

PC Industry Cost Increases

APRIL 2021



Overview

- Purchasing Managers Index (PMI) shows increased demand and costs across all industries
 - PMI Sentiment continues to get more positive
 - Input and Output price outlook continues to increase
 - Delivery delays and commodity costs continue to increase
- Costs are rising on key elements of PCs starting in Q3 and Q4 20 with acceleration across '21
 - Semiconductors increased in price in Q4 by 10-15% and are expected rise 20-40+% in '21
 - Memory prices increased in Q1 and expected to increase 13-18% in Q2
 - In March earnings call, Micron said “DRAM prices to increase rapidly”
 - Panels prices increased 20-30% in both Q3 and Q4'20 with “skyrocketing” prices in '21
 - Other materials such as Cardboard and Plastics are seeing double digit cost increases
- Key Points
 - The PC industry saw costs starting to rise in Q3'20 across key components
 - Continued Strong Costs increases in '21 across multiple PC components are expected

GLOBAL PURCHASING MANAGER'S REPORT | APRIL 1, 2021

J.P.Morgan Global Manufacturing PMI™

Global Manufacturing PMI rises to ten-year high as growth of output, new orders and employment gather pace

Manufacturing production increased at one of the quickest rates over the past decade, underpinned by the strongest expansion of incoming new work for just over a decade. International trade flows also picked up pace, with growth of new export business the steepest since January 2018.

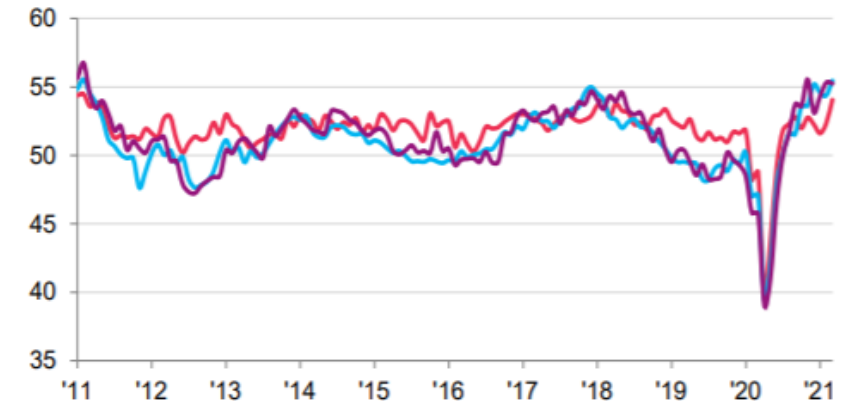
Efforts to raise production further were stymied by supply-chain disruptions in March, with input delivery schedules delayed by longer vendor lead times. The increase in supplier delivery times was the second-greatest extent on record, surpassed only by April last year. The combination of increased new orders at manufacturers and supply-chain delays was the main factor underlying a sharp rise in backlogs of work, the steepest since May 2010.

Demand outstripping supply also contributed to a marked increase in purchasing costs during March. Input price inflation surged to a near-decade high, the pass-through of which led to the steepest rise in output charges since data on selling prices were first tracked in October 2009.

PMI by goods sector

Consumer / Intermediate / Investment

sa, >50 = improvement since previous month



Sources: J.P.Morgan, IHS Markit.

Index summary

sa, 50 = no change over previous month. *50 = no change over next 12 months.

Index	Feb-21	Mar-21	Interpretation
PMI	53.9	55.0	Improvement, faster rate
Output	54.3	55.1	Growth, faster rate
New Orders	54.0	55.8	Growth, faster rate
New Export Orders	51.0	53.4	Growth, faster rate
Future Output	67.2	66.5	Growth expected, lesser sentiment
Employment	50.7	51.5	Growth, faster rate
Input Prices	65.1	68.2	Inflation, faster rate
Output Prices	55.7	59.3	Inflation, faster rate

SEMICONDUCTORS

- *Chip price increases started Q4 20 (Dec 17)* (<https://www.thestreet.com/investing/chip-prices-spiking-high-demand-and-supply-chain-disruptions>)

Earlier this week, chip manufacturing giant Taiwan Semiconductor ([TSM](#)) - [Get Report was reported](#) to be ending volume discounts starting in 2021 for 300mm (12-inch) chip wafers, which account for the lion's share of its production. Assuming the report is accurate, it could spell slightly higher wafer costs for TSMC customers such as Apple ([AAPL](#)) - [Get Report](#), AMD ([AMD](#)) - [Get Report](#), Nvidia ([NVDA](#)) - [Get Report](#) and Qualcomm ([QCOM](#)) - [Get Report](#).

The TSMC report arrived three weeks after one indicating that some of TSMC's rivals [are hiking prices](#) for 200mm (8-inch) wafers, which are often used for older and specialty chip manufacturing processes. 8-inch wafer prices are reportedly set to rise 10% to 15% in Q4, and another 20% to 40% in 2021.

- *Chip prices will increase across '21 (Mar 29 and Mar 31)*

<https://wccftech.com/tsmc-rumored-to-hike-chip-prices-by-25-by-2021-end-as-alleged-workers-receive-no-overtime-pay>


TSMC Rumored To Implement First 'Seasonal' Increase For 12-inch Wafer Prices From Next Quarter


Today's rumors, [reported by United News](#), seem to apply to all tech products. TSMC manufactures semiconductors in two wafer sizes, namely the 12-inch and 9-inch wafers. Out of these, chips that are generally used in consumer electronics are manufactured on 12-inch silicon wafers, which are the subject of the reported price hikes.

The details suggest that by the end of this year, TSMC will have increased its 12-inch wafer prices by \$400 for a 25% year-over-year increase - resulting in all-time record high prices. The fab's 7nm process node is its bread and butter for the time being as it looks to scale up production for the more advanced 5nm node this year and bring the leading-edge 3nm process to mass production in the second of 2022.

<https://www.digitimes.com/news/a20210331PD200.html>

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UMC, PSMC to raise foundry quotes by another 10-20%

Monica Chen, Taipei; Jessie Shen, DIGITIMES 🕒 Wednesday 31 March 2021 🗨️ 0 💬 ...

Pure-play foundries United Microelectronics (UMC) and Powerchip Semiconductor Manufacturing (PSMC) will initiate further price hikes of about 10-20% with the new pricing to be effective starting April, according to industry sources.

MEMORY

- *EPS News March 15th (<https://epsnews.com/2021/03/16/contract-dram-prices-to-rise-up-to-18/>)*



The screenshot shows the EPS News website header with the logo "EPSNews" and the tagline "News For Electronics Purchasing And The Supply Chain". A navigation bar includes links for HOME, NEWS ANALYSIS, DISTRIBUTION, SUPPLY CHAIN, INDUSTRIES, and RESOURCES. The main headline is "Contract DRAM Prices to Rise up to 18%". Below the headline, it says "March 16, 2021", "Leave a comment", "Business/Finance, News Analysis", and "By News Desk". Social media sharing icons for Facebook, Twitter, Reddit, Pinterest, LinkedIn, and Email are present. The article text discusses the DRAM market's new cycle of rising prices and forecasts a 13% to 18% increase for 2Q21. The final sentence is highlighted with a blue box.

EPSNews
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Contract DRAM Prices to Rise up to 18%

March 16, 2021 Leave a comment Business/Finance, News Analysis, By News Desk

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At the moment, the DRAM market has formally entered a new cycle of rising prices, and 2Q21 will see larger quarter-over-quarter (QoQ) price increases compared with 1Q21, according to [TrendForce](#)'s latest investigations. Looking ahead to 2Q21, shipments of various end products are expected to remain fairly strong. At the same time, clients in the data center segment will resume large-scale procurement. Hence, DRAM buyers across different application segments will be under pressure to stockpile. After experiencing QoQ increases of 3 percent to 8 percent for 1Q21, the average contract prices of different kinds of DRAM products are forecasted to rise more significantly by 13 percent to 18 percent QoQ for 2Q21.

Memory: MICRON EXPECTS SUPPLY DEMAND IMBALANCES TO BOLSTER FINANCIAL OUTLOOK | MARCH 31, 2021



Micron Technology, Inc.
Fiscal Q2 2021 Earnings Call Prepared Remarks

Forecasts for calendar 2021 PC unit sales have increased from three months ago and are expected to approach an average of one million units per day. There is robust demand in notebook PCs, especially Chromebooks. We also expect the desktop market to improve as workers gradually return to the office this year. Mobile unit sales are expected to show robust growth this year, and we also expect to benefit from higher content in 5G phones, which are forecast to double in calendar 2021 to more than 500 million units. Auto unit sales are expected to grow significantly from last year, while secular memory and storage content growth trends remain strong as EVs proliferate.

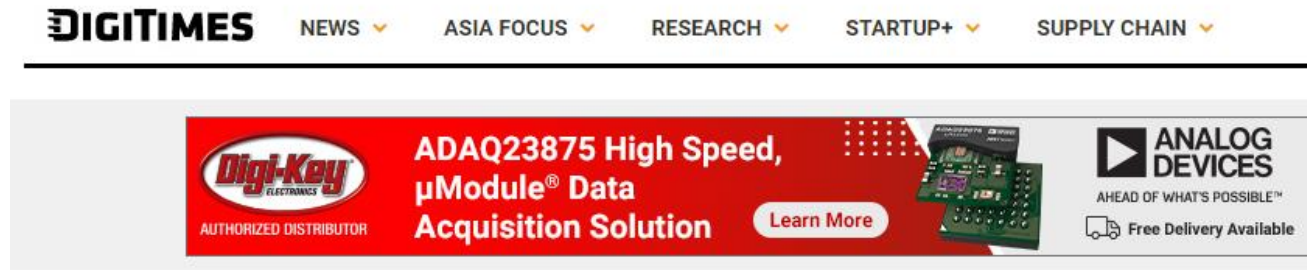
The strong demand across various end markets, combined with disruptions at certain logic and foundry semiconductor producers, has resulted in a shortage of these non-memory ICs for our customers, and we believe memory demand would have been even greater without these shortages.

In DRAM, due to the stronger demand, we now expect calendar 2021 bit growth at 20%, above our prior forecast of high teens. This growth builds on calendar 2020 bit growth, which was in the lower 20% range. As a result of disciplined CapEx investments since the start of the pandemic, we expect industry DRAM supply to be below demand. As a result of the strong demand and limited supply, the DRAM market is currently facing a severe undersupply, which is causing DRAM prices to increase rapidly. We see the DRAM market tightening further through the year.

PANELS

- *Panel prices for NB have been rising throughout the second half of CY20 (Digitimes Dec 10th)*

<https://www.digitimes.com/news/a20201210PD203.html>



The image shows the top section of the Digitimes website. At the top is the Digitimes logo followed by navigation links: NEWS, ASIA FOCUS, RESEARCH, STARTUP+, and SUPPLY CHAIN. Below this is a large red banner for Digi-Key Electronics, featuring the text 'ADAQ23875 High Speed, µModule® Data Acquisition Solution' and a 'Learn More' button. To the right of the banner is an advertisement for Analog Devices with the tagline 'AHEAD OF WHAT'S POSSIBLE™' and 'Free Delivery Available'.

DISPLAYS

LCD panel prices to rise another 20% in 4Q20

Rebecca Kuo, Tainan; Steve Shen, DIGITIMES Thursday 10 December 2020

LCD panel prices are expected to rise by about 20% in fourth-quarter 2020 following a 30% rally in the prior quarter, as demand for diverse sizes of panels from end-market brand vendors remains strong, according to industry sources.

- *Panel prices continue to increase (Trend Force Mar 31)*

<https://www.trendforce.com/presscenter/news/20210331-10738.html>

TRENDFORCE About Us Research Report Membership Price Trends Press Center

Given the extremely tight supply of panels relative to demand, notebook panel prices have skyrocketed accordingly. Case in point, quotes for 11.6-inch panels, which are among the mainstream and are widely used for Chromebooks, are now closing in on quotes for 14-inch and 15.6-inch panels. As such, the high profitability of notebook panels have led panel suppliers to set more aggressive shipment targets this year.

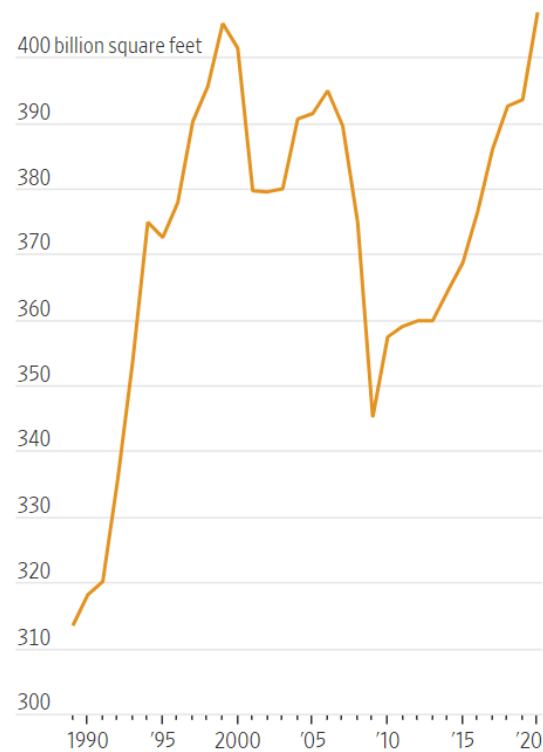
Cardboard Boxes Have Never Been in More Demand—or More Expensive

Producers of corrugated board boost prices, adding to supply-chain woes as economy reopens

By [Ryan Dezember](#)

Updated March 31, 2021 2:02 pm ET

U.S. corrugated product shipments



The demand prompted producers to raise prices to new highs in autumn and again recently, adding to the [supply-chain woes](#) piling up on businesses as the economy reopens.

Already contending with [record wood prices](#), scarce [shipping containers](#) and fast-rising freight, cabinetmaker John K. Morgan now faces more costly corrugated board. His Green Forest Cabinetry is paying 22% more for boxes than a year ago. Bales of corrugated board,

PLASTICS

Plastics join other raw materials in price surge

by KEVIN CROWLEY BLOOMBERG NEWS SERVICE (WPNS) | March 19, 2021 at 2:00 a.m.



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Green PVC pellets. (Bloomberg photo/Eilon Paz)

For anyone looking for examples of inflation these days, raw materials are a good place to start. Copper, steel -- even lumber -- are either near or at record highs. And so too are plastics, which are often overlooked but are on a tear right now.

Although they're the building blocks of thousands of everyday products, plastics and their chemical ingredients don't trade on major commodity exchanges, and large price moves are largely invisible to the wider world. Yet polyvinyl chloride, or PVC, is in the midst of a dramatic rally, driven by a combination of rebounding global consumer demand and production outages from last month's Texas freeze.

<https://www.nwaonline.com/news/2021/mar/19/plastics-join-other-raw-materials-in-price-surge>

11 MARCH 2021

PLASTICS – PRICES BREAK NEW THRESHOLDS, SUPPLY WORSENS

European PP and PE markets are on the verge of registering new supply-related rises in March, the fifth consecutive month of increases. The uptrend, which gained strength from January onwards, does not seem to stop its running as new triple-digit increases are expected.

Sellers are now preparing to test new highs for next month. Players expect to see increases of up to €150/mt for PP and €100/mt for PE.

According to ChemOrbis' weekly average Price Index data, the PP and PE markets have hit new highs for the past few years.

Rising prices and increasingly limited availability. The shortage situation on the market, as already occurred in 2015, is making the supply of raw materials for companies in the sector more critical.

Unionplast raises the alarm about the scarcity of raw materials and soaring prices caused by reduced imports and Force Majeure calls. It also appeals to manufacturers to implement a development policy in Europe aimed at renewal. Finally, it called for the production sector to make every effort to protect its supply chain.

The Italian processing industry, in a still difficult period for the national and European economy, has a strong need to receive the expected quantities in order to be able to satisfy its own markets and sectors.

<https://www.mori2a.com/en/dont-stop/news/products/plastics-prices-break-new-thresholds-supply-worsens/>

Supporting News Articles – Overall Computer Industry and Commodities

#	Headlines	Hyperlink	Date
1	Chip shortage: Samsung warns of 'serious imbalance	https://www.bbc.com/news/technology-56433082	Mar 17, 2021
2	What you need to know about the global chip shortage	https://www.washingtonpost.com/technology/2021/03/01/computer-chip-shortage-explainer-qa/	Mar 01, 2021
3	How a Chip Shortage Snarled Everything From Phones to Cars	https://www.bloomberg.com/graphics/2021-semiconductors-chips-shortage/	Mar 28, 2021
4	What the Global Shortage of Computer Chips Means for You	https://interestingengineering.com/what-global-shortage-of-computer-chips-means-for-you	Mar 23, 2021
5	Plastics join other raw materials in price surge	https://www.nwaonline.com/news/2021/mar/19/plastics-join-other-raw-materials-in-price-surge/	Mar 19, 2021

Supporting News Articles - MEMORY

#	Headlines	Hyperlink	Date
1	Explosive growth in Automotive DRAM demand expected	https://evertiq.com/design/49625	Feb 23, 2021
2	Memory super cycle may last longer this time, given the rise in spot movements	https://pulsenews.co.kr/view.php?sc=30800018&year=2021&no=201693	Mar 02, 2021
3	SK hynix: Entering Upcycle in Semiconductor Memory Prices	http://www.businesskorea.co.kr/news/articleView.html?idxno=61675	Mar 04, 2021
4	Adata expects DRAM shortage to worsen in 2Q21	https://www.digitimes.com/news/a20210305PD205.html	Mar 05, 2021
5	DRAM prices to continue to increase in Q2 2021	https://technosports.co.in/2021/03/06/dram-prices-to-continue-to-increase-in-q2-2021/	Mar 06, 2021
6	DRAM probe card demand ramping up	https://www.digitimes.com/news/a20210312PD205.html?mod=2	Mar 12, 2021
7	DDR3 memory shortage worsens	https://www.digitimes.com/news/a20210312PD207.html?mod=2	Mar 12, 2021
8	Strong memory chip, prices brighten SK hynix stock, earnings prospects	https://pulsenews.co.kr/view.php?sc=30800028&year=2021&no=238091	Mar 12, 2021
9	PC OEMs to increasingly adopt DRAM-less SSD in lower-end models	https://www.digitimes.com/news/a20210315PD200.html	Mar 15, 2021
10	Samsung Electronics: Chip Demand Outstripping Supply	http://www.businesskorea.co.kr/news/articleView.html?idxno=62297	Mar 15, 2021

Supporting News Articles – PANELS & TAIWAN MANUFACTURING

#	Publish Date	News Title	URL
1	30-Mar	Corning to hike glass substrate prices in 2Q21	https://www.digitimes.com/news/a20210330PD206.html
2	29-Mar	Highlights of the day: Panel short supply hikes prices	https://www.digitimes.com/news/a20210329VL201.html
3	29-Mar	LCD panel prices to continue rising in 2Q21	https://www.digitimes.com/news/a20210329PD200.html
4	24-Mar	Taiwan February manufacturing production index up on year	https://www.digitimes.com/news/a20210323PR201.html
5	17-Mar	Samsung raises quotes for rigid AMOLED panels	https://www.digitimes.com/news/a20210317PD214.html
6	16-Mar	Highlights of the day: LCD driver IC prices to rise on tight supply	https://www.digitimes.com/news/a20210316VL200.html
7	15-Mar	Global panel makers ramping up output for notebook applications	https://www.digitimes.com/news/a20210315PD207.html
8	4-Mar	LCD panel shortage to continue throughout 2021, says Innolux president	https://www.digitimes.com/news/a20210304PD208.html
9	17-Mar	ChipMOS expects double-digit sales growth in 2021	https://www.digitimes.com/news/a20210317PD203.html
10	30-Mar	Notebook component shortage to worsen in 2Q21, says Clevo	https://www.digitimes.com/news/a20210330PD212.html
11	16-Mar	5G optical component demand picking up	https://www.digitimes.com/news/a20210316PD204.html