

THE VIEW

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A 2020 SEMICONDUCTOR SLUMP WILL SEND SHOCKWAVES ACROSS THE GLOBAL ELECTRONICS INDUSTRY

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EXECUTIVE SUMMARY



Aurélien DUTHOIT, Sector Advisor for Retail, Technology and Household equipment

+33.1.84.11.45. 04

Aurelien.DUTHOIT@eulerhermes.com

- In 2019, the semiconductor industry will post its deepest decline in annual sales (-15%) since the dot com bubble, wiping off over USD70bn in revenue. The current slump has so far been very typical of this boom-and-bust industry, which experiences brutal drops in sales lasting twelve to fifteen months every four to five years on average. Unlike past downturns, however, we believe the current slump will last well into 2020 and send annual sales down again by -3%. Depressed demand from key final markets, including smartphones and computers, and an unfavorable pricing environment will weigh on sales, which should fall below the USD400bn mark. High fixed costs, including substantial capital investment and year-long R&D programmes, mean the decline in profits and profit margins will be even more pronounced.
- While the semiconductor industry as a whole will maintain above average credit metrics, with low financial leverage and positive cash generation, we believe a second consecutive year of falling revenue and an uncertain business environment will exacerbate risks for five specific profiles of companies operating in the wider electronics industry:
 - Second-tier chipmakers with an asset-heavy business model engaged in an unsustainable investment race.
 - Chinese electronic product assembly specialists, which are losing clients as companies are shifting their sourcing strategies away from China.
 - U.S. and Chinese semiconductor and electronic product companies, which are facing additional trade restrictions that hurt sales and profits.
 - South Korean chipmakers, which rely heavily on key Japanese chemicals used in semiconductor manufacturing as tensions between the two countries are escalating.
 - U.S. electronics retailers that are looking to preserve their market shares in a declining market and facing new tariffs on electronics goods coming in December 2019.



Photo by Mathew Schwartz on Unsplash

-3%

**Expected decline in annual
semiconductor sales in 2020**

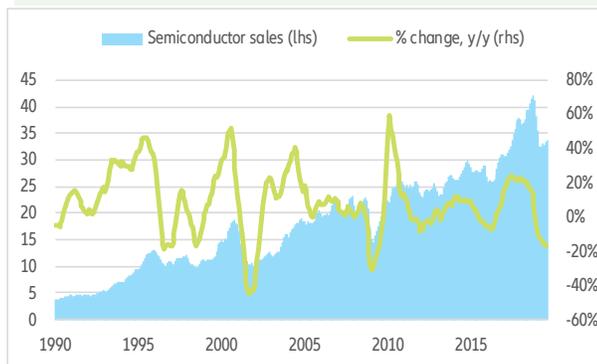
SEMICONDUCTORS ARE A TYPICAL BOOM-AND-BUST INDUSTRY

In 2019, the semiconductor industry will have its worst year since the dot com crisis, posting a -15% decline in revenue after two years of buoyant demand growth, as well as a favorable pricing environment that sent sales up +21.6% and +13.7% in 2017 and 2018, respectively. While impressive, the current slump is not unusual and reflects the industry's inherent boom-and-bust nature.

Over the last thirty years, periods of declining sales happened every four to five years and lasted 12-15 months on average. They typically happen when demand in end-market stalls: customers cut orders to reduce their inventories before eventually resuming placing new orders. Meanwhile, semiconductor companies find themselves with excess inventories and production overcapacities,

leading to fierce price competition. Inertia is another major feature of the industry: R&D cycles span over years, the average fabrication plant takes two years to build and the manufacturing of a chip takes weeks. The double impact of lower volumes and intense price competition during downturns explains the magnitude of the contractions.

Figure 1: World semiconductor sales



Sources: WSTS, Euler Hermes, Allianz Research.

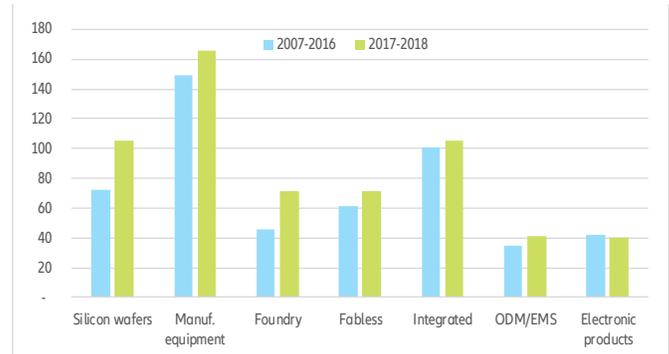
A DOWNTURN TRIGGERED BY OVERCAPACITIES AMID WEAKENING DEMAND

Figure 2: Capital expenditure of major semiconductor manufacturers



Sources: Bloomberg, Euler Hermes, Allianz Research

Figure 3: Median days inventory outstanding across the electronics value chain



Sources: Bloomberg, Euler Hermes, Allianz Research

The current downturn is no exception to this pattern. Looking at the financials of over 20 major foundry and integrated semiconductor companies, we observe a clear upward trend in investment, both in absolute terms and as a percentage of sales, starting in 2014 and peaking in 2018. Integrated memory manufacturers were the largest contributors to the surge in capacities, but the trend is noticeable among virtually all major players. Expectations of further dynamic growth ahead also prompted companies to in-

crease their inventories. Days inventory outstanding, a ratio expressing inventories as a number of days of production, point to a broad-based increase in inventories in 2017 and 2018 compared to the previous ten years. High inventory levels and new capacities set the stage for the massive decline in semiconductor sales seen in Q3 and Q4 2019. Growing China-US trade tensions, combined with weaker-than-expected demand for key electronic products (smartphones, computers, servers), sent monthly sales down -30% between Sep-

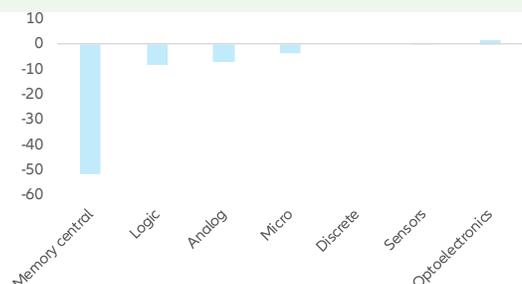
tember 2018 and January 2019. Three-month rolling average sales, the industry's preferred metric for activity, slid into negative territory year-over-year in January 2019 and were still down -17% year-over-year in August 2019. On most metrics, the current slump appears serious but nothing quite like the 2001-2002 Dotcom Crash or the 2008-2009 Great Recession. For the whole of 2019, we anticipate a -15% decline in semiconductor sales (-5.5% excluding memory semiconductors).

Figure 4: past periods of prolonged declines in sales in the semiconductor industry

| Time span | Duration of year-over-year decline in sales (months) | Peak-trough gap in sales (%) | Peak-trough gap in sales (\$bn) | Decline in sales, ten months after sales peak (%) |
|-----------|--|------------------------------|---------------------------------|---|
| 1996-1997 | 12 | -24% | -3.12 | -6% |
| 1998 | 10 | -20% | -2.43 | -16% |
| 2001-2002 | 16 | -46% | -8.63 | -44% |
| 2008-2009 | 13 | -39% | -9.01 | -1% |
| 2012 | 16 | -13% | -3.28 | -5% |
| 2015-2016 | 13 | -13% | -3.88 | -5% |
| 2019 | 8 as of August 2019 | -23% | -9.54 | -18% |

Sources: WSTS, Euler Hermes, Allianz Research. Computations use three-month rolling averages.

Figure 5: Change in semiconductor sales by application, 2019 estimates (USD bn)



Sources: WSTS, Euler Hermes, Allianz Research

NO RECOVERY SIGHTED FOR 2020: SALES WILL FURTHER DECLINE BY -3%

We believe the current semiconductor slump will be unusually long and last well into next year, sending annual sales down a further -3%:

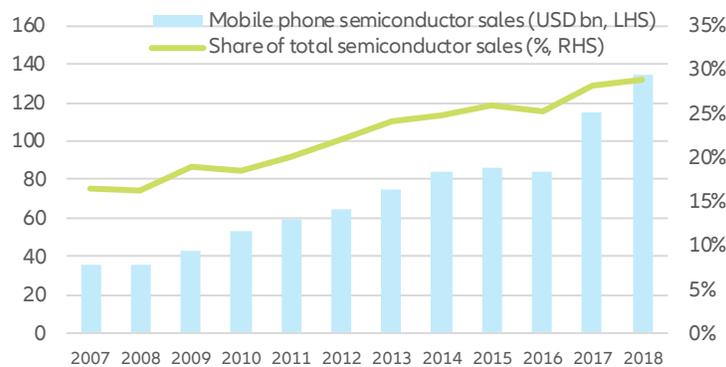
Most major end-markets (smartphones, computers, automotive) will continue to experience depressed demand in 2020 and remain in negative territory. In particular, we do not expect 5G take-up to be enough to accelerate smartphone replacement cycles. The smartphone boom, beginning with the introduction of the first iPhone, saw mobile semiconductor sales soar from USD35bn to

USD135bn between 2007 and 2018 and become the number one client industry for semiconductor companies.

Soft demand will maintain inventories at high levels while persisting trade tensions will further weigh on business confidence, leaving little room for a significant and general improvement in the pricing environment. The past and announced capital expenditure plans of some major foundry and integrated semiconductor companies also point to substantial new capacities coming to the market by the end of 2020.

Increasing semiconductor content across electronic systems used in automotive, electricity networks, building and factory automation, etc. should continue to benefit the optoelectronics and sensors segment, but it is far from enough to compensate for adverse trends in volumes and prices in other segments.

Figure 6: Sale of semiconductors to the mobile phone industry



Sources: IDC, Euler Hermes, Allianz Research

A PROLONGED SLUMP WILL WEIGH ON CASH-FLOW GENERATION

Figure 7: Expected trends in sales, profitability and investment across the electronics value chain

| Segment | Segment characteristics | | | | Expected 2020 trend | | |
|---------------------|---|----------------------------|--------------------------------------|---|---------------------|--------|-------|
| | Concentration in the main product markets | Past median EBITDA margins | Past median capex-to-sales-ratio (%) | Past R&D expenditure to-sales-ratio (%) | Sales | EBITDA | Capex |
| Silicon wafers | Very high | 25-30% | 10-12% | 3-5% | = | ↓ | = |
| Manuf. equipment | High | 25-30% | 3-4% | 12-14% | = | ↓ | = |
| Foundry | High | 30-35% | 15-20% | 5-7% | ↓ | ↓↓↓ | ↗ |
| Fabless | High | 30-35% | 2-3% | 20-22% | ↓ | ↓↓ | = |
| Integrated | High | 35-40% | 10-15% | 13-15% | ↓ | ↓↓↓ | ↓ |
| Electronic products | Low | 8-10% | 3-4% | 6-8% | ↓ | ↓ | = |
| ODM/EMS | Low | 3-5% | 1-2% | 1-2% | ↓ | ↓ | = |

Sources: Bloomberg, Euler Hermes, Allianz Research, based on a panel of over seventy of the world's largest electronics companies.

Our scenario of a prolonged downturn will play out similarly across the value chain, but its consequences differ significantly due to the structure and characteristics of each segment. We expect a minor but broad decline in revenue for most companies in 2020, consistent with our forecast of a -3% decline in semiconductor sales. Upstream companies should outperform the indus-

try, judging from the investment plans of major foundries.

The decline in profits will be steeper, especially for players in segments with high fixed costs (R&D, equipment) such as foundries and integrated semiconductor companies.

Capital expenditure should remain broadly flat after a strong correction in 2019, with investment focusing on new

generation telecom and memory chips. As a result of lower profits and flat investment, cash-flow generation is expected to decrease, while remaining largely positive for the vast majority of listed companies.

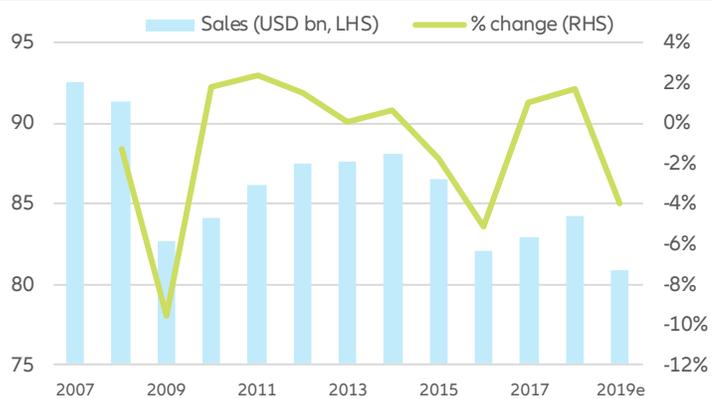
HEIGHTENED RISKS FOR FIVE PROFILES OF COMPANIES

We do not anticipate a broad-based and massive deterioration of credit quality across the semiconductor industry, which, as a whole, will continue to display healthy profit margins, positive cash generation and low financial leverage. We have, however, identified five pockets where risks will significantly increase in 2020, deserving scrutiny:

- Second-tier foundry and integrated semiconductor companies are at risk of either burning cash or being left behind if dominant players were to speed up their investment in more advanced technologies or compete even more aggressively on prices. Since industry concentration is already high across most markets and major M&A deals were blocked in the past few years, the incentive to drive smaller players out of business has never been so strong.
- Original Design Manufacturers (ODM) and Electronics Manufacturing Services companies (EMS), to which electronic product companies outsource the assembly of finished electronic devices, are also particularly at risk. A fragmented, low value-added, low margin activity, the segment will suffer from lower volumes and greater price pressure from its clients. Secondary Chinese players are also at risk of losing clients as electronic product companies are looking to shift assembly activities away from China to avoid U.S. tariffs.
- Some more Chinese and U.S. companies are at risk of facing new trade restrictions. In early October 2019, the U.S. added eight Chinese surveillance software and hardware companies on its “entity list”, preventing U.S. companies from doing business with them prior to obtaining a license. Trade restrictions have translated into inventory depreciation and lost sales for Chinese electronic products companies and U.S. chipmakers.
- South Korean companies also appear more vulnerable as the country is embroiled in a political and trade spat with Japan, a key supplier of chemicals used for semiconductor manufacturing. Japanese authorities introduced export restrictions (licenses) in July 2019. While tariffs would have a negligible impact on South Korean imports, restrictions on export volumes, such as quotas, would have a devastating impact on the semiconductor supply chain.
- U.S. consumer electronics retailers will feel the heat of additional tariffs on China-made electronic devices, including computers and smartphones, due for 15 December and covering about USD80bn of imports. Given the intense competition among brick-and-mortar and e-commerce companies, and a difficult 2019 (year-to-date sales down 4.3%), we expect retailers to defend their market shares at the cost of lower margins.



Figure 8: Retail sales at U.S. electronics and appliance stores (real)



Sources: US Census Bureau, Euler Hermes, Allianz Research

Director of Publications: Ludovic Subran, Chief Economist
Euler Hermes Allianz Economic Research
1, place des Saisons | 92048 Paris-La-Défense Cedex | France
Phone +33 1 84 11 35 64 |
A company of Allianz

<http://www.eulerhermes.com/economic-research>
research@eulerhermes.com



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