Don’t be Encumbered by History…
CY22 Semiconductor Outlook

SIA Webinar Panelist Discussion
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Key Message

- After increasing 26.5% in CY21, we estimate CY22 Semi Rev will grow ~16% y/y – the key drivers of our assumption is ~8% unit growth y/y and ~8% ASP growth.

- By 2HCY22, we expect to see signs of accelerating supply growth based upon CapEx response upturn-to-date. Accelerating supply growth increase risk of cyclical correction.

- Our base-case assumption for CY23 is for Semi Rev to decline mid-to-high single digit y/y with unit correction more prevalent in 1H and ASP correction in the 2H.

- Mitigating variables makes it more likely that cyclical peak is pushed out than pulled in, albeit, industry cyclicality is likely to increase not decrease going forward.

- Secular view is unchanged – Semi CAGR accelerating from 3-5% to AT LEAST 6-8% with upside to 9-12%. Data Economy and implications of AI/ML still woefully under-modeled.

- Semis value to the global economy peaked in 2000 at 4%, troughed in 2015 at 1.5% and is ~3.5% today - we see upside to Semi Rev of $1 tn and value of 6-8% by 2030.
Our Expectations for CY22 Semi Rev

Our View:
- After growing +21.5% in CY21, we expect CY22 Rev to grow +15.8% vs consensus of +8-12%.
- After growing +20.3% in CY21, we expect CY22 Units to grow +8.0%.
- After growing +5.1% in CY21, we expect CY22 ASPs to grow +7.3%.

Expect CY22 Semi Rev to grow ~16% y/y

Expect CY22 Semi Units ~INLINE w/ 8% Trend

Expect CY22 ASP Tailwinds to Accelerate

Source: Credit Suisse estimates, SIA
Expect Cyclical Tailwinds to Slow by 2HCY22

Our View:

- Duration of current upturn is 18 months vrs. average of 19 months and longest of 30 months.
- Units troughed at 23% BELOW trend and are just now approaching trend, units tend to peak 10-15% ABOVE trend.
- CapEx response cycle to date should drive accelerating supply growth in 2HCY22 – increasing the risk of cyclical correction.

Current Cyclical Upturn in Historical Context

<table>
<thead>
<tr>
<th>IC Units ex-Memory 3MMA Peak to Trough (ABOVE/BELLOW Trend)</th>
<th>Avg</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trough</td>
<td>01/31/12</td>
<td>02/29/16</td>
</tr>
<tr>
<td>% BELOW Trend</td>
<td>(14.2%)</td>
<td>(16.1%)</td>
</tr>
<tr>
<td>Peak</td>
<td>09/30/13</td>
<td>08/31/18</td>
</tr>
<tr>
<td>% ABOVE Trend</td>
<td>2.1%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Duration (months)</td>
<td>19.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Recovery (P-T)</td>
<td>16.4%</td>
<td>21.7%</td>
</tr>
<tr>
<td>Peak Units</td>
<td>15,227,070</td>
<td>23,526,631</td>
</tr>
<tr>
<td>Peak-Peak Growth</td>
<td>14.4%</td>
<td>54.5%</td>
</tr>
</tbody>
</table>

IC Units ONLY at Trend, Usually Peak ~15% ABOVE

CapEx Response Accelerating

Quarterly Semi CapEx

1. **IC Units ex-Memory versus Trend (8.5% CAGR)**
   - Currently IN LINE with Trend
   - 8.5% CAGR

2. **IC Units ex-Memory (bn)**
   - Currently IN LINE with Trend
   - 8.5% CAGR

3. **C1Q C2Q C3Q C4Q CY20 CY21 CY22E**
   - +31% y/y
   - +15% y/y

4. **C1Q C2Q C3Q C4Q CY20 CY21 CY22E**
   - Memory
   - Logic/Foundry

Source: Credit Suisse estimates, SIA, SEMI
Our View:

- We are modeling a 5.3% decline in Semi Rev in CY23 to reflect a modest cyclical correction.
- We expect a Unit correction in 1H, with units down mid-single-digits % y/y in CY23.
- We expect a ASP correction in 2H, with ASPs down low-single-digits % y/y in CY23.

Expect 1H CY23 Units BELOW Trend

Expect 2H CY23 ASPs to Moderate

Source: Credit Suisse estimates, SIA
Peak More Likely Pushed-out than Pulled-in

**Our View:**

- No one knows the new normal for inventory management, post-COVID JIT likely moves to JIC.
- There is still a meaningful deficient in global supply created by significant consolidation.
- Semis and Semi domestic production is now being viewed as strategic and essential.

**Inventory Burden Likely Migrates Downstream**

**Significant Consolidation has Dramatically Reduced IDM Capacity**

**Aggregate Semis M&A Activity (since ’08)**

**Domestic Production of Semis Is A Strategic Imperative**

**Geographic Production of Semis**

Source: Credit Suisse estimates, SIA, FactSet, BCG
We Remain Structurally Positive

Our View:

- Despite our cyclical concerns, we continue to see Semi CAGR accelerating from 3-5% to AT LEAST 6-8%, with upside to 9-12%.
- Rising barriers to entry, structurally slowing supply and improving demand mix establish a foundation for Semis to outgrow nominal GDP consistently.
- Our Data Thesis provides incremental drivers and foundation for $1 tn Industry by CY30.

Semis Moving from GDP Minus to GDP Plus Growth

- **Then: 1998-2007**
  - **BARRIERS TO ENTRY**
    - Foundry
    - IP
  - **SUPPLY GROWTH**
    - Moore's Accelerates
    - 350 nm
  - **END DEMAND**
    - Consumption
    - "Good Enough"

- **Now: 2008-2022**
  - **BARRIERS TO ENTRY**
    - IP Design
    - M&A
  - **SUPPLY GROWTH**
    - Moore's Decelerates
    - 450 nm
  - **END DEMAND**
    - Few to Many
    - Consumer to Cloud

Source: Credit Suisse estimates, SIA
Semi Revaluation Higher Still Mid Stream

Our View:

- Semis re-learning how to capture relative value to the economy.
- The market has already begun to recognize the improving secular backdrop for Semis.
- Semi MrktCap as a % of total Global MrktCap peaked in CY00 at 4%, troughed in CY15 at 1.5% and is at 3.5% today. We see upside to 6-8% by CY30.

Consistent Outperformance Since CY17

Semis Re-learning How to Capture Value

Semi Rev as a % of Nominal GDP

Semis Have Upside to ~8% of Global Mrkt Cap

Source: Credit Suisse estimates, SIA, Bloomberg, FactSet
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<th>Rating</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Outperform (O)</td>
<td>The stock’s total return is expected to outperform the relevant benchmark* over the next 12 months.</td>
</tr>
<tr>
<td>Neutral (N)</td>
<td>The stock’s total return is expected to be in line with the relevant benchmark* over the next 12 months.</td>
</tr>
<tr>
<td>Underperform (U)</td>
<td>The stock’s total return is expected to underperform the relevant benchmark* over the next 12 months.</td>
</tr>
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*Restricted by region. As of 30th December 2012, Japanese ratings are based on a stock’s total return relative to the analog’s average universe which consists of all companies covered by the analog within the relevant sector with JGARP/IV Investment Research, Inc. representing the most attractive, Société Générale representing the most neutral, and the analog representing the least attractive. Each rating is described, and Underperform’s definition is described, in the analog’s disclosure section of the firm’s website: https://www.credit-suisse.com/disclaimers-

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<tr>
<th>Rating</th>
<th>Versus universe (%)</th>
<th>Of which banking clients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garp/IV**</td>
<td>24%</td>
<td>24% (excluding clients)</td>
</tr>
<tr>
<td>Neutral**</td>
<td>35%</td>
<td>35% (excluding clients)</td>
</tr>
<tr>
<td>Underperform**</td>
<td>10%</td>
<td>10% (excluding clients)</td>
</tr>
<tr>
<td>Restricted**</td>
<td>5%</td>
<td>5% (excluding clients)</td>
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