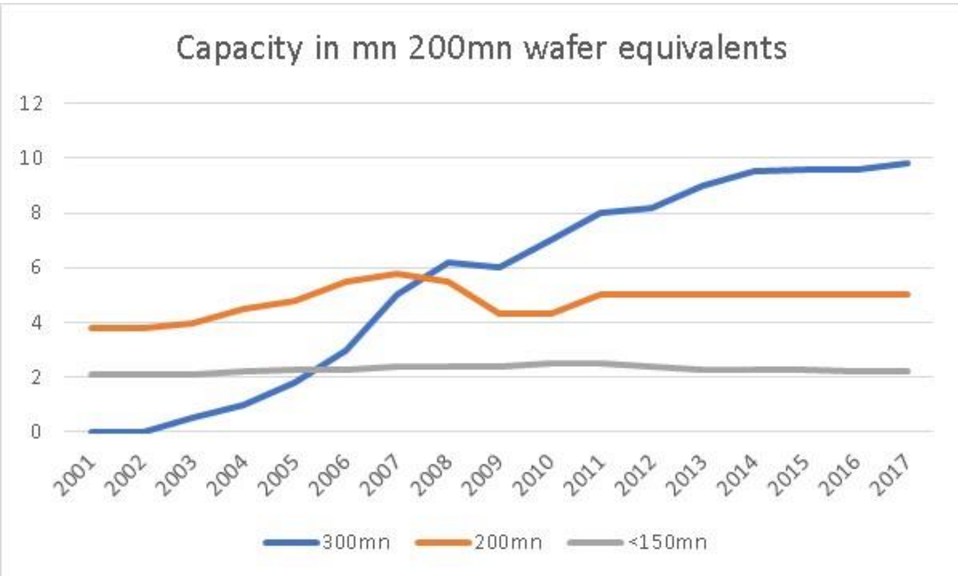
SEMI-CRAZY – WHEN TRAILING MEANS LEADING

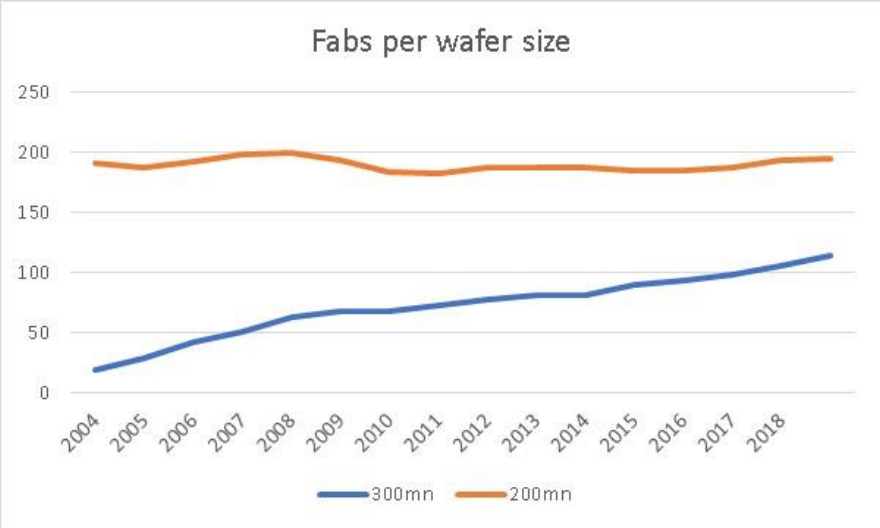
The semiconductor industry can be particularly confusing. Semiconductors can be categorised as memory, logic and discrete among others. The process used to make them is often referred to in nanometres (the distance been lines etched on semiconductors), where lower numbers means more advanced. Leading semiconductor companies tend to compete on being able to produce at lower nanometre as this means their chips are more powerful. Finally, they can also be described by the size of the wafer used to make the semiconductor. Conversely, here larger is more advanced.

A larger wafer should mean that more chips should be processed at one time, allowing larger economies of scale and lower cost. As a general rule, as the industry moves to lower nanometres, and bigger wafers, there is a learning curve as the engineers learn how to get the most out of the new technologies. Using rough numbers, a 300mn fabrication plant (fab) can produce 4 times as many wafers as a 200mm fab. As can be seen below, wafer from 300mn fabs have grown substantially, although growth has slowed recently.



Source: SEMI.ORG

If we look at number of fabs by wafer size, we can see a steady increase in number produced from 300mn fabs, and a steady number from 200mn fabs. Leading semiconductor research institute, SEMI, is forecasting that the decline in number of 200mn fabs since 2007, will be reversed and we will see a new high in 200mn fabs by 2020. It also predicts 300mn fabs will increase and asserts that 200mn fabs are producing profitable semiconductors.

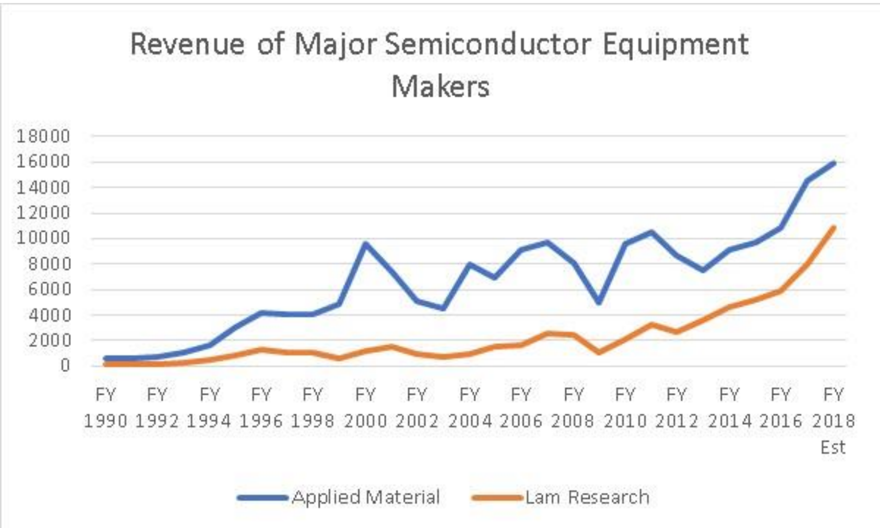


Source: SEMI.ORG

This broad based profitably is being borne by record billings for the industry. Recently billings for the semiconductor market have been very strong, driven by strong pricing and robust demand across all types of semiconductors.

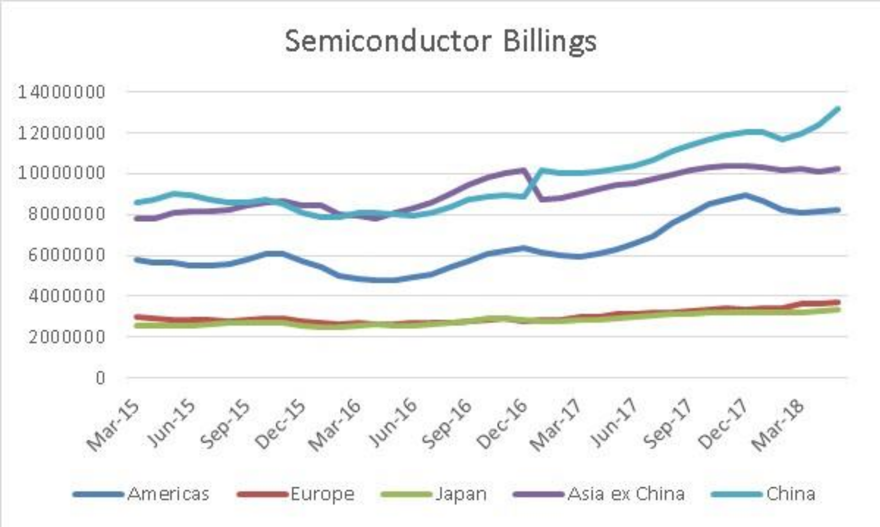
Source: SIA

The strong growth in sales and profitability has lead to a big increase in the capital spend of the leading chipmakers. Capex from chipmakers tends to translate directly to the sales of semiconductor equipment makers. The sales revenue of two leading US equipment makers, Applied Material and Lam Research, shows high correlation to semiconductor billings.



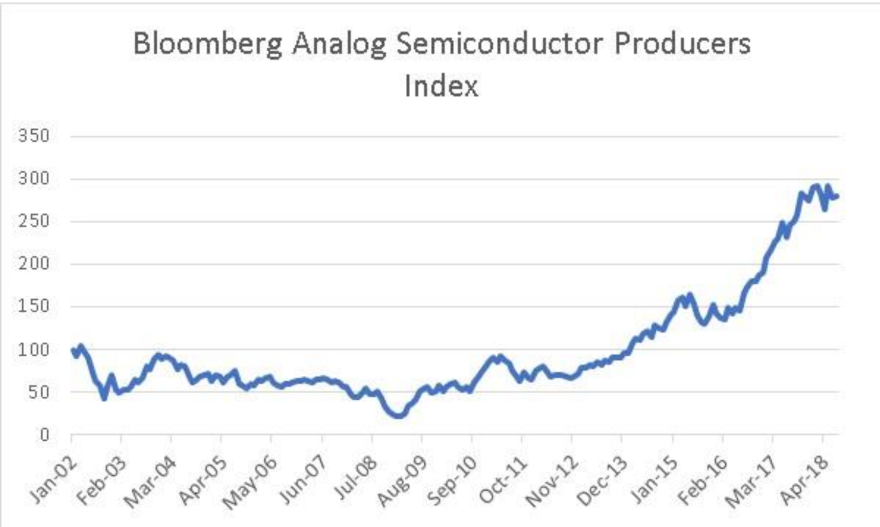
However, leading supplier of semiconductor equipment, Applied Materials, made the following comment on its most recent conference call on 16 August, "we're now seeing some movement on foundry spending" "To give you more colour on what we're seeing in the foundry, we continue to see growth in trailing-node geometries. The split between leading-edge and trailing-edge historically was 80-20, then it became 60-40. Today it's more like 50-50. And specifically, in 2018, we see trailing-node spend up and leading-edge node spend down". Both the increase in building of 200mn fabs, and Applied Materials stating that equipment sales is now 50% lagging to 50% leading, shows to me that the mature business is more profitable than leading end of the semiconductor market.

Currently China is the biggest market for semiconductors.

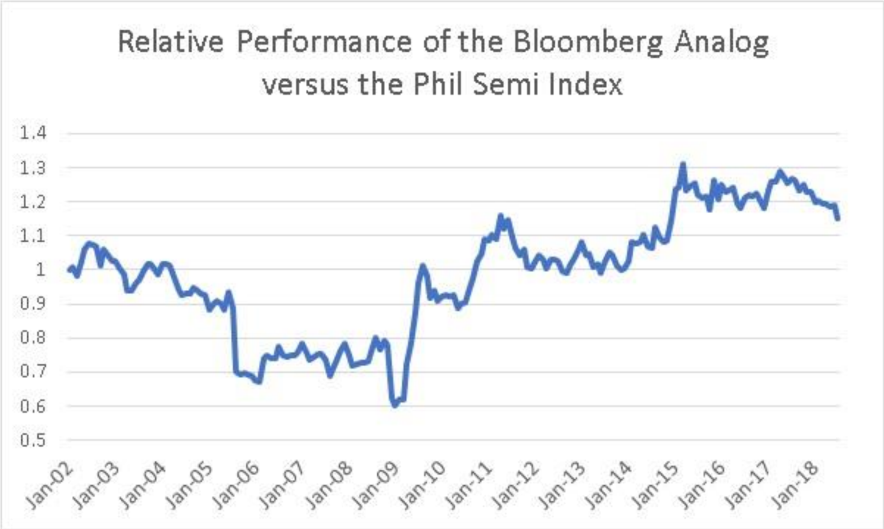


Source: SIA

According to SEMI and China Customs, semiconductors are the number one import for China, with domestic supply only able to meet 15% of domestic demand. China is looking to reduce its reliance on imports and to develop its own semiconductor industry. China has seen, and will likely continue to see the largest number of new fabs. Many market forecasters have dismissed China as a threat to the established chipmakers. Typical analysis run along the lines that it will take many years of experience for the Chinese to be able to compete at the leading edge of semiconductor market. The problem I have with this view is it ignores the fact that profitability in the semiconductor market is currently being driven by lagging technology, not leading. Chinese entry into the semiconductor market is much more likely to effect more mature semiconductor makers. There are signs this is already happening. Discrete and analog semiconductors tend to be produced in 200mn fabs. This area of the market, like all areas of the semi market has performed well.



However it is noticeable, that analog producers outperformed the broader Philadelphia Semiconductor Index (SOX) from 2009 until 2017, but have begun to underperform.



Investors should be cautious with any investments into the semiconductor companies dealing with lagging edge technology, due to Chinese production threat, and increasing investment from existing players.

INFORMATION

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Investor Relations: Samantha Dunn
Email: info@horsemancapital.com
Telephone: +44 (0)20 7838 7580
Website: www.horsemancapital.com
Business and registered address: Horseman Capital Management Limited, 9 Chester Close, London SW1X 7BE, United Kingdom.
Registered in England and Wales - Company number: 04034280

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