FEATURE ARTICLE

Trends in Electronics Inventories: Sales are all that matter now

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BACKGROUND

The global electronics industry posted spectacular growth of more than 50 per cent year-on-year in the first half of 2010. Apart from factors such as the corporate IT replacement cycle, pent-up consumer electronics demand in the US and stimulus effects in China, many analysts have also attributed this strong growth to inventory restocking activities.[1] This has thrown the spotlight on the role of inventories during recessionary and recovery periods, and led to questions about the sustainability of the restocking activities and hence the pace of the electronics recovery.

This paper attempts to shed light on this issue. It first provides a brief introduction to inventory and explains how inventory adjustments can lead to swings in output. It then examines the trends in electronics inventory adjustments in the US and to a lesser extent, Asia, in recent years including during the crisis and the subsequent recovery phase.[2] It further provides an assessment of whether the adjustments will continue to provide a fillip to global electronics output in the quarters ahead. Taking the inventory cycle into account, the paper concludes with an outlook for the global electronics industry.

INTRODUCTION TO INVENTORY

Inventories are goods and materials held available in stock by businesses. Most manufacturing firms classify their inventories based on the stages of production, namely Materials & Supplies (MS), Work in Progress (WP) and Finished Goods (FG).

There are two basic reasons why firms maintain inventories. First, the time lag between the demand, production and movement of goods necessitates that firms maintain a certain level of inventories for production smoothing (Blinder, 1986). Second, firms maintain inventories to avoid stockouts – where a firm runs out of products due to a sudden surge in demand, an unexpected drop in supply, or both (Kahn, 1987). Nevertheless, excess inventories are not desirable. When inventories pile up, the firm faces three major problems. The first is the problem of obsolescence - a risk especially acute in technology companies. Second, inventories tie up capital. Lastly, inventories incur associated costs for warehouse space, utilities and insurance.

Firms therefore have an incentive to keep their inventories lean, and yet retain flexibility to meet surges in demand. To improve their inventory systems, firms could adopt “just-in-time” inventory systems or practices such as vendor managed inventory and product tracking. In general, tighter inventory controls will lead to a lower inventories to sales ratio (or equivalently, inventories to shipment ratio) for the firm, and can also reduce the amplitude of the inventory cycle.[3] (See Box Item 1 for an illustration of how this works.)

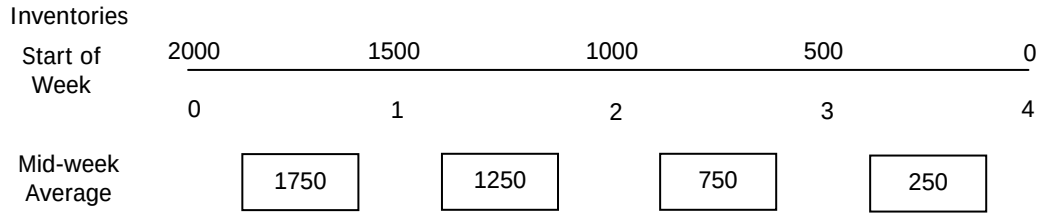
As the build-up and reduction of inventories during the business cycle will lead to swings in output, analysts and policymakers are often interested to know the direction and magnitude of firms’ inventory adjustments. To do so, they look at two complementary measures. The first is the inventories-sales or inventories-shipment ratio. A ratio that is high (low) relative to historical levels means that firms are

[1] For a detailed discussion, please see Lee and Soo (2010).
[2] We have focused on the US for two reasons. First, it has the largest information technology (IT) market in the world, with spending on IT products and services estimated to exceed US$500 billion in 2010 (Business Monitor International). Second, the US has the most comprehensive data on inventories.
[3] Inventories-sales ratio is measured for the wholesale and retail sector, while inventories-shipment ratio is measured for the manufacturing sector.

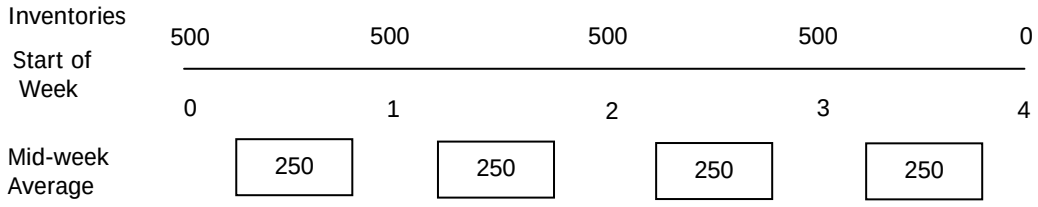
unlikely (likely) to build up inventories further. However, as this ratio by itself does not indicate the level of economic activity (e.g., when inventories move in tandem with sales, the ratio may remain unchanged even during a strong recovery), the second measure they monitor is changes in the level of inventories.

Box Item 1: How tighter inventory controls can lower a firm's inventories-sales ratio and the amplitude of the inventory cycle

Suppose a manufacturing firm produces 2,000 laptops each month for sale. Under the old inventory requirements, the firm received a delivery of 2,000 motherboards at the start of every month. At the end of the first production week, the firm's book would show 500 laptops produced, an average of 1,750 motherboards as inventories for the week, and 1,500 motherboards remaining as inventories. At the end of the second production week, the book would show another 500 laptops produced, an average of 1,250 motherboards for the week and 1,000 motherboards remaining, and so on. At the end of the month, the book would show that the firm had produced 2,000 laptops and kept a weekly average of 1,000 motherboards in inventory.



With tighter inventory controls, the same firm can reduce its inventories by receiving the motherboards more regularly. For instance, if the firm receives the motherboards weekly, the inventory at the start of each week will be 500. With no change to production and sales, the firm will still produce 500 laptops each week and 2,000 laptops every month by working the inventory to zero each week. This will result in weekly inventory holdings of 250 motherboards, compared to 1,000 under the previous system. Hence, for the same level of production (sales), the firm's inventory level is now lower, which results in a lower inventories-sales ratio.



Apart from lowering the inventories-sales ratio, the new inventory system will also reduce the amplitude of the inventory cycle. Under the old system where the firm received 2,000 motherboards as inventories at the start of the month, should the firm discover an increase in demand of 500 laptops for that month and beyond, it will not be able to meet the extra demand until the following month. Faced with 500 back orders of laptops and extra orders of 500 laptops for the new month, the firm will increase its inventory by 1,000 to 3,000 motherboards at the start of the new month.

However, under the new inventory system where inventory adjustments are smaller and more frequent, the firm can increase its production the next week instead of waiting till the next month. It will increase the order for motherboards by 200 at the end of the first week and 100 in each of the following weeks. Over the entire month, the new inventory controls result in an inventory adjustment of 500 instead of 1,000. The change in inventories in response to increased sales is thus smaller.

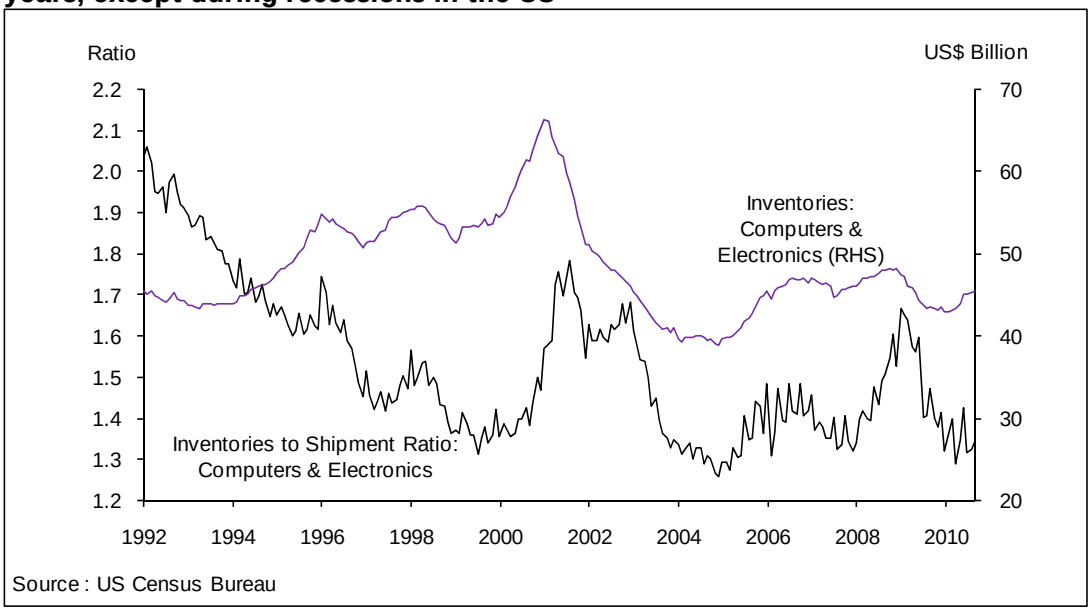
TRENDS IN ELECTRONICS INVENTORIES[4]

In this section, we take a closer look at the trends in electronics manufacturing inventories in the US and Asia, and make an assessment of whether the inventory adjustment cycle is close to an end.

Swings in electronics inventories in the US have become more muted...

The electronics inventories data show that inventory investment swings in the industry have become more muted. In the US, the standard deviation of the level of computer & electronic products (CE) manufacturing inventories between the first quarter of 1992 and the fourth quarter of 2001 was 3.3 per cent of its mean. Between the first quarter of 2002 and the fourth quarter of 2009, this fell to 2.3 per cent. This was likely due to improved inventory control practices.[5] Similarly, tighter inventory control practices have generally led to a reduction in the aggregate level of inventory and a lower inventories-shipment ratio in the CE industry over the years (Exhibit 1). In fact, just before the 2008 global financial crisis struck, the average inventories-shipment ratio for CE was around 1.3-1.4, down from 2.0 in early 1992.

Exhibit 1: Inventories level, and inventories-shipment ratio declined over the years, except during recessions in the US



Source : US Census Bureau

Electronics inventories in the US fell during the crisis, but have since recovered to pre-crisis levels...

When the crisis started to unfold in end 2007, the inventories-shipment ratio for CE rose to reach a high of 1.67 in January 2009, as shipments plummeted and inventories started to accumulate (Exhibit 2). At around the same time, firms started to destock in an attempt to bring the inventories-shipment ratio and costs down. The destocking continued until January 2010, even after shipments had started to pick up. Firms started to restock inventories only from February 2010 onwards, with the level of CE manufacturing inventories rising for eight consecutive months. By the second quarter of 2010, the inventories-shipment ratio was back to pre-crisis levels (1.3 – 1.4), due to a significant rise in inventories in the second quarter of 2010. In level terms, the CE manufacturing inventories level has also recovered to close to pre-crisis levels. The trend of inventories rebuilding is mirrored at the firm level. Research firm,

[4] In this section, electronics inventories encompass inventories at all stages of production, i.e., Materials & Supplies, Work in Progress and Finished Goods.

[5] Several studies in the 1990s (Morgan, 1991; Little, 1992) also postulated that the inventory cycle was fundamentally changing, as suggested by the decline in inventory-sales ratio.

iSuppli, reported that chip inventories at about 35 manufacturers grew 9 per cent in the second quarter of 2010 compared to the previous quarter.[6]

Exhibit 2: At the aggregate, inventories shipment ratio has risen to pre-crisis levels

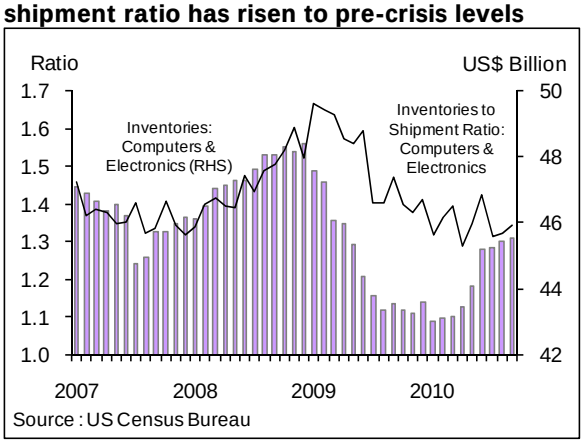
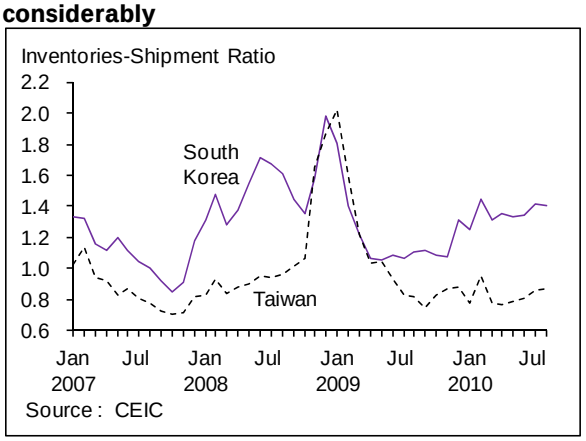


Exhibit 3: Asian manufacturers have restocked considerably



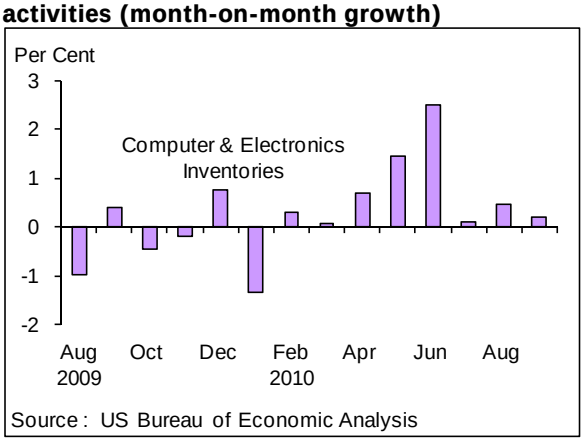
Data in Asia tells a similar story...

As electronics manufacturers in Taiwan and Korea have become more integrated with the global technologies cycle, similar inventory trends are also being played out in these economies. The latest data reveal that CE manufacturing inventories in both economies have continued to build, even as shipments seem to be flattening out. This has resulted in their inventories-shipment ratios rising to pre-crisis levels in recent months (Exhibit 3). Similarly in China, electronics inventories have built up. For instance, Haier Group, which is China's leading white goods home appliance manufacturer and retailer, reported a 150 per cent increase in its inventories to RMB987 million in the first half of 2010.

However, there are signs that restocking activities are at an end...

Further inventory re-stocking is likely to be limited because of two reasons. First, with the inventories-shipment ratios in the US and key Asia economies already back at pre-crisis levels, signs of waning sales and uncertainties in the economic outlook, firms are not likely to invest further in building up their inventories. In fact, investment in CE inventories in the US grew by a mere 0.2 per cent and 0.5 per cent month-on-month in September and August respectively, compared to the 2.5 per cent and 1.5 per cent growth in June and May (Exhibit 4). The slowdown in inventory investment is also borne out by feedback from major electronics companies (e.g., Intel and Nvidia).[7]

Exhibit 4: Slowdown in US electronics restocking activities (month-on-month growth)



Second, to save costs, some electronics manufacturers may have further improved their inventory control practices. A closer examination of the CE inventories in the US reveals that while MS, WP and FG inventories all fell during the recession, only WP inventories have recovered much of the losses since then (Exhibit 5). This finding is also consistent with firm-level data for Intel, the largest semiconductor firm in the US, which showed a shift in its mix of inventories away from MS and FG towards WP (Exhibit 6). This suggests that firms are adapting to leaner inventories, with a higher share of goods moving from the WP stage of production directly to sales. This in turn implies that firms are not likely to add to

[6] Source: "Chip Inventories Rise to Most in Six Quarters, ISuppli Says", Bloomberg, 25 Aug 2010
[7] Source: Various companies' conference calls.

inventories further, particularly since inventories have already risen close to pre-crisis levels and sales have shown signs of weakening.

Exhibit 5: CE inventories mix has also been changing at the aggregate level in the US...

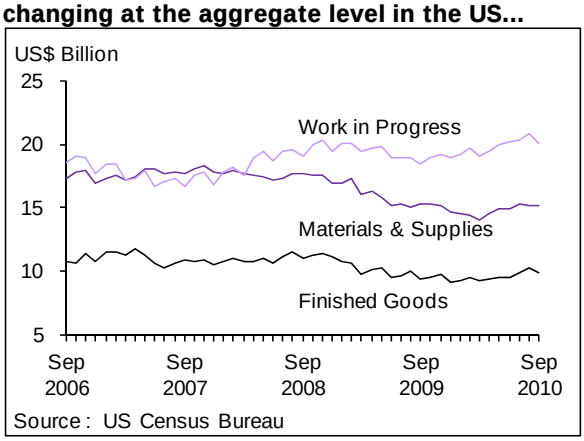
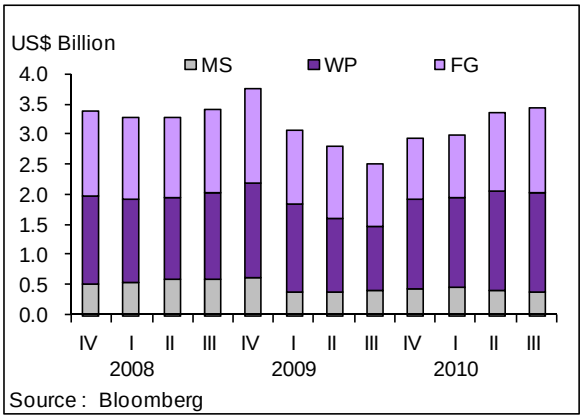


Exhibit 6: ... as well as at the firm level (Intel)



Sales are all that matter now...

Just as the destocking of electronics inventories at the start of the recent recession had contributed to the decline in global electronics output, the restocking of inventories since early 2010 has helped to boost the recovery of the industry. However, with signs that electronics inventories restocking activities are now at or close to an end, what matters most for growth going forward will be the final demand or sales of electronics. The next section examines the outlook for final demand for electronics in the US and China, and hence, the prospects for the electronics industry globally in the quarters ahead.

OUTLOOK FOR 2010 AND BEYOND

Final demand in the US appears sluggish...

Consumer spending rose by a less than expected 0.2 per cent in September 2010, as households continue to repair their weak balance sheets (Exhibit 7). At the same time, incomes dropped for the first time in more than a year, by 0.1 per cent. Consumer credit has also contracted in the past few months, as a result of (i) banks being more prudent; and (ii) consumers being reluctant to carry more debt amidst the high unemployment rate and weak economic outlook (Exhibit 8).

Exhibit 7: Consumer spending remains sluggish (month-on-month growth)

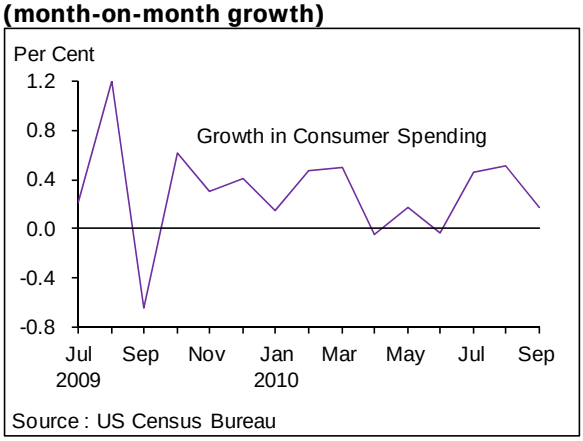
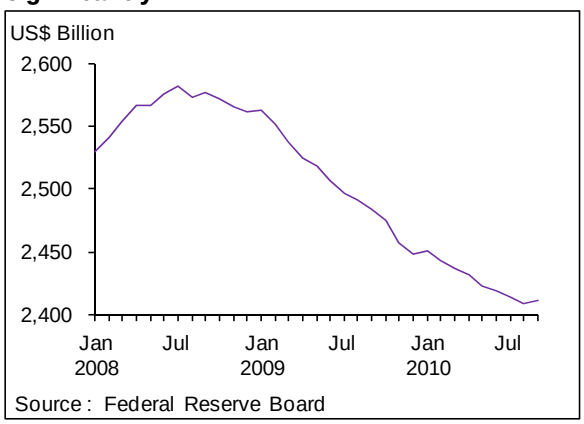


Exhibit 8: Consumer credit has contracted significantly

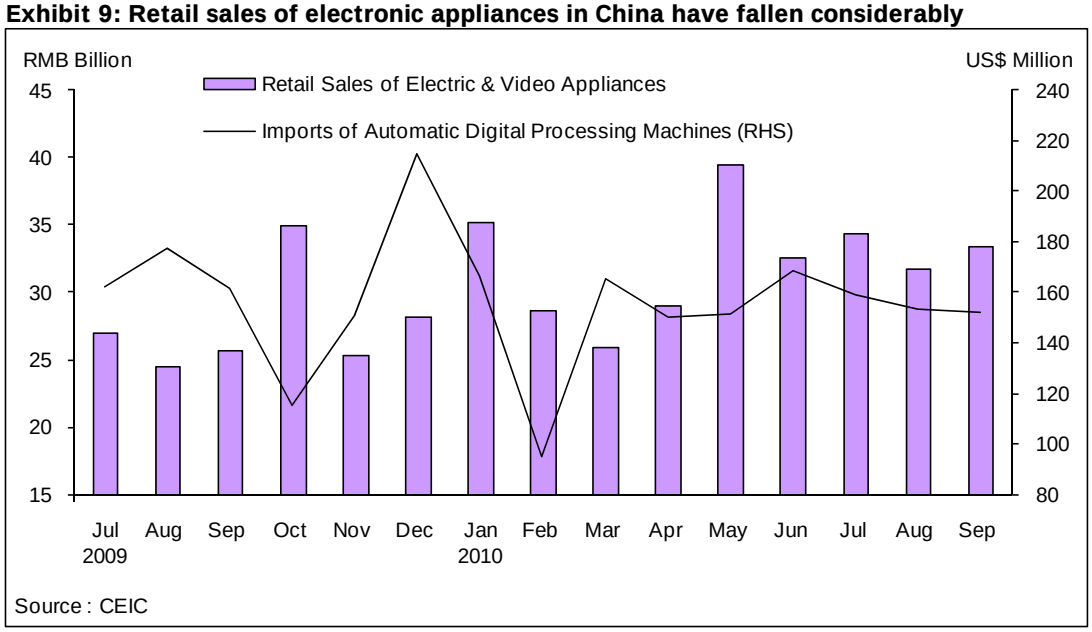


As consumers curtailed spending, sales of computers and electronics products have been affected. On a seasonally-adjusted quarter-on-quarter basis, retail sales for electronics and appliances grew at a slower rate of 0.7 per cent in the third quarter of 2010, compared to the 1.5 per cent and 2.4 per cent increase in the second and first quarters of 2010 respectively. At the same time, consumer sentiments remain weak, with October's Conference Board Consumer Confidence Index rising slightly by 1.6 points to 50.2, after falling to 48.6 in September. Business spending in IT, the only bright spot for electronics sales so far, has also started to moderate, growing by a slower pace of 2.8 per cent on a quarter-on-quarter basis in the third quarter of 2010, compared to 5.5 per cent in the second quarter.

...while demand growth in China is moderating as effects from the stimulus diminish

In China, retail sales of electrical and video appliances in recent months have moderated from the peak of RMB39.4 billion in May 2010 (Exhibit 9). Imports of automatic data processing machines (i.e., laptops, netbooks etc) have also remained flat after the sharp spike in December 2009.[8] The moderation in demand is likely to be due to the diminishing effects of the "electronics" stimulus. For instance, Haier Group has highlighted the "risk of (the) diminishing marginal effect of stimulation" as one of its key concerns in its annual report.

Exhibit 9: Retail sales of electronic appliances in China have fallen considerably



Source : CEIC

...resulting in weak sales by electronics manufacturers

Given the weak final demand in US and slowdown in demand in China, the three-month moving average of global chip sales for July-September rose by a lower 26 per cent year-on-year, compared to the 33 per cent for June-August.[9] New orders for CE products in the US also fell by 2.7 per cent sequentially in September, while Gartner has lowered its estimate for PC production growth in 2010 to 19 per cent from the 22 per cent in its previous update. At the same time, the US book-to-bill ratio fell to a 15-month low of 1.03 as orders (bookings) fell while shipments (billings) stagnated. Feedback from the industry echoes the view that demand has softened, with many technology companies and chipmakers lowering their outlook for the remainder of the year.

[8] The spike in imports in December 2009 was likely due to consumers bringing forward consumption before the expiry of the electronics stimulus programme which was originally set for February 2010. The stimulus programme was later extended to 2012.
[9] JP Morgan noted in their research note "Semiconductors: September semiconductors sales below seasonal but above expectations" that weakness was broad-based.

Growth momentum for electronics industry is likely to slow for rest of the year and in 2011...

All things considered, the global electronics industry is likely to see slower growth for the rest of the year and in 2011. This is especially since the electronics inventory restocking cycle is near or at an end, and the final sales of electronic products in the US remain sluggish.

This outlook is in line with forecasts by the US Semiconductor Association (SIA) and Gartner for 2010 and 2011. The SIA expects global semiconductor sales for 2010 to be 28.4 per cent, which implies a sharp pull-back in growth momentum for the rest of the year given the strong 50 per cent growth seen in the first half of this year. Gartner has highlighted that chips sales are likely to slow down in the second half of the year, after outpacing final demand in the first half.[10] For 2011, Gartner expects global chip sales to grow by 4.6 per cent, a significant moderation from the 31.5 per cent growth expected this year.

CONCLUSION

Electronics inventory restocking played a role in driving the growth of global electronics output in the first half of 2010. However, with the electronics inventory restocking cycle near or at its end, sales will be the main driver of growth in the industry going forward. With the weak outlook for sales given the economic uncertainties, growth in the global electronics industry is likely to moderate in 2011.

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[10] In their latest market insight report "Low Semiconductor Inventory Levels Misleading", Gartner expects a mild correction in the second half of 2010, which would set the stage for weaker annual growth in 2011.

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