

OLPC – Another blue sea or a bubble?

Sub-US\$150 notebook? Possible, but not sustainable

The one-laptop-per-child (OLPC) project, which promotes sub-US\$150 notebooks (NB) in emerging markets, has been the topic of hot discussions ever since MIT presented the concept in 2005. And now, the product is ready to be mass produced (in 2H07). However, investors should not look at related companies too seriously, as the optimism on OLPC might turn out to be hype, in our view.

After-sales service will be a big challenge

In addition to lower material costs, the major reason why OLPCs can be sold at US\$150 is by eliminating the roles of PC brands and distributors. This business model might be workable in initial stages, but OLPC users will be inconvenienced when they need maintenance services, software debug/updates, or in handling virus issues. PCs are not as stable & user-friendly as other consumer products, and after-sales service plays an important role in the business.

Expectations are high, but may not be achieved

Quanta Computer, the major ODM company for OLPCs, indicates that shipment volumes might reach more than 4-5mn units in 2007. Given this guidance, many research institutes expect OLPC shipments to grow at over 100% in the coming years. However, shipment volumes might drop quickly in 2008, as the market realizes the challenges with using them, in our view.

Cautious on fables; Prefer Simplo/SZS; Neutral on Quanta

Despite the hype, we urge investors to not chase stocks related to the OLPC story. There are downside risks for fables names like ENE (6243 TT, Not rated) if OLPC does not sell. We recommend investors to look at NB component vendors with solid fundamental growth and view OLPC as an additional bonus. Companies like Simplo (6121 TT, Buy) and SZS (3376 TT, not rated) are better investment choices. We maintain our Neutral rating on Quanta Computer as the OLPC story has been largely factored into its share price.

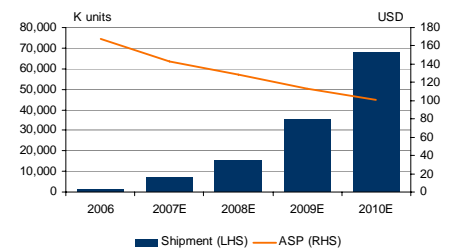


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Chart 1: Market expectation for sub-200 US\$ NB



Source: TRI (2006/11), Merrill Lynch

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Table 1: PC penetration rate (2005)

Rank	Country	PC penetration rate (%)
1	Switzerland	86.18
2	US	76.22
3	Sweden	76.14
4	Israel	73.40
5	Canada	69.82
6	Australia	68.90
7	Netherland	68.47
8	Denmark	65.48
9	Luxembourg	62.37
10	Austria	61.12
11	UK	60.02
12	HK	59.26
13	France	57.86
14	Norway	57.20
15	Germany	54.54
16	Korea	54.49
17	Japan	54.15
18	Taiwan	52.78
N.A.	Brazil	10.52
N.A.	Russia	12.13
N.A.	India	1.54
N.A.	China	4.08

Source: ITU 2005, TRI, Merrill Lynch

Chart 2: The first generation OLPC – XO



Source: MIT

Low-cost PCs - A trend...

The penetration rate of PC has reached 50% in developed markets and we see limited upside in the future. To increase the user base, PC makers need to look at emerging markets like BRICs, and pay more attention to cut average selling price of a PC to fulfill demand in these areas.

...but cheap doesn't mean everything

Low-cost PCs are a trend in emerging markets, as PC penetration is low. But that does not mean PC vendors can ignore everything except costs. The OLPC project is in the spotlight as it targets to sell a sub-US\$100 laptop PC (against US\$400 for Intel's Classmate PCs, based on current cost structures). However, OLPC features a broken supply-chain and the business model might not be sustainable, in our view. Our detailed analysis on OLPC architecture follows.

How to make OLPC at US\$150?

The major aim of the OLPC project is trying to save costs, and hence, it uses the simplest and cheapest components. The biggest difference in terms of system cost comes from – 1) storage, 2) software, and 3) battery.

- **Less storage:** OLPC does not need HDD (hard disk drive) and ODD (optical disk drive). Instead, it uses a 512MB NAND flash drive as the main storage device. That saves US\$60+ in material costs.
- **Free software:** OLPC adopts Linux OS (operating system) instead of Windows, saving US\$50 per system.
- **Smaller battery:** OLPC uses NiMH battery instead of Li-ion, saving US\$20+ per system. However, battery life is shorter and quality is not as good.

With these changes, OLPC save around US\$150 in system cost, when compared with Wintel architecture.

Table 2: OLPC – Cost structure

Component	Price & Specs	
CPU	AMD Geodo Gx2 500	28
Chipset	Integrated	
Memory	128MB DDR266	10
Panel	7.5" dual model TFT	28
Storage	512'MB SLC NAND flash	8
ODD	Not required	0
Wifi	802.11b/g (Marvell)	5
OS	Linux & other app.	10
Battery	5 cells (NiMH)	7
Others		44
System cost		140
Street price		150
Time to market		2H07

Source: Companies, Merrill Lynch estimates

Simplifying the supply-chain

In addition to lower system costs, OLPC also eliminates the cost of warranty, MVA (manpower value-added), OEM brand and distributors' profit. All these measures save another US\$100 per unit. Thus, OLPC can be sold at a street price of US\$150, or 60%+ lower than Intel's Classmate PC (US\$400).

Table 3: Difference in cost structures between OLPC, classmate PC, and low-end NB

(US\$)	OLPC	Intel Classmate PC	Low-end NB (available now)
System cost	140	300	400
Warranty, MVA, shipping fee, profit, and etc.	10	100	300
Street price	150	400	700

Source: Companies, Merrill Lynch estimates

Challenges for OLPC

OLPC uses different a business model and supply-chain to achieve the goal of lower costs. However, it will also face lots of challenges in seeking to drastically change the PC world.

The first question - Is it a workable model?

Whether OLPC get positive feedback from the children in emerging markets is the first challenge. First, the countries that decide to join the program need to develop their own educational resources to understand Linux. Second, OLPC saves on raw material cost by using relatively simple and/or cheap components, so the performance is significantly poor compared to even the lowest-end NBs available in the market now. Children might prefer to pay the same price to buy a desktop PC with better performance and a more stable system.

After-sales service is a big concern

Even assuming there is enough educational resource and children in emerging markets tolerate poor specs, after-sales service is another challenge. As mentioned earlier, the OLPC project eliminates the roles of OEM brands and distributors, so it will be difficult to find someone to provide after-sales service. PC is not as user-friendly as traditional consumer products, and it is easy to have software and/or hardware problems. We do not think customers will be able to send back their OLPC to Quanta when they have a problem. Thus, in the near term, emerging markets will find it a challenge to build relevant infrastructure to solve the situation.

Competition from other low-cost PC projects

In addition to OLPC, there are other low-cost PC projects that want to help children in emerging markets, for e.g., Microsoft's Flexgo program and Intel's World Ahead projects (including Community desktop PC and Classmate laptop PC). These IT giants are trying to cooperate with local PC brands in emerging markets to promote their low-cost PCs based on Wintel architecture.

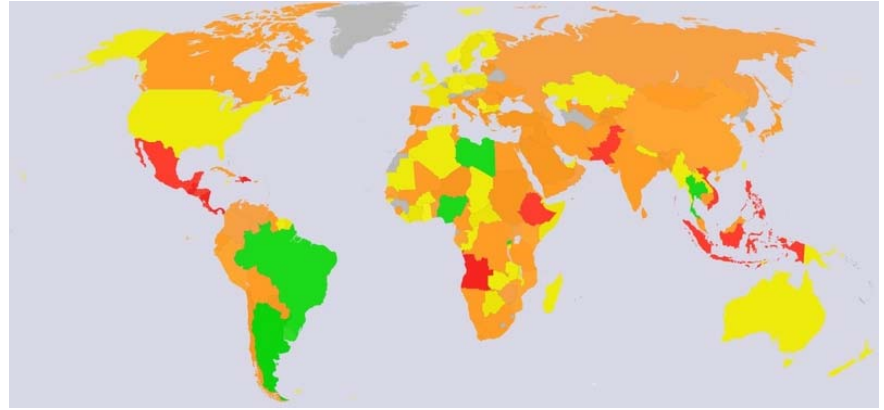
These projects might not be able to provide a sub-US\$150 NB in the next two or even three years. But, their business models are more profitable and workable in the real world, in our view. Also, if a government really wants to reduce the digital gap against other developed countries, buying more desktop PC in schools looks like a much better solution that would yield benefits to the masses.

Market seems to be over-optimistic

According to Quanta, seven countries are already supporting the OLPC program and will buy around 1mn units of XO (first-generation OLPC) in 2007-08. Thus, it will not be a problem for OLPC shipments to reach 5-10mn units in 2007, as the governments will not change plans in the near term. However, from a long-term perspective, market expectations for OLPC seem too high, in our view. Some local research institutions like TRI predict that the sub-US\$200 NB market will

pick up to 68mn units in 2010 from 7mn in 2007, implying a 113% CAGR. We expect the market to start realizing the difficulty to ramp up the OLPC project and cut shipment forecasts in 2H07.

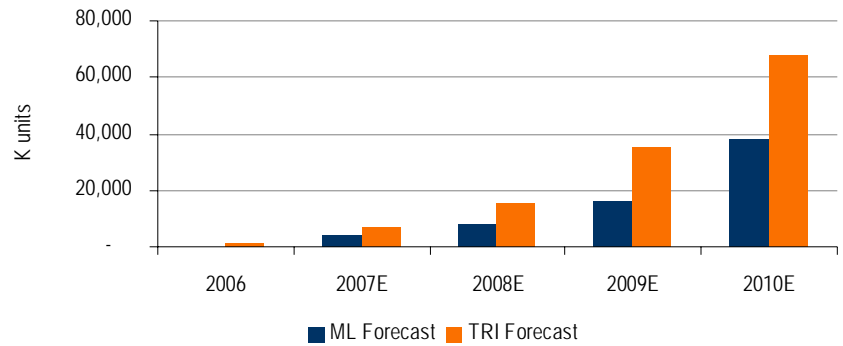
Chart 3: OLPC launching map



- * Green: Launch countries (Argentina, Brazil, Libya, Nigeria, Rwanda, Thailand, Uruguay)
- * Red: Post-launch discussion
- * Orange: Discussion at federal level
- * Yellow: Discussion
- * Gray: No active contact

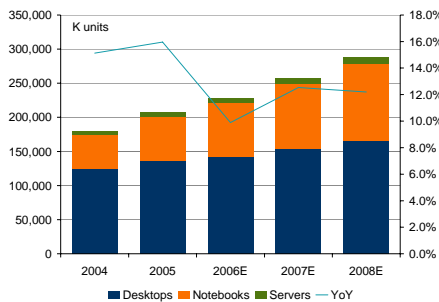
Source: OLPC Organization

Chart 4: OLPC shipment forecasts - Merrill Lynch vs. TRI



Source: Merrill Lynch estimates, TRI

Chart 5: Global PC market outlook



Source: IDC, Merrill Lynch estimates

Stock recommendations

Given that market expectations from OLPC seem high, while upside potential looks limited, we recommend investors not chase the stocks with high exposure to OLPC for now. Fabless names like ENE are stocks that already reflect most of the good news around OLPC, in our view.

We recommend investors look at NB-related companies that can maintain solid growth potential and view OLPC as an additional bonus only. Even without OLPC, the global NB market should achieve 15-20% YoY volume growth. Simplo, SZS, or Sunrex are better investment choices in the sector, in our view.

Table 4: OLPC's impact on related companies

Company	2006 revenue	2007E revenue	YoY	07 contribution from OLPC
ENE	NT\$1.4	NT\$2.1	48%	10-15%
GMT	NT\$2.0	NT\$2.4	20%	5-10%
Quanta	NT\$453bn	NT\$585bn	29%	<5%
Simplo	NT\$16.5bn	NT\$22.6bn	37%	<5%
Sunrex	NT\$4.9bn	NT\$6.5bn	33%	5-10%
SZS	NT\$4.1bn	NT\$5.6bn	37%	5-10%

Source: Companies, market consensus, Merrill Lynch estimates

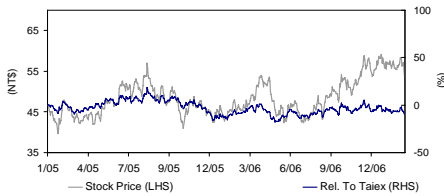
Table 5: OLPC supply chain

Component	Vendor	Potential vendor
IC	CPU	AMD
	Chipset	AMD
	KB controller	ENE
	Power IC	Maxim
	WLAN	Marvell
	Memory	Samsung, Hynix
Display	Chi Lin	
Battery	Simplo, BYD	
Keyboard	Sunrex	
Hinge	SZS, Jarlyte	
Assembly	Quanta	

Source: Merrill Lynch estimates

Tony Tseng >>

Chart 6: Quanta- share price performance



Source: TEJ

Assembler- Quanta Computer (2382 TT, Neutral)

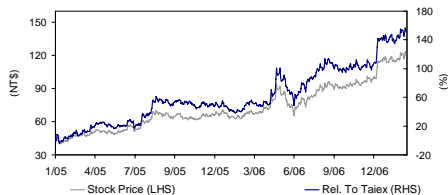
Quanta is the largest notebook ODM in Taiwan, with about 25% global market share, and the sole assembler for MIT's OLPC project. Quanta has indicated that 7-8 countries are interested in this project, and expects to ship 5-10mn units in the first year (2H07-1H08).

Our industry checks reveal that OLPC shipment schedule has been delayed to July 2007, as some software specs are still under discussion. The ASP for OLPC should be US\$145-150, but should yield gross margins than a normal NB (OLPC GM: about 6% vs. about 5% for a normal NB), given that it can leverage on the existing production scale. We forecast Quanta will ship 4.5mn OLPCs in 2007, with revenue and operating profit contribution of less than 5%.

Overall, we believe OLPC project provides Quanta valuable experience in entering the ultra-low-price NB segment for the long term, although execution is still a challenge (especially, after-sales service). We retain our Neutral rating on Quanta, being concerned about its sustained margin decline (consolidated operating margin seen dropping 10bp to 3% in FY07), fair valuation (12.5x 2007E P/E), and limited revenue/earnings contribution from OLPC.

Tina Chang >>

Chart 7: Simplo- share price performance



Source: TEJ

Battery - Simplo (6121 TT, Buy)

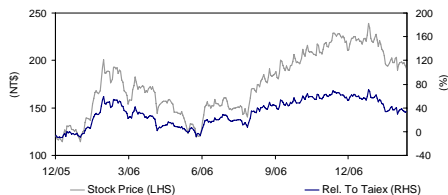
Simplo is the leading NB Li-ion battery pack manufacturer in Taiwan, with 20% global market share in 2006. Given the lower ASP (around US\$7-8 vs. US\$30 for a normal battery pack) and margin on OLPC battery pack (5 Cell, NiMH battery), Simplo is not actively promoting this business. Our channel checks reveal that Simplo already sampled-out the battery for OLPC and may account for 50% of OLPC battery supply.

We expect Simplo to ship OLPC batteries as soon as June 2007 and are conservatively forecasting OLPC shipments to make up only 2.5% of overall revenue, while contributing only 1-2% to operating profit in 2007.

Although contribution from OLPC is limited, we have a long-term positive view on Simplo given its strong fundamentals and sustained share gains in the NB battery pack space. Given its solid gross margin, high earnings growth potential and attractive valuation (10x 2007 P/E), we maintain Buy with PO of NT\$130 (11x 2007E P/E).

Tina Chang >>

Chart 8: SZS- share price performance



Source: TEJ

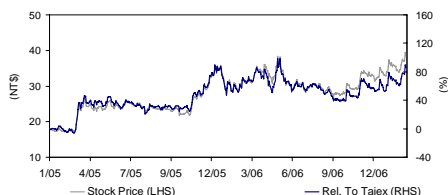
Hinge - SZS (3376 TT, Not rated)

SZS is largest NB hinge provider globally, with 45% global market share in terms of unit sales in 2006. The technology requirement for OLPC hinges are higher than normal (OLPC requires a complex mechanism for hinges, allowing the NB screen to smoothly rotate and reposition, as a tablet PC), and SZS and Jarlytec are the only two suppliers who can provide this hinge.

Through our checks, SZS has already sampled-out its revised hinge model in 1Q07, and may start shipments as soon as June 2007. The market expects SZS to account for 60-70% of OLPC hinge supply, with ASP at US\$2-2.5. Thus, revenue contribution from OLPC hinges could be 5-10% in 2007, but operating profit upside might be less than 5%, given relatively low margins on OLPC hinges.

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Chart 9: Sunrex- share price performance



Source: TEJ

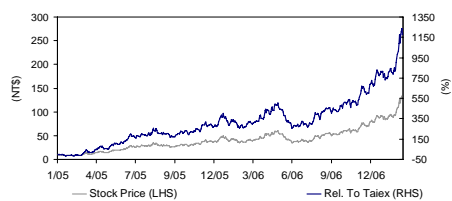
Keypad - Sunrex (2387 TT, Not rated)

Sunrex is Taiwan's largest NB keypad supplier, with around 35% global market share in 2006. Other major NB keypad suppliers include Chicony (about 25%) and Darfon (20%). However, Sunrex is the only provider with OLPC keypad qualification so far, and thus, the market expects Sunrex may account for 90% of OLPC keypad supply in 2007.

Through our checks, Sunrex has already sampled-out OLPC keypads in January 2007 and has scheduled mass production in May. Based on a US\$3-3.5 ASP, revenue/earnings contribution from OLPC keypads could be 5-10% in 2007. The market expects its competitor, Chicony, to aggressively get qualified for OLPC keypad as well.

Jonah Cheng >>

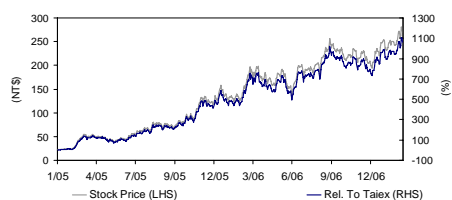
Chart 10: ENE- share price performance



Source: TEJ

Jonah Cheng >>

Chart 11: GMT- share price performance



Source: TEJ

Keyboard ICs - ENE (6243 TT, Not rated)

ENE is the global No.2 KB controller vendor with around 30% market share, and also the sole supplier for OLPC KB IC. It views OLPC as a good chance to enhance its relationship with Quanta Computer. It has around 50% share in Compal, but only 20% in Quanta. In 2006, KB controllers accounted for around 65% of its revenue.

Based on an ASP of US\$1, the OLPC KB IC revenue/earnings contribution could be 10-15% in 2007. The market expects ENE to ship 30mn units of KB controllers in 2007, and OLPC should account for 20-25% of it.

Power & analog ICs - GMT (8081 TT, Not rated)

GMT is the biggest power/analog NB IC vendor in Taiwan. It provides LDO (low drop out) power ICs, switch, thermal sensor, op. amplifier, and other analog chips to NB makers. As per the company, revenue contribution per NB is around US\$1.5.

The market expects GMT to be the major supplier of analog chips to OLPC, given its relationship with Quanta, which joined GMT's private placement and will buy 2.7mn shares (around 5%) of it in 1H07. Based on an ASP of US\$1.5, OLPC will generate around 5-10% of revenues for GMT in 2007.

Table 6: Valuation comparison table

	Ticker	ML Rating	Price 1-Mar-07	Mkt Cap (US\$mn)	EPS (Local)			EPG		PER(x)		ROE (%)			Price Perf. YTD
					2006E	2007E	2008E	2007E	2008E	2007E	2008E	2006E	2007E	2008E	
Quanta	QUCPF	C-2-7 Neutral	54.0	5,544	3.6	4.4	4.9	22%	11%	12.3	11.0	17.0%	19.4%	20.1%	-8%
Simple	SPLOF	C-1-7 Buy	119.0	545	9.0	11.8	14.7	30%	25%	10.1	8.1	31.3%	33.2%	33.8%	3%
SZS *	3376 TT	-	192.0	519	10.7	14.8	18.6	38%	25%	13.0	10.4	38.5%	38.4%	38.4%	-14%
Sunrex *	2387 TT	-	38.2	360	2.7	3.4	3.8	29%	10%	11.2	10.2	17.6%	20.2%	20.8%	15%
ENE *	6243 TT	-	126.5	207	4.4	6.0	7.7	36%	28%	21.0	16.4	31.3%	35.2%	31.6%	42%
GMT *	8081 TT	-	269.5	423	11.8	12.5	13.9	6%	11%	21.5	19.4	47.5%	42.5%	38.0%	13%

Source: Merrill Lynch estimates, Bloomberg

* from BBG IBES

Price Objective Basis & Risk

Simplo's recent historical P/E range has been 7~10x, but we believe it will be rerated to 11x level. NB ODMs, on average, trade at 11x P/E, while NB and handset components are trading at 12-13x P/E multiples. Our price objective of NT\$130 is based on 11x of 2007E P/E, given:

- **High earnings growth, improving ROE, strong cash flow:** Simplo should achieve strong earnings growth of 30% in 2007E and 25% in 2008E. ROE is expected to rise to 30% in 2007 with improvements in asset turnover. Simplo should continue to deliver strong cash flow for the next two years. The cash dividend yield is more than 5%.
- **Deserves a re-rating given its leading industry position:** Simplo has replaced Sanyo as the market leader in 2H06, as Japanese players are gradually exiting the battery pack field due to cost concerns. In our view, Simplo deserves a re-rating given its leading position and continuous market share gains.

Risks: (1) Retention of key customers, (2) supply and pricing of battery cells, (3) weak NB growth, and (4) slower-than-expected progress in diversification (consumer devices and OLPC battery).

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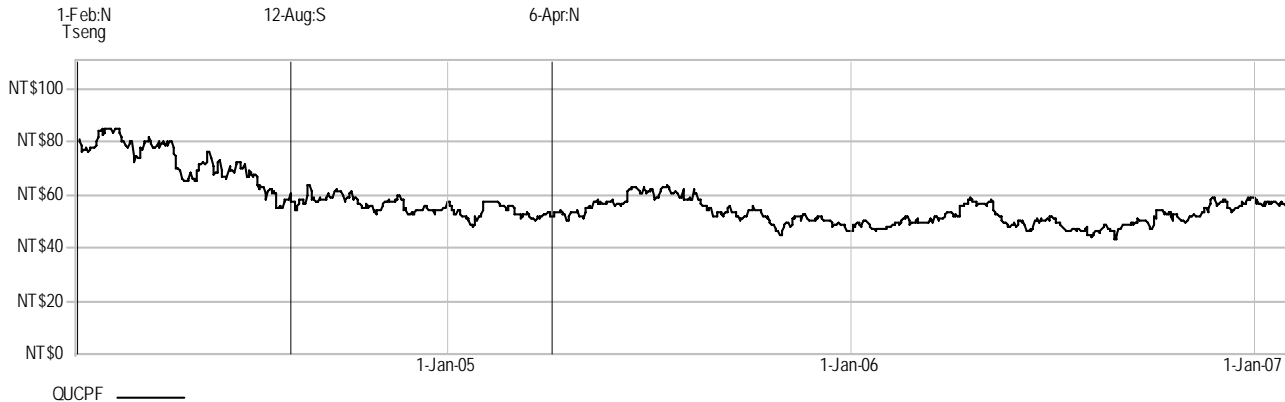
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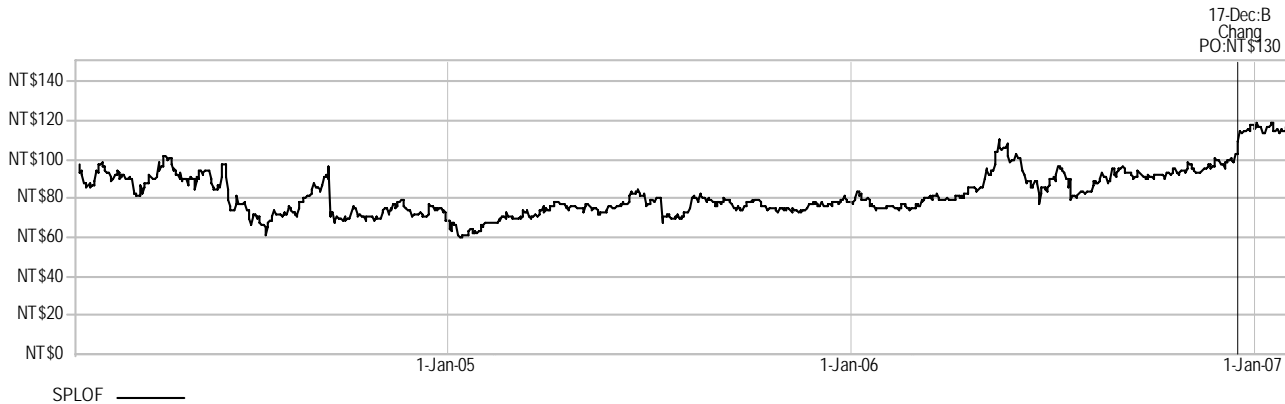
QUCPF Price Chart



B : Buy, N : Neutral, S : Sell, PO : Price objective, NA : No longer valid

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SPLOF Price Chart



B : Buy, N : Neutral, S : Sell, PO : Price objective, NA : No longer valid

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Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	40	40.82%	Buy	4	10.00%
Neutral	48	48.98%	Neutral	6	12.50%
Sell	10	10.20%	Sell	2	20.00%

Investment Rating Distribution: Global Group (as of 31 Dec 2006)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	1306	42.74%	Buy	406	31.09%
Neutral	1509	49.38%	Neutral	446	29.56%
Sell	241	7.89%	Sell	53	21.99%

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