

FUNDAMENTALS

The disruption dilemma

Technology change presents risks as well as opportunities. Identifying and valuing these risks is crucial to preserving investor value in both the short and the long term.

'Disruption' is the latest technology buzzword of the financial press. The spotlight mostly focuses on the disruptors boasting innovations that will revolutionise the way we consume and interact.

Whilst it can be enticing to focus on the emerging technologies, it's perhaps more important for investors to focus on the disrupted incumbents left in their wake: these companies represent a far larger portion of the investable universe. This is true for equities but is especially pertinent in fixed income; disruptors typically fund their growth through private equity whilst the cashflows of incumbents often flow back into the debt markets.

THE CHILL WIND OF SCHUMPETER'S GALE

The concept of corporate disruption emerged from the "gale of creative destruction" described by Joseph Schumpeter to articulate the "process of industrial mutation that incessantly revolutionizes the

economic structure from within, incessantly destroying the old one". It was taken further by Clayton Christensen of Harvard Business School, with a simple premise. A product or service starts small, initially appealing to a limited audience that often isn't served by the incumbents. As a result, it can be easily and rationally overlooked by established companies unwilling to lower their quality threshold or price points to address the new customer base. Incumbents can therefore be unprepared when the true disruptors mature, increase market share and threaten the status quo by growing into the incumbents' core markets.

Much as corporate boardrooms can underestimate the risks of creative destruction, investors may struggle to identify the risks posed by new technologies to established blue chip firms – the companies which often form the core of a typical fixed income or equity portfolio, and are cornerstone tenants of

commercial real estate. Correctly identifying and valuing the risks posed by technology change is therefore crucial to capital and income preservation over the long term across all major asset classes.

LOOK UP, LOOK DOWN, LOOK ALL AROUND

In order to construct and monitor portfolios to reduce technological disruption risk, we try to remind ourselves to look up from the minutiae of the current status quo, look down at the new entrants at the bottom of the quality or price pyramid, and look all around at potential threats from outside the existing value chain.

However, every situation is different, and the market reaction to technology risk can just as easily be overstated as underestimated. It is crucial to continue to apply the cold logic of cashflows against the theories of creative destruction in order to calibrate the risks against the opportunities.

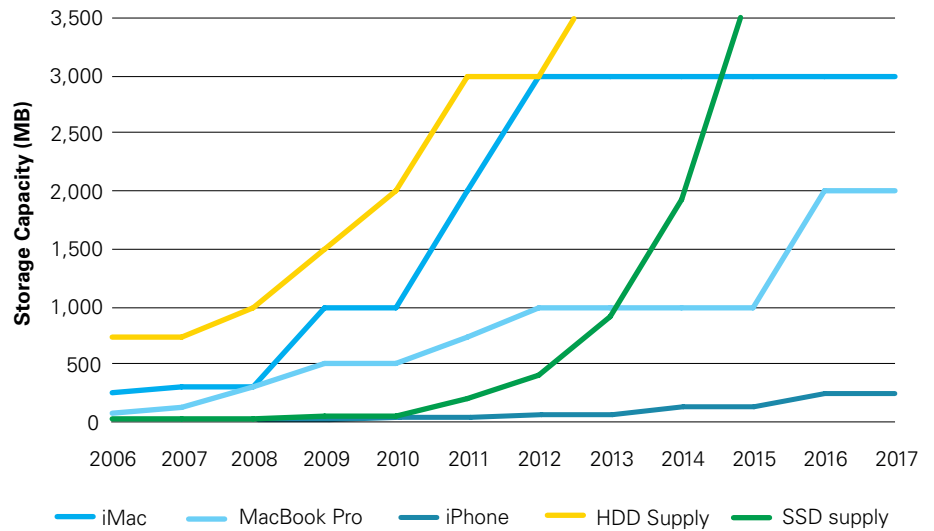
LOOK DOWN: LOW-END TECHNOLOGIES CAN QUICKLY EVOLVE, MATURE AND SUDDENLY BECOME COMPETITIVE

We can learn a valuable lesson about disruption from the computer storage market, which has historically been dominated by hard disk drive (HDD) technology. The blue lines on the chart opposite plot the increasing storage demands of computer equipment manufacturers (for simplicity we've used Apple products) and the yellow line shows that these capacity needs have been consistently met by continued innovations in HDD. The green line illustrates the evolution of solid state drive (SSD) technology, otherwise known as flash memory storage.

Back in the mid-2000s, SSD did not compete directly with HDD to supply computer manufacturers as it fell well short of meeting their capacity demands. Instead, it was successfully targeted at other (low capacity) markets, such as digital cameras and mobile phones. However, this changed as SSD technology evolved and its capacity increased, as illustrated in the chart. Both HDD and SSD can now provide more capacity than retail computer manufacturers demand, meaning that SSD is now taking share from HDD based on other attributes, specifically speed, performance and lower power consumption (52% of laptops shipped in 2017 are expected to utilise SSD storage, according to Gartner).

However, this may not be the end of the disruption story for HDD suppliers. SSD is still considerably

Storage supply versus demand, illustrated using Apple products



Source: Apple, Seagate, Western Digital, Hewlett Packard, LGIM.

more expensive, so for cost conscious enterprise consumers, HDD continues to look appealing. As the price differential continues to narrow, this may be the next segment to be disrupted.

LOOK ALL AROUND: THREATS CAN EMERGE FROM UN-EXPECTED SOURCES

As technology blurs the lines between industries, new competitors may emerge from a different sector so the competitive threats aren't always as obvious as you might expect. A simple example comes from maps. In the mid-2000s, investors in satnav manufacturers TomTom and Garmin weren't paying much attention to Google. Even after the launch of Google Maps in 2005 and Android in 2008, financial markets were still blasé about substitution risk but between 2008 and 2012 satnav sales fell by over 50% after Google Maps Navigation became available (for free) on smartphones.

Even when you can see the competitive threat, it isn't always easy to address it. Industries that are transitioning between product cycles are often at heightened risk of losing market share. Nokia provides a high profile example. The company floundered during the product cycle evolution into smartphones, surrendering its market leading mobile handset position. Nokia did not fail due to a lack of foresight, investment or technological expertise; the company invented its first smartphone in 1996, and even the current generation of iPhones and Samsung Galaxy's rely on Nokia patented technology. However, it did not successfully translate this expertise into producing a smartphone that large numbers of people wanted to buy. We think this highlights that anyone can fail when an industry transitions to a new phase.

TECHNOLOGY CAN BE FRIEND OR FOE

New technology may seem like a clear positive if it improves efficiency and margins, but this can have the side-effect of leading to industry overcapacity and therefore pricing pressure.

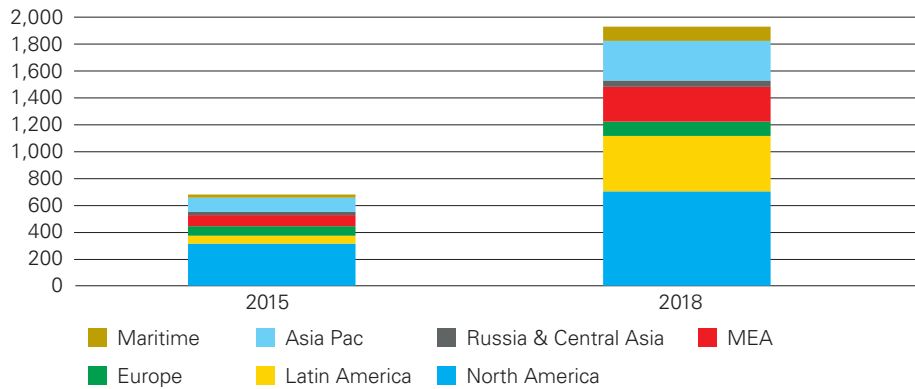
High Throughput Satellites (HTS) provide up to twenty times the capacity of traditional satellites, meaning that they are much more cost effective to operate. Also, unlike traditional satellites they are able to focus a high capacity in specific areas, making them suitable for new applications and opening up new markets to the industry. However, steady rollouts of this technology over the past five years has led to a major increase in satellite supply, outstripping demand. Based on current launch schedules, global capacity is set to almost triple over the three years to 2018 and supply is expected to further exceed demand by three times (falling to two times by 2024 assuming no additional launches). Unsurprisingly, this has led to pricing pressure and last year we witnessed a spate of profits warnings across the sector.

THE DISRUPTION DILEMMA: HOW MUCH IS PRICED IN?

As we discussed in our first Technology article, 'Investing in Change', investors tend to overestimate the effect of technologies in the short term and underestimate the effect over the long term. This can lead to market distortions and create attractive investment opportunities.

We think that valuing technology risk is the same as valuing any other risk in a portfolio. What risks

High Throughput Satellite Capacity (Gbps): Set to almost triple in three years based on current launch schedules



Source: Euroconsult

are already reflected in the price of a security, and which risks are we not (yet) adequately compensated for? How do our expectations compare to the broader market consensus? What catalysts might cause the market to begin pricing in our concerns? In order to answer these questions, we find it helpful to look across asset classes.

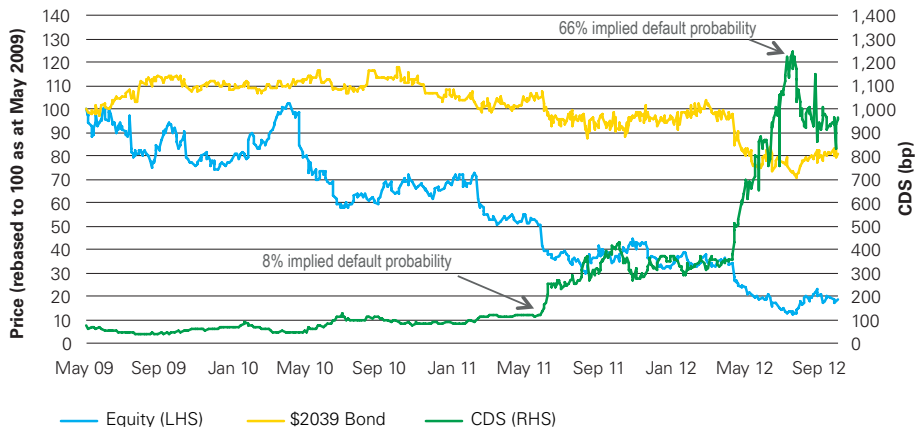
Using our previous Nokia example, from 2010 it became clear that its smartphone strategy was failing. As a result, equity and credit valuations fluctuated widely over the subsequent years, pricing in a range of risks and possibilities. Using credit default swaps (CDS)

as a proxy for market implied default risk, in July 2011 the implied probability of default over a five-year horizon was 8%.

It's fair to say (albeit with the benefit of hindsight) that markets were underestimating the risks faced by Nokia in July 2011. Over the next two years, the implied probability of default jumped to 66% while the share and bond prices plummeted (by 78% and 30% respectively).

Avoiding losses of this magnitude is critical to preserving the value of portfolios, meaning that understanding and correctly valuing technology risk is crucial.

Nokia: Equity, Bond and CDS trading levels

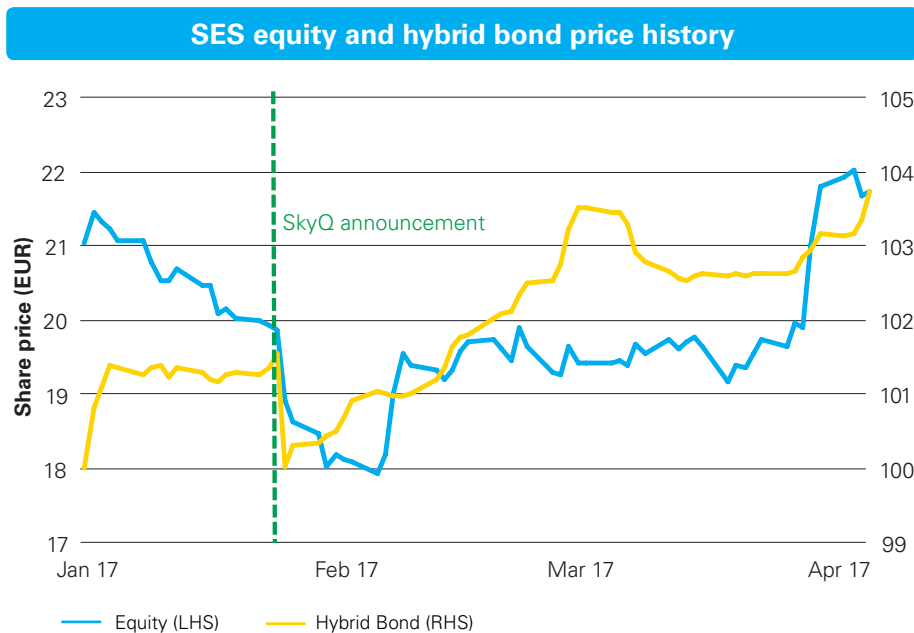


Bloomberg, LGIM. CDS implied default probabilities assume a 60% recovery value.

HAS THE PENDULUM SWUNG TOO FAR?

Joshua Gans, author of *The Disruption Dilemma*, argues that many management teams are “seeing disruption everywhere” and are using it to justify managerial decisions that are risky and which are not, ultimately, in the business’s best interests. Similarly, we think that looking at an investments with only a ‘why might this fail?’ perspective can lead to missed opportunities.

The satellite sector provides an example of an industry where financial markets may have overreacted to the threat of technology change. Looking back at the HTS capacity chart, the dramatic increase in supply has been concentrated in the Americas, while a lower number of HTS launches in Europe mean that the supply/demand balance in this region has barely changed. Nonetheless, satellite valuations globally have become increasingly sensitive to fears about a long-term destabilisation of this industry. We think the market has mispriced the risk in some instances, creating investment opportunities.



Source: Bloomberg, LGIM, company data. Note: The hybrid bond illustrated is the €4.575% NC'22 Perpetual

One example occurred earlier this year, when the share and bond prices of European satellite operator SES wobbled following the announcement from Sky that it would soon offer a television package which would not require a satellite dish: an event with zero financial impact on SES.

IDENTIFYING TECHNOLOGICAL CHANGE IS CRUCIAL

Investors can be blindsided by technology risks, from smaller disruptors or from other industries,

and even well-understood technologies can have unexpected impacts. Understandably, markets sometimes initially misprice these risks and the eventual correction in asset values can be extreme. From an investment perspective, identifying the threats posed by technology change is crucial to properly understanding the risk profiles of portfolios and to preserving shareholder value over the long term.

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