

Hon Hai Precision (Foxconn): A Black Book on a Black Box

DECEMBER 2012

Inside the black box, a well-positioned company with sustainable profit potential

Hon Hai Precision (Foxconn) is, by far, the world's largest EMS company; it got there by aggressively forward pricing to gain market share from competitors, and positioned itself in the fastest growing and most profitable segments (tablets, handsets and TVs) with key customers

Although revenue growth remains solid, the company is now at a crossroads as its ability to lower costs through vertical integration and scale is curtailed; significant margin compression has unsettled investors; opaque accounting and company structure have not helped sentiment

However, the move inland and other efficiencies have managed to arrest margin compression, even if quarter-over-quarter margin volatility remains high; double-digit revenue growth in the medium term appears sustainable as company retains privileged position as leading EMS

Even though the company remains enigmatic and hard to understand, its positioning, size and structural advantages provide upside potential that is not currently reflected in the stock price; we rate Hon Hai outperform, with a target price of TWD 107

Portfolio Manager's Summary

We state up front that Hon Hai Precision (better known by its Foxconn brand name) is a controversial investment opportunity. Nonetheless, we believe investors should look beyond the company's complicated corporate structure, lack of disclosure and general opaqueness. When we do that, we find a company whose positioning and profit potential are not fully captured in current valuations, even with the stock's "black box discount."

To begin with, we expect Hon Hai's exposure to the fast-growing and more profitable consumer segment (tablets, handsets and TVs) to expand to 64% by 2015 (end of our forecast period) from 50% currently. We believe that over the medium term the company has a structural advantage in profitability relative to its peers — and not just because of its size and scale, which we think is overrated (Hon Hai is the world's largest EMS company, with an estimated 48% share of EMS revenues).

Hon Hai's advantage, in our opinion, comes from the company's "true" gross margins after backing out the "pass-through" revenues and costs from key components (e.g., displays, memory, CPUs and HDD), which are recognized in Hon Hai's financial statements but are purchased on consignment from customers and carry effectively zero margin for Hon Hai. Because Hon Hai has a bigger proportion of costs under its control, both from a strong vertical integration and product mix, "true" gross margins are in the 30% area compared to a typical (notebook PC-focused) ODM in the 15% area.

We also find that margin compression at Hon Hai has bottomed out and operating margins are now slowly expanding. Although quarter-over-quarter margin volatility is frustratingly high, LTM margins have been rising over the last year, and we believe normalized operating margins close to 3% are achievable in the midterm.

Over the last few years, EMS and ODM companies have seen a structural compression in margins, as the inability to further cut costs amid rising wages has damaged the sector's economics. Hon Hai responded with a concerted effort to contain its burgeoning labor cost structure by moving production inland and developing greenfield and efficient manufacturing operations.

The process has been long and arduous, and taking far longer than the company (and investors) expected. But we see a positive payoff being gradually realized, even if the possibilities for the large-scale substitution of labor for capital through automation are limited at this point. The inability to contain labor costs through automation in the medium term means workforce issues and negative media exposure are likely to flare up on occasion.

On the top line, there are many questions and concerns about the sustainability of Hon Hai's revenue streams — particularly with respect to the relationship with its biggest customer, Apple, which accounts for almost 43% of revenues. But we see opportunity from both Apple and its diversified customer base, such that 15% year-over-year revenue growth over the next few years is not far-fetched.

On balance, we find that Hon Hai's positioning and economics outweigh the controversies around the investment opportunity, and remain bullish on the stock's upside in the medium term. We rate Hon Hai Precision outperform, with a target price of TWD 107, giving it 11% upside from current levels.

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Exhibit 1**Financial Overview**

| | |
|--------------------------------|----------------|
| Ticker | 2317.TT |
| Currency | TWD |
| Current Price (10-Dec-2012) | 96.10 |
| Market Cap (millions LCY) | 1,137,302 |
| 52-Week High | 106.36 |
| 52-Week Low | 70.27 |
| Rating | O |
| Target Price | 107.00 |
| Upside/(Downside) | 11% |
| Revenues (millions LCY) | TWD |
| 2011A | 3,452,681 |
| 2012E | 3,901,473 |
| 2013E | 4,632,781 |
| 2014E | 4,988,610 |
| 2015E | 5,464,404 |
| EPS (Fiscal Year) | TWD |
| 2011A | 7.65 |
| 2012E | 7.84 |
| 2013E | 10.68 |
| 2014E | 11.58 |
| 2015E | 13.72 |
| P/E Ratio | |
| 2011A | 12.6x |
| 2012E | 12.3x |
| 2013E | 9.0x |
| 2014E | 8.3x |
| 2015E | 7.0x |
| P/B Ratio | |
| 2011A | 1.8x |
| 2012E | 1.6x |
| 2013E | 1.3x |
| 2014E | 1.1x |
| 2015E | 1.0x |
| LTM Dividend Yield | 1.0% |

Source: Capital IQ and Bernstein estimates and analysis.

Significant Research Conclusions

Hon Hai Precision Is at a Crossroads, But We Believe Well-Positioned for Continued Profit Growth

Hon Hai Precision, also known by its brand name Foxconn, is by far the world's largest electronic manufacturing services (EMS) company, having a 49% share of 2012's estimated revenues in the EMS segment. It got there by being relentless in its search for revenue and aggressively forward pricing to gain market share from competitors. It also positioned itself in the fastest growing and most profitable segments (tablets, handsets and TVs) and aligned itself with key customers (Apple, Dell, HP, Cisco and Sony) — for many years growing revenues and profits at very high rates even as margins shrank.

However, Hon Hai is now at a crossroads, because its strategy of forward pricing to gain market share appears to be losing its effectiveness as the company's ability to lower costs is reduced. As a result, although revenue growth remains solid, we see a structural compression in margins that is unsettling investors. Hon Hai's complicated corporate structure, investor unfriendliness and general opaqueness are not helping to allay fears about the company.

How the company's strategy and execution — and hence profit growth — evolve in the medium term and how it reacts to the current challenges will determine the long-term attractiveness of Hon Hai as an investment. The company is well aware of this quandary, and is engaging in a series of moves (with varying levels of success) to respond to the changing environment.

On the plus side, and most importantly, we expect Hon Hai's exposure to the fast-growing and more profitable consumer segment to expand, from 50% of revenue currently to 64% in 2015, the end of our forecast period. We believe Hon Hai has a medium-term structural advantage in profitability relative to peers. This is reflected in its "net" margin after backing out the "pass-through" revenues from key components (e.g., displays, memory, CPUs and HDD), which are recognized in Hon Hai's financial statements but are purchased on consignment from customers and carry effectively zero margin for Hon Hai.

Another positive is that Hon Hai has made a concerted effort to contain its burgeoning labor cost structure by moving inland and developing greenfield and efficient manufacturing operations. The process has been long and arduous, and taking far longer than the company (and investors) expected. At the end of 2011, Hon Hai had about 73% of its operations by revenue in the coastal China region, and another 27% in inner China. It has been working toward dramatically shifting this geographic mix to be 50%/50% by the end of 2012, as the cost of operations in coastal China continues to rise and inner China provides attractive tax incentives.

On the minus side, there is controversy as to what the "true" benefits are of the inland move. Not only are labor costs in the inland areas rising even more than those in the coastal regions, but also the upheaval and supply chain extension into inland China has costs that could be higher than the labor costs savings. Moreover, this labor cost pressure will be a continued source of concern for the company and investors, as possibilities for the large-scale substitution of labor for capital through automation are limited at this point.

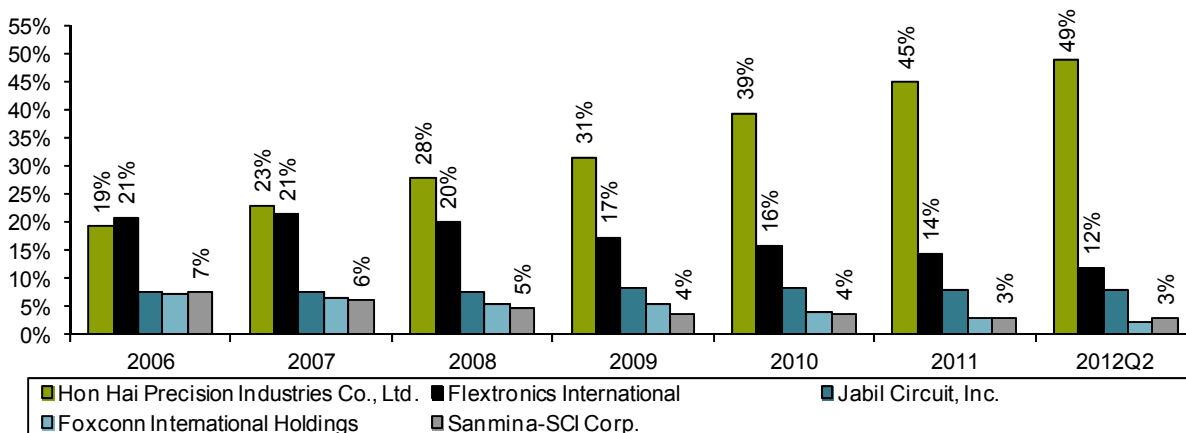
Another negative is that there are many questions and concerns about the sustainability of Hon Hai's revenue streams. This is particularly so with respect to its relationship with its biggest customer, Apple.

Also of concern is that Hon Hai has gained increasing (mostly negative) media exposure, as operational missteps and labor unrest plague China's largest private employer, impacting both Hon Hai's margin structure and investor sentiment.

How Hon Hai Has Managed to Outperform Its Competitors in Revenue Growth

Between 2004 and 2011, Hon Hai grew its revenues by a factor of 6.4x, resulting in a 30% CAGR. More impressively, it grew far faster than the industry average, gaining market share every year at the expense of its closest competitors. By second-quarter 2012, Hon Hai had captured ~49% of the EMS sector revenues (see Exhibit 2).

Exhibit 2 Hon Hai's Market Share Among EMS Companies



Source: IDC and Bernstein analysis.

We Forecast Revenue Growth Will Remain Above Market for the Medium Term

We expect the lion's share of Hon Hai's revenue growth will come from the company's positioning right at the sweet spot of the product opportunities we identify as being the most attractive in both top-line growth and having the best opportunity for margin capture: TVs, handsets and tablets (see Exhibit 3 and Exhibit 4). Even though we do not forecast substantial overall unit growth in handsets and TVs, an increase in the percentage where manufacturing is outsourced will drive stronger unit growth of these products, specifically at EMS companies such as Hon Hai.

We believe this puts Hon Hai in a situation where it is likely to experience revenue growth above the market (and peers), leading to increasing concentration and market share. Although we do not view this as necessarily improving profitability per se, it solidifies Hon Hai's position as the leading EMS company in the world.

Exhibit 3 Summary View of Unit and Outsourcing Growth in the Asian IT Hardware Sector

| Product Category | 2011 Units (million) | Historical | | Forecast | | Outsourcing Ratio | | Opportunity / Outlook |
|---------------------|----------------------|-----------------------|-----------------------|------------------------|------------------------|-------------------|-------|--|
| | | Unit CAGR (2001-2010) | Unit CAGR (2001-2010) | Unit CAGR (2011-2015E) | Unit CAGR (2011-2015E) | 2011 | 2015E | |
| Mobile Handsets | 1,535 | 17% | 41% | 4% | 12% | 24% | 32% | Moderate growth rates, but solid increase in outsourcing ratio driven by more outsourcing from Big 3, continued growth of fully outsourced Apple and emergence of Android as enabler for asset-light players |
| TFT-LCD TVs | 206 | 89% | 103% | 7% | 12% | 33% | 40% | Slowing growth, modest incr. in outsourcing driven in part by Japanese TV OEMs move to asset-light |
| Notebook PCs | 212 | 25% | 33% | 17% | 17% | 93% | 95% | Moderate unit growth, limited outsourcing upside |
| TFT-LCD PC Monitors | 215 | 32% | 34% | 7% | 7% | 70% | 70% | Modest unit growth, outsourcing ratio limited by vertically integrated leading players |
| Desktop PCs | 140 | 3% | 2% | 1.8% | 2.0% | 93% | 94% | Mature product, some cyclical demand uptick offset by shift to mobile form factor |
| Tablets | 67 | NA | NA | 34% | 32% | 85% | 82% | Significant unit growth due to mass adoption, though total volumes still likely to remain relatively small |

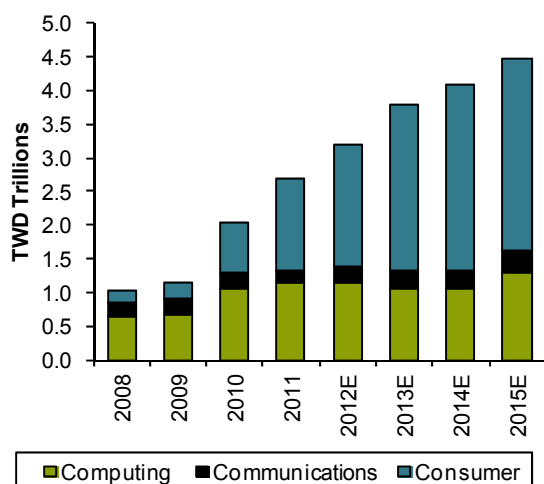
Source: Gartner, IDC, Strategy Analytics, DisplaySearch, iSuppli and Bernstein U.S. IT Hardware team and Bernstein estimates and analysis.

Exhibit 4 EMS and ODM Company Product Line Exposures

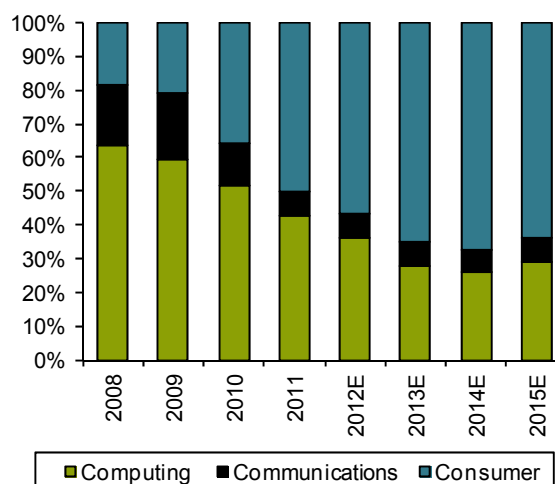
| Company | Type | Tablets (base case) | Mobile Handsets | Notebook PCs | Consumer (TVs, mp3) | Desktop PCs |
|--|------|------------------------|--------------------|-----------------|------------------------|----------------|
| Outsourced Unit CAGR (2011-15E) | | 34% | 12% | 17% | 12% | 2.0% |
| Hon Hai | EMS | Medium | High | Medium | High | Low |
| Flextronics | EMS | Medium | High | Medium | Low | Medium |
| Jabil | EMS | na | Medium | Low | Medium | Low |
| Sanmina | EMS | na | High | Low | High | Low |
| Celestica | EMS | na | High | Low | High | Low |
| Asus / Pegatron | ODM | Low | Medium | High | Medium | High |
| MSI | ODM | na | na | Medium | na | High |
| Compal | ODM | Low | Medium | High | Medium | na |
| Quanta | ODM | Low | Low | High | Low | na |
| Wistron | ODM | Low | Low | High | Low | Medium |
| Inventec | ODM | Low | Low | High | Low | na |

Source: IDC, corporate reports and Bernstein analysis.

As a major supplier to Apple (iPads and iPhones) and a close partner of Sony (and now Sharp) in their efforts to become "asset light," Hon Hai, although massive, remains nimble enough for a couple more years of super-normal revenue growth. We expect the company's exposure to the fast-growing consumer segment, which was 50% of revenues in 2011, will expand to 64% by the end of our forecast period in 2015 (see Exhibit 5 and Exhibit 6).

Exhibit 5 Hon Hai Revenue Forecast by Segment

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 6 Hon Hai Revenue Breakdown Forecast by Segment

Source: Corporate reports and Bernstein estimates and analysis.

Forward Pricing Had Enabled Hon Hai to Grow Faster Than Peers While Maintaining Profit Growth, But That Advantage Is Eroding

How Hon Hai managed to grow far faster than its peers is worth exploring in some detail. The company has followed a pricing strategy that was predicated on market share pickup through lower pricing, which would be "made up" by ex-post cost reductions as product volume picked up.

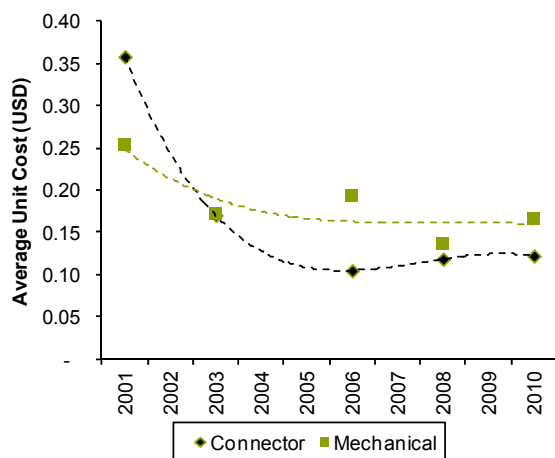
In the early days of the industry, it was possible for Hon Hai to "price forward" — that is, offer a competitive MVA (short for "market value added," which is a per-unit fee) to customers. The company would then "make up" the margin by driving cost reductions through volume purchasing, design for manufacturing and

process efficiencies. This approach worked quite well up until recently, as revenue growth more than made up for the gross margin compression.

However, the strategy now has broken down, as cost-reduction possibilities are exhausted. Hon Hai is having difficulty (like the rest of the segment) extracting costs and its "pricing ahead" has met the slower-moving cost reductions. We can see that in the flattening of the cost curves in connectors, mechanicals and insertion costs. Exhibit 7 shows our estimate of connector and mechanical unit costs over time, while Exhibit 8 shows the same for insertion costs. Insertion refers to the assembly of printed circuit boards (PCBs) into complete units by mounting the integrated circuits (ICs), discrete components, modules, and connectors.

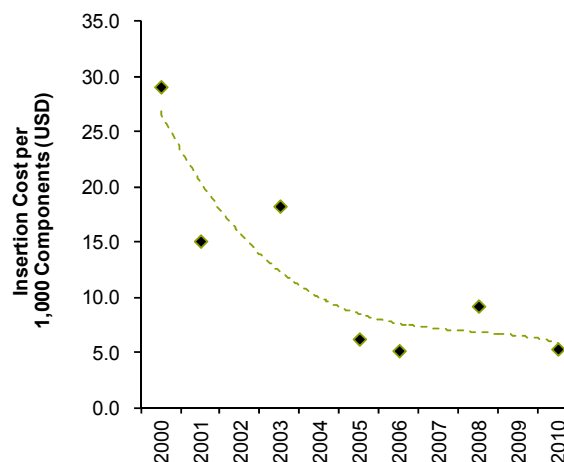
While Hon Hai continues offering low MVAs, its ability to reduce costs and "make it up on volume" is now limited. As a result, it has seen significant margin compression, which is currently a major concern with investors and will remain a major controversy relating to Hon Hai's profit growth prospects.

Exhibit 7 Connector and Mechanical Cost Trends



Source: UBM TechInsights and Bernstein analysis.

Exhibit 8 Insertion Cost Trends Over Time



Source: UBM TechInsights and Bernstein analysis.

However, Hon Hai's Product Mix Insulates It Somewhat from Continued Margin Erosion in the Future

Notwithstanding the margin trends, we believe Hon Hai will retain a structural advantage in profitability relative to its peers over the medium term. This is reflected in its "net" margin after backing out the "pass-through" revenues from key components (e.g., displays, memory, CPUs and HDD) — which are recognized in Hon Hai's financial statements, but are purchased on consignment from customers. Hon Hai takes no inventory or price risk on these purchases, and thus picks up no margin, as it books revenues equal to cost of goods for these items.

As a result, Hon Hai (like most EMS and ODM companies) is in reality a much "smaller" company than indicated by its financials, because roughly 68% of its revenues and 77% of its costs are pass-through revenues, by our estimation. Further, because the company has a minimal notebook PC business (where a hefty 80% of the bill of materials is key components, compared to under 60% for a handset), Hon Hai has a higher proportion of costs under its control than peers (23% versus the 17% averaged by ODM competitors).

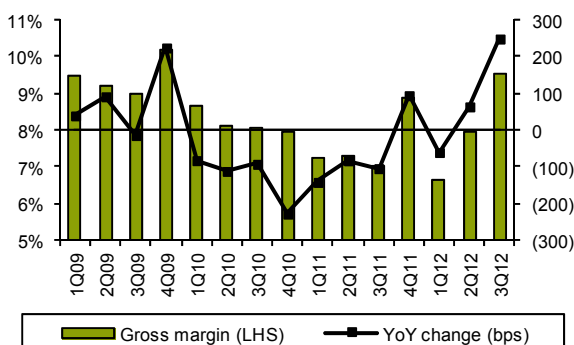
We can use the mix of business and cost breakdowns of the company's key product lines to determine the pass-through revenues and thus calculate Hon Hai's "net" revenues and COGS to estimate its true "net" margin. We find that, as a result of a higher portion of revenues and costs under Hon Hai's control where the company can gain a margin, its net margin is much higher than that of competitors — 30% compared to around 15% for Quanta, for example. Moreover, having control over revenues and costs appears to be the real source of Hon Hai's profitability. We believe this factor is more important than scale and volume

purchasing in extracting a margin. And, as Hon Hai's product mix tilts toward (low key component-ratio) consumer electronics (primarily handsets, tablets and TVs), the shift leads us to forecast a milder margin compression than expectations.

And Although Margin Erosion Is Structural, Hon Hai Margins Are Rebounding to a Lower But Steady Level

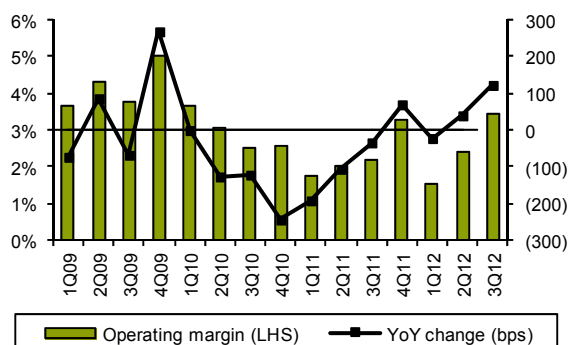
Although we believe that Hon Hai has a favored cost position because of its vertical integration in the supply chain and its product mix, investors have recently been concerned about the deterioration in Hon Hai's margins over the last several quarters. The erosion is apparent in both reported gross and operating margins (see Exhibit 9 and Exhibit 10). The margin compression in 2012 was less than that in 2011, and margins overall have stabilized and even have begun to rise. Nonetheless, we find that the new margin levels have been much lower than those of 2010 — with the general trend for the two years being toward margin deterioration.

Exhibit 9 Hon Hai: Quarterly Gross Margin Trends



Source: Corporate reports and Bernstein analysis.

Exhibit 10 Hon Hai: Quarterly Operating Margin



Source: Corporate reports and Bernstein estimates and analysis.

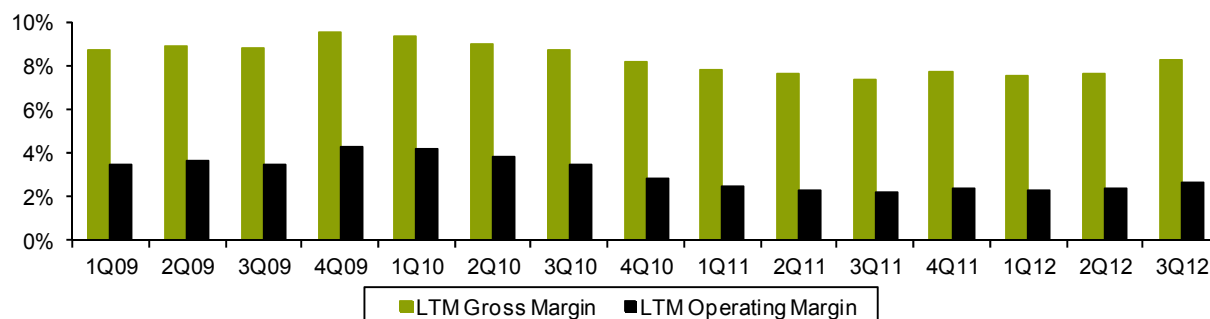
We attribute this relative deterioration of Hon Hai's margins to four key factors — three of which are temporal, and one which we believe is permanent and systematic to the EMS and ODM segment as a whole.

- **A pricing strategy** (impacting gross margins) that was predicated on expanding market share through lower pricing, which would be "made up" by ex-post cost reductions as product volume picked up (which we discussed earlier). This strategy — which worked quite well in the past, when the revenue growth more than made up for the gross margin compression — has broken down as Hon Hai is having difficulty (like the rest of the segment) extracting costs and its "pricing forward" model is met with slower-moving cost reductions. The situation gets a bit sticky given the growing alliance between Hon Hai and Apple, which has been reported to design products that are difficult to make and have low yields. We believe this pricing strategy has run its course, and Hon Hai is finding alternative ways to maintain margin through more disciplined pricing, higher control of the component supply chain, and continued efficiency gains.
- **An expansion strategy** (impacting operating expenses) predicated on duplication of facilities (e.g., inland investment in Chengdu and Chongqing) in 2011 and first-half 2012; increase of the global footprint; entry into unrelated business segments, such as their suspect foray into the display segment, their retail logistics and support operations; and increases in R&D. All of these expenditures can be rationalized or controlled better as Hon Hai learns to more successfully manage its operations in this environment. We believe the additional costs of relocating to inland China will be offset in the medium term by tax benefits and lower employee turnover rates. However, the increasing labor costs across China, particularly after the Fair Labor Association (FLA) audits, remains as a headwind for Hon Hai's margins going forward, especially given the unfavorable economics of substituting capital for labor.

- **The strategy of vertical integration in the supply chain**, which can be a double-edged sword. On the one hand, Hon Hai has been more profitable than its ODM and EMS peers because it has been able to capture higher margins from non-key component procurement within its group companies and associates. On the other hand, some investments have not proved to be good ideas. Even though the majority of the acquisitions or investments in suppliers are relatively small in size and remain in Taiwan, Hon Hai's recent investment plans for Sharp and its panel business unit have become a controversy, as the panel industry and the Japanese conglomerate are in weak competitive and economic condition.
- **The end of 5-6% operating margins** for the EMS and ODM segments. We believe a new reality has set in — one where the inability to reduce costs places a floor on how much farther ASPs can drop and how much pricing power EMS and ODM companies have. We believe the "new normal" is one of at most 3% operating margins, which is within Hon Hai's capabilities if it rationalizes its operations and improves its pricing accordingly, but is likely to take longer than expected to stabilize close to those levels.

Overall, we believe investors remain skeptical and are not giving "credit" to the fact that Hon Hai has actually managed to stabilize margins. There is even evidence that margins are actually rising. Quarter-over-quarter margin volatility makes it difficult to see the trend, but smoothing margins on a LTM trailing basis shows that both gross and operating margins are actually slowly rising (see Exhibit 11).

Exhibit 11 Hon Hai Trailing LTM Gross and Operating Margins



Source: Corporate reports and Bernstein analysis.

Hon Hai and Apple Depend on Each Other, and We Expect the Profit Relationship to Tilt in Hon Hai's Favor

The rise of Hon Hai cannot be viewed separately from the enormous success of Apple. With revenues of over US\$120 billion in 2011 and estimates of 15-20% growth for 2012, Hon Hai Precision has delivered tremendous top-line growth over the decade and established itself as the largest EMS globally.

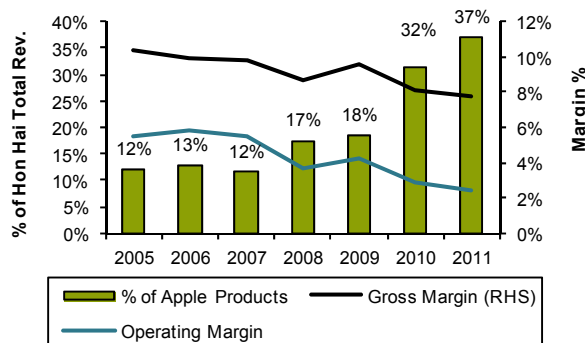
A predominant driver of Hon Hai's growth has been Apple, the strategic partner that contributed more than one-third of Hon Hai's revenue in 2011 and around 43% in 2012. Hon Hai's relationship with Apple started almost 30 years ago when Hon Hai was still mainly a supplier of connectors and other mechanical components to Apple's in-house manufacturing operations. Hon Hai integrated forward into manufacturing, logistics and the supply chain at the same time Apple shifted to an outsourcing manufacturing model, and Hon Hai became the natural partner for Apple. Apple's success in the iPhone and iPad has made Foxconn, Hon Hai's brand, widely known.

Based on the estimates from Bernstein's U.S. IT Hardware team, Apple is expected to ship around 135-140 million and 65-70 million units of iPhone and iPad, respectively, in 2012, which represents a significant increase from ~93 million and ~40 million, respectively, in 2011. Assuming Hon Hai captured ~100% production of iPad and over 90% production of iPhone in 2011, we estimate Hon Hai manufactured 83 million iPhones and 38 million iPads in that year.

For 2012, Hon Hai has probably lost a proportion of both orders (~10-15% of iPhone orders to Pegatron and ~10% of iPad orders to a second EMS or ODM) as Apple seeks to diversify its manufacturing base. For PC manufacturing, Pegatron and Quanta are reportedly making Apple's MacBook and MacBook Pro, respectively. Hon Hai reportedly also engages in MacBook manufacturing, although the size of the order is much smaller compared to the former two players.

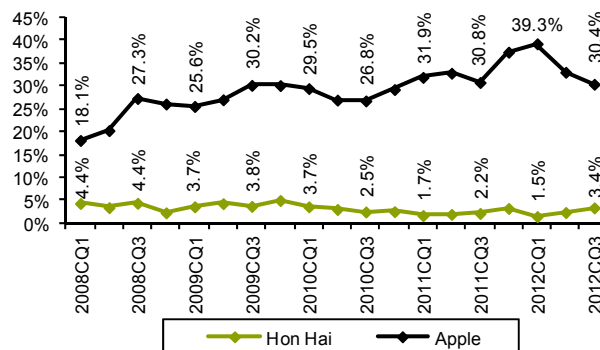
With an increasing proportion of Apple-related revenue, however, we believe top-line growth driven by Apple does not necessarily translate into improved profitability. From a company-level perspective, Hon Hai's margin compression occurred over time and the depressed margins are not likely to return to the pre-Apple era (see Exhibit 12). In fact, Apple's dependence on Hon Hai for manufacturing does not seem to translate into improved margins for Hon Hai even as Apple has improved its operating margin from 18.1% in first-quarter 2008 to 30.4% in third-quarter 2012. This poses a notable contrast to Hon Hai's profitability — which has undergone margin compression from 4.4% to an estimated 3.4% during the same period (see Exhibit 13).

Exhibit 12 Hon Hai's Margin Trends and Apple-Related Revenue as Percentage of Hon Hai's Total Revenues



Source: Corporate reports and Bernstein estimates.

Exhibit 13 Operating Margin Comparison of Hon Hai and Apple



Source: Corporate reports and Bernstein estimates.

Given the launch of new Apple products and growing unit shipments, Hon Hai is likely to increase the proportion of Apple-related products within its overall portfolio, to around 43% for 2012 and onward. What remains unknown, yet critical to investors, is whether Hon Hai can expand its gross margins, particularly from the Apple-related products. If the margin expansion is feasible given Hon Hai's current integrated supply chain, what are the key drivers for margin expansion and how much is the upside?

We believe it is possible for Hon Hai to increase its margin by increasing the proportion of components supplied by Hon Hai as opposed to being provided by Apple. The financial upside could be particularly meaningful and structural given the increasing proportion of revenues from Apple in the coming years, and we incorporate such a view in our model and investment thesis for Hon Hai.

Labor Cost Increases Should Continue to Be a Source of Pressure for Hon Hai's Profitability

Labor costs, one of the key factors in overall COGS (about 10-15% of the cost structure under the EMS's control, depending on the product), is also among the most-discussed topics given the rising labor costs and tightening labor policies in China.

After a spate of well-publicized suicides and industrial accidents in 2010-11, Hon Hai materially increased salaries and made improvements to working conditions in an attempt to both defuse and remedy the situation. Although the media and the court of public opinion were placated for a period, pressure on Apple from U.S. labor rights institutions and the media led it to finally agree to meet the

conditions imposed by the FLA in order to join the group. As a result of Apple joining the FLA, Hon Hai was required to participate in a comprehensive audit by the FLA on working conditions at Apple-related Hon Hai factories.

The audit found more than 50 different violations of its standards, which are expected to be remedied in a timeline ranging from immediately to two years, depending on the severity of the violation and the difficulty in fixing the situation. As of June 2012, FLA had conducted its second audit and verified the process of some of the recommendations proposed during the first audit. One of the most immediate measures that Hon Hai took is to reduce the long working hours and increase the health insurance benefits schemes, all of which will add to the total costs of employment.

The magnitude of the rising labor costs for Hon Hai is critical given the ongoing margin compression and the low-margin business EMS/ODM is in. We use data from the FLA's landmark February 2012 audit to take an in-depth look at Hon Hai's labor costs. In particular, we estimate 2012 headcount by Apple business production lines and the increases required to meet the FLA audit requirements, size the short- and medium-term costs of implementing the audit, gauge the timing and size of those costs that will be transferred to customers, and estimate the impact to Apple's bottom line.

Based on our analysis, we expect (and incorporate in our models) the FLA audit implementation to add about 90 bps of gross margin drag, which is to be allocated between Hon Hai and Apple in some equitable manner.

We Do Not Expect These Labor Cost Increases to Be Mitigated by Increasing Automation in the Medium Term

Although industrial robots have existed for decades, there is renewed interest from companies, governments and investors in industrial automation amid increasing labor costs in the developing world and high unemployment rates in the developed world. In contrast to the highly automated automotive industry, the electronics industry, particularly the final assembly segment, remains labor-intensive. Hon Hai Precision is a poster child for large-scale labor-intensive electronics assembly, employing more than one million workers in China. While Hon Hai has gone through a number of rounds of salary hikes to accommodate rising labor costs and to comply with the FLA requirements, Terry Guo, the CEO and Chairman of Hon Hai, also publicly expressed his interest in adopting one million robots in the assembly line in the next three years.

Despite the CEO's grandiose pronouncement, we have but anecdotal evidence of the timing and strategy of Hon Hai's potential automation initiatives in China, where the company is the single largest employer in the private sector. For example, we know that Hon Hai is the biggest customer of Harmonic Drive (6324.JP, not covered), a Japanese maker of precision drives widely used in robots. We do not know whether Hon Hai is using these precision motors in its own assembly lines to improve efficiency (but not replace direct assembly labor), to build robots for itself, or even to manufacture robots for third parties. The latest news indicates that Hon Hai has begun introducing automated handling equipment through low-cost "Foxbots," which can perform simple pick and place operations, but not assembly.

Despite limited information available and the rapid changing industry dynamic, investors are increasingly interested in the potential economic implications of large-scale automation in Hon Hai — whether Hon Hai should implement automation on its assembly lines given the rising labor costs in China. To assess the potential, we have run a simulation of four possible automation levels at Hon Hai, based on different ASPs for a robot. We then calculate the annual unit production of the robots and the kind of human labor replacement that could potentially be achieved. We also have calculated the breakeven points to determine at which point in time it makes sense to automate given the increasing labor cost environment, the kinds of efficiencies that could be achieved by automation, and the setup and ongoing incremental costs that the automation process will require.

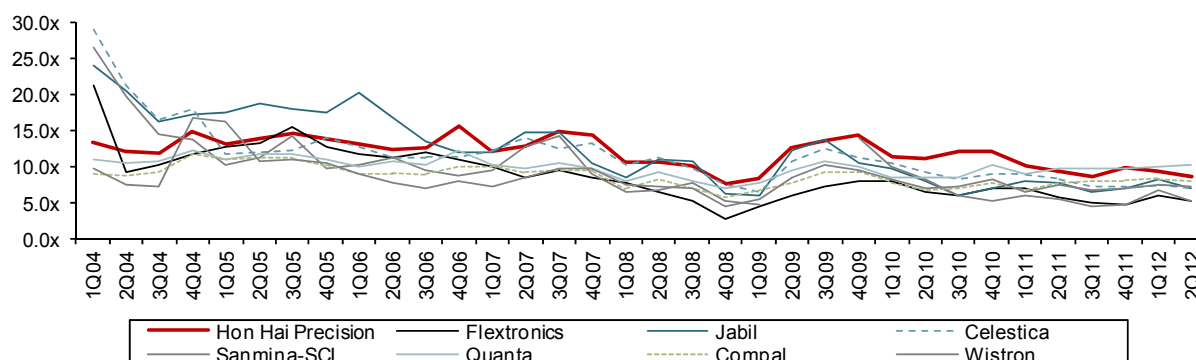
Our conclusion is that large-scale automation at Hon Hai remains a longer-term goal, and hence labor cost pressures will continue to have an impact on Hon Hai's operations and financials for at least the next few years.

Hon Hai Likely Trades at a Discount Purely from Its Opacity and Complicated Structure

Hon Hai with its informational opacity — complicated corporate structure, lack of earnings conferences, no management Q&A, bare minimum information disclosures only to meet regulatory requirements — has created a black box environment for investors. Therefore, we are interested to know how Hon Hai Precision has traded relative to its peers and whether this "black box effect" has an impact on valuations. ODM peers are included in our analysis, as they are closer to Hon Hai in profitability and size, albeit having different business models. Our sample of EMS peers includes Flextronics, Jabil Circuit, Celestica, Sanmina-SCI as well as ODM peers Quanta, Compal Electronics and Wistron.

On a forward earnings basis, for example, Hon Hai has commanded a premium over EMS and ODM peers. Trading multiples for all companies have clustered around 10.0x. Multiples have suffered compression over the years, dropping from 11.6x, on average, in 2004-08 to 8.3x post 2008. Prior to 2008, Hon Hai had traded on forward earnings basis at around 12.8x, and post-2008 it was at 10.9x, holding up against EMS company comparables, which dropped from 12.8x before 2008 to 8.3x after 2008, and ODMs, which dropped from 9.6x to 8.4x (see Exhibit 14).

Exhibit 14 EMS and ODM Price-to-Forward 12-Month Earnings Ratio



Source: FactSet, Capital IQ and Bernstein analysis.

We also review how Hon Hai Precision and its EMS/ODM peers trade relative to LTM earnings, forward earnings and book values. We compare how trading multiples stack up relative to profitability (from both operating margin and economic profit perspectives). In addition, we assess the impact of Apple's business on Hon Hai's valuation. We also discuss whether we think Hon Hai has a valuation headwind from its low institutional ownership, low liquidity, opaque ownership structure, and low levels of disclosure.

Based on our analysis, we believe Hon Hai's opacity hurts its valuation. Without visibility and understanding of its current and future income streams and their sources, investors are in the dark, imposing higher discount rates for uncertainty. Even though Hon Hai trades at a premium to peers, we believe the stock could be valued even higher (as a "bellwether stock") if this informational asymmetry was reduced through disclosure.

Valuation Methodology

Hon Hai, like other EMS and ODM companies in our coverage, has stable cash flows and reliably positive earnings. Hence, to set a target price, we triangulate values using historical P/E multiples and sum-of-the-parts discounted cash flow and residual income models that incorporate the market value of unconsolidated subsidiaries and shareholdings. Our TWD 107.00 target price for Hon Hai is based

on 10x FY 2013 earnings, slightly above the three-year historical forward earnings multiple of 9.8x.

Risks

Hon Hai, like other EMS and ODM companies in our coverage, is able to adapt to changing conditions because of its low fixed cost overhead and efficient logistics and operations. However, its target price is still exposed to segment-wide and firm-level risks.

Demand risk. EMS and ODMs manufacture to order and much of their inventory is on consignment, making them less exposed to demand risk. However, they can still end up with excess or obsolete component inventory or incur component shortages and slowdowns if they misjudge the product mix (in either direction). ODMs, because of their proactive design role, are also exposed to excess non-recurring expenses from design work that is either not adopted by OEMs or made obsolete by technology and product innovation.

Supply risk. EMS and ODM work is labor-intensive and subject to labor shortages and rising wages. On the component side, natural disasters and other supply disruptions can lead to component shortages, factory slowdowns or inventory mismatches.

Foreign exchange risk. Because the end products and much of the input material and capital equipment are denominated in multiple currencies (U.S. dollar and others for revenues, Japan's yen for capital equipment, China's renminbi for module components and labor inputs, and Taiwan's dollar for engineering and supervisory expenses), Hon Hai is exposed to foreign exchange risks in revenues and costs.

Firm-specific risks. Our target price for Hon Hai is based on a superior positioning to products more likely to be outsourced (TVs and handsets), which may not happen as fast as predicted; the primacy of Hon Hai as a supplier to Apple, which could change if Apple doesn't grow as fast as expected or searches more aggressively for alternative suppliers; a product mix with high proportion under control of Hon Hai, which would change to its detriment (e.g., more notebook PCs, less TVs); and an operating margin expansion forecast that may take longer to be realized.

Investment Conclusion

We rate Hon Hai Precision outperform with a target price of TWD 107.00. Our expectations are for an improvement of operating margins to 2.5-3.0%, and revenue growth in the 15-20% range in 2013, which should lead to above-expectations EPS growth for the forecast period.

How Did Hon Hai Precision Get Here?

Overview

Hon Hai Precision is by far the world's largest EMS company, accounting for an estimated 49% share of the EMS industry's revenues in 2012. It got there by being relentless in its search for business and aggressively forward pricing to gain market share from competitors. It also positioned itself in the fastest growing and most profitable consumer segments — tablets, handsets and TVs — and for many years grew revenues and profits at very high rates even as margins shrank.

However, Hon Hai is now at a crossroads: Its strategy of forward pricing to gain market share appears to be losing its effectiveness as the company's ability to lower costs has been reduced. As a result, we see structural margin compression that is unsettling investors, even though revenue growth remains solid. Hon Hai's complicated corporate structure, investor unfriendliness and general opaqueness are not helping sentiment about the company.

How the company's strategy and execution — and hence profit growth — evolve in the medium-term and how management reacts to the current challenges will determine the long-term attractiveness of Hon Hai as an investment. The company is well aware of its quandary, and is engaging in a series of moves (with varying levels of success) to respond to the changing environment.

On the plus side, and most importantly, we expect Hon Hai's exposure to the fast-growing and more profitable consumer segment to expand from 50% of revenues currently to 64% by 2015, the end of our forecast period. We believe Hon Hai has a medium-term structural advantage in profitability relative to its peers. This is reflected in its "net" margin after backing out the "pass-through" revenues from key components (e.g., displays, memory, CPUs and HDD), which are recognized in Hon Hai's financial statements but are purchased on consignment from its customers.

Another positive is that Hon Hai has made a concerted effort to contain its burgeoning labor cost structure by moving inland and developing greenfield and efficient manufacturing operations. The process has been long and arduous, and taking far longer than the company (and investors) expected. At the end of 2011, Hon Hai had about 73% of its operations by revenue in the coastal China region, and another 27% in inner China. It has been working toward dramatically shifting this geographic mix to 50%/50% by the end of 2012, as the cost of operations in coastal China continues to rise and inner China provides attractive tax incentives.

And third, Hon Hai, unveiled with a formal announcement in 2010, is penetrating the retailing space in Mainland China. It opened around 300-500 IT retail stores in 12 provinces by the end of 2011, and is targeting 10,000 stores in China within five years.

On the minus side, there is a controversy as to what the "true" benefits are of the inland move. Not only are labor costs in the inland areas rising even more than those in the coastal regions, but also the upheaval and supply chain extension into inland China has costs that could be higher than the labor costs savings.

A second negative is that Hon Hai has gained increasing (mostly bad) media exposure, as operational missteps and labor unrest plague China's largest private employer, impacting both Hon Hai's margin structure and investor sentiment.

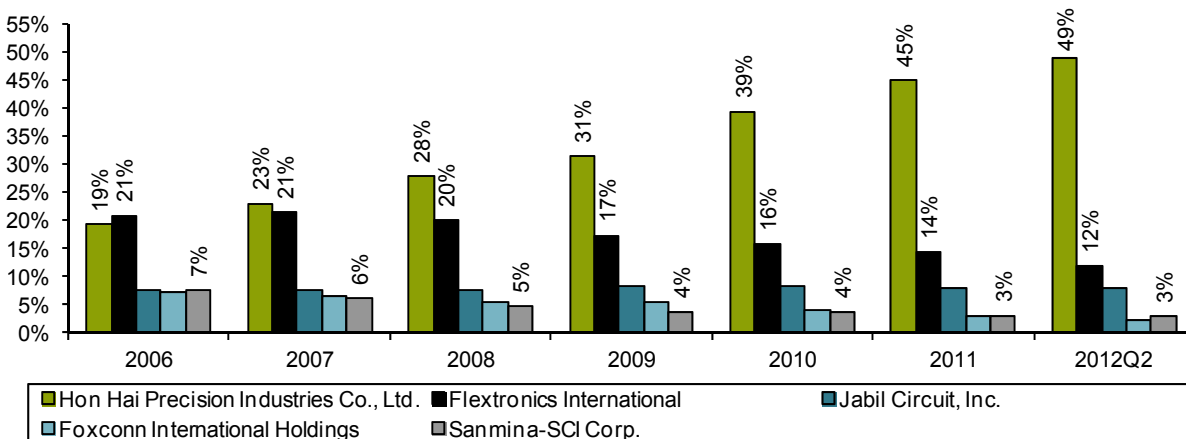
And finally, we estimate that Hon Hai's investments in the retail segment will not be transformational for the company. These are still by and large supplementary to Hon Hai's EMS business and will not be a significant top-line contribution for the time being.

As the company continues its transformation amid the rapidly changing IT competitive landscape, we believe it is worthwhile to take an in-depth look at the company and the current state of business.

How Hon Hai Has Managed to Outperform Its Competitors in Revenue Growth

Between 2004 and 2011, Hon Hai grew its revenues by a factor of 6.4x, resulting in a 30% CAGR. More impressively, it grew far faster than the industry average, gaining market share every year at the expense of its closest competitors. By second-quarter 2012, Hon Hai had captured an estimated 49% of the EMS industry's revenues (see Exhibit 15).

Exhibit 15 Hon Hai's Market Share Among EMS Companies



Source: IDC and Bernstein analysis.

How Hon Hai managed to grow revenues far faster than its competitors is worth exploring in some detail. Because it has a minimal notebook PC business (where ~80% of the bill of materials, or BOM, is key components) but a high proportion of consumer segment revenues (where only 50-60% of the BOM is key components), the company has a higher proportion of costs under its control than peers (23% versus 17% for ODM competitors). Hon Hai is also more highly vertically integrated than peers.

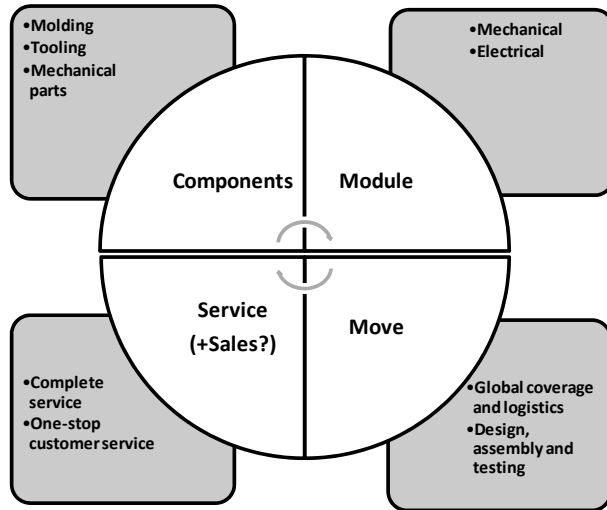
As a result, it has both the opportunity to capture a larger share of the supply chain margin and more flexibility in offering better pricing than its competitors, expecting to "make it up" in a better cost structure as product volume picked up. We review these two advantages separately.

Hon Hai's Focus on Vertical Integration Gave It an Edge Over Competitors

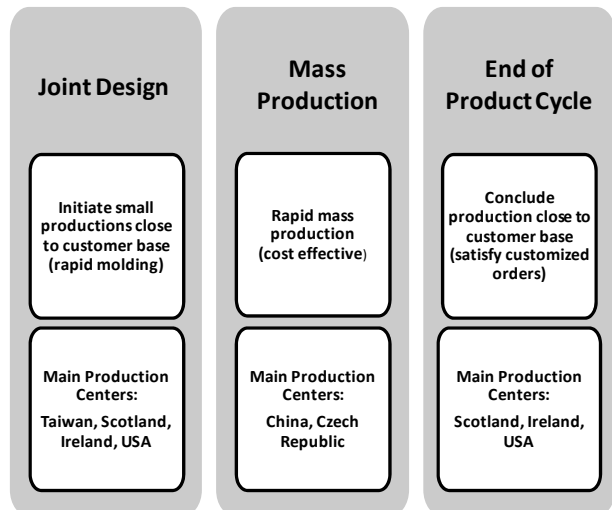
Hon Hai's business model (see Exhibit 16) — eCMMS (e-enabled Component, Module, Move and Service, as it is grandly known) — is a vertical business model that integrates mechanical, electrical and optical capabilities together for the manufacture of consumer electronics, communications and computing hardware (3C). Hon Hai's southern China campus is not only the world's largest 3C manufacturing base, but it also has the shortest supply chain from joint-design to mass production (see Exhibit 17). It is reported that Hon Hai takes 12 days to design an initial mold and then 32 days to start mass production via its highly vertically integrated 3C supply chain.

Based on the eCMMS model, Hon Hai claims its strategy of "central design, three-site manufacturing and global delivery" requires an efficient global manufacturing and logistical network that accounts for a significant proportion of capital investments. As shown in Exhibit 17, Hon Hai uses its overseas facilities (close to the end markets) in the initial and late stages of the product cycle, while mass production takes place in its China manufacturing bases to save costs. Coupled with a global customer base and diverse product mix, Hon Hai's global

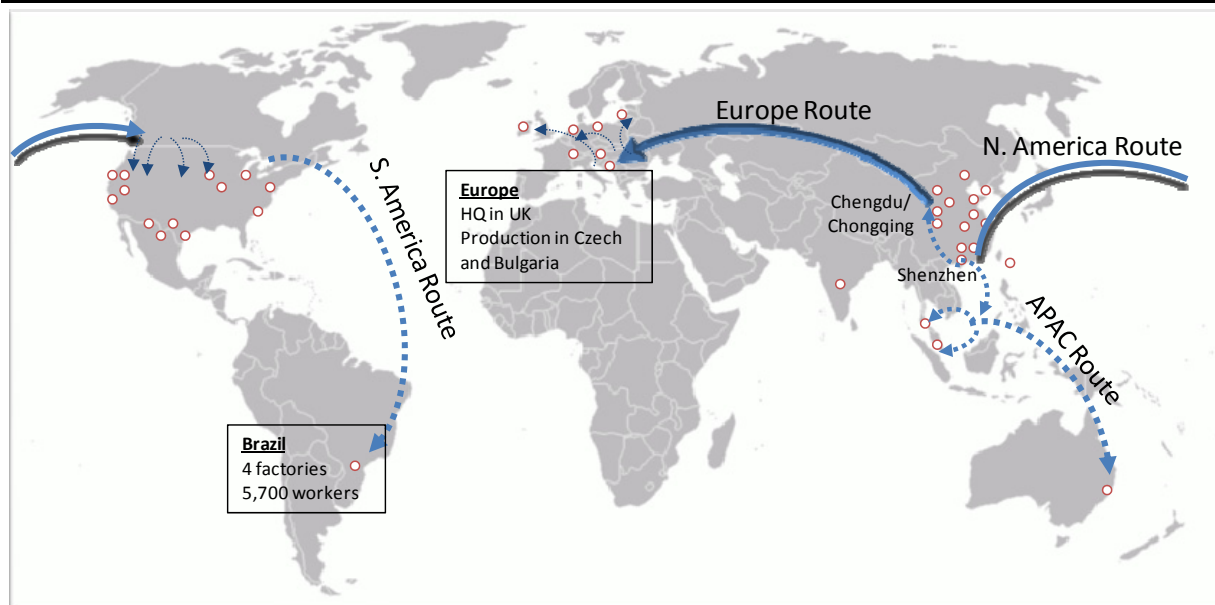
logistical arrangement has been particularly critical in order to connect major production centers with European and American markets (see Exhibit 18). This process requires constant and careful oversight for successful execution.

Exhibit 16 Hon Hai's eCMMS Business Model

Source: Corporate reports and Bernstein analysis.

Exhibit 17 Hon Hai's Production Process

Source: Corporate reports and Bernstein analysis.

Exhibit 18 Hon Hai's Global Expansion and Logistics

Source: Company website and Bernstein analysis.

To achieve cost advantages, Hon Hai has been keen on improving its cost competitiveness through vertical integration with specific business units dedicated to major customers (see Exhibit 19). As it internally fabricates molds, connectors, metal and plastic mechanical parts, and printed circuit boards (PCBs), this vertical integration know-how has enabled Hon Hai to capture more of the component margin than peers, which have to outsource the design of most parts.

However, competitors have gotten wise to Hon Hai's strategy. The performance gap has been closing steadily, with the differential advantages of Hon Hai's component-first vertical integration strategy diminishing over time.

Exhibit 19 Hon Hai's Business Units, Major Customers and Competitive Landscape

| Business Unit | Main Products | Major Customers | Employees | Competitors |
|---|----------------------|------------------------|-----------|-----------------------|
| CCPBG Consumer & Computer Products | Game Console | Sony, Nintendo | 105,000 | Asus, Flextronics |
| CNSBG Communication & Network Solution | Network Switch | Cisco, Motorola | 1,300* | Asustek, Gemtek |
| PCEBG Personal Computer & Enterprise Products | PCB, PC parts | HP, Dell, Lenovo | 70,000 | Pegatron, Wistron |
| CMMSG Computer Module Move & Service | PC Assembly | HP, Dell | - | Quanta, Compal |
| NWInG Network Interconnection | CPU Sockets, Headers | Intel, AMD | 30,000 | Tyco AMP, SMK |
| iDPBG Digital Product | PC,MP3, NB | Apple | 30,000 | |
| SHZBG Super Hongzhun | Module | Major module customers | 80,000 | Catcher, Asia Vital |
| MOEBG Mechanical Optical Electronic | DSC, Lenses | Sony, Fuji Film | - | Flextronics, ST Micro |

*The number of employees for CNSBG refers to R&D workforce only.

Source: Various news providers, company website and Bernstein analysis.

Forward Pricing Had Enabled Hon Hai to Grow Faster Than Peers While Maintaining Profit Growth, But That Advantage Is Eroding

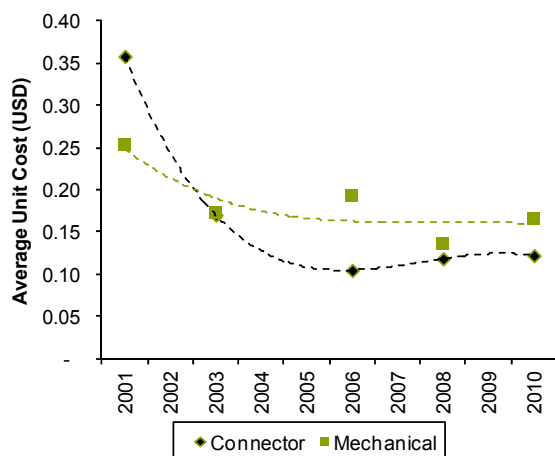
Hon Hai has followed a pricing strategy that was predicated on market share pickup through lower pricing. In the early days of the industry, it was possible for Hon Hai to "price forward" — that is, offer a competitive MVA (or per-unit fee) to customers. The company would then "make up" the margin by driving cost reductions through volume purchasing, design for manufacturing and process efficiencies.

This strategy — which worked quite well in the past, as the revenue growth more than made up for the gross margin compression — has broken down as cost-reduction possibilities are exhausted. Hon Hai is having difficulty (like the rest of the segment) extracting costs and its "pricing ahead" has met the slower-moving cost reductions. Although Hon Hai continues offering low MVAs, its ability to reduce costs and "make it up on volume" is now limited.

We can see that in the flattening of the cost curves in connectors, mechanicals and insertion costs. Exhibit 20 shows our estimate of connector and mechanical unit costs over time, while Exhibit 21 shows the same for insertion costs. Insertion refers to the assembly of PCBs into complete units by mounting the ICs, discrete components, modules, and connectors.

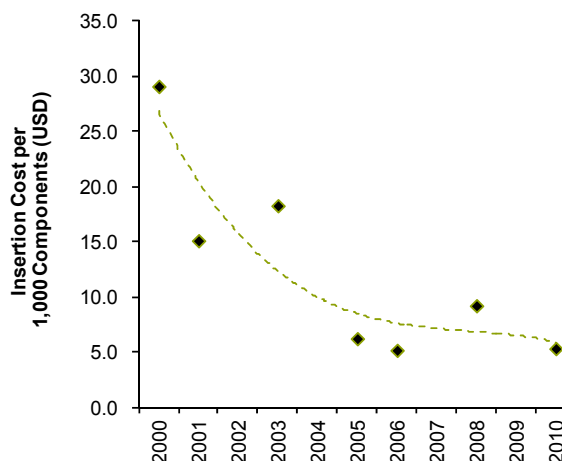
As a result, Hon Hai has seen significant margin compression. This is a major concern with investors, and is a major controversy relating to Hon Hai's future profit growth.

Exhibit 20 Connector and Mechanical Cost Trends Over Time



Source: UBM TechInsights and Bernstein analysis.

Exhibit 21 Insertion Cost Trends Over Time

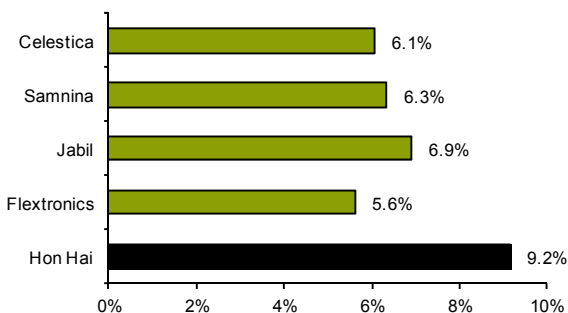


Source: UBM TechInsights and Bernstein analysis.

Hon Hai Has Seen Higher Profitability Erosion Than Peers in the Recent Past

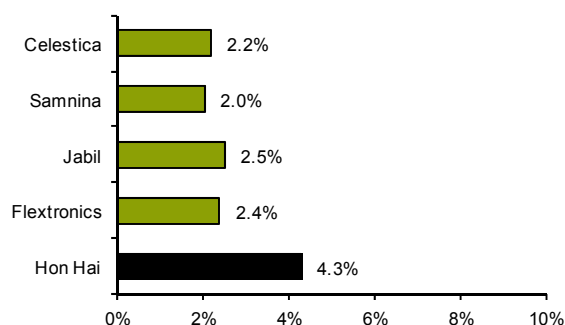
In terms of margins, Hon Hai compares favorably with other EMS companies globally. Historically, its gross margin has been higher than those of other global EMS companies (see Exhibit 22), which we attribute to the company's in-house component supply and vertical integration. The same can be seen in operating margins. Hon Hai's operating margin (see Exhibit 23) averaged 4.3% in the period of 2005-11, versus Jabil (2.5%), Flextronics (2.4%), Celestica (2.2%), and Sanmina (2.0%). The conclusions are similar when viewing a comparison against ODM companies, where Hon Hai's gross (see Exhibit 24) and operating margins (see Exhibit 25) have been higher than those of major ODMs.

Exhibit 22 Hon Hai's 2005-11 Average Gross Margins vs. EMS Competitors



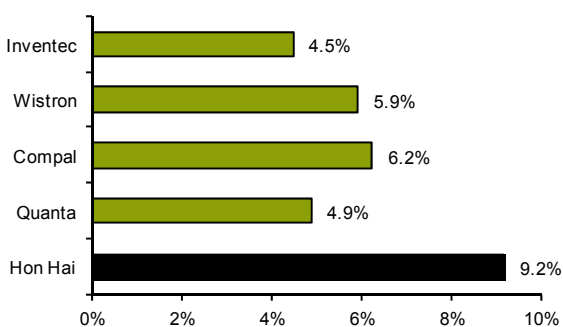
Source: Capital IQ and Bernstein analysis.

Exhibit 23 Hon Hai's 2005-11 Average Operating Margins vs. EMS Competitors



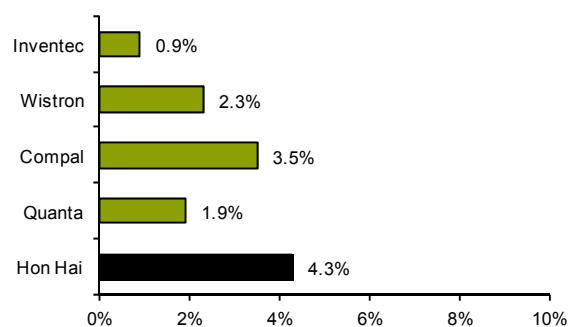
Source: Capital IQ and Bernstein analysis.

Exhibit 24 Hon Hai's 2005-11 Average Gross Margins vs. ODM Competitors



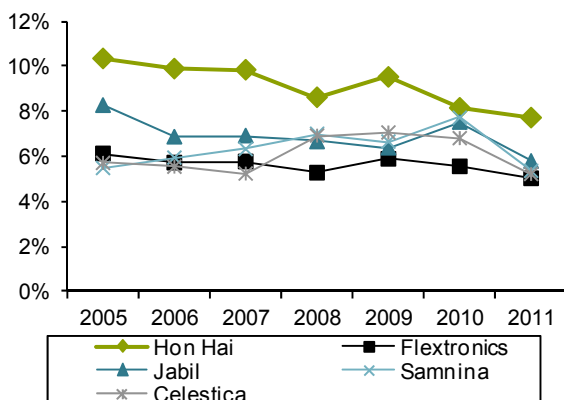
Source: Capital IQ and Bernstein analysis.

Exhibit 25 Hon Hai's 2005-11 Average Operating Margins vs. ODM Competitors

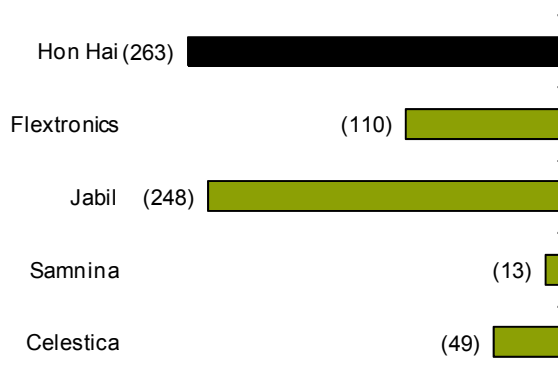


Source: Capital IQ and Bernstein analysis.

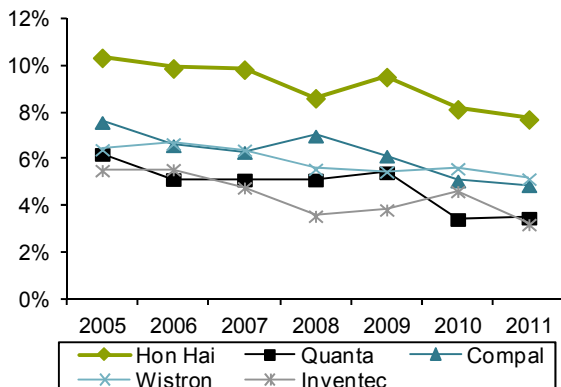
However, these averages mask some temporal dynamics and recent trends worth reviewing. Importantly, Hon Hai has experienced more margin deterioration than comparable companies. Its current gross margin is approaching those of some of its peers, particularly in the EMS space (see Exhibit 26 to Exhibit 29).

Exhibit 26 EMS Companies: Comparative Gross Margin Trends

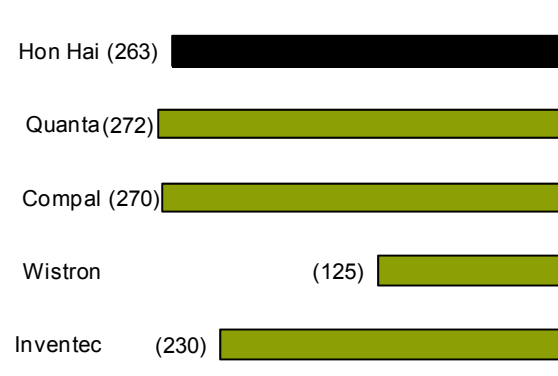
Source: Capital IQ and Bernstein analysis.

Exhibit 27 EMS Companies: Gross Margin Change During 2005-11 (bps)

Source: Capital IQ and Bernstein analysis.

Exhibit 28 ODM Companies: Comparative Gross Margin Trends

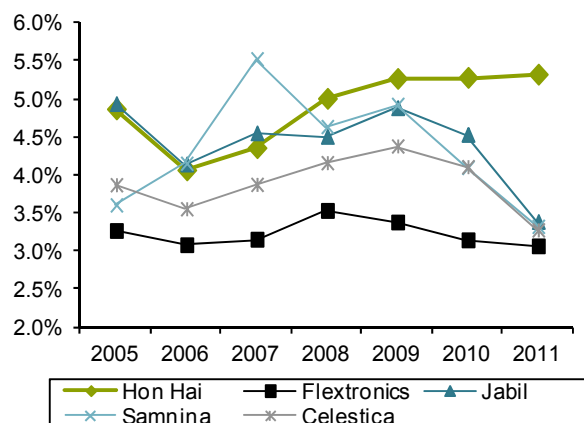
Source: Capital IQ and Bernstein analysis.

Exhibit 29 ODM Companies: Gross Margin Change During 2005-11 (bps)

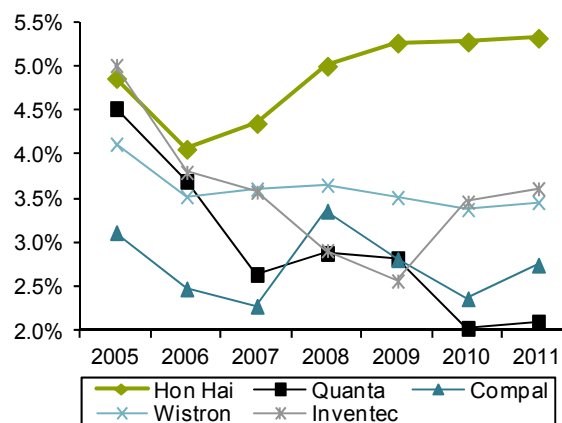
Source: Capital IQ and Bernstein analysis.

The gross and operating margin compression has been an issue for the EMS and ODM segments as a whole (though more so for the ODM segment), but Hon Hai's erosion has been steeper, albeit starting from a higher base. We attribute this greater margin erosion to Hon Hai's forward pricing strategy, which permitted margin compression at the expense of revenue growth, but still drove double-digit profit growth.

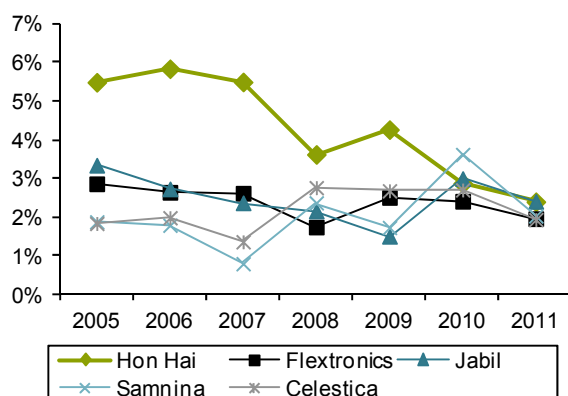
Further, as shown in Exhibit 30 to Exhibit 31, Hon Hai has experienced an increasing operating expense rate (defined as operating expenses, including SG&A and R&D, as a percentage of sales): from 4.9% in 2005 to 5.3% in 2011, in contrast to many of its EMS and ODM peers, which have for the most part been more disciplined about their spending and better able to leverage high rates of revenue growth. The end result is a deterioration of Hon Hai's operating margin against EMS and ODM peers shown in Exhibit 32 and Exhibit 33.

Exhibit 30 EMS Companies: Operating Expense Rate Trends

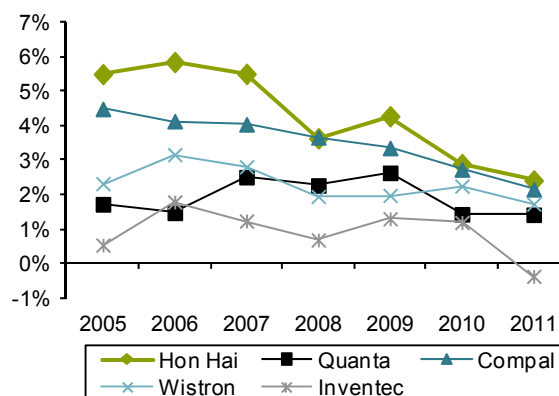
Source: Capital IQ and Bernstein analysis.

Exhibit 31 ODM Companies: Operating Expense Rate Trends

Source: Capital IQ and Bernstein analysis.

Exhibit 32 EMS Companies: Operating Margin Trends

Source: Capital IQ and Bernstein analysis.

Exhibit 33 ODM Companies: Operating Margin Trends

Source: Capital IQ and Bernstein analysis.

However, We Forecast Revenue Growth Will Remain Above Market for the Medium Term

We expect the lion's share of the revenue growth for the EMS industry will occur at Hon Hai's sweet spot: the product opportunities we have identified as being the most attractive in terms of top-line growth and having the best opportunity for margin capture — TVs, handsets and tablets (see Exhibit 34 and Exhibit 35). Although we do not forecast substantial overall unit growth in handsets and TVs, an increase in the percentage where manufacturing is outsourced will drive stronger unit growth of these products specifically for the EMS/ODM companies such as Hon Hai.

We believe this puts Hon Hai in a situation where it is likely to experience revenue growth above the market (and peers), leading to increasing concentration and market share. Although we do not view this as necessarily improving profitability per se, it solidifies Hon Hai's position as the leading EMS company in the world.

Exhibit 34 Summary View of Unit and Outsourcing Growth in the Asian IT Hardware Sector

| Product Category | 2011 Units (million) | Historical | | Forecast | | Outsourcing Ratio | | Opportunity / Outlook |
|---------------------|-------------------------|-----------------------|------------|------------------------|------------|-------------------|-------|--|
| | | Unit CAGR (2001-2010) | Outsourced | Unit CAGR (2011-2015E) | Outsourced | 2011 | 2015E | |
| Mobile Handsets | 1,535 | 17% | 41% | 4% | 12% | 24% | 32% | Moderate growth rates, but solid increase in outsourcing ratio driven by more outsourcing from Big 3, continued growth of fully outsourced Apple and emergence of Android as enabler for asset-light players |
| TFT-LCD TVs | 206 | 89% | 103% | 7% | 12% | 33% | 40% | Slowing growth, modest incr. in outsourcing driven in part by Japanese TV OEMs move to asset-light |
| Notebook PCs | 212 | 25% | 33% | 17% | 17% | 93% | 95% | Moderate unit growth, limited outsourcing upside |
| TFT-LCD PC Monitors | 215 | 32% | 34% | 7% | 7% | 70% | 70% | Modest unit growth, outsourcing ratio limited by vertically integrated leading players |
| Desktop PCs | 140 | 3% | 2% | 1.8% | 2.0% | 93% | 94% | Mature product, some cyclical demand uptick offset by shift to mobile form factor |
| Tablets | 67 | NA | NA | 34% | 32% | 85% | 82% | Significant unit growth due to mass adoption, though total volumes still likely to remain relatively small |

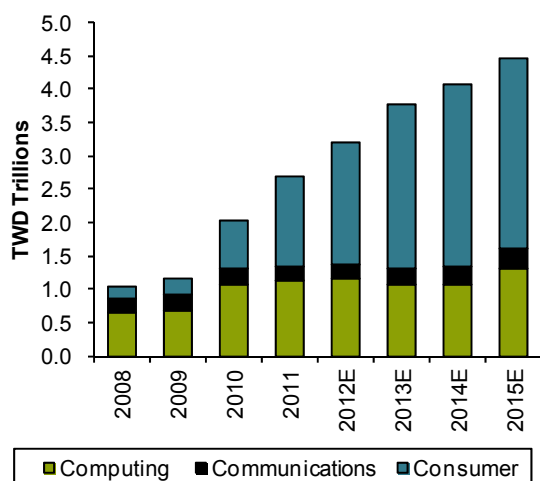
Source: Gartner, IDC, Strategy Analytics, DisplaySearch, iSuppli and Bernstein U.S. IT Hardware team and Bernstein estimates and analysis.

Exhibit 35 EMS and ODM Companies' Product Line Exposures

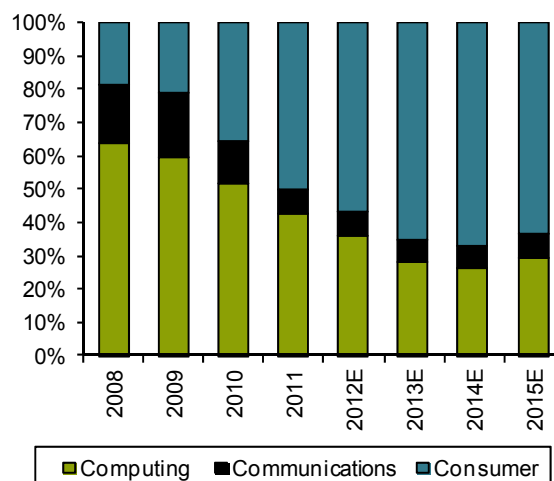
| Company | Type | Tablets (base case) | Mobile Handsets | Notebook PCs | Consumer (TVs, mp3) | Desktop PCs |
|--|------|------------------------|--------------------|-----------------|------------------------|----------------|
| Outsourced Unit CAGR (2011-15E) | | 34% | 12% | 17% | 12% | 2.0% |
| Hon Hai | EMS | Medium | High | Medium | High | Low |
| Flextronics | EMS | Medium | High | Medium | Low | Medium |
| Jabil | EMS | na | Medium | Low | Medium | Low |
| Sanmina | EMS | na | High | Low | High | Low |
| Celestica | EMS | na | High | Low | High | Low |
| Asus / Pegatron | ODM | Low | Medium | High | Medium | High |
| MSI | ODM | na | na | Medium | na | High |
| Compal | ODM | Low | Medium | High | Medium | na |
| Quanta | ODM | Low | Low | High | Low | na |
| Wistron | ODM | Low | Low | High | Low | Medium |
| Inventec | ODM | Low | Low | High | Low | na |

Source: IDC, corporate reports and Bernstein analysis.

As a major supplier to Apple (iPads and iPhones) and a close partner of Sony (and now Sharp) in their efforts to become "asset light," Hon Hai, although massive, will be nimble enough for a couple more years of super-normal revenue growth, in our view. We expect the company's exposure to the fast-growing consumer segment, which was 50% of revenues in 2011, will expand to 64% by end of our forecast period in 2015 (see Exhibit 36 and Exhibit 37).

Exhibit 36 Hon Hai: Revenue Forecast by Segment

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 37 Hon Hai: Revenue Breakdown Forecast by Segment

Source: Corporate reports and Bernstein estimates and analysis.

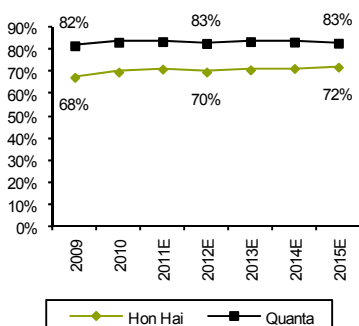
Additionally, Hon Hai's Product Mix Insulates It Somewhat from Continued Margin Erosion

Notwithstanding the company's eroding margin trends, we believe Hon Hai retains a medium-term structural advantage in profitability relative to its peers. This is reflected in its "net" margin after backing out the "pass-through" revenues from key components (e.g., displays, memory, CPUs and HDD), which are recognized in Hon Hai's financial statements, but are purchased on consignment from customers. Hon Hai takes no inventory or price risk on these purchases, and thus picks up no margin, as it books revenues equal to cost of goods for these items.

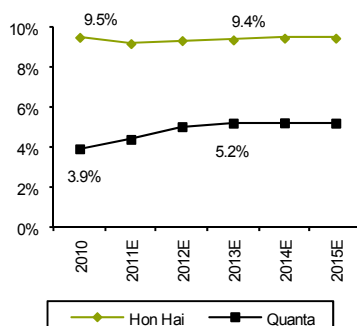
As a result, Hon Hai (like most EMS/ODM companies) is in reality a much "smaller" company than indicated by its financials, because roughly 68% of its revenues and 77% of its costs are "pass-through" revenues, by our estimation. Further, because it has a minimal notebook PC business (where a hefty 80% of the BOM is key components, compared to under 60% for a handset), Hon Hai has a higher proportion of costs under its control than peers (23% versus 17% averaged by ODM competitors).

We can use the mix of business and cost breakdowns of the key product lines to determine the pass-through revenues and thus calculate Hon Hai's "net" revenues and COGS to estimate its true "net" margin. We find that, as a result of a higher portion of revenues and costs under the company's control where it can gain a margin, Hon Hai's "net" margin is much higher than that of its competitors — 30% compared to around 15% for Quanta, for example (see Exhibit 38 through Exhibit 40).

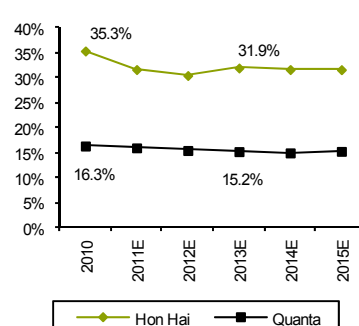
Moreover, having control over revenues and costs appears to be the real source of Hon Hai's profitability — not, as commonly believed, scale and volume purchasing. And, as Hon Hai's product mix tilts toward (low key component-ratio) consumer electronics (primarily handsets, tablets, and TVs) the shift leads us to forecast a milder margin compression than what is embedded in expectations (see Exhibit 41 and Exhibit 42).

Exhibit 38 Hon Hai vs. Quanta: Percent Pass-Through Revenues

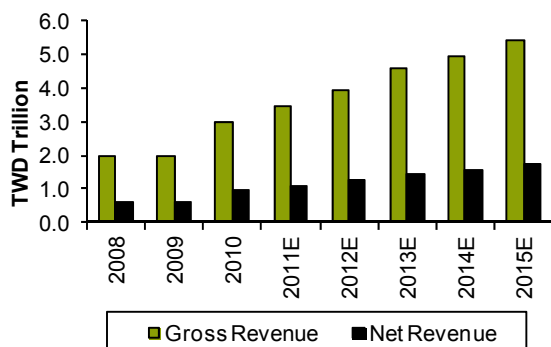
Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 39 Hon Hai vs. Quanta: "Gross" Gross Margin

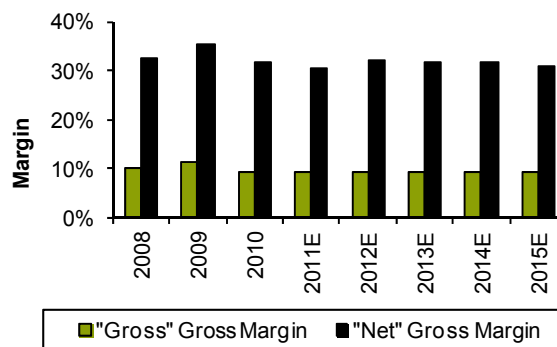
Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 40 Hon Hai vs. Quanta: "Net" Gross Margin

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 41 Hon Hai: Gross and Net Revenue Forecast

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 42 Hon Hai: Gross Margin Forecast

Source: Corporate reports and Bernstein estimates and analysis.

Hon Hai's China Expansion and "Go West" Movement Is Driven by Search for Lower-Cost Labor

Hon Hai began its manufacturing footprint expansion in China's coastal areas, primarily in Shenzhen. The Longhua campus was the first large-scale Hon Hai facility in Mainland China; the first phase opened in 1992, known as Block A (see Exhibit 43). The campus grew organically northward, and now consists of Blocks A-J, with Block J being the newest block. Virtually all of Hon Hai's business units have operations in the Longhua campus.

The Longhua campus is roughly 2.5km² with a population estimated at around 100,000 people at any point in time (both on-shift workers and on-campus residents). This translates to a population density of about 40,000/km², which compares to general population density of about 9,000/km² for the Shenzhen urban area. The facility overall employs about 230,000 people.

The campus houses about 50% of the employees in dormitories that used to be owned and managed by Hon Hai, but are now managed by Shenzhen City. It has the feel of a small city. Many facilities such as banks, clinics, Chinese Communist Party and labor union offices, convention center, libraries, stadium, five swimming pools and centralized food facility (with 200 cooks on site) are all housed within the campus' borders. There is a constant stream of shuttle buses that take people around the campus. There is also an on-campus university and training center, aptly termed "Hon Hai University," which has graduated 12,000 students.

Within the campus borders, the area is generally clean, spacious and relatively well-maintained. Outside the living and administrative areas, blocks are either production facilities or storage and warehouses. There is an on-campus customs station with direct access to an adjacent freeway, allowing direct in-bond transfer of

finished goods to trans-shipment points. Exhibit 44 to Exhibit 47 provide some exterior shots of the campus buildings.

Exhibit 43 Hon Hai's Longhua Campus



Source: Google Maps and Bernstein analysis.

Exhibit 44 Longhua: Production Facilities



Source: Bernstein site visit.

Exhibit 45 Longhua: Production Facilities



Source: Bernstein site visit.

Exhibit 46 Longhua: On-Campus Sports Facilities

Source: Bernstein site visit.

Exhibit 47 Longhua: On-Campus Convenience Stores and Banks

Source: Bernstein site visit.

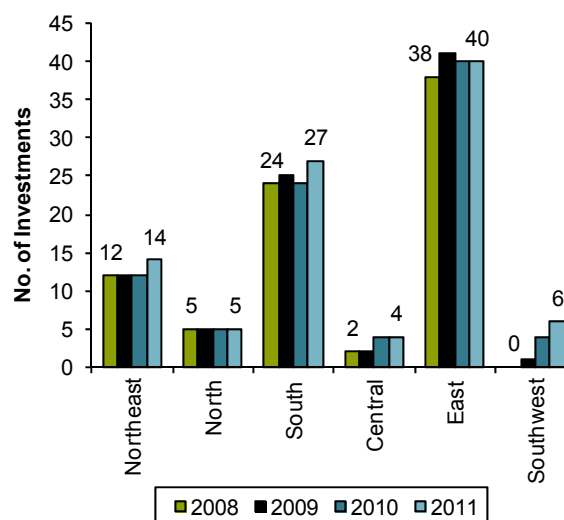
Labor cost pressures (to be discussed in later chapters) drove Hon Hai to undertake growth and investment in western China, primarily in Chengdu and Chongqing. The new manufacturing campuses connect China with Europe through railways, thus saving delivery time compared to the conventional shipping route from Shenzhen to Europe by sea.

Exhibit 48 and Exhibit 49 show details of Hon Hai's increased investment in mainland China production facilities for an accumulated total amount of TWD 181 billion (US\$6.2 billion) by the end of 2011. The fund outflow from Taiwan in 2011 alone accounted for TWD 50 billion, translating into 20% of Hon Hai's capex in 2011. With such a significant amount of investment, the number of Hon Hai's factories has risen from 81 in 2008 to 96 in 2011, with major facility constructions in southwestern and central China (0 in 2008 and about five each in 2011).

Exhibit 48 Hon Hai's China Investment Portfolio

| China Investment Portfolio | 2009 | 2010 | 2011 |
|---|------------|------------|------------|
| Number of Investments by Region | | | |
| Northeast | 12 | 12 | 14 |
| North | 5 | 5 | 5 |
| South | 25 | 24 | 27 |
| Central | 2 | 4 | 4 |
| East | 41 | 40 | 40 |
| Southwest | 1 | 4 | 6 |
| Total Number of Investments | 86 | 89 | 96 |
| Number of 100% subsidiaries | 43 | 52 | 54 |
| Financials of China Investments (TWD bil.) | | | |
| Total Capital (Accm.) | 112.3 | 134.5 | 181.3 |
| Fund from Taiwan (Accm.) | 6.3 | 23.8 | 50.0 |
| Investment Gain to Taiwan | 1.7 | 1.5 | 1.6 |
| Investment Gain (%) | 27% | 6% | 3% |
| Fund from TW as % of Capex | 12% | 24% | 20% |

Source: TEJ and Bernstein analysis.

Exhibit 49 Number of Hon Hai's China Investments by Regions

Source: TEJ and Bernstein analysis.

Hon Hai's "Go West" movement, shown in Exhibit 50, is facilitated both by local government policies to attract external investment as well as relatively cheap local labor to further push down costs. Hon Hai has invested US\$200 million of its capital in Chengdu and Chongqing (equal to about TWD 6 billion), with a reported total investment of US\$3 billion over the years. In addition, it has employed about

250,000 workers as part of the effort to shift manufacturing inland, although this does not materially alter the work force landscape of 400,000-plus in the Shenzhen campus.

The coastal regions (Shanghai and Shenzhen) still are Hon Hai's primary manufacturing bases, with established supply chains in place for an extended period. The plan is for the company's Shenzhen campus to eventually serve as its R&D and high-tech center, allowing a transfer of labor-intensive production lines to inland China.

Exhibit 50**Hon Hai's "Go West" Investment in Chengdu and Chongqing**

| Subsidiary Name | Location | Year of Invest. | Holding % | Capital (TWD Mil.) | % of Capex | Products | Employee # |
|----------------------------------|-----------|-----------------|-----------|--------------------|------------|-------------------------|----------------|
| Futaihua Precision Electronics | Chengdu | 2010 | 100 | 991 | 1.4% | NBPC, STB, components | } 200,000 |
| Hongfujing Precision Electronics | Chengdu | 2010 | 100 | 2,916 | 4.0% | Tablets | |
| Suwei Technology | Chengdu | 2010 | 70 | 17 | 0.0% | N/A | |
| Fujun Precision Electronics | Chongqing | 2010 | 100 | 437 | 0.6% | Switch, Router | } 50,000 |
| Hongfujing Precision Electronics | Chongqing | 2009 | 100 | 1,612 | 6.0% | Module, NBPC components | |
| Total | | | | 5,974 | | | 250,000 |

Source: TSEC, Taipei Times, corporate reports and Bernstein analysis.

Despite the unprecedented scale and speed of investments in western China, a number of factors could be counterproductive to what Hon Hai aims to achieve in cost reduction — the first of which is safety concerns in manufacturing facilities. It is reported that the Chengdu factory was built in only 76 days, an achievement proudly claimed by the local government. The explosion in Chengdu's factory in early 2012, however, reveals hidden safety concerns in Hon Hai's Chengdu campus and other factories that were built in a hurry.

Another counterproductive factor is increasing labor costs. Labor costs inland are certainly lower than those of the coastal regions at the moment — but this disparity will change, with the inland provinces catching up in terms of income level and economic development. In other words, lower labor costs are unlikely to be the source of Hon Hai's sustainable cost advantage in the long term.

Lastly is the additional overhead required to manage the dual operations and their supply chains. This could also be a continuing drag on profitability if corrective action is not taken.

Operations Moving to Inner China Generate Substantial Tax Benefits

By the end of 2011, Hon Hai had about 73% of its operations by revenue in the coastal China region, and another 27% in inner China. It is working toward dramatically shifting this geographic mix to 50/50% by 2012, as the cost of operations in coastal China continues to rise and inner China provides attractive tax incentives.

Hon Hai has picked Chengdu and Zhengzhou as its two inner China bases, with satellites in other locations including Chongqing, Wuhan, Shandong and Shanxi. The company has secured attractive incentives from provincial governments in inner China. Chengdu, alongside Longhua, will focus on iPad production; Zhengzhou, together with coastal Guanlan, will manufacture iPhones (among products from other business units). The Chongqing campus is manufacturing HP notebooks, and Shanxi builds solar modules.

Currently, Shenzhen employs a total of ~430,000 employees between Longhua (~230,000) and Guanlan (~200,000), both in the Shenzhen suburbs. Hon Hai had 950,000 employees in China in first-half 2011, but that number has now risen beyond 1 million. The shift inland is not expected to materially increase headcount, but that remains to be seen. The Zhengzhou and Chengdu campuses will each have about 350,000 employees at full employment by 2015. The Chengdu campus currently has ~200,000 employees.

After the completion of inland relocation, Hon Hai's effective tax rate in inland China will be 0% in Years 0-5, and then at half the corporate tax rate or ~12.5% in Years 6-10. Currently, coastal China is being taxed at an effective tax rate of 25%.

This implies that if 27% of incremental operations move inland and tax rates were effectively cut to 0%, Hon Hai's effective tax rate for China (only) could essentially see a 600 bps improvement (see Exhibit 51). As a result, we estimate around a 17% tax rate for 2013 and 2014, down from 2011 rates of 21% (see Exhibit 52).

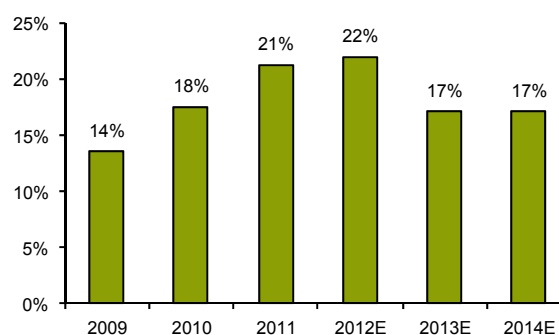
Ultimately, the move to inner China will be justified from tax savings and perhaps lower labor and operating costs (partly from other government subsidies and incentives). The faster inner China ramps up, the better margins and the bottom line ought to be. However, we forecast that inventory days will also see a marginal increase as a result, and that labor cost savings will erode very quickly, so that there will be no net benefit to gross margins from lower labor cost differentials between coastal and inner China.

Exhibit 51 Hon Hai: Tax Improvement from Move to Inner China

| Year 0-5 | China Total | Coastal | Inner |
|----------------------------------|-------------|---------|-------|
| Current Split | | 73% | 27% |
| Current Tax Rate | 18.3% | 25% | 0% |
| Future Split | | 50% | 50% |
| Future Tax Rate | 12.5% | 25% | 0% |
| Effective Tax Rate Improvement | 5.8% | | |
| Year 6-10 | China Total | Coastal | Inner |
| Split | | 50% | 50% |
| Future Tax Rate | 15.6% | 25% | 13% |
| Effective Tax Rate Deterioration | 3.1% | | |

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 52 Hon Hai: Effective Tax Rate Forecast



Source: Corporate reports and Bernstein estimates and analysis.

Overseas Expansion and Acquisition Widen the Footprint

As Hon Hai organizes its business units around major customers and products, its global expansion plans are kept in line with such a strategy through acquisition of major customers' unprofitable manufacturing facilities. Exhibit 53 lays out the timeline of Hon Hai's foreign expansion footprint from 1999 to 2009, as the company covered major developed markets with manufacturing facilities in less-developed countries in the regions.

A majority of Hon Hai's global investments appear to be acquisitions, such as Dell's Ireland enclosure plant, Motorola's Mexico handset plant, and Sony's LCD TV facilities both in Mexico and Slovakia. Such an inorganic growth strategy has worked well for Hon Hai, which has been able to reduce operating costs significantly while maintaining customer relations with sustainable orders. Meanwhile, the company has pushed forward its China-style organic growth strategy. It has increasingly expressed interest in Brazilian plants for manufacturing Apple products as well as facilities in Africa because of its abundant low-cost labor resources.

| Exhibit 53 Hon Hai's Global Expansion Timeline and Details | | | | | | |
|--|---------|----------------|-----------------|----------------|----------|---------------------|
| Region | Factory | Location | Year of Invest. | Capital (Mil.) | TWD Mil. | Products (Customer) |
| Europe | #1 | Ireland | 1999 | - | - | PC enclosure (Dell) |
| | #1 | Czech Republic | 2000 | €80 | - | PC assembly (Apple) |
| | #2 | Czech Republic | 2007 | €17 | 805 | LCD, PC assembly |
| | #1 | Bulgaria | 2003 | €20 | 857 | Smartphone |
| | #2 | Bulgaria | 2008 | €80 | 3,666 | NBPC |
| | #1 | Russia | 2008 | \$50 | 1,640 | PC assembly (HP) |
| | #1 | Slovakia | 2010 | - | - | LCD TV (Sony) |
| Americas | #1 | Houston, TX | 1999 | - | - | SMT |
| | #1 | Puerto Rico | 2000 | - | - | MB (Intel) |
| | #1 | Brazil | 2003 | \$18 | 612 | Handset (Nokia) |
| | #2 | Brazil | N/A | - | - | LCD TV |
| | #3 | Brazil | N/A | - | - | Desktop PC |
| | #1 | Mexico | 2003 | \$18 | 612 | Handset (Motorola) |
| | #2 | Mexico | 2009 | - | - | LCD TV (Sony) |
| APAC | #1 | India | 2005 | - | - | - |
| | #1 | Australia | 2005 | \$3 | 105 | PC assembly (HP) |

Source: China Social Science Net, Taipei Times, Elements of Logistics, various news providers and Bernstein analysis.

Stated Firm Strategy: Gearing Up on Consumer-Centric Devices for Future Growth

Hon Hai's expansion strategy is built around the premise that growth in smartphones and tablets will be the next major explosive phase in consumer electronics. According to the company, the products' growth is being driven by network bandwidth improvements into 4G and LTE wireless networks. 4G has been taking off with mainstream carriers since early 2012. Hon Hai foresees consumer-centric devices such as smartphones and tablets having huge potential, given they are serving a wider spectrum of the market in comparison to PCs, which tend to focus on enterprises, students and employees.

The company is predicting a greater focus on the devices' content that will originate from players wishing to stake a bigger share in the cloud market. Apple and Amazon (through its Kindle Fire) have officially launched devices that are fully integrated with their cloud platforms. Amazon's strategy is proving that companies are willing to sell the hardware at cost to establish a position in cloud (see our report, [Quanta Computer and the Kindle Fire: Flash in the Pan, or Rocket Fuel?](#) published October 14, 2011). Hon Hai believes this trend will continue, as Google, Facebook, Baidu and Alibaba each join the cloud battle.

Consumer-centric device growth will ultimately form one of Hon Hai's three main product pillars, along with PCs (servers, storage, desktops, notebook and printers) and communications (base station and WiMax), both for data communications and telecommunications. Hon Hai believes it still has potential for growth in notebooks (where it has started from a lower base) and communications devices as bandwidth demand increases and the LTE replacement cycle continues.

In the cloud business, Hon Hai holds the top position in manufacturing most of the back-end hardware. It is ranked No. 1 in servers and storage (with EMC and NetApp as customers), and has a strong position in data communications (base stations and WiMax). Together with consumer-cloud devices, Hon Hai seeks to achieve vertical integration in the cloud ecosystem. It currently has a software development team of a few thousand individuals to build system applications alongside the hardware.

In some sense, Hon Hai's diversified strategy plays out well irrespective of device rotation, as it has most of the device space covered. By responding quickly to the growth in tablets and smartphones, it is putting other EMS and ODMs at a disadvantage, as it builds scale and is able to provide services at competitive prices through its strategy of vertical integration.

Our view is that Hon Hai's strategy, on paper, seems compelling. However, we remain concerned about the sustainability of this wide-range diversification approach for a company pinned in the middle of the manufacturing supply chain.

Ambitious Retail and Logistics Expansion Projects in China May Not Amount to Much

Hon Hai's eCMMS business model is under rapid transition to CMMSS (Component, Module, Move, Sales and Service). The company formally announced plans to enter the retailing space in Mainland China in 2010, opening 500 IT retail stores in 12 provinces by the end of 2011, with a goal to have 10,000 stores in China within five years. However, the latest news indicates a difficult operating environment for Hon Hai's retailing expansion as there have been closures of several stores from the existing 300 in 2012.

Hon Hai has separated its channel retail business in China into four segments: (1) large IT retail stores (Mediamarkt) located in first-tier cities; (2) outlets in large department stores (Kantron International) and IT shopping malls (Cybermart) in first, second and third-tier cities; (3) small IT franchise retail stores in lower-end cities; and (4) online shopping (Efeihu.com). Specifically, Hon Hai expects strong growth both in large and small IT retail stores to capture market share across first- to third-tier cities.

The rationale behind Hon Hai's retail expansion is to extend the ecosystem of the company's 3C business to retailing, from purely design, manufacturing and customer services, thus maximizing benefits to the existing customers, which can better focus on their own branding strategies. In terms of financing such a rapid retail expansion project, Hon Hai announced an investment target of RMB 300 million in 2011, equal to TWD 1.3 billion or roughly 2% of Hon Hai's capex in 2010. This investment will mainly be used for loans (up to RMB 200,000) and subsidies (up to RMB 180,000) for former Hon Hai employees who are interested in starting IT retailing businesses in third-tier Chinese cities and beyond.

Given the competitive landscape of IT retailing business in China, with dominant players such as Gome and Suning, Hon Hai's ability to gain sizable market share as a latecomer is an outstanding question. In terms of the number of retail stores, the top three players in the market currently have opened fewer than 3,000 stores nationwide in the past decade. In terms of financing, our calculation indicates that 10,000 retail stores would cost Hon Hai at least RMB 1.8 billion (TWD 8 billion), more than 2% of capex per year for the next five years, for only subsidizing qualified Hon Hai employees, which is higher than the initial TWD 1.3 billion announced by the company. It is very unlikely Hon Hai will be able to achieve its goal of 10,000 stores in the near term if the trial stores in coastal regions do not generate substantial profits.

As of the end of 2011, Hon Hai has opened 300 Wanma Benteng ("10,000 Running Horses") stores, and is planning to build another 200 (scaled back from 400-500 due to the weaker macro environment). This brand is directly owned by Hon Hai through its subsidiaries. The stores will target electronics with small form factors in tier 4-6 cities that lack cross-brand stores. They will be concentrated in Shandong, Shanxi and Zhejiang provinces. Premises for these stores are typically rented, except in a few cases where good locations are acquired. Given the unprofitable business across majority of the stores in 2012, we expect Hon Hai's ambitious retailing plan for Wanma Benteng is likely to be de-emphasized in the future.

Through its partnerships with Pan International (27% stake) and Metrogroup (25% JV), Hon Hai has also opened 40-50 stores under the Cybermart brand and four under Mediamarkt brand. Cybermart works as an electronics retail mall that rents out space to other OEM and retailers. Ten of the stores currently are Apple-authorized shops. Similar to Wanma Benteng, Cybermart also rents its retail space in most instances.

We came across both formats during a visit in the periphery of the Longhua campus (see Exhibit 54 and Exhibit 55). Mediamarkt focuses on products with large form factors.

Exhibit 54 Wanma Retail Store at Campus Entrance



Source: Bernstein site visit.

Exhibit 55 Cybermart Retail Mall at Campus Periphery



Source: Bernstein site visit.

We estimate that Hon Hai's investments into retail will not be transformational to the company. The stores are still by and large supplementary to Hon Hai's EMS business and will not be significant in top-line contribution for the time being.

Overall, Hon Hai has spent quite a bit of capital and effort creating a vertically integrated manufacturing ecosystem that has allowed it to perform well in a difficult business environment. However, this continued vertical integration is now likely entering a diminishing marginal return phase, and the returns to further capital expenditures in this area are likely limited.

Shining Some Light on Hon Hai Precision's Opaque Corporate Structure

Overview

Hon Hai Precision has a complex and opaque corporate structure through which it invests in a vast range of companies across the supply chain. As a result of this structure, investors often find the scope of the company's portfolio and the complexity of its shareholding structure difficult to grasp. To aid in the understanding, this chapter maps the ownership structure of Hon Hai's key subsidiaries as well as its invested companies.

Hon Hai has grown both organically and through acquisitions all along the supply chain, but primarily in components. Its investment strategy is primarily through "co-investment," with both the parent and subsidiaries taking positions in the acquisitions, together with outside parties led by Terry Guo, Hon Hai Precision's Chairman and CEO. This co-investment approach is unusual and opaque, and sets up the possibility of benefiting other investor groups over the parent company, although we have no evidence of this happening.

Foxconn (Far East) Ltd, Bao Shin International Investment, Hon Chi International Investment and Hung Yang Venture Capital are Hon Hai's major subsidiaries that invest in different segments in the supply chain. Specifically, Foxconn (Far East) Ltd is the major subsidiary investing in Hon Hai's core EMS business operations, including FIH (Foxconn International Holdings) and all the Chinese manufacturing entities.

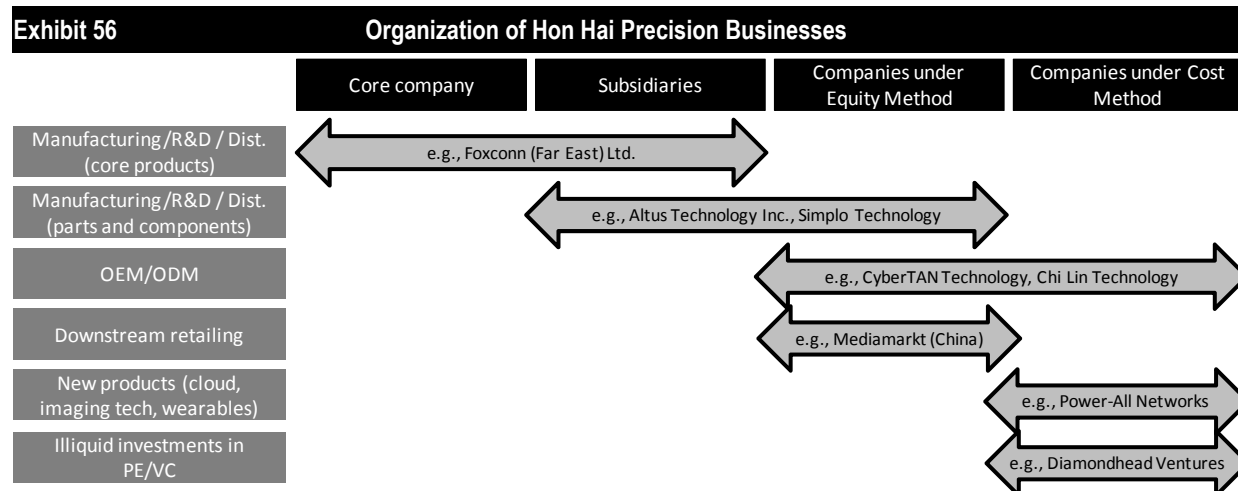
Foxconn Technology, which is 30% collectively owned by Hon Hai Precision and its subsidiaries, also invests in Chimei Innolux and CyberTan, and is intending to be part of the Sharp investment group.

Mr. Guo is another major investor in Hon Hai's investment portfolio. He owns 12.5% of Hon Hai Precision and 2.9% of Chimei Innolux, and has recently invested in Sharp Display Products (SDP) for a 46.5% stake.

There Is an Alignment Between Hon Hai's Acquisition Strategy and Its Corporate Structure

Hon Hai Precision seems to have adopted a strategy where companies that it consolidates have direct pertinence to its core business in contract manufacturing. Manufacturing operations (whether organically built or acquired) are usually wholly owned or majority-owned and are part of the parent company or a subsidiary. We believe that subsidiaries are set up mostly because of the need for separate entities in international operations, tax efficiency, risk and foreign exchange management, but are functionally and operationally indistinguishable from the parent company.

To achieve vertical integration and participate upstream, Hon Hai Precision has also invested into parts and component manufacturers (see Exhibit 56). Given that these companies supply the core business, but are not actually involved in contract manufacturing or located in Taiwan, they are usually subsidiaries (if majority held) or recorded under the equity method (if ownership is 20-50% or involve significant control). The decision between majority and minority ownership appears to be determined by the relevance to Hon Hai's core products, and to some extent how comfortable Hon Hai is with owning a majority stake.



Source: Company disclosure and Bernstein analysis.

Hon Hai adheres methodically to the framework we have described with regards to entity organization and acquisitions. However, different accounting treatments apply depending on the criteria of ownership. We summarize these in Exhibit 57.

Only the subsidiaries have a substantial impact on group performance, as companies under the equity method record only a pro-rated percentage of net income as non-operating investment income, while undistributed earnings from companies under the cost method are not recorded at all. We discuss each of these groups in subsequent sections.

| Exhibit 57 Accounting Treatment of Hon Hai's Subsidiaries and Companies Under Equity, Along With Cost Methods | | | |
|--|---|--|--|
| | Subsidiaries | Companies Under Equity Method | Companies Under Cost Method |
| Nature of Ownership | >50%, control | Long-term equity investments with 20-50% ownership "Associate companies"/significant influence, fair value can be measured | Illiquid assets whose fair valued cannot be measured reliably; <20% ownership |
| Accounting Method | Consolidation | Equity Method | Cost Method |
| Impact to Balance Sheet | - Fully consolidate line items from financial statement | - Carrying value based on initial investment - Pro-rated quarterly earnings increase carrying value - Dividends reduces carrying value | - Original cost of investment recorded - Undistributed earnings not recorded - Dividend deducted from initial investment value |
| Impact to Income Statement | - Fully consolidate line items from financial statement | - Investment income accounted for under EQ method (% net income of holdings) - Impairment booked under non-operating expense | - Impairment losses are recorded under non-operating expense |

Source: Company disclosure and Bernstein analysis.

Overall, Hon Hai owns a portfolio of 20 subsidiaries (see Exhibit 58) at the first level down from the listed company (Hon Hai Precision), 13 associated companies under the equity method (see Exhibit 59), and 10 sizable companies under the cost method (see Exhibit 60).

| Exhibit 58 Hon Hai Subsidiaries | | |
|---|---|-------------------------|
| Consolidated Subsidiaries | Company Description | Latest Ownership |
| Operating Subsidiaries | | |
| Foxconn (Far East) Ltd. | Holdings in China and HK | 100% |
| Foxconn Int'l Holdings Limited (FIH) | Contract manufacturing of handsets in China, US, etc. | 70.58% under Far East |
| Champ Tech Optical (Foshan) Corp | Mfg/wholesale of optical lens | 100% |
| WCube Co. | Mfg/supplier of cellphone camera lens | 100% |
| Hon Hai / Foxconn Logistics California LLC | Logistics Services | 100% |
| Hon Hai / Foxconn Logistics Texas LLC | Logistics Services | 100% |
| Ambit International Ltd. | Networking equipment, modems | 100% |
| Foxconn Singapore (Pte) Ltd. | Marketing, distribution of parts, comm. Equipment | 100% |
| Foxconn International Inc. | R&D | 100% |
| Altus Technology Inc. | Mfg cellphones, camera lens; marketing of sensors | 100% |
| Premier Image Technology | Manufacture/sales camera | 100% |
| Syntrend Creative Park Co., Ltd. | Mfg and marketing of computer components | 80% |
| Margini Holdings Limited | Holdings in Vietnam, Brazil. Process, sales, export | 100% |
| Foxconn Holdings Limited | Holdings of Czech sales co. | 100% |
| PCE Paragon Solutions | Holding company | 100% |
| Investment Holdings | | |
| Hyield Venture Capital Co., Ltd. | VC holdings | 98% |
| Bao Shin International Investment Co., Ltd. | Holdings in Taiwan | 100% |
| Advanced Optoelectronic Tech (AOT) | LED maker in Taiwan | 47% (Group) |
| Hung Yang Venture Investment Co., Ltd | Holdings in Taiwan | 98% |
| Hon Yuan International Investment Co., Ltd. | Holdings in Taiwan | 100% |
| Hon Chi International Investment Co., Ltd. | Holdings in Taiwan | 100% |
| Lin Yih International Investment Co., Ltd. | Holdings in Taiwan | 100% |
| Foxconn SA BV | Investment holdings | 98% |

Note: Indent refers to holdings under the entry above.

Source: Company disclosures from FYE2010 with additional anecdotes from press releases and Bernstein analysis.

| Exhibit 59 Hon Hai's Associated Companies Under Equity Method | | |
|--|---|----------------------------------|
| Companies EQ Method | Co. Description | Carrying Value (TWD mil.) |
| Foxconn Technology Co., Ltd | Mag/Al casing and mechanical, thermal modules, assembly | 16,680 |
| Foxconn Advanced Technology, Ltd. - Cayman | Flexible PCB | 7,644 |
| Pan International Industrial Corp. | Bulk wire, connectors, cable assembly, PCB, PCB assembly | 2,797 |
| Simplo Technology Co., Ltd. | Lithium battery packs (NB, smartphones, bicycles) | 2,074 |
| G-Tech Optoelectronics Corp | Glass substrates (touch sensor, optical coated, TFTLCD glass) | 2,440 |
| Eson Precision Ind.Co. Ltd | Others | 1,345 |
| Ways Technical Corp., Ltd. | Surface treatment for plastic casing and keypads | 1,140 |
| Ampower Holding Limited - Cayman | Power supply | 941 |
| Mediamarkt (China) Int'l. Retail Holding Limited - HK | International consumer electronics retail | 1,494 |
| Uer Holdings Corporation - Cayman | Manufacturer and wholesaler of lithium ion batteries | 696 |
| CyberTAN Technology, Inc. | Broadband and wireless network products | 583 |
| Alliance Fiber Optics Products Inc. | Fiber optic components, integrated modules comm equipment | 386 |
| Diabell Co., Ltd. | Cellphone casing and mechanical | 236 |
| Prepaid long-term investment | | 2 |
| Total | | 38,458 |

Note: The ownership percentage refers to the consolidated ownership from Hon Hai's subsidiaries.

Source: Company disclosures and Bernstein analysis.

Exhibit 60 Hon Hai's Associated Companies Under Cost Method

| Companies | Co. Description | Carrying Value (TWD mil.) |
|----------------------------------|---|---------------------------|
| Chi Lin Technology Co., Ltd. | High end home theater projector ODM/OEM | 825 |
| Diamondhead Ventures Ltd. | Early-stage venture capital firm | 317 |
| Global Strategic Investment Inc. | PE Fund | 200 |
| Riverwood Capital Partners L.P. | PE focusing on high-growth tech/services businesses | 186 |
| Power-All Networks | Cloud service provider | 175 |
| Aptina Acquisition L.P. | CMOS imaging technology | 154 |
| FUHU Inc. | Consumer cloud storage | 146 |
| Wimm. Labs Inc. | Connected personal wearable devices | 146 |
| Shenzhen Yuto Printing Co., Ltd. | Printing and packaging | 109 |
| Entire Technology Co., Ltd. | Diffuser plates for TFT-LCD backlight module | na |
| Others | | 782 |
| TOTAL | | 3,039 |

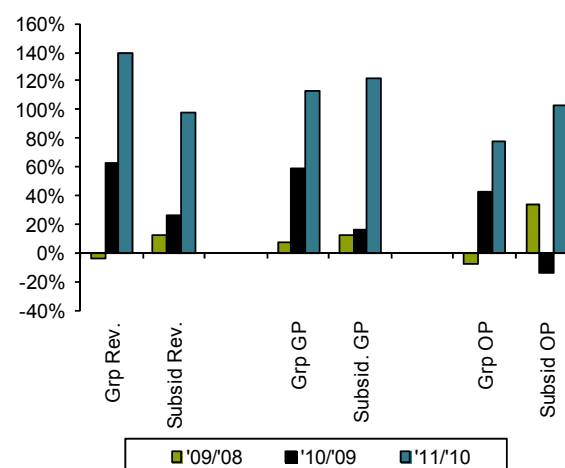
Source: TEJ, company disclosures and Bernstein analysis.

We compare Hon Hai Precision's consolidated and unconsolidated financials in Exhibit 61. Our analysis shows that subsidiaries under the group have traditionally made up 20-27% of group revenues, and about 8-12% of pretax income. In general, the subsidiaries show higher gross and operating margins than the unconsolidated parent. In 2011, where operating margins were particularly compressed at both the group and subsidiaries, operating margins were ~7.6% for subsidiaries versus ~1.1% for the unconsolidated parent. We observe that revenue and operating income growth rates between the group and the subsidiaries are relatively uncorrelated, but gross profit growth is tightly correlated (see Exhibit 62).

Exhibit 61 Scale of Subsidiaries of Hon Hai Precision

| TWD mil. | | 2008 | 2009 | 2010 | 2011 |
|---------------------|--------------|-----------|-----------|-----------|-----------|
| Rev. | Cons. | 1,950,481 | 1,959,182 | 2,997,205 | 3,452,681 |
| | Uncons. | 1,473,026 | 1,420,573 | 2,313,129 | 2,773,311 |
| | Est. subsid. | 477,455 | 538,609 | 684,076 | 679,370 |
| | Subsid/Cons. | 24% | 27% | 23% | 20% |
| Gross Profit | Cons. | 168,104 | 186,553 | 244,202 | 266,382 |
| | Uncons. | 59,407 | 63,675 | 100,920 | 107,827 |
| | Est. subsid. | 108,697 | 122,878 | 143,282 | 158,555 |
| | Subsid/Cons. | 65% | 66% | 59% | 60% |
| Gross Margin | Uncons. | 4.0% | 4.5% | 4.4% | 3.9% |
| | Subsid. | 22.8% | 22.8% | 20.9% | 23.3% |
| Op. Income | Cons. | 70,606 | 83,489 | 86,145 | 82,845 |
| | Uncons. | 26,687 | 24,788 | 35,444 | 31,500 |
| | Est. subsid. | 43,919 | 58,701 | 50,701 | 51,345 |
| | Subsid/Cons. | 62% | 70% | 59% | 62% |
| Op. Margin | Uncons. | 1.8% | 1.7% | 1.5% | 1.1% |
| | Subsid. | 9.2% | 10.9% | 7.4% | 7.6% |

Source: Company earnings announcements and Bernstein analysis.

Exhibit 62 Group and Subsidiary Growth Rate Comparison

Note: GP = gross profit, OP = operating profit.

Source: Company earnings announcements and Bernstein analysis.

Hon Hai's Complex Cross-Holding Ownership Structure Complicates Analysis

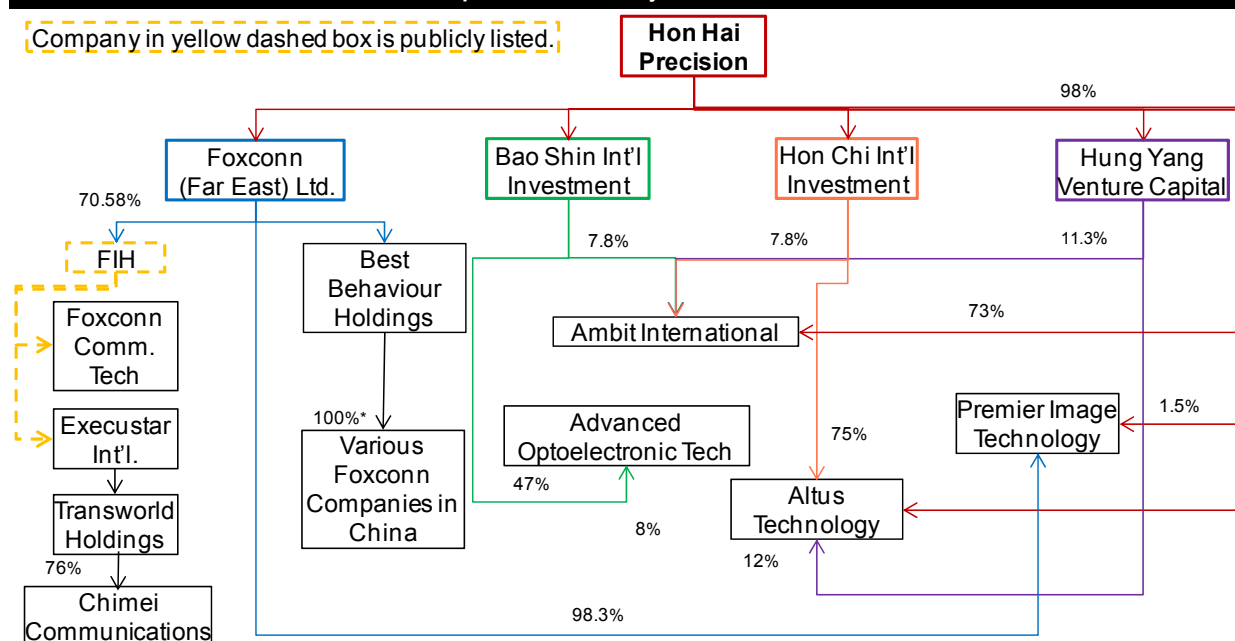
Complicating this relatively simple picture, some subsidiaries are themselves investors in other subsidiaries, and even Hon Hai Precision itself is a shareholder in these second-order subsidiaries (see Exhibit 63).

Some of the major subsidiaries — Foxconn (Far East), Bao Shin International Investment, Hon Chi International Investment and Hung Yang Venture Capital — are vehicles that Hon Hai uses to invest in different segments of the supply chain. The biggest one is Foxconn (Far East), a subsidiary that invests in Hon Hai's core EMS business operations, including FIH (Foxconn International Holdings) and all

the Chinese manufacturing entities. Bao Shin, Hon Chi and Hung Yang invest in companies that are mainly component makers related to its manufacturing business. Given that these companies supply the core business, but are not actually involved in contract manufacturing or located in Taiwan, they are usually subsidiaries (if majority held) or recorded under the equity method (if ownership is 20-50% or involve significant control).

What is interesting, unusual and perhaps worrisome is that Hon Hai Precision itself (the parent) is a "co-investor" with its subsidiaries in some of these component companies. For example, in Exhibit 63, we see that Hon Hai Precision (parent) is an investor in Ambit (networking equipment), Premier Image Technology (digital still cameras) and Altus (camera lenses and modules) together with Hon Hai Precision's subsidiaries. Four other types of businesses — OEM/ODM, retailing, new products and private equity/venture capital — are supplementary to Hon Hai's core business. As such, they are usually minority stakes and recorded under equity or cost methods.

Exhibit 63 Ownership Structure for Major Hon Hai Precision Subsidiaries

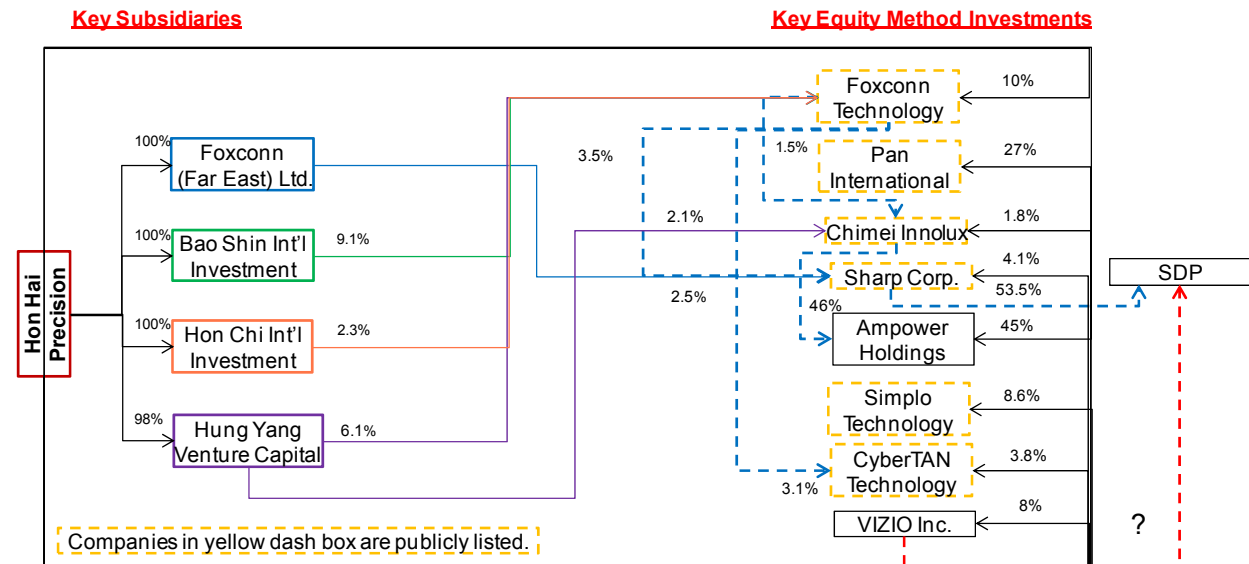


Note: The percentage owned by Hon Hai Precision also includes smaller subsidiaries that are not listed above.

*Majority of Foxconn's companies in China are 100% owned by Foxconn (Far East) but there are exceptions.

Source: FactSet, company disclosures and Bernstein analysis.

A similar strategy is employed by the Hon Hai group in its investments in public companies, booked using the equity method. Hon Hai Precision's investment holding subsidiaries are investors in a number of public companies, and Hon Hai Precision itself is directly invested (see Exhibit 64). For example, Foxconn Technology is invested through three subsidiaries plus the parent, for a 30% ownership stake through four investment vehicles. Foxconn Technology is itself an investor in Chimei Innolux and CyberTan, and is also slated to be one of the parties in the (eventual) Sharp investment.

Exhibit 64 Ownership Structure for Key Equity Investments


Note: Hon Hai's investment in Sharp is not closed as of the publication date of this *Blackbook*.

Source: FactSet, company disclosures and Bernstein analysis.

Adding yet another layer of complexity, Terry Guo, the Chairman and CEO of Hon Hai, is another major investor in Hon Hai's investment portfolio (see Exhibit 65). Mr. Guo owns 12.5% of Hon Hai Precision and 2.9% of Chimei Innolux, and has recently invested in Sharp Display Products (SDP) for a 46.5% of stake, which was diluted to 37.6% after the completion of a transaction between Toppan Printing and Dai Nippon Printing with SDP. A detailed discussion about Hon Hai's ventures in the panel industry is in a subsequent chapter.

Exhibit 65 Investments by Hon Hai Precision's CEO Terry Guo

| Terry Guo | | | |
|-------------------------------------|--------------|-------------------------------------|--------------|
| 2.9% | | 46.5% | |
| Chimei Innolux | | Sharp Display Products | |
| | | 12.5% | |
| | | Hon Hai Precision | |
| Shareholder | % OS | Shareholder | % OS |
| Chi Mei Group | 13.57 | Terry Guo | 37.6 |
| Lian Ci Development Corp | 3.57 | Sharp Corp | 37.6 |
| Terry Guo | 2.91 | Toppan Printing Co. | 9.54 |
| Vanguard Group Inc. | 2.78 | Dai Nippon Printing Co. | 9.54 |
| Hung Yang Venture Investment | 2.1 | SDP | 5.7 |
| Compal Electronics Inc | 1.84 | | |
| Hon Hai Precision Industry | 1.77 | | |
| Foxconn Technology Co Ltd | 1.52 | | |
| Hua Chun Investment Co Ltd | 1.44 | | |
| Hung Han Investment Co Ltd | 1.32 | | |
| Total Hon Hai related | 8.3 | Total Hon Hai related | 37.6 |
| Shareholder | % OS | Shareholder | % OS |
| Terry Guo | 12.54 | Terry Guo | 12.54 |
| Hon Hai Precision Industry Co Ltd | 2.98 | Hon Hai Precision Industry Co Ltd | 2.98 |
| Government of Saudi Arabia | 2.32 | Government of Saudi Arabia | 2.32 |
| BlackRock, Inc. | 1.50 | BlackRock, Inc. | 1.50 |
| The Vanguard Group Inc. | 2.09 | The Vanguard Group Inc. | 2.09 |
| FMR LLC | 1.38 | FMR LLC | 1.38 |
| Government of Singapore | 1.82 | Government of Singapore | 1.82 |
| EFG International AG | 1.53 | EFG International AG | 1.53 |
| Chinatrust Financial Holding Co Ltd | 1.06 | Chinatrust Financial Holding Co Ltd | 1.06 |
| Schroders Plc | 0.67 | Schroders Plc | 0.67 |
| Total Hon Hai related | 15.52 | Total Hon Hai related | 15.52 |

Source: FactSet, company disclosures and Bernstein analysis.

In general, it seems that Hon Hai group's investments usually have three "shareholders": Hon Hai Precision (the listed parent), Hon Hai Precision's subsidiaries (both listed and unlisted), and Terry Guo directly. Although Hon Hai Precision's "economic" ownership in its investment portfolio can be easily calculated by summing the ownership percentages of the parent and the subsidiary, there are conflicts of interest that are not clearly resolved and provide opportunities for potential minority shareholder expropriation:

- By the shareholding being both the publicly listed Hon Hai Precision and its subsidiaries, there exists the opportunity for transfer pricing discretion between the operating subsidiary and the parent company. This is not an issue if the operating subsidiary is wholly owned by the parent, but that is not always the case. For example, Hung Yang Venture Capital is only 98% owned by Hon Hai Precision, so any transfer pricing in favor of Hung Yang would benefit the remaining 2% shareholder disproportionately.
- The opportunity for tax arbitrage is present. Depending on where the subsidiary is listed, and whether it is an operating company or an investment vehicle, the tax regimes and rates could be very different. This sets up the corporate structure as a way to shift tax burdens around investment vehicles to minimize tax burdens overall. This is bad not per se for shareholders, but if this is done in a way that benefits investors in the subsidiaries (and not the parent), this becomes another form of value transfer to certain parties over others.
- The co-investment by the Chairman and CEO in both private and listed subsidiaries sets up the possibility of the Chairman influencing the operations of the subsidiary to the detriment of the parent and minority shareholders.

For completeness, we list major shareholders of Hon Hai's investments in public companies in Exhibit 66 through Exhibit 69, with the Hon Hai-related investment vehicles highlighted in the darker shading in the printed *Blackbook*.

To be perfectly clear, we have no evidence of any dubious activities of this kind, but Hon Hai Precision's corporate structure is organized in a way that these kinds of activities could be "layered" and easily carried out.

| Exhibit 66 Major Shareholders of Foxconn Technology (2354.TT) | |
|--|------------------|
| Top 10 Shareholders | % Holding |
| Hon Hai Precision Industry | 10.09 |
| Bao Hsin International Investment | 9.11 |
| Hung Yan Venture Capital | 6.14 |
| Hsin Sheng Investment Co | 5.71 |
| Shih Sung Co Ltd | 2.99 |
| Vanguard Group Inc | 2.41 |
| Hung Chi International Investment | 2.3 |
| Advance International Investment | 1.53 |
| Shang Chia Investment Co | 1.45 |
| Sjemg Femg Development Co | 1.4 |
| Total Hon Hai related | 27.64 |
| Float % | 78.06 |

Source: Bloomberg L.P., FactSet and Bernstein analysis.

| Exhibit 67 Major Shareholders of Pan International (2328.TT) | |
|---|------------------|
| Top 10 Shareholders | % Holding |
| Hon Hai Precision Industry | 21.55 |
| Fubon Financial Holding | 3.58 |
| Hung Yuan International Investment | 3.47 |
| EFG Private Bank Ltd. | 2.01 |
| EFG Bank AG | 1.85 |
| Credit Agricole (Suisse) SA | 1.83 |
| Hung Chi International Investment | 1.47 |
| Government of Taiwan | 1.13 |
| Dimensional Fund Advisors, Inc. | 1.03 |
| Han Cheng International Co. Ltd. | 0.87 |
| Total Hon Hai related | 26.49 |
| Float % | 66.74 |

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Exhibit 68 Major Shareholders of Simplo Technology (6121.TWO)

| Top 10 Shareholders | % Holding |
|--------------------------------------|------------------|
| Franklin Resources Capital | 5.13 |
| Hyield Venture Capital Co | 4.44 |
| Bao Hsin International Investment | 4.18 |
| Vanguard Group Inc | 3.15 |
| New Labor Pension Fund | 2.6 |
| Fubon Life Insurance Co | 2.55 |
| TLC Capital Co | 2.45 |
| Columbia Wanger Asset Management LLC | 2.25 |
| Blackrock Fund Advisors | 1.74 |
| William Blair & Company LLC | 1.58 |
| Total Hon Hai related | 8.62 |
| Float % | 82.7 |

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Exhibit 69 Major Shareholders of CyberTAN (2062.TT)

| Top 10 Shareholders | % Holding |
|------------------------------------|------------------|
| EFG Bank Channel Islands | 3.65 |
| Li I Intl Investment Co | 3.09 |
| Hung Yuan International Investment | 3.09 |
| Hung Yang Venture Capital | 3.09 |
| Foxconn Technology Co | 3.09 |
| Fortis Bank Singapore | 3.07 |
| Nan Shan Life Insurance | 2.48 |
| His Teng Investment | 2.12 |
| Hsiung Chih Investment | 1.91 |
| Credit Agricole Suisse | 1.81 |
| Total Hon Hai related | 9.27 |
| Float % | 88.92 |

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Hon Hai's Corporate Structure Has Evolved Opportunistically

The current investment structure we discussed earlier has been built up during the past 20 years. Exhibit 70 lists the most notable merger and acquisition transactions Hon Hai Precision and its affiliates have conducted over this period.

Hon Hai has spent substantial acquisition dollars to upgrade and expand its manufacturing capabilities particularly in core products. In network and communications, it recently acquired Cisco's set-top box plant in Mexico to increase capacity. Other notable acquisitions by Hon Hai were Dell's PC plants in Poland, and Sony's TV plants in Slovakia and Mexico (90% stake).

M&A activity appears to have increased after 2005, with the acquisition of various companies along the supply chain, mainly through Foxconn (Far East) Ltd. The most recent transaction is the acquisition of AirWalk Communications Inc. (small cell base station with compact radio access network products) by Ubee Interactive Inc., a subsidiary of Hon Hai that provides CDMA wireless radio access network solutions.

Measured by deal size (see Exhibit 71), the top five deals are all in the field of component makers, with Hon Hai Precision as the leading acquirer, as opposed to an investment vehicle subsidiary.

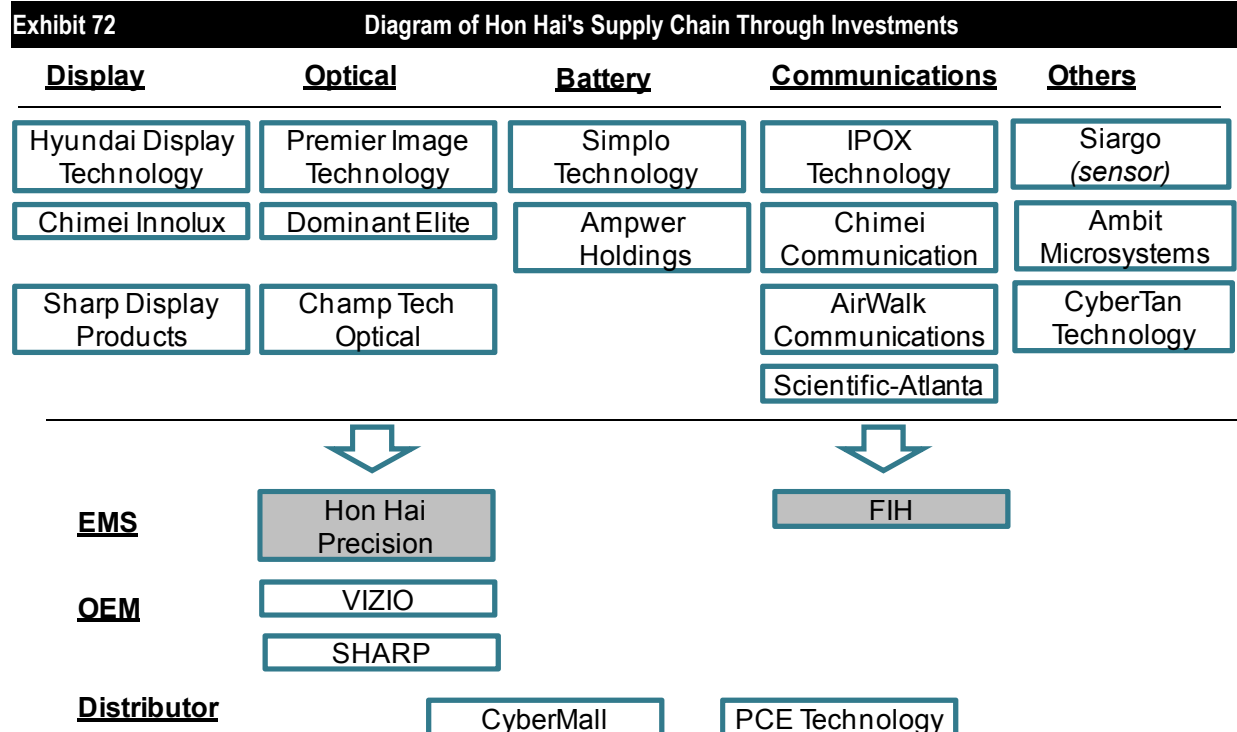
| Exhibit 70 Summary of Hon Hai-Related Transactions (US\$ million) | | | | | |
|---|--------------------------------|--|-------------|-------------|------------|
| Date | Acquirer Company | Target Name | Base Equity | Purpose | Type |
| Mar-02 | Hon Hai Precision | Hyundai Display Technology | 450 | Display | Acq/Merger |
| Oct-03 | Hon Hai Precision | Motorola, Inc./Mexican Unit | 18 | EMS | Acq/Merger |
| Nov-03 | Hon Hai Precision | Ambit Microsystems Corp. | 1,078 | Computing | Acq/Merger |
| Mar-04 | Foxconn (Far East) | Dominant Elite Holdings Ltd | 591 | PUH | Acq/Merger |
| Feb-05 | Hon Hai Precision | AnTec Electric System Co. Ltd. | 12 | EMS | Acq/Merger |
| May-05 | Hon Hai Precision | Hewlett-Packard Co./Manufacturing Plant India | na | EMS | Acq/Merger |
| Jun-05 | Foxconn International Holdings | Motorola Inc./Tianjin Ops. | na | Handset | Acq/Merger |
| Jun-06 | Hon Hai Precision | Premier Image Technology Corp. | 866 | Camera | Acq/Merger |
| Nov-09 | Foxconn (Far East) | Best Behaviour Holding Ltd. | 70 | Holding | Acq/Merger |
| Nov-09 | Best Behaviour Holding | China Galaxy Enterprises Ltd. | 19 | Holding | Acq/Merger |
| Nov-09 | Best Behaviour Holding | Keep Profit Investment Ltd. | 33 | Holding | Acq/Merger |
| Nov-09 | Best Behaviour Holding | Prime Rich Holdings Ltd. | 25 | Holding | Acq/Merger |
| Dec-09 | Foxconn Technology Co | Dell, Inc./Polish Manufacturing Operations | na | EMS | Acq/Merger |
| Dec-09 | Foxconn (Far East) | Champ Tech Optical (Foshan) Corp. | 34 | Optical | Acq/Merger |
| Dec-09 | Hon Hai Precision | Ever Rise Holdings Ltd. | 29 | Holding | Acq/Merger |
| May-10 | Foxconn Technology Group | Sony Baja California S.A. de C.V | na | EMS | Acq/Merger |
| Mar-11 | Prime Rich Holdings | Foxconn Precision Electronics (Taiyuan) Co. Ltd. | 71 | EMS | Acq/Merger |
| Jul-11 | Foxconn Technology Group | Cisco Systems, Inc./MX Manufacturing Ops | na | EMS | Acq/Merger |
| Jul-11 | PCE Paragon | Scientific-Atlanta Holdings BV | 45 | Network | Acq/Merger |
| Mar-12 | Ubee Interactive | AirWalk Communications, Inc. | na | Network | Acq/Merger |
| Aug-03 | Foxconn Finland Invest Oy | Eimo Oyj | na | EMS | Maj Stake |
| May-05 | Transworld Holdings | Chi Mei Communication Systems, Inc. | 80 | Handset | Maj Stake |
| Sep-09 | Famous Rise International | Sony Baja California S.A. de C.V | 10 | EMS | Maj Stake |
| Mar-10 | Foxconn Technology Group | Sony Slovakia spol sro | 40 | EMS | Maj Stake |
| Jul-10 | Bright Ever Holdings | Fenix Industria de Eletronicos Ltda. | 14 | EMS | Maj Stake |
| Jun-04 | Hon Hai Precision | Innolux Display Corp. | na | Display | Min Stake |
| Nov-05 | Hon Hai Precision | CyberTAN Technology, Inc. | 11 | Network | Min Stake |
| Feb-07 | Hon Hai Precision | IPOX Technology Co. Ltd. | na | IPC | Min Stake |
| Mar-08 | Hon Hai Precision | Siargo, Inc. | na | Sensor | Min Stake |
| Mar-10 | Full Bonus International | PCE Technology de Juarez S.A. de C.V. | 14 | Distributor | Min Stake |

Source: FactSet and Bernstein analysis.

| Exhibit 71 Details of Hon Hai's Major Transactions (US\$ million) | | | | |
|---|---------------------|-------------------------------------|--|-------------|
| Date | Acquirer Company | Target Name | Company Description | Base Equity |
| Nov-03 | Hon Hai Precision | Ambit Microsystems Corp. | Personal computing devices | 1,078 |
| Jun-06 | Hon Hai Precision | Premier Image Technology Corp. | Compact, advanced photographic system digital camera | 866 |
| Mar-04 | Foxconn (Far East) | Dominant Elite Holdings Ltd | Optical component and DVD player/recorder business | 591 |
| Mar-02 | Hon Hai Precision | Hyundai Display Technology | Thin film transistor business | 450 |
| May-05 | Transworld Holdings | Chi Mei Communication Systems, Inc. | Cellular phone GSM and GPRS module manufacturing | 80 |

Source: FactSet and Bernstein analysis.

Thanks to layers of investments through different investment vehicles, Hon Hai has developed a rather broad map of suppliers (see Exhibit 72) — from the upstream (display) to components (battery and optical) to downstream in OEMs and distributors.



Source: Bloomberg L.P., FactSet, corporate reports and Bernstein analysis.

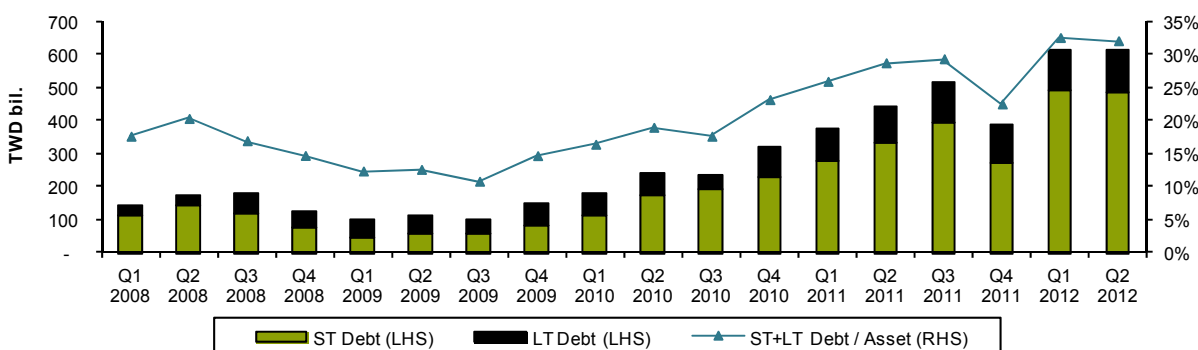
Where core manufacturing acquisitions are concerned, Hon Hai usually holds a majority stake, which is the case of many recent acquisitions. We believe the company seeks to control its core manufacturing business more directly to keep a tighter lid on cost and margins. Aside from manufacturing capability extensions, Hon Hai has also spent money on acquiring upstream players as part of its vertical integration strategy. It has targeted new growth products and areas with higher margins. On July 2011, the board approved US\$175 million of investments to be made in the following companies in the future, but no transactions have been finalized at this point:

- Upstream parts and components — US\$26 million (following an earlier US\$24 million tranche) in Sanying Precision (camera module), US\$18 million increased stake in UER Holdings (lithium ion batteries), US\$6.7 million in Champ Tech Optical (optical lens), Yihong Precision (molds), Fuhongyang (plugs and sockets);
- Core manufacturing — US\$70 million in Fuding (PC), US\$50 million in Futaihua Industry (handsets);
- A notable investment is Sanying Precision, which will supply Apple's iPhone 5 and iPad 3 with camera module components, and currently already counts HTC, Sony, Motorola, and Microsoft as its customers. Sanying also manufactures smartphones, game consoles, notebooks, and lenses.

How Impactful to Bottom Line Are These Acquisitions?

Hon Hai has traditionally not issued stock for acquisitions and, as such, its purchases of companies have not been dilutive. It has funded the acquisitions through its cash reserves and long-term debt. A total of TWD 3.47 billion worth of new shares have been issued (excluding stock dividend) since 2008, relative to a base of TWD 107 billion of share capital. Although we see an increase in debt levels and debt ratios (see Exhibit 73), cash and interest coverage are still at very healthy levels (see Exhibit 74), even after the Hitachi JV payment of TWD 40 billion was made (in two tranches — one in 2011 and another in 2012).

Exhibit 73 Hon Hai Precision: Debt Levels



Source: Company disclosures and Bernstein analysis.

Exhibit 74 Hon Hai Precision: Cash and Interest Coverage

| TWD mil. | Q1 2009 | Q2 2009 | Q3 2009 | Q4 2009 | Q1 2010 | Q2 2010 | Q3 2010 | Q4 2010 | Q1 2011 | Q2 2011 | Q3 2011 | Q4 2011 | Q1 2012 | Q2 2012 |
|-----------------------------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|---------|---------|
| EBIT | 13,849 | 18,814 | 20,188 | 30,639 | 19,915 | 20,090 | 21,461 | 24,681 | 12,689 | 15,815 | 18,965 | 35,375 | 15,225 | 21,519 |
| Capex | 7,554 | 9,608 | 3,574 | 6,238 | 9,694 | 10,733 | 23,506 | 28,783 | 25,462 | 22,375 | 25,523 | 18,307 | 10,617 | 11,209 |
| Interest Expense | 916 | 503 | 220 | 270 | 312 | 641 | 886 | 887 | 1,116 | 1,279 | 1,664 | 1,645 | 1,779 | 3,220 |
| Interest Income | 277 | 136 | 257 | 804 | 338 | 926 | 734 | 1,221 | 723 | 1,607 | 2,217 | 3,877 | 1,801 | 4,789 |
| Debt Issuance (+) / Repayment (-) | (27,756) | 11,756 | (9,199) | 45,542 | 30,116 | 61,236 | (1,611) | 83,810 | 74,691 | 83,834 | 91,468 | (127,997) | 225,809 | 2,664 |
| EBITDA+Debt Issuance | (13,907) | 30,570 | 10,988 | 76,181 | 50,030 | 81,325 | 19,850 | 108,491 | 87,380 | 99,649 | 110,433 | (92,622) | 241,034 | 24,183 |
| Average Cash Balance | 97,649 | 110,605 | 121,213 | 147,457 | 182,923 | 219,031 | 235,918 | 238,160 | 267,387 | 288,748 | 327,560 | 343,975 | 376,246 | 530,019 |
| Interest Coverage (pre-capex) | 15x | 37x | 92x | 114x | 64x | 31x | 24x | 28x | 11x | 12x | 11x | 22x | 9x | 7x |
| Interest Coverage (post-capex) | 7x | 18x | 76x | 90x | 33x | 15x | -2x | -5x | -11x | -5x | -4x | 10x | 3x | 3x |
| Ratio of Cash:Interest Expense | 107x | 220x | 552x | 547x | 586x | 342x | 266x | 268x | 240x | 226x | 197x | 209x | 212x | 165x |

Note: Interest coverage post-capex = (EBIT – capex)/interest expense.

Source: Company disclosures and Bernstein analysis.

Capex has been rising dramatically over the last few quarters (some of it as part of this acquisition strategy in addition to the Chengdu manufacturing campus ramp-up) as can be evidenced by the right-hand side of Exhibit 74. However, interest income is more than sufficient to cover interest expense — with interest income generated by borrowing funds in low-interest-rate currencies and investing them in high-yielding and appreciating RMB financial assets, according to the company. We discuss Hon Hai's accounting practices in the next chapter.

Hon Hai Precision's Accounting Is as Opaque as Its Operations

Overview

Because of Hon Hai Precision's overly complex investment and corporate structure (see the previous chapter), investors find it challenging and confusing to understand the company's financials and operations. This confusion adds to the general tone of skepticism about Hon Hai. In this chapter, we examine the components of parent and subsidiary revenue and operating income as well as the sources of non-operating income.

Overall, operating income from subsidiaries and non-operating income at the parent level are material contributors to Hon Hai's profitability. Subsidiary operating income is highly volatile, and results in fluctuating and possibly distorted operating margins.

Additionally, much of the non-operating income at the parent level is the result of financial engineering. We understand that investors do not view these treasury operations as germane to a manufacturing company, but understanding these operations' dynamics helps us quantify any possible downside, which we believe is manageable.

Hon Hai reports both unconsolidated (the parent company) and consolidated financials each quarter. We take the reported numbers and back out the revenues and operating profits of subsidiaries and calculate the profitability of the subsidiaries and the parent company. Generally speaking, the subsidiaries (mainly component makers) have much higher gross margins than those at the unconsolidated level, at ~20% versus ~4%.

Non-operating income has been a fluctuating portion of pretax profit, but in 2011 it reached a 27% share, and is thus a meaningful contributor to Hon Hai's bottom line. The three major identifiable sources of non-operating income are investment income (11% of non-operating income), foreign exchange gains (32%) and interest income (30%).

As for investment income, we can account for virtually all of the income as coming from Hon Hai's investments in public companies for 2009 and 2010. However, the total investment income of TWD 3.2 billion in 2011 was below the overall income contributed by the public companies of TWD 4.2 billion. In other words, Hon Hai's investments in non-public companies incurred material losses of roughly TWD 1 billion. We believe these are from the retail-focused operations.

Income from foreign exchange gains has become much more pronounced in the past two years (10 times the income in 2011 relative to 2009), which we believe is mostly from Hon Hai's foreign exchange hedge operations, where the company uses its renminbi cash deposits as collateral for U.S. dollar- and euro-denominated loans. Assuming the hedge is conducted in renminbi for the assets and in U.S. dollars and euros for the liabilities, we estimate gains of TWD 923 million and TWD 5.3 billion for 2010 and 2011, respectively, for the U.S. dollar- and euro-denominated liabilities. We find the RMB/US\$ hedge has been consistently generating gains while the euro trades appear to have generated losses in first-half 2011.

Understanding Hon Hai's Accounting Structure Is Not an Easy Task

Hon Hai has a complex and opaque ownership structure — it owns a portfolio of 20 subsidiaries at the first level down from the listed company (Hon Hai Precision), 13 associated companies under the equity method, and 10 sizable companies under the cost method. When aggregated, it becomes less obvious how to calculate and evaluate the evolving profitability at different accounting levels. As a result of such

an organizational structure, Hon Hai reports both unconsolidated (the parent company) and consolidated financials each quarter, through which we can back out the revenues and operating profits of subsidiaries and the profitability of them accordingly (see Exhibit 75). Generally speaking, the subsidiaries (mainly component makers) have much higher gross margins at ~20% compared to the gross margin of ~4% at the unconsolidated level.

| Exhibit 75 Hon Hai Consolidated, Unconsolidated and Derived Subsidiary Financials (TWD million) | | | | | | | | | | |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Unconsolidated | Q2 2010 | Q3 2010 | Q4 2010 | Q1 2011 | Q2 2011 | Q3 2011 | Q4 2011 | Q1 2012 | Q2 2012 | Q3 2012 |
| Revenue | 514,535 | 664,447 | 719,373 | 554,012 | 633,902 | 665,660 | 919,737 | 789,943 | 730,137 | 711,060 |
| COGS | 491,502 | 634,187 | 691,311 | 528,947 | 613,420 | 642,634 | 880,484 | 758,177 | 694,203 | 675,502 |
| COGS % | 96% | 95% | 96% | 95% | 97% | 97% | 96% | 96% | 95% | 95% |
| Gross Profit | 23,033 | 30,261 | 28,063 | 25,065 | 20,482 | 23,026 | 39,253 | 31,766 | 35,935 | 35,558 |
| Gross Margin % | 4.5% | 4.6% | 3.9% | 4.5% | 3.2% | 3.5% | 4.3% | 4.0% | 4.9% | 5.0% |
| Opex | 14,223 | 20,394 | 20,299 | 19,162 | 14,843 | 12,755 | 29,566 | 24,640 | 22,482 | 24,872 |
| Opex % | 2.8% | 3.1% | 2.8% | 3.5% | 2.3% | 1.9% | 3.2% | 3.1% | 3.1% | 3.5% |
| Op. Inc. | 8,810 | 9,866 | 7,764 | 5,904 | 5,639 | 10,271 | 9,687 | 7,125 | 13,453 | 10,686 |
| Op. Margin % | 1.7% | 1.5% | 1.1% | 1.1% | 0.9% | 1.5% | 1.1% | 0.9% | 1.8% | 1.5% |
| Non-op Inc. | 12,347 | 12,930 | 17,735 | 10,393 | 14,902 | 11,904 | 27,280 | 9,775 | 8,616 | 21,286 |
| Investment Inc. | 11,528 | 13,004 | 17,581 | 8,750 | 14,891 | 11,264 | 27,053 | 8,067 | 9,589 | 20,839 |
| Other non-op Inc. | 819 | -75 | 154 | 1,643 | 11 | 640 | 227 | 1,708 | -973 | 447 |
| Non-op Expense | 328 | 3,642 | 744 | 483 | 2,083 | -1,337 | 2,957 | 586 | 3,689 | -662 |
| Net Inc. | 16,749 | 20,984 | 21,432 | 14,401 | 12,983 | 19,177 | 35,030 | 14,924 | 12,610 | 30,256 |
| Net Margin % | 3.3% | 3.2% | 3.0% | 2.6% | 2.0% | 2.9% | 3.8% | 1.9% | 1.7% | 4.3% |
| Consolidated | | | | | | | | | | |
| Revenue | 653,989 | 846,712 | 952,134 | 729,259 | 785,938 | 863,293 | 1,074,192 | 1,001,286 | 891,917 | 874,442 |
| COGS | 600,961 | 778,251 | 876,560 | 676,420 | 728,702 | 802,463 | 978,714 | 934,760 | 821,218 | 791,003 |
| COGS % | 92% | 92% | 92% | 93% | 93% | 93% | 91% | 93% | 92% | 90% |
| Gross Profit | 53,028 | 68,462 | 75,574 | 52,839 | 57,236 | 60,830 | 95,478 | 66,526 | 70,700 | 83,439 |
| Gross Margin % | 8.1% | 8.1% | 7.9% | 7.2% | 7.3% | 7.0% | 8.9% | 6.6% | 7.9% | 9.5% |
| Opex | 32,939 | 47,001 | 50,893 | 40,150 | 41,420 | 41,865 | 60,102 | 51,301 | 49,181 | 53,474 |
| Opex % | 5.0% | 5.6% | 5.3% | 5.5% | 5.3% | 4.8% | 5.6% | 5.1% | 5.5% | 6.1% |
| Op. Inc. | 20,090 | 21,461 | 24,681 | 12,689 | 15,816 | 18,965 | 35,375 | 15,225 | 21,519 | 29,965 |
| Op. Margin % | 3.1% | 2.5% | 2.6% | 1.7% | 2.0% | 2.2% | 3.3% | 1.5% | 2.4% | 3.4% |
| Non-op Inc. | 2,755 | 3,677 | 931 | 5,386 | 6,326 | 5,868 | 7,815 | 5,934 | -1,153 | 6,585 |
| Investment Inc. | 873 | 38 | 2,429 | 0 | 1,824 | 3 | 1,492 | 0 | 1,253 | -5 |
| Other non-op Inc. | 1,882 | 3,639 | -1,497 | 5,386 | 4,502 | 5,865 | 6,323 | 5,934 | -2,407 | 6,589 |
| Non-op Expense | 641 | 886 | 887 | 1,116 | 1,279 | 1,664 | 1,645 | 1,779 | 3,220 | 2,111 |
| Net Inc. | 15,832 | 20,370 | 21,528 | 14,376 | 12,959 | 19,150 | 35,449 | 14,115 | 11,395 | 29,827 |
| Net Margin % | 2.4% | 2.4% | 2.3% | 2.0% | 1.6% | 2.2% | 3.3% | 1.4% | 1.3% | 3.4% |
| Subsidiaries | | | | | | | | | | |
| Revenue | 139,454 | 182,265 | 232,761 | 175,247 | 152,035 | 197,633 | 154,455 | 211,343 | 161,780 | 163,382 |
| % of Cons. | 21% | 22% | 24% | 24% | 19% | 23% | 14% | 21% | 18% | 19% |
| COGS | 109,459 | 144,064 | 185,249 | 147,473 | 115,282 | 159,829 | 98,230 | 176,582 | 127,015 | 115,501 |
| COGS % | 78% | 79% | 80% | 84% | 76% | 81% | 64% | 84% | 79% | 71% |
| Gross Profit | 29,995 | 38,201 | 47,511 | 27,774 | 36,754 | 37,804 | 56,225 | 34,761 | 34,765 | 47,881 |
| Gross Margin % | 21.5% | 21.0% | 20.4% | 15.8% | 24.2% | 19.1% | 36.4% | 16.4% | 21.5% | 29.3% |
| Opex | 18,715 | 26,606 | 30,595 | 20,988 | 26,577 | 29,110 | 30,536 | 26,661 | 26,698 | 28,603 |
| Opex % | 13.4% | 14.6% | 13.1% | 12.0% | 17.5% | 14.7% | 19.8% | 12.6% | 16.5% | 17.5% |
| Op. Inc. | 11,279 | 11,595 | 16,917 | 6,785 | 10,177 | 8,694 | 25,689 | 8,100 | 8,066 | 19,279 |
| Op. Margin % | 8.1% | 6.4% | 7.3% | 3.9% | 6.7% | 4.4% | 16.6% | 3.8% | 5.0% | 11.8% |

Source: Corporate reports and Bernstein estimates and analysis.

The significant differences in margins have led to the corresponding differences in operating income of the parent company versus subsidiaries (see Exhibit 76). For example, in second-quarter 2012, the subsidiaries contributed ~37% of the consolidated operating income, while they contributed only ~18% of total revenues.

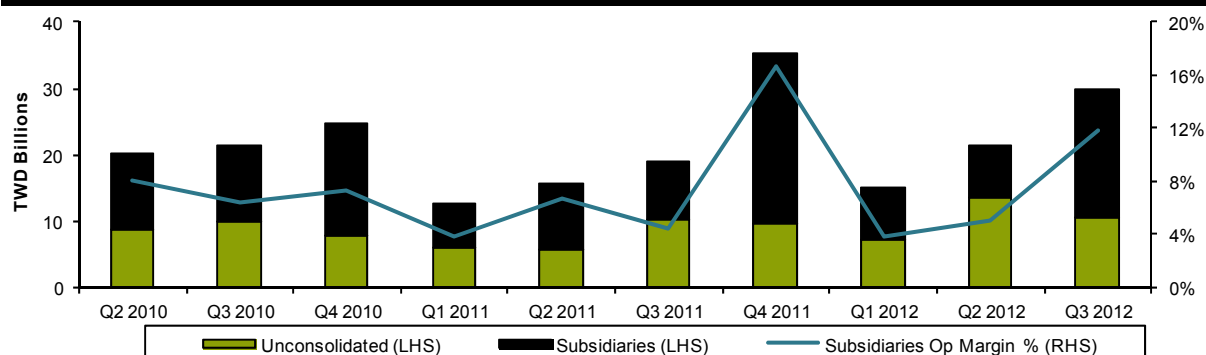
It is worth pointing out that fourth-quarter 2011 and third-quarter 2012 saw a spike in the operating income from the subsidiaries, which we believe might be some kind of "settling up" or "top up" performance payments from customers after

certain performance benchmarks were met or from non-recurring income from one-time design fees. The fourth-quarter 2011 spike coincided with the iPhone 4S ramp-up, while the one in third-quarter 2012 coincided with the iPhone 5. This pattern is also consistent with the fact that subsidiary operating income and margins tend to rise in the fourth quarter, but not as much as what was observed in fourth-quarter 2011.

Hon Hai's strategy of vertical integration makes economic sense, as the higher margins of the component makers reduce the margin pressure faced by the parent company. That said, the revenue growth drivers remain highly contingent on the EMS business at the parent level, where the rapidly growing Apple-related business is booked.

Exhibit 76

Hon Hai: Operating Income Breakdown Between the Parent (Unconsolidated) and Subsidiaries



Source: Company disclosures and Bernstein analysis.

Sources of Hon Hai's Non-Operating Income Stream Include Financial Engineering

Even though the operating income at both the parent and subsidiaries level matters to the overall profitability for Hon Hai, we find the sources of non-operating income are also essential to forecast the company's financial prospects — and they are just as complex. Exhibit 77 and Exhibit 78 show the breakdown of the non-operating income items reported in Hon Hai's consolidated financials.

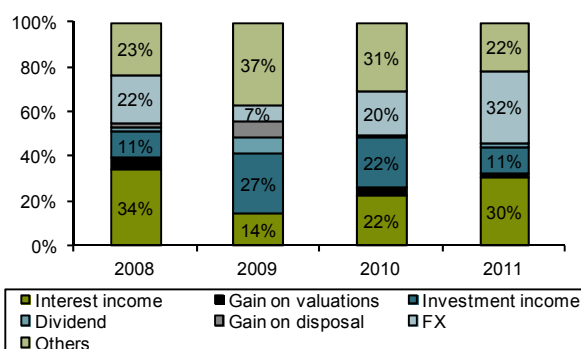
From 2008 to 2011, the most significant change in the contribution to non-operating income is foreign exchange gains and interest income, accounting for 32% and 30% of non-operating income in 2011, respectively. Investment income under the equity method has seen material fluctuations in the percentage of total, but overall has doubled from TWD 1.6 billion in 2008 to TWD 3.2 billion in 2011.

Exhibit 77 Non-Operating Income Breakdowns

| TWD Million | 2008 | 2009 | 2010 | 2011 |
|--|---------------|---------------|---------------|---------------|
| Interest income | 4,734 | 1,473 | 3,219 | 8,425 |
| Gain on valuation of financial assets | 454 | - | - | - |
| Gain on valuation of financial liabilities | 298 | - | 548 | 584 |
| Invst. income under equity method | 1,600 | 2,842 | 3,254 | 3,152 |
| Dividend income | 367 | 693 | 86 | 584 |
| Gain on disposal of PP&E | 238 | - | - | - |
| Gain on disposal of investments | - | 762 | - | - |
| Foreign exchange gain - net | 3,004 | 727 | 2,890 | 8,981 |
| Others | 3,262 | 3,870 | 4,485 | 5,976 |
| Total | 13,956 | 10,367 | 14,481 | 27,703 |
| % of Pretax Income | 19.2% | 11.8% | 15.8% | 27.0% |

Source: Corporate reports and Bernstein analysis.

Exhibit 78 Components of Non-Operating Income



Source: Corporate reports and Bernstein analysis.

In the following two sections, we analyze three important segments of non-operating income — investment income under the equity method, foreign exchange gains, and interest income. For investment income, we single out the public companies that Hon Hai and its subsidiaries invest and calculate the investment income Hon Hai booked on its consolidated financials by using public filings. For other non-operating income, we take a detailed look at the foreign exchange hedge operations run by Hon Hai over the past three years and determine the approximate proportion through foreign exchange rate changes, and their contribution to the growing interest income flows.

Hon Hai's Investments in Public Companies Are the Main Investment Income Contributor

More often than not, Hon Hai's investments in component makers are not made directly through Hon Hai Precision but rather through its fully owned subsidiaries. Exhibit 79 shows the 12 publicly listed companies that Hon Hai invested primarily through its investment vehicles, such as Pao Shin, Hung Yuen, Hyield Venture and Hung Chi (as highlighted in the exhibit).

| Exhibit 79 Shareholding Structure of Hon Hai's Investment in Public Companies (% Holding) | | | |
|---|-------|---|-------|
| Zhen Ding Tech — 4958 TT | | Fitipower Integrated Technology — 4961 TT | |
| Foxconn Far East Ltd | 41.36 | Pao Shin Intl Investment Co | 18.65 |
| Bigger Mind Ltd | 6.62 | Elan Microelectronic Corp | 10.07 |
| Bide Intl Ltd | 3.8 | Kai Yu Invest Co Ltd | 3.55 |
| Apex Excel Invest Ltd | 3.75 | Ta Lung Invest Co Ltd | 1.41 |
| Best Right Invest Ltd | 3.61 | Elan Invest Co Ltd | 1.24 |
| Precious Lake Intl Ltd | 3.41 | Chiu Shu-Hui | 1.17 |
| Favor Master Intl Ltd | 3.28 | Chen Feng-Hsuan | 0.75 |
| Nice Time Invest Co Ltd | 3.28 | Lin Yung-Chieh | 0.57 |
| Wide Choice Invest Ltd | 3.1 | Cheng Shih-Sheng | 0.42 |
| G-tech — 3149 TT | | Pan-International Industrial — 2328 TT | |
| Hung Yuen International Co | 10.59 | Hon Hai Precision Industry Co | 20.84 |
| Pao Shin Intl Investment Co | 5.57 | Fubon Insurance Co Ltd | 3.57 |
| Hung Chi Intl Investment Co | 5.35 | Hung Yuen International Co | 3.47 |
| Hyield Venture Capital Co | 5.12 | Fortis Bank Sa/Nv | 2.08 |
| Molus Technology Inc | 1.78 | Efg Bank Channel Islands | 2.01 |
| Chung Jung-Hua | 1.4 | Calyons A Swiss | 1.83 |
| Ritek Corp | 1.13 | Efg Bank | 1.79 |
| Mega Intl Commercial Bank Co Ltd | 1.12 | Hung Chi Intl Investment Co | 1.47 |
| Chun Cheng Investment Co Ltd | 1.06 | Han Sheng International | 0.87 |
| Ways Technical Corp — 3508 TT | | Alliance Fiber Optic — AFOP US | |
| Foxconn International | 23.06 | Foxconn Holding Limited | 18.22 |
| Lin Chen Kun | 5.77 | Chang Peter C | 13.57 |
| Chang Shu Wei | 4.91 | Wellington Management Co LLP | 4.33 |
| Capital Investment Trust | 3.95 | Renaissance Technologies Corp | 2.82 |
| Bank of Singapore | 2.77 | Keane Capital Management Inc | 2.34 |
| Lin Pi-Fang | 2.75 | Blackrock Institutional Trust | 2.17 |
| Liao Shih Wen | 2.19 | Herald Investment Mgmt Ltd | 2.15 |
| Chiu Shu-Chuan | 2.09 | Cadence Capital Management | 1.87 |
| TSC Venture Management | 1.93 | Matics Computer Systems Inc | 1.82 |
| UVAT Technology — 3580 TT | | CyberTAN Technology — 3062 TT | |
| Pao Shin Intl Investment Co | 16.91 | Efg Bank Channel Islands | 3.65 |
| Yuen-Chi Li | 5.52 | Li I Intl Invest Co Ltd | 3.09 |
| Hua Lu Venture Capital Co | 4.19 | Hung Yuen Intl Invest Co | 3.09 |
| Chen Wu-Chang Trust Proper | 3.76 | Hung Yang Venture Capital | 3.09 |
| Hantech Venture Capital Co | 3.16 | Foxconn Technology Co Ltd | 3.09 |
| Hung Shen Investment Co Ltd | 2.95 | Fortis Bank Singapore Bran | 3.07 |
| Hua Chi Venture Capital | 2.7 | Nan Shan Life Insurance | 2.48 |
| Hung Chieh Invest Co Ltd | 2.61 | Hsi Teng Investment Co Ltd | 2.12 |
| LIAO MIN-FENG | 2.39 | Hsiung Chih Investment Co | 1.91 |
| Simple — 6121 TT | | BIONET — 1784 TT | |
| Franklin Resources Incorporated | 5.1 | Cheng-Che Huang | 3.78 |
| Hyield Venture Capital Co | 4.44 | Hyield Venture Capital Co | 3.46 |
| Pao Shin Intl Investment Co | 4.18 | Pao Shin Intl Investment Co | 3.46 |
| Vanguard Group Inc | 3.04 | Kun Lun Investment Co Ltd | 2.26 |
| New Labor Pension Fund | 2.6 | Wen-Cheng Chang | 1.98 |
| Fubon Life Insurance Co | 2.55 | Lin An-Meng | 1.61 |
| Tic Capital Co Ltd | 2.37 | Mei Tung Investment Co Ltd | 1.56 |
| Columbia Wanger Asset Mgmt | 2.02 | U-Tech Media Corp | 1.41 |
| Blackrock Fund Advisors | 1.78 | Cheng-Hsien Tsai | 1.28 |
| Foxconn Tech — 2354 TT | | Soly Tech — 1471 TT | |
| Hon Hai Precision Industry Co | 10.09 | Chieh Cheng | 4.66 |
| Pao Shin Intl Investment Co | 9.11 | Hsiang Cheng | 4.29 |
| Hung Yan Venture Capital | 6.14 | Hsin Hsing Investment Co | 3.93 |
| Hsin Sheng Investment Co | 5.71 | Shih Chun Intl Investment | 3.16 |
| Shih Sung Co Ltd | 2.7 | Li Hsun Intl Investment Co | 2.94 |
| Vanguard Group Inc | 2.41 | Jui Chi Investment Co | 2.49 |
| Hung Chi Intl Investment Co | 2.3 | Fubon Life Insurance Co Ltd | 2.29 |
| New Labor Pension Fund | 1.86 | Kao Wen-Lung | 1.79 |
| Advance Intl Investment Co | 1.53 | Hung Chang Investment Co | 1.23 |

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Because none of these investments crosses the threshold of 50% ownership, Hon Hai does not consolidate the revenues from its invested companies and books these companies under the equity method to receive investment income. Apart from the public companies shown in Exhibit 79, Hon Hai has controlling stake in FIH, the handset ODM, with 71% stake, and has a 7% position in Chimei Innolux, the TFT-LCD panel maker. The former is fully consolidated in Hon Hai's financials and the latter is considered an "available-for-sale" asset that does not impact Hon Hai's income statement.

To gauge the scale of investment income, we analyzed net income data for the 12 listed companies from 2008 to 2011. Exhibit 80 shows the respective net incomes and Hon Hai's total stake in individual companies. By summing up investment income from individual investments, we reach an aggregated investment income for each fiscal year. From 2008 to 2011, we saw a significant increase in the investment income from the listed companies from TWD 1.6 billion to TWD 4.2 billion.

How material is the investment income that is contributed by the listed companies? Exhibit 81 shows a brief consolidated income statement of Hon Hai

with a breakdown of the non-operating income into investment income and other non-operating income. When we compare the investment income from public companies with the total investment income (see Exhibit 82), we can fully account for the investment income as coming from the listed subsidiaries in 2009 and 2010. However, the total investment income of TWD 3.2 billion in 2011 was below the overall income contributed by the public companies of TWD 4.2 billion. In other words, Hon Hai's investments in the non-public companies incurred material losses of roughly TWD 1 billion, which remains unexplained.

Exhibit 80 Historical Net Income of Hon Hai's Invested Public Companies

| Ticker | Company Name | Main Business | HH Stake (%) | Net Income (TWD mil.) | | | |
|---|---------------------------------|------------------------------------|-----------------|-----------------------|--------|---------|--------|
| | | | | FY2008 | FY2009 | FY2010 | FY2011 |
| Subsidiaries | | | | | | | |
| 2038 HK | Foxconn International Holdings | Handset ODM | 71% | 3,972 | 1,235 | (6,366) | 2,206 |
| Company Under Equity Methods | | | | | | | |
| 4958 TT | Zhen Ding Tech | Total solution to PCB | 43% | (1,573) | 1,184 | 711 | 2,356 |
| 4961 TT | Fitipower Integrated Technology | Display driver IC | 38% | (161) | 13 | 194 | 101 |
| 3149 TT | G-tech | Processing of glass substrates | 31% | (144) | (157) | 477 | 842 |
| 2354 TT | Foxconn Tech | Casing, heat sinks | 30% | 6,203 | 6,263 | 7,610 | 8,010 |
| 2328 TT | Pan-International Industrial | Electronic components EMS | 27% | 681 | 635 | 330 | (242) |
| 3508 TT | Ways Technical Corp | Plastic surface processing | 21% | 147 | 8 | 95 | 834 |
| AFOP US | Alliance Fiber Optic | Fiber optic components and modules | 20% | 133 | 46 | 175 | 134 |
| 3580 TT | UVAT Technology | Vacuum system components | 17% | 145 | 31 | 16 | (65) |
| 3062 TT | CyberTAN Technology | Broadband communications | 9% | 367 | 666 | 369 | 656 |
| 6121 TT | Simplo | Battery | 9% | 2,354 | 2,458 | 3,329 | 3,688 |
| 1784 TT | BIONET | Bio-tech | 7% | 58 | 101 | (39) | 23 |
| 1471 TT | Soly Tech | Power supply related products | 3% | (293) | 193 | (128) | (95) |
| Total investment income from public companies | | | | 1,586 | 2,828 | 3,284 | 4,233 |

Note: Hon Hai's stake presented here include stakes controlled by Hon Hai's subsidiaries.

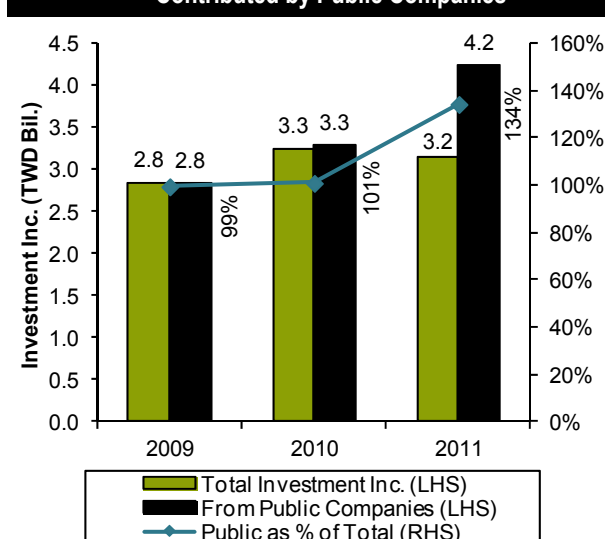
Source: Capital IQ and Bernstein analysis.

Exhibit 81 Hon Hai's Consolidated Income from 2009 to 2011

| TWD million | 2009 | 2010 | 2011 |
|------------------------|------------------|------------------|------------------|
| Revenue | 1,959,182 | 2,997,205 | 3,452,681 |
| COGS | 1,772,629 | 2,753,003 | 3,186,299 |
| Gross Profit | 186,553 | 244,202 | 266,382 |
| Gross Margin % | 9.5% | 8.1% | 7.7% |
| Opex | 103,064 | 158,056 | 183,537 |
| Op. Inc. | 83,489 | 86,146 | 82,845 |
| Op. Margin % | 4.3% | 2.9% | 2.4% |
| Non-op Inc. | 10,367 | 14,481 | 27,442 |
| Investment Inc. | 2,842 | 3,254 | 3,152 |
| Other Non-op Inc. | 7,525 | 11,228 | 24,290 |
| Non-op Expense | 5,825 | 9,150 | 7,751 |
| Net Inc. | 76,380 | 75,473 | 81,935 |
| Net Margin % | 3.9% | 2.5% | 2.4% |
| Profit to Shareholders | 75,685 | 77,155 | 81,591 |
| Minority Interests | 695 | 1,682 | 344 |

Source: Capital IQ and Bernstein estimates and analysis.

Exhibit 82 Percent of Hon Hai's Investment Income Contributed by Public Companies



Source: Capital IQ and Bernstein estimates and analysis.

Exhibit 83 shows the investee disclosures that Hon Hai published in its annual report regarding the main investments under the equity method. Out of the top 13 companies listed, we see eight companies that overlap with the public companies listed in Exhibit 80. Because there is limited information regarding the financial performance of private companies invested in by Hon Hai and its affiliates, we are unable to pinpoint the source of investment losses in 2011 by individual companies, especially given the large scale of Hon Hai's investment operation.

But we think Mediamarkt (China) and Uer Holding might be among the companies that incurred losses in 2011. Hon Hai's ambitious retailing business in China did not go as smoothly as it originally expected and could have initially required significant investments to kick off the ground operation. This may explain the implied loss in investment income in 2011.

| Exhibit 83 | | Hon Hai's Long-Term Equity Investments Accounted for Under the Equity Method and Book Value | | | |
|--|----------------------|--|---------------|---------------|---------------|
| Investee Company | Ownership (%) | 2008 | 2009 | 2010 | 2011 |
| Foxconn Technology Co., Ltd. | 30% | 11,457 | 14,934 | 16,299 | 16,681 |
| Zhen Ding Technology Holding Ltd. | 43% | 3,722 | 5,253 | 5,273 | 7,645 |
| Pan International Industrial Corporation | 27% | 3,058 | 3,829 | 3,694 | 2,797 |
| Simplo Technology Co., Ltd. | 31% | 1,593 | 1,721 | 1,886 | 2,074 |
| G-Tech Optoelectronics Corporation | 9% | 1,090 | 705 | 1,211 | 2,440 |
| ESON Precision. Ind. Co. Ltd. | 25% | - | 1,113 | 1,144 | 1,345 |
| Ways Technical Corp., Ltd. | 29% | 1,047 | 1,148 | 1,123 | 1,141 |
| Ampower Holding Limited - Cayman | 45% | 753 | 1,104 | 1,009 | 942 |
| Mediamarkt (China) International | 21% | - | - | 911 | 1,495 |
| Uer Holdings Corporation-Cayman | 42% | - | - | 672 | 697 |
| CyberTAN Technology, Inc. | 11% | 316 | 549 | 533 | 583 |
| Alliance Fiber Optic Products Inc. | 20% | 482 | 314 | 321 | 387 |
| Diabell Co., Ltd. | 20% | 253 | 331 | 240 | 236 |
| Others | | 1883,224 | 1,668 | 1,615 | 1,797 |
| Total | | 25,655 | 32,668 | 35,932 | 40,260 |

Note: Public companies shaded in gray.

Source: Corporate reports and Bernstein analysis.

Overall, the key take-away from this exercise is that we have a better understanding of the trends for Hon Hai's investment income based on public filings and estimates of the 12 listed companies in the company's portfolio. Assuming normal business operations, we can use the estimated investment income from the 12 public companies as a good approximation of Hon Hai's investment income.

Sources of Hon Hai Other Non-Operating Income — A Look at FX-Related Income

The biggest sources of non-operating income are interest income and foreign exchange gains, both of which we believe can be attributed to foreign exchange hedging operations.

We have observed that Hon Hai's cash and short-term loans increased rapidly over the past three years. From our understanding, Hon Hai deposits its cash accumulation in renminbi to yield a higher return — kept high by China's goal to reduce inflationary pressure. Hon Hai uses these deposits as collateral to borrow in U.S. dollar terms to fund operations (borrowing costs in U.S. dollars are much lower), as shown in Exhibit 84.

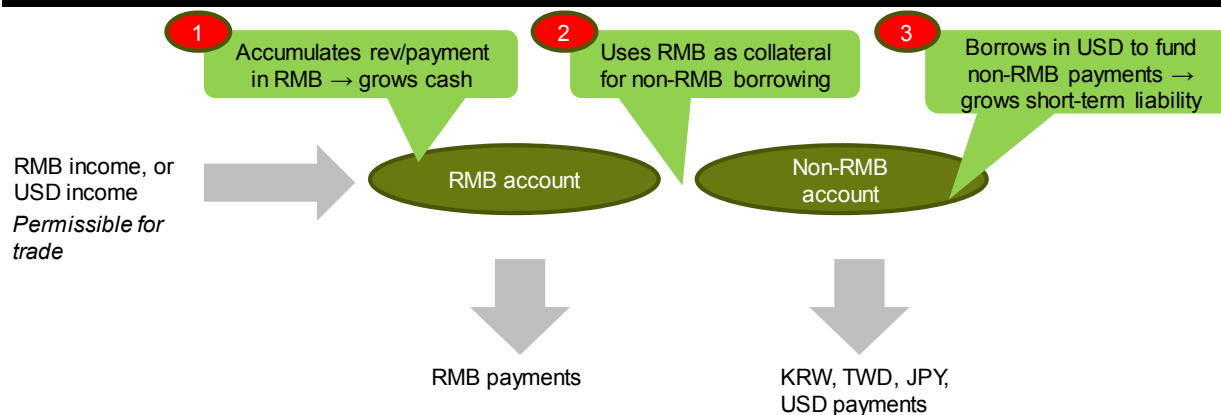
The renminbi is not convertible. As such, only physically backed trades would permit renminbi to be converted into foreign currencies. Hon Hai can only unwind its renminbi into non-renminbi operations through regular operations and not financial payment transfers (if not through SAFE). To exchange renminbi into other currencies, Hon Hai would need to have relatively more receipts in non-renminbi currencies and payments in renminbi to drawdown the TWD 123 billion of accumulated renminbi.

We estimate Hon Hai's renminbi payments to be about ~10-15% of COGS excluding depreciation (5% labor cost and 5-10% renminbi-related/China-sourced inputs), or roughly TWD 69 billion per quarter. Alternatively, the renminbi can also be spent on capex in China. Currently, TWD 100 billion translates to about 1.0x of LTM capex.

On the revenue side, we make the assumption, based on general corporate accounting practices in China, that Hon Hai can maintain separate U.S. dollar accounts (even in China) instead of converting all its foreign receipts into renminbis. Were that the case, Hon Hai, which receives most of its currency (about TWD 700 billion a quarter) in U.S. dollars, would be able to reduce its renminbi accumulation fairly easily if it so chose, except for a few China accounts.

Exhibit 84

Structure of a Foreign Exchange Transaction from the Renminbi Into Other Currencies



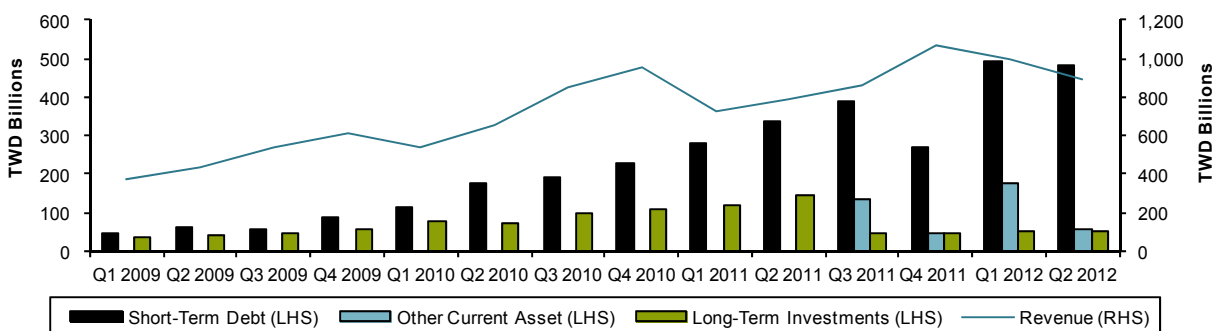
Source: Bernstein estimates and analysis.

How Hon Hai books these transactions has been a bit of a moving target. In third-quarter 2011, we noticed a reclassification of Hon Hai's renminbi hedges from long-term investments to current assets, which may indicate a shortening of the duration of the renminbi investments, in expectation of a reduction of the rate of renminbi appreciation. We also observe a TWD 100 billion drop in "Funds and Investments" (what we term "Long-Term Investments") between the second and third quarters of 2011, and a concurrent TWD 137 billion increase in "Other Financial Assets - Current" (see Exhibit 85 and Exhibit 86) in third-quarter 2011.

In fourth-quarter 2011's financials, the company reported TWD 46.7 billion of fixed deposits (down from TWD 137 billion) that were used as collateral for short-term loans, although this amount went up in first-quarter 2012 to TWD 177 billion. This implies that Hon Hai's renminbi hedges now are uniformly composed of fixed deposits of less than one year in duration, which may not have been the case in second-quarter 2011. This is completely consistent with Hon Hai's treasury taking a shorter-duration stance on its balanced RMB-US\$ book as the Chinese economy slows and renminbi appreciation is no longer a "sure thing."

Exhibit 85

Scale of Hon Hai's Renminbi Hedging



Source: TEJ, company disclosures and Bernstein analysis.

Exhibit 86 Details of Hon Hai's Current Assets and Long-Term Investments

| Acct. code | Funds and Investments (TWD mil.) | Q4 2008 | Q4 2009 | Q4 2010 | Q1 2011 | Q2 2011 | Q3 2011 | Q4 2011 | Q1 2012 | Q2 2012 |
|------------|---|----------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 1450 | Available-for-sale financial assets - non-current | 8,088 | 17,057 | 13,736 | 10,803 | 7,761 | 4,901 | 4,790 | 5,653 | 9,217 |
| 1480 | Financial assets carried at cost - non-current | 1,268 | 1,501 | 3,039 | 3,426 | 3,505 | 3,888 | 4,047 | 3,754 | 4,058 |
| 1421 | Equity investments under the equity method | 25,655 | 32,688 | 35,932 | 36,004 | 36,064 | 36,917 | 40,260 | 40,472 | 40,142 |
| 1425 | Prepayments for long-term investments | - | 427 | 31 | 31 | 88 | 124 | 2 | 37 | 26 |
| 1440 | Other financial assets - non-current | 119 | 3,551 | 58,319 | 69,382 | 99,953 | 1,042 | 24 | 24.2 | 23.1 |
| 14XX | Funds and Investments "LT Inv." | 35,129 | 55,223 | 111,057 | 119,646 | 147,371 | 46,872 | 49,122 | 49,940 | 53,466 |
| | Current Assets (TWD mil.) | Q4 2008 | Q4 2009 | Q4 2010 | Q1 2011 | Q2 2011 | Q3 2011 | Q4 2011 | Q1 2012 | Q2 2012 |
| 1100 | Cash and cash equivalents | 99,142 | 177,543 | 254,241 | 280,533 | 296,963 | 358,157 | 329,794 | 422,699 | 637,339 |
| 1310 | Financial assets at fair value - current | 152 | 321 | 85 | 70 | 48 | 239 | 70 | 1,619 | 140 |
| 1320 | Available-for-sale financial assets - current | 693 | 1,279 | 970 | 807 | 859 | 829 | 674 | 704 | 672 |
| 1140 | Accounts receivable, net | 253,211 | 288,648 | 391,140 | 371,803 | 376,370 | 360,435 | 450,758 | 438,218 | 413,351 |
| 1150 | Accounts receivable, net - related parties | 14,138 | 18,958 | 18,679 | 15,749 | 11,321 | 19,227 | 25,292 | 12,177 | 14,649 |
| 1160 | Other receivables | 18,351 | 24,077 | 30,893 | 28,268 | 28,054 | 34,321 | 34,680 | 22,965 | 32,276 |
| 1190 | Other financial assets - current | - | - | - | - | - | 136,984 | 46,742 | 177,005 | 58,417 |
| 120X | Inventories, net | 166,725 | 180,980 | 259,384 | 308,864 | 323,578 | 402,067 | 380,522 | 357,508 | 309,970 |
| 1260 | Prepayments | 3,663 | 4,521 | 5,121 | 6,807 | 7,121 | 8,849 | 7,120 | 7,189 | 5,480 |
| 1286 | Deferred income tax assets - current | 2,673 | 3,248 | 4,034 | 3,579 | 5,522 | 5,521 | 8,016 | 7,255 | 6,596 |
| 11XX | Current Assets | 558,749 | 699,574 | 964,548 | 1,016,481 | 1,049,836 | 1,326,629 | 1,283,668 | 1,447,338 | 1,478,889 |

Source: TEJ and Bernstein analysis.

Both ends of the lending and deposits are presumably left in a range of fairly liquid instruments to ease unwinding (e.g., term deposits). These transactions can perhaps be conducted within a single bank (one onshore bank and another in the bank's Hong Kong international branch), using some form of letter of credit to collateralize, with the bank taking on the convertibility risk. We can't ascertain whether Hon Hai is a net renminbi recipient or payee — but in the case of it being a renminbi payee under an appreciating renminbi environment, this trade would act also as a renminbi hedge for future operations.

As we believe the gains or losses from Hon Hai's foreign exchange hedge operations are booked in other non-operating income, we have traced back historical filings and have identified the potential hedge amount to reconstruct the gains and losses by quarters. While we looked through the financial statements, we also noticed a significant amount of liabilities outside the balance sheet that are denominated in foreign currencies. The fluctuation of foreign exchange rates should equivalently impact the fair value of those liabilities and be reflected in the income statement.

Exhibit 87 details the two parts of a calculation we attempted — for the hedge operations and the liabilities in foreign currencies — in order to measure the gains through foreign exchange fluctuations. Assuming the hedge is conducted between the renminbi in assets and the U.S. dollar and euro in liabilities, we estimate a gain of TWD 923 million and TWD 5.3 billion for 2010 and 2011 respectively, for the U.S. dollar- plus euro-denominated liabilities. We find the RMB/US\$ hedge has been consistently generating gains while the euro hedge likely booked a loss for first-half 2011. Overall, we estimate non-operating income of TWD 3.2 billion and TWD 8.0 billion for 2010 and 2011, respectively, from foreign exchange fluctuations. For 2012, our analysis shows if Hon Hai has maintained its hedging position, it would have generated gains of TWD 2.3 billion for first half 2012.

Comparing our estimates of 2010 and 2011 against the reported gains from foreign exchange effects, we find our estimates are roughly 10% above or below the actual, indicating a relatively good approximation. A potential reason for the discrepancy could be that Hon Hai was engaged in different currency hedges other than the U.S. dollar that could have yielded higher or lower returns over the period.

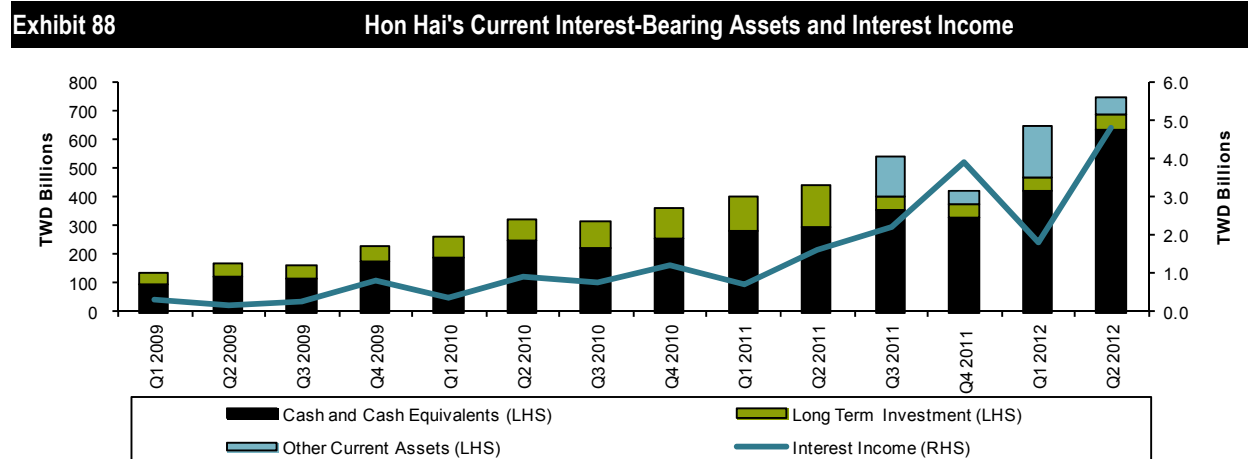
Given the significant amount of underlying assets involved in Hon Hai's US\$/RMB and €/RMB operations, there are risks associated with renminbi depreciation, interest rate volatility, RMB-US\$ conversion and regulatory risk. However, we do not believe such risks would be materially impacting Hon Hai's bottom line. As long as there is sufficient buffer with working capital and money committed into these short-term instruments, then there should not be any risk associated with illiquidity.

One last major contributor to non-operating income is the material expansion of the short-term deposit renminbi book used as the asset-side of the foreign exchange hedge. These deposits generate interest income, and this interest income has more than quadrupled since 2009, in concert with the growing renminbi deposit base. Exhibit 88 shows Hon Hai's current and liquid asset holdings, and the interest income on a quarterly basis. As the deposit base tilted toward higher-yielding renminbi deposits in 2011, the blended interest rate rose materially, driving a structural increase in interest income.

However, it is interesting to "unpack" Hon Hai's profitability and find a material fraction of that (8.8% of pretax income in 2011) is coming from purely financial foreign exchange-related operations. It seems that Hon Hai is as good at managing its treasury operations as it is its manufacturing business. As expected, this aspect is of concern to investors, but shedding light on how Hon Hai operates helps understand the potential downsides to these operations.

| Exhibit 87 Bernstein's Estimation of Hon Hai's Source of Non-Operating Income | | | | | | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| TWD Million | Q12010 | Q22010 | Q32010 | Q42010 | Q12011 | Q22011 | Q32011 | Q42011 | Q12012 | Q22012 |
| Estimated hedge amount | 23,559 | 23,482 | 45,768 | 58,319 | 69,382 | 99,953 | 136,984 | 46,742 | 177,005 | 58,417 |
| % of current asset | 3.1% | 2.5% | 4.7% | 6.0% | 6.8% | 9.5% | 10.3% | 3.6% | 12.2% | 4.0% |
| % of total asset | 2.1% | 1.8% | 3.4% | 4.2% | 4.8% | 6.5% | 7.8% | 2.7% | 10.2% | 3.4% |
| Estimated RMB/US\$ hedge gains | 11 | 11 | 372 | 529 | 1,941 | 1,204 | 1,734 | 448 | 1,334 | (186) |
| Total | | | | 923 | | | | 5,327 | | 1,148 |
| Liabilities outside the balance sheet | | | | | | | | | | |
| US\$-denominated liabilities (mil.) | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 0.91 | 0.86 | 0.74 | 0.74 |
| €-denominated liabilities (mil.) | - | - | 0.5 | 0.71 | 0.71 | 0.71 | 0.76 | 0.53 | 0.48 | 0.48 |
| Estimated gain | 153 | 16 | 252 | 1,818 | 782 | (791) | 1,289 | 1,406 | 865 | 316 |
| US\$ | 153 | 16 | 264 | 274 | 854 | 360 | 349 | 248 | 165 | (71) |
| € | - | - | (12) | 1,544 | (72) | (1,151) | 940 | 1,157 | 700 | 387 |
| Total | | | | 2,239 | | | | 2,685 | | 1,181 |
| Contribution to non-op income | | | | 3,162 | | | | 8,013 | | 2,329 |
| Reported foreign exchange gains | | | | 2,890 | | | | 8,981 | | 1,254 |
| % of reported | | | | 109% | | | | 89% | | 186% |
| Average Exchange Rate | | | | | | | | | | |
| RMB/US\$ | 6.83 | 6.83 | 6.77 | 6.77 | 6.58 | 6.50 | 6.42 | 6.36 | 6.31 | 6.33 |
| Change | 0.0% | 0.0% | -0.8% | -0.9% | -2.8% | -1.2% | -1.3% | -1.0% | -0.8% | 0.3% |
| RMB/€ | 9.45 | 8.70 | 8.75 | 8.98 | 9.01 | 9.36 | 9.08 | 8.57 | 8.28 | 8.12 |
| Change | -0.7% | -8.0% | 0.6% | -5.7% | 0.2% | 3.9% | -3.0% | -5.6% | -3.4% | -1.9% |

Source: Corporate reports and Bernstein estimates and analysis.



Source: TEJ, company disclosures and Bernstein analysis.

Where Is Hon Hai Precision Going?

Overview

As discussed in previous chapters, the opaqueness and overly complex organizational structure of Hon Hai and its group companies have made it difficult for investors to thoroughly understand current operations and financials. The lack of transparency also makes forecasting Hon Hai's performance a challenge — in particular, sorting out the major investment controversies (including this opaque attitude) that make it a difficult stock to own.

Yet, Hon Hai, as the predominant player in the EMS/ODM space and a key partner in the entire supply chain in the IT hardware industry, should be an important component of any tech-focused investment portfolio. The best we can do — which we do in this chapter — is lay out the key investment controversies surrounding the company and the stock, analyze each of them and offer our views.

Despite the murky transparency of Hon Hai's operations, investors as well as the company have noted recent unsatisfactory performance, which makes investors nervous. The company has been humbled by hubris and getting ahead of itself — especially the miscalculations on how fast costs could be extracted from the operations, how quickly and efficiently it could "double down" in Chengdu and Western China, and how well it could manage an increasingly global and sprawling operation.

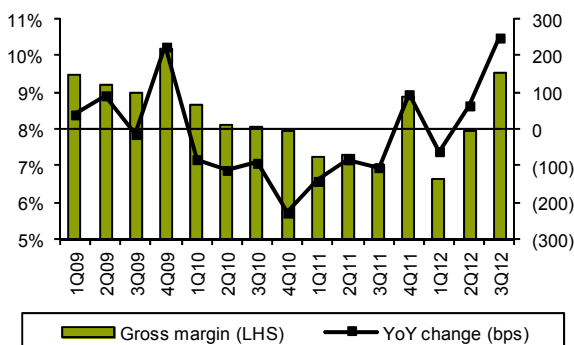
Of all the controversies plaguing Hon Hai, the one that investors appear to pay closest attention to is whether the margin expansion story is over. Recent exponential growth in revenues has been accompanied by margin contraction, creating doubts about the company's ability to manage its ever-expanding and complex operations.

We believe the contraction in margins by and large has to do with three factors: Hon Hai's increasing involvement in manufacturing Apple's new products; the company's continued vertical and deep expansion into the supply chain; and the rising labor costs in China creating a headwind for the COGS reduction efforts. (One way to offset this margin contraction is through automation and the substitution of capital for labor in order to limit the impact of wage increases on costs, which is a topic we explore in a subsequent chapter.)

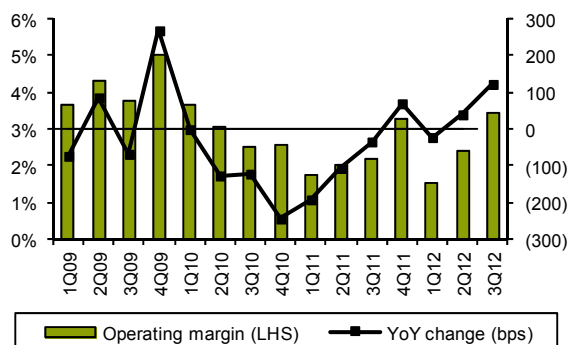
Overall, we cannot underestimate the ruthlessness and speed with which Hon Hai can turn around. Labor force rationalization, improvements in supply chain management for the far-flung empire, and simply stopping doing some things it should not be doing are all actions under the company's direct and immediate control. Even though the firm remains controversial and hard to understand, our analyses point to a regime where revenue growth and some margin expansion are possible, leading to continued profit growth even in the current environment.

Is Operating Margin Erosion Structural or Purely a Temporary Condition?

Although we believe that Hon Hai has a favorable cost position because of its vertical integration into the supply chain, investors have become concerned about the deterioration in Hon Hai's margins during the last several quarters. The contraction is apparent in both reported gross and operating margins (see Exhibit 89 and Exhibit 90). Although the margin compression in 2012 was less than that in 2011 and margins overall have stabilized and even have begun to rise, we find that the new margin levels have been much lower than those of 2010 — with the general trend for the two years being toward margin deterioration.

Exhibit 89 Hon Hai: Quarterly Gross Margin Trends

Source: Corporate reports and Bernstein analysis.

Exhibit 90 Hon Hai: Quarterly Operating Margin Trends

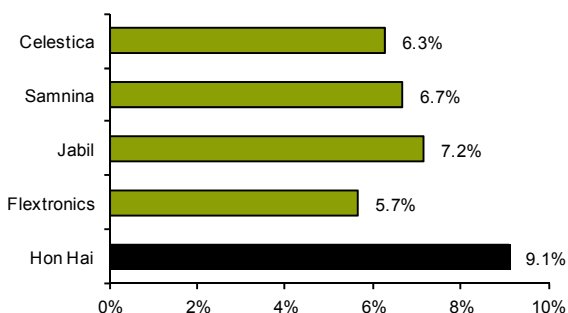
Source: Corporate reports and Bernstein estimates and analysis.

We attribute this relative deterioration of Hon Hai's margins to four key factors — three of which are temporal, and one which we believe is permanent and systematic to the EMS and ODM segment.

- **A pricing strategy** (impacting gross margins) that was predicated on expanding market share through lower pricing, which would be "made up" by ex-post cost reductions as product volume picked up (as we discussed in previous chapters). This strategy — which worked quite well in the past, when the revenue growth more than made up for the gross margin compression — has broken down as Hon Hai is having difficulty (like the rest of the segment) extracting costs and its "pricing forward" model is met with slower-moving cost reductions. The situation gets a bit sticky given the growing alliance between Hon Hai and Apple, which has been reported to design products that are difficult to make and have low yields. We believe this pricing strategy has run its course, and Hon Hai is finding alternative ways to maintain margin through more disciplined pricing, higher control of the component supply chain and continued efficiency gains.
- **An expansion strategy** (impacting operating expenses) predicated on duplication of facilities (e.g., inland investment in Chengdu and Chongqing) in 2011 and first-half 2012; increase of the global footprint; entry into unrelated business segments, such as their retail logistics and support operations; and increases in R&D. All of these expenditures can be rationalized or controlled better as Hon Hai learns to more successfully manage its operations in this context. We believe the additional costs of relocating to inland China will be offset in the medium term by tax benefits and lower employee turnover rates. However, the increasing labor costs across China, particularly after the FLA audits, remains a headwind for Hon Hai's margins going forward, especially given the unfavorable economics of substituting capital for labor.
- **The strategy of vertical integration in the supply chain**, which can be a double-edged sword. On the one hand, Hon Hai has been more profitable than its ODM/EMS peers because it has been able to capture higher margins from non-key component procurement within its group companies and associates (see Exhibit 91 through Exhibit 94). On the other hand, some investments have not proved to be good ideas. Even though the majority of the acquisitions or investments in suppliers are relatively small in size and remain in Taiwan, Hon Hai's recent investment plans for Sharp and its panel business unit have become a controversy, as the panel industry and the Japanese conglomerate are in a weak competitive and economic condition.
- **The end of 5-6% operating margins** for the EMS and ODM segments. We believe a new reality has set in — one where the inability to reduce costs places a floor on how much farther ASPs can drop and how much pricing power EMS and ODM companies have. We believe the "new normal" is one of at most 3% operating margins, which is within Hon Hai's capabilities if it rationalizes its

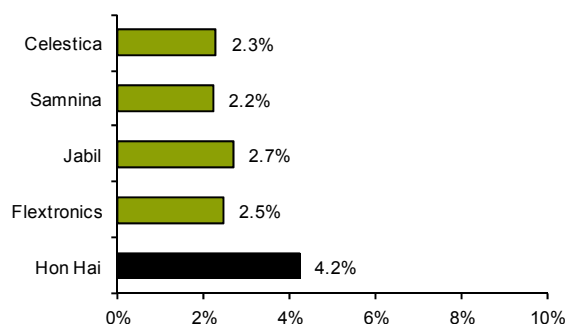
operations and improves its pricing accordingly, but is likely to take longer than expected to stabilize close to those levels.

Exhibit 91 Hon Hai's 2005-10 Average Gross Margins vs. EMS Competitors



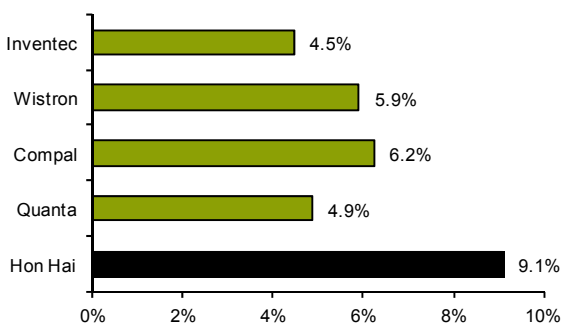
Source: Capital IQ and Bernstein analysis.

Exhibit 92 Hon Hai's 2005-10 Average Operating Margins vs. EMS Competitors



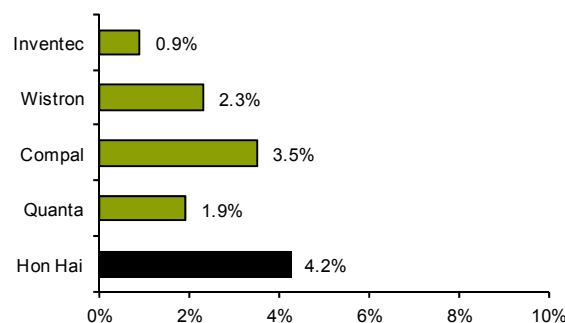
Source: Capital IQ and Bernstein analysis.

Exhibit 93 Hon Hai's 2005-10 Average Gross Margins vs. ODM Competitors



Source: Capital IQ and Bernstein analysis.

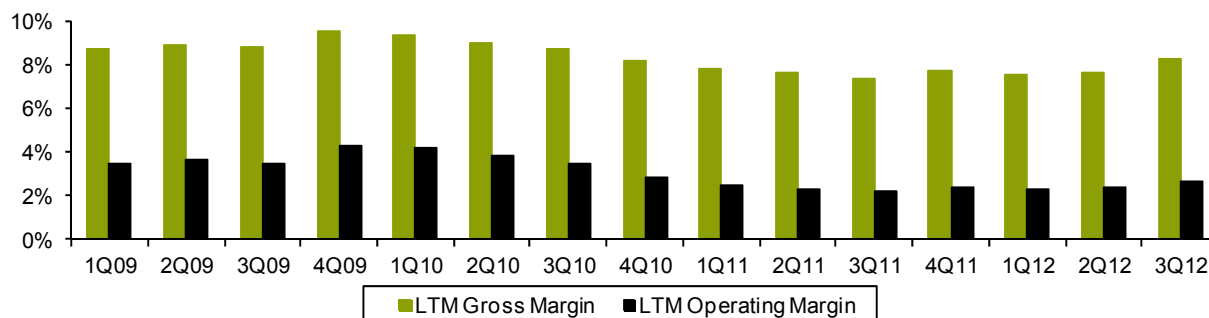
Exhibit 94 Hon Hai's 2005-10 Average Operating Margins vs. ODM Competitors



Source: Capital IQ and Bernstein analysis.

Overall, we believe investors are skeptical and are not giving "credit" to the fact that Hon Hai has actually managed to stabilize margins, with some evidence that margins are rising. Quarter-over-quarter margin volatility makes it difficult to see the trend, but smoothing margins on a LTM trailing basis reveals that both gross and operating margins are slowly rising (see Exhibit 95).

Exhibit 95 Hon Hai's Trailing LTM Gross and Operating Margins



Source: Corporate reports and Bernstein analysis.

In the following sections, we highlight five key controversies that we think are worth watching in the near and medium term as catalysts for Hon Hai's financial performance. An in-depth analysis of each controversy will be presented in the following chapters.

Controversy No. 1: The Changing Dynamics of the Hon Hai and Apple Relationship

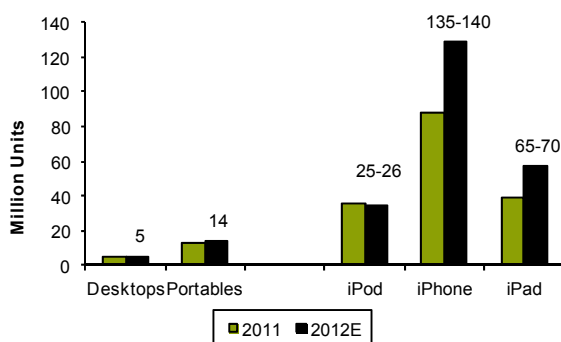
The rise of Hon Hai cannot be viewed separately from the enormous success of Apple. With revenues of over US\$120 billion in 2011 and likely growth of 13-15% for 2012, Hon Hai has delivered tremendous top-line growth over the decade and established itself as the largest EMS globally.

A predominant driver of Hon Hai's growth has been Apple, the strategic partner that contributed more than one-third of Hon Hai's revenue in 2011. Hon Hai's relationship with Apple started almost 30 years ago, when Hon Hai was still mainly a supplier of connectors and other mechanical components to Apple's in-house manufacturing operations. Hon Hai integrated forward into manufacturing, logistics and the supply chain at the same time Apple shifted to an outsourcing manufacturing model, thus becoming the natural partner for Apple. Apple's success in the iPhone and iPad has made Foxconn, Hon Hai's brand, widely known.

Based on the estimates from Bernstein's U.S. IT Hardware team, Apple is expected to ship around 135-140 million and 65-70 million units of iPhones and iPads, respectively, in 2012, which represents a significant increase from ~93 million and ~40 million, respectively, in 2011 (see Exhibit 96). Assuming Hon Hai captured 100% production of the iPads and over 90% production of the iPhones in 2011, we estimate Hon Hai manufactured 83 million iPhones and 38 million iPads in 2011.

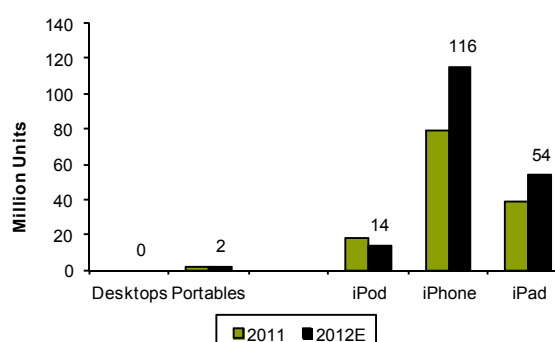
For 2012, Hon Hai has probably lost a proportion of both orders (~10-15% of iPhone orders to Pegatron and ~10% of iPad orders to a second EMS or ODM), as Apple seeks to diversify its manufacturing base. For PC manufacturing, Pegatron and Quanta are reportedly making Apple's MacBook and MacBook Pro, respectively. Hon Hai reportedly also engages in MacBook manufacturing, although the size of the order is much smaller compared to the former two players. Under these assumptions, we estimate Hon Hai will likely manufacture 116 million iPhones and 54 million iPads in 2012 (see Exhibit 97).

Exhibit 96 Total Units Shipment of Apple Products



Source: Corporate reports and Bernstein estimates.

Exhibit 97 Apple Products Manufactured by Hon Hai

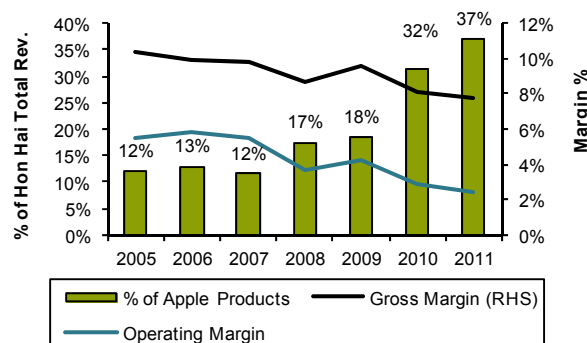


Source: Bernstein estimates.

Despite Hon Hai gaining an increasing proportion of Apple-related revenue, top-line growth driven by Apple does not necessarily translate into improved profitability, according to our analysis. From a company-level perspective, Hon Hai's margin compression occurred over time and the depressed margins are not likely to return to the pre-Apple era (see Exhibit 98). In fact, Apple's dependence on Hon Hai for manufacturing does not seem to translate into improved margins for Hon Hai even as Apple has improved its operating margin from 18.1% in first-quarter 2008 to 30.4% in third-quarter 2012. This poses a notable contrast to Hon

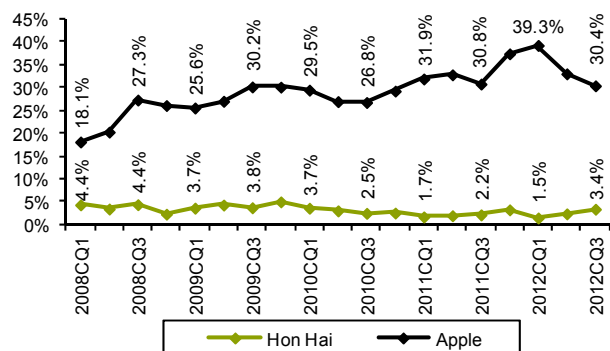
Hai's profitability: Hon Hai has undergone margin compression from 4.4% to an estimated 3.4% during the same period (see Exhibit 99).

Exhibit 98 Hon Hai's Margin Trends and Apple-Related Revenue as Percentage of Hon Hai's Total Revenues



Source: Corporate reports and Bernstein estimates.

Exhibit 99 Operating Margin Comparison of Hon Hai and Apple



Source: Corporate reports and Bernstein estimates.

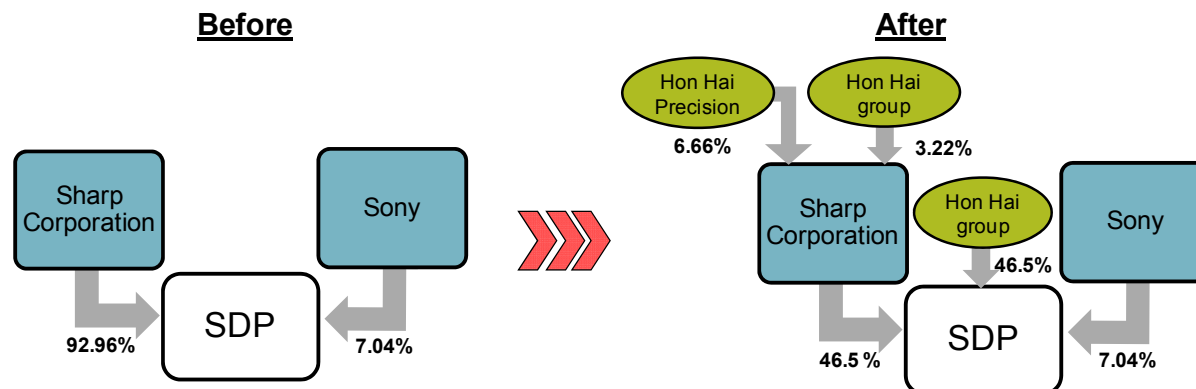
Given the launch of new Apple products and growing unit shipments, Hon Hai is likely to increase the proportion of Apple-related products within its overall portfolio, to around 43% for 2012 and onward. What is unknown, yet critical to investors, is whether Hon Hai can expand its gross margins, particularly from Apple-related products.

If the margin expansion is feasible given Hon Hai's current integrated supply chain, what are the key drivers for margin expansion and how much is the upside? We believe it is possible for Hon Hai to increase its margin by increasing the proportion of components supplied by Hon Hai as opposed to being provided by Apple. The financial upside could be particularly meaningful and structural given the increasing proportion of revenues from Apple in the coming years, and we incorporate such a view in our model and investment thesis for Hon Hai. Further details on our analysis can be found in the chapter, "Hon Hai and Apple: A Mutually Beneficial Relationship or Unequal Balance of Power?"

Controversy No. 2: Hon Hai's Venture Into Display Panels

Hon Hai's supply chain vertical integration and its unique cross-holding investment structure results in its complex organizational structure. Despite limited disclosure by the company, our analysis shows that Hon Hai's two investment holding subsidiaries, key manufacturing subsidiaries and chairman and CEO, Terry Guo, invest in component makers.

The recent potential investment in Sharp (see Exhibit 100), in particular, has attracted much media and investor attention for two reasons. First, the proposed transactions involve several key subsidiaries and Hon Hai Chairman Terry Guo in both the Sharp parent company and the display unit (SDP). Second, Sharp's share price dropped materially following the announcement, causing both parties to renegotiate the transaction details. Considering the uncertainty of the final transaction following the material decline in Sharp share price, we conduct an analysis on Hon Hai's planned investment and the potential economics if the deal went through in the chapter, "Hon Hai Precision's Venture Into the Panel Industry: A Good Idea?"

Exhibit 100 Structure of the Sharp Transaction

Source: Company disclosures and Bernstein analysis.

Hon Hai group's investment has two separate elements, which have quite different risk profiles. On one side is the planned investment made primarily by Hon Hai Precision, which is a direct stake in Sharp Corporation. On the other side, Hon Hai-related entities (but *not* Hon Hai Precision) have invested directly into SDP, whose main asset is the Sakai G10 plant.

The "crown jewels" of Sharp's display business are the Kameyama fabs and the Sakai fab. The Kameyama fabs were some of the earliest large panel fabs, and in the beginning they were some of the most advanced fab operations. Both Kameyama fabs were recently decommissioned and retrofitted with leading-edge backplane technologies, including Indium-Gallium-Zinc Oxide (IGZO) and LTPS, primarily for high-resolution displays. The Kameyama fabs are re-starting during 2012 and early 2013.

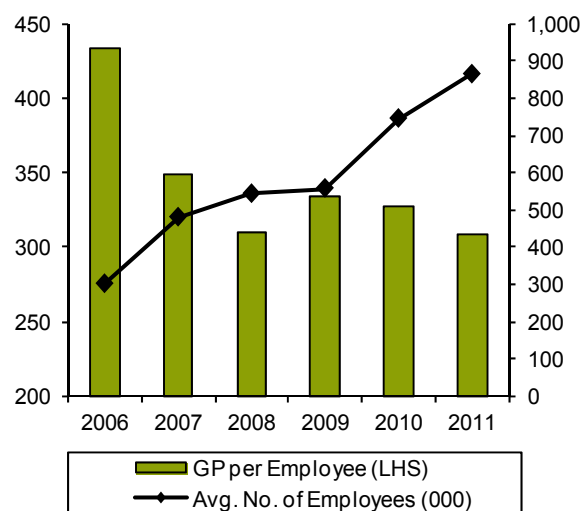
The SDP investment is done not by Hon Hai Precision directly, but by Hon Hai group companies, giving Hon Hai group a 46.5% stake in SDP. Together with the potential "implied" share of the Hon Hai group investment into Sharp, Hon Hai group investors (primarily Chairman Guo) effectively control SDP.

Above all, everything has a price and investors are interested in whether Hon Hai's potential investments make economic sense. Based on our calculations, the Sakai G10 plant alone is worth about US\$3.2 billion at 90% utilization, and hence a 46% stake in this stream of cash flows would be worth approximately US\$1.5 billion, assuming the fab is running at high utilization. The Hon Hai group paid US\$798 million for this stake, so even accounting for the current 50% utilization rate, the price paid is close to "fair." Any upside in utilization (both in output and margin expansion) of the Sakai fab will be pure profit for Hon Hai group investors.

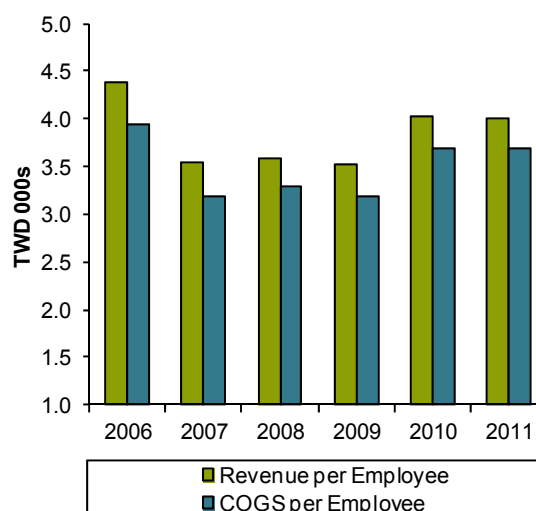
Nonetheless, downside risks do exist, other than the significant decline in share price that negatively impacts Hon Hai's non-operating income (which has been unwound after the renegotiation of the deal). For example, Hon Hai is likely to be unable to capitalize on the "riches" that Sharp may offer, the collaboration that is desired or expected may not materialize, or the "synergies" from the investment may not be realized.

Controversy No. 3: The Continued Labor Cost Increases in China

Labor costs, one of the key factors in determining Hon Hai's overall COGS (about 10-15% of the cost structure under an EMS company's control, depending on the product), is also among the most-discussed topics given the rising labor costs and tightening labor policies in China. Exhibit 101 and Exhibit 102 show rough productivity measures for Hon Hai, which are either stable (gross profit per employee) or improving (revenue per employee); the denominator, number of employees, has seen a massive rise between 2009 and 2010, as Hon Hai rapidly grew its top line, particularly for the manufacture of Apple products.

Exhibit 101 Hon Hai's Gross Profit per Employee Trends (NT\$)

Source: Corporate reports and Bernstein analysis.

Exhibit 102 Hon Hai's Revenue per Employee and COGS per Employee Trends

Source: Corporate reports and Bernstein analysis.

After a spate of well-publicized suicides and industrial accidents in 2010-11, Hon Hai materially increased salaries and made improvements in working conditions in an attempt to both defuse and remedy the situation. Although the media and the court of public opinion were placated for a period, pressure on Apple from U.S. labor rights institutions and the media led Apple to finally agree to meet the conditions imposed by the Fair Labor Association (FLA) in order to join the group. As a result of Apple joining the FLA, Hon Hai was required to participate in a comprehensive audit by the FLA on working conditions at Apple-related Hon Hai factories.

The audit found more than 50 different violations of FLA standards, which are expected to be remedied in a timeline ranging from immediately to two years, depending on the severity of the violation and the difficulty in remedying the situation. As of June 2012, FLA has conducted its second audit and verified the progress of some of the recommendations proposed during the first audit. One of the most immediate measures that Hon Hai took is to reduce the long working hours and increase the health insurance benefits schemes, both of which will add the total costs of employment.

The magnitude of the rising labor costs for Hon Hai is critical given the ongoing margin compression and low-margin business EMS/ODM is in. In the chapter, "Rising Labor Costs and the Financial Impact of the Fair Labor Association Audits," we use data from the FLA's landmark February 2012 audit to take an in-depth look at Hon Hai's labor costs. We estimate 2012's headcount by Apple business production lines and the increases required to meet the FLA audit requirements; size the short- and medium-term costs of implementing the audit; gauge the timing and size of those costs that will be transferred to customers; and estimate the impact to Apple's bottom line.

Controversy No. 4: Automation and the Substitution of Capital for Labor

Although industrial robots have existed for decades, there is renewed interest from companies, governments and investors about industrial automation, amid increasing labor costs in the developing world and high unemployment rates in the developed world. In contrast to the highly automated automotive industry, the electronics industry, particularly the final assembly segment, remains labor-intensive.

Hon Hai Precision is a poster child for large-scale labor-intensive electronics assembly (see Exhibit 103). While Hon Hai has gone through a number of rounds of salary hikes to accommodate rising labor costs and to comply with the FLA requirements, Terry Guo, the CEO and Chairman of Hon Hai, also publicly expressed his interest in adopting one million robots in the company's assembly lines in the next three years.

In an ABC News report about a reporter's recent visit with the Fair Labor Association to Hon Hai's Apple plants in China,¹ Hon Hai informs the reporter that it takes 141 steps to make an iPhone and 325 hands to make a single iPad over the span of five days. Based on a different assembly-counting method, TechInsights in Exhibit 104 indicates that it takes 313 steps and 1,166 seconds to make an iPhone3G. The automation level of Apple-device production is very low and most devices are essentially handmade by thousands of employees in the Chengdu and Zhengzhou plants. As Apple products are difficult to manufacture and the market demand is high, we believe significant adoption of automation to replace human labor is unlikely in the near future.

Exhibit 103 Major Facilities Dedicated to Apple Products

| Product Line | Factory Location | Estimated Employee | Daily Capacity | 2011 Annual Production |
|--------------|------------------|--------------------|----------------|------------------------|
| iPhone | Shenzhen | 80,000 | 50,000 | 65 million |
| | Zhengzhou | 100,000 | 200,000 | |
| iPad | Chengdu | 200,000 | 110,000 | 33 million |
| | Zhengzhou | 100,000 | 50,000 | |
| iPod | Shenzhen | 80,000 | 100,000 | 30 million |

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 104 Components and Assembly Time by Product

| | iPad 3G | iPhone 3G | ThinkPad |
|-----------------------------------|-------------|-------------|-------------|
| Number of Parts | 179 | 92 | 251 |
| Number of Steps | 609 | 313 | 854 |
| Assembly Time (Seconds) | 2,374 | 1,166 | 4,400 |
| Entire Assembly Process (Seconds) | 4,748 | 2,332 | 8,800 |
| Seconds per Part | 13 | 13 | 18 |
| Seconds per Step | 4 | 4 | 5 |
| Cost/Hour (USD) | 2 | 2 | 2 |
| Total Costs (USD) | 1.32 | 0.65 | 2.44 |
| Products/worker/8h | 6 | 12 | 3 |

Source: UBM TechInsights and Bernstein estimates and analysis.

That said, we have only anecdotal evidence about the timing and strategy of Hon Hai's potential automation initiatives in China, where it is the single largest employer in the private sector. For example, we know that Hon Hai is the biggest customer of Harmonic Drive (6324.JP, not covered), a Japanese maker of precision drives widely used in robots. We do not know whether Hon Hai is using these precision motors in its own assembly lines to improve efficiency (but not replace direct assembly labor), to build robots for itself, or even to manufacture robots for third parties. Latest news indicates that Hon Hai has begun introducing automated handling equipment through low-cost "Foxbots," which can perform simple pick and place operations, but not assembly.

Despite limited information available and the rapidly changing industry dynamic, investors are increasingly interested in the potential economic implications of large-scale automation in Hon Hai — specifically, whether Hon Hai should implement automation on its assembly lines given the rising labor costs in China. As detailed in the chapter, "Let a Million Robots Bloom? A Deep Dive Into the Economics of Automation at Hon Hai," we run a simulation of four possible automation levels (using four per-robot price points) at Hon Hai to calculate the annual unit production of the robots and the kind of human labor replacement that could potentially be achieved; we also calculate breakeven points to determine at which point in time it makes sense to automate given the increasing labor cost environment, the kinds of efficiencies that could be achieved by automation, and the setup and ongoing incremental costs that the automation process will require.

Our conclusion is that large-scale automation at Hon Hai is a longer-term goal. Hence, labor cost pressures will continue to have an impact on Hon Hai's operations and financials for at least the next few years.

¹ABC News Nightline, Apple Foxconn factory in China, <http://www.youtube.com/watch?v=hLuPtMvwwA0>.

Controversy No. 5: The Black Box Discount and Opaqueness

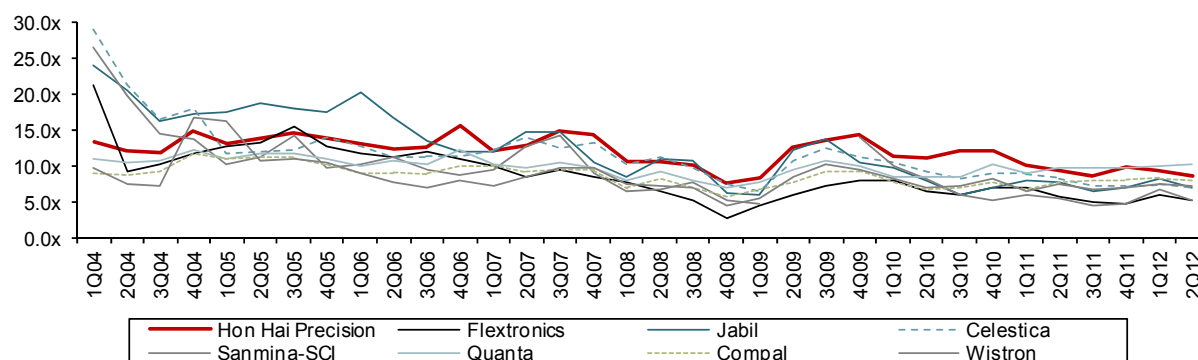
Hon Hai with its informational opaqueness — complicated corporate structure, lack of earnings conferences, no management Q&A and bare minimum information disclosures only to meet regulatory requirements — has made the company akin to a black box for investors. Therefore, we are interested to know how Hon Hai Precision has traded relative to its peers and whether this "black box effect" has an impact on valuations.

ODM peers are included in our analysis as they are closer to Hon Hai in profitability and size than EMS peers, albeit having different business models. Our sample contains EMS peers Flextronics, Jabil Circuit, Celestica and Sanmina-SCI, and ODM peers Quanta, Compal Electronics and Wistron.

We find that, on a forward earnings basis, Hon Hai has commanded a premium over EMS and ODM peers, although trading multiples for all companies have clustered around 10.0x. Multiples have suffered compression over the years, dropping from 11.6x, on average, in 2004-08 to 8.3x post 2008. Prior to 2008, Hon Hai had traded on forward earnings basis at around 12.8x; post-2008, it was valued at 10.9x, holding up against EMS company comparables, which dropped from 12.8x before 2008 to 8.3x after 2008, and ODMs, which dropped from 9.6x to 8.4x (see Exhibit 105).

Exhibit 105

EMS and ODM Price-to-Forward 12-Month Earnings Ratio



Source: FactSet, Capital IQ and Bernstein analysis.

In the chapter, "Hon Hai's Valuation: The Black Box Discount?" we review how Hon Hai Precision and its EMS/ODM peers trade relative to LTM earnings, forward earnings and book values. We compare how trading multiples stack up relative to profitability (from both operating margin and economic profit perspectives). We review the impact of Apple's business on Hon Hai's valuation, and discuss whether we think Hon Hai has a valuation headwind from its low institutional ownership, low liquidity, opaque ownership structure and low levels of disclosure.

Based on our analysis, we believe Hon Hai's opaqueness hurts its valuation. Without visibility and understanding of its current and future income streams and their sources, investors are in the dark, imposing higher discount rates for uncertainty. Even though the stock trades at a premium to peers, we believe it could trade even higher (as a "bellwether stock") if this informational asymmetry was reduced through disclosure.

Hon Hai and Apple: A Mutually Beneficial Relationship or Unequal Balance of Power?

Overview

With revenues of over US\$120 billion in 2011 and estimated revenue growth of 15-20% for 2012, Hon Hai Precision has delivered tremendous top-line growth over the decade and established itself as the largest EMS globally. A predominant driver of Hon Hai's growth is Apple, the strategic partner that contributed more than one-third of Hon Hai's revenue in 2011, and we estimate over 40% in 2012. However, top-line growth does not necessarily translate into improved profitability.

In this chapter, we look at the relationship between Hon Hai and Apple. We investigate revenue growth prospects, product mix and profitability, and the relative balance of power.

In the medium term, we expect Apple-related revenue as a proportion of overall Hon Hai revenue to rise to around 43% by 2015, from 37% in 2011. We forecast Hon Hai's consumer segment — which includes TVs, handsets and tablets — to account for close to 64% of revenues in 2015, up from 39% in 2011.

Although Apple has provided a meaningful boost to Hon Hai's top line, we estimate that Apple is a less profitable customer to Hon Hai than others, reducing gross margins by about 60 bps. To a large extent, Hon Hai has been unable to pass along costs to Apple to cover an expanding workforce, rising wages and investments in new facilities. Apple's wider and tighter control of the supply chain means fewer opportunities for Hon Hai to provide high-margin components to Apple products.

Hon Hai has been making significant investments in facilities (Chengdu and Zhengzhou) that are solely devoted to Apple-related products. Its vertically integrated business structure and massive scale makes Hon Hai the ideal business partner for Apple. However, we don't have solid evidence that any possible investment by Apple in Hon Hai facilities has been material enough to be irreversible and to commit Apple to have Hon Hai as a single source for any of its products.

Nonetheless, we expect Hon Hai will remain Apple's predominant EMS for the next two to three years at least. Given Apple's volumes, we believe it would be difficult for other EMS and ODMs to make a dent in iPhone or iPad orders without going through major capacity expansions, and putting that additional capacity to work on lower-margin Apple orders. Based on the existing manufacturing capacity of Hon Hai's competing EMS and ODMs, we estimate it would take at least 12-18 months for Apple to shift a significant amount of production out of Hon Hai.

That said, we do expect Apple to exert continued cost pressure on Hon Hai, as it has shifted some production to other EMS partners such as Pegatron and Quanta. Having qualified alternative providers, Apple is likely to put marginal volumes out to bid in order to extract beneficial pricing and maintain the upper hand in the balance of power in its relationship with Hon Hai.

We Estimate Apple Contributed About 37% of Hon Hai 2011 Total Revenues, and 43% in 2012

Hon Hai's relationship with Apple started almost 30 years ago, when Hon Hai was still mainly a supplier of connectors and other mechanical components to Apple's in-house manufacturing operations. Hon Hai integrated forward into manufacturing, logistics and the supply chain at the same time Apple shifted to an outsourcing manufacturing model. As a result, Hon Hai became the natural partner

for Apple. Apple's success in the iPhone and iPad has made Foxconn, Hon Hai's brand, widely known.

EMS and ODMs assemble the major components for final delivery, and in many cases, the product is directly shipped from the EMS and ODM to the end customers (see our report, [EMS and ODM, Part I: Products, Processes and Profits](#), published June 23, 2011, for an in-depth review of the structure and economics of the business). Apple has outsourced 100% of its production to EMS and ODMs that are located in Asia. Hon Hai reportedly has obtained most of Apple's iPad and iPhone orders (with some volume of iPhones going to Pegatron), while sharing the production of iPods and Mac computers with ODMs such as Quanta and Pegatron. Key component suppliers for the iPhone and iPad have remained relatively stable for each model (see Exhibit 106).

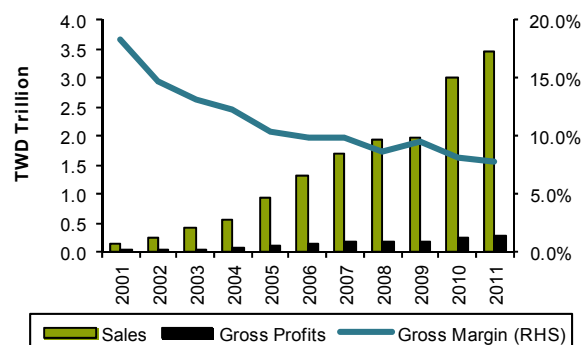
| Exhibit 106 Key Component Suppliers and EMS of iPhone and iPad | | | | |
|--|--------------------|-------------------|--------------------|---------|
| Component | iPhone | | iPad | |
| Display | LGD/Samsung/CMi | | LGD/Samsung/Sharp | |
| Touch Panel | TPK | Wintek | TPK | Wintek |
| Microprocessor | Samsung | | Samsung | |
| Memory | Samsung | Toshiba | Samsung | Toshiba |
| Camera | Largan Precision | Genius Electronic | Largan Precision | |
| Battery | Simple | Dynapack | Amperex | |
| Casing | Foxconn Technology | Catcher | Foxconn Technology | Riteng |
| EMS | Hon Hai | Pegatron | Hon Hai | |

Source: Digitimes, Wall Street Journal and Bernstein analysis.

From 2001 to 2011, Hon Hai's annual revenues grew at a CAGR of 37% and reached TWD 3.5 trillion (US\$120 billion) in 2011. Even though, the company's gross profit grew from TWD 28 billion to TWD 256 billion during this period, gross margin underwent continuous compression, from 18.3% in 2001 to 7.7% in 2011 (see Exhibit 107). We believe the two are intimately related — it was Hon Hai driving pricing (and margins) down in exchange for additional customer business that allowed such extraordinary revenue growth.

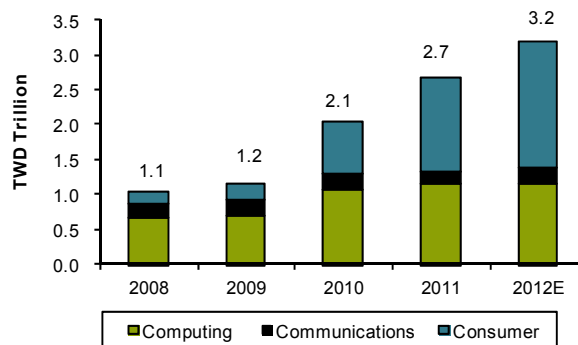
From the perspective of product mix, Hon Hai has disproportionately grown its consumer business division, which accounted for almost 39% of total consolidated revenues in 2011 and is estimated to be 46% in 2012 (see Exhibit 108). The majority of the growth in Hon Hai's consumer products is Apple-related — specifically the iPod (since 2001), iPhone (since 2007) and iPad (since 2010). We estimate that up until the end of 2012, Hon Hai manufactured around 90% of iPhone units and 95% of iPad units, or 116 million and 54 million units, respectively.

Exhibit 107 Hon Hai Revenue and Operating Profits



Source: Corporate reports and Bernstein analysis.

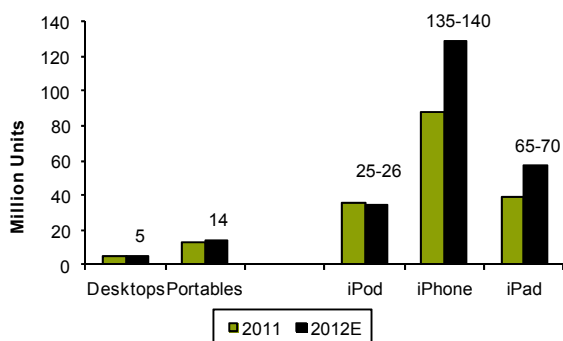
Exhibit 108 Revenue Breakdown by Product Lines



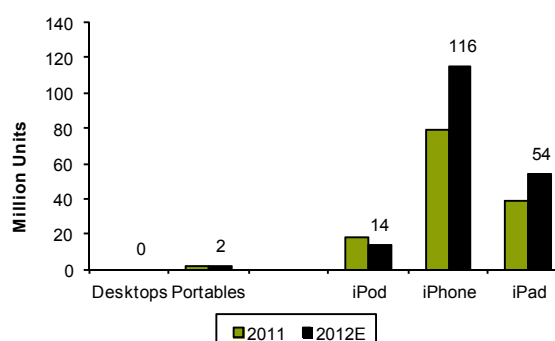
Source: Corporate reports and Bernstein estimates and analysis.

Based on the estimates from Bernstein's U.S. IT Hardware team, Apple is expected to ship around 135-140 million and 65-70 million units of iPhones and iPads, respectively, in 2012, which represents a significant increase from ~93 million and ~40 million in 2011. Assuming Hon Hai captured ~100% production of iPads and over 90% production of iPhones in 2011, we estimate Hon Hai manufactured 83 million iPhones and 38 million iPads in 2011 (see Exhibit 109).

For 2012, Hon Hai has probably lost a proportion of both orders (~10-15% of iPhone orders to Pegatron and ~10% of iPad orders to a second EMS or ODM) as Apple seeks to diversify its manufacturing base. For PC manufacturing, Pegatron and Quanta are reportedly making Apple's MacBook and MacBook Pro, respectively. Hon Hai reportedly also engages in MacBook manufacturing, although the size of the order is much smaller compared to the former two players. Under these assumptions, we estimate Hon Hai will likely manufacture 116 million iPhones and 54 million iPads in 2012 (see Exhibit 110).

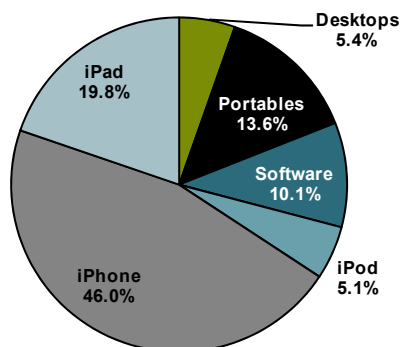
Exhibit 109 Total Units Shipment of Apple Products

Source: Corporate reports and Bernstein estimates.

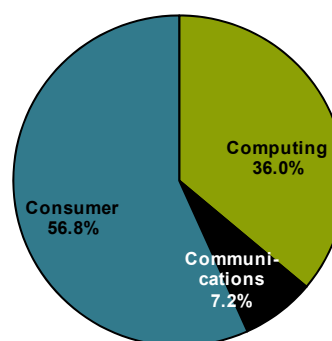
Exhibit 110 Apple Products Manufactured by Hon Hai

Source: Bernstein estimates.

The iPhone accounted for an estimated 46% of Apple's total revenue in 2011, followed by the iPad at 20% (see Exhibit 111). This contrasts with Hon Hai's revenue stream shown in Exhibit 112, where computing devices (desktop, notebook, printers and storage) remain as a significant proportion of revenue, accounting for 36% of total revenues. The divergence of revenue streams reflects Hon Hai's large customer base that ranges from TVs to computers to industrial electronics.

Exhibit 111 Apple's Revenue Distribution (2011)

Source: Corporate reports and Bernstein estimates.

Exhibit 112 Hon Hai's Revenue Distribution (2011)

Source: Bernstein estimates.

Although no specific financial data have been disclosed regarding Hon Hai's total exposure to Apple products, we conducted an analysis to understand the relationship based on our estimates of Hon Hai's unit shipments of Apple products and the wholesale ASP for each product. Exhibit 113 presents our estimates for Hon Hai's unit shipments for Apple products. For 2012, we estimate a six-percentage-point incremental revenue growth for Apple-related products (see Exhibit 114), primarily driven by unit growth in iPhone (115 million units) and iPad (54 million units). We adjust our unit shipment forecast based on an expected proportional shift of iPad and iPhone orders to another EMS/ODM and a minor ASP decline in 2012.

| Exhibit 113 Apple-Related Products as Percentage of Hon Hai's Total Revenue (2011) | | | | | |
|---|------------|-------------------------|------------------------|------------------------------|-------------------|
| Apple Product | ASP | 2011 Unit ('000) | Rev. (USD Mil.) | Hon Hai Group Revenue | (USD Mil.) |
| Desktops | 1013 | - | - | Computing | 38,140 |
| Portables | 933 | 1,932 | 1,803 | | |
| iPod | 105 | 14,481 | 1,519 | Communications | 6,339 |
| iPhone | 280 | 83,792 | 23,487 | Consumer | 44,393 |
| iPad | 404 | 38,633 | 15,617 | Subsidiaries | 25,120 |
| Total | | | 42,427 | Total | 113,991 |
| <i>Apple-Related Products as % of Total Revenue</i> | | | <i>37%</i> | | |

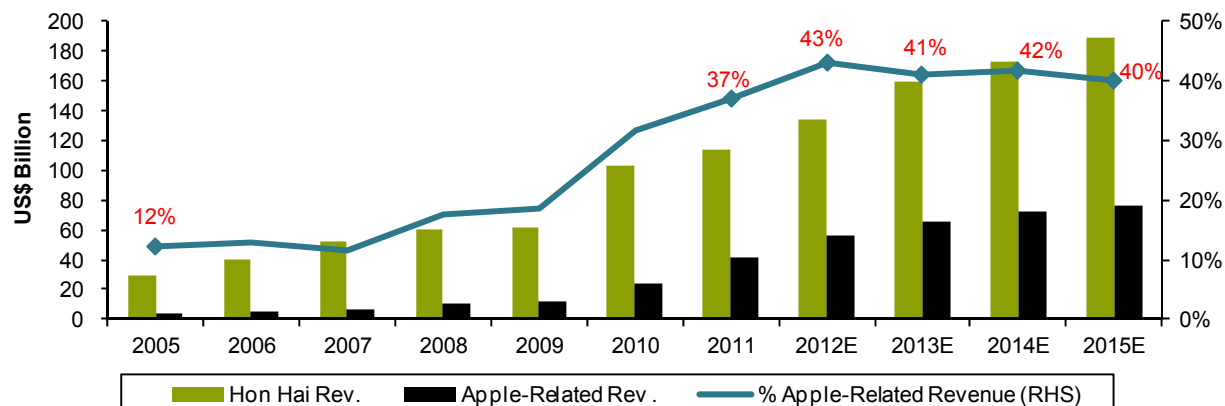
Source: Corporate reports and Bernstein estimates and analysis.

| Exhibit 114 Apple-Related Products as Percentage of Hon Hai's Total Revenue (2012) | | | | | |
|---|------------|-------------------------|------------------------|------------------------------|-------------------|
| Apple Product | ASP | 2012 Unit ('000) | Rev. (USD Mil.) | Hon Hai Group Revenue | (USD Mil.) |
| Desktops | 930 | - | - | Computing | 39,757 |
| Portables | 887 | 2,795 | 2,481 | | |
| iPod | 98 | 13,981 | 1,375 | Communications | 7,949 |
| iPhone | 274 | 115,504 | 31,631 | Consumer | 62,753 |
| iPad | 392 | 54,153 | 21,251 | Subsidiaries | 23,302 |
| Total | | | 56,739 | Total | 133,761 |
| <i>Apple-Related Products as % of Total Revenue</i> | | | <i>43%</i> | | |

Source: Corporate reports and Bernstein estimates and analysis.

Overall our estimates are relatively conservative, as we do not take into consideration Apple's recently launched products, including the iPad Mini, which the U.S. IT Hardware Team estimates will have unit shipments of 30 million in FY13 (Apple's FY starts on October 1). Therefore, we think the major impact from the iPad Mini will appear in Hon Hai's FY2013 financials. That said, the iPad Mini's cannibalization effect on iPad, we believe, is likely to offset the overall revenue fluctuation for Hon Hai.

In the medium term, we expect Apple-related revenue as a proportion of overall Hon Hai revenue to rise to around 40% by 2015, when iPhone and iPad unit shipments are expected to reach 197 million and 115 million, respectively (see Exhibit 115).

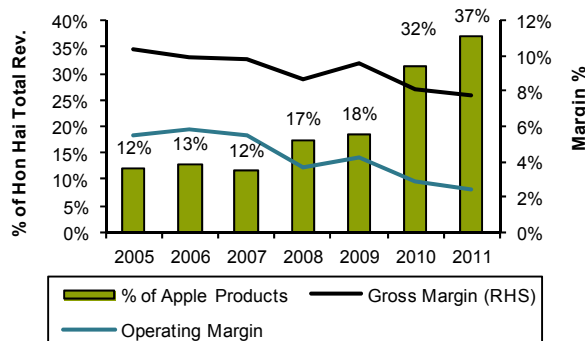
Exhibit 115 Annual Revenue of Hon Hai and the Portion from Apple (2005-15E)

Source: Corporate reports and Bernstein estimates and analysis.

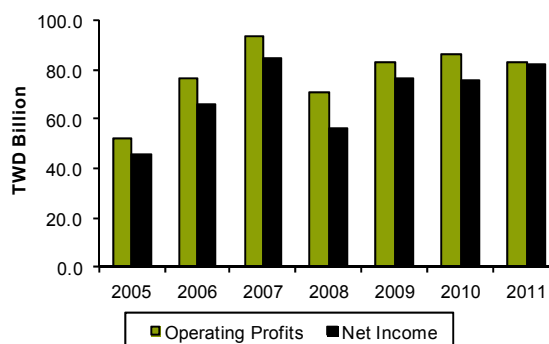
Impact on Bottom Line: Apple Is Not as Profitable as Other Hon Hai Customers

Building on the top-line outlook, we then explored the economic benefits for Hon Hai to take on additional Apple orders and how much of a bottom-line impact Apple products have on Hon Hai's overall margin. From a company-level perspective, Hon Hai's margin compression occurred over time and the depressed margins are not likely to return to the pre-Apple era (see Exhibit 116 and Exhibit 117).

However, we believe Hon Hai has a medium-term structural profitability advantage relative to its peers — it is reflected in its "net" margin after backing out the "pass-through" revenues from key components, which are recognized in Hon Hai's financial statements, but are purchased on consignment from customers. Because Hon Hai is a highly vertically integrated EMS with subsidiaries in mechanical components, Hon Hai has been able to gain higher margins in non-key components.

Exhibit 116 Hon Hai's Margin Trends and Apple-Related Revenue as Percentage of Hon Hai's Total Revenues

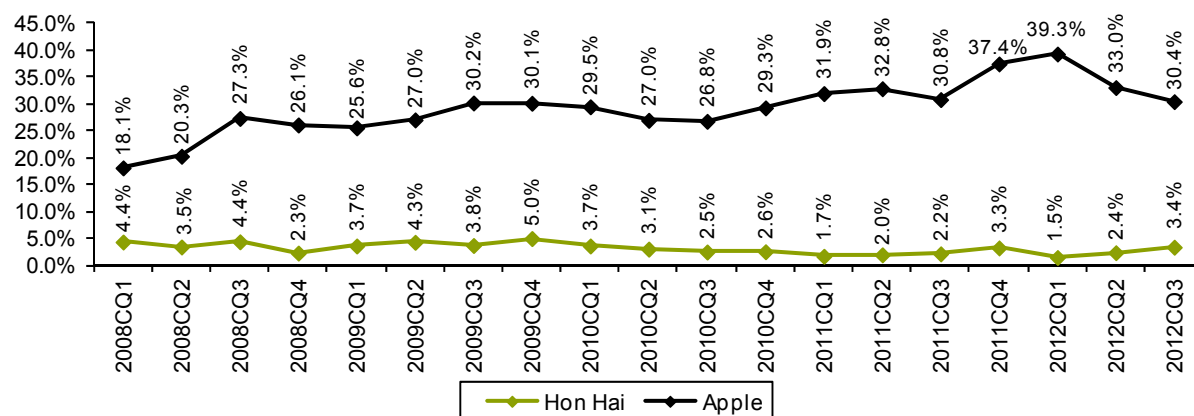
Source: Corporate reports and Bernstein estimates.

Exhibit 117 Hon Hai's Operating Profits and Net Income

Source: Corporate reports and Bernstein analysis.

Apple's dependence on Hon Hai for manufacturing products does not seem to translate into improved margins for Hon Hai even as Apple has significantly improved its operating margin from 18.1% in first-quarter 2008 to 30.4% in third-quarter 2012. This poses a notable contrast to Hon Hai's profitability — which has undergone margin compression from 4.4% to an estimated 3.4% during the same period (see Exhibit 118).

Exhibit 118 Operating Margin Comparison of Hon Hai and Apple



Source: Corporate reports and Bernstein estimates.

Apple "atomizes" its supply chain to an unprecedented degree, breaking up component processing steps across multiple vendors. Therefore, Apple has a higher degree of control over its suppliers, leaving fewer opportunities for Hon Hai to capture profits from the component and supply chain. Exhibit 119 shows our estimated bill of materials and EMS margins for Apple products: iPad and iPod Nano are the most profitable products, with 6.8% and 8.7% EMS margin, respectively, while MacBook Air has the lowest EMS margin of 3.7%, at the similar levels of regular notebook PCs manufactured by EMS and ODM.

Exhibit 119 Summary of Estimated Costs of Apple Products

| | iPhone 4S 16GB | iPad 2 16GB | MacBook Air 64GB | Apple TV | iPod Nano 6th |
|------------------------------------|----------------|---------------|-----------------------|--------------|---------------|
| Retail Price | \$499 | \$499 | \$999 | \$99 | \$129 |
| Channel Price | \$241 | \$364 | \$780 | \$77 | \$65 |
| Retail Margin | 107.5% | 36.9% | 28.1% | 28.6% | 97.8% |
| EMS Gross Profits | \$12 | \$21 | \$25 | \$3 | \$4 |
| EMS Gross Margin (Excl. SW) | 6.6% | 6.8% | 3.7% | 4.7% | 8.7% |
| Cash COGS (Incl. SW) | \$228 | \$344 | \$750 | \$74 | \$61 |
| Key Components | 42% \$96 | 59% \$203 | 61% \$459 | 48% \$35 | 52% \$32 |
| ICs and Discretes | 19% \$44 | 14% \$50 | 10% \$72 | 14% \$10 | 8% \$5 |
| Mechanicals and Others | 18% \$40 | 12% \$41 | 19% \$140 | 22% \$16 | 12% \$7 |
| Labor and Insertion | 4% \$8 | 3% \$10 | 1% \$10 | 3% \$2 | 4% \$3 |
| SW, Royalties, Warranties | 18% \$40 | 12% \$40 | 11% \$79 | 14% \$10 | 24% \$15 |
| Model | iPhone 4S | iPad 2 | MacBook Air (11-inch) | Apple TV 2nd | iPod Nano 6th |
| Release Date | Oct-11 | Mar-11 | Jul-11 | Sep-10 | Sep-10 |
| Processor | Apple A5 1GHz | Apple A5 1GHz | 1.6 GHz Intel Core i5 | Apple A4 | Samsung ARM |
| RAM | 512MB | 512MB | 2GB | 256MB | |
| Storage | 16GB | 16GB | 64GB | 8GB | 8GB |
| OS | iOS 5 | iOS 5.0.1 | OS X Lion | OS X 10.4 | OS X v10.5.8 |

Source: iSuppli, Apple website and Bernstein estimates and analysis.

Comparatively speaking, Apple-related products have lower gross margins than non-Apple products, which is evident in its lower pass-through revenue compared to non-Apple products (see Exhibit 120). At the company level, Hon Hai has a gross margin of 7.7% and 30% "net" gross margin after backing out the pass-through components with zero margins. When breaking down the product category into Apple and non-Apple products, we estimate a higher gross margin of 8.3% for

non-Apple products compared to 6.6% and 6.8% gross margin for iPhones and iPads, respectively. Thus, one source of Hon Hai's margin compression is its increasing portfolio of Apple's products with lower gross margins.

Exhibit 120**Apple Products' Impact on Hon Hai's Gross Margin**

| Product Category | % Rev. | "Net" GM | Ex. Mechanicals | | | Incl. Mechanicals | | | |
|---------------------------|--------|--------------|-------------------|----------------------|-------------|--------------------|----------------------|-------|-------------|
| | | | % Passthrough Rev | % of Profitable Rev. | "Gross" GM | % Passthrough Rev. | % of Profitable Rev. | Delta | "Gross" GM |
| Non-Apple | 64% | 36.5% | 77% | 23% | 8.3% | 77% | 23% | 0% | 8.3% |
| iPad | 14% | 17.5% | 61% | 39% | 6.8% | 66% | 34% | -13% | 6.0% |
| iPhone | 22% | 17.0% | 61% | 39% | 6.6% | 68% | 32% | -18% | 5.4% |
| Blended "Gross" GM | | 29.6% | | | 7.7% | | | | 7.3% |
| Change in "Gross" GM | | | Apple Blended GM | | | -0.38 bp | | | |

Source: Bernstein estimates.

Why might this be? An explanation lies in the nature of the products Apple makes. Key components (e.g., CPU, displays, HDD, memory and optical drives) are procured and purchased on consignment by the OEM and shipped to the EMS/ODM, but remain on the EMS's or ODM's books, both on a COGS basis and as revenue. But the EMS or ODM does not provide any value-add to the key components and simply assembles them into the finished product, and hence is unable to add a margin to the end-product ASP.

The key components are purely "pass-through" zero-margin components, and the EMS/ODM's gross margin comes exclusively from the components it provides itself plus whatever the EMS or ODM can charge the OEM for the design and manufacturing services. Consequently, all else equal, an EMS or ODM will prefer a product with a lower proportion of key components, because it gives the EMS or ODM the opportunity to capture more margin from the bill of materials, leading to higher per-unit profit margins. (The economics of this cost structure are reviewed in depth in our report, [EMS and ODM, Part III: How Low Can You Go? The Limits to Cost Reduction in the IT Hardware Supply Chain](#), published July 5, 2011.)

We estimate a lower blended gross margin on Apple-products due to the higher proportion of components provided by Apple suppliers. In other words, if the level of Apple-controlled components remains unchanged, Hon Hai's overall gross margin will keep declining as the weight of Apple-products in the overall revenue contribution rises. To effectively reverse such negative trends, Hon Hai could simply increase its control of components, which would generate a decent gross margin and consequently improve the overall Apple business profitability.

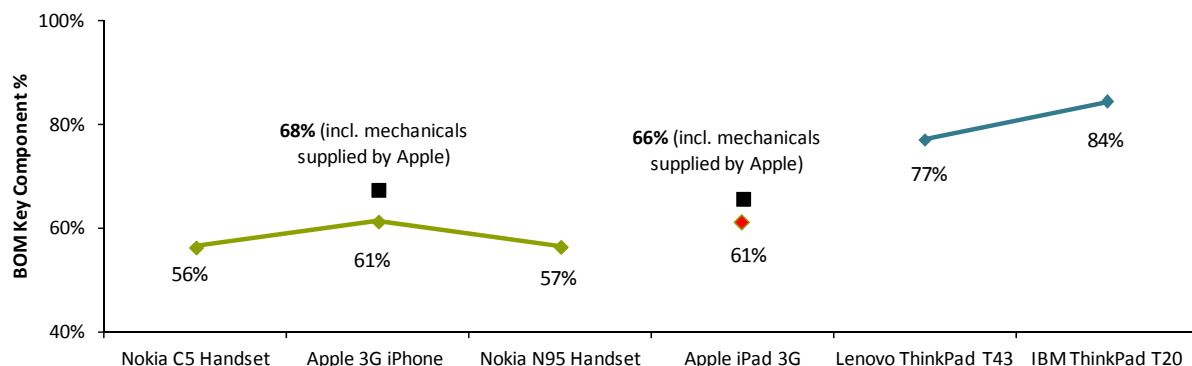
In the recently published list of suppliers by Apple, we see one of Hon Hai's associates, Simplo Technology, as a lithium battery supplier to iPhone and iPad. In the process of diversifying Apple's supplier base, Hon Hai, with its expertise in components, including cable connectors, modules, PCB, aluminum casings and antennas, has a high possibility of gaining additional component orders after meeting Apple's supplier qualification requirements, and we model such an outcome in our forecast financials, with gross margins remaining relatively stable at around 8%.

Exhibit 121 shows our estimates of the percentage of the bill of materials that is composed of key components for a set of representative products, including an Apple iPhone and iPad. As can be seen, Apple products tend to have a higher proportion of key components than equivalent products. Furthermore, we know that Apple has tighter and wider control of its supply chain, and provides mechanical and other components that would have been naturally the province of the EMS/ODM — hence the proportion of zero-margin "pass-through" components is higher for Apple products.

For example, we believe the raw material for the magnesium-aluminum alloy back cover of the iPad 2 and the iPhone 5 is provided by Apple, capturing some of that margin that "rightfully" should have gone to Hon Hai. We estimate that these

additional components bring up the proportion of zero-margin pass-through components in an Apple product to the 65-70% range, above equivalent products in the 55-60% range.

Exhibit 121 Percentage of the Bill of Materials Included in the Key Components



Source: UBM TechInsights and Bernstein estimates and analysis.

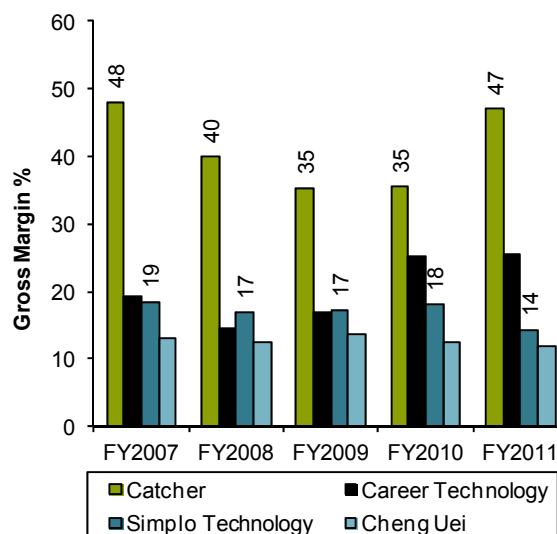
In the detailed COGS breakdown of iPhone and iPad presented in Exhibit 122, we identify that around 18% of total ASP is non-pass-through components, including mechanicals, batteries, and box contents. Although we are uncertain what percentage Hon Hai controls of the non-pass-through components, such component segment capture could be margin-accretive for Hon Hai. From a gross margin perspective (see Exhibit 123), non-key components have reasonably high margins, ranging from 35-48% for casing companies, such as Catcher, to 14-19% for battery companies, such as Simplo.

Exhibit 122 Detailed COGS Breakdown of iPhone and iPad (US\$)

| | iPhone 4S 16GB | | iPad 2 16GB | |
|-----------------------------------|----------------|--------------|--------------|--------------|
| Pass-through Components | 142.0 | 56.6% | 228.0 | 62.0% |
| Key Components | 97.9 | 39.0% | 178.2 | 48.4% |
| Display / Touch Screen | 37.0 | | 127.0 | |
| Memory | 28.3 | | 32.9 | |
| Application Processor | 15.0 | | 14.0 | |
| Camera | 17.6 | | 4.3 | |
| ICs and Discretes | 44.1 | 17.6% | 49.8 | 13.5% |
| Baseband/RF/PA | 23.5 | | 18.7 | |
| Power Management | 7.2 | | 10.2 | |
| BT/FM/GPS/WLAN | 6.5 | | 9.0 | |
| Sensors/Touch Controller | 6.9 | | 11.9 | |
| Non-Passthrough Components | 45.9 | 18.3% | 65.8 | 17.9% |
| Batteries | 5.9 | | 25.0 | |
| Mechanical | 33.0 | | 35.0 | |
| Box Contents | 7.0 | | 5.8 | |
| SW, Royalties, Warranties | 40.0 | 15.9% | 40.0 | 10.9% |
| Labor and Insertion | 7.1 | 2.8% | 10.0 | 2.7% |
| Total Cash COGS | 235.0 | | 343.8 | |
| EMS Gross Profits | 16.0 | | 24.0 | |
| Gross Margin % | 6.8% | | 7.0% | |
| Total ASP | 251.0 | | 367.8 | |

Source: iSuppli and Bernstein estimates and analysis.

Exhibit 123 Gross Margins of Apple's Current Component Suppliers



Source: Capital IQ and Bernstein analysis.

Exhibit 124 shows our calculations that estimate Hon Hai's "net" gross and net margins — that is, net of the pass-through components — at the company level. As can be seen, although the reported gross margins are in the 7% area, the "implied" margins for the components under the control of Hon Hai are a much more respectable 26.5%. This is not unexpected; our channel checks and data points indicate that a 30% gross margin for a casing or a connector is not that unusual.

And further, given Hon Hai's high degree of vertical integration, we would expect them to capture quite a bit of value.

Exhibit 124 Hon Hai Net Margin Estimates (Unconsolidated Financials)

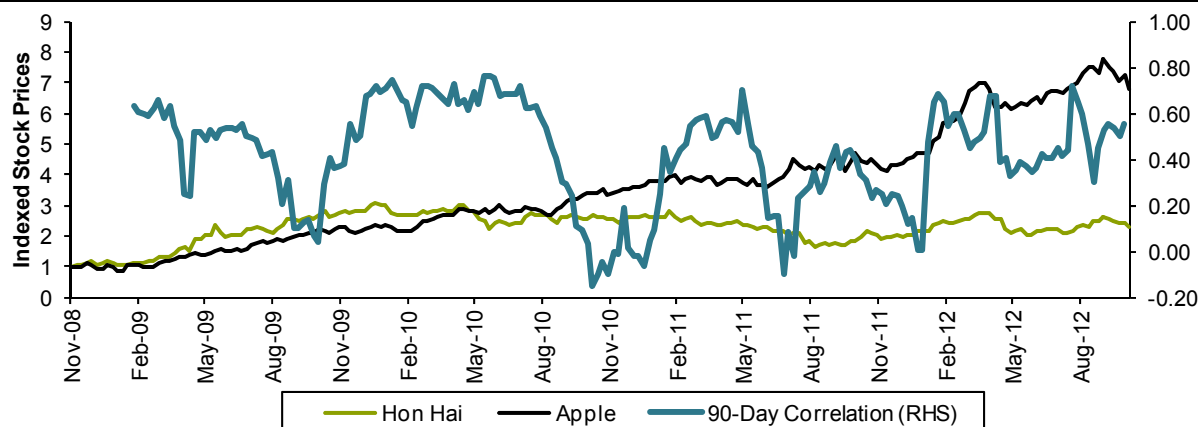
| TWD Billion | 2011Q1 | 2011Q2 | 2011Q3 | 2011Q4 |
|--|--------------|--------------|--------------|--------------|
| Gross (reported) revenues | 729 | 786 | 863 | 1,074 |
| Pass-through revenues | 517 | 558 | 613 | 774 |
| Net revenues | 212 | 228 | 251 | 300 |
| Gross (reported) cost of goods | 676 | 729 | 802 | 979 |
| Pass-through costs | 517 | 558 | 613 | 774 |
| Net cost of goods | 160 | 171 | 190 | 205 |
| "Gross" (reported) gross profit | 53 | 57 | 61 | 95 |
| Pass-through gross profit | 0 | 0 | 0 | 0 |
| "Net" gross profit | 53 | 57 | 61 | 95 |
| "Gross" (reported) gross margin | 7.2% | 7.3% | 7.0% | 8.9% |
| Average | | 7.6% | | |
| "Net" gross margin | 24.9% | 25.1% | 24.3% | 31.8% |
| Average | | 26.5% | | |

Source: Corporate reports and Bernstein estimates and analysis.

Particularly rich in margin are handsets and tablets, both of which have "naturally" low key component ratios. However, we know that Apple captures some of that additional margin through its own procurement and component supply. Hence, the key component ratio for Apple products is likely to be higher. As shown in Exhibit 121, we estimate that iPads and iPhones have about 5-6 percentage points higher proportion of key components, which we calculate represents roughly a 60 bps decrease in Hon Hai's gross margin.

Obviously, product mix and margin dynamics are only one element of stock returns, but it is illustrative to review the indexed stock performance of Hon Hai and Apple after the debut of the iPhone in June 2007, together with their 90-day rolling return correlations (see Exhibit 125). Between the advent of the financial crisis in mid-2008 to mid-2010, we saw a strong correlation of returns between the two stocks. However, starting in mid-2010, there has been a noted divergence between the fortunes of the two companies, with Apple materially outperforming Hon Hai.

Exhibit 125 Indexed Stock Performance: Hon Hai vs. Apple



Source: Bloomberg L.P. and Bernstein analysis.

It is possible for Hon Hai to increase its margin by increasing the proportion of self-supplied components. To gauge the magnitude of the financial impact from increasing components supplied by Hon Hai, we conduct simulations in Exhibit

126 and Exhibit 127 for enclosures and printed circuit boards. We assume Hon Hai obtains 30% of component orders of enclosures and printed circuit boards for Apple products in 2012, and the gross margin levels are equivalent to those of Apple's current component suppliers.

We find that Hon Hai is able to increase its gross profits by US\$72 million by manufacturing 30% of iPad enclosures at US\$10 per unit, and its blended gross margin (including EMS margin) increases by 30 bps from 6.9% (EMS margin) to 7.2%. This simulation shows that Hon Hai has the flexibility and potential to increase its overall gross margin for Apple-related products quite materially by leveraging its component manufacturing capabilities.

Exhibit 126 Estimate of Hon Hai's Adjusted Gross Margin by Supplying Enclosures for Apple Products

| | iPhone 4S | iPad 2 |
|---------------------------------------|-------------|-------------|
| Unit Shipments (Mil.) | 111 | 55 |
| Total Cash COGS | 26,062 | 19,010 |
| Total Cash COGS/Unit | 235 | 349 |
| EMS Gross Profits | 16 | 24 |
| Gross Margin % | 6.8% | 6.9% |
| Total Gross Profits (USD Mil.) | 1774 | 1308 |
| Enclosure Unit Cost | 5 | 10 |
| Gross Margin %* | 20% | 35% |
| Gross Profits | 1.0 | 3.5 |
| Total Gross Profits (USD Mil.) | 111 | 191 |
| Gross Profits with 30% order size | 33.3 | 57.2 |
| New Gross Profits | 1808 | 1365 |
| Gross Margin %* | 6.9% | 7.2% |
| Delta in GM (bps) | 13 | 30 |

*The enclosure materials for iPhone and iPad are plastic and aluminum respectively, thus differing in pricing and gross margins.

Source: Capital IQ and Bernstein estimates and analysis.

Exhibit 127 Estimate of Hon Hai's Adjusted Gross Margin by Supplying Printed Circuit Boards for Apple Products

| | iPhone 4S | iPad 2 |
|---------------------------------------|-------------|-------------|
| Unit Shipments (Mil.) | 111 | 55 |
| Total Cash COGS | 26,062 | 19,010 |
| Total Cash COGS/Unit | 235 | 349 |
| EMS Gross Profits | 16 | 24 |
| Gross Margin % | 6.8% | 6.9% |
| Total Gross Profits (USD Mil.) | 1774 | 1308 |
| PCB Unit Cost | 3 | 5 |
| Gross Margin % | 17% | 17% |
| Gross Profits | 0.5 | 0.9 |
| Total Gross Profits (USD Mil.) | 57 | 46 |
| Gross Profits with 30% order size | 17.0 | 13.9 |
| New Gross Profits | 1791 | 1322 |
| Gross Margin %* | 6.9% | 7.0% |
| Delta in GM (bps) | 7 | 7 |

*The enclosure materials for iPhone and iPad are plastic and aluminum respectively, thus differing in pricing and gross margins.

Source: Capital IQ and Bernstein estimates and analysis.

Comparing the economies of scale in non-Apple components with higher proportions in non-pass-through components for Apple products, we consider the latter as having more immediate financial impact on the gross margin and more feasible to be achieved in the near term. The financial upside will be particularly meaningful and structural given Hon Hai's increasing proportion of revenues from Apple in coming years.

To a great degree, Hon Hai has not been able to pass along the costs of an expanding workforce, rising wages and investing in new facilities in order to keep up with Apple orders. As a result of this the divergence of profitability, Hon Hai has not been able to benefit from the lucrative iPhone and iPad markets, which now contribute two-thirds of Apple's total revenues.

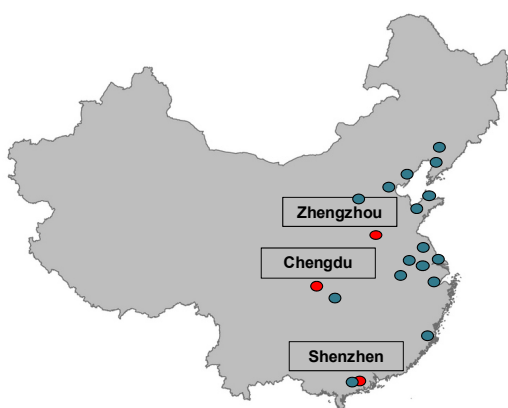
Hon Hai Has Devoted Resources to Apple's Business, But It Is Not Clear Apple Has Invested as Much in Hon Hai

To maintain the strategic relationship with Apple, Hon Hai has been making significant investments in facilities that are solely devoted to Apple-related products. Looking at Hon Hai's production facilities across Mainland China, we see that the majority of the company's latest investments are Apple-related. In particular, Hon Hai's recent "Go West" movement to relocate its manufacturing base to inland China demonstrates its commitment to Apple.

As illustrated in Exhibit 128, Hon Hai now has three main campuses in Mainland China, namely Shenzhen, Zhengzhou and Chengdu. The newly constructed Chengdu and Zhengzhou campuses are mostly devoted to iPad and iPhone production, respectively (see Exhibit 129). The Zhengzhou factory currently has a daily production capacity of ~200,000 iPhone units per day. The Chengdu campus, which drew media attention due to the explosion of iPad facilities in May 2011, is reportedly to have employed ~200,000 workers for iPad production.

In addition to the Zhengzhou campus, Hon Hai's main subsidiary, Foxconn International Holdings (FIH), is also reportedly to begin manufacturing iPhones, although it remains unclear whether all of the iPhone production will shift to Zhengzhou soon. Given the scale required for fulfilling Apple's orders, FIH, with its main factory in the Shenzhen campus, is likely to gradually shift its focus to non-Apple orders.

Exhibit 128 Hon Hai's Mainland Facilities and Apple-Dedicated Factories in Red



Note: Please view the color version of the map in the online version of the *Blackbook*.

Source: Corporate reports and Bernstein analysis.

Exhibit 129 Major Facilities Dedicated to Apple Products and Estimated Units Production by Hon Hai

| Product Line | Factory Location | Estimated Employee | Daily Capacity | 2011 Annual Production |
|--------------|------------------|--------------------|----------------|------------------------|
| iPhone | Shenzhen | 80,000 | 50,000 | 65 million |
| | Zhengzhou | 100,000 | 200,000 | |
| iPad | Chengdu | 200,000 | 110,000 | 33 million |
| | Zhengzhou | 100,000 | 50,000 | |
| iPod | Shenzhen | 80,000 | 100,000 | 30 million |

Notes:

- Shenzhen iPhone is manufactured by FIH.
- Daily capacity reflects the latest production capacity.

Source: Corporate reports and Bernstein estimates and analysis.

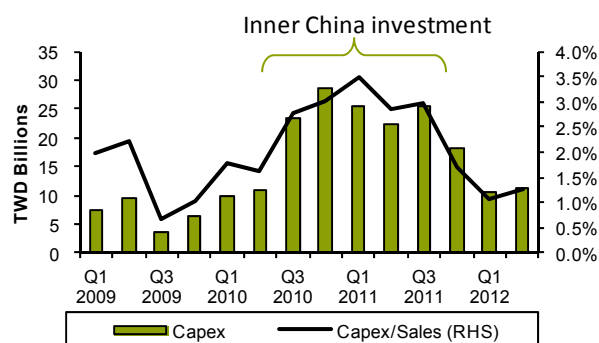
As previously pointed out, in addition to Apple's legendary control of the component supply chain, the company has been known to invest directly into the manufacturing facilities of its suppliers to build Apple-dedicated capacity. For FY12, this number is US\$7.1 billion (for more details, see our report [Apple: \\$7B+ in Non-Retail Cap Ex this Year - What Is it Being Used for, and Why?](#), published November 14, 2011).

However, it is not clear to what extent Apple has invested in Hon Hai facilities exclusively for Apple products. We have no direct evidence of investments made on site, but there are anecdotal reports that Apple has been installing CNC machines (Robodrills from Fanuc) and other automation tools (the iPhone 5 back-cover-pick and place tool). If these investments were used to generate Apple-related revenues, we would expect the reported capital efficiency to increase (evidenced by a decline in the capital expenditure to sales ratio), as more revenue was being generated with invested capital not on Hon Hai's books. Given the increasing contribution of Apple's business to Hon Hai's revenues, we would at least expect to see Hon Hai's capital efficiency to remain constant. However, the capital expenditure-to-sales ratio peaked in 2011 and has gradually come down to 1.3% in second-quarter 2012 (see Exhibit 130).

The decline in capital efficiency in first-half 2011 appears to have been driven by the rollout and ramp-up of the inland China facilities in Chengdu and Zhengzhou — so perhaps whatever investments Apple made in Hon Hai were not large enough to move the needle relative to the large expenditures from the new campus build-outs. However, we do know that Apple's investments (if any) are primarily in machinery and equipment, which Hon Hai breaks out separately in its financials. Exhibit 131 shows Hon Hai's expenditures in machinery and equipment, and as a percentage of revenue. Once again, spending has tended to increase.

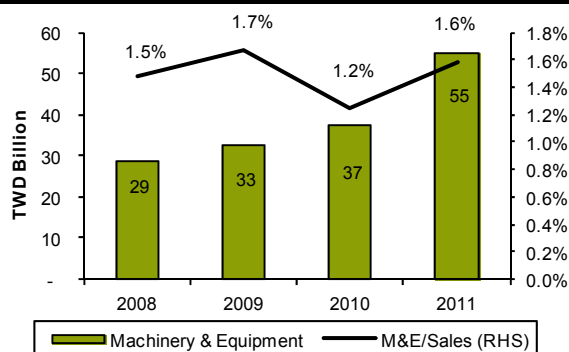
If Apple was purchasing tooling to be installed in Hon Hai's facilities, we would expect the revenue generated by this equipment not to have a corresponding entry in Hon Hai's books, reducing the equipment purchases-to-revenue ratio. But we see no evidence of that. At any rate, given the naturally low capital intensity of Hon Hai's business, we would expect Apple's investment, if any, to be but a fraction of the US\$7.1 billion in non-retail capital expenditures.

Exhibit 130 Hon Hai's Capital Efficiency Trend



Source: Corporate reports and Bernstein estimates.

Exhibit 131 Hon Hai's Machinery and Equipment Spending Trends



Source: Corporate reports and Bernstein analysis.

What Would Hon Hai Look Like If "Apple Didn't Exist"?

Building on the analysis in this chapter, we quantify Apple's impact on Hon Hai from another perspective: What if Apple never became a customer of Hon Hai's? We developed a hypothetical scenario where we remove Apple-related revenues and COGS for two periods — 2008-11 (see Exhibit 132) and 2012-15 (see Exhibit 133). We estimate Apple-related COGS based on a weighted gross margin for Apple products, and estimate other expenses and income proportionally to its corresponding revenue.

From 2008 to 2010, we see around 10-30 bps increase in Hon Hai's operating and net margins when we take out Apple-related revenues, as Apple-related revenue accounts for less than 25% of Hon Hai's overall revenue. In 2011, such margin gap increases to 59 bps and 45 bps in operating and net margins, respectively, as a result of a material increase in Hon Hai's portfolio.

Exhibit 132 Comparison of Hon Hai's Revenue and Profitability With and Without Apple Products — Historical

| TWD Billion | Hon Hai (Reported) | | | | Hon Hai Without Apple (Proforma) | | | |
|----------------------|---------------------------|-------------|-------------|-------------|---|-------------|-------------|-------------|
| | 2008 | 2009 | 2010 | 2011 | 2008 | 2009 | 2010 | 2011 |
| Revenue | 1,950 | 1,959 | 2,997 | 3,453 | 1,610 | 1,598 | 2,052 | 2,175 |
| Gross profits | 168 | 187 | 244 | 266 | 141 | 154 | 173 | 181 |
| <i>Gross Margin</i> | 8.6% | 9.5% | 8.1% | 7.7% | 8.7% | 9.7% | 8.4% | 8.3% |
| Operating Expense | 97 | 103 | 158 | 184 | 80 | 84 | 108 | 116 |
| Operating Income | 71 | 83 | 86 | 83 | 60 | 70 | 65 | 65 |
| <i>Op. Margin</i> | 3.6% | 4.3% | 2.9% | 2.4% | 3.7% | 4.4% | 3.2% | 3.0% |
| <i>Delta (bp)</i> | | | | | 13 | 14 | 28 | 59 |
| Non Operating Income | 2 | 5 | 5 | 20 | 2 | 4 | 4 | 12 |
| Income Tax | 16 | 12 | 16 | 21 | 14 | 10 | 12 | 16 |
| Net Income | 57 | 76 | 75 | 82 | 48 | 64 | 56 | 61 |
| <i>Net Margin</i> | 2.9% | 3.9% | 2.5% | 2.4% | 3.0% | 4.0% | 2.7% | 2.8% |
| <i>Delta (bp)</i> | | | | | 10 | 12 | 22 | 45 |
| Workforce ('000) | 486 | 611 | 836 | 995 | 467 | 577 | 695 | 682 |
| NI/employee (TWD) | 116,646 | 125,009 | 90,278 | 82,345 | 103,636 | 111,262 | 80,999 | 89,936 |

Source: Corporate reports and Bernstein estimates and analysis.

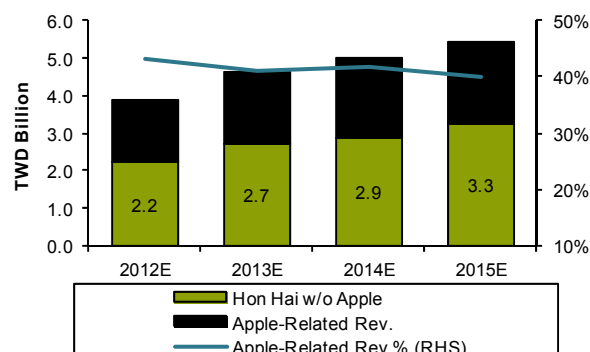
Exhibit 133 Comparison of Hon Hai's Revenue and Profitability With and Without Apple Products — Forecast

| TWD Billion | Hon Hai (Forecast) | | | | Hon Hai Without Apple (Proforma) | | | |
|----------------------|---------------------------|--------------|--------------|--------------|---|--------------|--------------|--------------|
| | 2012E | 2013E | 2014E | 2015E | 2012E | 2013E | 2014E | 2015E |
| Revenue | 3,901 | 4,633 | 4,989 | 5,464 | 2,223 | 2,731 | 2,909 | 3,273 |
| Gross profits | 315 | 362 | 383 | 431 | 203 | 234 | 244 | 284 |
| <i>Gross Margin</i> | 8.1% | 7.8% | 7.7% | 7.9% | 9.1% | 8.6% | 8.4% | 8.7% |
| Operating Expense | 214 | 240 | 244 | 268 | 122 | 142 | 143 | 160 |
| Operating Income | 101 | 122 | 139 | 163 | 81 | 93 | 101 | 124 |
| <i>Op. Margin</i> | 2.6% | 2.6% | 2.8% | 3.0% | 3.6% | 3.4% | 3.5% | 3.8% |
| <i>Delta (bp)</i> | | | | | 104 | 77 | 70 | 79 |
| Non Operating Income | 9 | 30 | 26 | 32 | 5 | 18 | 15 | 19 |
| Income Tax | 21 | 26 | 28 | 33 | 17 | 20 | 20 | 25 |
| Net Income | 90 | 126 | 137 | 162 | 69 | 91 | 96 | 118 |
| <i>Net Margin</i> | 2.3% | 2.7% | 2.7% | 3.0% | 3.1% | 3.3% | 3.3% | 3.6% |
| <i>Delta (bp)</i> | | | | | 82 | 61 | 56 | 63 |
| Workforce ('000) | 1,095 | 1,204 | 1,324 | 1,457 | 658 | 653 | 726 | 783 |
| NI/employee (TWD) | 81,849 | 104,971 | 103,508 | 111,503 | 105,402 | 139,454 | 132,539 | 150,679 |

Source: Corporate reports and Bernstein estimates and analysis.

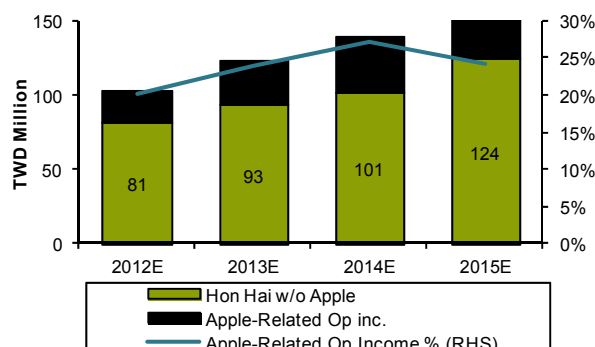
Looking ahead, from 2012 to 2015, such margin impacts of not having Apple as a customer continue until 2013, when our forecasts have Apple-related revenues leveling off at the 40% range (see Exhibit 134 and Exhibit 135).

Exhibit 134 Hon Hai Without Apple by Revenue



Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 135 Hon Hai Without Apple by Operating Income



Source: Corporate reports and Bernstein estimates and analysis.

Hon Hai's revenue growth has been accompanied by the expansion of its workforce, as Apple products are comparatively more difficult to manufacture and require manpower to be specifically devoted to Apple production lines. In our hypothetical scenario without Apple as a customer, Hon Hai will have 856,000 employees by 2015 in comparison to 1.46 million with Apple-related revenue, under the assumption of limited or no productivity improvements. More significantly, we see a material improvement in employee efficiency by 23% based on our calculation of net income per employee (all else equal).

Accrued Warranty Liabilities Provide Further Profit Drag on Hon Hai

In addition to Apple's impact on Hon Hai's revenue and profitability, investors have been interested in understanding the warranty obligations that Hon Hai has in manufacturing Apple products, and we provide our understanding of these dynamics.

It is well known that Apple's per unit fee (the "Market Value Added" or MVA) comes with strings attached, in that the product repairs under warranty are the obligation of Hon Hai. This provides an incentive for Hon Hai to provide high-quality finished goods that will not require warranty servicing, because that cost comes out of Hon Hai's profits.

Accounting-wise, Hon Hai sets aside a warranty reserve each period, which then gets reduced by the amount of warranty expense actually incurred and by the natural aging and expiration of product warranties. Hon Hai started recognizing warranty liabilities on its balance sheet in fourth-quarter 2007, around the same time when Apple launched its first iPhone. As Exhibit 136 shows, Hon Hai has been steadily accumulating warranty liabilities, with rapid growth in its warranty liabilities in 2011. We expect Hon Hai to maintain levels of warranty provisioning at 6.5% of Apple-related COGS going forward.

As long as Hon Hai's Apple-related unit production continues to increase, the warranty reserve per period will be larger than any reduction resulting from warranty expenses, and hence the accrued warranty liabilities journal entry will continue to increase. For a reversal to occur — that is, for the warranty liability to contribute to operating (or non-operating) income — the expected warranty costs from a period's sales plus the costs incurred during the period to service warranties outstanding will have to be less than the balance of the warranty liabilities. In other words, the company has to manufacture fewer units of products in order to gain such reversal.

| Exhibit 136 Hon Hai's Accrued Warranty Liabilities | | | | | | | | | | | |
|--|-------|-------|-------|--------|--------|--------|--------|-------|-------|-------|-------|
| Warranty Obligation TWD Millions | 2008 | 2009 | 2010 | 2011Q1 | 2011Q2 | 2011Q3 | 2011Q4 | 2012E | 2013E | 2014E | 2015E |
| Hon Hai Revenue | 1,950 | 1,959 | 2,997 | 729 | 786 | 863 | 1,074 | 3,901 | 4,633 | 4,989 | 5,464 |
| Apple-related revenue | 213 | 272 | 649 | 212 | 270 | 287 | 452 | 1,630 | 2,117 | 2,385 | 2,368 |
| Apple-related COGS | 195 | 250 | 601 | 198 | 252 | 268 | 423 | 1,517 | 1,967 | 2,216 | 2,201 |
| Accrued Warranty Liabilities | 5 | 8 | 14 | 17 | 19 | 17 | 30 | 98 | 127 | 143 | 142 |
| Warranty/Apple-related COGS | 2.3% | 3.1% | 2.3% | 8.6% | 7.7% | 6.5% | 6.5% | 6.5% | 6.5% | 6.5% | 6.5% |
| Hon Hai Net Income | 55 | 76 | 77 | 14 | 13 | 19 | 35 | 93 | 126 | 137 | 162 |
| Accrual as % of Net income | 8% | 10% | 18% | 118% | 150% | 90% | 85% | 106% | 101% | 105% | 88% |

Source: Corporate reports and Bernstein estimate and analysis.

Hon Hai management has the discretion to determine the estimated warranty provision and readjust the amount based on up-to-date information on a quarterly basis. As we have no clear picture of how Hon Hai manages the warranty provision, we can only calculate the potential one-time impact on Hon Hai's earnings when the company ships fewer Apple products or when it stops manufacturing Apple products. Exhibit 136 shows the potential warranty provision reversal impact on net income — we estimate the one-time net income boost to be around 101% in 2013, assuming Apple ceases to use Hon Hai as an EMS supplier, and all warranty accruals are reversed. Note that this is an *upper bound*, and how the reversal (if any) is applied in practice remains unclear.

Hon Hai's Primacy as a Supplier to Apple Seems to Be Safe in the Medium Term, But Long-Term Risks Exist

Hon Hai has certain advantages that should allow it to keep Apple's business. It is 50% larger in terms of revenues than the other top four EMS companies combined (Flextronics, Jabil, Celestica and Sanmina-SCI). Further, Hon Hai, as the largest exporter in China, has benefited and will likely continue to do so from its economies of scale, favorable governmental taxation, and subsidies for moving inland and providing employment opportunities to the local workforce.

With nearly one million employees in Mainland China, Hon Hai has a workforce that is more than five times the workforce of Flextronics and Quanta (see Exhibit 137). However, scale does not seem to guarantee profitability. Both Jabil and Celestica, a fraction of Hon Hai's size, are more profitable than Hon Hai.

| Exhibit 137 Summary of Key Financials Among EMS/ODM Competitors | | | | | | | | |
|---|---------|-------------|--------|-----------|---------|--------|---------|----------|
| | Hon Hai | Flextronics | Jabil | Celestica | Quanta | Compal | Wistron | Pegatron |
| Q2 2012 Revenue (USD Mil.) | 29,195 | 8,008 | 4,280 | 1,830 | 9,582 | 5,844 | 5,626 | 6,186 |
| SG&A | 1,049 | 210 | 152 | 62 | 170 | 75 | 90 | 139 |
| % of Rev. | 3.6% | 2.6% | 3.6% | 3.4% | 1.8% | 1.3% | 1.6% | 2.3% |
| Op. Income (USD Mil.) | 641 | 151 | 166 | 59 | 107 | 133 | 85 | 30 |
| Op. margin % | 2.2% | 1.9% | 3.9% | 3.2% | 1.1% | 2.3% | 1.5% | 0.5% |
| Capex (USD Mil.) | 0 | 0 | 138 | 19 | 91 | 55 | 97 | 172 |
| % of Rev. | 0.0% | 0.0% | 3.2% | 1.0% | 0.9% | 0.9% | 1.7% | 2.8% |
| Workforce | 995,000 | 176,000 | 69,000 | 26,400 | 123,076 | 67,801 | 60,678 | 90,167 |

Source: Capital IQ, IDC, corporate reports and Bernstein analysis.

How difficult would it be for a competitor to materially impact Hon Hai's business with Apple? Exhibit 138 shows our estimates of the revenue breakdown by segment of major competitors, their workforces and the allocation of labor to the different business units. Hon Hai dwarfs all other competitors, especially when it comes to labor force strength. However, the company's labor force isn't very efficient; Hon Hai has the lowest revenue per employee (by far) among its peers.

| Exhibit 138 Allocation of Workforce by Business Segment Among EMS/ODM Competitors | | | | | | |
|--|----------------|--------------------|---------------|------------------|-----------------|----------------|
| | Hon Hai | Flextronics | Jabil | Celestica | Pegatron | Quanta |
| Segment Breakdown | | | | | | |
| Computers | 51% | 12% | 1% | 0% | 62% | 90% |
| Consumer Devices | 37% | 40% | 40% | 29% | 31% | 8% |
| Networking | 6% | 19% | 32% | 27% | 4% | 0% |
| Servers and Storage | 4% | 13% | 18% | 30% | 2% | 2% |
| Telecommunications | 2% | 16% | 9% | 15% | 1% | 0% |
| Workforce Allocation | 995,000 | 176,000 | 69,000 | 26,400 | 90,167 | 123,076 |
| Computers | 507,074 | 21,627 | 478 | 0 | 55,665 | 110,744 |
| % of Hon Hai | | 4% | 0% | 0% | 11% | 22% |
| Consumer Devices | 366,525 | 70,872 | 27,881 | 7,546 | 28,347 | 9,432 |
| % of Hon Hai | | 14% | 5% | 1% | 6% | 2% |
| Networking | 62,416 | 33,642 | 21,916 | 7,057 | 3,892 | 106 |
| Servers and Storage | 38,629 | 22,246 | 12,270 | 7,904 | 1,709 | 2,794 |
| 11'Q3 Revenue (USD Mil.) | 29,687 | 8,008 | 4,280 | 1,830 | 6,290 | 9,743 |
| Revenue/employee | 29,836 | 45,502 | 62,033 | 69,322 | 69,765 | 79,162 |

Source: IDC, Bloomberg L.P. and Bernstein analysis.

If these competitors wanted to pick up some of Apple's business, they would have to expand capacity materially. Exhibit 139 shows our estimates of the increases in workforce required for these companies to be able to supply 10% of 2011's iPad and iPhone production, even after accounting for the higher labor efficiency.

For example, we estimate that for Flextronics to be able to serve 10% of Apple's 2011 iPhone and iPad assembly, it would have to increase its labor force by 18% (11% for iPad and 7% for iPhones). In the case of a smaller competitor, such as Jabil, this number approaches 40% (21% for iPad, and 18% for iPhone). All this capacity expansion for a product that, as we have shown, is likely less profitable than their current product portfolios, especially for a small, focused, high-margin EMS provider such as Jabil or Celestica. However, a new, low-profitability entrant eager to make its mark, such as Pegatron, may have fewer qualms to work with Apple and act as a pressure point for Apple to keep Hon Hai "in line."

| Exhibit 139 Simulation of Workforce Required for Manufacturing 10% of iPhone and iPad Orders Among EMS/ODM Competitors | | | | | | |
|---|----------------|--------------------|--------------|------------------|-----------------|---------------|
| | Hon Hai | Flextronics | Jabil | Celestica | Pegatron | Quanta |
| Production Efficiency | | | | | | |
| Revenue/employee | 29,836 | 45,502 | 62,033 | 69,322 | 69,765 | 79,162 |
| % of Hon Hai | | 153% | 208% | 232% | 234% | 265% |
| iPad (unit/employee) | 129 | 196 | 268 | 299 | 301 | 342 |
| iPhone (unit/employee) | 587 | 704 | 704 | 704 | 704 | 704 |
| 2011 iPad Units (mil.) | 38.6 | | 10% Order | 3.9 | | |
| 2011 iPhone Units (mil.) | 88.0 | | 10% Order | 8.8 | | |

| Required Workforce for 10% of Total Unit Shipment | | | | | | |
|--|----------------|----------------|---------------|---------------|---------------|----------------|
| iPad employees | 30,000 | 19,671 | 14,429 | 12,912 | 12,830 | 11,307 |
| iPhone employees | 15,000 | 12,500 | 12,500 | 12,500 | 12,500 | 12,500 |
| Current Workforce | 995,000 | 176,000 | 69,000 | 26,400 | 90,167 | 123,076 |
| Percentage of Additional Employees Required | | | | | | |
| iPad employees | | 11% | 21% | 49% | 14% | 9% |
| iPhone employees | | 7% | 18% | 47% | 14% | 10% |

Source: IDC, Bloomberg L.P. and Bernstein estimates and analysis.

Longer term, Apple's ramping with suppliers such as Pegatron suggests that its complex supply chain — where Apple purchases many of the components directly from suppliers and then "sells" them to its manufacturing partners — has already been set up to be able to potentially shift volume across manufacturing partners. In this regard, we believe that there is an inherent asymmetry in power between Apple and Hon Hai. Specifically, we note Apple helps drive ~US\$57 billion of Hon Hai's revenues today — albeit at lower margins — and no single company could make up for that business if it migrated to another EMS vendor.

By contrast, Apple, over time, could likely migrate its volumes to other EMS vendors away from Hon Hai. The barriers to entry, such as maintaining Apple's strict confidentiality norms, have already been overcome during the company's qualification process for any current manufacturing partners. And scaling of facilities, work force and machinery — while requiring potentially 12-18 months of lead time — is essentially what EMS companies do. Indeed, we expect that incremental volumes — largely from the strong growth in iPhone and iPad — may likely increasingly be put to bid across all of Apple's EMS partners.

Nonetheless, Hon Hai's apparent comfort in taking lower margins from Apple, combined with the scaling difficulty that competitors will certainly face if they aimed to capture a large fraction of Apple's business, suggests that Apple's heavy concentration of manufacturing at Hon Hai is not at risk in the foreseeable future.

We believe Hon Hai is likely to remain as Apple's lead EMS partner for the next two or three years at least. After that, we forecast that top-line growth for Hon Hai will be materially reduced unless alternative and sustainable sources of revenue are brought to bear.

Hon Hai Precision's Venture Into the Panel Industry: A Good Idea?

Overview

Hon Hai has taken notice of the rising demand for higher resolution large-size panels, propelled by the continued technological evolution of consumer electronics and PCs. In this chapter, we highlight the company's two major investments in public panel companies, Chimei Innolux (now named Innolux) and Sharp Corporation. We discuss and evaluate the economics and details of the transactions, implications for Hon Hai, and whether these kinds of investments make sense for Hon Hai.

This was no easy task. As we've pointed out in earlier chapters, Hon Hai's vertical integration of the supply chain and its unique cross-holding investment structure result in a complex organizational structure, with the intricacy compounded by limited disclosure from the company. For details about Hon Hai's segments by investment within the supply chain and the layers of investment vehicles that ultimately own individual assets, see the chapter, "Shining Some Light on Hon Hai Precision's Opaque Corporate Structure."

Of the two investments in the panel industry, the Sharp investment, in particular, has attracted much media and investor attention. The proposed transactions involve several key subsidiaries and Terry Guo in both the Sharp parent company and the large-panel display unit, SDP (Sakai Display Products, formerly known as Sharp Display Products). Since the announcement of the transaction on March 27, 2012, Sharp's share price has dropped materially (by 63% as of December 10, 2012) and has caused both parties to renegotiate the transaction details.

Whether the deal will go through or not is unknown at the moment, with negotiations extended until March 2013. Nonetheless, we offer our opinion on whether we think the investment is a good deal based on our understanding of the transaction.

Chimei Innolux: Hon Hai's First Move Into the Panel Industry

Chimei Innolux — known as "CMI," and recently renamed simply "Innolux," in a nod to Hon Hai's de facto control of the company and to add to the confusion — is a recent creation. It was formed from the merger between Innolux Display, Chi Mei Optoelectronics (CMO) and TPO Displays on March 18, 2010.

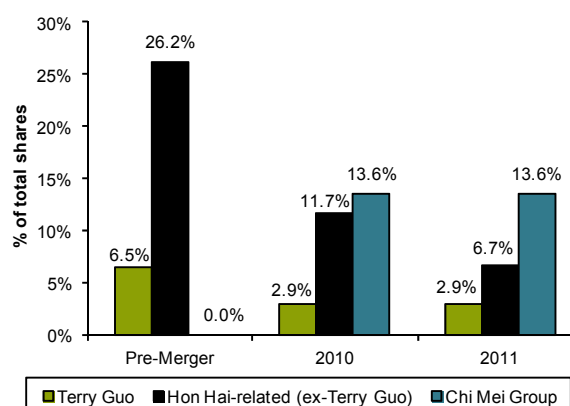
Innolux was Hon Hai's investment in the display sector, CMO was the TFT-LCD subsidiary of Chi Mei Electronics, and TPO was a small-panel joint venture between Toppoly and Philips. Prior to the merger, Hon Hai Chairman Terry Guo along with Hon Hai Precision and its affiliates were Innolux's largest shareholders, with combined 32.73% share interest and Terry Guo holding 6.53%.

As shown in Exhibit 140 and Exhibit 141, the Hon Hai group has significantly decreased its overall holding of Innolux (the former CMI) over time from 14.6% in 2010 to 9.6% currently. We have seen the ownership structure from Hon Hai-related parties become simpler, with a reduction in the number of investment vehicles going from nine to five (see Exhibit 142 and Exhibit 143). However, both Terry Guo and Chi Mei Group have maintained their Innolux stakes of 2.9% and 13.6%, respectively, during the same period.

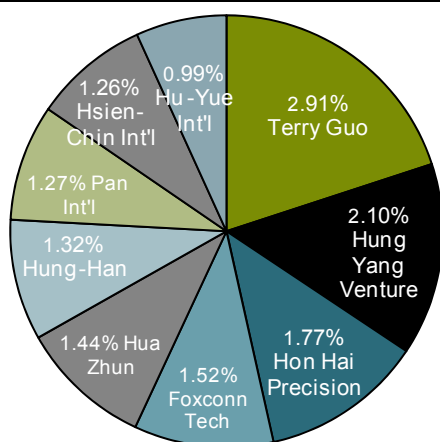
Exhibit 140 Innolux: Shareholder Structure (2012)

| Shareholders | % Holding |
|-------------------------------|-------------|
| Chi Mei Corp. | 13.6 |
| Lien-Chi Investment Co., Ltd. | 3.6 |
| Terry Guo | 2.9 |
| Vanguard Group | 2.8 |
| Hung Yang Venture Invest | 2.1 |
| Compal Electronics, Inc. | 1.8 |
| Hon Hai Precision Industry Co | 1.8 |
| Foxconn Technology | 1.5 |
| Hua Chun Investment | 1.4 |
| Hung Han Investment | 1.3 |
| Hon Hai-Related | 9.6 |
| Float % | 69.1 |

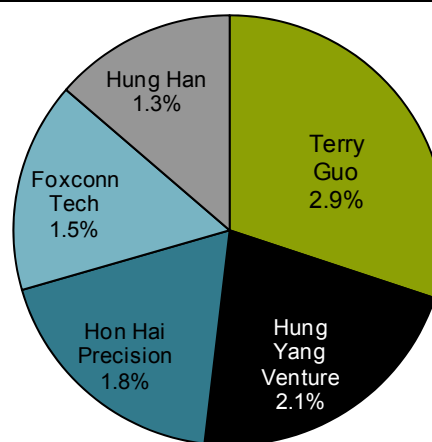
Source: Bloomberg L.P., FactSet and Bernstein analysis.

Exhibit 141 Changes of Shareholding Position in Innolux/CMI

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Exhibit 142 Hon Hai's Ownership of CMI — 2010**Total = 14.6%**

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Exhibit 143 Hon Hai's Ownership of Innolux/CMI — 2012**Total = 9.6%**

Source: Bloomberg L.P., FactSet and Bernstein analysis.

Hon Hai's reduction in shareholding has been carried out while the company consolidates its control of Innolux, even to the extent of changing the name:

- In December 2011, Liao Ching-Siang, who also serves as Chairman of Chi Mei Corporation, stepped down as Chairman of CMI.
- On March 16, 2012, CMI appointed CEO Hsing-Chien Tuan as its new Chairman, while continuing to serve as CEO. Although in "usual" governance situations having the CEO and Chairman be the same person is considered a problem, in the case of CMI it may be a qualified positive, because it vests in the same person the ability to push through the needed reforms and restructuring to move CMI toward profitability.
- One member of Chi Mei Corporation's board of directors and two supervisors simultaneously resigned their positions at CMI on May 15, 2012, effective from June 28, according to Digitimes. This further clears the way for consolidation of control of the company with the Hon Hai faction.
- Chimei Innolux changed its name to simply Innolux (the original name of Hon Hai's display unit and the de facto acquirer) in November 2012.

In terms of investment strategy, there has been very little overlap between Innolux and Hon Hai. Exhibit 144 and Exhibit 145 show the lists of subsidiaries and companies through equity method for Innolux.

Unlike Hon Hai's vast investment portfolio, Innolux's investment is more concentrated in the panel supply chain. The only company that both Innolux and Hon Hai invested in is Ampower Holdings Ltd, an upstream power supply company for the TFT-LCD industry based in Taiwan.

Overall, Innolux and Hon Hai hold over 91% of Ampower, which mainly manufactures inverters, a key component for TFT-LCD panel backlights, accounting for around 6% of total BOM. Hon Hai's investment in Ampower is a strategic move to assist Innolux in building up its vertically integrated supply chain.

| Exhibit 144 Chimei Innolux: Subsidiaries FY 2011 (TWD million) | | | |
|---|--|--------------------|-------------------|
| Consolidated Subsidiaries | Company description | Ownership % | Book Value |
| Landmark International Ltd. | Investment Holding | 100 | 33,559 |
| Innolux Holding Ltd. | Holding in Taiwan | 100 | 17,098 |
| Toppoly Optoelectronics (B.V.I.)Ltd. | Investment Holding | 100 | 2,971 |
| TPO Hong Kong Holding Ltd | Investment Holding | 100 | 2,367 |
| Chimei Lighting Technology Corp. | Marketing, distribution of parts, lighting equipment | 34 | 1,765 |
| Chi Mei Optoelectronics Japan Co., Ltd. | Marketing, distribution of parts and equipment | 100 | 1,735 |
| Chi Mei Materials Technology Corporation | Marketing, distribution of parts and equipment | 16 | 1,339 |
| Yuan-Qi Investment | Investment Holding | 100 | 1,252 |
| Leadtek Global Group | Investment Holding | 100 | 1,205 |
| Qun Yi Investment Co., Ltd. | Investment Holding | 100 | 1,114 |
| Samoa Gold Union Investment Limited | Investment Holding | 100 | 1,000 |
| Qun Cheng Investment | Investment Holding | 100 | 552 |
| Contrel Technology Co., Ltd. | Marketing, distribution of parts and equipment | 13 | 465 |
| Keyway Investment Management Limited | Investment Holding | 100 | 264 |
| Jetronics International Corp. | Investment Holding | 32 | 243 |
| Netherlands Chi Mei Optoelectronics Corp | Holding in Netherland | 100 | 135 |
| Chi Mei Optoelectronics Pte Ltd.(SG) | Marketing, distribution of parts and equipment | 100 | 6 |

Source: TEJ, FactSet, corporate reports and Bernstein analysis.

| Exhibit 145 Chimei Innolux: Companies Under Equity Method FY 2011 (TWD million) | | | |
|--|---|--------------------|-------------------|
| Consolidated Subsidiaries | Company description | Ownership % | Book Value |
| GIO Optoelectronics Corp. | Manufacturer and distribution of backlight and lightening | 24 | 606 |
| Ampower Holding Ltd. | Power Supply | 46 | 1,566 |
| Bright Information Holding Ltd. | Investment Holding | 57 | 144 |
| Global Display Taiwan Co., Ltd. | Display Panel | 23 | 45 |
| Optivision Technology Inc. | Optical Prism Film manufacturer for LCD/LED backlight | 6 | 43 |
| Bo-Jing Optoelectronics | | 15 | 17 |

Source: TEJ, FactSet, corporate reports and Bernstein analysis.

Sharp Corp: Hon Hai's Second Move Into the Display World Is Controversial

Hon Hai's more recent but controversial move into the panel sector is its venture into the large-panel league, where Hon Hai and its affiliates announced a transaction with Sharp Corp. and Sharp Display Products (SDP) on March 27, 2012. Although the deal has yet to close, delayed by the renegotiation due to the material decline in Sharp shares after the announcement, we lay out the basic economics and gauge the rationale of the proposed transactions in this section.

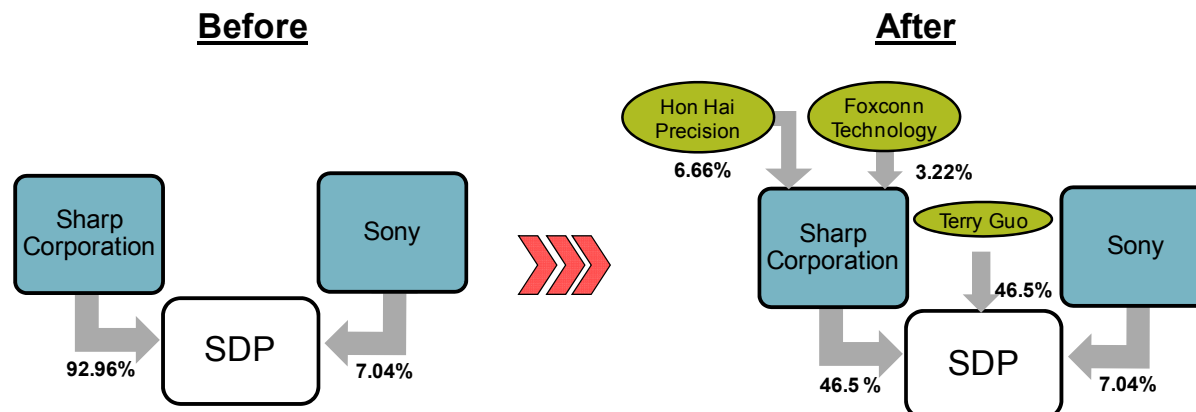
The Hon Hai group's original investment consists of two separate but simultaneous transactions shown in Exhibit 146. In the first transaction, Terry Guo, Hon Hai Precision's Chairman, and other entities including Hon Hai and Terry Guo-related investment corporations, buys 46.5% of SDP for ¥66 billion (US\$798 million).

SDP was established on April 1, 2009 as a 100% subsidiary of Sharp Corporation. On July 2009, Sharp transferred its 10th-generation TFT-LCD fab in Sakai City, Japan (then under construction) to SDP. The G10 fab produces the world's largest motherglass substrate (sized 2,880mm x 3,130mm). No fab with equal or bigger substrate size has been built by any of Sharp's competitors. SDP spent about ¥430 billion to build and operate the Sakai plant, which began mass production in fourth-quarter 2009. On December 29, 2009, Sony Corporation

invested ¥10 billion in SDP, giving it a 7.04% ownership on the venture. The original joint venture agreement called for Sony to increase its ownership stake in SDP to up to 34% by the end of April 2011. The agreement was amended in April 2011 so that Sony was relieved of its obligation to increase its ownership in SDP, keeping its ownership stake at 7.04%. The revised agreement called for a review of the investment by the end of March 2012.

The Hon Hai entities buying the 46.5% stake in SDP paid exactly the same price as Sony did in 2009. Hon Hai's investment in SDP values it at ¥142 billion. This prevented dilution of the Sony stake, and gives entry to Hon Hai entities into a deeply discounted asset. Hon Hai is planning to buy up to 50% of the TFT-LCD panels produced by SDP.

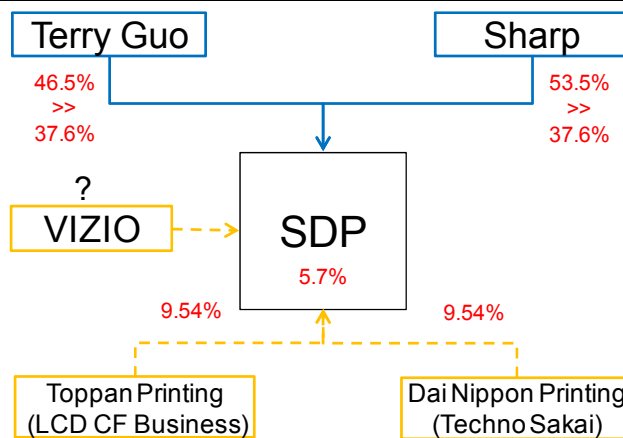
Exhibit 146 Structure of the Original SDP Transaction



Source: Company disclosures and Bernstein analysis.

On May 24, 2012 Sharp announced a second round of equity transactions for SDP, where Sony sold its stake in SDP at the same time as Terry Guo and Sharp reduced their share ownership, with "new" investors Toppan Printing and Dai Nippon Printing added. Dai Nippon Printing and Toppan Printing are Japan's two biggest printing companies, with color filter manufacturing fabs within SDP's premises, and have been supplying color filters to the JV. After the transaction (see Exhibit 147), both Terry Guo and Sharp Corp will have 37.61% of SDP's stake, and DNP and Toppan will each have 9.54% with the remaining 5.7% owned by SDP itself.

Exhibit 147 Second Round Equity Transaction for SDP



Source: Bloomberg L.P., FactSet and Bernstein estimates and analysis.

VIZIO is reportedly considering investing in SDP after Hon Hai's move. VIZIO Inc., a leading TV brand in the United States, is known for its efficient supply chain management to produce low-cost TVs. More interestingly, VIZIO has been a major TV customer for Hon Hai, which has already invested an 8% stake in VIZIO for approximately US\$1 million in April 2004. AmTRAN, a Taiwan-based ODM, owns about 23% of VIZIO. Although there has not been an official announcement regarding VIZIO's investment in SDP, VIZIO's potential investment in SDP certainly has a rationale as VIZIO plans to sell TV sets with larger screen sizes (60" and 70"), and Sharp's G10 fab is ideal for such panel sizes. Considering the existing relationship between VIZIO and Hon Hai, we believe the potential collaboration between SDP, VIZIO and Hon Hai is likely to create synergies vertically from the upstream supplier to EMS to the TV OEM.

In the second transaction, Sharp Corporation was supposed to issue new shares to Hon Hai group companies through third-party allotment. It planned to issue 121,649,000 shares at ¥550 each, an 11% premium to Sharp's closing price on Tuesday, March 27. The known details of the transaction are as follows:

- Gross proceeds from the share placement would have been ¥66.9 billion (US\$808 million) and net proceeds ¥66.47 billion (US\$803 million). Sharp indicated that it would use the funds mainly on capital investments for smaller LCD panels used in mobile applications.
- After the share issuance, Hon Hai Precision would hold a 4.06% stake in Sharp Corporation. Foxconn (Far East) Limited, a wholly owned Hon Hai Precision subsidiary, would hold 2.53% of Sharp Corporation's shares. Foxconn Technology (2354.TT, not covered), would hold 0.65%, and Q-Run Holdings would be limited an additional 2.64%. Hon Hai Precision owns 10% of Foxconn Technology's shares. In aggregate, Hon Hai group companies would control 9.88% of Sharp Corporation.
- After the transaction is completed, Hon Hai Group companies would become Sharp's single largest shareholder group, with Hon Hai Precision directly or indirectly controlling 6.66% of Sharp Corporation.

As of this writing, this second transaction, Hon Hai's investment into Sharp Corporation, has not been closed. As the deal was being negotiated, Sharp announced estimated losses far larger than originally expected, and Sharp's share price has declined precipitously. As a result, both parties are in the process of renegotiating this transaction, which is expected to "close" by March 2013.

What Would the Hon Hai Group Be Getting for Its Money?

Hon Hai group's investment has two separate elements with quite different risk profiles. On one side is the investment made primarily by Hon Hai Precision, which is a direct stake in Sharp Corporation. On the other side, Hon Hai-related entities (but *not* Hon Hai Precision) invested directly into SDP, whose main asset is the Sakai G10 plant.

The Sharp investment

Sharp Corporation is an "old line" Osaka-based diversified electronics manufacturer, with interests in consumer and information products and electronic components (see Exhibit 148). Sharp is both an OEM and a component manufacturer. Of the largest electronics manufacturers, it is one of the most vertically integrated; of the majors, only Samsung is more vertically integrated.

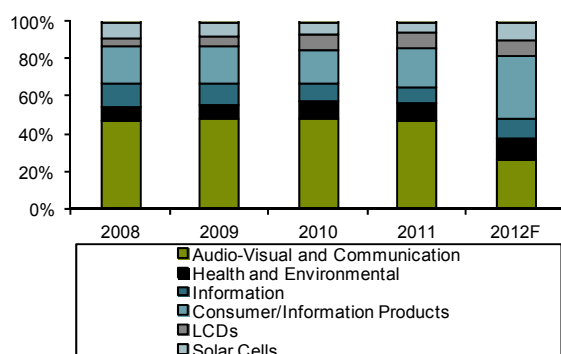
Sharp was once a leader in the development and commercialization of TFT-LCD, and remains a leader in display technology, solar cells and advanced electronic components and materials, including lasers, ceramics and semiconductor technology. Its TFT-LCD business is expected to contribute about 9% of revenues in 2012. Sharp's revenue base is geographically diversified, and remains a major integrated OEM (see Exhibit 149 and Exhibit 150).

Exhibit 148 Sharp Corp: Summary of Revenues by Product Lines (¥ billion)

| Product Category | 2008 | 2009 | 2010 | 2011 | 2012F |
|--|--------------|--------------|--------------|--------------|--------------|
| Audio-Visual and Communication Equipment | 1,625 | 1,368 | 1,332 | 1,426 | 710 |
| YoY growth rate (%) | -100% | -16% | -3% | 7% | -50% |
| Health and Environmental Equipment | 250 | 225 | 244 | 270 | 310 |
| YoY growth rate (%) | - | -10% | 8% | 11% | 15% |
| Information Equipment | 411 | 306 | 267 | 274 | 290 |
| YoY growth rate (%) | -100% | -25% | -13% | 3% | 6% |
| Consumer/Information Products | 2,285 | 1,899 | 1,843 | 1,970 | 1,310 |
| LCDs | 680 | 574 | 509 | 614 | 880 |
| YoY growth rate (%) | - | -16% | -11% | 21% | 43% |
| Solar Cells | 151 | 157 | 209 | 265 | 230 |
| YoY growth rate (%) | - | 4% | 33% | 27% | -13% |
| Other Electronic Components | 298 | 217 | 195 | 172 | 270 |
| YoY growth rate (%) | - | -27% | -10% | -12% | 57% |
| Electronic Components | 1,129 | 948 | 913 | 1,052 | 1,380 |
| Total | 3,415 | 2,847 | 2,756 | 3,022 | 2,690 |
| YoY growth rate (%) | -100% | -17% | -3% | 10% | -11% |

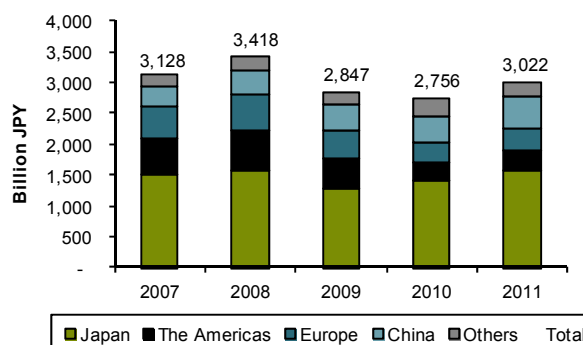
Note: Fiscal year ends March 31; forecast is from the management at earnings conference calls.

Source: Company disclosures and Bernstein analysis.

Exhibit 149 Sharp Corp: Annual Sales Distribution by Products

Note: Fiscal year ends March 31; forecast is from the management at earnings conference calls.

Source: Company disclosures and Bernstein analysis.

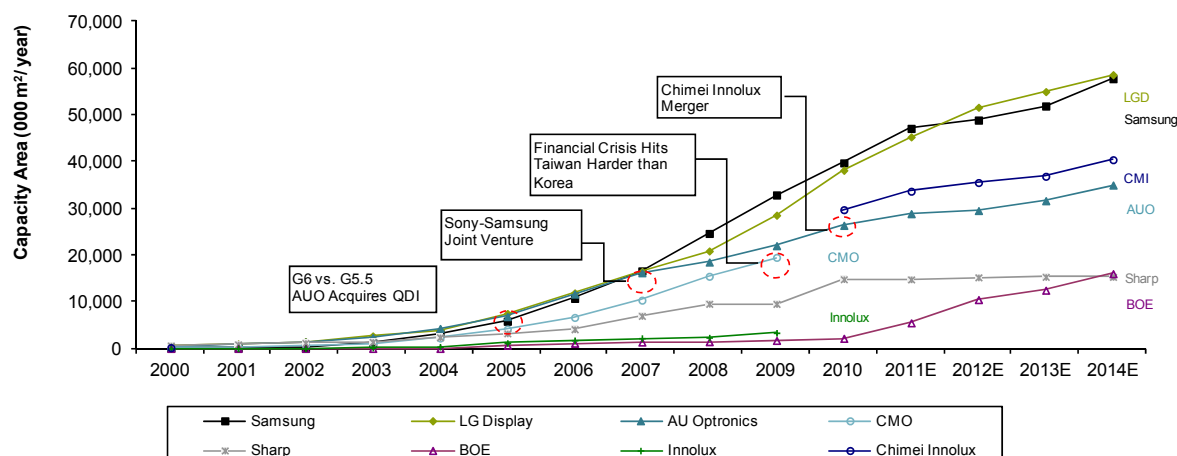
Exhibit 150 Sharp Corp: Annual Sales by Regions

Note: Fiscal year ends March 31.

Source: Company disclosures and Bernstein analysis.

Of particular interest is the TFT-LCD business. In terms of total area capacity, Sharp is ranked No. 5 in areal capacity and is the only Japanese player among the major TFT-LCD players by areal capacity (see Exhibit 151). At one point, Sharp commanded more than 80% of TFT-LCD unit share. Since then, Sharp has been surpassed by more aggressive and faster-moving Korean and Taiwanese competitors, and its share has dwindled to high single digits.

The "crown jewels" of Sharp's display business are the Kameyama fabs and the Sakai fab. The Kameyama fabs were some of the earliest large panel fabs, and in the beginning they were some of the most advanced fab operations. Both Kameyama fabs were recently decommissioned and retrofitted with leading-edge backplane technologies, including Indium-Gallium-Zinc Oxide (IGZO) and LTPS, primarily for high-resolution displays. The Kameyama fabs are being ramped up in 2012.

Exhibit 151 Area Capacity of Major Players in TFT-LCD Segment

Source: DisplaySearch and Bernstein analysis and estimates.

Sharp owns 10 fabs in Japan; of those, two are G8 fabs and one is a G10 fab (see Exhibit 152). The G10 fab, which is the major asset of the SDP subsidiary, is the single largest fab for Sharp, with about half of Sharp's total area capacity. The other fabs remain part of Sharp Corporation.

Exhibit 152 Sharp Corp: List of Fab Facilities and Monthly Average Panel Production

| Area Capacity ('1000 m ²) | | | | | 2011 | | | | 2012 | | | |
|---------------------------------------|-------------|-------------|-------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Factory | Application | MG Size | Tech. | Gen. | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| FJT Yonago #2 | LCD | 404 x 515 | a-Si | 2.5 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 3 |
| SHP Kameyama 2 | LCD | 2160 x 2460 | a-Si | 8 | 436 | 436 | 436 | 329 | 329 | 197 | 143 | 80 |
| SHP Kameyama 2 IGZO | LCD | 2160 x 2460 | IGZO | 8 | | | | 53 | 106 | 239 | 292 | 345 |
| SHP Kameyama LTPS-C | LCD | 1500 x 1850 | LTPS | 6 | | | | | 14 | 33 | 56 | 56 |
| SHP Sakai 1 | LCD | 2880 x 3130 | a-Si | 10 | 649 | 649 | 649 | 649 | 649 | 649 | 649 | 649 |
| SHP Taki CGS-B | LCD | 730 x 920 | LTPS | 4 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| SHP Taki Plant No1A | LCD | 550 x 650 | a-Si | 3 | 18 | 18 | 18 | 18 | 18 | 11 | | |
| SHP Taki Plant No2C | LCD | 680 x 880 | a-Si | 3.5 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| SHP Taki Plant No2D | LCD | 680 x 880 | a-Si | 3.5 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| SHP Tenri CGS-A | LCD | 620 x 750 | LTPS | 3.25 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Total | | | | | 1,245 | 1,245 | 1,245 | 1,192 | 1,259 | 1,271 | 1,282 | 1,268 |

Source: DisplaySearch and Bernstein analysis.

Of particular interest is Sharp's IGZO technology. In collaboration with Semiconductor Energy Laboratory, a private research organization, Sharp developed IGZO technology to meet the increasing demand for high-resolution small- and medium-size LCD panels. From a technological perspective, IGZO replaces amorphous silicon for the active layer of a LCD screen, and with a 20-40x higher electron mobility than amorphous silicon, it allows smaller pixels or higher reaction speed for a screen.

From a commercial perspective, Sharp's new LCD technology features performance on par with that of LTPS but can be mass produced on existing amorphous-silicon TFT LCD production lines. In other words, the conversion cost of a fab is much cheaper than constructing a new production line.

IGZO technology is ideal for smartphones and tablet PCs, which have been driving the rapid growth in unit shipments. There is a possibility that Apple will use IGZO-based displays from Sharp for future generations of iPhones and iPads. A number of iPad 3 panels with Retina Display have been made using Sharp's IGZO technology.

The SDP investment

The SDP investment is done not by Hon Hai Precision directly, but by Hon Hai group companies controlled by Terry Guo.

SDP's main asset is the Sakai G10 plant. The G10 plant has been an albatross around Sharp's neck, a major strategic misstep and a source of much of Sharp's recent financial troubles. The Sakai plant was the result of a "natural" progression in TFT-LCD motherglass, where the expectation was that, even though larger motherglass would carry higher absolute costs, the per-unit cost would continue to steadily decline, given the larger production per motherglass. However, there is a limit to that progression, and the Sakai plant went past that optimal point in a number of ways.

Larger and larger motherglass costs more in absolute terms. And the cost doesn't involve just the glass, which is more expensive per unit area. All the ancillary manufacturing equipment needs to scale up non-linearly with glass area. Larger glass area requires bigger equipment, larger vacuum chambers, more spacious (and expensive) cleanrooms, and tooling that becomes more expensive both from the larger size and the finer tolerances required to handle the larger glass.

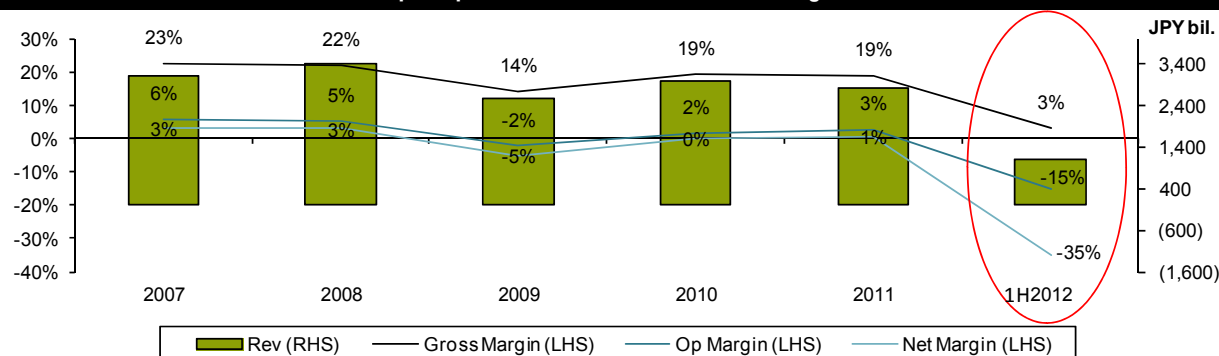
If the rate of absolute capex and cost increase is slower than the cost reduction per unit of production from the larger capacity, the per-unit cost decreases monotonically, and the cost curve is downward-sloping. However, unlike semiconductor manufacturing, larger substrates (silicon wafers in the case of semiconductors, motherglass in the case of TFT-LCD) do not carry materially larger value-added per unit area.

In other words, TFT-LCD pixel technology does not obey Moore's Law. Making a pixel smaller as the substrate size increases does not generate higher margins, unlike the case of semiconductor processing, where wafer scaling upward and transistor scaling downward go hand-in-hand to drive unit costs down, while maintaining (or improving) margins. Hence, the substrate scaling in TFT-LCD has a limit — the cost curve isn't downward sloping, it is U-shaped, and it is possible to make a substrate "too large." The Sakai plant has gone past that limit, and its economics are quite challenged, as we discuss later.

Complicating the picture is the fact that the Sakai G10 plant is optimized for making large TV panels (55"+ is the "sweet spot" for this fab), and given its capacity, lots of them. So many, in fact, that its production capacity far exceeds demand for such panels, and the fab has had consistent problems ramping up to scale, and has been a clear financial disaster from the perspective of Sharp's investment.

In summary, the Sakai plant makes too many panels of sizes nobody wants, at higher costs than competitors. Making more "accepted" panel sizes (such as 42" or 47") is not feasible either. Given the motherglass size, it would make even more of them (18 panels per motherglass, against eight panels for a G8) at a cost structure that is demonstrably inferior to that of a well-optimized G8 fab.

As a result of this strategic mistake, Sharp's financial position in the last few years has deteriorated materially (see Exhibit 153). In particular, gross margins were in the 20% area prior to 2012, and now have declined to merely 3%, and operating margins have declined to -15% for the first six months in FY 2012-13. This is in spite of Sharp's enviable position as both a well-known and valuable OEM brand and a leader in high-margin component technology.

Exhibit 153 Sharp Corp: Consolidated Revenue and Margins

Source: Company disclosures and Bernstein analysis.

Does the Hon Hai Investment Make Sense Financially?

Although with hindsight Hon Hai's Sharp investments were not sensible, everything has a price. Moreover, Hon Hai may be buying into Sharp and SDP at a point in their valuation where it may make sense for such an investment. We review the evidence in the following sub-sections.

The Sharp investment

As for the Sharp investment, the Hon Hai group would be buying into Sharp at historically low valuations. Sharp reported a record ¥376 billion (US\$4.7 billion) loss for the year ending March 2012 as it struggled with weak demand for TFT-LCD, especially at the panel sizes where the Sakai plant is most cost-effective. Continued low profitability and losses have driven down valuations, and the entire firm is trading at P/BV multiples below 1.0 (currently at 0.3x), implying that Sharp will not return its cost of capital in the future (see Exhibit 154).

Exhibit 154 Sharp Corp: Price-to-Book Multiple

Source: Bloomberg L.P., Capital IQ and Bernstein analysis.

However, much of that valuation compression is from the severe underperformance of the Sakai fab, which we believe *should* be valued below 1.0x P/BV in a steady-state, given Sharp's estimated ¥430 billion investment in the fab. Although difficult to estimate, "netting out" the Sakai fab from the rest of Sharp leaves a company in relatively good operational form and with a quality product and technology portfolio (in both components and technologies such as solar and a brand that remains with some value) that one would expect would generate returns above its cost of capital in the future, and hence a P/BV valuation of at least 1.0x.

But we also need to consider that a high debt load and financial distress have pushed the firm to the brink of bankruptcy. Given the (currently) high likelihood of bankruptcy, we would not be surprised if Hon Hai abandons this investment, waiting for a restructuring where it could pick up assets for even less than their current implied value.

The SDP investment

As we have previously quantified, the TFT-LCD panel segment is value-destroying — and that is simply because it engages in negative-NPV projects (i.e., TFT-LCD fab construction) as part of its core business. For details on our analysis, see the report, [TFT-LCD: Are Capital Expenditure Reductions the Catalyst We Have Been Waiting For?](#) published October 12, 2011.

In the course of our analysis of the panel industry, we have developed fairly comprehensive TFT-LCD fab models, which allow us to determine the NPV of a fab as an investment project. As an example, Exhibit 155 shows the details of the investment requirements for a greenfield G10 fab, such as the Sakai plant, including the land conditioning and utilities build out.

| Exhibit 155 | | Bernstein's G10 Fab Model Outline | | | |
|-------------------|-------------------------|-----------------------------------|--------------|--------|--------|
| TFT-LCD Fab Model | | Capex (USD Millions) | Year 1 | Year 2 | Year 3 |
| Generation | G10 | Construction + Utilities | 977 | | |
| Substrate Size | 2880mm x 3130mm | Clean Room | 401 | 332 | |
| Major Product | 42" Wide TV | Equipment | | 2,893 | 283 |
| Ups | 18-up | | | | |
| Capacity | 72,000 substrates/month | Total | 4,886 | | |
| Fab Life | 15 Years | | | | |

Source: DisplaySearch and Bernstein analysis and estimates.

We model two cleanroom buildings, a class 10 cleanroom for the cell fab, and a class 1,000 room for the module factory. The two buildings are assumed to be sited in the same facility, and to utilize the same utilities and overheads. Equipment includes all G10 tooling required for full cell manufacture and assembly, including motherglass cutting, backlight assembly, optical and electrical testing, and packaging.

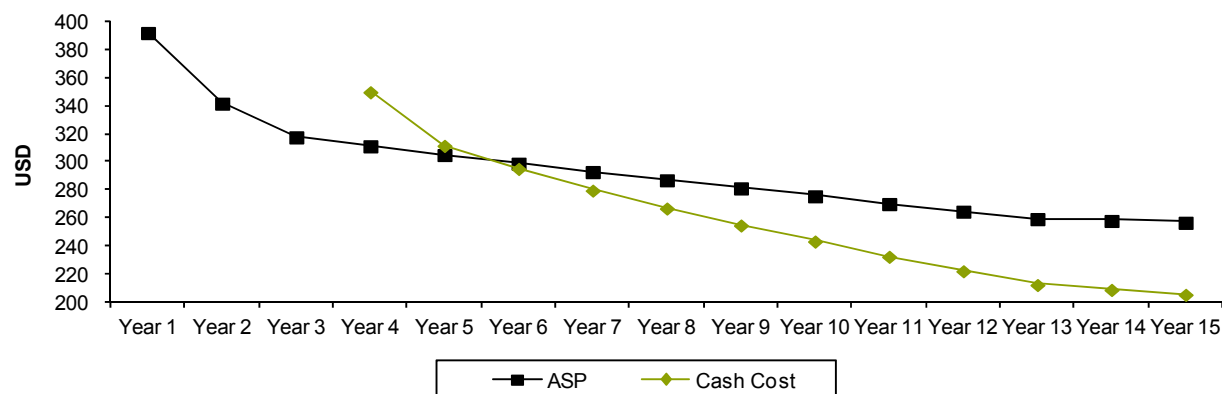
We estimate that the land conditioning and utilities build-out would take about 18 months, and another 18 months for building construction, equipment installation and ramp-up. Ramp-up can only proceed once all equipment is installed, although in practice it is customary to ramp up individual production lines even as equipment is being installed. A faster ramp-up improves project NPV, because it can generate revenue quicker and at higher ASPs.

Our calculations indicate that the total capex over the three-year investment period is about US\$4.9 billion, broken up according to Exhibit 155. In general, fabs are built as "brownfield" as much as possible, to take advantage of utilities and land conditioning, plus engineering and surrounding support facilities. In that case, utilities and conditioning, which is about US\$750 million for a G10 fab, can be saved, improving the project economics.

We assume a standard six- to nine-month ramp-up to full production, with steady state yields of 99% at each process step (cell, color filter and modularization). A 72,000 substrate-per-month G10 fab can produce 15.5 million 42" TV panels a year at 100% yield, and about 15.1 million TVs at operational

yields. We assume TV panel ASPs and unit cash costs to follow the profile in Exhibit 156, where production starts in Year 4, and the first year's cash contribution is negative, given initially low production volumes and yields, but full-fab overhead costs.

Exhibit 156 ASP and Cash Cost per Panel for 42" Wide TV Panel

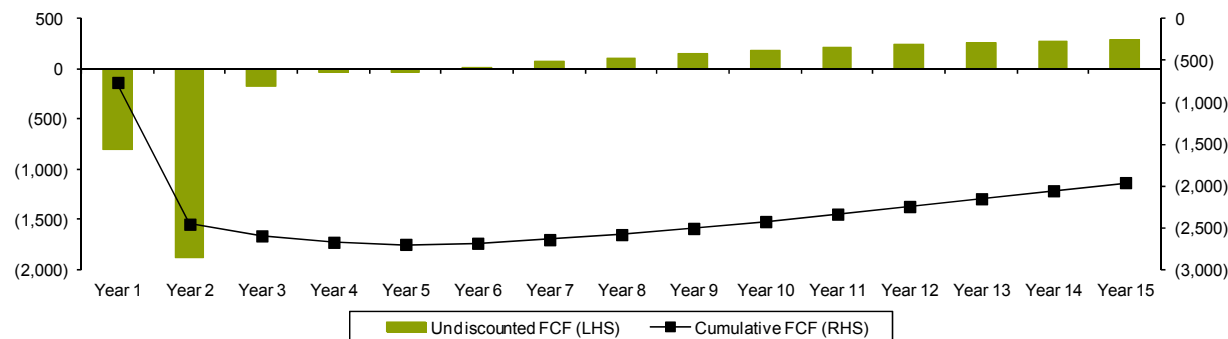


Source: DisplaySearch and Bernstein analysis and estimates.

This is consistent with greenfield fab economics. What is *not* consistent, and where we are being particularly conservative, is our assumption that ASPs drop more slowly than cash costs, improving fab economics toward the later years of the forecast. This is not usually the outcome, but we model it to prove the point about the poor fab economics.

Exhibit 157 shows the yearly cash flows of such a model fab, given the ASPs, cost structures and investment costs we have assumed. We overlay the discounted cumulative cash flows, at an 8% discount rate. The cumulative cash flow line crossing the x-axis would correspond to the period when the project turns NPV positive. As can be seen, our fab does *not* turn NPV positive during the fab lifetime. As a matter of fact, it never does.

Exhibit 157 Yearly Free Cash Flow and Cumulative Discounted Free Cash Flow for Model Fab (US\$ million)



Source: DisplaySearch and Bernstein analysis and estimates.

Even from this simple, but realistic model, it is clear that the front-loaded capex, which has only had small reductions over the last few years for a given fab capacity and glass generation, completely overwhelms the cash contribution per unit multiplied by the units of production. A quick analysis shows us that, of the US\$4.9 billion spent in a fab such as SDP's Sakai plant, about US\$1.7 billion is dissipated value. Put another way, for every dollar invested in a TFT-LCD fab, it destroys about 35 cents in value.

However, once the investment has been made, and the initial capex "sunk," the remaining cash flow profile does have a net present value, for which one may pay a certain amount. A quick calculation indicates that this is worth about US\$3.2 billion, and hence a 46% stake in this stream of cash flows would be worth approximately US\$1.5 billion, assuming the fab is running at high utilizations.

The Hon Hai group pays US\$798 million for its stake in SDP, so even accounting for current 50% utilization rate, the price paid is close to "fair." Any upside in utilization (both in output and margin expansion) of the Sakai fab will be pure profit for Hon Hai group investors.

Why the Dual Investment Structure and What Is the Strategic Rationale for the Investment?

Questions we have gotten from investors are about why the Sharp transaction is worth doing — and why this deal is structured as such, with a complicated investment profile and two sets of investors. After some reflection, we believe this investment structure is a creative way of risk-shifting and apportioning value to the entities best prepared to both capture the upside and deal with the risk:

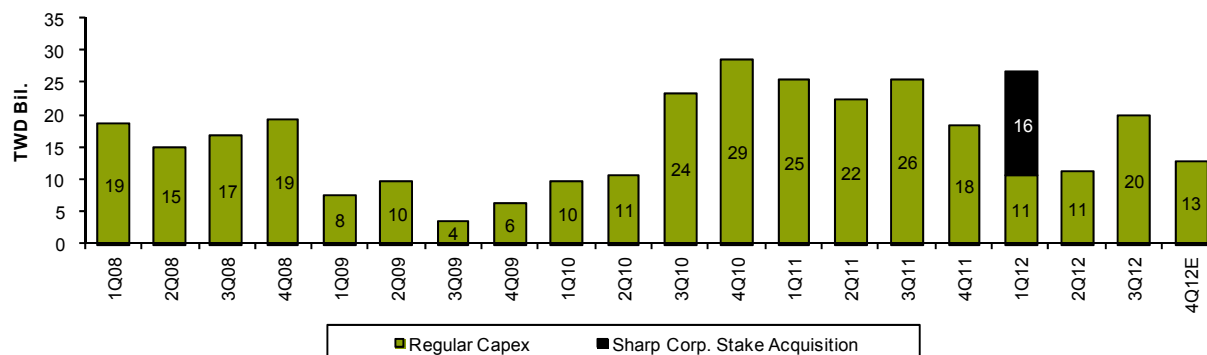
- From the perspective of Hon Hai Precision, it is under constant pressure from its major customers, especially Apple, and any way to gain leverage over them is positive for Hon Hai Precision's strategic positioning. By investing in another major supplier for Apple, Hon Hai is able to both capture some of the key component margin, and provide some negotiating leverage for Sharp as a supplier to Apple.
 - The investment also diversifies the customer base, especially in the TV business, where Hon Hai Precision is overly dependent on Sony. With this investment, Hon Hai gains Sharp as a customer, and also gains access to Sharp's panel customers, especially in the very large panel segment, where Sharp has a major presence.
 - Sharp's display technology and R&D is second to none, and only Japan Display comes close. By becoming a large investor in Sharp, Hon Hai Precision gains access to these technology developments and value-creating opportunities, at a very modest valuation, or even out of bankruptcy or a court-appointed restructuring.
 - The creative aspect of the transaction is how Sharp's downside risk is partially shifted away from Hon Hai Precision and onto Terry Guo's investment vehicles. By Hon Hai Precision investing directly in Sharp, it is buying the "good with the bad." It gets access to the R&D, the Kameyama state-of-the-art facilities, the solar business and the OEM value-added products. But that comes at a price: the SDP unit, with its underperforming Sakai fab. By buying into Sharp, but simultaneously "selling" some of the risk to Terry Guo's and his investment vehicles, Hon Hai transfers both the underperforming asset and the drag on valuation multiples to third parties. By structuring the deal as such, the company retains access to the parts of Sharp that have value to Hon Hai Precision, while "hedging" the riskier bits.
 - One would expect that Terry Guo and his investment vehicles know something we don't. He's buying into an asset at "fair value," given by the present value of its cash flows, and at the same time taking the downside (and upside) risk of the Sakai fab underperforming (or outperforming) in the future. By not saddling Hon Hai Precision with much of this risk, it makes the transaction value accretive to Hon Hai — a "cheap" way to play the technology innovation game without having to take on risks it is not prepared to bear. The Sakai upside (for example, from something such as the Apple iTV) would benefit Terry Guo's investment vehicles disproportionately, but would also provide upside to Hon Hai Precision shareholders. If whatever the Sakai fab is slated for fails, Terry Guo and his investment group will suffer all the downside.
-

In summary, we think the Sharp transaction, which at first appears inscrutable and value-destroying, is in fact an opportunistic play on a valuable asset, structured in a way that unlocks value for the parties involved. Of course, there are risks to Hon Hai Precision of this transaction (not to mention to Terry Guo).

First, the investment, even if made at a "good" price, could still drop in value, which may require Hon Hai Precision to take an impairment charge or a write-down. We do not know where Hon Hai intends to book the purchase, but it would likely be in "Long Term Investments." If the cash purchase had been made in first-quarter 2012, that would have represented over twice the capital expenditure estimate for the quarter (see Exhibit 158). Hon Hai can easily finance the purchase; the TWD 16 billion is roughly 6% of estimated cash balances.

Exhibit 158

Sharp Stake Acquisition Relative to Hon Hai Historical Capital Expenditures



Source: Capital IQ, company disclosures and Bernstein analysis.

Second, a more dangerous downside is that Hon Hai is unable to capitalize on the "riches" that Sharp may offer. The collaboration that is desired or expected may not materialize, and the "synergies" from the investment not realized. This is a very real possibility, and leaves Hon Hai exposed to only capturing a pure financial upside from the transaction.

However, we would like to stress that although the Sharp transaction may be valuable for Hon Hai Precision and the Hon Hai group, it is *not* good news for the TFT-LCD industry. Through this investment, not only is underperforming capacity kept "alive," but it gives the Sakai fab a "second wind" in trying to ramp up production closer to capacity, exacerbating the supply-demand imbalance that is structural to the industry. This is particularly damaging to AUO and LG Display, and it works against the sector re-rating.

As of this writing, the Hon Hai Precision-Sharp transaction remains in limbo, with negotiations continuing. However, the Terry Guo-SDP transaction has closed, and SDP has begun to ramp up production of low-cost 60" TV panels for sale through Hon Hai's OEM partners in Taiwan and elsewhere, as we predicted.

Our current prediction on the Hon Hai Precision-Sharp deal is that it will be abandoned — and Hon Hai will wait until Sharp is restructured to pick up certain choice assets from Sharp, such as its TV EMS operations, which would be revenue and (likely) profit accretive to Hon Hai.

Rising Labor Costs and the Financial Impact of the Fair Labor Association Audits

Overview

After a spate of well-publicized suicides and industrial accidents in 2010-11, Hon Hai materially increased salaries and made improvements to working conditions in an attempt to both defuse and remedy the situation. Although the media and the court of public opinion were placated for a period, pressure on Apple from U.S. labor rights institutions and the media led it to finally agree to meet the conditions imposed by the Fair Labor Association (FLA) in order to join the group. As a result of Apple joining the FLA, Hon Hai was required to participate in a comprehensive audit by the FLA on working conditions at Apple-related Hon Hai factories.

In this chapter, we use data from February 2012's landmark FLA audit to take an in-depth look at Hon Hai's labor costs. In particular, we estimate 2012's headcount by Apple business production lines and the increases required to meet the FLA audit requirements; size the short- and medium-term costs of implementing the audit; gauge the timing and size of those costs that will be transferred to customers; and estimate the impact to Apple's bottom line. We also review the progress report that FLA published in June 2012 and compare it against the initial recommended measures to see the remaining impact on Hon Hai's financials.

We expect Hon Hai's labor compensation in 2012 to rise 31% in total, of which 14% is an increase in headcount from higher unit shipments (fully passed on to customers) and 15% are salary increases. The 15% increase in salaries will put Hon Hai's average monthly compensation at RMB 2,875.

Those numbers assume no change in productivity. If we assume a 10% productivity improvement in 2012, then the increase in the company's labor costs will be around 18%, mainly because of the 15% rise in the average salary. Consequently, most of Hon Hai's non-pass-through increase in labor expense can be mitigated through productivity improvements.

Because of higher volume of unit shipments for Apple, we estimate a 27% increase in Apple-related employees in 2012 assuming no improvement in productivity. If there is a 10% improvement in productivity, the Apple-related headcount will rise 14%, according to our analysis.

We estimate the audit will boost Hon Hai's total labor costs by about TWD 40 billion, equal to a gross margin impact of about 90 bps. We expect that Hon Hai will be able to pass on, over time, most of these costs to its customers, but still will bear a 20 bps margin drag, which we have incorporated in our models. Assuming that Apple pays entirely for the increased labor costs associated with its business at Hon Hai (which we estimate would amount to TWD 16 billion or US\$540 million), it would negatively impact Apple's estimated FY12 gross margins by a relatively immaterial 30 bps.

A Review of the FLA Audit Findings and Recommendations That Hon Hai Has Agreed to Implement

The FLA audit of Hon Hai surveyed 35,000 randomly selected workers, conducted onsite and offsite interviews of workers and management, logged 3,000 staff-hours inside the factories, and inspected 12 months of payroll and time records. The audit involved a thorough look at Apple-related operations in Guanlan, Shenzhen and Chengdu by about 20 FLA staffers and a number of FLA-accredited subcontractors and monitoring organizations. The audit took about three to four days per site.

It included a compliance assessment using the Sustainable Compliance (SCI) methodology developed by the FLA as well as surveys, both small-scale (one-on-ones and focus groups) and large-scale (electronic surveys). The surveys asked workers about "perception and satisfaction" of working hours, wage and benefits, health and safety, working environment, and the atmosphere within the factory.

The audit found more than 50 different violations of FLA standards, which are expected to be remedied in a timeline ranging from immediately to two years, depending on the severity of the violation and the difficulty in remedying the situation. The findings uncovered the following, based on worker and management perceptions and interviews.

- **Working hours.** The average number of hours worked per week exceeded FLA code standards (60 hours per week including overtime) and Chinese legal limits (40 hours per week and maximum of 36 hours of overtime per month, which is effectively 9 hours per week) for all three factories surveyed. The sample surveyed averaged 56 hours per week, with maximum weekly working hours averaging 61 hours per week, and nearly half of employees indicated there had been periods when they worked 11 consecutive days without a mandated 24-hour break. Of surveyed employees, 48% thought hours were reasonable, 34% would like to make more money, and 18% felt they worked too much. Ironically, all discussions found employees raising concerns that stricter regulations on hours would lower their income. The root cause was attributed to "high labor turnover (1.3-1.9 years in tenure on average between campuses), which undermined efficiency, and gaps in production and capacity planning."
- **Health and safety.** Of the employees surveyed, 2% felt that the factory did not provide sufficient protective equipment and facilities to prevent work injuries of workers, 62% thought the factory partly met these requirements, and 35% said the factory absolutely did satisfy the necessary health and safety needs. Of the respondents, 43% have experienced or witnessed an accident. Aluminum dust was of particular concern and was the cause of an explosion in Chengdu last year.
- **Industrial relations and worker integration.** Workers were largely alienated from safety and health committees, unaware of committees' existence or role, and had little confidence in the management of health and safety issues. Committees were also composed of candidates nominated by management for election. The committee was mostly reactive in nature.
- **Wage rates.** Hon Hai wages are above the Chinese average and legal minimums. Of the survey respondents, 64% thought the salary was not sufficient to cover basic needs — but this number was 72% in Chengdu, where wages were lower. Basic monthly pay in Longhua and Guanlan is RMB 2,200 after probation. Survey respondents' average monthly salary in Chengdu was RMB 2,257 versus RMB 2,687 in Longhua, and RMB 2,872 in Guanlan. Unscheduled overtime was not fairly compensated as only blocks of 30-minutes were counted, while partial blocks went unpaid.
- **Social insurance.** The social insurance system is still patchy and does not allow workers to claim benefits in their hometown if they have worked out-of-province, and the provinces involved have not established institutional mechanisms to transfer the relevant funds. As a result, many workers are not enrolled in the employment and maternity insurance systems. This is most prominent for the Guanlan and Longhua campuses in Shenzhen, where 95% of work force is migrant, in contrast with 47% for Chengdu.
- **Intern employment.** In 2011, 2.7% of workers were interns, who were found to work overtime and night shifts, in violation of regulations governing internships. Interns, by regulation, are not protected by labor laws. Hon Hai only provides injury and health insurance, but not personal accident and liability insurance, which are covered by their schools.

Recommendations That Hon Hai Has Agreed to Implement

Hon Hai has agreed to the following remedial actions from the issues identified above:

- **Working hours.** Hon Hai has agreed to full legal compliance on work hours by July 1, 2013, and will need to increase employment to maintain current levels of output, productivity and quality.
- **Health and safety.** Hon Hai is remediating risks related to aluminum dust, blocked exits, lack of or faulty personal protective equipment, missing permits, and the way accidents are recorded (all types instead of only work stoppage related).
- **Industrial relations and worker integration.** Hon Hai has agreed to ensure elections of worker representatives without management interference. All workers will receive a Collective Bargaining Agreement and new employees will receive information about union activities during orientation.
- **Wages and insurance.** Hon Hai will pay for overtime in units of 15 minutes and for work-related meetings outside regular hours. It will investigate alternative private options to provide unemployment insurance to migrant workers, and work with government agencies to expedite the transportability of benefits. For interns, Hon Hai will put together a better protection system necessary for a more productive, healthy and safer experience.

Wage Rate Increases from Higher Base Pay and Reduced Overtime Limits

Hon Hai manufactures Apple products — iPads, Macs, iPhones and iPods — and their relevant components in three geographical locations: Shenzhen, Chengdu and Zhengzhou. Both Chengdu and Zhengzhou were constructed recently, and the facilities are specifically optimized for iPads and iPhones, respectively. Exhibit 159 shows some employee statistics for the Shenzhen and Chengdu facilities.

| Exhibit 159 Estimated Demographic Characteristics of Employees on Apple Production Lines | | | | | |
|---|--|---|--|--|---------|
| | Shenzhen | | Chengdu | Estimated Employees on Apple Production | |
| Campus: | Guanlan | Longhua | | | |
| Division: | iDPBG | iDSBG | SHZBG | | |
| Total number of workers | 73,237 | 66,680 | 38,393 | | 400,000 |
| Gender | | | | | |
| % male | 67% | 63% | 64% | 65% | 258,827 |
| % female | 33% | 37% | 36% | 35% | 141,173 |
| Average age (years) | 23.1 | 23.1 | 23.4 | 23.2 | |
| Average tenure (years) | 1.86 | 1.66 | 1.27 | 1.76 | |
| Employment by occupation | | | | | |
| Operators (%) | 90.7% | 91.1% | 82.3% | 88% | 352,173 |
| Managers (%) | 0.1% | 0.1% | 0.1% | 0% | 333 |
| Line/floor supervisors (%) | 6.4% | 4.9% | 6.6% | 6% | 23,920 |
| Engineers/technical (%) | 2.8% | 3.9% | 11.0% | 6% | 23,573 |
| Employment by status | | | | | |
| Permanent/regular (%) | 96.9% | 99.8% | 100.0% | 99% | 395,613 |
| Interns (%) | 0.1% | 0.2% | | 0% | 580 |
| Other (%) | 3.0% | | | 3% | 12,000 |
| Young workers (16 to <18 years) (%) | 3.6% | 4.9% | 5.5% | 4.7% | 18,693 |
| Migrant workers (%) | 99.0% | 99.2% | 14.2% | 70.8% | 283,187 |
| Living in the dormitories (%) | 29.3% | 37.5% | 69.6% | 45.5% | 181,907 |
| Province (% of top 4) | Henan: 20.9% Hunan: 16.4% Hubei: 15.4% Guangxi: 12% | Henan: 20.1% Hunan: 18.1% Hubei: 15.4% Guangxi: 9.5% | Sichuan: 84.8% Chongqing: 2.5% Hubei: 2.2% Shanxi: 1.6% | | |

Source: FLA reports and Bernstein estimates and analysis.

The Shenzhen campuses, Guanlan and Longhua, are more established and manufacture a more diversified basket of products for a wider client base. Although the average age and gender composition is similar across facilities, we find the average tenure of Chengdu employees is shorter than that of Shenzhen due to the newness of the facility. This means the average salary level for Chengdu factories will be lower, as the salary increases have less impact on employees in their probationary period. Additionally, migrant workers account for only 14.2% of the staff in comparison with over 99% in Shenzhen. Having a smaller portion of migrant workers leads to a lower turnover rate, and potentially easier access to social insurance schemes with the local governments.

Two things jumped at us during our visit to the Longhua campus in October 2011. One is the recruiting machine surrounding the campus entrance and periphery areas — not just for candidates for the Longhua campus, but also to staff new retail stores in the Zhengzhou campus. The other notable feature was the nets for all buildings to prevent suicides.

Ads and recruitment centers for the Shenzhen Longhua campus in mid-2011 advertised a starting base salary of RMB 1,550 per month, progressively increasing to RMB 3,000-3,300 per month including overtime, after nine months and passing a qualifying test (see Exhibit 160 and Exhibit 161). This is much better than the minimum wage of RMB 1,500 per month in Shenzhen — an almost 100% premium. According to the Labor and Social Security Bureau, the average salary in Shenzhen as of 2011 was about RMB 5,021 per month, based on a government survey. "Medium-level" (presumably median) salaries were about RMB 4,595 per month, and average low-end salaries were at RMB 3,000 per month.

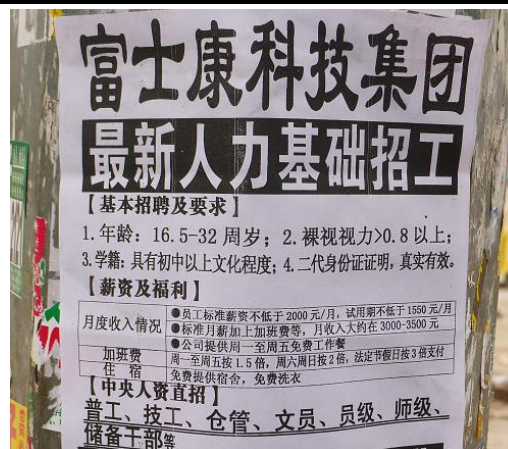
Exhibit 160 Salary for Entry-Level Operator at Hon Hai — Per Month in RMB

| | |
|---|-------------|
| Salary | |
| Base salary | 1,550 |
| Comprehensive Salary including Overtime | 2,500 |
| Base Salary after 6 months probation | 1,650 |
| Base Salary after 9 months and passing qualifying test | 2,000 |
| Comprehensive Salary after 9 months and passing qualifying test | 3,000-3,300 |

Benefits

Bonus
Insurance
11 days paid holiday per year
Training and development

Exhibit 161 Ad for Admin Hiring on Periphery of Longhua Campus



Source: Hon Hai Precision employment office and Bernstein analysis.

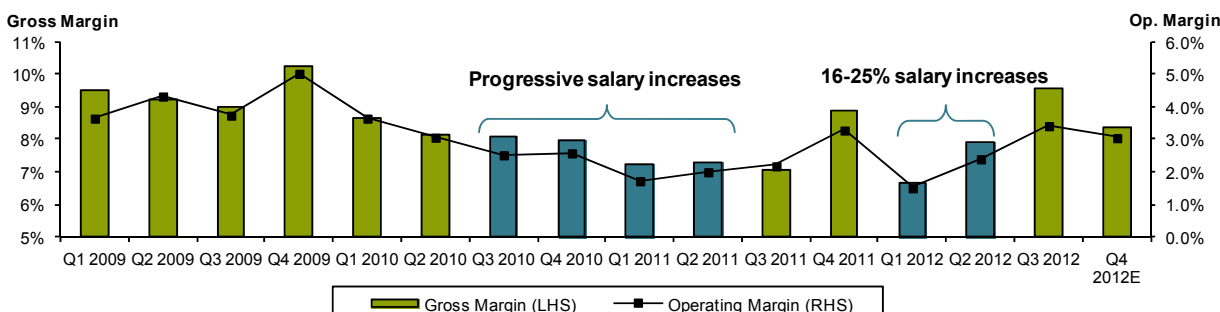
Source: Bernstein site visit (Bernstein photo).

The current salary has effectively more than doubled from early 2010, after a spate of suicides in Shenzhen campuses. This is an attempt to increase workers' work-life balance, encourage investment into leisure, cap overtime, and reduce the stress on overtime payments to improve take home pay.

Hon Hai believes that despite the increase in salaries paid out, the long-term expense is attenuated by lower employee turnover, which translates to reduced training and development costs. But at the gross margin level, higher salaries will have a long-term impact and will prevent gross margins from expanding, in our view. However, as inner China ramps up, and some of the double expenses are eliminated, gross margins are seeing a slight rebound in 2012 (see Exhibit 162).

We estimate that with an employee population of over 1 million and with comprehensive salaries averaging RMB 3,000, Hon Hai's compensation expense should be in the area of RMB 36 billion, or TWD 162 billion. Relative to COGS excluding depreciation, compensation made up essentially 7.3% of the cost base in second-quarter 2012. This is slightly higher than what we have described in our 2011 survey of the EMS/ODM cost landscape (see our report, [EMS and ODM, Part III: How Low Can You Go? The Limits to Cost Reduction in the IT Hardware Supply Chain](#), published July 5, 2011). With a doubling of Hon Hai's compensation, we can imagine gross margins dropping 200 bps in the short term, as we've observed over the past quarters in Exhibit 162. Continued RMB appreciation could further depress gross margins.

Exhibit 162 Hon Hai: Gross and Operating Margin Projections



Source: Corporate reports and Bernstein estimates and analysis.

One of the key findings of the FLA is Hon Hai's long work hours, which exceed the maximum hours set by the local government. The survey estimates an average of 56 working hours per week, whereas the local government only permits 49 hours.

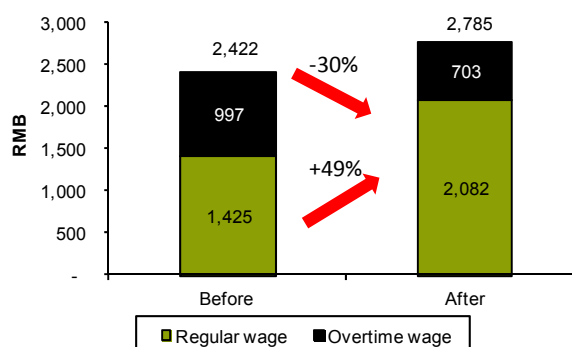
Exhibit 163 shows our calculations of the compensation structure for an operator-level employee. Assuming a 75% premium of overtime wages over regular wages, an operator earns RMB 1,425 a month as base plus RMB 997 for overtime, which accounts for 40% of the total compensation. The main reason that employees work overtime is because of the low salary base, and workers have the incentive to work longer hours for higher total compensation. As Hon Hai adjusts to the 49-hour per week regulation, we expect that the total compensation per employee will increase by 10-15% to reach RMB 2,875, reflecting a 50% increase in base salary and a reduction in the proportion of overtime compensation (see Exhibit 164).

Exhibit 163 Estimated Wage and Hours Adjustments for Hon Hai Because of FLA Audits

| | Before FLA Audits | | After FLA Audits | |
|-----------------------|-------------------|------------|------------------|------------|
| | RMB | USD | RMB | USD |
| Monthly Salary | 2,422 | 384 | 2,785 | 442 |
| Base Salary | 1,425 | 226 | 2,082 | 331 |
| Overtime Salary | 997 | 158 | 703 | 112 |
| Weekly Hours | 56 | | 49 | |
| Regular Hours | 40 | | 40 | |
| Overtime Hours | 16 | | 9 | |
| Hourly Wage | 10.8 | 1.7 | 14.2 | 2.3 |
| Regular Wage | 35.6 | 5.7 | 52.1 | 2.1 |
| Overtime Wage | 62.3 | 8.5 | 78.1 | 2.7 |
| Premium for OT | 75% | | 50% | |

Source: FLA reports and Bernstein estimates and analysis.

Exhibit 164 Proportion of Increase in Base and OT Salary for a Hon Hai Employee



Source: FLA reports and Bernstein estimates and analysis.

The average salary does not fully reflect the number of employees that work significantly more overtime hours, which could be potentially very costly. As the premium of overtime comes down, salary expenses for overtime are expected to decline. However, Hon Hai is expected to add more headcount to the labor force in order to make up for the manufacturing hours required for meeting production targets.

We view the rising labor costs situation from a different perspective and believe that it is likely to yield a neutral impact on Hon Hai's margins. The following three points support our argument:

- We believe the pay increase will be mostly, if not fully, absorbed by Hon Hai's customers through increases in ASPs, although the negotiation process might take longer than one quarter with different customers. Using an Apple-specific example, we estimate the labor cost as a percentage of an iPad's total cash COGS will increase from 2.7% to 3.3% (see Exhibit 165). As of now, we are seeing a very volatile gross and operating margin behavior — but as previously pointed out, the smoothed trailing data indicate that both gross and operating margins are beginning to increase.

| Exhibit 165 | | The Impact of Salary Increases on Hon Hai's Cost Structure (US\$) | | | | | | | |
|----------------------------|----------------|---|-------------|-------|-------------------------|-------|-------------|-------|--|
| | Base Case | | | | Increase in Base Salary | | | | |
| | iPhone 4S 16GB | | iPad 2 16GB | | iPhone 4S 16GB | | iPad 2 16GB | | |
| Pass-through Components | 142.0 | 56.6% | 228.0 | 62.0% | 142.0 | 56.3% | 228.0 | 61.6% | |
| Key Components | 97.9 | 39.0% | 178.2 | 48.4% | 97.9 | 38.8% | 178.2 | 48.2% | |
| Display / Touch Screen | 37.0 | | 127.0 | | 37.0 | | 127.0 | | |
| Memory | 28.3 | | 32.9 | | 28.3 | | 32.9 | | |
| Application Processor | 15.0 | | 14.0 | | 15.0 | | 14.0 | | |
| Camera | 17.6 | | 4.3 | | 17.6 | | 4.3 | | |
| ICs and Discretes | 44.1 | 17.6% | 49.8 | 13.5% | 44.1 | 17.5% | 49.8 | 13.5% | |
| Baseband/RF/PA | 23.5 | | 18.7 | | 23.5 | | 18.7 | | |
| Power Management | 7.2 | | 10.2 | | 7.2 | | 10.2 | | |
| BT/FM/GPS/WLAN | 6.5 | | 9.0 | | 6.5 | | 9.0 | | |
| Sensors/Touch Controller | 6.9 | | 11.9 | | 6.9 | | 11.9 | | |
| Non-Passthrough Components | 45.9 | 18.3% | 65.8 | 17.9% | 45.9 | 18.2% | 65.8 | 17.8% | |
| Batteries | 5.9 | | 25.0 | | 5.9 | | 25.0 | | |
| Mechanical | 33.0 | | 35.0 | | 33.0 | | 35.0 | | |
| Box Contents | 7.0 | | 5.8 | | 7.0 | | 5.8 | | |
| SW, Royalties, Warranties | 40.0 | 15.9% | 40.0 | 10.9% | 40.0 | 15.9% | 40.0 | 10.9% | |
| Labor and Insertion | 7.1 | 2.8% | 10.0 | 2.7% | 8.5 | 3.4% | 12.0 | 3.3% | |
| Total Cash COGS | 235.0 | | 343.8 | | 236.4 | | 345.8 | | |
| EMS Gross Profits | 16.0 | | 24.0 | | 16.0 | | 24.1 | | |
| Gross Margin % | 6.8% | | 7.0% | | 6.8% | | 7.0% | | |
| Total ASP | 251.0 | | 367.8 | | 252.4 | | 369.9 | | |
| Increase % | | | | | 0.6% | | 0.6% | | |

Source: iSuppli and Bernstein estimates and analysis.

- The 16-25% salary increase only applies to the base salary. We view such an increase as Hon Hai's efforts to encourage work-life balance among workers, thus discouraging and reducing the overall overtime compensation (which is more than double of the non-overtime hourly wage) and lowering turnover. However, we expect an increase in headcount to maintain the same level of output as employees work fewer overtime hours. Combining the effects of the rise in base salary and reduction in overtime payouts, we estimate the overall increase in Hon Hai's total employee compensation will be at the lower end of the 16-25% range. We are now seeing the increased headcount during the ramp-up of the iPhone 5, where employee densities at the factories have increased substantially, with resulting labor unrest and frictions.

- Hon Hai's move inland (to Chengdu and Zhengzhou) serves as an effective means of reducing labor costs, compared to that of the Shenzhen campus, due to both lower overall wage rates and (probably more importantly) lower turnover rates. The local hiring strategy (~95% of employees are local recruited in Chengdu and Zhengzhou) ensures the inland move has its merits other than lower salary base — it should result in much lower turnover rate and therefore lower employee training costs in the long run. As a result, and with the inland move coming to an end in first-half 2012, we believe the overall compensation payouts will be stabilized at the company level, and will likely continue rising, but not at the recent historical high rates.

Above all, the key challenge for Hon Hai to sustain and improve its margin centers around how much and how quickly it could transfer higher labor costs to its customers. Judging from the broader social and economic environment in China, we expect that major customers, such as Apple, will likely absorb some of the higher labor costs and encourage Hon Hai to improve working conditions. We assume the FLA report will serve as a catalyst for further improvements in working conditions.

Headcount Increases for Apple Products from Both Higher Unit Shipments and Lower Overtime Limits

Apple, Hon Hai's largest customer, is increasing its unit shipments in 2012 and beyond, leading to even more employees required for Hon Hai. As analyzed in the chapter, "Hon Hai and Apple: A Mutually Beneficial Relationship or Unequal Balance of Power?" Hon Hai is expected to remain the predominant EMS for the iPad and iPhone in the medium term. We estimate Hon Hai will ship around 116 million iPhones and 54 million iPads in 2012, up from 83 million and 38 million in 2011, respectively.

To gauge the total compensation hike for employees, we looked at the assembly time required for manufacturing Apple products and calculated the additional employees needed for new production capacity. Based on our understanding, and as we discuss in the next chapter, the level of automation at Hon Hai facilities is relatively low. The Apple production lines, in particular, are labor-intensive due to the complexity of assembly of iPhones and iPads.

Exhibit 166 shows the number of assembly parts and the estimated assembly time required for a number of representative electronic products. Comparatively speaking, the iPad 3G (the first generation) and iPhone 3G have significantly more assembly parts than other models. Similarly, the assembly time required per part for iPad is 14.6 seconds, 2 seconds longer than the average handset part assembly. Overall, Apple products require longer assembly time than regular handsets, thus requiring more labor hours and employees.

Although there are no updated data available for the estimated assembly time for the new iPad (the third generation) and iPhone 5, we believe, based on press reports, that both new models require longer assembly time from the additional product complexity relative to the earlier generations.

Exhibit 167 and Exhibit 168 show our estimates for daily production and the number of employees at the Chengdu iPad assembly unit and Guanlan iPhone assembly unit, respectively. Our calculations are based on our initial estimates of annual unit shipments for iPads and iPhones in 2011, and projections of the number of employees based on our estimates for 2012. We developed two scenarios to analyze the total labor costs after the new 49-hour regulation is implemented: (1) there are no productivity improvements from the current level; and (2) there is a 10% productivity improvement in 2012 potentially through automation and optimized assembly processes (which we will discuss in more detail in the next chapter).

| Exhibit 166 Manufacturing Cost Breakdown of Representative CE and IT Products | | | | | | |
|--|----------------|-----------------|------------------|------------------|-------------------|----------------|
| Products | iPad 3G | Nokia C5 | iPhone 3G | Nokia N95 | Lenovo T43 | IBM T20 |
| Manufacture Date | April-10 | June-10 | July-08 | March-07 | February-05 | August-00 |
| Manufacturing Location | China | China | China | Singapore | China | Japan |
| Direct Assembly Cost (USD/hour) | 2.00 | 2.00 | 2.00 | 10.00 | 1.00 | 30.00 |
| Assembly Time (sec) | 2,374 | 724 | 1,166 | 936 | 4,400 | 2,988 |
| Assembly Time (Hour) | 0.66 | 0.20 | 0.32 | 0.26 | 1.22 | 0.83 |
| Assembly Part Count | 163 | 60 | 93 | 78 | 251 | 230 |
| Seconds per Part | 14.6 | 12.1 | 12.5 | 12.0 | 17.5 | 13.0 |
| Total Part Count | 1,545 | 457 | 1,069 | 666 | 2,465 | 2,254 |
| Number of PCBs/Flex | 5 | 2 | 5 | 4 | 6 | 5 |
| Key Components | 15 | 7 | 8 | 8 | 11 | 10 |
| ICs | 66 | 20 | 68 | 50 | 87 | 83 |
| Discretes | 1,255 | 342 | 867 | 481 | 2,067 | 1,861 |
| Modules | 26 | 26 | 31 | 35 | 18 | 16 |
| Connectors | 23 | 17 | 15 | 18 | 38 | 60 |
| Mechanical | 155 | 43 | 75 | 70 | 238 | 219 |
| Insertion Cost (USD) | 8.1 | 1.9 | 9.1 | 3.0 | 13.8 | 58.7 |
| Direct Assembly Labor Cost (USD) | 1.3 | 0.4 | 0.6 | 2.6 | 1.2 | 24.9 |
| Total Cost (USD) | 260 | 61 | 177 | 147 | 733 | 1,767 |
| Total Direct Handling Time (Hour) | 1.40 | 0.43 | 0.69 | 0.55 | 2.59 | 1.76 |
| Total Labor Cost (USD) | 2.80 | 0.85 | 1.38 | 5.52 | 2.59 | 52.86 |
| Direct Assembly Labor as % of Total Cost | 0.5% | 0.7% | 0.4% | 1.8% | 0.2% | 1.4% |
| Total Direct Labor Cost as % of Total Cost | 1.1% | 1.4% | 0.8% | 3.7% | 0.4% | 3.0% |

Source: UBM TechInsights and Bernstein estimates and analysis.

For the iPad shown in Exhibit 167, we expect an overall 31% increase in the labor compensation as a result of 14% increase in headcount and 15% salary increase under the "no productivity improvement" assumption. Under the "productivity improvement" assumption, the increase is around 18% mainly through a 15% increase in average salary. For iPhone, we expect the improvement in productivity (about 10%) has already taken place earlier in 2012 and the two assumptions are applied on top of the current productivity level. Overall, the percentage of increase in labor compensation remains roughly the same as the iPad (see Exhibit 168).

| Exhibit 167 Stimulation of Salary Hike Impact on iDSBG (iPad/iMac Assembly Unit) in Chengdu | | | | | | |
|--|----------------------|-------------|----------------------------------|---------------|------------------------------------|---------------|
| | Before Audits | | After Audits (2012) | | | |
| | 2011 | 2012 | No Change in Productivity | Change | Improvement in Productivity | Change |
| Total Weekly Hours/Employee | 56 | 56 | 49 | -13% | 49 | -13% |
| Weekly Hours for Production | 50 | 50 | 44 | | 44 | |
| Total Employees | 40,300 | 44,778 | 51,175 | 14.3% | 46,057 | 3% |
| iPad Employees | 32,240 | 35,822 | 40,940 | 14.3% | 36,846 | 3% |
| Operators | 26,537 | 29,485 | 33,697 | 14.3% | 30,328 | 3% |
| Total Hours/Month | 5,349,808 | 5,944,231 | 5,944,231 | 0% | 5,349,808 | -10% |
| Daily Production | 150,000 | 166,667 | 166,667 | | 166,667 | |
| Monthly Production | 3,000,000 | 3,333,333 | 3,333,333 | | 3,333,333 | |
| Annual Production | 36,000,000 | 40,000,000 | 40,000,000 | | 40,000,000 | |
| Average Hours/Unit (Takt Time) | 1.78 | 1.78 | 1.78 | 0% | 1.60 | -10% |
| Average Monthly Compensation | | | | | | |
| Operators | 2,422 | 2,422 | 2,785 | 15% | 2,785 | 15% |
| Supervisors | 3,504 | 3,504 | 4,030 | 15% | 4,030 | 15% |
| Total Monthly Salary (RMB Mil.) | | | | | | |
| Operators | 64 | 71 | 94 | 31% | 84 | 18% |
| Supervisors | 20 | 22 | 29 | 31% | 26 | 18% |

Source: FLA reports and Bernstein estimates and analysis.

Exhibit 168 Stimulation of Salary Hike Impact on iDPBG (iPhone Assembly Unit) in Guanlan, Shenzhen

| | Before Audits | | After Audits (2012) | | | |
|--|---------------|------------|---------------------------|--------|-----------------------------|--------|
| | 2011 | 2012 | No Change in Productivity | Change | Improvement in Productivity | Change |
| Total Weekly Hours/Employee | 56 | 56 | 49 | -13% | 49 | -13% |
| Weekly Hours for Production | 50 | 50 | 44 | | 44 | |
| Total Employees | 83,400 | 78,813 | 89,357 | 13% | 80,421 | 2% |
| iPhone Employees | 66,720 | 63,050 | 71,486 | 13% | 64,337 | 2% |
| Operators | 60,515 | 57,187 | 64,838 | 13% | 58,354 | 2% |
| Total Hours/Month | 12,199,832 | 11,437,343 | 11,437,343 | 0% | 10,293,608 | -10% |
| Daily Production | 200,000 | 208,333 | 208,333 | | 208,333 | |
| Monthly Production | 4,000,000 | 4,166,667 | 4,166,667 | | 4,166,667 | |
| Annual Production | 48,000,000 | 50,000,000 | 50,000,000 | | 50,000,000 | |
| Average Hours/Unit (Takt Time) | 3.05 | 2.74 | 2.74 | 0% | 2.47 | -10% |
| Average Monthly Compensation | | | | | | |
| Operators | 2,422 | 2,422 | 2,785 | 15% | 2,785 | 15% |
| Supervisors | 3,504 | 3,504 | 4,030 | 15% | 4,030 | 15% |
| Total Monthly Salary (RMB Mil.) | | | | | | |
| Operators | 147 | 139 | 181 | 30% | 163 | 17% |
| Supervisors | 22 | 21 | 27 | 30% | 24 | 17% |

Source: FLA reports and Bernstein estimates and analysis.

Based on our calculations, a 14% increase in employees is needed to make up for the "lost" overtime production hours caused by the lowered maximum working hours. Additionally, we expect an increase in headcount due to an increase in order size from Apple. Exhibit 169 summarizes the potential increase in headcounts for Hon Hai between Apple-related and non-Apple production lines.

Exhibit 169 Estimated Increase in Employee Headcounts by Locations at Hon Hai

| Location | Business Group | Prior | After | |
|----------------------------|----------------|------------------|---------------------------|-----------------------------|
| | | No. of Employees | No Change in Productivity | Improvement in Productivity |
| Longhua | IDSBG-LH | 39,200 | 49,778 | 44,800 |
| | SHZBG-LH | 27,600 | 35,048 | 31,543 |
| Guanlan | SHZBG-GL | 56,800 | 72,127 | 80,421 |
| | IDPBG-GL | 83,400 | 105,905 | 80,421 |
| Chengdu | IDSBG-CD | 40,300 | 51,175 | 46,057 |
| | SHZBG-CD | 41,500 | 52,698 | 47,429 |
| Zhengzhou | | 111,200 | 141,206 | 127,086 |
| Total Apple-Related | | 400,000 | 507,937 | 457,757 |
| | | | 27% | 14% |
| Non-Apple | | 600,000 | 685,800 | 618,049 |
| Total | | 1,000,000 | 1,193,737 | 1,075,807 |
| Employee Increase | | | 19% | 8% |

Source: FLA reports and Bernstein estimates and analysis.

Because of higher unit shipments for Apple, Hon Hai will need a 27% increase in Apple-related employees assuming no improvement in productivity and 14% increase if there is 10% improvement in productivity, according to our estimates. For the non-Apple business, we are more conservative in term of expected volume increases; therefore, we assume only a 14% increase in headcount to make up for the loss of production hours due to regulation changes. Overall, we expect 19% increase in Hon Hai's labor force without productivity improvements and 8% increase with productivity improvements.

Summary of Financial Implications from the FLA Audits

We estimate Hon Hai's overall increase in labor compensation in 2012 to be 31%, of which 14% is an increase in headcount from higher unit shipments (fully passed on to customers) and 15% is salary increases, based on the assumption of no change in productivity. If we assume a 10% productivity improvement in 2012, Hon Hai's increase in labor compensation will be around 18%, mainly through the 15% rise in average salary — meaning most of the non-pass-through increase can be mitigated through productivity improvements. Further, we expect that average hourly compensation will increase by 15%, amounting to RMB 2,875 per month.

Because of the higher volume of unit shipments for Apple, we estimate a 27% increase in Apple-related employees in 2012 assuming no improvement in productivity. That becomes a 14% increase if there is a 10% improvement in productivity.

Exhibit 170 outlines each issue brought up by the FLA audit, and our estimates for the affected employees and incremental costs associated with resolving each issue. In our analysis, we categorize the issues into short term and medium term. The former is expected to have an immediate or near-term financial impact on Hon Hai's COGS, and is more likely to be transferred and shared with customers. The latter requires a longer time to be absorbed by customers, as we expect the implementation of those audit requirements to take between six and 18 months, depending on the issue.

Specifically, we expect the adjustments to the long work hours and overtime payment will result in an incremental cost of about TWD 23 billion in 2012, equivalent to 59 bps on Hon Hai's 2012 gross margin. The medium-term issues, which include social insurance coverage, labor unions and safety improvements, are expected to take longer to be addressed, and we estimate a total incremental cost of TWD 16 billion in 2012, equivalent of 42 bps of margin impact.

In summary, we expect the major costs in complying with the FLA audits lie in an increase in the labor compensation from the reduction in hours, followed by compensation for training and 15-minute overtime compensation.

| Exhibit 170 Estimated Financial Impact of FLA Audits on Hon Hai | | | | | |
|---|--|---|---|---------------------|--|
| Issue | Measure | Affected Employees | Incremental Annual Cost (TWD Mil.) | Margin Impact (bps) | Assumptions |
| Long work hours | Cap overtime and hire new employees | 143,000 additional employees by 2013 | 19,449 | 50 | Average of 56 hours/week reduced to 49 as required by Chinese laws |
| Pay overtime in units of 15 minutes for unscheduled overtime | | 1 mil. employees | 3,642 | 9 | 56 hours/week on average, where 40 is non-overtime. Assume of 16 hours overtime, half was unscheduled, 1 hour went unpaid. |
| Short-Term Impact | 1-2 Quarters | | | 59 | |
| TWD Million per year | 23,091 | | | | |
| Compensation for training and meetings | Pay for morning meeting and trainings | 1 mil. employees | 8,779 | 23 | 10-min morning meeting for five days a week |
| Social insurance | Alternative insurance scheme for immigrant workers | Around 70% of employees with coverage of 33% target in 2012 | 3,145 | 8 | Assume increases 10% of average wage |
| Lack of safety measures | Personal protection equipment and facilities | | 3,159 | 8 | Add 2% to SG&A |
| Industrial relations | Potential wage hikes resulting from union | 1 mil. employees | 1,170 | 3 | Faster wage hikes, add 5% incremental on base of RMB 2,082 |
| Intern insurance | | 1,900 | 10 | 0 | Assume increases 5% of intern wage, which is 80% of average wage (no overtime) |
| Medium-Term Impact | 3-4 Quarters | | | 42 | |
| TWD Million per year | 16,264 | | | | |
| Total Impact (bp) | | | | 101 | |
| Estimated pass-through on to customers | | | 100% of short-term impact and 50% of medium-term impact | | |
| Net Impact (bp) | | | | 21 | |

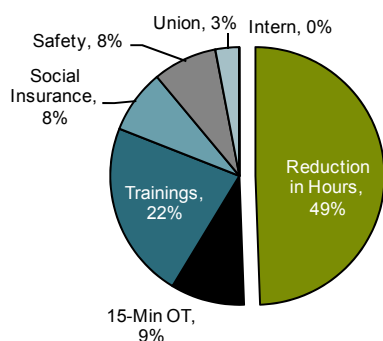
Source: FLA reports and Bernstein estimates and analysis.

Who Pays for What, and When? Some Scenarios and the Impact on Apple

If Hon Hai had to absorb all the incremental costs without passing on any to its customers, we could see a material 90 bps compression in gross margins by the end of this year. Our model incorporates a gradual pass-through of these costs over 2012, with Hon Hai absorbing increases not assigned to direct labor costs, such as the improvement in safety measures and social insurance (see Exhibit 171).

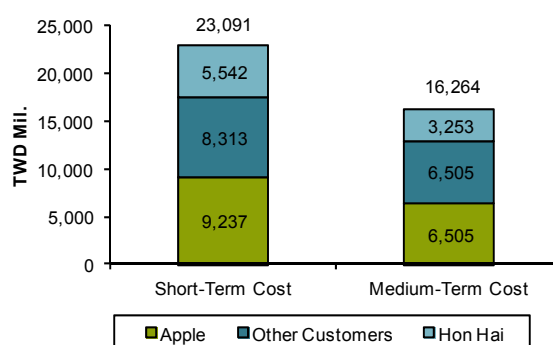
Additionally, we assume that Apple, as the instigator and driver of the audit, fully "pays" for its estimated 42% 2012 share of Hon Hai's revenue (about TWD 16 billion), but other customers are unable to absorb all of the costs and only 50% of the increase (about TWD 15 billion) is passed on to them. This increases Hon Hai's labor costs by about TWD 9 billion, or a steady-state 20 bps "drag" on gross margins (see Exhibit 172).

Exhibit 171 Hon Hai's Cost Distribution by Categories



Source: FLA reports and Bernstein estimates and analysis.

Exhibit 172 Hon Hai's Estimated Cost Allocation by Customer



Source: Bernstein estimates and analysis.

From the perspective of Apple, if it were to completely and immediately absorb its TWD 16 billion (US\$540 million) share of the costs, that would correspond to an immaterial 30 bps compression in estimated FY12 Apple gross margins. That said, given that Apple is Hon Hai's largest customer, has historically been very demanding of its supply chain partners and uses Pegatron as an alternative manufacturer for both the iPad and iPhone, it is possible that it may pay a lower share of the increase, maybe as little as 50% of its allocated cost increase.

What Progress Has Hon Hai Made in Implementing the FLA Audit Recommendations, and at What Cost?

The February 2012 FLA audit provided a specific remediation plan, which required a number of actions to be taken over a period of 15 months, from April 1, 2012 through July 1, 2013, with deadlines for many of the requirements in the first three months (by June 30, 2012). From June 25 through July 6, the FLA team and their associates and subcontractors (Openview and SCSA) visited Hon Hai's factories to verify progress on the audit requirements. The full results of the site visit are available at www.fairlabor.org.

The FLA site visits found solid progress in meeting the recommendations. All of the action items that were required to be completed by June 1, 2012 were completed on or ahead of schedule, and many of the remaining items were ahead of schedule. Exhibit 173 shows a summary of the action items at the three different factories (Guanlan, Longhua, and Chengdu), and their current completion rates.

Exhibit 173

FLA Site Visit Progress Report and Action Completed as of June 30, 2012

| Site | Total | % Total | To be completed by May 31 | Percentage on schedule | Remedial Actions | | |
|--------------|------------|-------------|------------------------------|---------------------------|---|-----------------------------|------------------------------------|
| | | | | | To be completed between June 1, 2012 and July 1, 2013 | Number ahead of schedule | Percentage ahead of schedule |
| Guanlan | 119 | 33% | 69 | 100% | 50 | 31 | 62% |
| Longhua | 113 | 31% | 56 | 100% | 57 | 29 | 51% |
| Chengdu | 128 | 36% | 70 | 100% | 58 | 29 | 50% |
| Total | 360 | 100% | 195 | 100% | 165 | 89 | 54% |

Source: Fair Labor Association and Bernstein analysis.

FLA pointed out progress in several notable areas:

- There have been many changes relating to improving worker health and safety, such as the enforcement of ergonomic breaks, redesign of workstations to prevent injuries, and improved testing and maintenance procedures.
- The "internship" program was a point of contention with the FLA, and the FLA noted "significant" improvement there. Hon Hai has ensured that the interns no longer work overtime, that the work is more directly related to their field of study, and that it was clear to the interns that they could quit at any time.
- Hon Hai has enabled legislation that would extend unemployment insurance coverage for migrant workers starting January 1, 2013. This is significant because it affects not just Hon Hai's workers but all migrant workers in Shenzhen.
- Work continues in the most difficult recommendations — those involving union elections, worker representation and reduction in working hours to comply with Chinese law. The deadlines for meeting those requirements extend through July 2013, but Hon Hai has taken steps toward fulfilling these commitments. The company has reduced working hours to 60 per week (including overtime), aiming to meet the 40 hour (plus 9 hours of overtime) target by July 2013.

Of course, a number of concerns, which although not clearly stated in the report, remain top of mind:

- The follow-up visit was a "spot visit," and there have been some (unverified) complaints that a number of the activities performed for the audit were "reversed" as soon as the review was completed.
- Even if the remediation is completed in good faith, enforcement and compliance may fall off over time as the company (and employees themselves) revert to the "old ways."
- Issues may persist in non-audited facilities. For example, news reports at unaudited facilities at Yantai, which are known to make products for Nintendo, indicate that the use of "interns" in production lines remains an issue.
- The most sensitive issues, those involving union representation and working hours, still need to be implemented. We also note that the reduction of working hours per week to 60 hours was not exactly a Herculean task, given the FLA-reported average of 56, with a maximum of 61. But progress is progress, in our opinion.

The implementation of the FLA's recommendations has a large financial impact on Hon Hai, which we estimate at about 100 bps of gross margin. Exhibit 174 summarizes the audit recommendations, key actions by Hon Hai, progress to date, and the realized margin impact to date, which we estimate at around 50 bps, or half of the total cost of implementing the audit. We believe the majority of the financial impacts have been reflected in the first and second quarters of 2012 — with the remaining costs spread out in the second half of the year and first-half 2013, or about an additional 10 bps per quarter.

Exhibit 174

Hon Hai Precision's Progress in Meeting FLA Audit Recommendations

| Issue | Measure | Affected Employees | Incremental Annual Cost (TWD Mil.) | Margin Impact (bps) | Progress (%) | Realized Margin Impact (bps) | Comments |
|--|--|---|------------------------------------|---------------------|--------------|------------------------------|--|
| Long work hours | Cap overtime and hire new employees | 143,000 additional employees by 2013 | 19,449 | 50 | 25% | 12 | Average work hours have been reduced to 60 (including overtime), target is 49. |
| Pay overtime in units of 15 minutes for unscheduled overtime | | 1 mil. employees | 3,642 | 9 | 50% | 5 | Reorganization of work practices for overtime payment has been completed. |
| Short-Term Impact | 1-2 Quarters | | | 59 | | 17 | |
| TWD Million per year | | | | 23,091 | | 6,683 | |
| Compensation for training and meetings | Pay for morning meeting and trainings | 1 mil. employees | 8,779 | 23 | 100% | 23 | This action has been completed. |
| Social insurance | Alternative insurance scheme for immigrant workers | Around 70% of employees with coverage of 33% target in 2012 | 3,145 | 8 | 0% | 0 | Social insurance legislation will come in force January 1, 2013. |
| Lack of safety measures | Personal protection equipment and facilities | | 3,159 | 8 | 100% | 8 | This action has been completed. |
| Industrial relations | Potential wage hikes resulting from union | 1 mil. employees | 1,170 | 3 | 0% | 0 | Deadline for completion is July 1, 2013, remains work in progress. |
| Intern Insurance | | 1,900 | 10 | 0 | 100% | 0 | |
| Medium-Term Impact | 3-4 Quarters | | | 42 | | 31 | |
| TWD Million per year | | | | 16,264 | | 11,948 | |
| Total Impact (bp) | | | | 101 | | 48 | |

Source: FLA reports and Bernstein estimates and analysis.

Let a Million Robots Bloom?

A Deep Dive Into the Economics of Automation at Hon Hai Precision

Overview

目前富士康有1万台机器人, 明年将达到30万台, 3年后机器人的规模将达到100万台
That quote is from Hon Hai Precision's Chairman and CEO Terry Guo, on July 29, 2011, which translated says, "Currently there are 10,000 robots in Foxconn, and this number will increase to 300,000 in 2012 and one million in three years." The remark set off a firestorm of commentary about Hon Hai's "secret weapon" against rising labor costs.

In theory, automation could be used to offset rising labor costs at a company like Hon Hai, but the economic argument for such a transformation remains unformed, in our opinion. In this chapter, we review the industrial automation space, gauge the feasibility of Hon Hai adopting industrial robots in its assembly line, and estimate the costs and breakeven times of such an effort.

Robots that are low cost, flexible and mass customizable and still make economic sense in high-manual-dexterity assembly applications such as electronic manufacturing are not yet widely available. Large global players such as ABB and Fanuc and start-ups such as Rethink Robotics and Industrial Perception are developing low-cost industrial robots that could change the competitive landscape. The common features of the newer industrial robot models center around flexibility, mass customization and portability that could complement human labor in the electronics industry.

We have developed an economic model and a breakeven analysis of the potential industrial automation at Hon Hai's assembly lines. For calculating the total cost of ownership (TCO) of the robot investments, we estimate a lump-sum investment of robots for the first year, along with one-time integration costs equivalent to the robot's unit cost and 10% annual maintenance costs. For the "human labor TCO," we assume an annual salary based on a US\$3/hour wage and a maximum of 49 hours per week, and 10% increase in the hourly wage every year going forward.

Based on our breakeven analysis, we conclude that only at robot ASPs of US\$25,000 or below would it make economic sense for Hon Hai to replace human labor with industrial robots on a mass scale over the next four years. Robot ASPs higher than that have very long breakevens, as long as 12 years or more.

Additionally, the capex required to achieve this automation would be unprecedented for Hon Hai, especially at higher levels of automation. There are likely political barriers to the mass conversion of labor for capital in China, and the supply of the kinds of robots Hon Hai would require is highly constrained.

The implication of our analysis is that automation is not likely to be a material counterweight to increasing labor costs at Hon Hai in the medium term unless very low-cost flexible robots become widely available.

Leading Trends in Industrial Robot Development Show We Are Not There Yet

Although industrial robots have existed for decades, there is renewed interest about industrial automation from companies, governments and investors, amid increasing labor costs in the developing world and high unemployment rates in the developed world. In contrast to the highly automated automotive industry, the electronics industry, particularly the final assembly segment, remains labor-intensive.

Hon Hai Precision, the world's largest EMS, is a poster child for large-scale labor-intensive electronics assembly, with more than one million workers in China. While the company has gone through a number of rounds of salary hikes to accommodate rising labor costs and to comply with the Free Labor Association requirements (discussed in the previous chapter), Terry Guo, the CEO and Chairman of Hon Hai, also publicly expressed his interest in adopting one million robots in the assembly line in the next three years. If his plan comes to realization, we would expect an unprecedented wave of industrial automation coming to the electronics industry.

Within the industrial robot manufacturing space, several large global players such as ABB and Fanuc have been dominant in the competitive landscape. Apart from the large-scale robots used for heavy manufacturing industry, companies have been developing nimbler and lighter robots that much more closely mimic human capabilities and could be tailored towards use in the electronics industry.

More importantly, the newly developed robots are more capable of mass customization and are easily programmed to learn new tasks, lowering both the initial capital expense (robot costs plus the necessary integration costs, which can be multiples of the initial robot ASP) and the ongoing maintenance, upgrade, and programming costs. These kinds of robots would be highly suitable for the electronics industry with shorter product cycles and very flexible manufacturing requirements.

Exhibit 175 shows six robot prototypes marketed by leading companies. The common features of the new models center around the flexibility and portability that could complement or replace human labor. FRIDA, the human-like dual-arm concept robot developed by ABB, is a prototype designed for consumer electronics assembly, as it can conduct multiple tasks instead of one task by regular robots. FRIDA, however, remains a concept robot, not yet commercialized. Industrial robots by Fanuc and Adept, however, are being sold as having high flexibility and versatility, and can be placed in a regular assembly line without significant expansion of the factory space. KUKA, the German robotic player, has introduced the AGILUS series for the electronics industry in Germany, China, Southeast Asia, and Taiwan. As a matter of fact, Hon Hai, among many other Chinese companies, is already a customer of KUKA.

| Exhibit 175 | | Summary of Industrial Robot Trends by Company | |
|-----------------|--|---|-------------------|
| | | ABB | Fanuc Robotics |
| Robot | FRIDA | Delta Robot M-1iA/0.5A | |
| Features | Portable 14-axis dual-arm concept robot | 6-axis parallel-link robot | |
| Industry | Consumer electronics assembly | Assembly/material handling | |
| Specs | Human-like arms with integrated IRC5 controller Padded dual arms ensure productivity and flexibility Lightweight and easy to mount for fast deployment Complements human labor with scalable automation | A 3-axis wrist for flexibility and versatility Easy integration into a machine Small part handling/high-speed picking/assembly Detachable color-graphic to be shared among multiple robots | |
| | | KUKA | Yaskawa |
| Robot | KR 6 R900 6 axes (KR Agilus) | Motoman SDA10D | |
| Features | High-working speeds | Dual-arm, 15-axis robot | |
| Industry | Handling/packaging/assembly | Assembly | |
| Specs | 6kg payload and approx. 901mm reach Installation on the ceiling One vertical arm lightweight robot of 52kg | 10 kg payload/arm and ± 0.1 mm repeatability Both arms can work together or independently Hold part with one arm while performing additional operations with other arm | |
| | | Adept | Kawasaki Robotics |
| Robot | Parallel Robot Quattro S650H | RS05L | |
| Features | Four-arm design with ultra-compact controls | High-speed, high-performance | |
| Industry | Packaging/manufacturing/assembly | Assembly/inspection/welding | |
| Specs | Conveyer tracking with integrated vision guidance High-efficiency, low-inertia drives and light arms Diagnostic display for faster troubleshooting Reduce maintenance costs with max uptime | 5kg payload and 903mm horizontal/1484 vertical reach Max speed of 9,300 mm/s Small floor space required for high-density applications without impeding performance | |

Source: Company websites and Bernstein analysis.

Besides the major global players mentioned earlier, niche players such as Rethink Robotics and Industrial Perception (a spinoff from Willow Garage) are also developing low-cost industrial robots that could change the competitive landscape in the automation space.

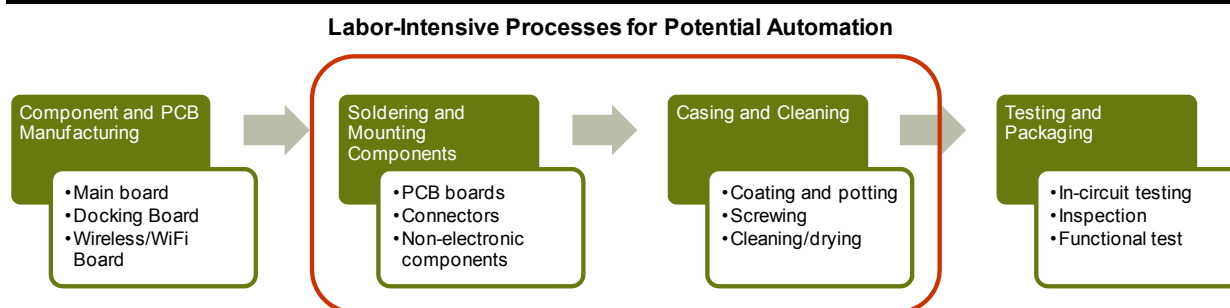
That said, the mass adoption of robots depends on the savings generated from the initial robot investment. The price of an industrial robot varies from about US\$50,000 to well over US\$200,000, depending on specifications. On top of that, there are integration costs, which can be a meaningful multiple of the initial robot ASP, plus incremental fixed costs during operation (electricity, reprogramming, additional integration during product switchovers, etc.) The numbers involved are very significant compared to the salary paid to a Chinese worker with a US\$2-US\$3/hour wage.

We will discuss and analyze the economics of adopting automation in a later section. Before we do that, we wanted to provide details about how robots can and can't be used in manufacturing electronics.

Potential Automation Opportunities in the Assembly Line Exist, But Are Limited

Generally speaking, an electronics assembly line can be divided into four major stages: component and printed circuit board (PCB) manufacturing (using primarily surface mounting, or SMT), component soldering and mounting, mechanical assembly and casing, and testing and packaging (see Exhibit 176).

Exhibit 176 Flow Charts for Electronics Assembly Stages



Source: Bernstein analysis.

Components and PCBs are usually shipped to the assembly line from the component suppliers in advance with key components such as ICs and processors installed, thus requiring no further work on the PCB board itself. Hon Hai with its vertically integrated supply chain manufactures PCB boards in-house or by its affiliates (see the chapter, "Shining Some Light on Hon Hai Precision's Opaque Corporate Structure"). Thus, when all the components are shipped to the assembly line, we assume major PCB components are ready to be assembled without much preparation. Other components, such as casings, covers, hinges and connectors, are shipped to final assembly ready for mounting.

In contrast, soldering and mounting components is a labor-intensive process that integrates all the PCB boards and non-electronic components together, by dozens of workers one step after another along the assembly line. It is our understanding that each assembly worker is responsible for only one or two steps (soldering, connecting premade parts, or loading the components) and five to eight workers form a team to work on the same function throughout the day. Compared to soldering, cleaning and casing are safer for workers to perform, as it does not involve in physical exposure to electricity and heavy machines. Overall, the assembly job itself is highly repetitive with relatively simple tasks that could be done by robots.

Given the large scale of the assembly business that Hon Hai is engaged in, we estimate Hon Hai employed around half a million workers in China for its Apple-related business in 2011 (see Exhibit 177). From the component assembly

perspective (see Exhibit 178), Apple products are difficult to manufacture — an iPad 3G has 179 final assembly components and takes 2,374 seconds to assemble (excluding the time needed to transfer products from one assembly station to another). iPads and iPhones are known for the complexity in assembly and low yield rate in the initial phases of mass production. For 2012, we estimate the overall revenue contribution from Apple-related business will reach over 40% from 35% in 2011 (see the chapter, "Hon Hai and Apple: A Mutually Beneficial Relationship or Unequal Balance of Power?"), which leads to an increase in the workforce dedicated to the Apple facilities in Chengdu and Zhengzhou.

Exhibit 177 Major Facilities Dedicated to Apple Products

| Product Line | Factory Location | Estimated Employee | Daily Capacity | 2011 Annual Production |
|--------------|------------------|--------------------|----------------|------------------------|
| iPhone | Shenzhen | 80,000 | 50,000 | 65 million |
| | Zhengzhou | 100,000 | 200,000 | |
| iPad | Chengdu | 200,000 | 110,000 | 33 million |
| | Zhengzhou | 100,000 | 50,000 | |
| iPod | Shenzhen | 80,000 | 100,000 | 30 million |

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 178 Components and Assembly Time by Product

| | iPad 3G | iPhone 3G | ThinkPad |
|-----------------------------------|-------------|-------------|-------------|
| Number of Parts | 179 | 92 | 251 |
| Number of Steps | 609 | 313 | 854 |
| Assembly Time (Seconds) | 2,374 | 1,166 | 4,400 |
| Entire Assembly Process (Seconds) | 4,748 | 2,332 | 8,800 |
| Seconds per Part | 13 | 13 | 18 |
| Seconds per Step | 4 | 4 | 5 |
| Cost/Hour (USD) | 2 | 2 | 2 |
| Total Costs (USD) | 1.32 | 0.65 | 2.44 |
| Products/worker/8h | 6 | 12 | 3 |

Source: UBM TechInsights and Bernstein estimates and analysis.

Before delving into the economics of industrial automation in electronics assembly, we first need to determine the components and assembly steps that could potentially be automated by robots. In Exhibit 179 we take a detailed look at iPad 3G teardown analyses: out of the 1,378 components for main electronics and 305 for subsystem electronics, only 34 connectors would require manual assembly in Hon Hai and the rest would have been soldered onto the respective PCB boards. Exhibit 180 illustrates the individual PCB boards from an iPad 3G (main board, wireless board, WiFi, and proximity sensor flex) that have been mounted with the key components and other ICs.

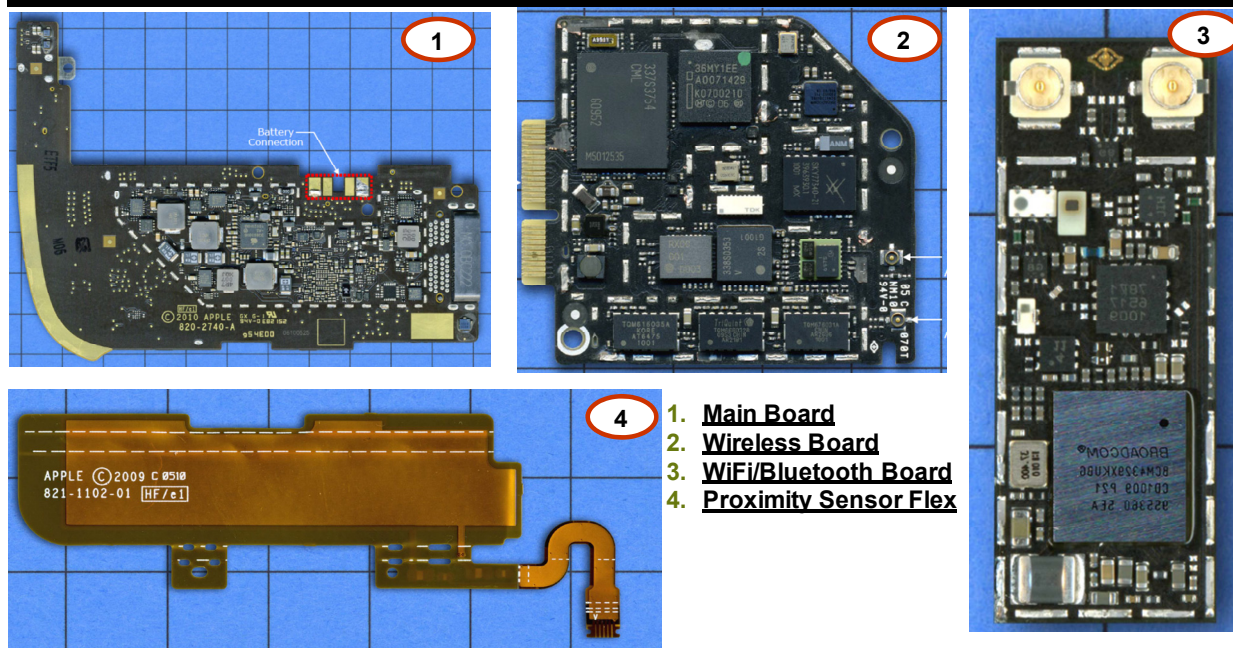
Exhibit 179 iPad 3G Component Counts

| | Parts | No. of Components | Modular/ Active | Small Active | Passive | Connector |
|-----------------------|-----------------------------|-------------------|-----------------|--------------|--------------|-----------|
| Main Electronics | 3G Wireless Board | 313 | 11 | 2 | 282 | 4 |
| | Ambient Light Sensor | 3 | 0 | 0 | 1 | 1 |
| | Docking Board | 61 | 6 | 2 | 45 | 4 |
| | Main Board | 997 | 9 | 50 | 877 | 14 |
| | Proximity Sensor Flex | 4 | 0 | 0 | 4 | 0 |
| | Total | 1,378 | 26 | 54 | 1,209 | 23 |
| Subsystem Electronics | Battery Pack: Battery PCB | 75 | 0 | 7 | 46 | 5 |
| | Display Module: Display PCB | 146 | 3 | 4 | 122 | 4 |
| | WiFi/Bluetooth Module | 84 | 2 | 0 | 74 | 2 |
| | Total | 305 | 5 | 11 | 242 | 11 |

Source: UBM TechInsights and Bernstein analysis.

Specifically, we break down the connector counts of the main electronics in Exhibit 181 — the main board has 14 connectors and the 3G wireless board has four. However, the main assembly work is in the 155 non-electronic components, with the majority being miscellaneous components such as screws and foam pads (see Exhibit 182). Combining the main electronics connectors and the non-electronic components, we reach a total of 179 parts or 609 steps for assembly. Given the total estimated seconds based on the teardown analysis, we include the extra seconds needed between transferring the semi-finished parts from one assembly line to another and the labor breaks to reach an average assembly time of 4,748 seconds for an iPad (see Exhibit 178). In other words, each step, on average, requires 8 seconds to complete — we estimate each component takes 24 seconds to

assemble, assuming three steps for one component. The assembly speed is roughly comparable between the iPad and iPhone.

Exhibit 180**Components of iPad 3G Teardown**

Source: UBM TechInsights (reproduced with permission) and Bernstein analysis.

Exhibit 181 Connectors Used in iPad 3G

| Part | Connector | Count |
|----------------------------------|-------------------------|-----------|
| 3G Wireless Board | Antenna Coax | 2 |
| | External Antenna | 2 |
| Ambient Light Sensor Flex | Bd to Bd: Female | 1 |
| | Bd to Bd: Female | 1 |
| Docking Board | Connector: Spring | 2 |
| | Connector: Docking | 1 |
| Main Board | Proximity Sensor Flex | 1 |
| | 3G Board | 1 |
| | SIM Flex Cable Assembly | 1 |
| | Socket | 2 |
| | ZIF | 4 |
| | Bd to Bd: Male | 3 |
| | Jack: Headphone w/Flex | 1 |
| | Cable Assembly-Display | 1 |
| Total | | 23 |

Source: UBM TechInsights and Bernstein analysis.

Exhibit 182 Non-Electronic Components Used in iPad 3G

| Part | Count |
|------------------------------|------------|
| Ambient Light Sensor Flex | 3 |
| Back Enclosure | 8 |
| Headphone Jack/Mic Flex | 5 |
| Main Board | 4 |
| Miscellaneous | 117 |
| Screw | 38 |
| Spring Clips | 14 |
| Foam Pads | 35 |
| Side Key Assembly | 8 |
| Speaker Assembly | 7 |
| WiFi/Bluetooth Docking Board | 3 |
| Total | 155 |

Source: UBM TechInsights and Bernstein analysis.

The number of assembly parts for an iPhone is much smaller than for iPad or a Lenovo ThinkPad notebook PC, but again the non-electronic components account for the majority of the assembly work (see Exhibit 183 and Exhibit 184). The components used for a ThinkPad are more commonly used by personal computers, while the iPhone uses mostly unique components that are tailored for iPhone products, thus making it difficult for assembly workers to get up to speed when the new model comes online, let alone training new workers with no experience in assembly lines.

Exhibit 183 iPhone 3G's Component Counts

| Part | Components | Connector |
|----------------------------------|------------|-----------|
| System | | |
| Docking Board | 31 | 2 |
| Earpiece/Sensor Board | 23 | 0 |
| Main Board | 843 | 11 |
| User Interface Board | 19 | 2 |
| WiFi/Bluetooth Board | 65 | 0 |
| Subsystem | | |
| Battery PCB | 10 | |
| Camera Flex | 2 | |
| Display Flex | 23 | |
| Non-Electronic Components | | 80 |

Source: UBM TechInsights and Bernstein estimates and analysis.

Exhibit 184 Non-Electronic Components Used in Lenovo ThinkPad

| Part | Count |
|-----------------------------|------------|
| WiFi Antenna Mounting Frame | 2 |
| Palm Rest | 8 |
| Touch Pad | 6 |
| Display | 7 |
| CD/DVD Player | 5 |
| Battery | 5 |
| Hard Drive | 8 |
| Memory | 3 |
| Keyboard | 5 |
| Miscellaneous | 189 |
| Total | 238 |

Source: UBM TechInsights and Bernstein analysis.

A Model of Industrial Automation in Hon Hai's Assembly Line

Four key numbers will determine the replacement of human labor with robots in electronics assembly at Hon Hai, and allow us to estimate how far away in time we are from this robot assembly reality:

- The ASP per robot;
- The integration costs of the robot assembly line — that is, the ancillary one-time and ongoing costs in making the assembly line "robot friendly" and the reconfiguration costs for product switchovers;
- The ratio of human to robot replacement; and
- The wage rate trends in Mainland China.

We discuss each of these in turn, before turning to our integrated model and implications for Hon Hai.

ASP per robot

The ASP of the current "state of the art" industrial robots of the required flexibility and dexterity to assemble small electronic devices is quite broad, but can range from US\$50,000 to more than US\$200,000 per unit. There is a new class of highly flexible, low-cost robots under development with "disruptive" pricing. Such robots are not yet commercially available, but companies such as Rethink Robotics have announced such offerings and are shipping at a very small scale. Pricing for these robots begin at US\$22,000 for the simplest configuration. We assume US\$25,000 for modeling purposes.

Integration costs of the robot assembly line

Robots, as much as they are efficient and tireless, are not very smart. For example, a human can easily look at a bag full of plastic components, take one out, align and orient it in an instant, and mount it on a product in an assembly line without batting an eyelash. For a robot to "know" what to do, unless it has been "told" what to do, is impossible. Robots require extremely structured environments. Every part a robot handles has to be reachable in a way that is predictable and repeatable, with as little variability as possible. Parts to be assembled need to be presented to the robot in a way that its fast, but pea-sized brain can handle, which means fixturing, packaging and specialized component delivery systems.

Further, because of the speed and momentum of robots, the environment surrounding the assembly line has to be "human-proofed," with safety containment to prevent undesired human-robot interaction, which means barriers, safety interlocks and sufficient floor space for the robot to do its work. Also, robots consume power above and beyond the electronics and equipment present in an assembly line. The energy previously provided by properly fed humans now has to be delivered via electrical systems, requiring incremental power delivery and control infrastructure, not to mention additional operational costs.

And lastly, the robots need to be programmed, integrated into the assembly line and debugged. This programming and re-integration process needs to be repeated at every product cycle change, which can happen as frequently as every six months for an Apple product.

Hence, the entire production line that will be automated needs to be re-designed and re-fitted to handle the introduction of robots. And at every product cycle, the production line needs to be readjusted for the new devices. Integrating robots in the production line (part of the manufacturing discipline of industrial automation, or IA) is done by specialized companies or contractors to the robot makers that work with the plant in putting it all together. Companies that do this kind of work include Maverick Technologies and Rockwell Automation, as well as the industrial automation divisions within Fanuc and ABB.

How much this integration costs varies widely. An often-cited rule of thumb is that a US\$50,000 robot will need US\$500,000 of integration costs before all is said and done. These integration costs can be amortized over many robots, but even integration costs that roughly equal the total cost of the robots is an optimistic assumption. Even though we are likely being aggressive under the current state of the art, our assumption is that the initial integration costs, all-in, are an amount equal to the cost of the robot. The new generation of flexible robots will likely be much cheaper to integrate — and in that case, the 1:1 assumption we're making may be sensible. For ongoing integration and maintenance costs, we assume 10% of the robot unit cost as a yearly expense.

The ratio of human to robot replacement

Of course, a robot can work much faster than a human, has very high uptime, doesn't require bathroom breaks, does not require a wage increase, and is not prone to agitate for better labor conditions. However, robots, for all their appeal, are rather simpleminded.

Going back to the previous example of taking a component out of a bag and then mounting it into a device, there are a couple of "implied" steps that a single robot (or automation tool) may not be able to handle. When a human picks up a component out of a bag (or out of a specially configured bin, in the case of a robot), it implicitly does a quality inspection: Are there blemishes on the part, is it of the right color, does it have a manufacturing defect that renders it unusable? A human, in an instant, can ascertain this and either proceed to assembly or simply toss the part into a reject bin. Such an activity for a robot is, essentially, rocket science, which means the parts the robots handle are already quality-controlled and prescreened to prevent line stops. This may require a separate inspection station — meaning two robots are required, when before a single human could do the job.

So the tradeoff is between speed and tirelessness versus smarts, with smarts going to the human, and speed and tirelessness going to the robot. A robot can run (almost) 24/7, while a human has material downtime, and even at three shifts, the "utilization rate" of a human can only be as high as 80%, incorporating lunch and bathroom breaks and shift changes. However, a human can carry out implicitly simple tasks that would stump a specialized robot, such as on-the-fly inspection, picking up a part dropped on the floor, or learning a new procedure.

For some steps, robots can run much faster (for example, putting on a solder point to connect a PCB to an module such as a headphone), or only slightly faster (screwing on a part, where a human would use the same power tool the robot would, but torque and force limitations prevent the robot from working at high speeds). And for others, humans come out well ahead. In an "implicit" part pick and place with quality controls, it would take two robots to do the task of one human.

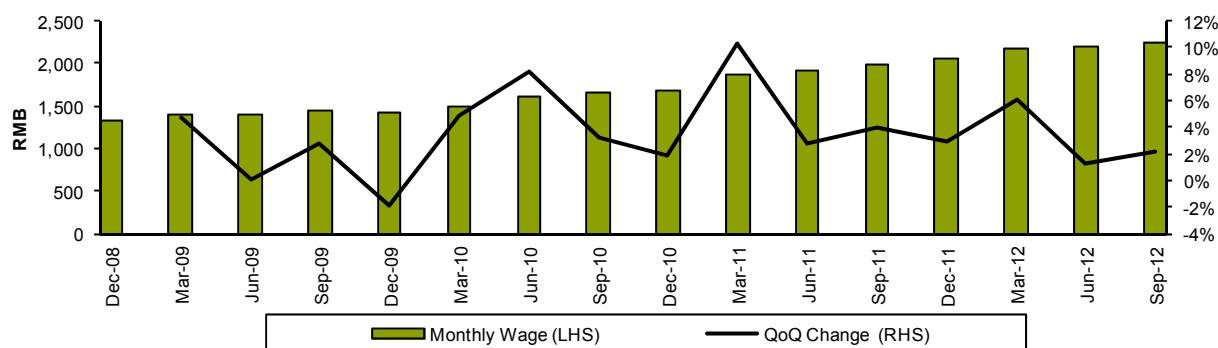
In the end, the two tradeoffs — between specialization versus speed and flexibility — balance each other. Thus, it wouldn't be unreasonable to expect that a robot could, on average, replace one human.

However, given the fact that a robot can work 24 hours a day without much break time, it is effectively working as three workers or three shifts (seven hours for each worker). Combining the tradeoffs of specialization versus speed and flexibility of using a robot instead of a person and the time each can work, we assume a robot-to-human labor replacement ratio of 1:3, that is, one robot replaces three humans.

Chinese labor wage rate trends

Despite having the largest population in the world, China is experiencing rising labor shortages and wage inflation across provinces and industries, particularly in the regions where skilled labor is needed. Exhibit 185 shows the average monthly wage for migrant workers since 2008, indicating a 68% increase over three years from to RMB 1,340 month to RMB 2,249 month. Hon Hai is the single largest private enterprise in China, and employs more than one million workers, yet it is constantly hiring due to high turnover rates. Facing pressure from the Fair Labor Association and media reports, Hon Hai has increased monthly wages multiple times across its Chengdu, Shenzhen and Zhengzhou campuses. This trend is unlikely to reverse in the near future. For our automation analysis in the following section, we assume a moderate 10% increase in labor wage per year for the next four years.

Exhibit 185 Monthly Wage Trend for Migrant Worker in China



Source: CEIC and Bernstein analysis.

A Deep Dive Into the Economics of Industrial Automation in Hon Hai

In this section, we delve into the economics of potential industrial automation. Because Hon Hai is unlikely to implement a complete automation at once across the assembly lines, we create three scenarios with low, half and high automation levels for the iPad and iPhone as well as a notebook PC line, exemplified by our analysis of a Lenovo ThinkPad, which Hon Hai does not manufacture, but serves as a representative product (see Exhibit 186).

Under the three different automation scenarios, we estimate a similar automation level for the iPads and iPhones due to their complexity and shorter product cycle. We also assume a higher level of automation for a ThinkPad notebook PC, as it might be easier to assemble with common components across PCs; has a longer product cycle, requiring fewer switchovers and product upgrades; and is more amenable to automation.

To establish a benchmark, we assume that the final assembly is 100% manual and the total assembly time for one unit of iPad is 4,748 seconds or 1.3 hours from beginning to end. Because the robots can be operating around the clock, we assume three shifts of workers needed in a 21-hour working day, producing 15 units per day or 4,777 units per year. Another key assumption we make is that there is a 1:1 productivity ratio between one robot and one worker — that is, one robot replaces one human at a specific task, but that same robot can be doing that same task for all three shifts, implying a 1:3 total replacement ratio between robots and humans.

| Exhibit 186 | | Simulations of Automation Implementation by Product | | | | | | | | | |
|----------------|-----------------------|---|----------------|--------|----------|-----------------|--------|----------|-----------------|--------|----------|
| | | Current | Low Automation | | | Half Automation | | | High Automation | | |
| | | iPad | iPad | iPhone | ThinkPad | iPad | iPhone | ThinkPad | iPad | iPhone | ThinkPad |
| Steps | Total Steps | 609 | 609 | 313 | 854 | 609 | 313 | 854 | 609 | 313 | 854 |
| | Automated Steps | 0 | 183 | 94 | 427 | 305 | 157 | 640 | 487 | 250 | 769 |
| | % of Automation | 0 | 30% | 30% | 50% | 50% | 50% | 75% | 80% | 80% | 90% |
| Time (Seconds) | Human Labor x 1 | 4,748 | 4,748 | 2,332 | 8,800 | 4,748 | 2,332 | 8,800 | 4,748 | 2,332 | 8,800 |
| | Robot x 1 | | 4,748 | 2,332 | 8,800 | 4,748 | 2,332 | 8,800 | 4,748 | 2,332 | 8,800 |
| | Human/Robot | | 4,748 | 2,332 | 8,800 | 4,748 | 2,332 | 8,800 | 4,748 | 2,332 | 8,800 |
| | Human | | 3,324 | 1,632 | 4,400 | 2,374 | 1,166 | 2,200 | 950 | 466 | 880 |
| | Robot | | 1,424 | 700 | 4,400 | 2,374 | 1,166 | 6,600 | 3,798 | 1,866 | 7,920 |
| Hours/Day | Human Labor x1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| | Robot x 1 | | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| Units/Day | Human Labor x 1 | 5 | 5 | 11 | 3 | 5 | 11 | 3 | 5 | 11 | 3 |
| | Robot x 1 | | 16 | 32 | 9 | 16 | 32 | 9 | 16 | 32 | 9 |
| | Human x3/Robot x 1 | | 8 | 17 | 6 | 11 | 22 | 7 | 14 | 28 | 8 |
| Units/Year | Human Labor x 1 | 1,592 | 1,592 | 3,242 | 859 | 1,592 | 3,242 | 859 | 1,592 | 3,242 | 859 |
| | Robot x 1 | | 5,573 | 11,346 | 3,007 | 5,573 | 11,346 | 3,007 | 5,573 | 11,346 | 3,007 |
| | Human/Robot | | 2,972 | 6,051 | 2,005 | 3,715 | 7,564 | 2,506 | 4,830 | 9,834 | 2,806 |
| | % of human production | | 1.9x | 1.9x | 2.3x | 2.3x | 2.3x | 2.9x | 3.0x | 3.0x | 3.3x |

Source: Literature search and Bernstein estimates and analysis.

Under the low automation scenario for the iPad, we assume a 30% automation level, meaning 30% out of the 609 steps would be done by robots and the remaining 70% would be still done by workers. Such combination of robots and human labor leads to a total annual production of 2,972 units compared to 1,592 by human labor alone, indicating a 1.9x productivity multiple over pure human labor.

Under the high automation scenario for iPad, we assume 80% of the steps are automated and 20% continue to be executed by human labor. In that case, we estimate the automated line could produce 4,380 units per year, a 3.0x improvement over the 100% human labor line at 1,592 units a year. Following the same logic, we estimate that the productivity increase for ThinkPad is even higher, reaching 3.3x under the assumption of 90% automation.

The improvement of productivity and accuracy through automation is not unexpected. What matters to the decision-making process is the economics behind investing in robots — that is, how long does it take for the initial robot capex to breakeven given the rising labor costs, and what is the "total cost of ownership" (TCO) of a robot versus a human?

One of the biggest uncertainties in the industrial robots is the pricing. Prices for existing robots range from as low as US\$50,000 to over US\$200,000, excluding the deployment charge and maintenance fees. However, companies like Rethink Robotics have launched industrial robots at a "disruptive" price point of about US\$25,000.

As a result of the varying pricing points, we conduct our breakeven analysis using four per-robot price points: US\$25,000, US\$50,000, US\$75,000 and US\$100,000. Overall, we assume a workforce of 200,000 in the iPad's production and each level of automation (30%, 50% and 80%) would lead to a reduction of workforce in line with the automation level.

There are effectively two "multipliers" that impact the total workforce reduction:

- The number of humans that can be replaced by robots at different tasks — here we assume 1:1 given the complexity of Apple product assembly.
- The number of humans that can be replaced by robots at the same task — here we assume 3:1 because a robot can do three shifts in the 21 hours/day window compared to 7 hours per shift per worker.

Combining those two factors, we assume the total robot-to-human labor replacement ratio to be 1:3 in the analysis we conducted. Therefore, a 30% automation level means a total reduction of 60,000 workers and a purchase of 20,000 robots. For calculating the TCO of the robot investment, we estimate an initial lump-sum investment of the robots for the first year with:

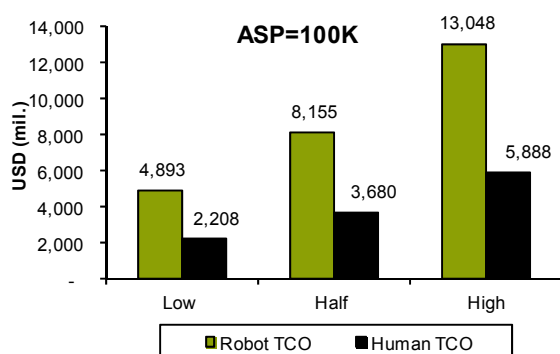
- Deployment and integration costs that are equivalent to the cost of one robot;
- 10% of the robot capex per year as incremental operations costs (e.g., electricity and ambient environmental control), maintenance, upgrade, re-fixturing, and reprogramming costs; and
- For calculating the TCO under manual labor, we assume an annual salary based on an average of US\$3/hour wage (including US\$1/hour welfare benefits and overhead) and a maximum of 49 hours/week (under Chinese labor laws) for the first year, and 10% increase in hourly wage every year going forward.

In Exhibit 187 we calculate the TCOs of three levels of automation scenarios discussed previously under two robot ASP levels of US\$100,000 and US\$75,000 to compare against the TCO of employing humans over a five-year investment period. We show the TCO in millions of U.S. dollars, comparing the cost of buying and operating all the needed robots against the present value of the wage savings from automation. We assume a conservative 6% cost of capital for the discounting exercise. Whenever the TCO of the robot is lower than that of the equivalent labor savings, automation would be preferred over a purely manual assembly process.

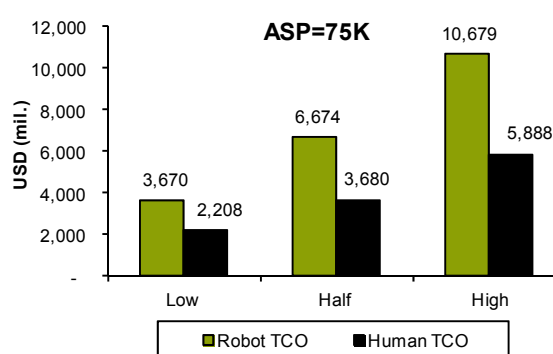
As the data show in Exhibit 188 and Exhibit 189, the TCO is substantially higher than the TCO of 100% human labor at both pricing levels.

| Exhibit 187 | | Estimates of Total Cost of Ownership of Robot Investment vs. Human Labor for an iPad (Replacement Ratio 3:1) — Robot ASPs of US\$75,000 and US\$100,000 | | | | | | | | | | |
|------------------------|---------------------------------|---|---------|---------|---------|---------|-------------------------|---------|---------|---------|---------|--|
| | US\$ Million Robot ASP (USD) | Yr 1 100,000 | Yr 2 | Yr 3 | Yr 4 | Yr 5 | Yr 1 Robot ASP (USD) | Yr 2 | Yr 3 | Yr 4 | Yr 5 | |
| Low Automation 30% | Robot Capex | 2,000 | | | | | 1,500 | | | | | |
| | Maintenance | 200 | 200 | 200 | 200 | 200 | 150 | 150 | 150 | 150 | 150 | |
| | Integration costs | 2,000 | | | | | 1,500 | | | | | |
| | Total | 4,200 | 200 | 200 | 200 | 200 | 3,150 | 150 | 150 | 150 | 150 | |
| | TCO | 4,893 | | | | | 3,670 | | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | |
| | Worker Reduction | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | |
| | Salary Reduction | 410 | 450 | 495 | 545 | 600 | 410 | 450 | 495 | 545 | 600 | |
| | TCO | 2,208 | | | | | 2,208 | | | | | |
| | | | | | | | | | | | | |
| Half Automation 50% | Robot Capex | 3,333 | | | | | 2,500 | | | | | |
| | Maintenance | 333 | 333 | 333 | 333 | 333 | 375 | 375 | 375 | 375 | 375 | |
| | Integration costs | 3,333 | | | | | 2,500 | | | | | |
| | Total | 7,000 | 333 | 333 | 333 | 333 | 5,375 | 375 | 375 | 375 | 375 | |
| | TCO | 8,155 | | | | | 6,674 | | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | |
| | Worker Reduction | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | |
| | Salary Reduction | 683 | 751 | 826 | 908 | 999 | 683 | 751 | 826 | 908 | 999 | |
| | TCO | 3,680 | | | | | 3,680 | | | | | |
| | | | | | | | | | | | | |
| High Automation 80% | Robot Capex | 5,333 | | | | | 4,000 | | | | | |
| | Maintenance | 533 | 533 | 533 | 533 | 533 | 600 | 600 | 600 | 600 | 600 | |
| | Integration costs | 5,333 | | | | | 4,000 | | | | | |
| | Total | 11,200 | 533 | 533 | 533 | 533 | 8,600 | 600 | 600 | 600 | 600 | |
| | TCO | 13,048 | | | | | 10,679 | | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | |
| | Worker Reduction | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | |
| | Salary Reduction | 1,092 | 1,201 | 1,321 | 1,453 | 1,599 | 1,092 | 1,201 | 1,321 | 1,453 | 1,599 | |
| | TCO | 5,888 | | | | | 5,888 | | | | | |
| | | | | | | | | | | | | |

Source: CEIC, literature search and Bernstein estimates and analysis.

Exhibit 188 Human TCO Comparison With Robot ASP of US\$100,000

Source: Bernstein estimates and analysis.

Exhibit 189 Human TCO Comparison With Robot ASP of US\$75,000

Source: Bernstein estimates and analysis.

In other words, within a five-year investment horizon, and with our sensible (if not overly optimistic) assumptions for robot and integration costs, automation at Hon Hai does not make economic sense despite rising labor wages in China.

If the total cost savings in the initial five years do not support the adoption of industrial automation, we wonder how many years it would take for robots to become a viable alternative to a human. Effectively, as wages increase, the TCO of the human increases and eventually surpasses that of the robot.

In Exhibit 190, we conduct a breakeven analysis looking out up to 12 years, assuming that the TCO of the robot does not decrease over this period (a simplifying but likely conservative assumption). The results indicate that for robot ASP of US\$100,000, the earliest breakeven time horizon will be 12 years from now at all three automation levels, although adopting industrial automation is close to achieve breakeven in the 11th year at the low automation level.

Exhibit 190 Breakeven Year Analysis by Robot ASP and Automation Level — Robot ASPs of US\$75,000 and US\$100,000

| ASP: US\$100,000 | | 5 Yrs | 6 Yrs | 7 Yrs | 8 Yrs | 9 Yrs | 10 Yrs | 11 Yrs | 12 Yrs |
|------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Low Automation | Robot TCO | 4,893 | 5,042 | 5,183 | 5,316 | 5,442 | 5,560 | 5,672 | 5,777 |
| | Human TCO | 2,208 | 2,701 | 3,212 | 3,743 | 4,294 | 4,865 | 5,458 | 6,074 |
| Half Automation | Robot TCO | 8,155 | 8,404 | 8,639 | 8,861 | 9,070 | 9,267 | 9,453 | 9,629 |
| | Human TCO | 3,680 | 4,501 | 5,354 | 6,238 | 7,156 | 8,109 | 9,097 | 10,123 |
| High Automation | Robot TCO | 13,048 | 13,447 | 13,823 | 14,177 | 14,512 | 14,828 | 15,125 | 15,406 |
| | Human TCO | 5,888 | 7,202 | 8,566 | 9,981 | 11,450 | 12,974 | 14,555 | 16,197 |
| ASP: US\$75,000 | | 5 Yrs | 6 Yrs | 7 Yrs | 8 Yrs | 9 Yrs | 10 Yrs | 11 Yrs | 12 Yrs |
| Low Automation | Robot TCO | 3,670 | 3,782 | 3,888 | 3,987 | 4,081 | 4,170 | 4,254 | 4,333 |
| | Human TCO | 2,208 | 2,701 | 3,212 | 3,743 | 4,294 | 4,865 | 5,458 | 6,074 |
| Half Automation | Robot TCO | 6,674 | 6,955 | 7,219 | 7,468 | 7,704 | 7,926 | 8,135 | 8,333 |
| | Human TCO | 3,680 | 4,501 | 5,354 | 6,238 | 7,156 | 8,109 | 9,097 | 10,123 |
| High Automation | Robot TCO | 10,679 | 11,127 | 11,550 | 11,949 | 12,326 | 12,681 | 13,016 | 13,332 |
| | Human TCO | 5,888 | 7,202 | 8,566 | 9,981 | 11,450 | 12,974 | 14,555 | 16,197 |

Source: CEIC, literature search and Bernstein estimates and analysis.

Using the same methodology, Exhibit 191 shows the analysis at two lower ASP levels of US\$50,000 and US\$25,000 for a five-year investment period. Under the new scenarios, we find that the TCO of robots is less than the TCO of human labor for an ASP of US\$25,000 and under across all automation levels (see Exhibit 192). However, the TCO of robots versus human labor is reasonably close for the low automation level at the ASP of US\$50,000 (see Exhibit 193).

One simplifying assumption that makes the US\$25,000 ASP robot a viable investment is that we are estimating the integration cost of the robot to be the robot ASP. This is probably too aggressive — the integration cost has many elements

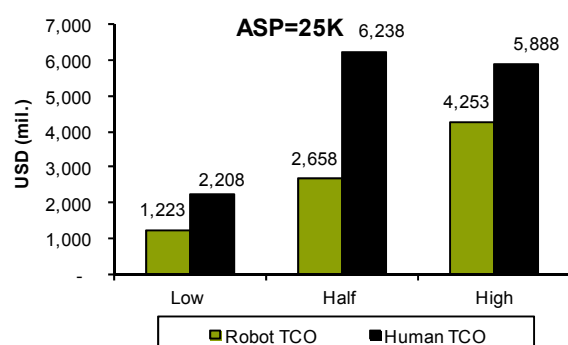
where the cost of the robot is not relevant. Hence, the four-year breakeven period is probably too short under more realistic conditions.

Exhibit 191 Estimates of Total Cost of Ownership of Robot Investment vs. Human Labor for an iPad (Replacement Ratio 3:1) — Robot ASPs of US\$25,000 and US\$50,000

| USD (Mil.) | | Yr 1 | Yr 2 | Yr 3 | Yr 4 | Yr 5 | Yr 1 | Yr 2 | Yr 3 | Yr 4 | Yr 5 |
|-------------------------------|-------------------------|-----------------|--------------|--------------|--------------|--------------|-----------------|--------------|--------------|--------------|--------------|
| | | Robot ASP (USD) | | | | | Robot ASP (USD) | | | | |
| | | 50,000 | | | | | 25,000 | | | | |
| Low Automation 30% | Robot Capex | 1,000 | | | | | 500 | | | | |
| | Maintenance | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 |
| | Integration costs | 1,000 | | | | | 500 | | | | |
| | Total | 2,100 | 100 | 100 | 100 | 100 | 1,050 | 50 | 50 | 50 | 50 |
| | TCO | 2,447 | | | | | 1,223 | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 |
| Half Automation 50% | Worker Reduction | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 |
| | Salary Reduction | 410 | 450 | 495 | 545 | 600 | 410 | 450 | 495 | 545 | 600 |
| | TCO | 2,208 | | | | | 2,208 | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 |
| High Automation 80% | Worker Reduction | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 |
| | Salary Reduction | 683 | 751 | 826 | 908 | 999 | 683 | 751 | 826 | 908 | 999 |
| | TCO | 3,680 | | | | | 6,238 | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 |
| Low Automation 30% | Worker Reduction | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 | 160,000 |
| | Salary Reduction | 1,092 | 1,201 | 1,321 | 1,453 | 1,599 | 1,092 | 1,201 | 1,321 | 1,453 | 1,599 |
| | TCO | 5,888 | | | | | 5,888 | | | | |
| | Annual Salary | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 | 6,825 | 7,508 | 8,258 | 9,084 | 9,992 |

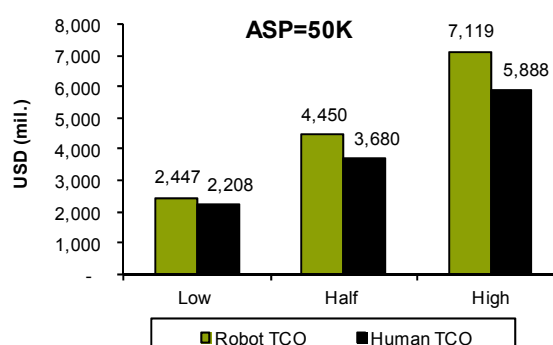
Source: CEIC, literature search and Bernstein estimates and analysis.

Exhibit 192 Human TCO Comparison With ASP of US\$25,000



Source: Bernstein estimates and analysis.

Exhibit 193 Human TCO Comparison With ASP of US\$50,000



Source: Bernstein estimates and analysis.

Given the lower levels of robot ASPs in this set of analyses, it is not surprising to see the breakeven years are much shorter than the previous ASP levels. In Exhibit 194, we see the initial breakeven year under the ASP of US\$50,000 is in the sixth year for the low automation level only, and starting from the seventh year, the TCO of robots is lower than that of human labor. For the robot ASP of US\$25,000 however, we see the breakeven year is at the third year for low automation and at the fourth year for all levels of automation.

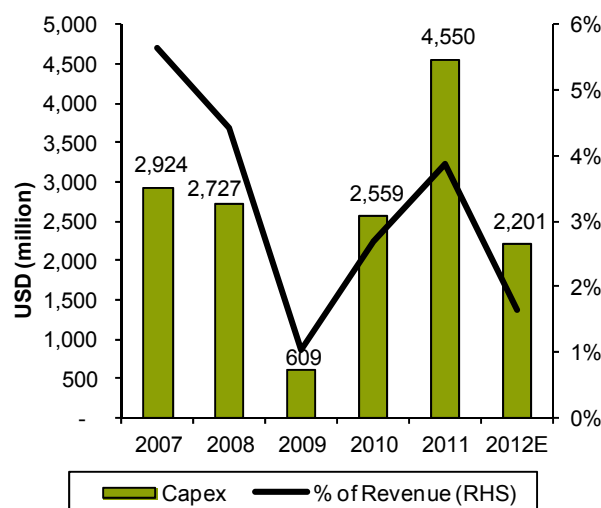
Exhibit 194 Breakeven Year Analysis by Robot ASP and Automation Level — Robot ASPs of US\$25,000 and US\$50,000

| ASP: US\$50,000 | | | 3 Yrs | 4 Yrs | 5 Yrs | 6 Yrs | 7 Yrs | 8 Yrs | 9 Yrs | 10 Yrs |
|------------------------|-----------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| Low Automation | Robot TCO | | 2,283 | 2,367 | 2,447 | 2,521 | 2,592 | 2,658 | 2,721 | 2,780 |
| | Human TCO | | 1,275 | 1,733 | 2,208 | 2,701 | 3,212 | 3,743 | 4,294 | 4,865 |
| Half Automation | Robot TCO | | 4,042 | 4,252 | 4,450 | 4,636 | 4,813 | 4,979 | 5,136 | 5,284 |
| | Human TCO | | 2,126 | 2,888 | 3,680 | 4,501 | 5,354 | 6,238 | 7,156 | 8,109 |
| High Automation | Robot TCO | | 6,467 | 6,803 | 7,119 | 7,418 | 7,700 | 7,966 | 8,217 | 8,454 |
| | Human TCO | | 3,401 | 4,622 | 5,888 | 7,202 | 8,566 | 9,981 | 11,450 | 12,974 |
| ASP: US\$25,000 | | | 3 Yrs | 4 Yrs | 5 Yrs | 6 Yrs | 7 Yrs | 8 Yrs | 9 Yrs | 10 Yrs |
| Low Automation | Robot TCO | | 1,142 | 1,184 | 1,223 | 1,261 | 1,296 | 1,329 | 1,329 | 1,329 |
| | Human TCO | | 1,275 | 1,733 | 2,208 | 2,701 | 3,212 | 3,743 | 4,294 | 4,865 |
| Half Automation | Robot TCO | | 2,250 | 2,460 | 2,658 | 2,845 | 3,021 | 3,187 | 3,187 | 3,187 |
| | Human TCO | | 2,126 | 2,888 | 3,680 | 4,501 | 5,354 | 6,238 | 7,156 | 8,109 |
| High Automation | Robot TCO | | 3,600 | 3,936 | 4,253 | 4,552 | 4,834 | 5,100 | 5,100 | 5,100 |
| | Human TCO | | 3,401 | 4,622 | 5,888 | 7,202 | 8,566 | 9,981 | 11,450 | 12,974 |

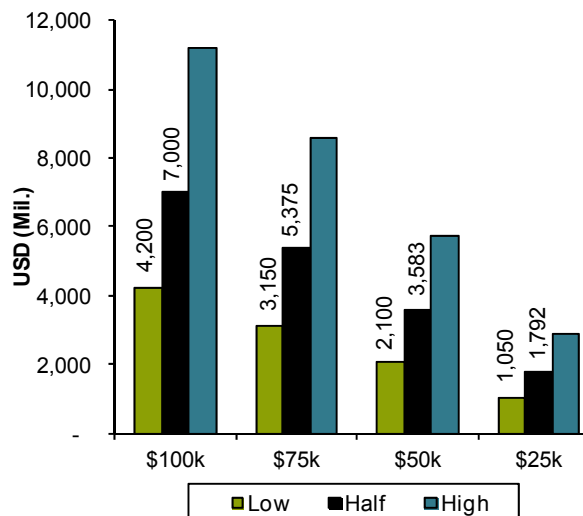
Source: CEIC, literature search and Bernstein estimates and analysis.

Another barrier to the adoption of automation is the initial outlays, which can be significant. From a capex perspective, Hon Hai's annual capex budget has been consistently under US\$3 billion, with a spike (likely caused by the move inland) of US\$4.5 billion in 2011 (see Exhibit 195).

Although historical trends do not perfectly predict future capex, we believe it is unlikely that Hon Hai will exceed the capex levels of 2011 given the uncertain economic and market environment. Therefore, only for low levels of automation and very low cost robots (US\$50,000 and under) does the investment required meet Hon Hai's likely capital constraints (see Exhibit 196).

Exhibit 195 Hon Hai's Capex Trends

Source: Corporate reports and Bernstein estimates and analysis.

Exhibit 196 Estimated Initial Robot Capex for Hon Hai Under Different ASPs

Source: Bernstein estimates and analysis.

Overall, we conclude that only at the lowest robot pricing point of US\$25,000 or below would it make economic sense for Hon Hai to replace human labor with industrial robots. Otherwise the TCO of the robot investment is higher than that of continuing to pay increasingly higher monthly salaries.

Although there is a slight possibility for a US\$50,000 per robot to work in the low automation scenario as well, the higher levels of automation certainly require much more initial investment that far exceeds the TCO of human labor. Beyond the pricing point of US\$50,000, however, we find it difficult for Hon Hai to implement

large-scale automation given the lengthy investment period that is required to reach breakeven on the total costs.

In summary, the economics alone do not make the automation investment case valid at this point. Additionally, there are four other caveats regarding the analysis we conduct in this chapter that could delay or prevent Hon Hai's move into automation:

- First, we have not taken Chinese regional policies into consideration, especially given the fact that Hon Hai has enjoyed preferential tax breaks and governmental policies in the new facilities in Chengdu and Zhengzhou. The significant employment reduction, to a large extent, would create political and social instability for a company like Hon Hai.
- Second, as the automation benefits come into play over a time frame that is four years or longer, it is critical for Hon Hai to enjoy a stable or growing electronics industry to keep up its high utilization rate. In an unfavorable economic environment, Hon Hai can readjust its workforce, who are mostly on short-term contracts, but the fixed costs of maintaining a troupe of robots could be daunting.
- Third, the current state of the art in low-cost flexible robots is relatively slow and consists of low-precision robots that carry out simple tasks such as pick-and-place or materials handling. Robots sophisticated enough for fine assembly are too inflexible and expensive to work with Hon Hai's economics. Even Hon Hai's own robots, the "Foxbots," are designed for simple tasks that limit their usefulness in a production line.
- Lastly, Hon Hai's automation ambition also hinges on the manufacturing capacity of industrial robots as it is likely to purchase more than 10,000 robots for the iPad division alone or more than 50,000 for the entire company for the low automation level. Given the global robot production capacity for 2012 is only 190,000 units, the tight supply would delay Hon Hai's purchase schedule.

Hon Hai Precision's Valuation: The Black Box Discount?

Overview

Hon Hai Precision with its informational opaqueness — complicated corporate structure, lack of earnings conferences, no management Q&A and bare minimum information disclosures only to meet regulatory requirements — has created a black box environment for investors. In this chapter, we examine how Hon Hai Precision has traded relative to its peers and whether this "black box effect" has an impact on valuations. ODM peers are included as they are closer to Hon Hai in profitability and size, albeit having different business models. Our sample of EMS peers includes Flextronics, Jabil Circuit, Celestica, Sanmina-SCI, and ODM peers Quanta, Compal Electronics and Wistron.

Hon Hai's trading multiples have decreased in absolute terms and have narrowed the gap with peer averages, despite having commanded historical premiums on forward and LTM earnings. The decline in valuation has coincided with the drop in Hon Hai's operating margins and economic profits (which we define as ROIC minus WACC). Hon Hai's trading multiple premiums were justified in the past, as the company generated above-average economic profits and operating margins when compared to EMS peers. The reduction in profitability has coincided with the growth of Apple's business at Hon Hai and, as explained in earlier chapters, we believe this is not coincidental.

Hon Hai continues to trade at a premium relative to peers, even if that premium has shrunk materially. We find that the stock's multiple fully incorporates the value of Apple's franchise (and may even overvalue it); Hon Hai's non-Apple business carries a higher multiple than EMS peers, indicating a belief by the market that the company's scale and positioning are better than competitors.

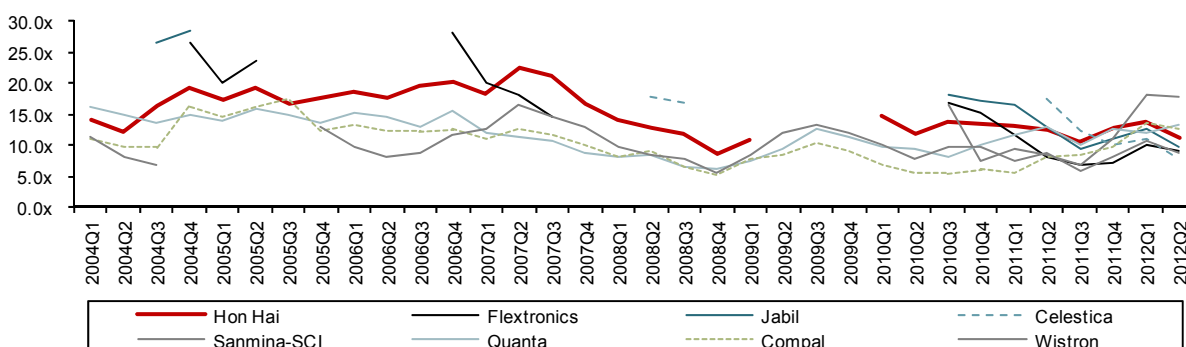
Hon Hai's investor base is largely composed of retail investors, and suffers from very low liquidity because of its listing in Taiwan. These factors subject Hon Hai stock to increased risks, which are exacerbated by informational opaqueness that is unique to the company even among its Taiwanese peers. The low institutional participation of 30% that is inherent to stocks listed in Taiwan contrasts sharply to EMS peers trading in U.S. and Canada with about 90% institutional holdings.

We believe Hon Hai's opaqueness hurts its valuation. Without visibility and understanding of the company's current and future income streams and their sources, investors are in the dark, causing them to impose higher discount rates for uncertainty. Even though Hon Hai trades at a premium to peers, we believe it could trade even higher (as a "bellwether stock") if this informational asymmetry was reduced through disclosure.

Hon Hai's Trading Multiples Are Higher Than Comparables, But Have Recently Fallen Closer to Peer Average

From 2011 through first-half 2012, Hon Hai traded at a trailing-LTM-earnings multiple of 12.3x, the highest among EMS peers (in the range of 8.8x-12.3x). Over the longer time frame of 2004 through first-half 2012, Hon Hai traded at an average 15.3x LTM earnings, versus EMS peers at 12.0-15.7x and ODM peers at 9.9-11.7x (see Exhibit 197).² However, we see increasingly that Hon Hai's trailing earnings multiples are normalizing towards the peer average.

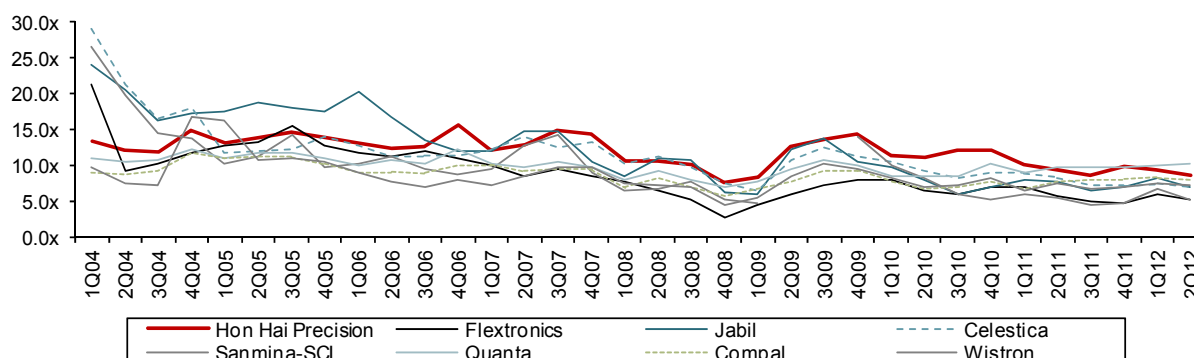
²Trailing LTM earnings as a measure have substantial noise, due to stock price volatility and loss-making quarters or near breakeven earnings, which would send multiples off the charts. For presentation, we have removed these outliers.

Exhibit 197 EMS and ODM Price-to-Trailing-12-Month Earnings Ratios

Note: Omissions made when price/LTM earnings are overly high or negative.

Source: Capital IQ and Bernstein analysis.

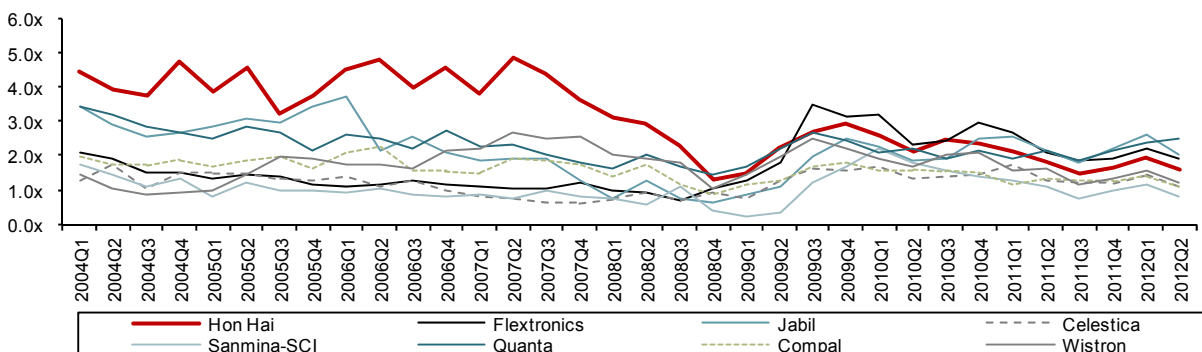
On a forward earnings basis, Hon Hai also has commanded a premium over EMS and ODM peers, although trading multiples for all companies have clustered around 10.0x. Multiples have suffered compression over the years, dropping from 11.6x, on average, in 2004-08 to 8.3x post 2008. Prior to 2008, Hon Hai traded on forward earnings basis at around 12.8x, falling to 10.9x post-2008, but still holding up against EMS company comparables, which dropped from 12.8x before 2008 to 8.3x after 2008, and ODMs which dropped from 9.6x to 8.4x (see Exhibit 198).

Exhibit 198 EMS and ODM Price-to-Forward 12-Month Earnings Ratios

Source: FactSet, Capital IQ and Bernstein analysis.

On forward earnings basis from 2009 through first-half 2012, Hon Hai still commanded a higher multiple (at 10.9x) relative to EMS companies (7.6x) and ODMs (8.4x). Since 2009, Hon Hai has seen its revenue base more than double from Apple-related business, but has seen stagnating operating profit caused by a halving of the operating margins. In first-half 2012, Hon Hai forward earnings multiples slid to 9.1x, but still maintained a premium against its peer group's P/FE of 6.6x.

On a P/BV basis, Hon Hai had the highest multiple prior to 2008 at 3.8x versus EMS/ODM peer average of 1.6x. The stock's P/BV multiple has since been reduced to 1.6x by the end of second-quarter 2012, in line with EMS/ODM historical averages. As EMS companies suffered losses in 2008-09, coupled with market rebound, book multiples inflated over 2009, but have since normalized (see Exhibit 199).

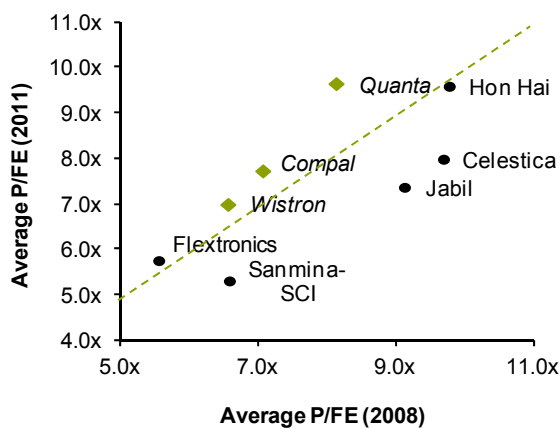
Exhibit 199 EMS and ODM Price-to-Book Ratios

Source: Capital IQ and Bernstein analysis.

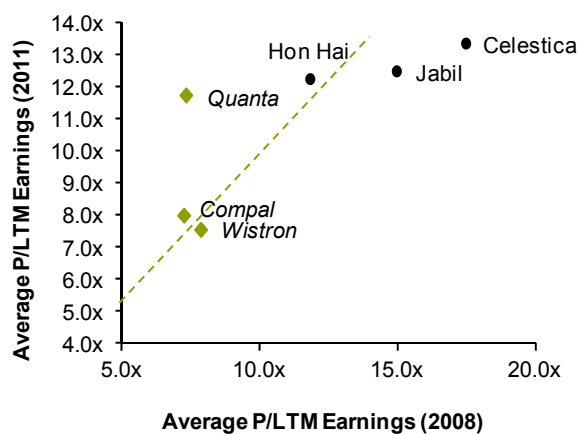
Over time, trading multiples for forward earnings have been relatively constant across most players within the industry — larger EMS/ODMs such as Hon Hai and Quanta commanded a premium over smaller-scale peers. Celestica, Jabil Circuit and Sanmina-SCI saw the biggest reduction in forward multiples during 2008-11 as earnings improved, while Quanta increased the most on the back of an increasing stock price alongside higher earnings expectations. Hon Hai's multiple has held relatively constant (see Exhibit 200).

On an LTM earnings basis, Quanta saw the biggest increase between 2008 and 2011 because of a decline in trailing earnings, while Jabil and Celestica saw earnings improve and multiples decreased. For Hon Hai, trailing earnings multiples improved mainly due to an increased stock price, on the back of marginally increasing LTM earnings (see Exhibit 201).

In summary, Hon Hai has carried a higher valuation multiple than its peers, particularly the directly comparable EMS companies, and although valuation multiples have compressed for the whole industry, Hon Hai has managed to retain a (shrinking) valuation premium relative to its peers.

Exhibit 200 EMS and ODM P/FE Trends: 2011 vs. 2008

Source: FactSet, Capital IQ and Bernstein analysis.

Exhibit 201 EMS and ODM: P/LTM Earnings Trends 2011 vs. 2008

Note: Loss-making companies with non-meaningful multiples excluded

Source: Bloomberg L.P., Capital IQ and Bernstein analysis.

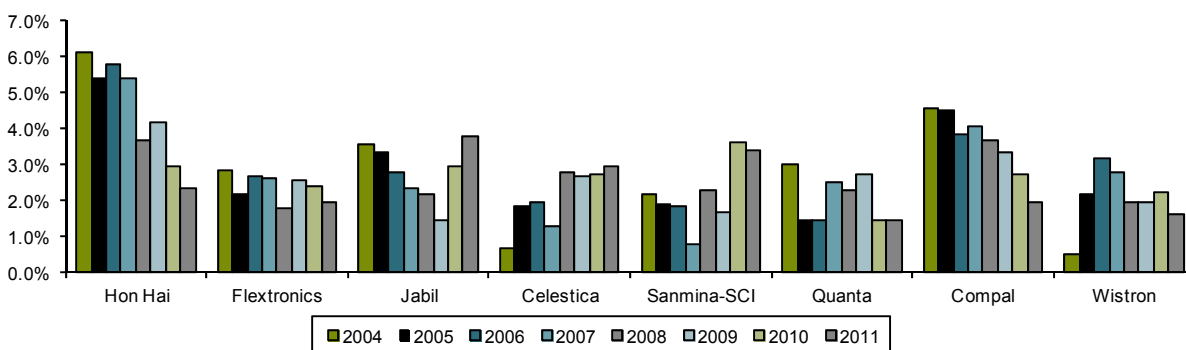
Hon Hai Economic Profit and Operating Margins Declining Even as the Firm Grows the Top Line

There are many measures of profitability we can rely on to compare Hon Hai to its EMS and ODM peers, but we settle on two that we think capture reasonably well the behavior of the firms involved and allow us to make meaningful cross-segment comparisons.

One measure is operating margins, which allow us to compare ongoing profitability across segments, and is a closely watched indicator. However, operating margins do not capture the asset intensity required to generate such margins. The other measure is economic profit: the excess return to the cost of capital, as measured by ROIC minus WACC, which includes the "cost" of invested capital needed to generate commensurate returns.

We note that Hon Hai has historically outperformed EMS peers in both operating margins and economic profit, even though it has seen a material reduction in profitability over time. From an operating margin perspective, Hon Hai's were higher than EMS peers' in the past, but the growth of Apple-related business and Hon Hai's "forward pricing" strategy have decreased operating margins closer to peer ranges. However, it still maintains a (shrinking) lead over EMS peers, which only recently have managed to generate returns above their cost of capital (see Exhibit 202 and Exhibit 203).

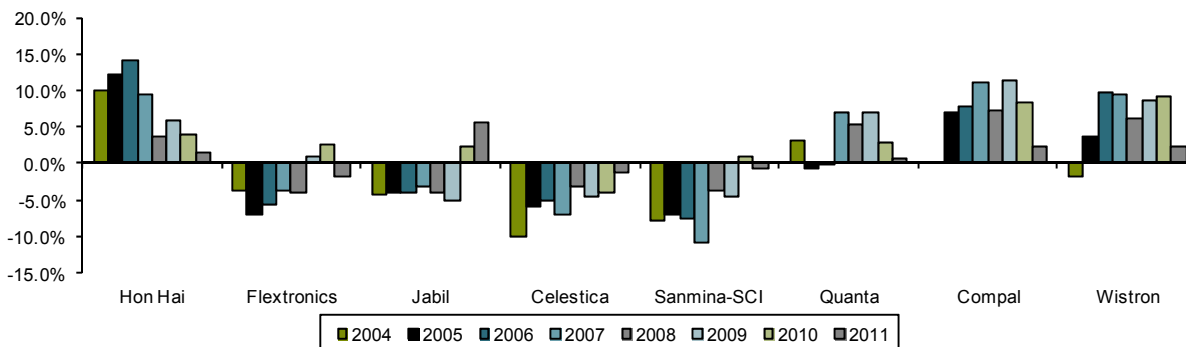
Exhibit 202 Yearly Operating Margin for EMS and ODMs



Note: Quanta, Compal, Wistron are ODMs; others are EMS companies.

Source: Capital IQ, company disclosures and Bernstein analysis.

Exhibit 203 Yearly Economic Profit — Excess Return to the Cost of Capital (ROIC – WACC) — for EMS and ODMs



Note: Quanta, Compal, Wistron are ODMs; others are EMS companies.

Source: Capital IQ, company disclosures and Bernstein analysis.

More specifically, Hon Hai used to have outsized "winner takes all" economic profits relative to EMS peers, but its lead has shrunk as invested capital grew and profitability shrank. The decline in profitability has been driven by increased capital expenditures (as the firm moved inland in search of lower labor costs) and

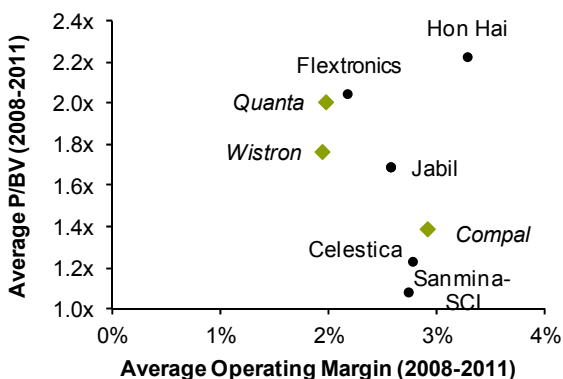
by Hon Hai's "manufacturing hedge," which swelled debt levels as the company borrows in U.S.-dollar-denominated loans with matched deposits in countries with account-payable liabilities. Without these operations, Hon Hai's economic profit (excess returns) would be closer to 2009 levels at 5%, well above EMS peers.

Comparisons of Hon Hai's profitability with ODMs' are not as appropriate given the differences in business models. ODMs tend to have higher operating margins and economic profit because of the different value-added propositions offered relative to EMS.

When we compare relative valuations to profitability measures, Hon Hai's higher valuations during 2008-11 are matched by higher economic profits and operating margins, justifying the premium. This provides evidence to the "winner takes all" scenario for EMS, where being the biggest companies provide scale advantages that translate into financial outperformance (see Exhibit 204 through Exhibit 209).

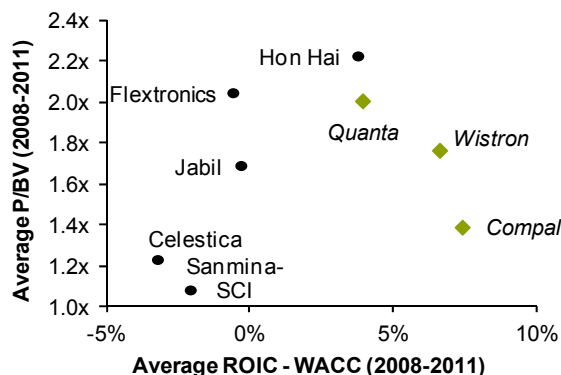
In summary, Hon Hai carries a higher multiple simply because it has grown faster and has been more profitable than peers, both on a realized basis and in expectations. Lately, these multiples have compressed as Hon Hai becomes less profitable and less capital efficient, but still carries a material premium relative to EMS peers.

Exhibit 204 EMS and ODM Average P/BV vs. Average Operating Margin



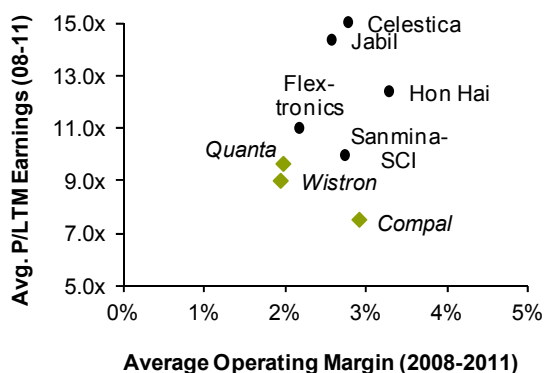
Source: Bloomberg L.P., Capital IQ and Bernstein analysis.

Exhibit 205 EMS and ODM Average P/BV vs. Average ROIC – WACC



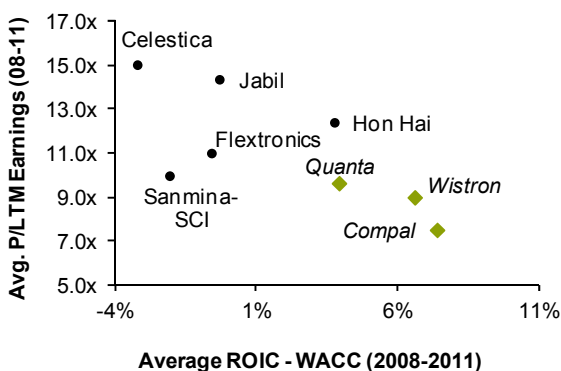
Source: Bloomberg L.P., Capital IQ and Bernstein analysis.

Exhibit 206 EMS and ODM Average Price/LTM Earnings vs. Average Operating Margin

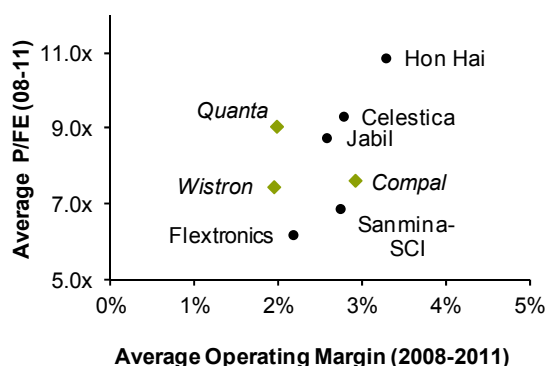


Source: Bloomberg L.P., Capital IQ and Bernstein analysis.

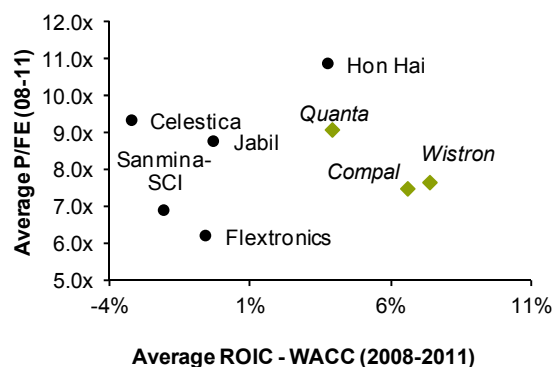
Exhibit 207 EMS and ODM Average Price/LTM Earnings vs. Average ROIC – WACC



Source: Bloomberg L.P., Capital IQ and Bernstein analysis.

Exhibit 208 EMS and ODM Average P/FE vs. Average Operating Margin

Source: FactSet, Capital IQ and Bernstein analysis.

Exhibit 209 EMS and ODM Average P/FE vs. Average ROIC – WACC

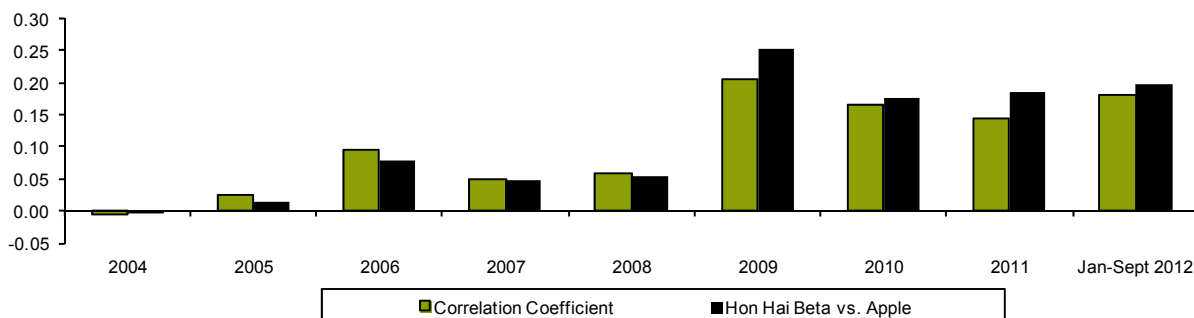
Source: FactSet, Capital IQ and Bernstein analysis.

Apple-Related Franchise Premium Appears to Be Fully Reflected in Hon Hai Valuation

Hon Hai's stock movements since 2009 have become increasingly correlated with Apple compared to periods prior to 2009. The tighter relationship coincides with the takeoff of the iPhone and iPad and the increasing importance of Apple to Hon Hai (see the chapter, "Hon Hai and Apple: A Mutually Beneficial Relationship or Unequal Balance of Power?" for an in-depth look at this relationship). Annual correlation of returns between Apple and Hon Hai are currently in the 0.20 area (see Exhibit 210; 90-day correlations are far higher, in the 0.60-0.70 range).

More interesting, however, is the *beta* of returns between Hon Hai and Apple. Although the stocks are positively correlated, that correlation does not translate into material outperformance by Hon Hai. For every 1% increase (or decrease) in Apple's stock price, Hon Hai will only move up (or down) 25 bps, on average.

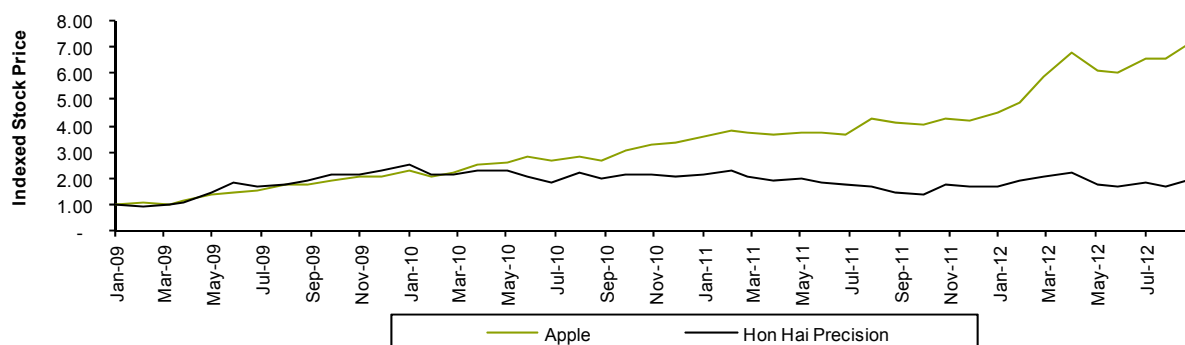
As a result, from the viewpoint of stock performance, Apple's stock has risen by a multiple of 7x since 2009, but Hon Hai's stock price has only doubled in the same period (see Exhibit 211). Interestingly, the decoupling of stock performance coincided with the launch of the iPad in April 2010. Up to that point, Apple and Hon Hai had followed a relatively similar return path.

Exhibit 210 Correlation Coefficient and Beta Between Apple's and Hon Hai's Daily Stock Price Movement

Source: Bloomberg L.P. and Bernstein analysis.

Exhibit 211

Apple and Hon Hai: Indexed Stock Price (2009 = 1.00)



Source: Bloomberg L.P. and Bernstein analysis.

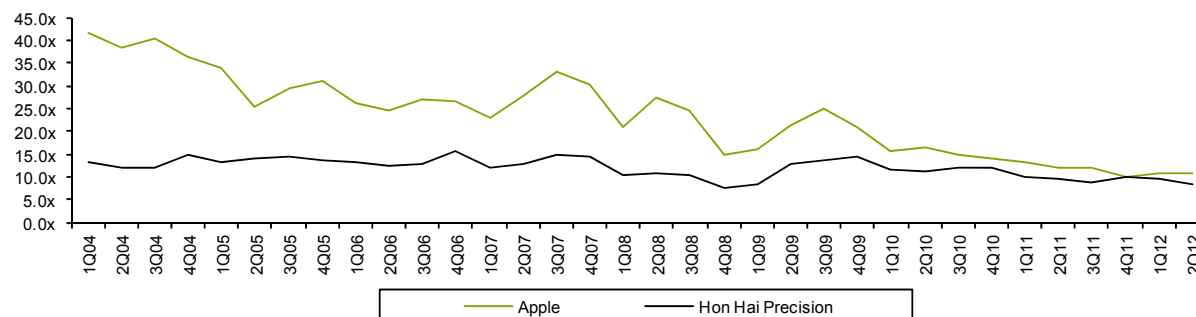
If Apple's business to Hon Hai was "profit neutral," that is, Hon Hai's rate of profit growth were the same as Apple's (resulting from Hon Hai's Apple-related profits growing at the same rate as Apple's own profits), we would expect the valuation of Apple and Hon Hai's Apple-related business to be the same, even if the corresponding margins were very different.

We estimate that about 30% of Hon Hai's business between 2009 and 2012 is Apple-related (see the chapter, "Hon Hai and Apple: A Mutually Beneficial Relationship or Unequal Balance of Power?"). Apple's average P/FE from 2009 through first-half 2012 was around 15.2x, while Hon Hai was 10.9x. This (roughly) implies that the multiple attached to Hon Hai's non-Apple business is 9.0x, well above EMS peer range of 7.6x.³ Alternatively, if Hon Hai's non-Apple business has a multiple aligned with EMS peer valuations (P/FE of 7.6x), then Hon Hai's Apple business would be valued at around 18.5x P/FE, well above its "implied fair" multiple of 15.2x.

In other words, even though we estimate Apple's business is less profitable on a margin basis to Hon Hai, the revenue upside more than makes up for the lower blended margin, resulting in multiple expansion above and beyond Apple's own profit growth expectations. And more importantly, Apple's business is pretty much fully reflected in Hon Hai's valuation, and its non-Apple business is valued more highly than EMS peers.

At this point, Apple forward earnings multiples have been decreasing over the long term as it increasingly monetizes its potential, but on many measures are still considered "cheap." If we look at P/FE multiples in first-half 2012, Hon Hai averaged 9.1x and Apple 10.8x, suggesting a Hon Hai non-Apple multiple of 8x, still above the latest EMS peer P/FE multiple of 6.6x (see Exhibit 212). Thus, Hon Hai's non-Apple business has been re-rated downward, but still retains a premium to peers — consistent with the lower structural profitability of Hon Hai relative to historical values, but still above peer profitability. Additionally, its multiple is further "boosted" by the lower-margin but faster-growing Apple business.

³ To calculate this number, we create two "virtual" companies, one composed of Apple-related business (30% the size of the "real" Hon Hai) and the other one being the remainder (70% the size of Hon Hai). We value the Apple-related company at 15.2x P/FE. Knowing the "merger" of the two "virtual" companies has a P/FE multiple of 10.9x, we can back out the implied multiple of the non-Apple company as 9.0x.

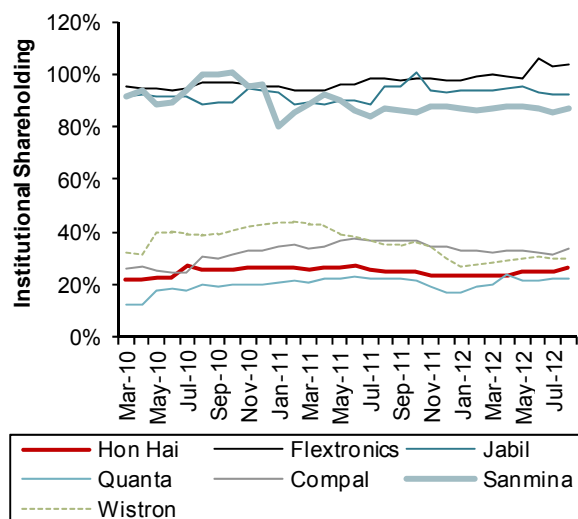
Exhibit 212 Apple and Hon Hai: Price/Forward 12-Month Earnings Ratios

Source: FactSet, Capital IQ and Bernstein analysis.

Retail Investor Base and Low Liquidity Probably Depress Hon Hai's Valuation

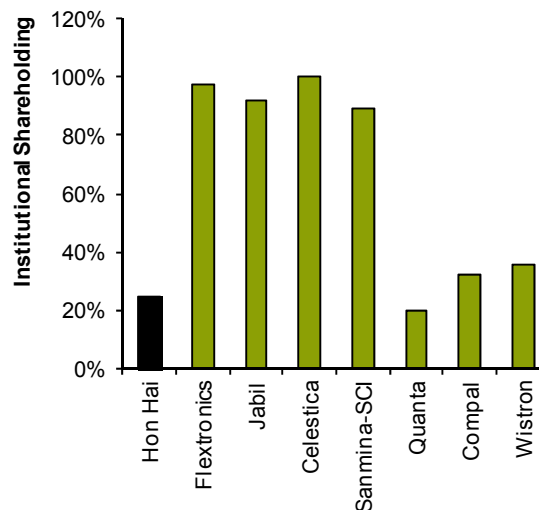
We examine Hon Hai's shareholding structure and trading behavior, and we find evidence that its valuation is likely constrained by market structure.

Low institutional ownership. A unique feature of the Taiwanese stock market (together with Korea's in Asia) is the high incidence of retail trading, estimated at 70%. When we examine institutional holdings among EMS and ODM stocks, we find a different shareholding structure from U.S. and Canada-listed shares, which have seen significantly higher institutional shareholding at around 90% versus Taiwan-listed stocks at around 30% (see Exhibit 213 and Exhibit 214). Overall, Hon Hai's institutional ownership is well below that of U.S.- and Canada-listed peers, indicating that Hon Hai is not viewed as a "core" holding in institutional investor portfolios, even though it is one of the largest capitalization tech stocks in Asia.

Exhibit 213 EMS and ODM Institutional Shareholding Over Time

Note: Flextronics, Jabil and Sanmina-SCI are listed in the U.S./Canada.

Source: Bloomberg L.P. and Bernstein analysis.

Exhibit 214 EMS and ODM Institutional Shareholding — 2010-1H:12 Average

Note: Flextronics, Jabil, Celestica and Sanmina-SCI are listed in the U.S./Canada.

Source: Bloomberg L.P. and Bernstein analysis.

Hon Hai is a relatively illiquid name. Turnover for Hon Hai is lower, on average, than peers as a percentage of float market capitalization, perhaps as a result of its listing location in Taiwan. Its opaqueness as a company certainly does not help either. We note that stocks listed in U.S. and Canada (Flextronics, Jabil,

Celestica and Sanmina-SCI) have systematically higher liquidity. Of Hon Hai's outstanding shares, 80% are floated, slightly below EMS/ODM peers but not significantly different (see Exhibit 215 and Exhibit 216). Hon Hai's market-cap weight as the third largest Greater China technology stock after TSMC and Tencent does not help with liquidity against Taiwanese peer stocks (Exhibit 217). In other words, Hon Hai's size is not reflected in broad institutional ownership or in a position as a "bellwether stock." We cannot quantify the impact of this illiquidity, but we would expect Hon Hai to carry a valuation discount relative to U.S. and Canada-listed peers due to its low liquidity and lack of disclosure.

Exhibit 215 EMS and ODM Monthly Turnover Percentage of Free Float Market Cap

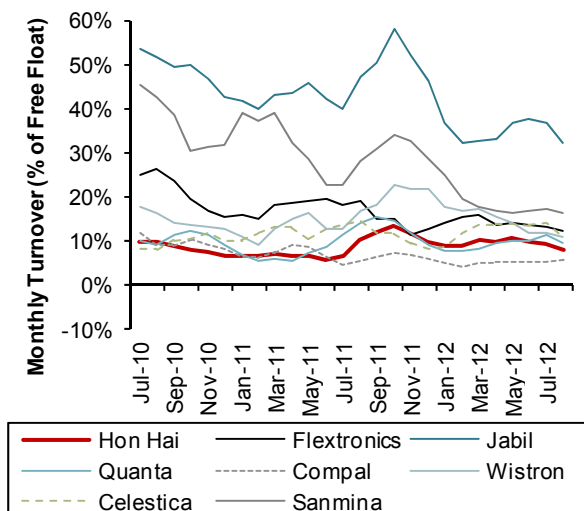
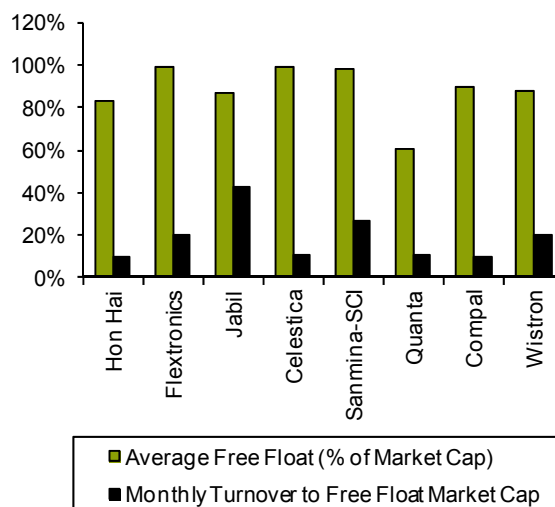


Exhibit 216 EMS and ODM Free Float and Monthly Turnover



Note: Data are three-month rolling averages.

Source: Bloomberg L.P. and Bernstein analysis.

Source: Bloomberg L.P. and Bernstein analysis.

Exhibit 217 Greater China (China, Taiwan and Hong Kong) Tech Stock Screener — Top 10 Stocks With Market Caps Greater Than US\$2.5 Billion

| Company | Listing Currency | Aug 2012 Mkt Cap (USD billions) | % Sector Weight | Sector |
|------------------------------------|------------------|---------------------------------|-----------------|--------------------------|
| 1 TSMC | TWD | 71.5 | 21.8% | Semiconductor |
| 2 Tencent | HKD | 59.0 | 18.0% | Internet |
| 3 Hon Hai Precision | TWD | 34.2 | 10.4% | EMS/ODM/Components |
| 4 Mediatek | TWD | 12.0 | 3.6% | Semiconductor |
| 5 Quanta Computer | TWD | 9.8 | 3.0% | EMS/ODM/Components |
| 6 Hangzhou HIK-Vision Digital Tech | CNY | 9.1 | 2.8% | Security Surveillance |
| 7 Lenovo | HKD | 8.6 | 2.6% | PC OEM |
| 8 Delta Electronics | TWD | 8.2 | 2.5% | Electronics Power Supply |
| 9 ASUSTeK Computer | TWD | 7.3 | 2.2% | PC OEM |
| 10 HTC | TWD | 7.1 | 2.2% | Mobile Phone OEM |

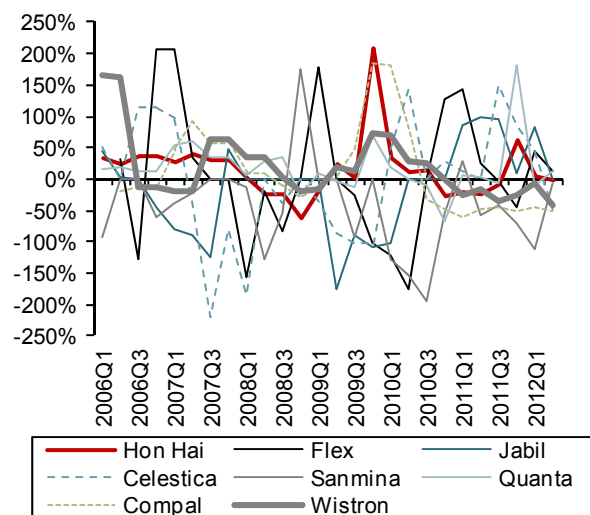
Source: Bloomberg L.P. and Bernstein analysis.

Hon Hai has been an outperformer, but non-operating income is a concern.

Since 2006, we have observed Hon Hai delivering higher year-over-year quarterly EPS growth relative to EMS peers. The company's revenue growth has been the highest at ~30% year-over-year, driven by Apple-related growth (see Exhibit 218 through Exhibit 221). Investors have gotten used to Hon Hai's ~30% year-over-year top line growth and ~15% year-over-year bottom-line growth, even as operating profit stagnated during 2009-11 due to declining operating margins despite a doubling of the top line. Much of the bottom-line contribution has been driven by non-operating income, which quadrupled in the 2009-11 period. Growing net interest income from "manufacturing hedges" and "other non-operating income"

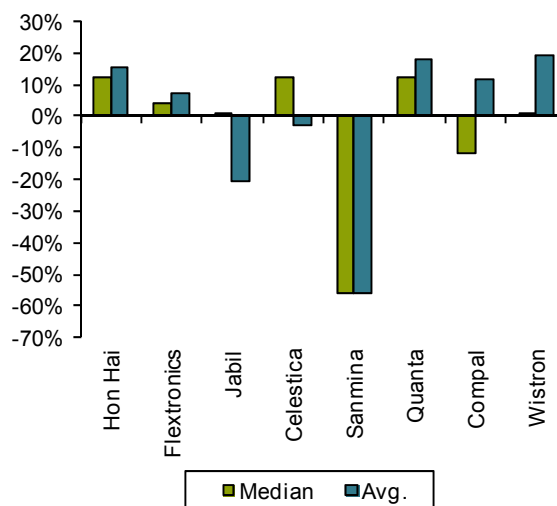
has added to the bottom line. Investors may be concerned whether the trend is sustainable given the structurally lower operating margins.

Exhibit 218 EMS and ODM YoY Quarterly EPS Growth



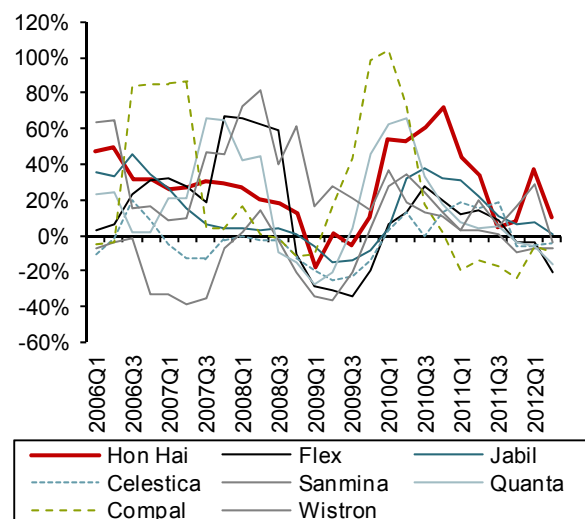
Source: Capital IQ and Bernstein analysis.

Exhibit 219 EMS and ODM Average YoY Quarterly EPS Growth (1Q:06-2Q:12)



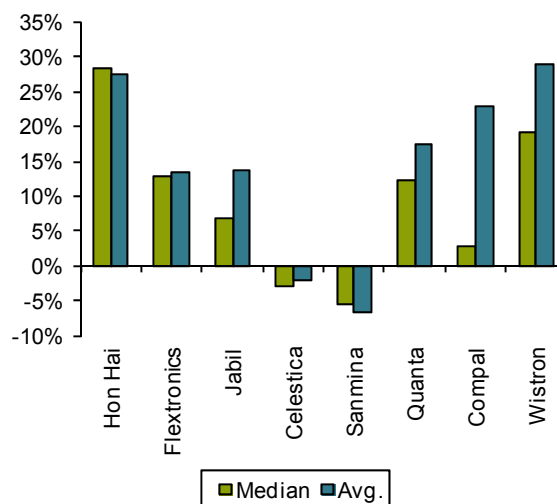
Source: Capital IQ and Bernstein analysis.

Exhibit 220 EMS and ODM YoY Quarterly Revenue Growth



Source: Capital IQ and Bernstein analysis.

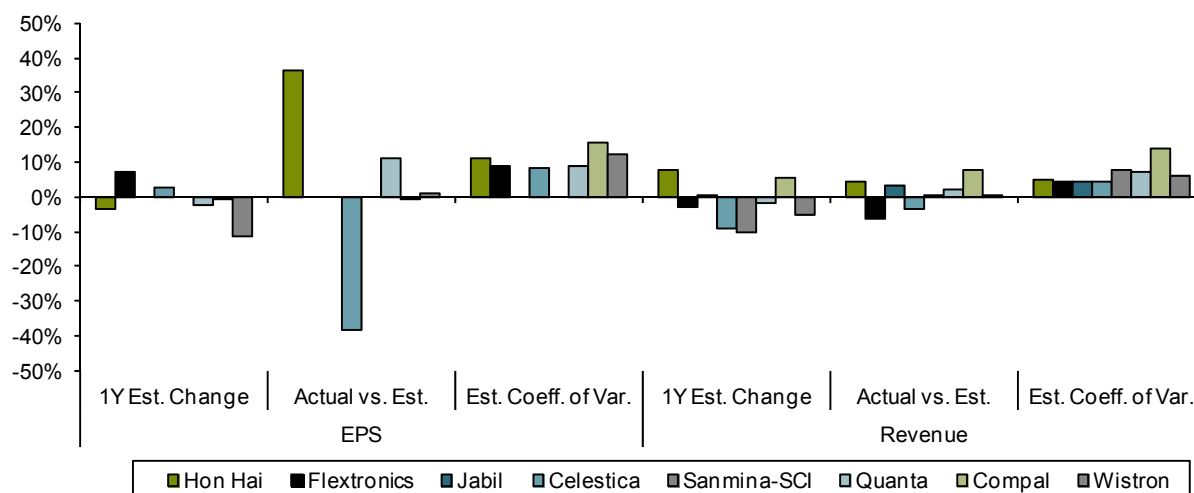
Exhibit 221 EMS and ODM Average YoY Quarterly Revenue Growth (1Q:06-2Q:12)



Source: Capital IQ and Bernstein analysis.

Hon Hai tends to surprise to the upside, although with high volatility. Hon Hai has managed to beat EPS expectations by almost 30%, on average, from 2009 through first-half 2012. Much of this can be attributed to 2009 alone, when gross margin rebounds and jumps in non-operating income delivered surprises. Excluding 2009, we see the company's EPS performance generally 10% higher than expectations, still much higher than peer group. Looking at another metric, changes in revenue estimates over a one-year period prior to the quarter's end, we note that Hon Hai is also higher than the peer group, again mainly driven by its Apple-related business. EMS and ODMs generally have had a hard time over the past three years, coping with declining top line relative to expectations (see Exhibit 222). Overall, earnings volatility at Hon Hai is high, and earnings surprises

materially higher than those for peers, indicative of the opaqueness and informational asymmetry between the company and market participants.

Exhibit 222**EMS and ODM Analyst Estimates Revision and Discrepancy from Actual (2009-1H:12)**

Note: Omissions made where results not meaningful.

Source: FactSet and Bernstein analysis.

Is Hon Hai's Multiple Constrained by Its Disdain for Investors?

Hon Hai operates like a black box, in our view. It does not conduct quarterly earnings discussions (which would then allow for management Q&A), and provides very limited access to company management and spokespeople. It only publishes consolidated and unconsolidated financials on a quarterly basis, along with monthly unconsolidated revenues as required by regulations. Further, its shareholding structure is highly opaque and the opportunities for value transfer between majority owners and minority shareholders are high (for further details, see the chapters, "Shining Some Light on Hon Hai Precision's Opaque Corporate Structure" and "Hon Hai Precision's Accounting Is as Opaque as Its Operations").

Hon Hai's opaqueness is ultimately detrimental to the company, according to our analysis. Without visibility on current performance or future income streams (much of it purely fanciful guesswork), shareholders and institutional investors are uninformed about earnings prospects, possibly applying a larger discount than would otherwise be justified given the informational asymmetry.

Informational opaqueness adds risks to the stock, particularly in situations where business direction goes against the company — e.g., from slower top-line growth from Apple, margin pressure or volatility in non-operating income. By creating a more transparent environment and providing more information about its operations, Hon Hai could avoid sudden shocks to the stock price if any of the factors turn against the company, especially if they are not material.

Having transparency would provide more assurance to longer-term investors, build up a larger institutional investor base, and ultimately improve stock price stability and support. We understand the business of EMS and ODM is one where client confidentiality may limit the ability to disclose, but peer experience has shown that Hon Hai does not have to choose the extreme option.

We believe that, although Hon Hai trades at a decent (but shrinking) premium relative to its EMS peers (as well it should, given its higher structural profitability and market power), it could probably trade at even higher multiples if it weren't so opaque. We cannot quantify this number, but it would likely be material, leading to higher institutional ownership and long-term supportive shareholders.

We believe Hon Hai has the potential to become a "bellwether" company and stock, but will not be one until it behaves like one (see [Lenovo: Why Does It Have Such A High Multiple Relative to Peers? Introducing the "Lampost Effect."](#) published August 27, 2012, for an example of how high-information environments can lead to structurally higher multiples).

| Exhibit 223 | | Hon Hai: Consolidated Financial Summary | | | | | | | | | | |
|--|-------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| TWD Billions | 2009 | 2010 | 2011 | Q1'12 | Q2'12 | Q3'12 | Q4'12E | 2012E | 2013E | 2014E | 2015E | |
| Income Statement Items | | | | | | | | | | | | |
| Net Revenue | 1,959 | 2,997 | 3,453 | 1,001 | 892 | 874 | 1,134 | 3,901 | 4,633 | 4,989 | 5,464 | |
| COGS | 1,773 | 2,753 | 3,186 | 935 | 821 | 791 | 1,039 | 3,586 | 4,271 | 4,605 | 5,033 | |
| Gross Profit | 187 | 244 | 266 | 67 | 71 | 83 | 95 | 315 | 362 | 383 | 431 | |
| Operating Expense | 103 | 158 | 184 | 51 | 49 | 53 | 60 | 214 | 240 | 244 | 268 | |
| EBITDA | 122 | 127 | 134 | 32 | 38 | 48 | 53 | 171 | 204 | 230 | 252 | |
| Depreciation | 38 | 41 | 51 | 16 | 17 | 18 | 19 | 70 | 82 | 91 | 88 | |
| EBIT | 83 | 86 | 83 | 15 | 22 | 30 | 35 | 101 | 122 | 139 | 163 | |
| Total Non-Operating Income(Expense) | 5 | 5 | 20 | 4 | (4) | 4 | 5 | 9 | 30 | 26 | 32 | |
| Tax Expense | 12 | 16 | 21 | 5 | 6 | 5 | 5 | 21 | 26 | 28 | 33 | |
| Profit Before Taxes | 88 | 91 | 103 | 19 | 17 | 34 | 40 | 111 | 152 | 165 | 196 | |
| Net Profits | 76 | 75 | 82 | 14 | 11 | 30 | 34 | 90 | 126 | 137 | 162 | |
| Minority Interests | 1 | (2) | 0 | (1) | (1) | (0) | (0) | (3) | 0 | 0 | 0 | |
| Profit to Shareholders | 76 | 77 | 82 | 15 | 13 | 30 | 35 | 93 | 126 | 137 | 162 | |
| | | | | | | | | | | | | |
| Shares Outstanding (Millions) | 8,563 | 9,637 | 10,661 | 10,652 | 10,652 | 10,652 | 11,801 | 11,801 | 11,801 | 11,801 | 11,801 | |
| EPS (TWD) - Reported | 8.84 | 8.01 | 7.65 | 1.40 | 1.18 | 2.84 | 2.94 | 7.84 | 10.68 | 11.58 | 13.72 | |
| EPS (TWD) - Adjusted | 8.85 | 8.02 | 7.65 | 1.26 | 1.07 | 2.56 | 2.94 | 7.84 | 10.68 | 11.58 | 13.72 | |
| | | | | | | | | | | | | |
| Revenue Growth (YoY) | 0.4% | 53.0% | 15.2% | 37.3% | 13.5% | 1.3% | 5.6% | 13.0% | 18.7% | 7.7% | 9.5% | |
| Gross Margin | 9.5% | 8.1% | 7.7% | 6.6% | 7.9% | 9.5% | 8.4% | 8.1% | 7.8% | 7.7% | 7.9% | |
| EBITDA Margin | 6.2% | 4.2% | 3.9% | 3.2% | 4.3% | 5.5% | 4.7% | 4.4% | 4.4% | 4.6% | 4.6% | |
| Operating (EBIT) Margin | 4.3% | 2.9% | 2.4% | 1.5% | 2.4% | 3.4% | 3.1% | 2.6% | 2.6% | 2.8% | 3.0% | |
| Net Margin | 3.9% | 2.5% | 2.4% | 1.4% | 1.3% | 3.4% | 3.0% | 2.3% | 2.7% | 2.7% | 3.0% | |
| EPS Growth (YoY) | 34.4% | 1.5% | 5.1% | 3.0% | -3.4% | 57.8% | -0.8% | 13.1% | 36.1% | 8.5% | 18.5% | |
| | | | | | | | | | | | | |
| Balance Sheet Items | | | | | | | | | | | | |
| Cash and Cash Equivalents | 178 | 254 | 330 | 423 | 637 | 565 | 594 | 594 | 719 | 857 | 1,017 | |
| Total Current Assets | 33 | 41 | 51 | 40 | 45 | 52 | 68 | 68 | 73 | 75 | 83 | |
| Net Fixed Assets | 235 | 272 | 355 | 344 | 345 | 366 | 361 | 361 | 352 | 334 | 319 | |
| Total Assets | 1,022 | 1,381 | 1,730 | 1,878 | 1,916 | 1,929 | 2,229 | 2,229 | 2,450 | 2,610 | 2,887 | |
| | | | | | | | | | | | | |
| Total Current Liabilities | 475 | 771 | 992 | 1,133 | 1,158 | 1,164 | 1,423 | 1,423 | 1,517 | 1,541 | 1,654 | |
| Total Long-Term Liabilities | 72 | 96 | 124 | 127 | 138 | 124 | 131 | 131 | 132 | 131 | 133 | |
| Total Liabilities | 547 | 867 | 1,115 | 1,260 | 1,296 | 1,289 | 1,554 | 1,554 | 1,649 | 1,672 | 1,787 | |
| Total Equity | 475 | 513 | 615 | 618 | 620 | 640 | 675 | 675 | 801 | 938 | 1,100 | |
| | | | | | | | | | | | | |
| Debt Ratio | 15% | 23% | 22% | 32% | 32% | 27% | 24% | 24% | 22% | 21% | 19% | |
| Net Debt to Equity | -7% | 13% | 10% | 30% | -4% | -8% | -8% | -8% | -23% | -36% | -46% | |
| Current Ratio | 1.5x | 1.3x | 1.3x | 1.3x | 1.3x | 1.3x | 1.2x | 1.2x | 1.3x | 1.4x | 1.5x | |
| | | | | | | | | | | | | |
| Cash Flow Items | | | | | | | | | | | | |
| Cash from Operations | 100 | 62 | 116 | 13 | 108 | 32 | 17 | 179 | 197 | 224 | 232 | |
| Cash from Investing | (36) | (139) | (129) | (141) | 102 | 28 | (16) | (39) | (78) | (79) | (80) | |
| Cash from Financing | 16 | 172 | 88 | 226 | 2 | (115) | 28 | 125 | 7 | (7) | 9 | |
| Cash at Beginning of Period | 99 | 178 | 254 | 330 | 423 | 637 | 565 | 330 | 594 | 719 | 857 | |
| Cash and Cash Equivalents at End of Period | 178 | 254 | 330 | 423 | 637 | 565 | 594 | 594 | 719 | 857 | 1,017 | |
| | | | | | | | | | | | | |
| Capex | 27 | 73 | 133.9 | 10.6 | 11.2 | 19.8 | 12.8 | 75.9 | 73.1 | 73.1 | 73.1 | |
| Capital Intensity | 1.4% | 2.4% | 3.9% | 1.1% | 1.3% | 2.3% | 1.1% | 1.9% | 1.6% | 1.5% | 1.3% | |

Source: Corporate reports and Bernstein estimates and analysis.

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Disclosure Appendix

VALUATION METHODOLOGY

Hon Hai, like other EMS and ODM companies in our coverage, has stable cash flows and reliably positive earnings. Hence, to set a target price, we triangulate values using historical P/E multiples and sum-of-the-parts discounted cash flow and residual income models that incorporate the market value of unconsolidated subsidiaries and shareholdings. Our TWD 107.00 target price for Hon Hai is based on 10x FY 2013 earnings, slightly above the three-year historical forward earnings multiple of 9.8x.

RISKS

Hon Hai, like other EMS and ODM companies in our coverage, is able to adapt to changing conditions because of its low fixed cost overhead and efficient logistics and operations. However, its target price is still exposed to segment-wide and firm-level risks.

Demand risk. EMS and ODMs manufacture to order and much of their inventory is on consignment, making them less exposed to demand risk. However, they can still end up with excess or obsolete component inventory or incur component shortages and slowdowns if they misjudge the product mix (in either direction). ODMs, because of their proactive design role, are also exposed to excess non-recurring expenses from design work that is either not adopted by OEMs or made obsolete by technology and product innovation.

Supply risk. EMS and ODM work is labor-intensive and subject to labor shortages and rising wages. On the component side, natural disasters and other supply disruptions can lead to component shortages, factory slowdowns or inventory mismatches.

Foreign exchange risk. Because the end products and much of the input material and capital equipment are denominated in multiple currencies (U.S. dollar and others for revenues, Japan's yen for capital equipment, China's renminbi for module components and labor inputs, and Taiwan's dollar for engineering and supervisory expenses), Hon Hai is exposed to foreign exchange risks in revenues and costs.

Firm-specific risks. Our target price for Hon Hai is based on a superior positioning to products more likely to be outsourced (TVs and handsets), which may not happen as fast as predicted; the primacy of Hon Hai as a supplier to Apple, which could change if Apple doesn't grow as fast as expected or searches more aggressively for alternative suppliers; a product mix with high proportion under control of Hon Hai, which would change to its detriment (e.g., more notebook PCs, less TVs); and an operating margin expansion forecast that may take longer to be realized.

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12-Month Rating History as of 12/09/2012

**Ticker Rating
Changes**

2317.TT O (IC) 05/19/11

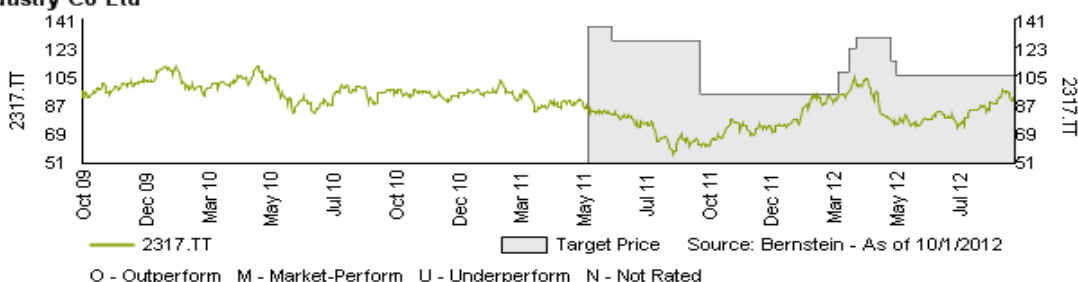
Rating Guide: O - Outperform, M - Market-Perform, U - Underperform, N - Not Rated

Rating Actions: IC - Initiated Coverage, DC - Dropped Coverage, RC - Rating Change

2317.TT / Hon Hai Precision Industry Co Ltd

| Date | Rating | Target(TVWD) |
|----------|--------|--------------|
| 05/19/11 | O(IC) | 138.00 |
| 06/16/11 | O | 129.00 |
| 09/28/11 | O | 95.00 |
| 03/09/12 | O | 109.00 |
| 03/22/12 | O | 124.00 |
| 03/29/12 | O | 131.00 |
| 05/10/12 | O | 116.00 |
| 05/16/12 | O | 107.00 |

IC - Initiated Coverage

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