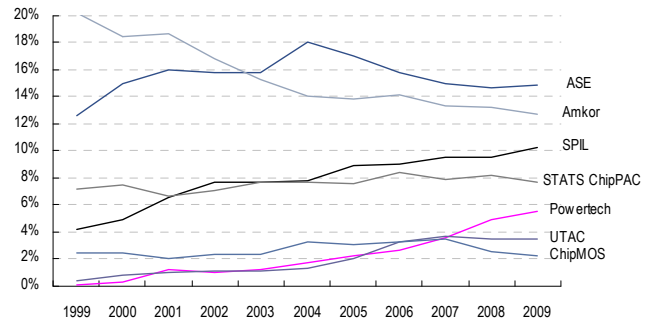
Growth from expanding IDM outsourcing is also a key driver for Taiwan OSAT companies' market share gains. ASE is seeing incremental revenue from Japanese IDMs (NEC, Toshiba) as well as Europe-based IDMs (Infineon and STMicro). According to a *Commercial Times* report (June 20, 2010), SPIL is to get AMD's CPU assembly and testing business from 2H10. In fact, worldwide IDMs are reducing capex spending significantly since 2006 (see charts below). The capacity dependence on OSAT, especially Taiwan-based OSAT, is on the rise. Meanwhile, Chipbond is also gaining market share sharply this year after completing its consolidation with IST.

Figure 13. Global Packaging and Test Revenue Forecast



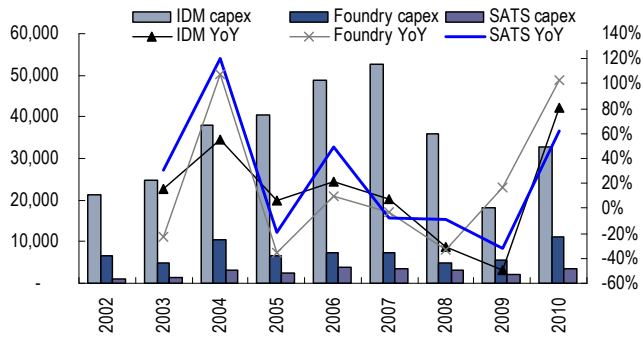
Source: Gartner (Jun 2010)

Figure 14. Market Share Trend of Leading OSAT Companies



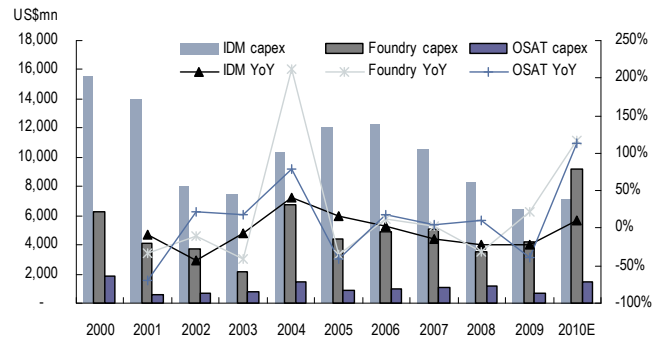
Source: Gartner

Figure 15. Capex Growth Is High in 2010 Across the Board (Including Memory)



Source: Gartner (Jun 2010)

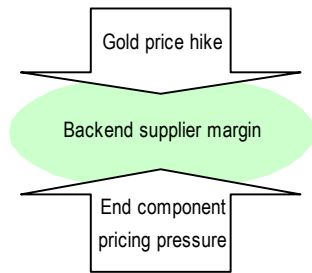
Figure 16. But Logic IDMs Are Only Slightly Increasing Capex



Source: Company, dataCentral, Citi Investment Research and Analysis. IDM includes INTC, TXN, NSM, AMD, ADI, IFX, STM. Foundry includes TSM, UMC, SMIC, Globalfoundries/Chartered. OSAT includes ASE, SPIL, Amkor

Cost-Cutting Initiatives Emerging

Figure 17. Cost-Cutting Initiatives Emerging to Combat Margin Pressure



Source: Citi Investment Research and Analysis

The demands of the cost-cutting initiatives driven by continued end-components pricing pressures and skyrocketing gold prices are accelerating. Two trends are appearing to mitigate cost increases from rising gold prices:

- Replacing gold with a less expensive alternative
- Totally eliminating the use of gold in the package.

Replacing gold with copper. Adoption of copper wire as the replacement for gold wire to connect between chip and lead frame is the most well-known low-cost approach in the back-end sector. On average, with the gold price around US\$1,100 per ounce in 1Q10, the cost of gold wire accounted for 10% to 40% of the total wire bonding based package cost, rising sharply along with the numbers of gold wires and gold price hike. In addition for gold replacement, some other approaches also adopted to reduce the overall package cost further include: aQFN (advanced QFN or array QFN) and NBA to replace higher-cost wire bond BGA substrate with a lower-cost lead frame, and high density packaging to reduce unit cost per molding compound.

Figure 18. Cost Composition of Different Types of Packages

	Pin counts	PKG price (NTD)	Molding compound	Leadframe	Gold
DIP	16	\$2-2.5	60%	30%	20%
SOP	6	\$1	40%	50%	10%
QFN	40-48	\$3-4	40%	30%	30%
LQFP	80	\$8-10	40%	30%	30%

Source: Citi Investment Research and Analysis

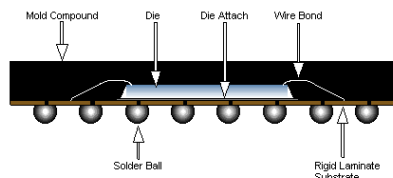
Figure 20. Gold and Copper – Cost Comparison

pin counts	Gold price	Copper price
200	5.0	0.60
128	3.2	0.39
64	1.6	0.19
48	1.20	0.14
16	0.40	0.05

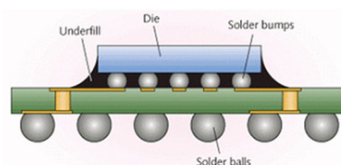
Source: Citi Investment Research and Analysis

Figure 19. WB BGA and FC BGA

Wire Bond BGA



Flip Chip BGA



Source: Amkor, cnfolio.com

Eliminating usage of gold – wafer-level and flip-chip packaging. Wafer-level CSP and flip-chip packages are the two most frequently adopted approaches in the industry to totally eliminate the usage of gold wire in the package. A derivative wafer-level CSP, named fan-out WLP, not only eliminates the usage of the gold but also enlarges the PCB surface of a smaller die, enabling higher I/O pin counts compared to conventional wafer-level CSP. Flip-chip package is another approach without using gold or copper wire bonding. However, the flip-chip package is in general not cost competitive to the conventional wire-bonding packaging due to necessity of a more expensive substrate and underfill material. Flip-chip package is mostly used on the performance-driven chips, e.g., CPU, chipsets, graphics, FPGA, satellite communication chips, etc.

Gold replacement: Copper wire bonding on the rise

Gold is the material used in wire bond assembly, for most of chips for cell phones, WLAN, memory, PDA, DSC, audio/video, MCU, DSP and other consumer applications.

There are different types of the package methodologies used to connect the outputs of integrated circuits (IC) with the underneath substrate or lead frames. Using lead frame to carry the IC chips and adoption of gold wire to connect between IC chips and lead frames are the most common and least expensive approaches to assemble the modern chips. This approach, so-called wire bond assembly, can be used on most of chips for cell phone, WLAN, memory, PDA, DSC, audio/video, MCU, DSP and other consumer applications. Gold is the material being used for most of the wire bonding assembly in the past. Characteristics such as good ductility, stability in the atmosphere and lower melting point for easy reworking make gold the best interconnecting material for the wire bonding.

OSAT's margins have been hit by skyrocketing gold prices since 2007.

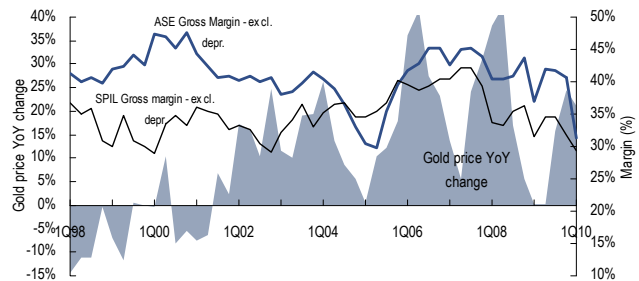
However, with continued rising gold price since 2007, most of the assembly houses were under huge margin pressure. The charts below illustrate that both ASE's and SPIL's gross margin declined in 1Q08 after both companies had run through lower-priced gold inventories. Although OSAT companies were able to partially pass the gold-adders (extra cost from the incremental gold price) to customers to maintain a certain level of profitability, the margins are more or less being impacted by the rising gold price.

Figure 21. Gold Price Is Unlikely to Go Back Where It Was



Source: Bloomberg, Citi Investment Research and Analysis

Figure 22. OSAT's Margins Are Hit by Rising Gold Prices



Source: Company, Citi Investment Research and Analysis

At US\$1,200/oz gold price level, both ASE and SPIL have to achieve a copper wire bonding penetration rate of >20% and >15% respectively to keep gross margins at 1Q10 level.

Our sensitivity checks of the gross margin impact from the high gold prices and copper wire bonding penetration are shown in the tables below. Starting from 1Q10 level with gold price around US\$1,100 per ounce, every \$100 per ounce gold price increase may negatively impact 1.3ppt and 1.7 ppt of gross margins at ASE and SPIL, respectively. On the other hand, every 5% increase of copper wire bonding penetration may positively move gross margins by 0.7ppt and 0.8ppt at ASE and SPIL respectively. Given a gold price assumption of US\$1,200 per ounce in 2011E, both ASE and SPIL have to achieve a copper wire bonding penetration rate at >20% and >15% respectively in order not to have a negative gross margin impact from 1Q10 levels.

Figure 23. GPM Sensitivity Check of Gold Price and Copper Penetration as % of Total Wire Bonding

	0%	5%	10%	15%	20%	25%	50%
1000	0.6	1.3	1.7	2.3	2.9	3.4	6.3
1100	-0.8	0.0	0.5	1.1	1.8	2.4	5.5
1200	-2.1	-1.3	-0.7	0.0	0.7	1.3	4.8
1300	-3.4	-2.5	-1.9	-1.2	-0.5	0.3	4.0
1400	-4.8	-3.8	-3.2	-2.4	-1.6	-0.8	3.2
1500	-6.1	-5.1	-4.4	-3.5	-2.7	-1.8	2.5

Source: Citi Investment Research and Analysis estimates, based on 1Q10 results with gold price \$1100 /ounce and copper penetration rate of 6%

Figure 24. SPIL – GPM Sensitivity Check of Gold Price and Copper Penetration as % of Total Wire Bonding

	0%	5%	10%	15%	20%	25%	50%
1000	1.7	2.2	2.9	3.7	4.4	5.2	9.0
1100	0.0	0.5	1.4	2.2	3.0	3.9	8.0
1200	-1.7	-1.1	-0.2	0.7	1.6	2.5	7.1
1300	-3.4	-2.7	-1.8	-0.8	0.2	1.2	6.1
1400	-5.0	-4.4	-3.3	-2.2	-1.2	-0.1	5.2
1500	-6.7	-6.0	-4.9	-3.7	-2.6	-1.5	4.2



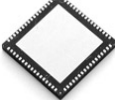

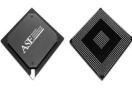

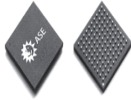
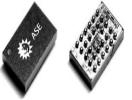
Source: Citi Investment Research and Analysis estimates, based on 1Q10 result with gold price of \$1100/ounce and 2% of copper penetration rate.

Significant potential for copper penetration in assembly market

We expect copper gradually to achieve 50% of wire bonding package, assuming gold price above US\$1000/oz.

Below we list the common technologies adopted in the semiconductor assembly market. The wire bonding connection method accounts for up to 66% unit share of the total semiconductor assembly market. However, low-pin-count devices such as SO package are not cost effective to migrate to copper. As such, we believe that ~80% of the wire bonding packages will eventually migrate to copper wire bonding, under the assumption that the gold price remains above US\$1,000 per ounce. Currently, copper only accounts for 6% of ASE's assembly revenue and low single-digit percentage of SPIL's.

Figure 25. Copper Has the Potential to Replace Gold in the 70% Unit Share of Total Semiconductor Assembly Market

Technology	Lead Frame				BGA			Wafer Level
Connection	Wire Bonding				Flip Chip			Wafer Level
Package Type	SOP/PDIP	TSOP	QFP	QFN/aQFN	WB	Flip Chip	FCCSP	aCSP
								
Pin count	8-56	10-54	28-256	40-400	120-1600	100-2500	16-200	8-100
Wiring material	Gold/Cu	Gold/Cu	Gold/Cu	Gold/Cu	Gold/Cu	N.A.	N.A.	N.A.
Applications	Cell phone WLAN PDA DSC Video	Cell phone Memory WLAN PDA DSC Audio Video	ASIC DSP MCU Memory IC	Telecommunication Portable Consumer	Graphic PC chipset PLDS DSPS MCP MCU Networking	Graphic Chipset Game console MCP Networking Cellular Base Station	RFIC Memory ICS	Analog Micro controller FEPROM PA RF
Unit share (%)	39%	5%	9%	13%	5%	29%		

Source: ASE website, Gartner, Citi Investment Research and Analysis

Big gap on copper wire bonding between ASE and its followers

ASE is the only company that is mass producing copper wire bonding.

TXN was most aggressive on adopting copper to replace gold amidst all of the IDM companies, followed by STMicro. ASE, on the other hand, is the leader of copper wire bonding among all of the OSAT companies. ASE is the only company that is at mass production of copper wire bonding. Copper wire bonding accounted for 6% of total assembly revenue in 1Q10, and it is

expected to exceed 20% of the total assembly revenue by end-2010. SPIL is catching up with ASE on copper wire bonding. The company said it is adding >2,000 units of new wire bonders in 2010 for copper application. Revenue contribution is also expected to reach 20% of total assembly by end of 2010, though we think it's challenging due to tightness of wire bonder supply. Stats ChipPAC is also doing copper wire bonding conversion, although we believe the pace is much slower than ASE and SPIL. Amkor is focusing on the wafer-level and flip-chip package. The company is focusing limited resources on copper, in our view.

Obstacles of using copper as gold's replacement

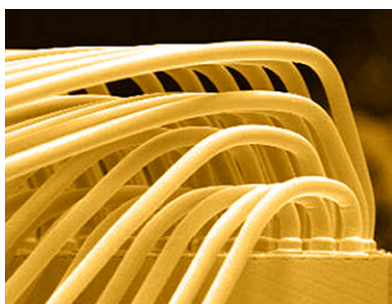
Using copper as the alternative to gold as the wire bonding material between chips and lead frames (or substrates) has been explored for a long while. Key obstacles related to copper's material characteristics have to be resolved before copper can be widely adopted.

Physical differences between gold and copper

Copper, in general, is physically harder, less ductile but with better electron and thermal conductivity than gold. The physical characteristics make copper a worse material to form a fine wire for connecting the IC and lead frames. A higher bonding force is needed to attach copper firmly onto the chips due to copper's hardness, and this introduces higher risk of die cracking during the bonding process and also leads to difficulty of reprocessing.

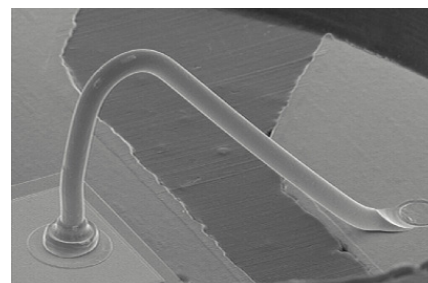
Copper is harder, thus it requires higher bonding force, which results in higher risk of die cracking.

Figure 26. Multiple Layers of Wire Bonding



Source: K&S

Figure 27. Single Wire Bonding



Source: K&S

ASE's yield rate in copper has reached within 100ppm compare to gold, while SPIL's still lagging behind.

Both ASE and SPIL are saying a 10-15% productivity loss from adoption of copper wire bonders.

Yield rate loss is the key: Higher yield rate loss means higher bearing cost to IC fables/IDMs and OSAT companies. Our industry check indicated the yield rate loss of copper wire bonding has to be within 100 ppm compared to gold. ASE, according our checks, has already met with this target (99.85% yield rate), while others such as SPIL are still working hard to meet this target.

Lower productivity in general: Moreover, the higher melting point and less ductility has led to less productivity of wire bonders. Both ASE and SPIL are indicating a 10-15% productivity loss from adoption of copper wire bonders, implying a lower ROIC of the copper wire bonder operation due to more wire bonders are requested to compensate for the productivity loss.

Figure 28. Characteristics of Gold and Copper

	Gold	Copper
Melting point	1064C	1084C
Electrical resistivity (20C)	22.14 n.ohm.m	16.78 n.ohm.m
Young's modulus	79 Gpa	110-128 Gpa
Shear modulus	279 Gpa	48 Gpa
Bulk modulus	180 GPa	140 Gpa

Source: Citi Investment Research and Analysis

Copper in chemical is more active than gold, which makes it harder to connect wire without oxidation before modulation of the ex-wire bonded dies.

Chemical differences

Copper, in chemical, is more active (less stable) than gold. This makes it even harder to make copper as the connecting wire without oxidation before modulation of the ex-wire bonded dies.

Compared with other metals, pure gold is chemically least reactive. To overcome the chemical characteristics of copper, one has to operate copper wire bonding at the inert gas atmosphere. Kullicke & Soffa was the first company introducing the copper wire bonders with introduction of nitrogen purge stage into a gold wire bonder. The introduction of the inert gas makes copper wire bonding a feasible replacement of gold wire bonding.

It, however, suffers from a lower system productivity on the copper wire bonding due to copper's higher melting temperature and less ductility. The efficiency of copper wire bonding is said to be 10-15% less than a normal gold wire bonder in use.

Re-qualification needed for a major material change such as copper

Replacing gold with copper takes ~2 quarters to re-qualify the products. The longest copper wire bonding product lifetime with track record is 5 years. White box products with shorter product life cycles are the early adopters of copper wire bonding.

End-devices with a short product lifecycle such as white box handsets are at the forefront of adopting copper wire bonding as the lower cost alternative to gold, in our view. Device such as automobile ICs, which need to display longer-term reliability, will not easily adopt copper as the replacement of gold, as safety is the most critical concern of auto. Low pin count devices such as SO package are not cost effective to migrate to copper. As such, we believe that ~50% of the wire bonding packages will eventually migrate to copper wire bonding, with the assumption that gold price is keeping above US\$1,000 per ounce.

Gold elimination: wafer-level and flip-chip package

The other way to combat cost hikes from gold prices is to totally eliminate the usage of gold. Wafer-level CSP and flip-chip package are the two most common technologies which do not use wire bonding to connect with the dies and the underneath connection pads.

Wafer-level package (WLP)

Wafer-level package is driven by thinner and lightweight products, e.g. Bluetooth, image sensor, controller, memory and IPDs.

Wafer-level package is fully packaged without dicing. The as-deposited wafers are bumped with solder balls and the bumped dies are subsequently diced and attached onto PCB. The growth of the wafer level package is mainly driven by increased thinner and light-weight products such as Bluetooth, image sensor, controller, memory and integrated passive devices (IPDs). WLP is often used

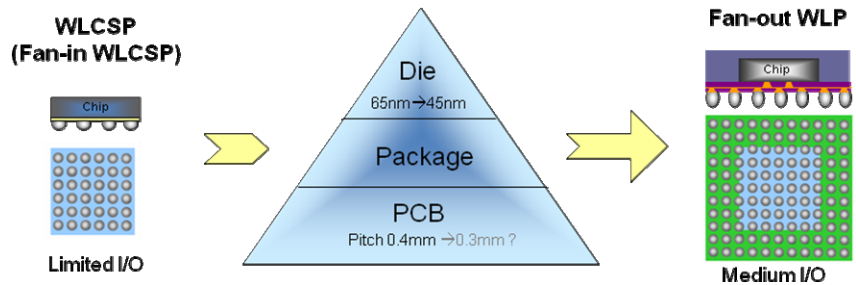
on the low to mid pin counts (<100 pins) solutions. But many end-users intend to use WLP for high pin counts (up to 300 pins) and higher wafer size applications such as mobile application processors.

Fan-outs wafer-level package

Fan-outs WLP is a low-cost WLP solution; ASE has been mass producing for IFX and others.

Fan-outs WLP is a derivative package of WLP. It enables chips to deal with more I/O pin counts by keeping sufficient PCB surface when chip size shrinks along with foundry technology migration. Unlike the wafer-level CSP which is processed on the un-diced dies, fan-out is putting all of the diced dies on a substrate and is redistributed the connected bumping pads for all diced dies. The purpose for doing this is to extend the usage of legacy bumping process onto leading edge technology devices; as such, lower cost will be compared to the most up-to-speed bumping technology. The fan-out package has gained accelerating attention from companies requiring a thin package solution for increasing I/O pin counts devices. Fan-out WLP was developed by several companies including Casio Micronics, Freescale Semiconductor, Fujikura, Infineon and NXP. ASE had licensed Infineon's embedded wafer-level ball (eWLB) technology for fan-out and has been mass producing for Infineon and other customers.

Figure 29. Fan-Outs Wafer-Level Package



Source: SPIL

The advantages provided by fan-out WLP include:

- Lower cost because of no wire bond or bumps required for interconnection. Fan-out also extends the existing bumping life cycle by one to two nodes along with the continuous wafer technology shrink. As shown in the chart above, fan-out helps to deal with the doubled I/Os at the same silicon surface when wafer technology shrinks further.
- Small form factor with medium I/Os.
- Reduced package thickness.
- Multiple chips and components integration capabilities.

FC is not cost competitive vs. conventional wire bonding, but is the solution for performance-sensitive chips such as MCPU, Northbridge chipsets, graphics, FPGA and communication chipsets. Gold price hikes also push some performance driven devices to FC package from WB BGA package.

Flip-chip package

The drivers of the flip-chip package continued to be form factor, higher performance, limited silicon surface for thousands pin counts and on-chip power and heat distribution. In general, flip-chip package is not cost competitive compared to conventional wire bonding packages due to the necessity use of high-cost substrate and under-fill material. Therefore, the performance sensitive chips such as microprocessors, PC Northbridge chipsets, graphic chipsets, Field Programmable Grid Array (FPGA) and communication chipsets are key end-applications widely adopting flip-chip packages. Other devices, i.e., most of the consumer and baseband chips, will remain packaged by wire bonding approaches.

Other lead frame-related cost reduction

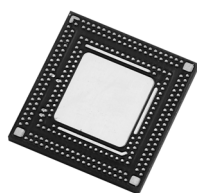
As shown earlier, lead frame (or other substrate) is the other big portion of the assembly material cost. For some devices with the demands of higher pin count (>200 pin), the need for higher-cost PBGA (ball grid array) substrate caused the cost to be even higher than the lead frame based package.

aQFN

By replacing higher-cost BGA substrate with lower-cost aQFN lead frame, aQFN provides 20-30% cost saving relative to WB BGA package.

ASE is the first company to launch the alternative of aQFN to replace the wire bond BGA for the lower cost solution. aQFN means advanced QFN or array QFN. The ordinary QFP or QFN is to have the lead pads at the four sides at the back side of the finished dies. aQFN is adopting an array of the lead pads, similar to substrates of ball grid array (BGA). This reduces the use of the higher-cost BGA substrate and is replaced by a lower-cost aQFN lead frame. It saves users about US\$0.4 to US\$0.5 per chip on the substrate cost, which implies 20-30% of the total cost of a WB BGA package.

Figure 30. aQFN Package



Source: ASE

Figure 31. Normal QFP Package



Source: ASE

Besides ASE, we believe that SPIL has launched a similar approach to ASE's aQFN, named NBA, as the lower-cost solution. SPIL licenses ASE's aQFN technology to produce MediaTek's baseband chipset. SPIL, however, will be charged with royalty should it employ aQFN to any customers other than MediaTek according to this half-right license agreement with ASE. SPIL, on the other hand, is developing an alternative solution, so-called NBA1, for the purpose of replacing the high cost BGA substrates.

High-density package

Molding compound indeed is the biggest portion in the package BOM. This is an approach to increase the lead frame number per panel (or per strip) when performing molding compound formation. By doing so, it increases productivity of every molding compound forming process and reduces compound material loss in average. The unit cost per die will be dramatically reduced.

Comparison of OSAT companies' use of new technologies

ASE leads Amkor and SPIL in new technology initiatives.

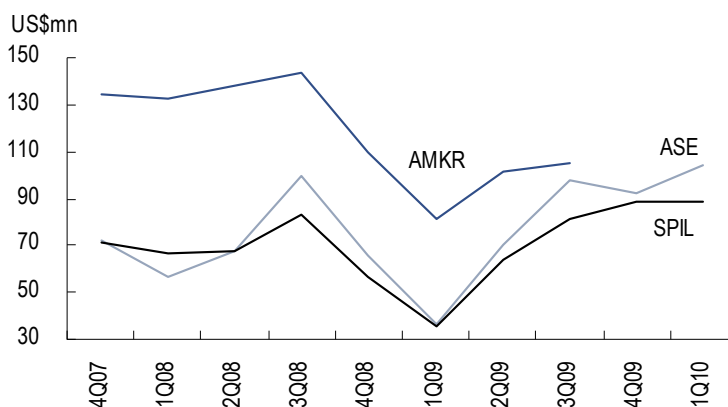
We compare the new technologies exposure associated with cost-reduction initiatives among the top three OSAT companies. ASE, with no doubt, leads both SPIL and Amkor on all wire bonding low-cost initiatives ranging from copper wire bonding, aQFN, to high-density package. ASE is also leading in the fan-outs wafer-level package. Amkor is an obvious leader on the WLP and flip-chip package with a >30% total revenue contribution in 1Q10, compared with ASE's 15% and SPIL's 18%. However, Amkor did not emphasize much on copper wire bonding, or on the other low-cost initiatives due to its high exposure to IDM companies. We believe Amkor is likely to lose market share on the wire bonding package or suffer more on rising gold prices in the long run given its lower focus on copper wire bonding. SPIL is catching up fast on the low-cost initiatives and WLP process. We rank SPIL third place in the low-cost initiatives among the top three OSAT makers.

Figure 32. ASE Leads Competitors in Cost-Cutting Initiatives

	Copper wire	aQFN	High Density	Fan-outs	FC CSP	FC BGA	total
ASE	vvv	vvv	vvv	vvv	vv	vv	16
SPIL	vv	vv	vv	v	v	v	9
AMKR	v	v	v	vv	vvv	vvv	11

Source: Citi Investment Research and Analysis

Figure 33. Flip-Chip and Wafer-Bumping Revenue at Amkor, ASE, and SPIL



Source: Company data, Citi Investment Research and Analysis.

*We did not compare AMKR's revenue from 4Q09, because AMKR re-categorized the product segment in 4Q09, it's no longer like-for-like comparison

ASE is gaining share from its low-cost initiatives

We believe that ASE's efforts on low-cost initiatives and higher R&D expense in the past decade have been paying off recently. The company is leading its peers in cost-reduction initiatives, and we believe that ASE is gaining share from competitors as well. According to Gartner data shown below, ASE's market share worldwide has slightly increased from 14.7% in 2008 to 14.9% in 2009. We expect this momentum to strengthen in 2010. ASE, in our view, is riding on the low-cost wave and is dominating the copper market share.

Figure 34. Leading OSAT Companies' Market Share

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
ASE	12.6%	15.0%	16.0%	15.8%	15.8%	18.1%	17.0%	15.8%	15.0%	14.7%	14.9%
Amkor	20.2%	18.5%	18.7%	16.8%	15.3%	14.1%	13.8%	14.2%	13.3%	13.2%	12.7%
SPIL	4.2%	4.9%	6.6%	7.7%	7.7%	7.8%	8.9%	9.0%	9.5%	9.5%	10.3%
STATS ChipPAC	7.2%	7.5%	6.6%	7.1%	7.7%	7.7%	7.6%	8.4%	7.9%	8.2%	7.7%
PTI	0.1%	0.3%	1.2%	1.0%	1.2%	1.7%	2.3%	2.7%	3.6%	4.9%	5.5%
UTAC	0.4%	0.8%	1.0%	1.1%	1.1%	1.3%	2.1%	3.3%	3.7%	3.5%	3.5%
ChipMOS	2.5%	2.5%	2.1%	2.4%	2.4%	3.3%	3.1%	3.3%	3.5%	2.6%	2.2%

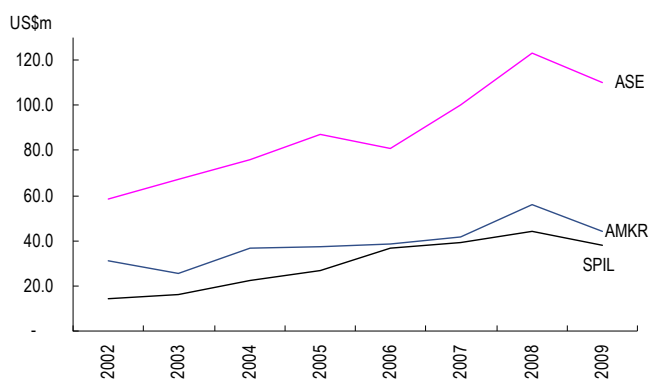
Source: Gartner

SPIL follows in the footprints of ASE, but has further to go

SPIL was late in the copper wire bonding market. However, SPIL has to benchmark what has been done at ASE as both of them are serving the same group of customers. It implies higher pricing pressure and margin pressure for SPIL compared to ASE in the low-cost initiatives.

SPIL, for a long time, was better at operational efficiency to squeeze profit from the matured nodes of technologies, as evidenced by its higher operating margin over recent years. The company, however, did not focus too much on the new technology development. This can be explained by SPIL's lower R&D expense in the past decade. As such, the learning curve of new technology adoption to SPIL will be longer than expected, in our view.

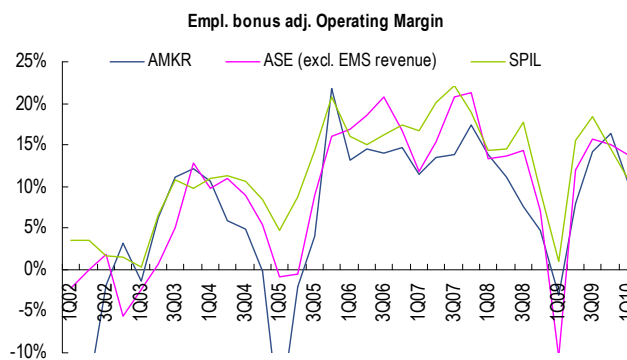
Figure 35. R&D Expenditures of ASE, SPIL and Amkor



Source: Citi Investment Research and Analysis

*This is reported R&D expense, employee stock bonus (2002-07) is not considered.

Figure 36. Operating Margin of ASE, SPIL and Amkor



Source: Citi Investment Research and Analysis

*Employee bonus expense adjusted operating margin

Decelerating ROIC at wire bond assembly is a concern for the sector overall

The conventional wisdom suggests that for every US\$1 spent in the assembly sector, it yields around US\$1.3 to US\$1.4 of revenue per year. On the copper wire bonding, however, the revenue generated per year from every dollar invested is 10% lower, due to cost-saving rebates to customers. Meanwhile, OSAT companies are suffering 10-15% lower productivity from copper wire bonders. To compensate for the lower productivity, 10-15% higher invested capital is required to generate the equivalent output.

While some companies have claimed that they are yielding an equivalent or an even better amount of earnings from copper operations, we believe that is the case only for the industry leaders who are the first in the market with a meaningful volume. The one with market share gains in the OSAT sector will be the key beneficiary of copper migration.

Figure 37. Copper Wire Bonding Yields 10% Lower ROIC Than Gold (a hypothetical case, 10% net margin is a mere assumption to facilitate calculation)

(US\$)	Gold	Copper	Note
Revenue	1.35	1.215	1.35x90%; Copper generates 10% lower revenue relative to gold
Net profit	0.135	0.135	Assuming same amount of earnings generated from equivalent output
Implied net margin	10%	11%	10% net margin in gold is a mere assumption; higher net margin in copper is implied
Invested capital	1	1.125	To produce same unit output, copper requires 10-15% higher capital investment
ROIC	13.5%	12.0%	ROIC is 10% lower in copper

Source: Citi Investment Research and Analysis

Memory Back-end – Margins Decouple with the Cyclicity of Taiwan DRAM Makers

DRAM pricing pressure on the downside

We expect tight DRAM supply to continue until normal year-end correction.

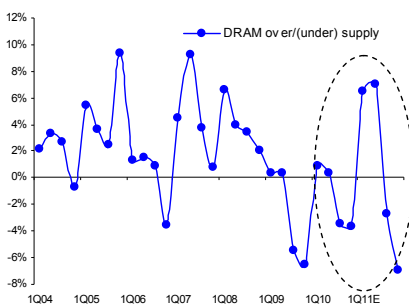
Demand side: strong demand from mobile DRAM, server, graphic and smart TV.

Supply side: NAND takes more allocation in memory capacity on strong demand from iPad and ebooks; only Samsung increased capacity in the past years.

Citi memory analyst Henry Kim expects worldwide DRAM supply entering 3Q10 to be in a severe shortage (see charts below). The buoyant demand from mobile DRAM, server memory, graphic memory and smart TV consume more silicon surfaces of DRAM production. Meanwhile, the seasonal smart phone growth in 3Q10 as well as the new additional demands from iPad and ebooks takes more allocations to NAND flash out of the existing memory capacity.

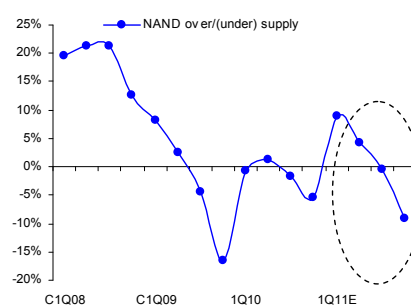
On the other hand, from the supply side, Samsung electronics is the only memory maker worldwide which increased capacity in the past years. Others in the market are mainly accelerating technology migration to ramp bit growth. Given a very high expectation but bumpy execution of Taiwan-based DRAM makers on the 5nm technology migration, the DRAM demand and supply gap is widening. Therefore, Henry expects very limited pricing pressure to memory makers across the board. Contrary with the views of most in the market, Henry believes that it's premature to call a memory peak in 1H10. He expects the tight DRAM supply to continue until normal year-end correction.

Figure 38. Global DRAM Supply / Demand



Source: Citi Investment Research and Analysis

Figure 39. Global NAND Supply / Demand



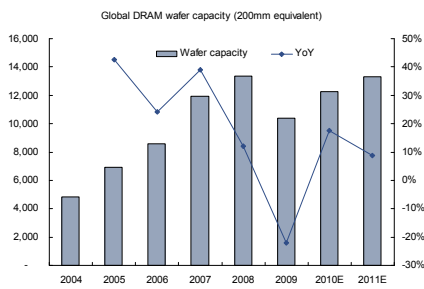
Source: Citi Investment Research and Analysis

We expect DRAM wafer capacity to increase by less than 10% in 2011E, and DRAM revenue to fall by 2% in 2011E on the back of 40% YoY ASP erosion.

Memory growth to slow in 2011E

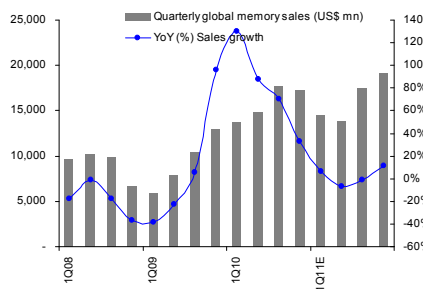
Looking forward to 2011, Citi forecasts the new DRAM wafer capacity addition to be below 10%, mainly from increase of Samsung. Therefore, Citi expects DRAM industry supply growth will totally depend on the progress of technology migration in 2011. Overall DRAM revenue is expected to decrease by 2% YoY in 2011E given the assumptions of 40% YoY ASP erosion under a perfect industry-wide execution. On the other hand, NAND flash is expected to grow by 12% YoY in 2011E driven by secular growth of digital storage demands such as iPhone, iPad and other newly launched smart phones. Citi expects the total memory revenue to increase 3% YoY to US\$65.2bn in 2011E.

Figure 40. Global DRAM Wafer Capacity



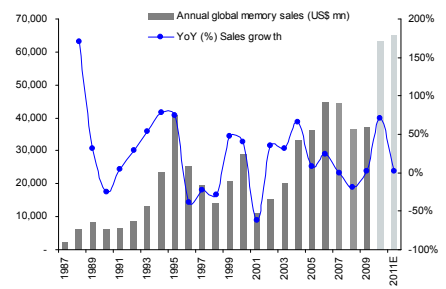
Source: CIRA estimates

Figure 41. Global Memory Sales Fcst - Quarterly



Source: CIRA estimates

Figure 42. Global Memory Sales Fcst - Annual

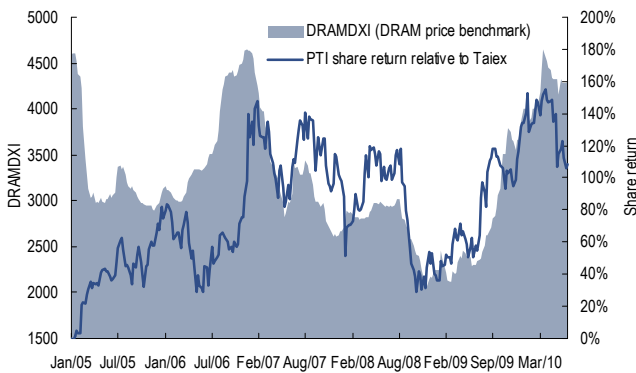


Source: CIRA estimates

Memory back-end sector: a highly fragmented market

Most of the memory makers are outsourcing memory packaging and testing to their own subsidiaries or in-house back-end departments. For example, Samsung and Hynix are using in-house capacity for back-end services. PSC, Elpida, Nanya Tech and Inotera are outsourcing to their subsidiaries. Elpida, Toshiba and PSC in total contributed >70% of PTI's (PTI) total revenue. Nanya Tech as well as Inotera accounted for >80% of Walton Semiconductor's total revenue. Memory back-end companies' margins theoretically are highly dependent on the pricing and profitability of these underlying parent companies. However, the memory back-end companies' margins and profitability over time are decoupled with Taiwan-based DRAM companies, and likewise the share price performance and returns (see charts below).

Figure 43. PTI Share Return vs. DRAM Price Index



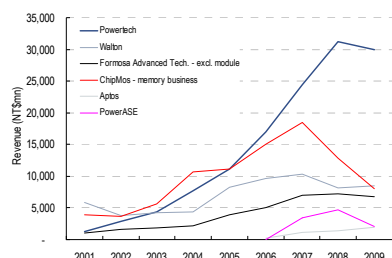
Source: Bloomberg, Citi Investment Research and Analysis

Figure 44. Taiwan DRAM Names' Share Return vs. DRAM Price Index



Source: Bloomberg, Citi Investment Research and Analysis

Figure 45. PTI is Clearly the Leader in Memory Back-end in Taiwan



Source: Citi Investment Research and Analysis

We conclude the outperformance in profitability of the memory back-end companies mainly stems from:

- Low cost structure due to resource sharing from underlying parent companies.
- Higher utilization supported by the memory companies.
- Stable ASP and preferred payment terms agreed upon by the strategic partners.
- Favorable support from strategic partners.

PTI: The memory market share leader in Taiwan

The Taiwan outsourced memory assembly and testing sector is mainly dominated by PTI with a market share of 52% in 2009, followed by 15% from Walton. From a margin perspectives, the 2009 gross margin of 24% and 8% at PTI and Walton were substantially better than the gross margin of -20% to -200% of Taiwan-based DRAM companies. In our view, the margins decoupling of Taiwan-based DRAM makers and memory back-end companies is mainly due to stable loading rate at back-end companies. Memory back-end companies are less impacted by the huge DRAM price fluctuation. Furthermore, memory back-end companies are subsidized by the funding from their parent or strategic partner companies.

Figure 46. Revenue Comparison of Major Taiwan Memory Back-end Suppliers

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Revenue (NT\$mn)									
PTI	1,314	2,821	4,385	7,678	11,165	16,971	24,438	31,189	29,968
Walton	5,885	3,804	4,287	4,418	8,297	9,621	10,364	8,119	8,452
Formosa Advanced Tech. - excl. module	1,029	1,632	1,806	2,204	3,957	5,037	6,950	7,257	6,771
ChipMOS - memory business	3,854	3,659	5,592	10,622	11,163	15,000	18,432	12,818	7,982
Aptos						183	1,105	1,392	1,931
PowerASE						29	3,402	4,725	2,102
Total	12,082	11,916	16,070	24,922	34,582	46,840	64,690	65,499	57,206
Revenue Share									
PTI	11%	24%	27%	31%	32%	36%	38%	48%	52%
Walton	49%	32%	27%	18%	24%	21%	16%	12%	15%
Formosa Advanced Tech. - excl. module	9%	14%	11%	9%	11%	11%	11%	11%	12%
ChipMOS - memory business	32%	31%	35%	43%	32%	32%	28%	20%	14%
Aptos	0%	0%	0%	0%	0%	0%	2%	2%	3%
PowerASE	0%	0%	0%	0%	0%	0%	5%	7%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
YoY growth									
PTI		115%	55%	75%	45%	52%	44%	28%	-4%
Walton		-35%	13%	3%	88%	16%	8%	-22%	4%
Formosa Advanced Tech. - excl. module		59%	11%	22%	80%	27%	38%	4%	-7%
ChipMOS - memory business		-5%	53%	90%	5%	34%	23%	-30%	-38%
Aptos							505%	26%	39%
PowerASE							11796%	39%	-56%
Total		-1%	35%	55%	39%	35%	38%	1%	-13%

Source: Company reports, Citi Investment Research and Analysis

Figure 47. Gross Margin Comparison of Memory Back-end in Taiwan and Memory Chip Makers

	2001	2002	2003	2004	2005	2006	2007	2008	2009	1Q10
Memory backend										
PTI	14%	14%	28%	36%	34%	33%	32%	27%	24%	28%
Walton	3%	2%	9%	13%	14%	16%	12%	8%	8%	10%
Formosa Advanced Tech. *	-42%	-2%	12%	4%	18%	19%	21%	13%	6%	11%
ChipMos - memory business	-7%	-1%	21%	32%	30%	35%	31%	4%	-38%	N/A
Aptos						32%	28%	8%	7%	N/A
PowerASE						26%	43%	38%	24%	N/A
Memory chip										
Nanya Tech	-57%	22%	16%	35%	15%	31%	2%	-49%	-23%	2%
Powerchip	-31%	10%	10%	44%	18%	36%	-7%	-76%	-38%	26%
Promos	-24%	5%	14%	39%	14%	37%	-1%	-76%	-222%	-49%
Elpida				25%	17%	26%	16%	-16%	0%	37%

Source: Citi Investment Research and Analysis. *includes module business.

High hurdles for memory back-end makers to enter logic OSAT

This is as difficult as for the memory wafer makers to enter the logic foundry space. The logic OSAT business's nature of small volume and high variety is far different from the memory operating model of huge volume and small variety. The learning curve to ramp up production efficiency such as yield rate, supply chain management and production allocations is very high for the memory wafer and back-end makers. The competition from the defensive logic OSAT makers and pricing pressure from competition and rising COGS are also difficult for the memory back-end companies to overcome.

LCD Driver IC back-end – Pricing Power Returns

Figure 48. LCD Driver IC Back-end Capacity

Taiwan	46%
Japan	25%
Korea	24%
China	5%
Others	1%

Source: Citi Investment Research and Analysis

Supplier consolidation was pretty much done

The gold bumping sector experienced a massive consolidation in recent years with IST's purchase of Fubo and Chipbond's purchase of Aptos Corporation in 2005. Chipbond's acquisition of IST in 2009 has made itself a significant leader among the gold bumping subcontractors. Key players for gold bumping worldwide include Chipbond, Casio Micronics, Nepes. Our industry check indicated that Chipbond accounted for 32% of the total worldwide capacity, out of total of 720K 200mm equivalent wafer per month.

Gold bumping capacity overbuilt, in general

Our global LCD driver IC demand model indicated the total LCD driver IC consumes ~460K per month of 200mm of silicon surface in 2010, which is 36% under the available bumping capacities. Due to the continuous LCD driver IC die size shrink, the wafer numbers of the LCD driver ICs are decreasing at a CAGR of 8% from 2007 to 2012E (see table below), although total chip demand is on the rise at a CAGR of 9% driven mainly by growing TV, NB and handset demand. The existing gold bumping capacity indicated that all of the gold bumping companies had built excess capacity for the LCD driver IC bumping. Companies such as Casio using its expensive labor may find it difficult to compete with lower-cost suppliers.

But pricing power is strengthening

Nevertheless, the overall pricing pressure is favorable for gold bumping providers. Companies were able to pass gold adders to their customers since 2009. The companies do not have to absorb the margin pressure from gold price hikes by adopting a buy-and-sell business model of gold. Furthermore, Chipbond is seeing pricing power come back due to its oligopoly gold bumping position. The second-largest LCD driver IC gold bumping supplier in Taiwan, i.e., Chipmos, had failed to be profitable for quarters, which means a potential price rise of gold bumping is needed to keep the second-biggest supplier viable. We expect Chipbond – the market share leader, will be the key beneficiary from the overall pricing structure adjustment.

Figure 49. Global LCD Driver IC Demand

	2007	2008	2009	2010E	2011E	2012E	CAGR
Ics (mn of units)	6900	8014	8140	9016	9966	11060	9%
Wafers ('000 of 8" eqv)	7034	6770	6224	5542	5296	4706	-8%
Average Ics per wafer	981	1184	1308	1627	1882	2350	19%

Source: Citi Investment Research and Analysis

Companies

Company Focus

Initiation of coverage

Buy/Medium Risk	1M
Price (07 Jul 10)	NT\$26.10
Target price	NT\$34.00
Expected share price return	30.3%
Expected dividend yield	1.5%
Expected total return	31.7%
Market Cap	NT\$143,249M US\$4,449M

Price Performance (RIC: 2311.TW, BB: 2311 TT)



ASE (2311.TW)

Initiating at Buy: Outpacing Peers on Copper Wire Bonding and Other Cost-Cutting

- Initiate with Buy and NT\$34 target** — We initiate coverage of ASE with a Buy / Medium Risk (1M) rating and DCF-based target price of NT\$34, equivalent to P/E of 10.3x of FY10E and P/B of 2.0x FY10E, and implying 30% share price upside from here. We expect ASE to trade at a premium over SPIL on its technology leadership, increasing market share and improving profitability. Current valuation is depressed by concerns over industry-wide deteriorating ROIC, uncertainty on 2H10 demand, and underestimating the barriers to ASE's competitors in copper wire bonding.
- ASE takes lead on cost-cutting initiatives** — ASE's technology maturity on copper wire bonding helps to mitigate margin pressure from high gold prices. ASE is pressuring its competitor by rebating part of the cost savings to customers. Meanwhile, ASE's other cost-cutting approaches, e.g., aQFN, fan-outs and high-density package, also help it gain market share. We believe the company's focus on low-cost solutions positions it for a secular earning growth trend from 2010 to 2012.
- 4Q10 seasonality mitigated by copper migration and IDM outsourcing** — ASE expects the migration from gold to copper to continue through the end of 2011. Demand for copper wire bonding should be strong all the time. >50% of ASE's wire bonders will be copper available by end-2011, compared with 25% to 30% at end-2010. Meanwhile, IDM outsourcing from NEC, Toshiba and other European IDMs is increasing strongly. ASE expects a seasonal correction in 4Q10. But the copper migration and increasing IDM outsourcing should mitigate the seasonal correction. Thus, we think the overall 4Q10 outlook won't be as negative as the bears' fear.
- ASE to outperform SPIL** — Despite ASE's leading position in copper and other cost-cutting initiatives, ASE still trades at lower valuations relative to SPIL (1.5x vs. 1.8x P/B and 7.9x vs. 14.2x P/E). We believe the market is overly optimistic on SPIL's capability to play catch-up. ASE, with its technology leadership, should continue to gain market share and put margin pressure on competitors through end-2011, in our view. We expect ASE to outperform SPIL and show improving valuation metrics.

Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2008A	6,160	1.15	-49.7	22.7	2.0	8.5	1.9
2009A	6,745	1.31	13.6	20.0	1.9	9.5	1.5
2010E	17,772	3.31	153.7	7.9	1.5	21.6	5.0
2011E	19,471	3.61	9.1	7.2	1.3	19.7	5.5
2012E	19,718	3.66	1.3	7.1	1.2	17.8	5.6

Source: Powered by dataCentral

Fiscal year end 31-Dec	2008	2009	2010E	2011E	2012E
Valuation Ratios					
P/E adjusted (x)	22.7	20.0	7.9	7.2	7.1
EV/EBITDA adjusted (x)	5.9	6.8	4.8	4.8	4.4
P/BV (x)	2.0	1.9	1.5	1.3	1.2
Dividend yield (%)	1.9	1.5	5.0	5.5	5.6
Per Share Data (NT\$)					
EPS adjusted	1.15	1.31	3.31	3.61	3.66
EPS reported	1.15	1.31	3.31	3.61	3.66
BVPS	13.25	13.86	17.18	19.48	21.71
DPS	0.49	0.38	1.31	1.43	1.45
Profit & Loss (NT\$M)					
Net sales	94,431	85,775	178,744	191,963	202,824
Operating expenses	-82,631	-76,761	-157,075	-168,495	-179,217
EBIT	11,800	9,014	21,668	23,468	23,607
Net interest expense	-1,487	-1,334	-1,316	-1,331	-1,264
Non-operating/exceptionals	-837	708	1,003	1,270	1,360
Pre-tax profit	9,476	8,388	21,355	23,407	23,703
Tax	-2,268	-1,485	-3,048	-3,511	-3,556
Extraord./Min.Int./Pref.div.	-1,047	-159	-536	-425	-430
Reported net income	6,160	6,745	17,772	19,471	19,718
Adjusted earnings	6,160	6,745	17,772	19,471	19,718
Adjusted EBITDA	28,133	25,790	38,317	39,360	40,269
Growth Rates (%)					
Sales	-6.7	-9.2	108.4	7.4	5.7
EBIT adjusted	-38.9	-23.6	140.4	8.3	0.6
EBITDA adjusted	-19.5	-8.3	48.6	2.7	2.3
EPS adjusted	-49.7	13.6	153.7	9.1	1.3
Cash Flow (NT\$M)					
Operating cash flow	23,079	13,862	20,591	34,399	36,263
Depreciation/amortization	16,334	16,776	16,648	15,891	16,662
Net working capital	-462	-9,817	-14,365	-1,388	-547
Investing cash flow	-26,681	-11,601	-40,453	-15,809	-15,226
Capital expenditure	-19,303	-11,382	-38,599	-15,500	-14,880
Acquisitions/disposals	0	0	0	0	0
Financing cash flow	2,792	-2,090	19,154	-6,367	-8,171
Borrowings	27,002	2,096	15,725	673	-458
Dividends paid	-8,827	-2,576	-1,978	-7,039	-7,713
Change in cash	-810	172	-708	12,223	12,866
Balance Sheet (NT\$M)					
Total assets	152,190	162,061	224,466	241,271	254,902
Cash & cash equivalent	27,406	27,578	26,870	39,093	51,960
Accounts receivable	11,388	17,812	40,912	43,521	44,752
Net fixed assets	84,758	79,364	101,315	100,923	99,142
Total liabilities	80,229	87,347	128,314	132,264	133,458
Accounts payable	5,167	8,954	24,808	26,702	27,702
Total Debt	60,010	62,105	77,830	78,503	78,045
Shareholders' funds	71,961	74,714	96,151	109,008	121,443
Profitability/Solvency Ratios (%)					
EBITDA margin adjusted	29.8	30.1	21.4	20.5	19.9
ROE adjusted	8.5	9.5	21.6	19.7	17.8
ROIC adjusted	9.7	7.1	14.5	13.4	13.5
Net debt to equity	45.3	46.2	53.0	36.2	21.5
Total debt to capital	45.5	45.4	44.7	41.9	39.1

For further data queries on Citi's full coverage universe please contact CIRA Data Services Asia Pacific at CIRADataServicesAsiaPacific@citi.com or +852-2501-2791



Figure 50. ASE QFII Holding



Source: TEJ

Figure 51. ASE WACC Assumptions

Risk Free Rate	1.36%
Risk Premium	7.00%
Beta	1.24
Cost of debt	3.0%
Tax rate	15.0%
Debt / (Debt+Equity)	46.8%
WACC	6.5%

Source: CIRA estimates

Valuation and target price

We introduce our DCF-based target price of NT\$34. We use a DCF-based valuation to reflect ASE's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.24, we calculate ASE's WACC as 6.5%. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's long term semiconductor industry growth of 7%.

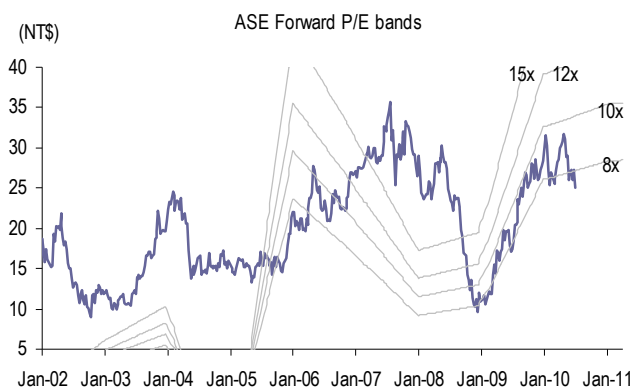
Our target price is equivalent to 10.3x 2010E EPS and 2.0x 2010E BVPS. It is also at ASE's 8-year P/B mean plus one standard deviation, which is not too stretched, in our view, given its historical trading range and the structural change of its competitive advantage relative to peers. We believe the target P/E valuation is also fair based on its historical range and valuation of semiconductor peers.

Figure 52. ASE DCF Assumptions

	2008	2009	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E
Sales Growth	-7%	-9%	108%	7%	6%	3%	3%	3%	3%	3%	3%	3%
EBIT margin	12%	11%	12%	12%	12%	11%	9%	9%	9%	9%	9%	9%
Fixed asset turns	1.1	1.1	1.8	1.9	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Working capital turns	13.1	5.2	5.0	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Net other assets turns	5.6	5.3	8.7	9.4	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Cash tax as % of EBIT	16%	15%	14%	15%	15%	15%	15%	15%	15%	15%	15%	15%

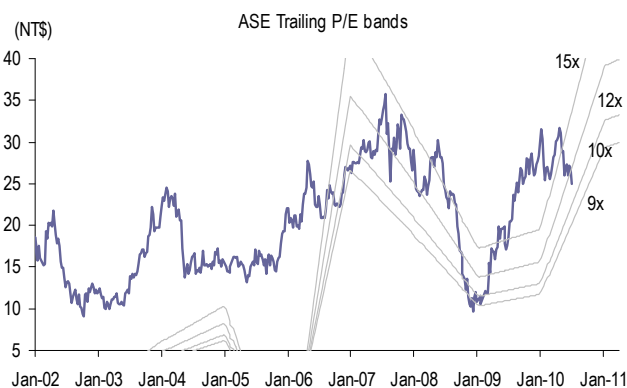
Source: Citi Investment Research and Analysis estimates

Figure 53. ASE Forward P/E Band



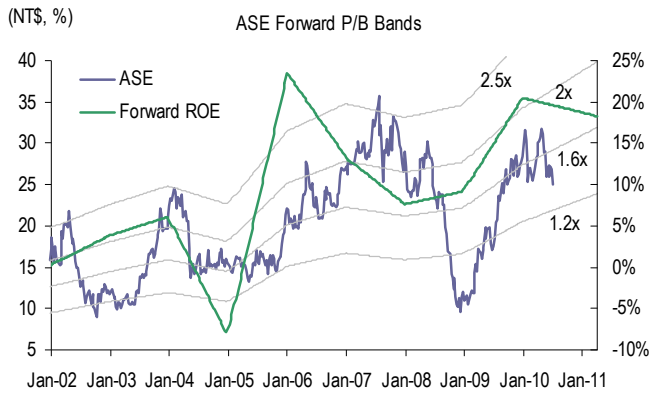
Source: Citi Investment Research and Analysis estimates

Figure 54. ASE Trailing P/E Band



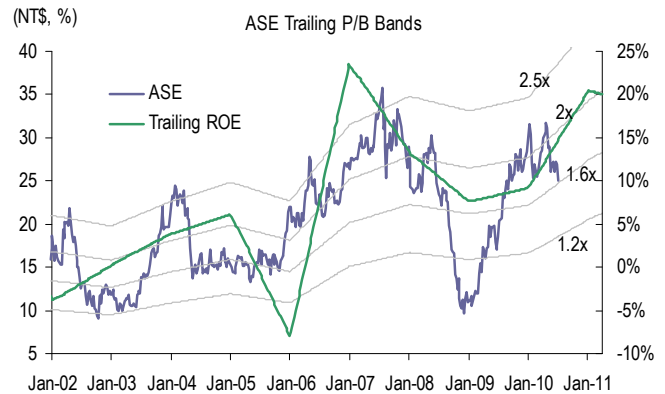
Source: Citi Investment Research and Analysis

Figure 55. ASE Forward P/B Band vs. Trailing ROE



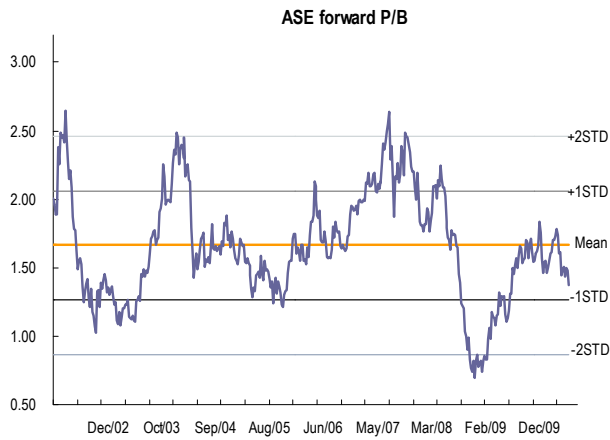
Source: Citi Investment Research and Analysis estimates

Figure 56. ASE Trailing P/B Band vs. Trailing ROE



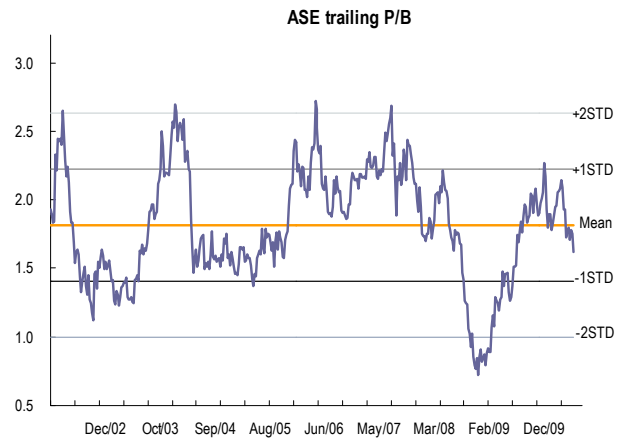
Source: Citi Investment Research and Analysis

Figure 57. ASE Forward P/B Range



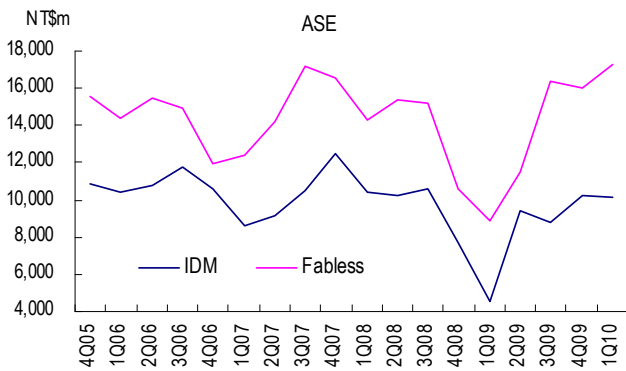
Source: Citi Investment Research and Analysis estimates

Figure 58. ASE Trailing P/B Range



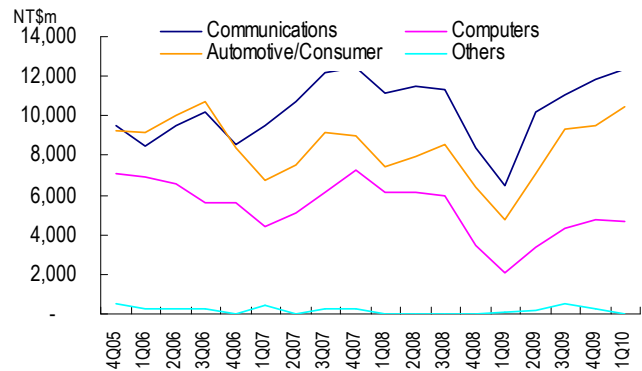
Source: Citi Investment Research and Analysis

Figure 59. ASE Revenue Breakdown by IDM / Fabless



Source: Company

Figure 60. ASE Revenue Breakdown by Application



Source: Company

Figure 61. ASE Key Earnings Estimates

(NT\$ in Mn, year-end Dec)	2009				2010				2008	2009	2010E	2011E	2012E
	1Q	2Q	3Q	4Q	1Q	2QE	3QE	4QE					
Revenue	13,397	20,881	25,205	26,293	37,555	46,416	48,767	46,006	94,431	85,775	178,744	191,963	202,824
COGS	-12,739	-16,357	-18,848	-19,686	-29,999	-36,689	-38,405	-36,384	-71,902	-67,629	-141,477	-151,709	-161,442
Gross Profit	658	4,524	6,357	6,607	7,556	9,727	10,362	9,622	22,529	18,146	37,267	40,254	41,383
Operating Expense	-2,069	-2,028	-2,390	-2,645	-3,277	-4,040	-4,258	-4,024	-10,730	-9,132	-15,598	-16,786	-17,776
SG&A expenses	-1,319	-1,203	-1,434	-1,564	-1,976	-2,459	-2,592	-2,449	-6,853	-5,520	-9,475	-10,216	-10,818
R&D expenses	-750	-825	-957	-1,081	-1,301	-1,581	-1,667	-1,575	-3,877	-3,612	-6,124	-6,570	-6,957
EBIT	-1,411	2,496	3,967	3,962	4,279	5,687	6,103	5,599	11,800	9,014	21,668	23,468	23,607
Net Interest Income	-435	-340	-303	-256	-292	-320	-356	-349	-1,487	-1,334	-1,316	-1,331	-1,264
Net Other Income	199	50	193	266	86	300	314	302	-837	708	1,003	1,270	1,360
Pre-Tax Profit	-1,646	2,206	3,857	3,972	4,073	5,668	6,062	5,552	9,476	8,388	21,355	23,407	23,703
Tax	-50	559	558	418	455	850	909	833	-2,268	-1,485	-3,048	-3,511	-3,556
Net Profit After Extraordinaries	-1,567	1,674	3,187	3,450	3,395	4,715	5,042	4,619	6,160	6,745	17,772	19,471	19,718
Empl. Bonus -adj. EPS (NT\$)	-0.30	0.33	0.62	0.67	0.64	0.87	0.94	0.86	1.15	1.31	3.31	3.61	3.66
Key Drivers													
Wirebonder	8,419	8,501	8,880	9,515	9,817	10,617	11,217	11,717	8,446.0	9,515.0	11,717.0	13,282.0	14,657.0
Utilization (%)	42%	72%	89%	90%	83%	91%	94%	85%	77%	73%	88%	86%	83%
Tester	1,572	1,510	1,569	1,603	1,634	1,644	1,664	1,674	1,583	1,603	1,674	1,724	1,764
Utilization (%)	45%	65%	77%	74%	75%	81%	81%	76%	75%	65%	78%	81%	80%
Margins (%)													
Gross Margin	4.9	21.7	25.2	25.1	20.1	21.0	21.2	20.9	23.9	21.2	20.8	21.0	20.4
Operating Margin	-10.5	12.0	15.7	15.1	11.4	12.3	12.5	12.2	12.5	10.5	12.1	12.2	11.6
Net Margin	-11.7	8.0	12.6	13.1	9.0	10.2	10.3	10.0	6.5	7.9	9.9	10.1	9.7
Sequential Growth (%)													
Revenue	-26.8	55.9	20.7	4.3	42.8	23.6	5.1	-5.7	-6.7	-9.2	108.4	7.4	5.7
Gross Profit	-82.2	587.3	40.5	3.9	14.4	28.7	6.5	-7.1	-22.6	-19.5	105.4	8.0	2.8
EBIT	n.m.	n.m.	58.9	-0.1	8.0	32.9	7.3	-8.3	-38.9	-23.6	140.4	8.3	0.6
Net Profit	n.m.	n.m.	90.3	8.2	-1.6	38.9	6.9	-8.4	-49.4	9.5	163.5	9.6	1.3
EPS	n.m.	n.m.	90.4	7.9	-4.0	36.4	6.9	-8.4	-44.9	13.6	153.7	9.1	1.3

Source: Citi Investment Research and Analysis estimates

Figure 62. ASE Balance Sheet (NT\$mn)

	2006	2007	2008	2009	2010E	2011E	2012E
Cash and Cash Equivalents	26,634	28,216	27,406	27,578	26,870	39,093	51,960
Account Receivables	11,455	18,748	11,388	17,812	40,912	43,521	44,752
Inventory	5,674	5,596	4,779	12,206	25,342	26,958	27,720
Total Other Current Assets	5,000	4,343	2,793	3,817	6,889	7,328	7,536
Total Current Assets	48,763	56,902	46,367	61,413	100,013	116,901	131,967
Net Fixed Assets	73,544	81,788	84,758	79,364	101,315	100,923	99,142
Other Long Term Assets	9,000	8,837	16,738	16,124	20,497	20,497	20,497
Long Term Investments and Associates	5,735	4,850	4,327	5,160	2,640	2,949	3,295
Total Long Term Assets	88,278	95,475	105,823	100,648	124,452	124,370	122,934
Total Assets	137,041	152,377	152,190	162,061	224,466	241,271	254,902
ST Debt and Current Portion of LT Debt	2,868	9,072	8,779	13,025	24,571	24,783	24,639
Accounts Payable	7,305	9,242	5,167	8,954	24,808	26,702	27,702
Other Current Liabilities	17,837	17,437	11,324	12,595	21,684	23,067	23,719
Total Current Liabilities	28,010	35,751	25,271	34,574	71,063	74,552	76,060
Long Term Debt	29,398	23,936	51,230	49,080	53,259	53,720	53,406
Other Long Term Liabilities	2,506	2,951	3,728	3,693	3,992	3,992	3,992
Total Long Term Liabilities	31,904	26,887	54,959	52,773	57,251	57,712	57,398
Total Equity	77,127	89,740	71,961	74,714	96,151	109,008	121,443
Total Liabilities and Equity	137,041	152,377	152,190	162,061	224,466	241,271	254,902

Source: Citi Investment Research and Analysis estimates

Figure 63. ASE Cash Flow Statement

(NT\$mn)	2006	2007	2008	2009	2010E	2011E	2012E
Net Income	17,416	12,165	6,160	6,745	17,772	19,471	19,718
Depreciation and Amortization	15,074	15,641	16,334	16,776	16,648	15,891	16,662
Changes in Working Capital:	7,204	-5,021	-462	-9,817	-14,365	-1,388	-547
Net Cash from Operations	42,560	24,613	23,079	13,862	20,591	34,399	36,263
Purchase of Property, Plant & Equipment	-20,577	-23,885	-19,303	-11,382	-38,599	-15,500	-14,880
Other investing activities	806	1,047	-7,378	-219	-1,853	-309	-346
Net Cash from Investing Activities	-19,771	-22,838	-26,681	-11,601	-40,453	-15,809	-15,226
Issuance/Repayment of Debt	-15,681	742	27,002	2,096	15,725	673	-458
Change in other LT liabilities	43	445	777	-35	299	0	0
Change in Common Equity - net	-1,531	11,247	4,834	-1,397	1,370	0	0
Payment of Cash Dividends	0	-6,669	-8,827	-2,576	-1,978	-7,039	-7,713
Other Financing Charges, Net	3,396	-5,958	-20,994	-178	3,739	0	0
Net Cash from Financing Activities	-13,772	-194	2,792	-2,090	19,154	-6,367	-8,171
Net Change in Cash and Cash Equivalents	9,018	1,582	-810	172	-708	12,223	12,866
Cash at Beginning of Period	17,617	26,634	28,216	27,406	27,578	26,870	39,093
Cash at end of Period	26,634	28,216	27,406	27,578	26,870	39,093	51,960

Source: Citi Investment Research and Analysis estimates

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Data as of: 02-Jul-10

Radar Screen Quadrant Definitions

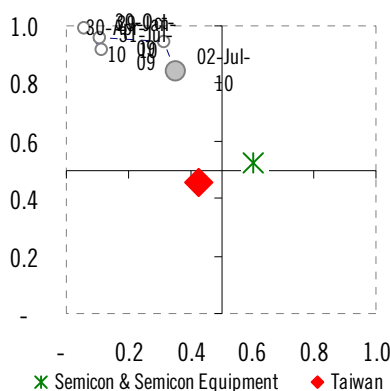
Glamor <i>Poor relative value but superior relative momentum</i>	Attractive <i>Superior relative value and superior relative momentum</i>
Unattractive <i>Poor relative value and poor relative momentum</i>	Contrarian <i>Superior relative value but poor relative momentum</i>

Quants View on ASE – Glamour

Advanced Semiconductor Engineering currently lies in the Glamour quadrant of our Value-Momentum map with strong momentum but relatively weak value scores. Having been a resident there since the past 11 months. Compared to its peers in the Semicon & Semicon Equipment sector, Advanced Semiconductor Engineering fares worse on the valuation metric but better on the momentum metric. Similarly, compared to its peers in its home market of Taiwan, Advanced Semiconductor Engineering fares worse on the valuation metric but better on the momentum metric.

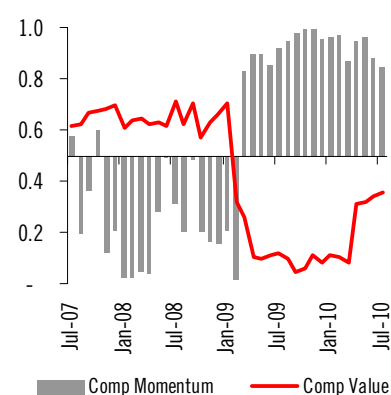
From a macro perspective, Advanced Semiconductor Engineering is likely to benefit from falling Commodity (ex-oil) prices, weaker US dollar, and a weaker Yen.

Figure 64. Radar Quadrant Chart History



Source: CIRA

Figure 65. Radar Valuation Momentum Ranks



Source: CIRA

Figure 66. Radar Model Inputs

IBES EPS (Actual and Estimates)

FY(-2)	2.27	Implied Trend Growth (%)	15.84
FY(-1)	1.14	Trailing PE (x)	19.35
FY0	1.29	Implied Cost of Debt (%)	2.66
FY1	2.83	Standardised MCap	0.50
FY2	3.12		

Note: Standardised MCap calculated as a Z score – (mkt cap - mean)/std dev – capped at 3

Source: Citi Investment Research and Analysis, Worldscope, I/B/E/S

Figure 67. Stock Performance Sensitivity to Key Macro Factors

Region	1.06	Commodity ex Oil	(0.27)
Local Market	0.75	Rising Oil Prices	0.25
Sector	0.68	Rising Asian IR's	(0.20)
Growth Outperforms Value	0.99	Rising EM Yields	0.10
Small Caps Outperform Large Caps	(0.19)	Weaker US\$ (vs Asia)	2.27
Widening US Credit Spreads	(0.13)	Weaker ¥ (vs US\$)	0.86

Source: Citi Investment Research and Analysis

ASE

Company description

The ASE Group is the world's largest provider of independent semiconductor manufacturing services in assembly and test, with 14.9% market share in 2009. The group develops and offers a wide portfolio of technology and solutions, including IC test program design, front-end engineering test, wafer probe, wafer bump, substrate design and supply, wafer level package, flip chip, system-in-package, final test and design manufacturing services (DMS, ODM/EMS) through Universal Scientific Industrial Co, which is to be acquired by ASE in 2010.

Investment strategy

We rate ASE shares as Buy / Medium Risk (1M), with a target price of NT\$34. We like ASE due to: 1) ASE leads in technology development, especially in cost-cutting initiatives such as copper migration, aQFN, fan-outs and high-density package; 2) ASE is taking share aggressively by its aggressive move into copper; 3) strong outsourcing increases from Japanese and European IDMs, 4) seasonal correction in 4Q10 mitigated by IDM outsourcing and copper migration.

Valuation

We set our DCF-based target price at NT\$34. We use a DCF-based valuation to reflect ASE's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.24, we calculate ASE's WACC as 6.5%. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's long term semiconductor industry growth of 7%.

Our target is equivalent to 10.3x 2010E EPS and 2.0x 2010E BVPS. It is also at ASE's 8-year P/B mean plus one standard deviation, which is not too stretched, in our view, given its historical trading range and the structural change of its competitive advantage relative to peers. We believe the target P/E valuation is also fair based on its historical range and valuation of semiconductor peers. Given the share gain on copper migration, ASE's share price looks attractive, as it trades below 8-year mean of forward 1-year P/B of 1.7x; and we believe it is not justified for ASE to trade at a lower P/B relative to SPIL.

Risks

Our quantitative risk-rating system assigns a Medium Risk rating to ASE shares, based on the stock's 260-day historical volatility. Key downside risks that could prevent the shares from reaching our target price include: 1) weaker-than-expected 4Q10 on global semiconductor demand, 2) competitors catching up faster than expected in copper migration, 3) industry oversupply resulting from aggressive capacity expansion, 4) the acquisition of EMS businesses makes it more difficult for investors to evaluate the company with OSAT peers, which can result in less favorable valuation, and 5) although debt ratio has been reducing, the financial gearing is still much higher than peers, which may be considered as negative when adverse times come.

Company Focus

Initiation of coverage

Hold/Low Risk	2L
Price (07 Jul 10)	NT\$35.90
Target price	NT\$37.00
Expected share price return	3.1%
Expected dividend yield	7.2%
Expected total return	10.3%
Market Cap	NT\$111,877M
	US\$3,474M

Price Performance (RIC: 2325.TW, BB: 2325 TT)



SPIL (2325.TW)

Initiating at Hold: Pricing Pressure and Margin Headwinds Ahead

■ **Initiate with Hold and NT\$37 target** — We initiate coverage on SPIL with a Hold / Low Risk (2L) rating and DCF-based target price of NT\$37, equivalent to P/E of 14.6x FY10E and P/B of 1.8x of FY10E. We do not expect SPIL's share price to trade back to 2x BVPS given: 1) continued pricing pressure from copper wire bonding and other low-cost solutions. SPIL is reactively matching competitors' solution and pricing; 2) bumpy operations during implementation of new technologies; and 3) an inert player in R&D. We prefer ASE to SPIL in the OSAT sector.

■ **Pricing under pressure and margin headwinds ahead** — SPIL generated higher OP margin than ASE since 2007, but the situation reversed from 4Q09; and SPIL's -10% QoQ revenue growth in 1Q10 vs. ASE's +4% QoQ (excluding EMS business) fully reflected SPIL's lagging technology position in copper wire bonding and severe pricing pressure from ASE's aggressive push into copper. As the late-comer in copper and with a smaller scale of copper capacity, SPIL's potential margin upside from its migration into copper would be much narrower. It's unlikely for SPIL to return to high gross margin levels (high-20s to mid-30s in 2006-07) in the long run. We expect SPIL to report 2Q10/3Q10 gross margin of 19%/20%, compared to our forecast of 26%/26% for ASE (OSAT only).

■ **Market's high expectations on SPIL's technology ramp-up appear overoptimistic** — Some in the market are looking for the timing to switch from ASE to SPIL on expectations of SPIL's technology catch-up, improving profitability and higher dividend yield. However, we believe it's premature to play with this theme given: 1) SPIL is still struggling with copper wire bonding yield rate, and 2) the gap of copper wire bonder capacity between ASE and SPIL is enlarging. K&S, the only copper wire bonder supplier, has commented that 1/3rd of its 1H10 orders were shipped to ASE and 16%-17% orders to SPIL. Furthermore, SPIL is also less ready on the other low-cost solutions such as aQFN, fan-outs and high density package.

■ **Limited share price upside** — SPIL is trading at P/E of 14.2x FY10E, a huge premium to ASE (7.9x), PTI (8.6x) and Chipbond (8.9x). We believe the favorable valuation on SPIL is not sustainable in the face of continuous pricing and margin pressure. However, significant downside is less likely with the support of 7% cash dividend yield.

Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2008A	6,314	2.05	-64.7	17.5	1.9	9.8	5.0
2009A	8,790	2.82	37.8	12.7	1.8	14.4	7.2
2010E	7,889	2.53	-10.3	14.2	1.8	12.5	5.6
2011E	8,792	2.82	11.4	12.7	1.7	13.8	6.3
2012E	9,289	2.98	5.7	12.0	1.7	14.0	7.5

Source: Powered by dataCentral

Fiscal year end 31-Dec	2008	2009	2010E	2011E	2012E
Valuation Ratios					
P/E adjusted (x)	17.5	12.7	14.2	12.7	12.0
EV/EBITDA adjusted (x)	5.1	5.7	5.2	4.7	4.4
P/BV (x)	1.9	1.8	1.8	1.7	1.7
Dividend yield (%)	5.0	7.2	5.6	6.3	7.5
Per Share Data (NT\$)					
EPS adjusted	2.05	2.82	2.53	2.82	2.98
EPS reported	2.05	2.82	2.53	2.82	2.98
BVPS	19.03	20.24	20.10	20.90	21.62
DPS	1.80	2.58	2.03	2.26	2.68
Profit & Loss (NT\$M)					
Net sales	62,403	59,295	66,192	70,886	75,240
Operating expenses	-53,459	-51,152	-57,154	-60,798	-64,598
EBIT	8,944	8,143	9,038	10,087	10,642
Net interest expense	277	12	28	23	24
Non-operating/exceptionals	-2,697	2,058	208	232	262
Pre-tax profit	6,524	10,213	9,273	10,343	10,928
Tax	-211	-1,423	-1,384	-1,551	-1,639
Extraord./Min.Int./Pref.div.	0	0	0	0	0
Reported net income	6,314	8,790	7,889	8,792	9,289
Adjusted earnings	6,314	8,790	7,889	8,792	9,289
Adjusted EBITDA	17,576	16,410	17,663	19,698	20,627
Growth Rates (%)					
Sales	-3.4	-5.0	11.6	7.1	6.1
EBIT adjusted	-44.0	-9.0	11.0	11.6	5.5
EBITDA adjusted	-24.7	-6.6	7.6	11.5	4.7
EPS adjusted	-64.7	37.8	-10.3	11.4	5.7
Cash Flow (NT\$M)					
Operating cash flow	18,352	16,975	19,427	18,500	19,253
Depreciation/amortization	8,632	8,267	8,625	9,610	9,985
Net working capital	3,406	-82	2,913	98	-20
Investing cash flow	-5,357	-7,361	-15,366	-12,010	-11,026
Capital expenditure	-11,185	-5,743	-15,413	-12,000	-11,000
Acquisitions/disposals	0	0	0	0	0
Financing cash flow	-15,283	-8,377	-8,541	-6,302	-7,029
Borrowings	656	-3,427	-37	9	4
Dividends paid	-13,836	-5,609	-8,040	-6,311	-7,033
Change in cash	-2,288	1,237	-4,480	188	1,198
Balance Sheet (NT\$M)					
Total assets	73,380	78,311	79,380	83,289	85,896
Cash & cash equivalent	18,841	20,078	15,598	15,786	16,984
Accounts receivable	7,336	11,299	11,410	12,435	12,720
Net fixed assets	38,840	36,316	43,104	45,494	46,509
Total liabilities	14,066	15,229	16,729	18,158	18,510
Accounts payable	4,837	7,954	7,668	8,294	8,421
Total Debt	3,652	225	189	198	202
Shareholders' funds	59,314	63,081	62,651	65,131	67,386
Profitability/Solvency Ratios (%)					
EBITDA margin adjusted	28.2	27.7	26.7	27.8	27.4
ROE adjusted	9.8	14.4	12.5	13.8	14.0
ROIC adjusted	20.5	15.9	18.1	19.3	19.6
Net debt to equity	-25.6	-31.5	-24.6	-23.9	-24.9
Total debt to capital	5.8	0.4	0.3	0.3	0.3

For further data queries on Citi's full coverage universe please contact CIRA Data Services Asia Pacific at CIRADataServicesAsiaPacific@citi.com or +852-2501-2791



Figure 68. SPIL QFII Holding



Source: TEJ

Valuation and target price

We introduce our DCF-based target price of NT\$37. We use a DCF-based valuation to reflect SPIL's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.2, we calculate SPIL's WACC as 9.7%. On SPIL's conservative approach to financial leverage, its WACC is higher comparing to peers. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's expectation of long-term semiconductor industry growth of 7%.

Our target price is equivalent to 14.6x 2010E EPS and 1.8x 2010E BVPS. It is slightly below SPIL's 8-year mean P/B plus one standard deviation. Due to SPIL's lagging technology position, we believe SPIL should no longer enjoy a valuation premium to ASE as in the previous three years.

Figure 69. SPIL WACC Assumptions

Risk Free Rate	1.36%
Risk Premium	7.00%
Beta	1.20
Cost of debt	3.0%
Tax rate	15.0%
Debt / (Debt+Equity)	0.3%
WACC	9.7%

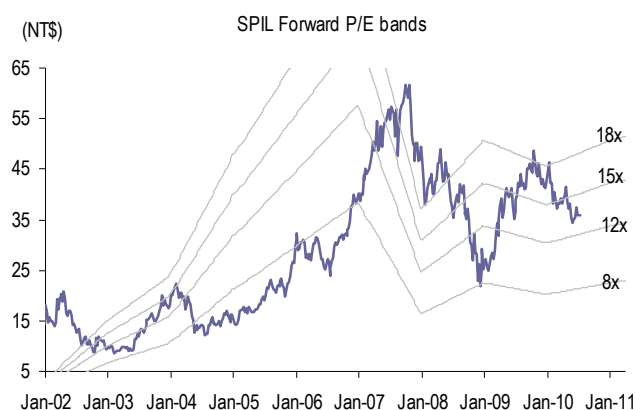
Source: CIRA estimates

Figure 70. SPIL DCF Assumptions

	2008	2009	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E
Sales Growth	-3%	-5%	12%	7%	6%	3%	3%	3%	3%	3%	3%	3%
EBIT margin	14%	14%	14%	14%	14%	13%	13%	13%	13%	13%	13%	13%
Fixed asset turns	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Working capital turns	15.0	14.5	43.5	42.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7
Net other assets turns	20.8	14.3	37.1	39.7	42.1	42.1	42.1	42.1	42.1	42.1	42.1	42.1
Cash tax as % of EBIT	-2%	21%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%

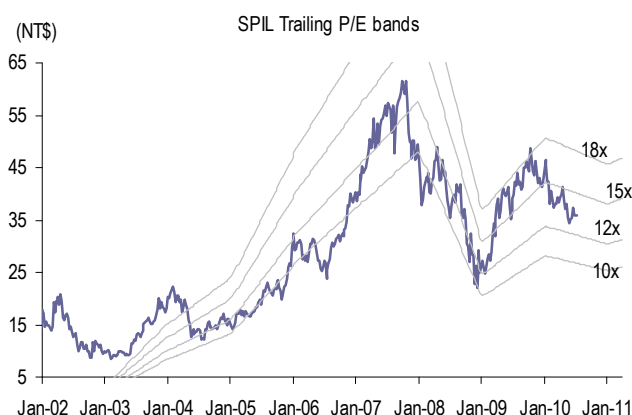
Source: Citi Investment Research and Analysis estimates

Figure 71. SPIL Forward P/E Band



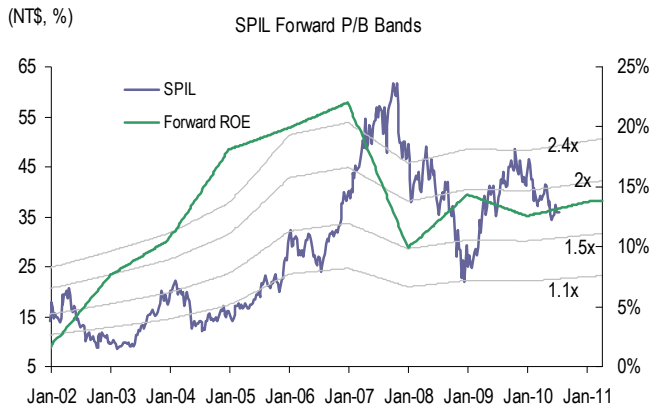
Source: Citi Investment Research and Analysis estimates

Figure 72. SPIL Trailing P/E Band



Source: Citi Investment Research and Analysis

Figure 73. SPIL Forward P/B Band vs. Forward ROE



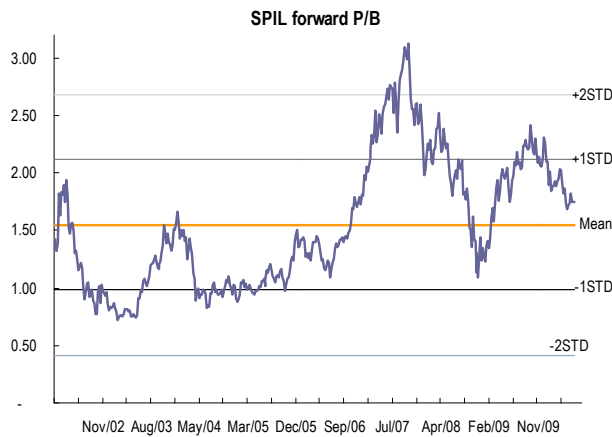
Source: Citi Investment Research and Analysis estimates

Figure 74. SPIL Trailing P/B Band vs. Trailing ROE



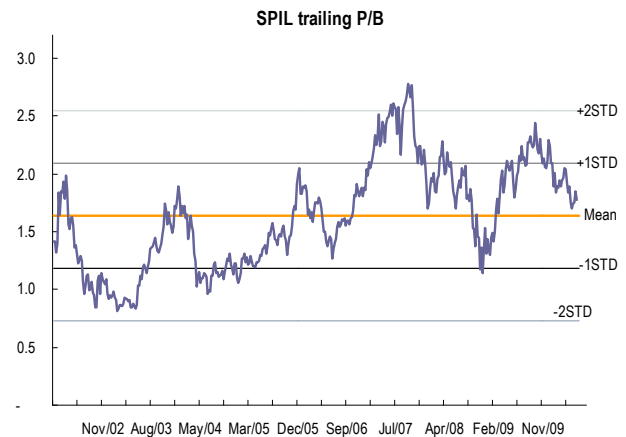
Source: Citi Investment Research and Analysis

Figure 75. SPIL Forward P/B Range



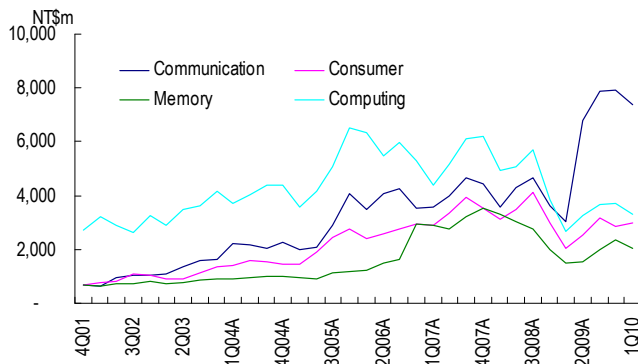
Source: Citi Investment Research and Analysis estimates

Figure 76. SPIL Trailing P/B Range



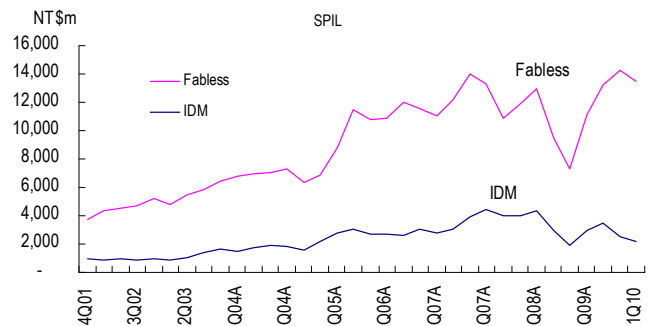
Source: Citi Investment Research and Analysis

Figure 77. SPIL Revenue Breakdown by Application



Source: Company

Figure 78. SPIL Revenue Breakdown by IDM / Fabless



Source: Company

Figure 79. SPIL Key Earnings Assumptions

Consolidated (NT\$ in Mn, year-end Dec)	2009				2010E				2008	2009	2010E	2011E	2012E
	1Q	2Q	3Q	4Q	1Q	2QE	3QE	4QE					
Revenue	9,619	14,681	17,466	17,528	15,689	16,387	17,463	16,654	62,403	59,295	66,192	70,886	75,240
Depreciation	2,175	2,063	2,001	2,028	2,100	2,109	2,148	2,269	8,632	8,267	8,625	9,610	9,985
COGS	8,770	11,659	13,418	14,005	13,175	13,333	14,023	13,427	-49,456	-47,852	-53,958	-57,254	-60,083
Gross Profit	849	3,022	4,048	3,523	2,513	3,053	3,440	3,227	12,947	11,443	12,234	13,632	15,156
Operating Expense	747	749	833	971	797	778	829	791	-4,003	-3,300	-3,196	-3,544	-4,514
EBIT	102	2,273	3,216	2,552	1,716	2,275	2,611	2,436	8,944	8,143	9,038	10,087	10,642
Net Interest Income	4	-5	7	7	7	8	8	5	277	12	28	23	24
Net Other Income	211	-117	-118	2,081	49	51	55	52	-2,697	2,058	208	232	262
Pre Tax Profit	317	2,151	3,105	4,640	1,773	2,334	2,674	2,493	6,524	10,213	9,273	10,343	10,928
Tax	56	487	543	338	259	350	401	374	-211	-1,423	-1,384	-1,551	-1,639
Net Profit	262	1,664	2,561	4,303	1,514	1,984	2,273	2,119	6,314	8,790	7,889	8,792	9,289
Reported EPS (NT\$)	0.08	0.53	0.82	1.38	0.49	0.64	0.73	0.68	2.05	2.82	2.53	2.82	2.98
Key Drivers (consolidated from 2010)													
Wirebonders	4,652	4,698	4,909	4,939	5,855	6,305	7,205	8,105	4,656	4,939	8,105	8,625	9,075
Utilization (%)	50%	81%	93%	95%	95%	93%	93%	81%	84%	80%	90%	83%	88%
Testers	375	375	381	382	424	427	431	434	374	382	434	445	455
Utilization (%)	38%	67%	85%	85%	80%	83%	83%	75%	73%	69%	80%	80%	84%
Margins (%)													
Gross Margin	8.8	20.6	23.2	20.1	16.0	18.6	19.7	19.4	20.7	19.3	18.5	19.2	20.1
Operating Margin	1.1	15.5	18.4	14.6	10.9	13.9	15.0	14.6	14.3	13.7	13.7	14.2	14.1
Net Margin	2.7	11.3	14.7	24.5	9.6	12.1	13.0	12.7	10.1	14.8	11.9	12.4	12.3
Sequential Growth (%)													
Revenue	-25.7	52.6	19.0	0.4	-10.5	4.5	6.6	-4.6	-3.4	-5.0	11.6	7.1	6.1
Gross Profit	-65.3	255.8	34.0	-13.0	-28.7	21.5	12.7	-6.2	-32.5	-11.6	6.9	11.4	11.2
EBIT	-91.6	2123.6	41.5	-20.6	-32.7	32.5	14.8	-6.7	-44.0	-9.0	11.0	11.6	5.5
Net Profit	n.m.	535.8	53.9	68.0	-64.8	31.1	14.6	-6.8	-63.9	39.2	-10.2	11.4	5.7
EPS	n.m.	535.8	54.0	67.9	-64.8	31.1	14.6	-6.8	-57.5	37.8	-10.3	11.4	5.7

Source: Citi Investment Research and Analysis estimates

Figure 80. SPIL Balance Sheet

(NT\$Mn)	2005	2006	2007	2008	2009	2010E	2011E	2012E
Cash and Cash Equivalents	10,569	13,353	21,129	18,841	20,078	15,598	15,786	16,984
Account Receivables	9,526	8,899	10,917	7,336	11,299	11,410	12,435	12,720
Inventory	2,764	2,765	3,243	2,383	2,992	3,304	3,600	3,683
Total Other Current Assets	2,091	1,860	2,512	1,587	1,614	0	0	0
Total Current Assets	24,949	26,878	37,801	30,147	35,983	30,311	31,820	33,387
Net Fixed Assets	29,139	32,238	36,287	38,840	36,316	43,104	45,494	46,509
Other Long Term Assets	2,668	2,596	1,396	2,996	4,141	1,786	1,786	1,786
Long Term Investments and Associates	9,701	16,144	8,825	1,398	1,870	4,179	4,189	4,215
Total Long Term Assets	41,508	50,978	46,508	43,233	42,327	49,068	51,468	52,509
Total Assets	66,457	77,856	84,309	73,380	78,311	79,380	83,289	85,896
ST Debt and Current Portion of LT Debt	1,467	19	0	1,404	225	189	198	202
Accounts Payable	5,037	3,968	6,122	4,837	7,954	7,668	8,294	8,421
Other Current Liabilities	4,252	4,960	6,100	5,425	6,826	8,833	9,626	9,848
Total Current Liabilities	10,755	8,946	12,221	11,666	15,005	16,690	18,118	18,471
Long Term Debt	14,644	5,697	2,996	2,248	0	0	0	0
Other Long Term Liabilities	234	276	183	152	224	40	40	40
Total Long Term Liabilities	14,877	5,973	3,179	2,400	224	40	40	40
Total Equity	40,825	62,936	68,908	59,314	63,081	62,651	65,131	67,386
Total Liabilities and Equity	66,457	77,856	84,309	73,380	78,311	79,380	83,289	85,896

Source: Citi Investment Research and Analysis estimates

Figure 81. SPIL Cash Flow Statement

(NT\$Mn)	2005	2006	2007	2008	2009	2010E	2011E	2012E
Net Income	8,244	13,329	17,489	6,314	8,790	7,889	8,792	9,289
Depreciation and Amortization	6,440	6,983	7,349	8,632	8,267	8,625	9,610	9,985
Changes in Working Capital:	-425	495	147	3,406	-82	2,913	98	-20
Net Cash from Operations	13,609	20,807	24,985	18,352	16,975	19,427	18,500	19,253
Purchase of Property, Plant & Equipment	-9,286	-10,083	-11,398	-11,185	-5,743	-15,413	-12,000	-11,000
Other investing activities	-787	-6,371	8,518	5,828	-1,618	47	-10	-26
Net Cash from Investing Activities	-10,073	-16,453	-2,880	-5,357	-7,361	-15,366	-12,010	-11,026
Issuance/Repayment of Debt	-4,177	-10,395	-2,719	656	-3,427	-37	9	4
Change in other LT liabilities	202	43	-93	-32	73	-185	0	0
Change in Common Equity - net	3,271	17,029	1,261	2,702	-5,818	5,720	0	0
Payment of Cash Dividends	-1,759	-4,170	-9,974	-13,836	-5,609	-8,040	-6,311	-7,033
Other Financing Charges, Net	-1,773	-4,078	-2,804	-4,774	6,405	-6,000	0	0
Net Cash from Financing Activities	-4,237	-1,570	-14,330	-15,283	-8,377	-8,541	-6,302	-7,029
Net Change in Cash and Cash Equivalents	-701	2,784	7,776	-2,288	1,237	-4,480	188	1,198
Cash at Beginning of Period	11,271	10,569	13,353	21,129	18,841	20,078	15,598	15,786
Cash at end of Period	10,569	13,353	21,129	18,841	20,078	15,598	15,786	16,984

Source: Citi Investment Research and Analysis estimates

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Data as of: 02-Jul-10

Radar Screen Quadrant Definitions

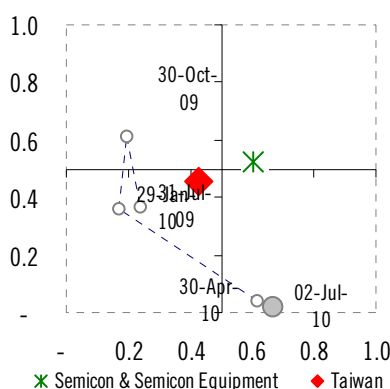
Glamor <i>Poor relative value but superior relative momentum</i>	Attractive <i>Superior relative value and superior relative momentum</i>
Unattractive <i>Poor relative value and poor relative momentum</i>	Contrarian <i>Superior relative value but poor relative momentum</i>

Quants View on SPIL – Contrarian

Siliconware Precision Industries currently lies in the Contrarian quadrant of our Value-Momentum map with relatively weak momentum but strong value scores. It has been a resident there since the past two months. Compared to its peers in the Semicon & Semicon Equipment sector, Siliconware Precision Industries fares better on the valuation metric but worse on the momentum metric. Similarly, compared to its peers in its home market of Taiwan, Siliconware Precision Industries fares better on the valuation metric but worse on the momentum metric.

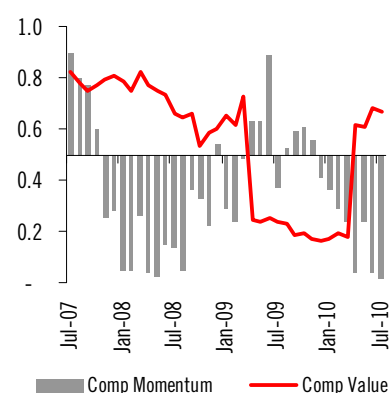
From a macro perspective, Siliconware Precision Industries is likely to benefit from Growth outperformance, weaker US dollar, and a weaker Yen.

Figure 82. Radar Quadrant Chart History



Source: CIRA

Figure 83. Radar Valuation Momentum Ranks



Source: CIRA

Figure 84. Radar Model Inputs

IBES EPS (Actual and Estimates)

FY(-2)	5.74	Implied Trend Growth (%)	(12.47)
FY(-1)	2.03	Trailing PE (x)	11.10
FY0	2.80	Implied Cost of Debt (%)	3.51
FY1	2.73	Standardised MCap	0.44
FY2	3.32		

Note: Standardised MCap calculated as a Z score – (mkt cap - mean)/std dev – capped at 3

Source: Citi Investment Research and Analysis, Worldscope, I/B/E/S

Figure 85. Stock Performance Sensitivity to Key Macro Factors

Region	0.91	Commodity ex Oil	0.09
Local Market	0.63	Rising Oil Prices	0.15
Sector	0.85	Rising Asian IR's	(0.06)
Growth Outperforms Value	1.51	Rising EM Yields	0.09
Small Caps Outperform Large Caps	(0.52)	Weaker US\$ (vs Asia)	2.18
Widening US Credit Spreads	0.06	Weaker ¥ (vs US\$)	1.33

Source: Citi Investment Research and Analysis

SPIL

Company description

Established in 1984, SPIL listed on the Taiwan Stock Exchange in 1993 and became a public company on the NASDAQ Stock Exchange in 2000. SPIL is a back-end IC packaging turnkey solution provider that include wafer bumping, wafer sort, assembly and testing. SPIL has manufacturing sites in Taiwan (Taichung, Hsinchu, Changhua) and China (Suzhou). SPIL is the world-wide No.3 Outsourced Assembly and Test (OSAT) provider with 10.3% market share in 2009, according to Gartner.

Investment strategy

We rate SPIL shares Hold / Low Risk (2L) with a target price of NT\$37. We expect SPIL's share price to hover at current levels because: 1) competitor ASE is taking market share with aggressive migration to copper wire bonding and other low-cost solutions; 2) SPIL is catching up in these new technologies, but bumpy operations are expected during the implementation stage; 3) SPIL has been an inert player in R&D. Given these issues, we believe SPIL should no longer enjoy a valuation premium to ASE as in the previous three years. However, significant downside is less likely with the support of 7% cash dividend yield.

Valuation

We set a DCF-based target price of NT\$37. We use a DCF-based valuation to reflect SPIL's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.2, we calculate SPIL's WACC as 9.7%. On SPIL's conservative approach to financial leverage, its WACC is higher comparing to peers. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's expectation of long-term semiconductor industry growth of 7%.

Our target price is equivalent to 14.6x 2010E EPS and 1.8x 2010E BVPS. It is slightly below SPIL's 8-year mean P/B plus one standard deviation. Due to SPIL's lagging technology position, we believe SPIL should no longer enjoy a valuation premium to ASE as in the previous three years. SPIL is broadly fair-valued as it currently trades between its 8-year forward P/B mean (1.5x) and mean plus one standard deviation.

Risks

Our quantitative risk-rating system assigns a Low Risk rating to SPIL shares, based on its 260-day historical volatility. Key upside risks include: 1) faster-than-expected catch-up in copper wire bonding, 2) expedited IDM outsourcing, such as AMD, 3) stronger-than-expected 2H10 seasonality, 4) copper wire bonder supply does not appear as bottlenecked as expected. Key downside risks include: 1) weaker-than-expected 4Q10 on global semiconductor demand, 2) slow improvement in copper wire bonding yield rate, 3) industry oversupply resulting from aggressive capacity expansion, 4) foundries integrating more back-end service in-house. Any of these risk factors could cause the shares to deviate from our target price.

Company Focus

Initiation of coverage

Buy/Low Risk	1L
Price (07 Jul 10)	NT\$93.00
Target price	NT\$130.00
Expected share price return	39.8%
Expected dividend yield	3.8%
Expected total return	43.5%
Market Cap	NT\$65,494M
	US\$2,034M

Price Performance (RIC: 6239.TW, BB: 6239 TT)



Powertech Technology (6239.TW)

Initiating at Buy: Operations Continue to Decouple From Taiwan DRAM Makers

- Initiate with Buy and NT\$130 target** — We initiate coverage on PTI with a Buy / Low Risk (1L) rating. Leveraging its tight utilization and lean cost structure, PTI should benefit from the severe DRAM supply shortage we see in 3Q10. Supply tightness supports firm DRAM prices and keeps PTI loading at a high utilization in 2H10. PTI should also benefit from high operating leverage. Our DCF-based TP, implying 40% upside, is based on assumptions of 3% rev growth and 15% long-term EBIT margin. It equates to P/E of 12.1x FY10E and P/B of 2.8x FY10E, compared to average forward P/E and P/B from 2003 to 1Q10 of 9.1x and 2.1x.
- Sustainable high margins** — We expect PTI's gross margin to be sustained at nearly 30% in 2011E/2012E thanks to a high and stable utilization contributed from strategic customers. Meanwhile, Kingston's flexible business model also works as a good fab filler to PTI during the downturn. Combined with a lean operating expense structure, PTI is able to deliver industry-high EBIT margin (~25%).
- Moderate revenue growth in 2011E and 2012E** — While we are confident on high margins over time, top-line growth is set to be moderate in the long run given a very high share at its key customers; upside on top of 80% in Elpida's DRAM and 70% in Toshiba's NAND looks limited. Growth from other DRAM chipmakers also looks unlikely due to the very fragmented business nature of DRAM back-end. PTI's plans to get into the logic OSAT space do not add value, in our view, as high capital intensity for small volume and high variety products and lower margin are drags to PTI's operation. We estimate 6% and 4% total revenue growth in 2011E and 2012E, compared to 40% revenue CAGR over 2000-2010E.
- Attractive valuations** — PTI's shares are trading at P/E of 8.6x FY10E and P/B of 2.0x FY10E, below its average 9.1x P/E and 2.1x P/B from 2003 to 2010. We believe recent concerns about DRAM demand peaking out in 1H10 are already in the price. PTI shares have underperformed the market by 6% YTD. As we expect DRAM supply will be in a severe shortage in 2H10 due to capacity allocation to NAND, PTI should benefit from firm DRAM demand and pricing. PTI is our top buy idea in the back-end sector, and we think recent share price weakness represents an attractive entry point.

Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2008A	6,545	10.07	3.2	9.2	2.9	33.3	3.2
2009A	4,956	7.44	-26.1	12.5	2.5	21.2	3.8
2010E	7,509	10.77	44.6	8.6	2.0	26.0	5.2
2011E	8,441	11.99	11.3	7.8	1.7	24.1	5.8
2012E	8,748	12.42	3.6	7.5	1.5	21.9	6.0

Source: Powered by dataCentral

Fiscal year end 31-Dec	2008	2009	2010E	2011E	2012E
Valuation Ratios					
P/E adjusted (x)	9.2	12.5	8.6	7.8	7.5
EV/EBITDA adjusted (x)	5.3	5.3	4.0	3.4	3.1
P/BV (x)	2.9	2.5	2.0	1.7	1.5
Dividend yield (%)	3.2	3.8	5.2	5.8	6.0
Per Share Data (NT\$)					
EPS adjusted	10.07	7.44	10.77	11.99	12.42
EPS reported	10.07	7.44	10.77	11.99	12.42
BVPS	32.48	37.83	46.11	53.29	60.32
DPS	3.00	3.50	4.80	5.39	5.59
Profit & Loss (NT\$M)					
Net sales	31,189	29,968	36,145	38,292	39,744
Operating expenses	-23,899	-24,054	-27,733	-28,821	-29,877
EBIT	7,290	5,915	8,411	9,471	9,867
Net interest expense	-413	-268	-59	25	87
Non-operating/exceptionals	-315	-262	-9	-12	-12
Pre-tax profit	6,562	5,384	8,343	9,485	9,941
Tax	-17	-428	-835	-1,043	-1,193
Extraord./Min.Int./Pref.div.	0	0	0	0	0
Reported net income	6,545	4,956	7,509	8,441	8,748
Adjusted earnings	6,545	4,956	7,509	8,441	8,748
Adjusted EBITDA	14,462	13,575	16,407	17,691	18,362
Growth Rates (%)					
Sales	27.6	-3.9	20.6	5.9	3.8
EBIT adjusted	2.9	-18.9	42.2	12.6	4.2
EBITDA adjusted	14.7	-6.1	20.9	7.8	3.8
EPS adjusted	3.2	-26.1	44.6	11.3	3.6
Cash Flow (NT\$M)					
Operating cash flow	12,441	15,029	16,087	16,491	17,131
Depreciation/amortization	7,172	7,661	7,996	8,220	8,495
Net working capital	-1,276	2,412	583	-170	-113
Investing cash flow	-9,741	-6,951	-10,119	-10,114	-10,118
Capital expenditure	-9,544	-4,244	-10,117	-10,000	-10,000
Acquisitions/disposals	0	0	0	0	0
Financing cash flow	-384	-3,173	-3,153	-2,627	-3,167
Borrowings	2,637	-1,925	-2,790	751	632
Dividends paid	-2,225	-1,892	-2,465	-3,379	-3,799
Change in cash	2,317	4,905	2,816	3,750	3,846
Balance Sheet (NT\$M)					
Total assets	43,662	49,252	52,482	58,840	64,782
Cash & cash equivalent	4,095	9,000	11,815	15,565	19,411
Accounts receivable	9,748	7,906	7,936	8,463	8,812
Net fixed assets	25,524	23,152	23,956	25,736	27,241
Total liabilities	22,150	23,929	20,013	21,308	22,300
Accounts payable	1,345	1,851	1,701	1,814	1,889
Total Debt	16,537	14,613	11,822	12,574	13,206
Shareholders' funds	21,512	25,323	32,469	37,532	42,481
Profitability/Solvency Ratios (%)					
EBITDA margin adjusted	46.4	45.3	45.4	46.2	46.2
ROE adjusted	33.3	21.2	26.0	24.1	21.9
ROIC adjusted	23.9	18.2	26.5	27.8	27.0
Net debt to equity	57.8	22.2	0.0	-8.0	-14.6
Total debt to capital	43.5	36.6	26.7	25.1	23.7

For further data queries on Citi's full coverage universe please contact CIRA Data Services Asia Pacific at CIRADataServicesAsiaPacific@citi.com or +852-2501-2791

Valuation and target price

We introduce our DCF-based target price of NT\$130. We use a DCF-based valuation to reflect PTI's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.1, we calculate PTI's WACC as 7.3%. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's expectation of long-term semiconductor industry growth of 7%.

Our target price is equivalent to 12.1x 2010E EPS and 2.8x 2010E BVPS. It is slightly above PTI's 8-year mean P/B plus one standard deviation.

PTI's share price started to correct in April 2010 as DRAM prices dropped off peak levels (see chart below), and foreign ownership also declined. But the recent sell-off is overdone, in our view. PTI has proven its capability to generate stable margins during the downturn, and even as DRAM prices began to weaken, PTI maintained its utilization rate at a very high level. Given PTI's stable profitability, lean operating efficiency and strong customer relationships, valuation looks attractive as the stock currently trades below 7-year mean on both P/B and P/E.

Figure 86. PTI WACC Assumptions

Risk Free Rate	1.36%
Risk Premium	7.00%
Beta	1.10
Cost of debt	3.0%
Tax rate	15.0%
Debt / (Debt+Equity)	27.3%
WACC	7.3%

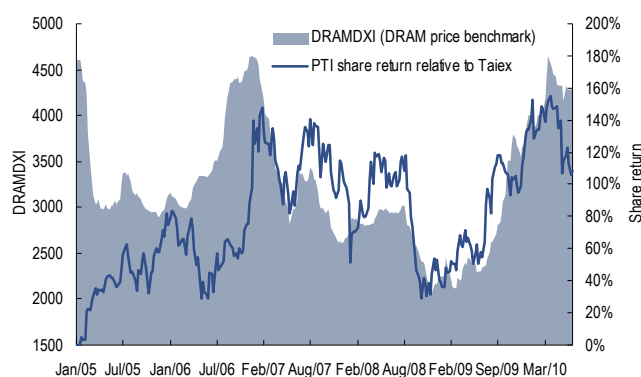
Source: CIRA estimates

Figure 87. PTI DCF Assumptions

	2008	2009	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E
Sales Growth	28%	-4%	21%	6%	4%	3%	3%	3%	3%	3%	3%	3%
EBIT margin	23%	20%	23%	25%	25%	20%	18%	17%	16%	15%	15%	15%
Fixed asset turns	1.2	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Working capital turns	4.6	9.0	8.3	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Net other assets turns	19.9	10.2	12.8	13.6	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Cash tax as % of EBIT	-1%	6%	10%	11%	12%	12%	12%	12%	12%	12%	12%	12%

Source: Citi Investment Research and Analysis estimates

Figure 88. PTI Share Return vs. DRAM Price Index



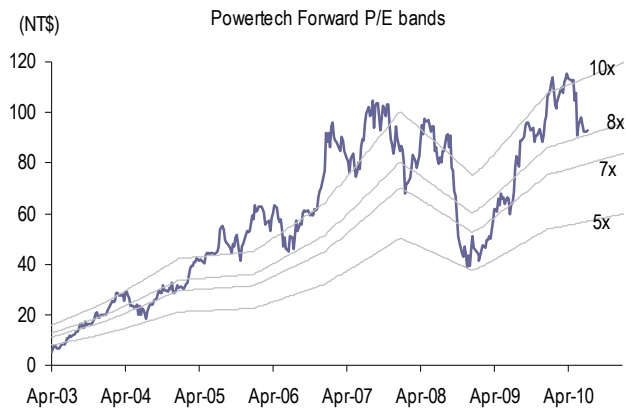
Source: Bloomberg, Citi Investment Research and Analysis

Figure 89. Taiwan DRAM Names' Share Return vs. DRAM Price Index



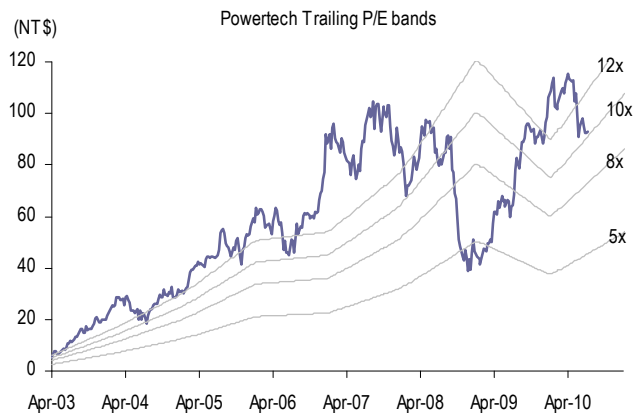
Source: Bloomberg, Citi Investment Research and Analysis

Figure 90. PTI Forward P/E Band



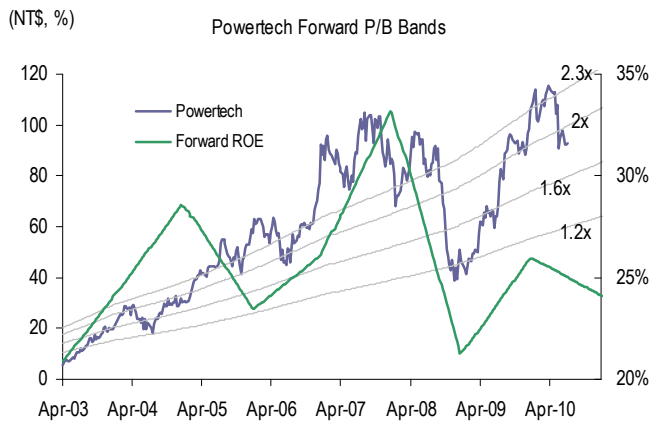
Source: Citi Investment Research and Analysis estimates

Figure 91. PTI Trailing P/E Band



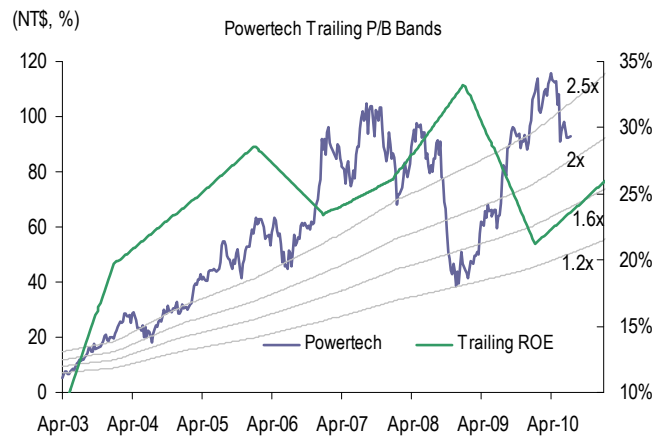
Source: Citi Investment Research and Analysis

Figure 92. PTI Forward P/B Band vs. Forward ROE



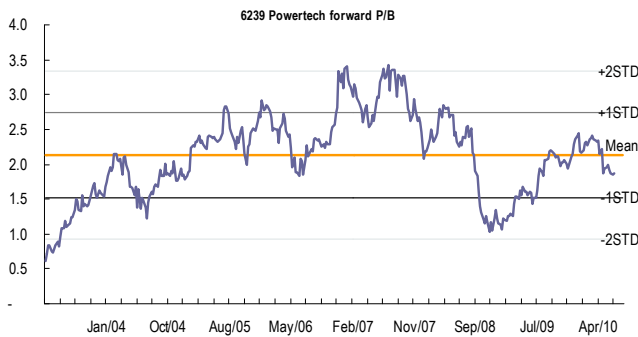
Source: Citi Investment Research and Analysis estimates

Figure 93. PTI Trailing P/B Band vs. Trailing ROE



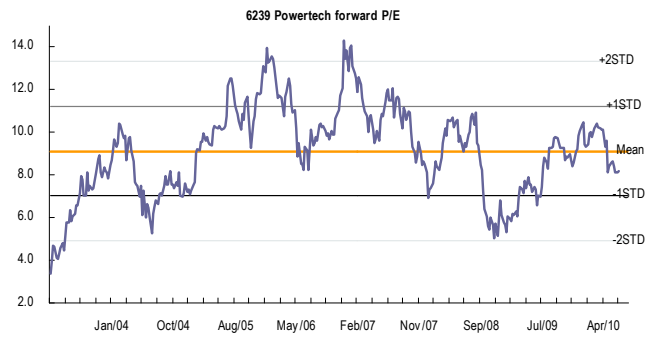
Source: Citi Investment Research and Analysis

Figure 94. PTI Forward P/B Range



Source: Citi Investment Research and Analysis estimates

Figure 95. PTI Forward P/E Range



Source: Citi Investment Research and Analysis estimates

Figure 96. PTI Key Earnings Estimates

PTI (NT\$ in Mn, year-end Dec)	2009				2010				2008	2009	2010E	2011E	2012E
	1Q	2Q	3Q	4Q	1Q	2QE	3QE	4QE					
Revenue	6,013	7,108	8,103	8,743	8,649	9,193	9,251	9,052	31,189	29,968	36,145	38,292	39,744
COGS	-4,850	-5,573	-6,035	-6,339	-6,271	-6,613	-6,658	-6,583	-22,649	-22,797	-26,125	-26,983	-27,970
Gross Profit	1,164	1,536	2,069	2,404	2,379	2,580	2,592	2,468	8,540	7,172	10,019	11,309	11,774
Operating Expense	-269	-258	-324	-406	-385	-409	-412	-403	-1,250	-1,257	-1,608	-1,838	-1,908
SG&A expenses	-110	-105	-146	-220	-184	-196	-197	-193	-601	-581	-770	-881	-914
R&D expenses	-159	-153	-178	-186	-201	-213	-215	-210	-649	-676	-838	-957	-994
EBIT	895	1,277	1,744	1,998	1,994	2,171	2,181	2,066	7,290	5,915	8,411	9,471	9,867
Net Interest Income	-86	-67	-69	-46	-21	-9	-18	-11	-413	-268	-59	25	87
Net Other Income	89	-79	-145	-127	-1	-3	-3	-2	-315	-262	-9	-12	-12
Pre-Tax Profit	897	1,131	1,531	1,825	1,971	2,159	2,160	2,053	6,562	5,384	8,343	9,485	9,941
Tax	72	90	123	144	198	216	216	205	-17	-428	-835	-1,043	-1,193
Net Profit After Extraordinaries	826	1,041	1,408	1,682	1,773	1,943	1,944	1,848	6,545	4,956	7,509	8,441	8,748
Empl. Bonus -adj. EPS (NT\$)	1.25	1.57	2.10	2.51	2.62	2.76	2.76	2.62	10.07	7.44	10.77	11.99	12.42
Key Drivers													
Packaging capacity (units/month)	167	175	235	245	270	280	290	300	167.0	245.0	300.0	311.0	320.0
Utilization (%)	77%	82%	89%	92%	91%	96%	96%	90%	90%	85%	93%	94%	96%
Testers	212	212	217	218	198	202	206	208	222	218	208	218	228
Utilization (%)	65%	77%	89%	91%	91%	94%	94%	90%	90%	80%	92%	92%	90%
Margins (%)													
Gross Margin	19.3	21.6	25.5	27.5	27.5	28.1	28.0	27.3	27.4	23.9	27.7	29.5	29.6
Operating Margin	14.9	18.0	21.5	22.9	23.1	23.6	23.6	22.8	23.4	19.7	23.3	24.7	24.8
Net Margin	13.7	14.6	17.4	19.2	20.5	21.1	21.0	20.4	21.0	16.5	20.8	22.0	22.0
Sequential Growth (%)													
Revenue	-25.2	18.2	14.0	7.9	-1.1	6.3	0.6	-2.2	27.6	-3.9	20.6	5.9	3.8
Gross Profit	-43.5	32.0	34.7	16.2	-1.1	8.5	0.5	-4.8	10.8	-16.0	39.7	12.9	4.1
EBIT	-49.1	42.7	36.5	14.6	-0.2	8.9	0.5	-5.3	2.9	-18.9	42.2	12.6	4.2
Net Profit	-49.0	26.1	35.2	19.5	5.5	9.6	0.1	-5.0	6.1	-24.3	51.5	12.4	3.6
EPS	-49.0	26.1	33.9	19.4	4.2	5.3	0.1	-5.0	55.5	-26.1	44.6	11.3	3.6

Source: Citi Investment Research and Analysis estimates

Figure 97. PTI Balance Sheet

(NT\$Mn)	2005	2006	2007	2008	2009	2010E	2011E	2012E
Cash and Cash Equivalents	578	972	1,778	4,095	9,000	11,815	15,565	19,411
Account Receivables	2,447	3,941	5,845	9,748	7,906	7,936	8,463	8,812
Inventory	496	861	1,018	739	1,222	1,488	1,587	1,652
Total Other Current Assets	44	80	350	302	2,012	1,324	1,412	1,470
Total Current Assets	3,566	5,854	8,992	14,884	20,139	22,563	27,026	31,345
Net Fixed Assets	14,972	19,246	25,631	25,524	23,152	23,956	25,736	27,241
Other Long Term Assets	993	1,060	1,439	1,569	2,934	2,824	2,824	2,824
Long Term Investments and Associates	727	775	1,618	1,685	3,027	3,139	3,253	3,372
Total Long Term Assets	16,692	21,081	28,688	28,778	29,113	29,919	31,814	33,437
Total Assets	20,259	26,935	37,680	43,662	49,252	52,482	58,840	64,782
ST Debt and Current Portion of LT Debt	1,714	268	1,574	3,203	5,889	3,344	3,557	3,735
Accounts Payable	381	833	1,293	1,345	1,851	1,701	1,814	1,889
Other Current Liabilities	2,326	2,507	4,396	4,165	7,465	6,489	6,920	7,205
Total Current Liabilities	4,421	3,608	7,262	8,713	15,205	11,534	12,291	12,830
Long Term Debt	5,692	9,793	12,327	13,334	8,724	8,478	9,017	9,470
Other Long Term Liabilities	26	15	318	103	0	0	0	0
Total Long Term Liabilities	5,719	9,807	12,644	13,438	8,724	8,478	9,017	9,471
Total Equity	10,119	13,520	17,774	21,512	25,323	32,469	37,532	42,481
Total Liabilities and Equity	20,259	26,935	37,680	43,662	49,252	52,482	58,840	64,782

Source: Citi Investment Research and Analysis estimates

Figure 98. PTI Cash Flow Statement

(NT\$m)	2005	2006	2007	2008	2009	2010E	2011E	2012E
Net Income	3,508	4,823	6,166	6,545	4,956	7,509	8,441	8,748
Depreciation and Amortization	2,807	4,227	5,524	7,172	7,661	7,996	8,220	8,495
Changes in Working Capital:	-579	-997	-744	-1,276	2,412	583	-170	-113
Net Cash from Operations	5,736	8,053	10,945	12,441	15,029	16,087	16,491	17,131
Purchase of Property, Plant & Equipment	-6,828	-8,765	-11,148	-9,544	-4,244	-10,117	-10,000	-10,000
Other investing activities	-803	-115	-1,222	-197	-2,707	-2	-114	-118
Net Cash from Investing Activities	-7,631	-8,880	-12,370	-9,741	-6,951	-10,119	-10,114	-10,118
Issuance/Repayment of Debt	3,061	2,654	3,840	2,637	-1,925	-2,790	751	632
Change in other LT liabilities	4	-12	303	-214	-103	0	0	0
Change in Common Equity - net	1,015	1,056	1,430	1,645	1,380	2,048	0	0
Payment of Cash Dividends	-845	-1,202	-1,649	-2,225	-1,892	-2,465	-3,379	-3,799
Other Financing Charges, Net	-1,093	-1,277	-1,694	-2,227	-633	54	0	0
Net Cash from Financing Activities	2,143	1,220	2,231	-384	-3,173	-3,153	-2,627	-3,167
Net Change in Cash and Cash Equivalents	248	393	807	2,317	4,905	2,816	3,750	3,846
Cash at Beginning of Period	331	578	972	1,778	4,095	9,000	11,815	15,565
Cash at end of Period	578	972	1,778	4,095	9,000	11,815	15,565	19,411

Source: Citi Investment Research and Analysis estimates

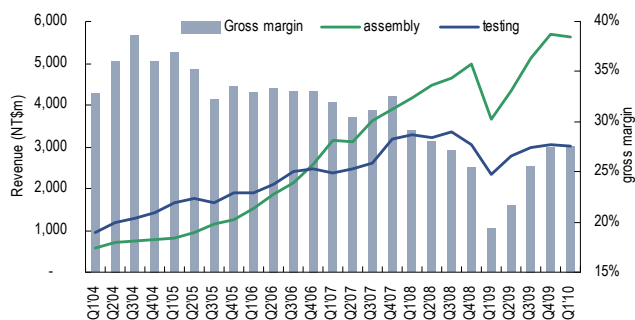
Background information about PTI

Major business

PTI conducts packaging and testing business for memory chips, which include DRAM and flash. Packaging and testing accounted for 65% and 35% of revenue in 1Q10 respectively. By application, DRAM and flash accounted for 75%/24% of total revenue in 1Q10.

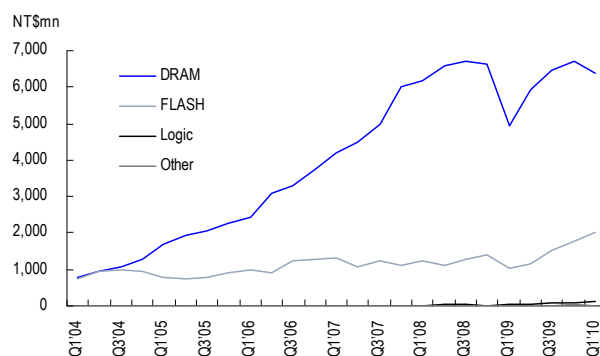
PTI has stepped into the logic back-end territory from 2008, but the revenue contribution is still small at 1%. Due to PTI's lack of competitive advantage in the logic field, we don't expect this part of the business to provide meaningful contribution in coming years (we model 9% of revenue in 2012E).

Figure 99. PTI Revenue Breakdown: Assembly and Testing



Source: Company, Citi Investment Research and Analysis

Figure 100. PTI Revenue Breakdown: DRAM and Flash



Source: Company, Citi Investment Research and Analysis

Major customers

Figure 101. PTI Major Customers

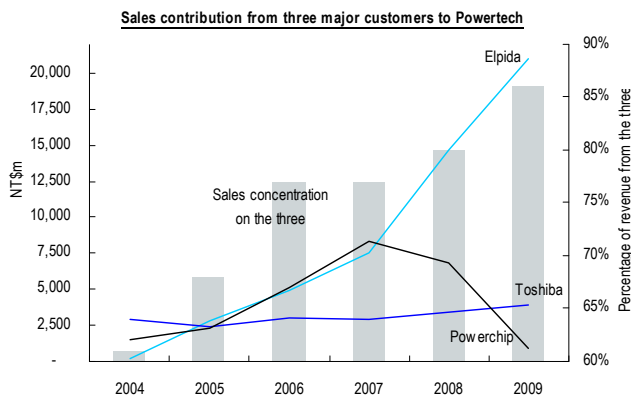
Elpida	50%
Toshiba	20%
Kingston	10%
Powerchip	10%
Promos	1-2%

Source: Company, Citi Investment Research and Analysis

PTI's major customers include Elpida, Toshiba, Kingston, Powerchip and Promos, with Elpida taking the lion's share (70% of PTI's revenue in 2009).

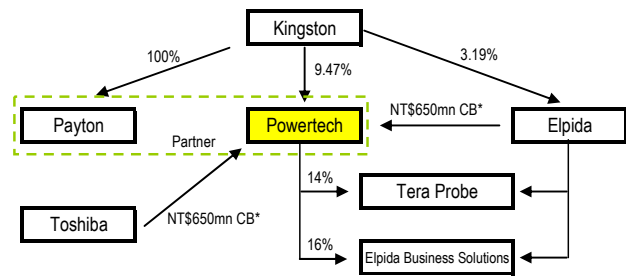
The support from Kingston, the largest shareholder of PTI and the No.1 DRAM module maker globally, is the key reason behind PTI's strong performance over recent years. PTI also strengthens its relationship with key customers by cross-investing structures (see chart below).

Figure 102. PTI Revenue Contribution From Major Customers



Source: Company annual reports

Figure 103. PTI's Relationship With Customers



Source: Company, Citi Investment Research and Analysis. *represents around 1.5% shares outstanding (conversion price NT\$60.6)

It is unlikely for PTI to acquire new customers outside of the Japanese customer base, because major memory chip makers either do packaging and testing in house or have their own alliance partners.

Figure 104. Memory Back-end Competitive Landscape

Memory chip maker	Major backend supplier
Samsung	in-house
Hynix	in-house
Micron	in-house
Elpida	Akita Elpida, PTI, Walton
Toshiba	Aptos Technology, PTI
Powerchip	PowerASE, PTI
Promos	ChipMos
Nanya Tech	Formosa Advanced Tech.

Source: Citi Investment Research and Analysis

Figure 105. PTI QFII Holding



Source: TEJ

Major shareholders

Kingston is the largest shareholder of PTI, with 9.47% ownership in May 2010. Kingston controls 3 out of 7 director seats (which includes 2 independent directors), and 3 supervisor seats in the board.

Along with PTI's outperformance in operation, foreign investor (QFII) holdings have steadily increased from 39% in 2009 to 73% in end of June 2010; QFII holding declined from its 78% peak in May with DRAM price decline.

Figure 106. PTI Board Composition (May/2010)

	Director name	Representative	Type	Shareholding (%)
1	KTC-TU Corporation	Chih Shih Pen Ming	Director	
2	KTC-TU Corporation	Sun Ta Wei--a	Director	4.03
3	KTC-TU Corporation	Liao Chung Chi	Director/General Manager	
4	Shihren Corp	Hsieh Tsai Chu	Director	0.33
5	Toshiba Tech. Taiwan	Chi T'ieh T'ou	Director	0.47
6	Lin K'un Hsi	Lin K'un Hsi	Independent director	0
7	Cheng Wan Lai	Cheng Wan Lai	Independent director	0.11
8	KTC-SUN Corporation	Liang Ta Chun	Supervisor	
9	KTC-SUN Corporation	Ch'en Chien Hua	Supervisor	5.44
10	KTC-SUN Corporation	Yeh Yun Lung	Supervisor	

Source: TEJ

Financial health

PTI has been generating positive operating cash flow in recent years, and started to generate positive free cash flow from 2008. We expect PTI to continue generating positive free cash flow, so the company should not need further financing activities to support its capacity expansion.

Net gearing was above 50% before 2009, but significantly lowered to 22% in 2009. Due to its healthy operations, we expect PTI to achieve positive net cash level from 2011E.

Figure 107. PTI Gearing

	2003	2004	2005	2006	2007	2008	2009	2010E	2011E	2012E
Operating cash flow	1,933	4,250	5,736	8,053	10,945	12,441	15,029	16,087	16,491	17,131
Capex	(2,755)	(6,952)	(6,828)	(8,765)	(11,148)	(9,544)	(4,244)	(10,117)	(10,000)	(10,000)
Free cash flow	(822)	(2,702)	(1,092)	(712)	(202)	2,897	10,785	5,970	6,491	7,131
Net debt(cash) to equity	46%	53%	67%	67%	68%	58%	22%	0%	-8%	-15%

Source: Citi Investment Research and Analysis estimates

Dividend policy

Powetech plans to distribute cash dividends with >50% payout in the future, and will not issue stock dividends.

Figure 108. PTI Dividend History

	2004	2005	2006	2007	2008	2009
Dividend per share	2.5	3.0	3.5	4.0	3.0	3.5
Cash dividend as % of net income	32%	34%	34%	36%	29%	50%

Source: Citi Investment Research and Analysis

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Data as of: 02-Jul-10

Radar Screen Quadrant Definitions

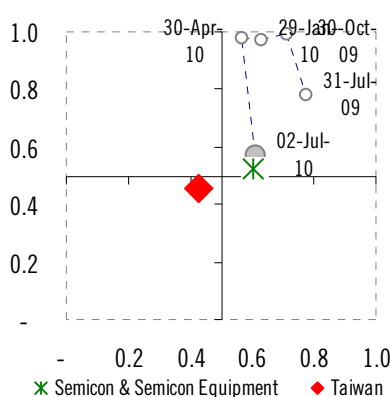
Glamor <i>Poor relative value but superior relative momentum</i>	Attractive <i>Superior relative value and superior relative momentum</i>
Unattractive <i>Poor relative value and poor relative momentum</i>	Contrarian <i>Superior relative value but poor relative momentum</i>

Quants View on PTI – Attractive

Powertech Technology Inc currently lies in the Attractive quadrant of our Value-Momentum map with strong value and momentum scores. Having been a resident there since the past 11 months. Compared to its peers in the Semicon & Semicon Equipment sector, Powertech Technology Inc fares better on the valuation metric and on the momentum metric. Similarly, compared to its peers in its home market of Taiwan, Powertech Technology Inc fares better on the valuation metric and on the momentum metric.

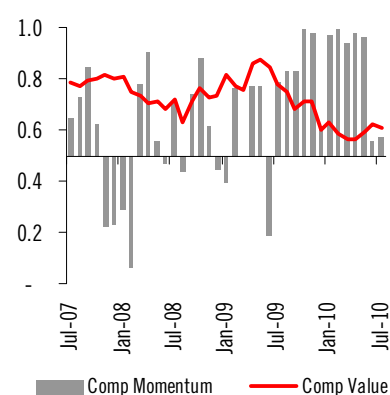
From a macro perspective, Powertech Technology Inc has a high Beta to the region so is likely to rise (or fall) faster than the region. It is also likely to benefit from tightening Asian interest rates, falling EM yields, weaker US dollar, and a weaker Yen.

Figure 109. Radar Quadrant Chart History



Source: CIRA

Figure 110. Radar Valuation Momentum Ranks



Source: CIRA

Figure 111. Radar Model Inputs

IBES EPS (Actual and Estimates)

FY(-2)	9.59	Implied Trend Growth (%)	7.64
FY(-1)	9.89	Trailing PE (x)	12.41
FY0	6.88	Implied Cost of Debt (%)	2.46
FY1	11.08	Standardised MCap	0.07
FY2	12.84		

Note: Standardised MCap calculated as a Z score – (mkt cap - mean)/std dev – capped at 3

Source: Citi Investment Research and Analysis, Worldscope, I/B/E/S

Figure 112. Stock Performance Sensitivity to Key Macro Factors

Region	1.28	Commodity ex Oil	0.09
Local Market	(0.10)	Rising Oil Prices	0.02
Sector	0.99	Rising Asian IR's	(0.25)
Growth Outperforms Value	0.75	Rising EM Yields	(0.38)
Small Caps Outperform Large Caps	(0.17)	Weaker US\$ (vs Asia)	1.33
Widening US Credit Spreads	0.05	Weaker ¥ (vs US\$)	1.03

Source: Citi Investment Research and Analysis

Powertech Technology

Company description

Powertech was founded in May 1997, initially providing testing services to Powerchip and Macronix. In 1999, Kingston Technology, the world's largest memory module provider, became the largest shareholder. Soon after, management was replaced by executives from Kingston and the company started to provide turnkey solutions by expanding its packaging capacities. Over the past years, it has expanded its footprint into the Japanese market by gaining business from IDMs such as Toshiba and Elpida.

Investment strategy

We rate Powertech shares Buy / Low Risk (1L) with a target price of NT\$130. Leveraging its tight utilization and lean cost structure, PTI should be well positioned to benefit from the severe DRAM supply shortage we forecast in 3Q10. The supply tightness supports firm DRAM prices and keeps PTI loading at a high utilization in 2H10. PTI will also benefit from high operating leverage. In the longer term, PTI should continue to benefit from high operating margin relative to other OSAT names, given its strategic relationship with Kingston, economies of scale, and lean operations.

Valuation

We set a DCF-based target price of NT\$130. We use a DCF-based valuation to reflect PTI's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.1, we calculate PTI's WACC as 7.3%. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's expectation of long-term semiconductor industry growth of 7%.

Our target price is equivalent to 12.1x 2010E EPS and 2.8x 2010E BVPS. It is slightly above PTI's 8-year mean P/B plus one standard deviation.

PTI's share price started to correct in April 2010 as DRAM prices dropped off peak levels, and foreign ownership also declined. But the recent sell-off is overdone, in our view. PTI has proven its capability to generate stable margins during the downturn, and even as DRAM prices began to weaken, PTI maintained its utilization rate at a very high level. Given PTI's stable profitability, lean operating efficiency and strong customer relationships, valuation looks attractive as the stock currently trades below 7-year mean on both P/B and P/E.

Risks

Our quantitative risk-rating system assigns a Low Risk rating to Powertech, based on the stock's 260-day historical volatility. Key downside risks that could prevent the shares from reaching our target price include: 1) if severe DRAM price correction in 2H10 and our expectation of severe short supply in 3Q10 does not come true, 2) Japanese memory chip makers lose market share to Korean makers, 3) key customers diversify memory back-end suppliers, 4) failure to gain more new customers in flash segment, 5) PTI's entry into logic area absorbs more resources away from its main memory business.

Company Focus

Initiation of coverage

Hold/Low Risk	2L
Price (07 Jul 10)	NT\$45.80
Target price	NT\$50.00
Expected share price return	9.2%
Expected dividend yield	0.0%
Expected total return	9.2%
Market Cap	NT\$26,828M US\$833M

Price Performance (RIC: 6147.TWO, BB: 6147 TT)



Chipbond Technology (6147.TWO) Initiating at Hold: Most of the Positives Are in the Price

- Initiate with Hold and NT\$50 target** — We initiate coverage on Chipbond with a Hold / Low Risk (2L) rating. Chipbond's share price has advanced by 65% YTD relative to Taiex; QFII holdings have grown from 9% in 1Q10 to 30% in 2Q10 to reflect the structural change in the gold bumping sector for LCD driver ICs. The share price now is trading fairly valued, in our view, near our target price. Our DCF-based target of NT\$50, assuming 3% long-term revenue growth and 19% EBIT margin, translates to a P/E of 9.7x FY10E and P/B of 2.2x FY10E.
- Oligopoly player in LCD driver IC bumping** — After consolidation with International Semiconductor Technology (IST), Chipbond is the market share leader in the LCD driver IC back-end with bumping market share >35%. Looking ahead, we expect more gold bumping suppliers to exit the market due to: 1) worldwide gold bumping capacity remaining in oversupply in the future and 2) total wafer demand declining at 8% CAGR from 2007 to 2013E as a result of continuous technology shrink. The advantage of lower-cost solutions from cyanide-based bumping technology and in-house equipment makes Chipbond most competitive in the gold bumping sector. We believe Japanese gold bumpers will exit the market gradually due to their higher labor cost. New entrants are unlikely, in our view, as even the second-biggest supplier finds it difficult to achieve break even at the operating level.
- Firming pricing power, immune from rising gold prices** — Unlike the OSAT companies, who are suffering from margin contraction due to rising gold prices, the gold bumpers charge customers the actual gold consumption per wafer based on the real-time gold price. Gold bumpers are 100% passing the gold cost to customers and making profit from the gold bumping service fees. LCD driver IC package (COF, COG) is totally free of using gold wire bonding, thus there is no margin pressure from high gold prices. Gold bumpers were able to raise pricing in 1H10 due to poor profitability across the board, but rising LCD driver IC demand. We expect overall pricing is on the upward trend as a result of fewer suppliers in the market.
- Stretched valuations** — The stock is trading at premium (2.0x FY10E P/B) to both ASE (1.5x) and SPIL (1.8x), and is at the high end of its 8-year P/B trading range. We expect limited share price upside from here.

Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2008A	78	0.24	-93.1	187.6	2.7	1.3	0.0
2009A	353	1.11	355.8	41.1	2.4	6.0	0.0
2010E	2,684	5.14	361.9	8.9	2.0	27.6	6.0
2011E	3,080	5.26	2.3	8.7	1.8	22.0	6.9
2012E	3,327	5.68	8.0	8.1	1.7	21.5	7.4

Source: Powered by dataCentral

Fiscal year end 31-Dec	2008	2009	2010E	2011E	2012E
Valuation Ratios					
P/E adjusted (x)	187.6	41.1	8.9	8.7	8.1
EV/EBITDA adjusted (x)	18.5	17.3	5.3	4.3	3.9
P/BV (x)	2.7	2.4	2.0	1.8	1.7
Dividend yield (%)	0.0	0.0	6.0	6.9	7.4
Per Share Data (NT\$)					
EPS adjusted	0.24	1.11	5.14	5.26	5.68
EPS reported	0.24	1.11	5.14	5.26	5.68
BVPS	17.13	19.21	22.67	25.18	27.70
DPS	0.00	0.00	2.75	3.15	3.41
Profit & Loss (NT\$M)					
Net sales	5,264	5,211	13,197	14,470	14,679
Operating expenses	-4,938	-4,798	-10,005	-10,771	-10,700
EBIT	326	413	3,191	3,699	3,979
Net interest expense	-129	-87	-89	-94	-83
Non-operating/exceptionals	-109	66	17	18	19
Pre-tax profit	88	392	3,119	3,623	3,914
Tax	-9	-39	-435	-543	-587
Extraord./Min.Int./Pref.div.	0	0	0	0	0
Reported net income	78	353	2,684	3,080	3,327
Adjusted earnings	78	353	2,684	3,080	3,327
Adjusted EBITDA	1,592	1,684	5,212	5,929	5,850
Growth Rates (%)					
Sales	-10.1	-1.0	153.2	9.6	1.4
EBIT adjusted	-72.2	26.7	673.0	15.9	7.6
EBITDA adjusted	-29.1	5.8	209.5	13.8	-1.3
EPS adjusted	-93.1	355.8	361.9	2.3	8.0
Cash Flow (NT\$M)					
Operating cash flow	1,344	1,487	2,877	5,254	5,230
Depreciation/amortization	1,266	1,271	2,021	2,230	1,871
Net working capital	0	-137	-1,827	-56	32
Investing cash flow	-916	-692	-5,713	-1,000	-1,000
Capital expenditure	-915	-832	-4,803	-1,000	-1,000
Acquisitions/disposals	0	0	0	0	0
Financing cash flow	-813	-262	5,952	-2,097	-2,222
Borrowings	52	-513	1,489	-487	-375
Dividends paid	-700	0	0	-1,610	-1,848
Change in cash	-385	533	3,117	2,157	2,008
Balance Sheet (NT\$M)					
Total assets	10,734	10,970	20,573	21,557	22,662
Cash & cash equivalent	1,672	2,205	5,321	7,478	9,486
Accounts receivable	845	1,160	3,184	3,223	3,201
Net fixed assets	6,872	6,433	9,216	7,986	7,115
Total liabilities	5,177	4,809	7,294	6,809	6,434
Accounts payable	96	177	483	471	479
Total Debt	4,688	4,175	5,664	5,177	4,802
Shareholders' funds	5,557	6,161	13,279	14,749	16,228
Profitability/Solvency Ratios (%)					
EBITDA margin adjusted	30.2	32.3	39.5	41.0	39.8
ROE adjusted	1.3	6.0	27.6	22.0	21.5
ROIC adjusted	3.7	4.6	26.3	25.4	29.8
Net debt to equity	54.3	32.0	2.6	-15.6	-28.9
Total debt to capital	45.8	40.4	29.9	26.0	22.8

For further data queries on Citi's full coverage universe please contact CIRA Data Services Asia Pacific at CIRADataServicesAsiaPacific@citi.com or +852-2501-2791



Valuation and target price

Figure 113. Chipbond WACC Assumptions

Risk Free Rate	1.36%
Risk Premium	7.00%
Beta	1.31
Cost of debt	3.0%
Tax rate	15.0%
Debt / (Debt+Equity)	31.0%
WACC	8.1%

Source: CIRA estimates

We introduce our DCF-based target price of NT\$50. We use a DCF-based valuation to reflect Chipbond's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.3, we calculate PTI's WACC as 8.1%. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's expectation of long-term semiconductor industry growth of 7%.

Our target price is equivalent to 9.7x 2010E EPS and 2.2x 2010E BVPS. Our target price is slightly above 8-year mean P/B plus one standard deviation.

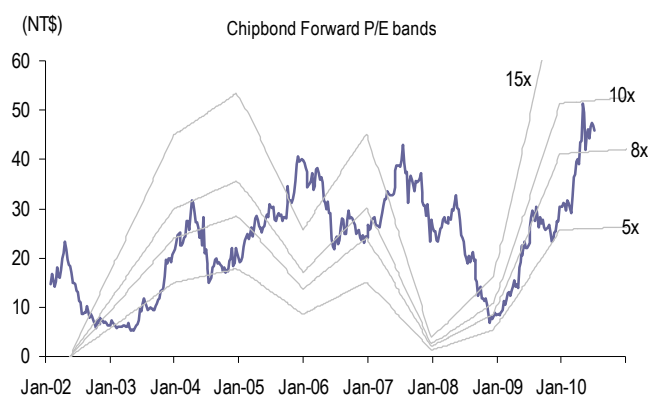
Though we like the company's oligopolistic market position, Chipbond is now trading near the peak level of its 8-year P/B trading range, and we believe all the good news have been reflected in current valuations. We see limited near-term catalysts to drive up the share price further.

Figure 114. Chipbond DCF Assumptions

	2008	2009	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E
Sales Growth	-10%	-1%	153%	10%	1%	3%	3%	3%	3%	3%	3%	3%
EBIT margin	6%	8%	24%	26%	27%	22%	21%	20%	19%	19%	19%	19%
Fixed asset turns	0.8	0.8	1.4	1.8	2.1	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Working capital turns	3.8	3.4	3.5	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Net other assets turns	15.0	24.7	18.7	20.5	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Cash tax as % of EBIT	-8%	9%	13%	14%	15%	15%	15%	15%	15%	15%	15%	15%

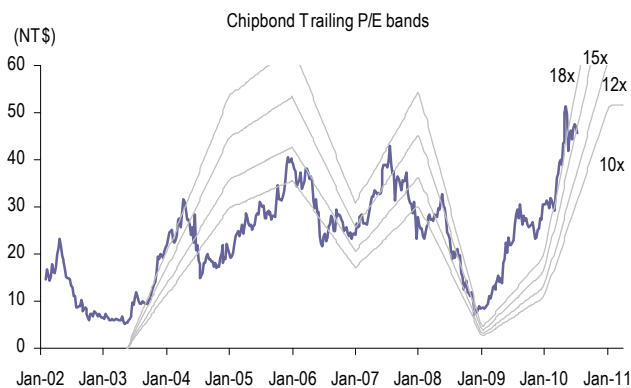
Source: Citi Investment Research and Analysis estimates

Figure 115. Chipbond Forward P/E Band



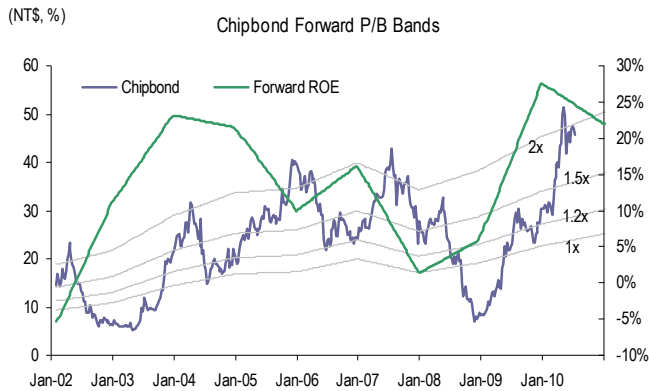
Source: Citi Investment Research and Analysis estimates

Figure 116. Chipbond Trailing P/E Band



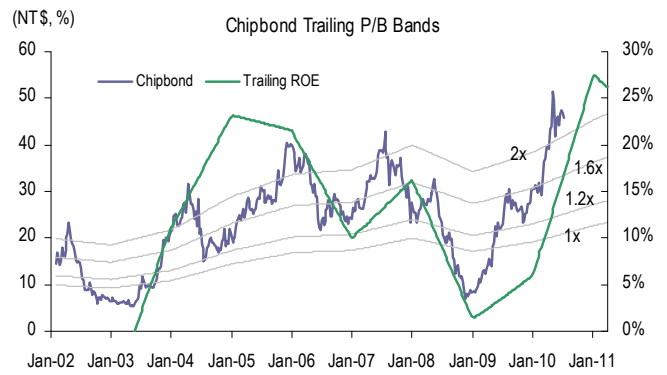
Source: Citi Investment Research and Analysis

Figure 117. Chipbond Forward P/B Band vs. Forward ROE



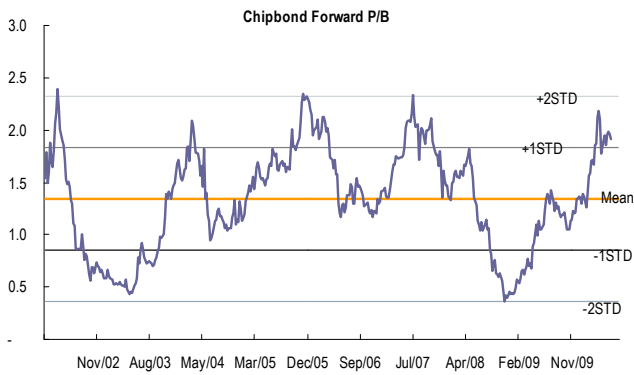
Source: Citi Investment Research and Analysis estimates

Figure 118. Chipbond Trailing P/B Band vs. Trailing ROE



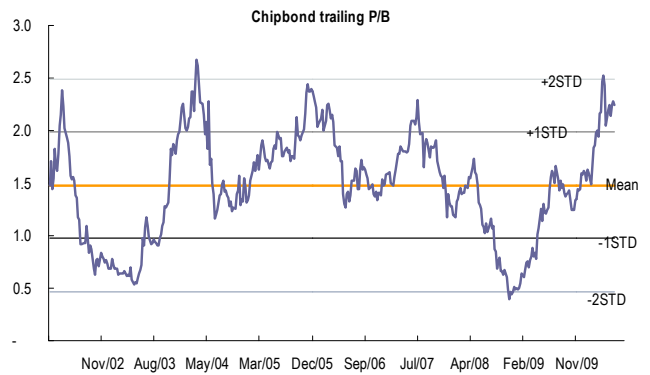
Source: Citi Investment Research and Analysis

Figure 119. Chipbond Forward P/B Range



Source: Citi Investment Research and Analysis estimates

Figure 120. Chipbond Trailing P/B Range



Source: Citi Investment Research and Analysis

Figure 121. Chipbond Key Earnings Estimates

Chipbond (NT\$ in Mn, year-end Dec)	2009				2010				2008	2009	2010E	2011E	2012E
	1Q	2Q	3Q	4Q	1Q	2QE	3QE	4QE					
Revenue	636	1,338	1,877	1,360	2,011	3,703	4,036	3,446	5,264	5,211	13,197	14,470	14,679
COGS	-773	-1,122	-1,404	-1,103	-1,466	-2,605	-2,803	-2,473	-4,574	-4,401	-9,348	-10,049	-9,969
Gross Profit	-137	216	473	257	545	1,098	1,233	973	689	810	3,849	4,420	4,711
Operating Expense	-87	-113	-101	-96	-100	-185	-201	-172	-364	-397	-658	-721	-732
SG&A expenses	-52	-72	-64	-58	-64	-118	-129	-110	-246	-247	-420	-461	-467
R&D expenses	-35	-40	-37	-38	-36	-67	-73	-62	-117	-150	-238	-261	-264
EBIT	-223	103	372	161	445	914	1,031	801	326	413	3,191	3,699	3,979
Net Interest Income	-25	-22	-21	-20	-18	-20	-25	-26	-129	-87	-89	-94	-83
Net Other Income	75	0	-18	9	3	5	5	4	-109	66	17	18	19
Pre-Tax Profit	-173	82	334	151	430	898	1,011	779	88	392	3,119	3,623	3,914
Tax	0	1	14	25	32	135	152	117	-9	-39	-435	-543	-587
Net Profit After Extraordinaries	-173	81	320	126	398	763	860	662	78	353	2,684	3,080	3,327
Empl. Bonus -adj. EPS (NT\$)	-0.54	0.26	1.01	0.39	1.20	1.31	1.47	1.13	0.24	1.11	5.14	5.26	5.68
Key Drivers													
Bumping capacity (000s wafers)	615	615	615	615	615	690	705	720	2,460	2,460	2,730	2,895	2,940
COF capacity (mn units)	150	150	150	150	150	345	345	345	600	600	1,185	1,440	1,500
COG capacity (mn units)	180	180	180	180	180	360	360	360	720	720	1,260	1,560	1,680
Average utilization rate	33%	69%	82%	59%	87%	83%	92%	78%	59%	61%	84%	81%	83%
Margins (%)													
Gross Margin	-21.5	16.2	25.2	18.9	27.1	29.7	30.5	28.2	13.1	15.5	29.2	30.5	32.1
Operating Margin	-35.1	7.7	19.8	11.8	22.1	24.7	25.6	23.2	6.2	7.9	24.2	25.6	27.1
Net Margin	-27.3	6.1	17.0	9.3	19.8	20.6	21.3	19.2	1.5	6.8	20.3	21.3	22.7
Sequential Growth (%)													
Revenue	-27.9	110.5	40.2	-27.5	47.9	84.1	9.0	-14.6	-10.1	-1.0	153.2	9.6	1.4
Gross Profit	n.m.	n.m.	118.9	-45.6	112.0	101.4	12.2	-21.1	-53.7	17.5	375.2	14.8	6.6
EBIT	n.m.	n.m.	260.0	-56.7	176.5	105.3	12.9	-22.4	-72.2	26.7	673.0	15.9	7.6
Net Profit	n.m.	n.m.	294.3	-60.6	216.2	91.7	12.6	-22.9	-93.0	350.8	660.1	14.8	8.0
EPS	n.m.	n.m.	288.0	-61.0	204.1	9.5	12.1	-22.9	-92.0	355.8	361.9	2.3	8.0

Source: Citi Investment Research and Analysis estimates

Figure 122. Chipbond Balance Sheet

(NT\$Mn)	2005	2006	2007	2008	2009	2010E	2011E	2012E
Cash and Cash Equivalents	1,332	1,017	2,057	1,672	2,205	5,321	7,478	9,486
Account Receivables	1,029	979	1,488	845	1,160	3,184	3,223	3,201
Inventory	356	509	491	651	430	996	1,009	1,002
Total Other Current Assets	201	195	208	122	311	514	520	517
Total Current Assets	2,917	2,699	4,243	3,290	4,106	10,015	12,230	14,205
Net Fixed Assets	3,751	5,776	7,222	6,872	6,433	9,216	7,986	7,115
Other Long Term Assets	195	236	351	352	211	705	705	705
Long Term Investments and Associates	3	218	220	220	220	637	637	637
Total Long Term Assets	3,949	6,230	7,794	7,444	6,865	10,558	9,328	8,457
Total Assets	6,866	8,929	12,037	10,734	10,970	20,573	21,557	22,662
ST Debt and Current Portion of LT Debt	314	479	559	1,152	1,622	1,890	1,727	1,602
Accounts Payable	262	134	205	96	177	483	471	479
Other Current Liabilities	437	596	853	393	458	1,118	1,132	1,124
Total Current Liabilities	1,013	1,210	1,616	1,641	2,257	3,490	3,330	3,205
Long Term Debt	911	2,349	4,077	3,536	2,552	3,774	3,450	3,200
Other Long Term Liabilities	0	0	0	0	0	29	29	29
Total Long Term Liabilities	911	2,350	4,078	3,536	2,552	3,803	3,479	3,229
Total Equity	4,942	5,369	6,344	5,557	6,161	13,279	14,749	16,228
Total Liabilities and Equity	6,866	8,929	12,037	10,734	10,970	20,573	21,557	22,662

Source: Citi Investment Research and Analysis estimates

Figure 123. Chipbond Cash Flow Statement

(NT\$Mn)	2005	2006	2007	2008	2009	2010E	2011E	2012E
Net Income	1,059	696	1,113	78	353	2,684	3,080	3,327
Depreciation and Amortization	483	776	1,075	1,266	1,271	2,021	2,230	1,871
Changes in Working Capital:	-426	-65	-178	0	-137	-1,827	-56	32
Net Cash from Operations	1,116	1,403	2,009	1,344	1,487	2,877	5,254	5,230
Purchase of Property, Plant & Equipment	-1,901	-2,801	-2,521	-915	-832	-4,803	-1,000	-1,000
Other investing activities	-16	-256	-117	-1	140	-910	0	0
Net Cash from Investing Activities	-1,918	-3,057	-2,638	-916	-692	-5,713	-1,000	-1,000
Issuance/Repayment of Debt	-324	1,604	1,807	52	-513	1,489	-487	-375
Change in other LT liabilities	-2	0	0	0	0	29	0	0
Change in Common Equity - net	1,490	418	382	278	57	4,434	0	0
Payment of Cash Dividends	-250	-440	-300	-700	0	0	-1,610	-1,848
Other Financing Charges, Net	-209	-243	-221	-443	195	0	0	0
Net Cash from Financing Activities	705	1,339	1,669	-813	-262	5,952	-2,097	-2,222
Net Change in Cash and Cash Equivalents	-97	-315	1,040	-385	533	3,117	2,157	2,008
Cash at Beginning of Period	1,429	1,332	1,017	2,057	1,672	2,205	5,321	7,478
Cash at end of Period	1,332	1,017	2,057	1,672	2,205	5,321	7,478	9,486

Source: Citi Investment Research and Analysis estimates

Background information

Major business

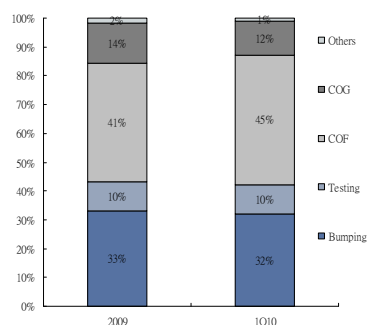
Chipbond is a semiconductor back-end service provider specializing in driver IC bumping, packaging and testing. Bumping, COF, COG and testing accounted for 33%, 41%, 14%, and 10% of 2009 revenue respectively.

LCD driver IC packaging: COF and COG

Driven by high application voltage demand and thin/slim form factor, LCD driver IC is packaged uniquely by gold bumping and is attached on a thin film tape (chip on film, COF). Some driver IC used on small panel is attached directly on the glass (chip on glass, COG) without adopting thin film tape.

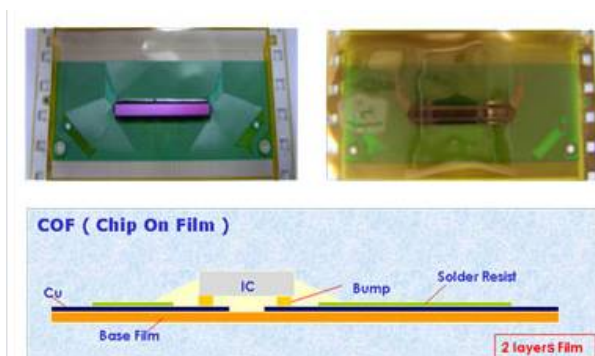
Reasons to use gold bumping are the excellent ductility of gold in order to form a fine pitch and thin bump pads on top of the wafer. The gold bumping and COF/COG package is usually conducted by the dedicated LCD driver IC packagers such as Chipbond, Casio, Nepes and other suppliers worldwide.

Figure 124. Chipbond Revenue Breakdown



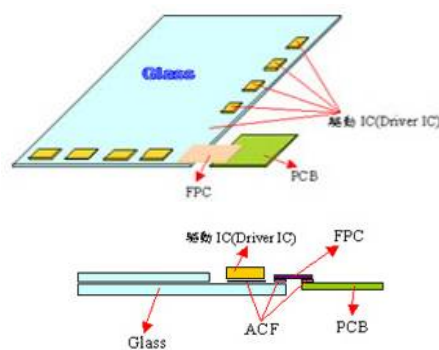
Source: Company, Citi Investment Research and Analysis

Figure 125. COF Assembly



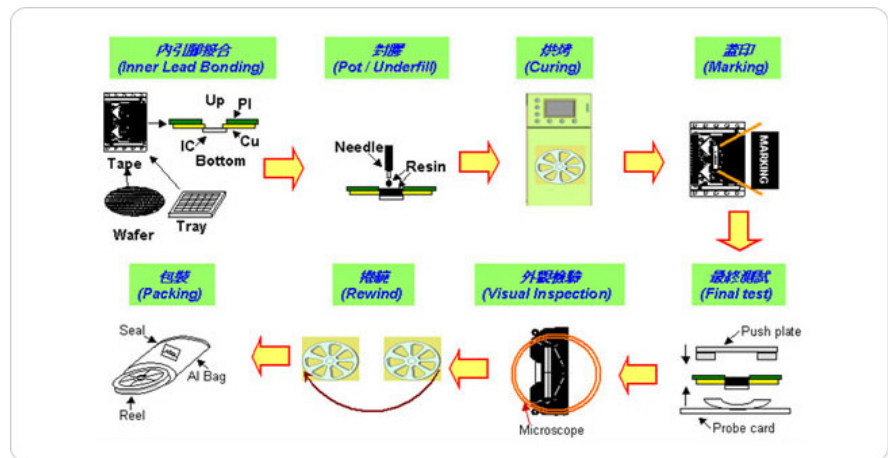
Source: Chipbond

Figure 126. COG Assembly



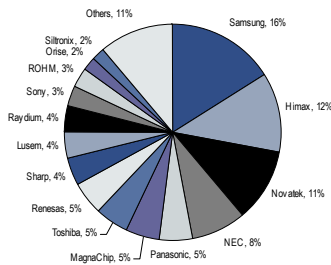
Source: Chipbond

Figure 127. COF Packaging Process Flow



Source: Chipbond

Figure 128. 2009 LCD Driver IC Suppliers' Market Share



Source: iSuppli, company annual report

Figure 129. Chipbond Major Customers

Novatek	30%
Himax	26%
Raydium	15%
Ilitek	9%
NEC	5%
Siltronics	5%

Source: Company, Citi Investment Research and Analysis

LCD driver IC is Asia-based business

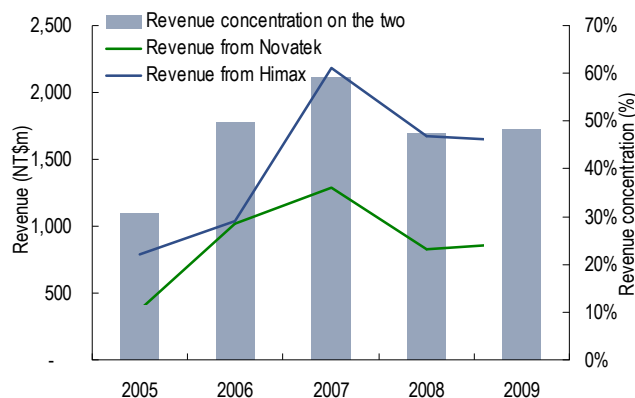
According to iSuppli 2009 panel driver IC tracker, the top 12 LCD driver IC suppliers are all based in Asia, and accounted for 89% of the total revenue out of a TAM of US\$5.6bn. Addressable market to Taiwan-based LCD driver IC back-end suppliers was estimated around US\$1.0bn by taking off Samsung, Magnachip and Lusem out of the TAM and by assuming 25% of the revenue as COGS from wafer foundry and back-end.

Major customers

Chipbond's major customers include Novatek, Himax, Radium, Ilitek, NEC and Siltronics. The top two driver IC suppliers in Taiwan, Novatek and Himax, account for around 50% revenue contribution. Further share gain opportunities would be from Japanese players outsourcing, due to their higher labor costs.

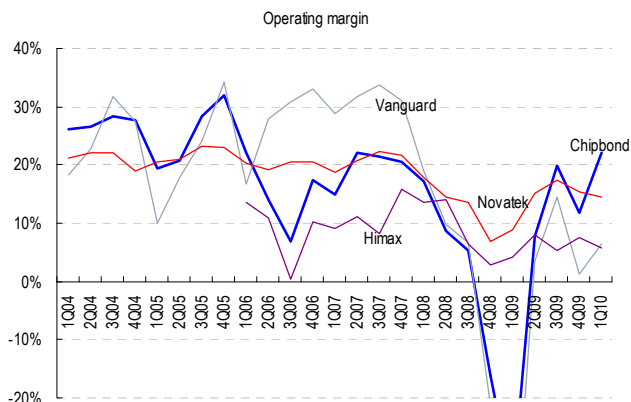
Industry consolidation has benefited Chipbond with better pricing power at the expense of its customers. Chipbond's operating margin increased in 1Q10 while that of Novatek and Himax declined (see charts below). As Chipbond raised overall prices in 2Q10 and was able to pass 100% of gold price hikes to customers, the shift in bargaining power from driver IC fables to back-end suppliers should continue; but the trend won't become extreme in our view, because driver IC design is also a fragmented market with few large suppliers (see chart at left).

Figure 130. Chipbond Top Two Customers



Source: Company

Figure 131. Chipbond Margin Expands at the Expense of Its Customers



Source: Company. *reported operating margin.

Figure 132. Chipbond QFII Holding



Source: Citi Investment Research and Analysis

Major shareholders

Chipbond's QFII holding surged since the beginning of 2010 from 6% to near 30% post the announcement of merger with IST in December 2009.

Chipbond's board is composed of seven members. The total shareholding of board is 3.22% as of May 2010.

Figure 133. Chipbond Board Composition (May 2010)

	Name	Director type	Share holding (%)
1	Wu Fei Chien	Chairman	1.06
2	Li Chung Hsin	Director	0.7
3	Li Jung Sheng--a	Director	0.64
4	Kao Huo Wen	Director/General Manager	0.12
5	Cheng Wen Feng--a	Director	0.04
6	Li Yuan Chung-A	Supervisor	0
7	Li Jung Fa--a	Supervisor	0.66
	Total		3.22

Source: Citi Investment Research and Analysis

Financial health

Chipbond has been generating positive operating cash flow in recent years, and the company started to generate positive free cash from 2008. We expect the company to continue generating positive free cash flow going forward. Despite the stable cash flow, the company announced plans to conduct fund raising by seeking a strategic investor.

Net gearing in 2008 was high at 54%, but improved to 32% in 2009. Due to better profitability with pricing power, we expect Chipbond to achieve a positive net cash position from 2011E.

Figure 134. Chipbond Gearing Metrics

	2003	2004	2005	2006	2007	2008	2009	2010E	2011E	2012E
Operating cash flow	591	705	1,116	1,403	2,009	1,344	1,487	2,877	5,254	5,230
Capex	(849)	(897)	(1,901)	(2,801)	(2,521)	(915)	(832)	(2,000)	(1,000)	(1,000)
Free cash flow	(258)	(192)	(786)	(1,398)	(512)	429	654	877	4,254	4,230
Net debt(cash) to equity	5%	4%	-2%	34%	41%	54%	32%	3%	-16%	-29%

Source: Citi Investment Research and Analysis estimates

Dividend policy

Chipbond did not distribute a cash dividend from 2009 net income, but it plans to distribute cash dividends with a 60-70% payout ratio in future years.

Figure 135. Chipbond Dividend History

	2004	2005	2006	2007	2008	2009
Cash dividend per share	1.3	1.6	1.0	2.3	-	-
Cash dividend as % of net income	33%	42%	43%	63%	0%	0%

Source: Citi Investment Research and Analysis

Chipbond Technology

Company description

Chipbond was established in 1997. The company provides turnkey service for back-end assembly processing of LCD driver ICs from wafer bumping to packaging. The recent acquisition of International Semiconductor Technology (IST) has made Chipbond the largest LCD driver IC back-end supplier.

Investment strategy

We rate Chipbond shares Hold / Low Risk (2L) with a target price of NT\$50. Chipbond is the largest LCD driver IC back-end service provider post its recent acquisition, with >35% global bumping capacity. On the back of its dominant position, Chipbond has regained pricing power, successfully hiked prices in 2Q10, and has been able to 100% pass gold price increases to customers. Although the competitive landscape is stabilizing, the growth in the industry is lackluster, while bumping capacity remains in oversupply along with geometry shrink of driver IC. Though we like the company's oligopolistic market position, Chipbond is now trading near the peak level of its 8-year P/B trading range (0.4x-2.3x), and we believe all the good news have been reflected in current valuations. We see limited near-term catalysts to drive up the share price further.

Valuation

We set a DCF-based target price of NT\$50. We use a DCF-based valuation to reflect Chipbond's capability to generate stable cash. With a risk-free rate of 1.36%, a market risk premium of 7% and an equity beta of 1.3, we calculate PTI's WACC as 8.1%. Our model assumes 3% long-term revenue growth starting 2013, compared to TSMC's expectation of long-term semiconductor industry growth of 7%.

Our target price is equivalent to 9.7x 2010E EPS and 2.2x 2010E BVPS. Our target price is slightly above 8-year mean P/B plus one standard deviation.

Risks

Our quantitative risk-rating system assigns a Medium Risk rating to Chipbond shares based on the stock's 260-day historical volatility. However, we prefer to rate it Low Risk given that the past few month's volatility is not likely to continue due to more stable ASP/margins and LCD driver IC demand in coming quarters. Key upside risks include: 1) stronger-than-expected driver IC demand in 2H10, 2) Japanese players exiting the market faster than expected, and 3) faster-than-expected gold-bumping migration by customers from 8" to 12", as Chipbond is the only supplier for the latter and may thus trigger further share gain. Key downside risks include: 1) severe European demand slowdown, 2) if strong seasonality does not appear in 3Q10, 3) its customers losing share to competitors, and 4) the consolidation process is not as smooth as expected. Any of these risk factors could cause the shares to deviate from our target price.

Appendix A-1

Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of all or any identified portion of this research report hereby certifies that, with respect to each issuer or security or any identified portion of the report with respect to an issuer or security that the research analyst covers in this research report, all of the views expressed in this research report accurately reflect their personal views about those issuer(s) or securities. The research analyst(s) also certify that no part of their compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this research report.

IMPORTANT DISCLOSURES

ASE (2311.TW)

Ratings and Target Price History Fundamental Research

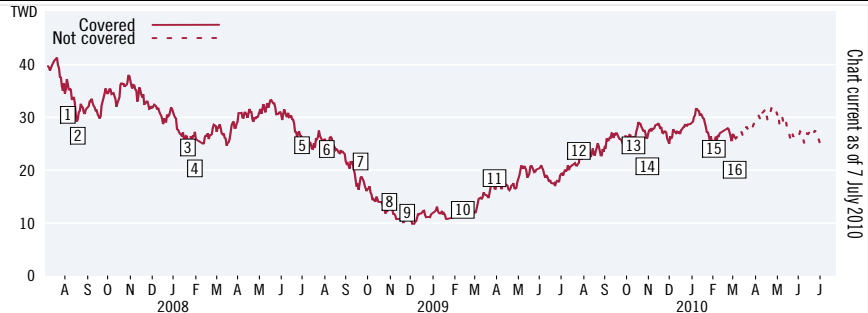


Chart current as of 7 July 2010

Date	Rating	Target Price	Closing Price
1 5-Aug-07	*1L	*44.45	37.25
2 20-Aug-07	1L	*44.44	29.69
3 22-Jan-08	1L	*39.85	24.88
4 31-Jan-08	1L	*34.99	27.26
5 1-Jul-08	1L	*33.04	25.37
6 5-Aug-08	1L	*31.10	24.01

Date	Rating	Target Price	Closing Price
7 21-Sep-08	1L	*27.00	17.40
8 31-Oct-08	1L	*17.00	14.00
9 26-Nov-08	*3L	*8.00	11.20
10 12-Feb-09	3L	*10.00	12.20
11 30-Mar-09	3L	*15.00	16.50
12 26-Jul-09	3L	*17.00	21.20

Date	Rating	Target Price	Closing Price
13 12-Oct-09	3L	*18.00	26.40
14 30-Oct-09	3L	*20.00	26.15
15 2-Feb-10	*2L	*26.00	24.05
16 3-Mar-10	Coverage suspended		

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

ASE (2311.TW)

Rating History Global Quantitative Research Asia Radar Screen

Analyst: Paul R Chanin

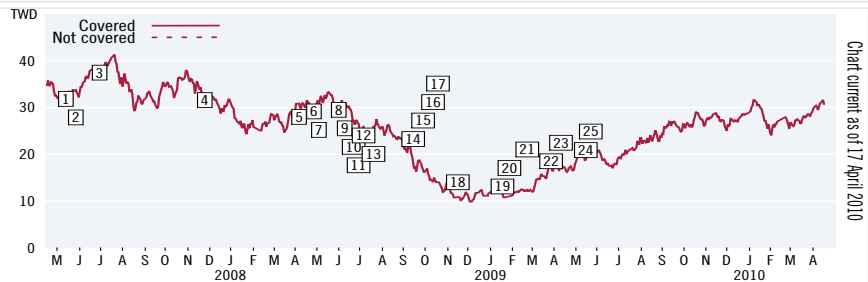


Chart current as of 17 April 2010

Date	Rating	Target Price	Closing Price
1 14-May-07	*3	-	33.19
2 28-May-07	*2	-	33.74
3 29-Jun-07	*1	-	37.89
4 26-Nov-07	*4	-	33.14
5 7-Apr-08	*5	-	30.86
6 28-Apr-08	*4	-	30.13
7 5-May-08	*5	-	30.66
8 2-Jun-08	*4	-	30.57
9 10-Jun-08	*2	-	30.03

Date	Rating	Target Price	Closing Price
10 23-Jun-08	*3	-	27.21
11 30-Jun-08	*2	-	26.53
12 7-Jul-08	*3	-	25.85
13 21-Jul-08	*4	-	25.90
14 15-Sep-08	*2	-	18.15
15 29-Sep-08	*3	-	17.20
16 13-Oct-08	*4	-	14.05
17 20-Oct-08	*3	-	14.00
18 17-Nov-08	*4	-	10.85

Date	Rating	Target Price	Closing Price
19 19-Jan-09	*3	-	11.55
20 28-Jan-09	*4	-	10.75
21 23-Feb-09	*5	-	12.50
22 27-Mar-09	*3	-	17.70
23 10-Apr-09	*2	-	17.15
24 15-May-09	*1	-	18.90
25 22-May-09	*3	-	20.10

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

ASE (2311.TW)
Rating History
Global Quantitative Research
World Radar Screen

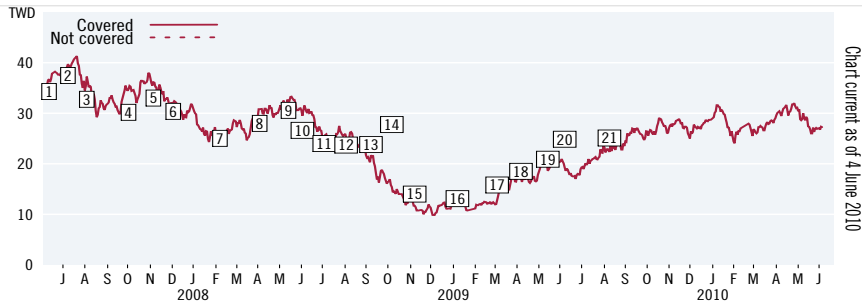


Chart current as of 4 June 2010

	Date	Rating	Target Price	Closing Price
1	6-Jun-07	*7	-	35.14
2	7-Jul-07	*4	-	39.11
3	3-Aug-07	*3	-	37.25
4	2-Oct-07	*1	-	34.74
5	6-Nov-07	*4	-	36.15
6	4-Dec-07	*9	-	32.07
7	7-Feb-08	*8	-	25.85

	Date	Rating	Target Price	Closing Price
8	3-Apr-08	*7	-	30.81
9	14-May-08	*5	-	31.83
10	3-Jun-08	*9	-	29.50
11	3-Jul-08	*4	-	25.37
12	3-Aug-08	*7	-	25.95
13	8-Sep-08	*6	-	21.70
14	7-Oct-08	*7	-	15.40

	Date	Rating	Target Price	Closing Price
15	7-Nov-08	*9	-	11.70
16	7-Jan-09	*10	-	13.10
17	4-Mar-09	*5	-	12.80
18	7-Apr-09	*6	-	17.15
19	14-May-09	*4	-	18.60
20	8-Jun-09	*6	-	19.25
21	10-Aug-09	*4	-	22.35

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

SPIL (2325.TW)
Ratings and Target Price History
Fundamental Research

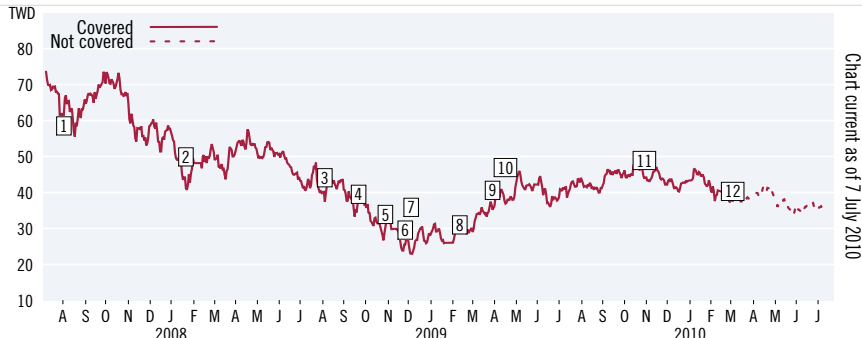


Chart current as of 7 July 2010

	Date	Rating	Target Price	Closing Price
1	2-Aug-07	1L	*82.53	61.98
2	22-Jan-08	1L	*71.29	41.14
3	5-Aug-08	1L	*66.00	37.40
4	21-Sep-08	1L	*60.00	36.85

	Date	Rating	Target Price	Closing Price
5	29-Oct-08	1L	*52.00	30.40
6	26-Nov-08	1L	*32.00	25.50
7	4-Dec-08	1L	*30.00	23.00
8	11-Feb-09	1L	*39.00	31.00

	Date	Rating	Target Price	Closing Price
9	30-Mar-09	1L	*44.00	35.20
10	16-Apr-09	1L	*46.00	36.90
11	29-Oct-09	1L	*50.00	43.85
12	3-Mar-10	Coverage suspended	-	-

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

SPIL (2325.TW)
Rating History
Global Quantitative Research
Asia Radar Screen

Analyst: Paul R Chanin

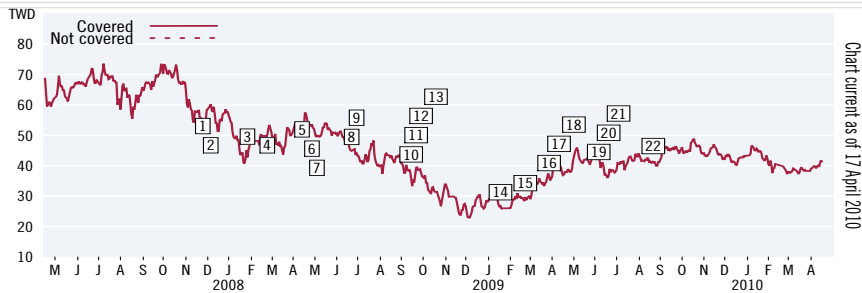


Chart current as of 17 April 2010

	Date	Rating	Target Price	Closing Price
1	26-Nov-07	*2	-	55.35
2	6-Dec-07	*3	-	60.30
3	28-Jan-08	*4	-	42.77
4	25-Feb-08	*3	-	50.20
5	14-Apr-08	*4	-	52.77
6	28-Apr-08	*3	-	53.66
7	5-May-08	*4	-	49.90
8	23-Jun-08	*1	-	44.90

	Date	Rating	Target Price	Closing Price
9	30-Jun-08	*4	-	44.31
10	15-Sep-08	*2	-	35.70
11	22-Sep-08	*3	-	39.40
12	29-Sep-08	*4	-	38.90
13	20-Oct-08	*2	-	31.45
14	19-Jan-09	*3	-	26.80
15	23-Feb-09	*4	-	29.70
16	27-Mar-09	*2	-	36.60

	Date	Rating	Target Price	Closing Price
17	10-Apr-09	*1	-	40.90
18	1-May-09	*4	-	41.50
19	5-Jun-09	*2	-	43.00
20	19-Jun-09	*4	-	36.80
21	3-Jul-09	*2	-	40.80
22	21-Aug-09	*4	-	40.90

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

SPIL (2325.TW)
Rating History
Global Quantitative Research
World Radar Screen



Chart current as of 4 June 2010

	Date	Rating	Target Price	Closing Price
1	6-Jun-07	*3	-	67.00
2	7-Jul-07	*4	-	70.78
3	3-Aug-07	*1	-	66.24
4	2-Oct-07	*2	-	73.47
5	6-Nov-07	*4	-	61.88
6	4-Dec-07	*2	-	59.21
7	8-Jan-08	*6	-	49.50

	Date	Rating	Target Price	Closing Price
8	7-Feb-08	*7	-	48.17
9	6-Mar-08	*9	-	50.50
10	3-Apr-08	*7	-	53.86
11	14-May-08	*3	-	52.48
12	3-Jun-08	*10	-	49.70
13	3-Aug-08	*8	-	40.15
14	8-Sep-08	*9	-	40.30

	Date	Rating	Target Price	Closing Price
15	7-Oct-08	*10	-	34.50
16	7-Nov-08	*9	-	29.80
17	7-Jan-09	*10	-	31.30
18	7-Apr-09	*9	-	39.45
19	14-May-09	*3	-	40.75
20	8-Jun-09	*4	-	41.50
21	10-Aug-09	*3	-	41.45

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Chipbond Technology (6147.TWO)
Ratings and Target Price History
Fundamental Research

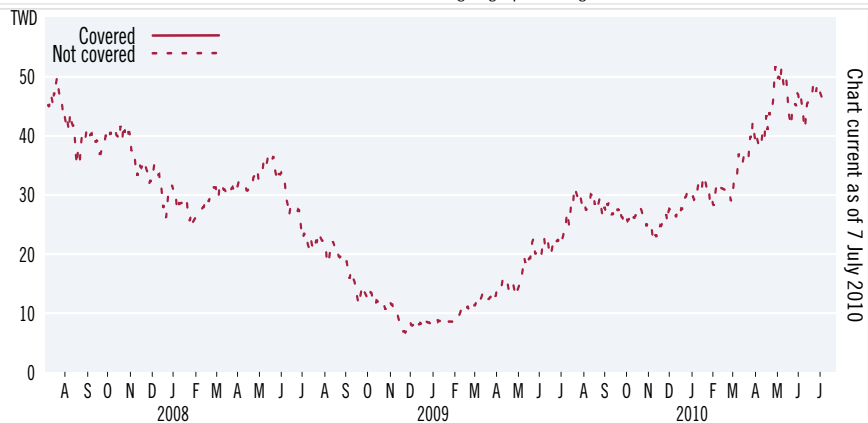


Chart current as of 7 July 2010

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Chipbond Technology Corp (6147.TWO)
Rating History
Global Quantitative Research
World Radar Screen



Chart current as of 4 June 2010

	Date	Rating	Target Price	Closing Price
1	6-Jun-07	*9	-	42.44
2	7-Jul-07	*5	-	44.60
3	3-Aug-07	*4	-	43.11
4	2-Oct-07	*8	-	40.48
5	6-Nov-07	*3	-	37.55
6	4-Dec-07	*6	-	33.98

	Date	Rating	Target Price	Closing Price
7	8-Jan-08	*7	-	27.47
8	7-Feb-08	*8	-	26.11
9	6-Mar-08	*7	-	31.87
10	3-Apr-08	*5	-	31.97
11	14-May-08	*3	-	36.96
12	3-Jul-08	*8	-	23.56

	Date	Rating	Target Price	Closing Price
13	3-Aug-08	*7	-	21.46
14	8-Sep-08	*5	-	16.95
15	7-Nov-08	*7	-	10.60
16	4-Dec-08	*3	-	8.00
17	7-Jan-09	*NR	-	9.19

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Powertech Technology (6239.TW)
Ratings and Target Price History
Fundamental Research

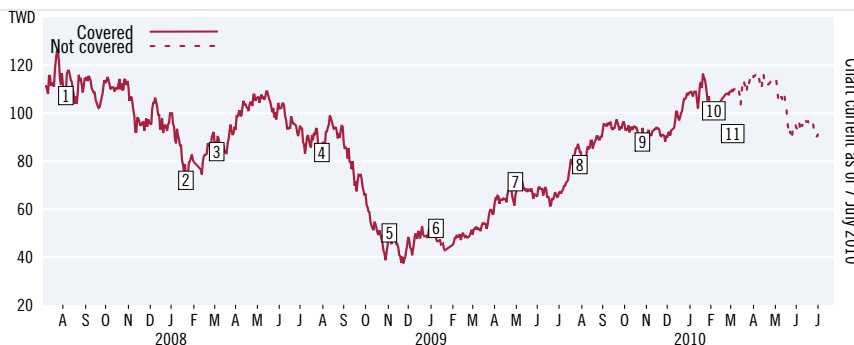


Chart current as of 7 July 2010

	Date	Rating	Target Price	Closing Price
1	6-Aug-07	1M	*142.86	109.09
2	22-Jan-08	1M	*121.21	73.33
3	5-Mar-08	1M	*125.54	87.01
4	31-Jul-08	1M	*119.05	83.62

	Date	Rating	Target Price	Closing Price
5	4-Nov-08	1M	*65.71	50.10
6	8-Jan-09	1M	*61.90	47.71
7	30-Apr-09	*3M	61.90	65.81
8	30-Jul-09	3M	*68.57	83.81

	Date	Rating	Target Price	Closing Price
9	27-Oct-09	3M	*73.00	93.90
10	4-Feb-10	3M	*82.00	105.00
11	3-Mar-10	Coverage suspended		

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Powertech Technology (6239.TW)
Rating History
Global Quantitative Research
Asia Radar Screen

Analyst: Paul R Chanin



Chart current as of 17 April 2010

	Date	Rating	Target Price	Closing Price
1	14-May-07	*2	-	89.22
2	28-May-07	*3	-	91.10
3	5-Jun-07	*2	-	94.11
4	29-Jun-07	*1	-	103.14
5	26-Nov-07	*4	-	95.67
6	6-Dec-07	*3	-	104.33
7	25-Jan-08	*1	-	79.48
8	28-Jan-08	*4	-	80.00

	Date	Rating	Target Price	Closing Price
9	4-Mar-08	*1	-	88.31
10	2-Jun-08	*2	-	101.73
11	21-Jul-08	*3	-	91.77
12	28-Jul-08	*1	-	87.90
13	4-Aug-08	*2	-	85.24
14	25-Aug-08	*3	-	91.62
15	15-Sep-08	*1	-	75.05
16	19-Jan-09	*2	-	45.71

	Date	Rating	Target Price	Closing Price
17	23-Feb-09	*1	-	48.19
18	27-Mar-09	*2	-	59.52
19	24-Apr-09	*3	-	68.10
20	1-May-09	*1	-	65.81
21	12-Jun-09	*3	-	68.38
22	19-Jun-09	*1	-	61.90
23	3-Jul-09	*3	-	66.48
24	7-Aug-09	*1	-	78.60

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Powertech Technology (6239.TW)
Rating History
Global Quantitative Research
World Radar Screen



Chart current as of 4 June 2010

	Date	Rating	Target Price	Closing Price
1	6-Jun-07	*5	-	93.73
2	7-Jul-07	*1	-	111.05
3	3-Aug-07	*3	-	109.96
4	2-Oct-07	*1	-	113.42
5	6-Nov-07	*2	-	106.93
6	4-Dec-07	*6	-	95.24
7	8-Jan-08	*4	-	87.45

	Date	Rating	Target Price	Closing Price
8	7-Feb-08	*3	-	79.65
9	3-Apr-08	*2	-	98.70
10	14-May-08	*1	-	109.09
11	3-Jun-08	*5	-	102.16
12	3-Jul-08	*7	-	93.94
13	3-Aug-08	*2	-	88.10
14	7-Nov-08	*1	-	48.48

	Date	Rating	Target Price	Closing Price
15	5-Feb-09	*8	-	48.00
16	4-Mar-09	*6	-	52.00
17	7-Apr-09	*3	-	65.24
18	14-May-09	*1	-	67.62
19	8-Jun-09	*2	-	68.48
20	7-Jul-09	*6	-	68.10
21	10-Aug-09	*1	-	84.10

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Taiwan Semiconductor Back-end

8 July 2010

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Citi Investment Research & Analysis Quantitative World Radar Screen Model Coverage	30%	40%	30%
<i>% of companies in each rating category that are investment banking clients</i>	22%	22%	20%
Citi Investment Research & Analysis Quantitative Decision Tree Model Coverage	46%	0%	54%
<i>% of companies in each rating category that are investment banking clients</i>	57%	0%	49%
Citi Investment Research & Analysis Quantitative European Value & Momentum Screen	30%	40%	30%
<i>% of companies in each rating category that are investment banking clients</i>	50%	52%	49%
Citi Investment Research & Analysis Asia Quantitative Radar Screen Model Coverage	20%	60%	20%
<i>% of companies in each rating category that are investment banking clients</i>	19%	19%	22%
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Quantitative Research Consultant:

* Daniel Giamouridis is an academic consultant to Citi Investment Research & Analysis and is Athens, Greece based. This research maybe a result of his part input.

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