Dividend forecasting

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Global semiconductor shortage

Winners and victims through the lens of dividends

Stella Lim, APAC Dividend Research Lead

Ruiying Zhao, Research Analyst

Ryan Torie, Research Analyst

Key Implications

- We discuss the dividend dynamics of the winners—80 key companies in the semiconductor supply chain—and victims of the global semiconductor shortage.
- Dividend from winners is expected to amount to US$66.1 billion this year, up 14% year on year (y/y) excluding Samsung Electronics. Asia Pacific accounts for more than half of the aggregate payout followed by 40% from the United States and 10% from the European Union.
- Among companies likely to hike dividends (up more than 30%), Taiwanese names stand out owing to the competitive edge gained over the years. US companies are rarely found in the top dividend growth list owing to their nature of preferring progressive over a volatile dividend stream.
- Players with significant revenue exposure to automobile semiconductors will show notable dividend growth; capex spending and mergers and acquisitions (M&A) will compromise some companies' dividend upside potential.
- We analyzed 114 sub-sectors and concluded that the dividends outlook of chip shortage victims is relatively safe from the crisis. Automobile and consumer electronics flagged warning signs on production but dividend payout will be guarded by a generally optimistic earnings outlook.
- Semiconductor nationalism—large-scaled government investment—acts as a double-edged sword to semiconductor players. The increasing notion of politicizing stemming from the US-China trade war adds uncertainty to the outlook.

It appears that the global appetite for semiconductors is only growing—multiple semiconductor market research houses have estimated a sharp growth in semiconductor demand this year. World Semiconductor Trade Statistics (WSTS) announced in early June that the global semiconductor market is expected to grow by

Contacts

Stella Lim, APAC Dividend Research Lead · stella.lim@ihsmarkit.com
Ruiying Zhao, Research Analyst · ruiying.zhao@ihsmarkit.com
Ryan Torie, Research Analyst · ryan.torie@ihsmarkit.com

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19.7% in 2021 to US$527 billion, a much faster pace than 6.8% in 2020 during the peak of COVID-19. IC Insights' publication in mid-June is largely in line—the research house adjusted its projection for the 2021 integrated circuit (IC) market from 19% to 24% to exceed US$500 billion for the first time ever. The same is echoed by Semiconductor Industry Association (SIA). According to the association, the global semiconductor industry sales were at US$43.6 billion in May 2021, a year-on-year increase of 26.2% from US$34.6 billion in May 2020 and 4.1% month-on-month growth from US$41.9 billion in April 2021.

Global semicondcutor market forecast

Market	Amount in US$ million			Year-on-year growth		
	2020	2021F	2022F	2020	2021	2022
Americas	95,366	105,981	116,304	21.3%	11.1%	9.7%
Europe	37,520	45,446	48,335	-5.8%	21.1%	6.4%
Japan	36,471	41,092	43,303	1.3%	12.7%	5.4%
Asia Pacific	271,032	334,705	365,498	5.1%	23.5%	9.2%
Total world	440,389	527,223	573,440	6.8%	19.7%	8.8%

Note: F=forecast

Source. World Semiconductor Trade Statistics

It is also a widely known fact that the demand is far outstripping the supply of these tiny chips. Given the highly capital-intensive nature of semiconductor production, and the years it takes to increase production capacity, the impact of the shortage is expected to last into 2022. The change in the chip demand pattern owing to COVID-19 and the failure to predict this change by companies are often pointed to as the primary reasons behind the chip depletion crisis. Yet, we believe the causes of the chip famine are multifold, with increasing downstream demand across various sectors and production disruptions that manufacturers faced owing to climate change and fire outbreak. Government supports in a bid to fully localize the semiconductor value chain and the ongoing US-China trade war are also growingly involved in the landscape, rendering significant changes to the industry dynamic.

The crisis gave a natural rise to **winners**—mostly from the supply side of the semiconductor market—which are poised to benefit from robust chip demand, as well as **victims**—generally on the demand side of the market—which are expected to face production disruption owing to the shortage, even a compromise to upside potential. In this report, we explore the winners and victims through the lens of dividends, if the remarkable earnings growth among winners translates to notable dividend increment and whether the production disruption the victims are facing will erode their profitability, and thereby dividends.

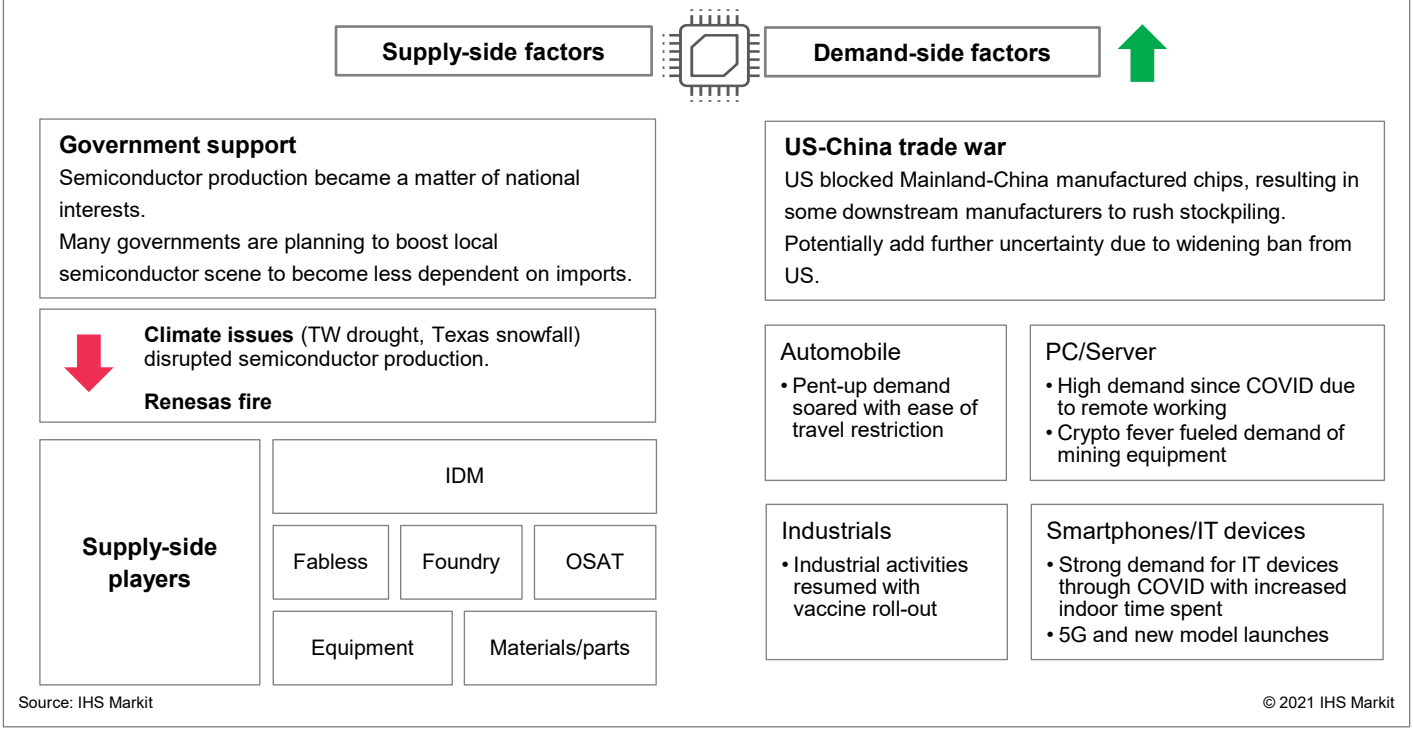
Top 10 integrated circuit by sales growth

Rank	Product category	2020	2021F
1	Industrial/other—special purpose logic	12%	47%
2	DRAM	8%	41%
3	Auto—speical purpose logic	10%	39%
4	Consumer—speical purpose logic	8%	38%
5	Cellphone application MPUs	24%	34%
6	Auto—app-specific analog	-7%	31%
7	Display drivers	13%	31%
8	Wireless Comm—app-specific analog	8%	28%
9	Wireless comm—special purpose logic	24%	26%
10	Consumer—app-specific analog	8%	25%

Note: MPU = microprocessor chips; F = forecast

Source. IC Insights

Semiconductor shortage crisis overview



Source: IHS Markit

Winners—Will earnings growth lead to dividend growth?

Semiconductors are produced via a series of highly specialized processes of designing (fabless), manufacturing (foundry) and testing, packaging, and assembling (outsourced assembly and testing, OSAT). There are also integrated device manufacturers (IDM), which cover the entire value chain from design to production. It is more common for memory chip (e.g., DRAM, NAND) players such as Samsung Electronics, SK Hynix, Micron to operate as IDMs while non-memory chip players tend to focus on specific process of the value chain. For instance, TSMC concentrates solely on manufacturing, while Intel and Qualcomm are pure fabless and focus on design and outsource the rest of the process.

We shortlisted 80 key semiconductor players across the value chain to examine their earnings and dividend trajectory. Based on our analysis, the aggregate dividend from common shares of these 80 companies are expected to amount to US$66.1 billion this year, up 14% y/y excluding Samsung Electronics for its one-off payout hike in fiscal year (FY) 2020. This is on the back of robust earnings growth as we see 57 companies' earnings per share (EPS) to leap by more than 30%.

Geographically, Asia Pacific accounts for more than half of the aggregate payout from key semiconductor companies, followed by around 40% from the US and 10% from Europe. This is due to the broad presence of East Asian (mainland China, South Korea, Japan, and Taiwan) companies across the whole value chain, while the semiconductor landscape in US and Europe is skewed toward specific process of the production. US companies are more concentrated in designing part of the value chain. European companies tend to be found more in equipment and material supply, such as specialty gases.

Of the 80 shortlisted companies, 24 firms are projected to hike their annual payout by more than 30% along with their soaring earnings. Although we do not see a single common trend across markets or value chain, dividend trajectory of Taiwanese names is of the most remarkable one among all. With their long-standing position as the heart of the global semiconductor supply chain, the competitive edge gained over the years

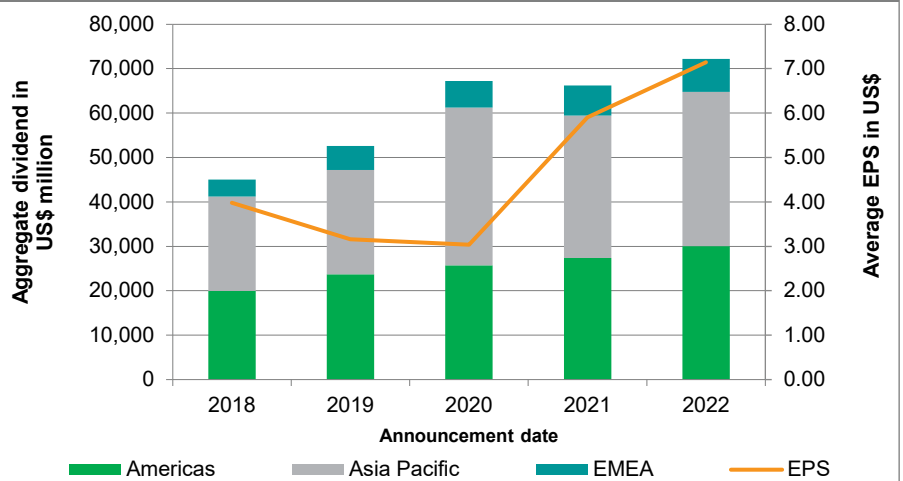
Winners—Value chain breakdwon

Type	Region	Key companies	Number of companies
IDM	Global	Intel Corp (US) Micron (US) Samsung Electronics (South Korea) SK Hynics (South Korea)	11
Fabless	Americas, Asia Pacific	Qualcom(US) Nvidia (US) Broadcom (US) AMD (US) Media Tek (Taiwan)	18
Foundry	Asia Pacific	TSMC (Taiwan) UMC (Taiwan) DB Hitek (South Korea) SMIC (mainland China)	7
OSAT	Asia Pacific	ASE Technology (Taiwan) Powertech (Taiwan)	6
Manufacturing equipment	Americas, Asia Pacific, EMEA	Applied Materials (US) Inficon (mainland China) Tokyo Electroni (Japan) Lam Research (US)	12
Materials/parts	Asia Pacific, EMEA	Cicor tech (mainland China) Schaffner (mainland China) Huber & Suhner (mainland China)	26

Note: EMEA = Europe, the Middle East, and Africa
Source: IHS Markit

with superior production techniques allowed them to build up an ample capacity to feed new orders. **Media Tek**, a Taiwanese fabless giant in chips for mobile phones, is forecast to grow 69% y/y in its dividend for FY 2021. Based on the confidence in future cash flow upon the world's first 4 nanometer (nm) chip launch, which is being co-developed with TSMC, the company raised its payout ratio to 80–85% for a regular cash payout and announced special cash dividends (CR) of NT$16 per share annually from 2021 to 2024. **Nanya Tech** and **Novatek** are other names to double their annual dividend on the back of over 160% earnings growth. We also see mainland China—based companies demonstrating high dividend growth this year. Dividends from **China**

Semiconductor sector aggregate dividend and average EPS trend



Note: Based on ICB classification level 4, including stocks from extended-coverage. Data resfreshed on 12 July 2021.
Source: IHS Markit, Factset

Winners—High earnings growth to lead to high dividend growth

Company	ISIN	Value chain	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y %	EPS y/y %
Novatek Microelectronics	TW0003034005	Fabless	TWD	40.9000	15.6000	162%	167%
Nanya Tech	TW0002408002	IDM - memory	TWD	2.8700	1.2986	121%	167%
Media Tek	TW0002454006	Fabless	TWD	62.6000	37.0000	69%	127%
China Resources Microelectronics	CNE100003S06	IDM	CNY	0.1300	0.0737	76%	63%
Tianjin Zhonghuan Semiconductor	CNE1000000B8	OSAT	CNY	0.0800	0.0600	33%	118%
U-Blox holding	CH0033361673	Fabless	CHF	0.6000	0.0000	100%	turnaround
Comet Holding	CH0360826991	Materials/parts	CHF	1.7000	1.3000	31%	73%
BE Semiconductor Industries	NL0012866412	Fabless	Euro	2.5000	1.7000	47%	59%
Siltronic	DE000WAF3001	Materials/parts	Euro	3.0000	2.0000	50%	30%
NXP Semiconductors	NL0009538784	IDM	USD	2.2500	1.5000	50%	5,086%
Infineon Tech	DE0006231004	Fabless	Euro	0.3200	0.2200	45%	329%
AMKOR Technology	US0316521006	OSAT	USD	0.1800	0.0800	125%	43%

Source. IHS Markit, Factset

Resources Microelectronics is expected to soar by 76% despite a historical low payout ratio of 10%. **Tianjin Zhonghuan**, another leading player in mainland China is also set to increase payout by 33% driven by close to 120% earnings growth. Both firms are set to benefit from soaring domestic demand on the back of strong support from the Chinese government, which is encouraging downstream chip users to source domestic suppliers to boost local semiconductor production.

While Asia Pacific is hitting a winning season, Europe is not left behind. **U-Blox Holding** is expected to initiate dividend distribution underpinned by high demand for printed circuit boards and wireless semiconductor chips as its earnings are turning around. **Comet Holding** and **BE Semiconductors**, which already have benefited from the upswing in the semiconductor and electronics, are continuing to be expected to generate over 50% growth in EPS, and thus the higher annual dividend that follows. **Siltonic AG**, a German hyper pure silicon wafer producer is also set to increase FY 2021 dividend to €3 per share, which is 50% up from that of last year. Surprisingly, US companies rarely make it into the top growth ranks owing to their nature of preferring stable over volatile dividend streams

Elsewhere we also see semiconductor players with considerable revenue exposure to automobiles topping the dividend growth list. **NXP Semiconductors**, a Netherlands silent hero of the automotive industry, is expected to grow dividends over 50%, driven by a surge in extra demand developing microcontrollers and processors for self-driving cars. **Infineon Tech**, a Germany fabless expert, which offers a wide range of chips for automotive and power management ICs, is expected to grow 45% in dividend along with a 329% increase in future EPS. Similarly in the US, **AMKOR Technology**, the world's largest OSAT for automotive ICs initiated a regular quarterly dividend (representing a 125% growth) based on consistent free cash flow (FCF) and strong balance sheet, driven by continued strength in advanced packaging and a recovery in the automotive end market. However, we flag that more automobile companies (i.e., those with revenue exposure to automobiles over 30%)—such as **On semiconductors, Renesas Electronics**, **Rohm**, and **STmicroelectronics**—are choosing to continue paying either flat or zero dividends despite strong earnings growth.

Including those paying zero dividends, we see that 53 out of our 80 shortlisted companies will show a relatively moderate dividend growth (less than 30%) against rising earnings. This includes 35 firms with earnings estimated to surge by more than 30%.

One key reason holding companies back from sharper dividend increment is their massive capex spending. In order to become more semiconductor-self-sufficient amid increasing political risk across the global

Winners—Moderate dividend growth owing to heavy investment

Company	ISIN	Value chain	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y %	EPS y/y %
Will Semiconductor	CNE100002XM8	Fabless	CNY	0.3800	0.3150	21%	60%
SK Hynix	KR7000660001	IDM—memory	KRW	1,400.0000	1,170.0000	20%	97%
TSMC	TW0002330008	Foundry	TWD	11.0000	10.0000	10%	13%
Mitsui Chemicals	JP3888300005	Materials/parts	JPY	110.0000	100.0000	10%	39%
Western Digital	US9581021055	IDM—memory	USD	0.0000	1.5000	-100%	turnaround

Note. Mitsui Chemical's FY 2021 figures represent FY end in March 2022; FY20 figures represents FY end in March 2021.
Source. IHS Markit, Factset

semiconductor supply chain, governments around the world are luring the big names to build domestic foundries. As marvelous an opportunity as it appears to be for them to expand their global presence, the aggressive expansion plan at the same time pressures their cash position and shadows potential downside risks to the historically generous dividend payout. One such example is **TSMC**, the world's largest semiconductor foundry. TSMC announced its FY 2021 first-quarter dividend of NT$2.75 per share, a mere 10% quarter-on-quarter (q/q) growth despite its record-high first-quarter earnings for NT$139.59 billion. The mixed result is mainly attributable to its FCF shrinking to below zero for the first time in recent years in support of the US$100 billion capacity plan into its new plants in the US, Japan, mainland China, and Europe. Just for FY 2021, TSMC has already announced to invest US$30 billion into the booming advanced chip business, which is expected to severely drag down its usually generous dividend payout. **Mitsui Chemical** has experienced similar dilemma. The company poured approx. ¥10 billion to increase Taiwanese production of ICROS™ Tape used in in manufacturing semiconductors. Along with other investment, the company guided FCF of negative ¥11 billion. The company guided a steady 10% increase in annual dividend of ¥110 per share which highlight its confidence in sales growth, nevertheless, a clear stretch on its financial statement is evident.

Likewise, M&A deals are also limiting the upside room for dividends. **SK Hynix**, a South Korean leader in DRAM chips and flash memory chips, is expected to have a relatively low dividend growth of 20% despite earnings almost doubling. The company pays FCF-lined dividend and the M&A deal with automobile semiconductor manufacturer Key Foundry is restricting availability of cash for shareholder returns. Similarly, dividend growth for **Will Semiconductor** from mainland China is forecast to be 21% despite EPS climbing by 54%, mainly owing to the merger with Seagull Investment Holdings. **Western Digital Corp**, a well-known US memory chip maker, suspended dividends to reinvest in the busines as shown by a 93.1% increase in annual capex. This exclude the US$30 billion acquisition of SSD manufacturer Kioxia, which is widely speculated in the market.

Winners—Outliers

Company	ISIN	Value chain	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y %	EPS y/y %
Intel	US4581401001	IDM	USD	1.3900	1.3200	5%	-7%
Samsung Electronics	KR7005930003	IDM—memory	KRW	1,444.0000	2,994.0000	-52%	48%

Source. IHS Markit, Factset

The other reason we identified behind rather lackluster dividend growth is the cultural preference of steady increment over hikes. We see majority of US companies falling under this category. While 28 US firms are expected to see positive earnings growth, only 2 companies (NXP Semiconductors and AMKOR Technology) are projected to hike dividend more than 30%. Excluding Western Digital, which suspended dividend as mentioned earlier, the average DPS growth of the remaining 23 companies only stands at 6%. Among them are **Broadcom**, **Skyworks Solutions**, **Applied Materials**, **Nvidia**, and **Texas Instruments**. For instance, **Qualcomm** has just reported 52% revenue growth in revenue during the latest quarter and signaled continued optimism thanks to 5G chipsets like the Qualcomm Snapdragon 480. However, only 5% annual dividend increment is expected based on its past five year's practice of inching dividend by 3–6%.

The scene is largely similar in Japan. Traditionally stronger in equipment and material supply of the semiconductor scene, all 16 Japanese companies are estimated to see positive earnings growth but only three—Sumitomo Chemical, Sumitomo Electric and Tokyo Electron—are set to increase dividend more than 30%. The rest otherwise are either only inching dividends up or even maintaining flat as per their historical trend. **Asahi Kasei**, for example, has remained flat for ¥34 since FY 2018, and therefore we see a higher chance for a flat dividend to follow. Other examples include **Murata Manufacturing, Denka**, and **Showa Denko**, which have guided steady payouts, and the famous automobile chips maker **Renesas Electronics**, which is not showing signs of dividend initiation despite doubling its earnings. Such characteristics of dividend distribution marks a stark contrast with those of Taiwan and mainland China players mentioned earlier, where shareholders are more accommodating toward volatility in the payout stream.

Winners—Lackluster dividend growth

Company	ISIN	Value chain	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y %	EPS y/y %
Broadcom	US11135F1012	Fabless	USD	14.4000	13.0000	11%	316%
Skyworks Solutions	US83088M1027	Fabless	USD	2.0000	1.8200	10%	113%
Qualcomm	US7475251036	Fabless	USD	2.6600	2.5400	5%	70%
Applied Materials	US0382221051	Equipment	USD	0.9400	0.8700	8%	67%
Nvidia	US67066G1040	Fabless	USD	0.64	0.64	0	53%
Texas Instruments	US8825081040	Fabless	USD	4.2200	3.7200	13%	23%
Asahi Kasei*	JP3111200006	Materials/parts	JPY	34.0000	34.0000	0%	94%
Murata Manufacturing*	JP3914400001	Materials/parts	JPY	120	115	4%	8%
Denka*	JP3549600009	Materials/parts	JPY	135.0000	125.0000	8%	37%
Showa Denko	JP3368000000	Materials/parts	JPY	65.0000	65.0000	0%	turnaround
Renesas Electronics	JP3164720009	Fabless	JPY	0.0000	0.0000	0%	101%

Note. *FY 2021 figures represent FY end in March 2022; FY20 figures represents FY end in March 2021.
Source. IHS Markit, Factset

Not all winners are winners—Intel is the only player in our list to see earnings fall of 7%. This is largely attributable to delays in the production of their chips and cancellation of contracts by customers. The company is currently seeking various means to boost the production, as reflected in 38% increase in FY21 capital expenditure estimate as well as the latest talk on acquiring GlobalFoundires Inc. The impact on dividend front is limited as the management plans to keep up recent past years annual dividend growth rate of 5%.

Samsung Electronics revenue and operating income composition

Business segment	% on revenue	% operating income
Consumer electronics	20%	10%
Information technology and mobile communications	42%	32%
Semiconductor	31%	52%

Note. Samsung Electronics FY 2021 Q1 earnings report
Source: Company financial reports

Lastly, Samsung Electronics, a South Korean giant IDM specialized in memory chip, and also the single largest player in 80 key semiconductor player list, is projected to show a 52% y/y decline for its common share dividend. This is due to the one-off hike in FY 2020 final dividends as the company distributed an accumulated portion of excessive FCF in the past three years. Excluding this, the company guided that a minimum of 1,444 Korean Republic won per share of annual dividend will be paid, which represents a 2% y/y increment. Samsung Electronics is different from other semiconductor players as it has exposure to both the winner and victim side of the chip crisis. Nonetheless, the company guides a regular portion of dividends and adds on an additional portion to the final payout based on the availability of FCF.

Victims—Are chip victims also dividend victims?

The ubiquitous use of semiconductors made the impact of the shortage felt in every corner of the economy. Earlier in April, Goldman Sachs highlighted 169 industries that are affected by the shortage. The list, which features industries that spend more than 1% of their GDP on semiconductors, stretches from automobile and tech sectors to all types of manufacturing and even retail. To add a dividend perspective to the echoed ripple effects of the semiconductor crunch, we analyzed 114 sub-sectors of our core coverage and concluded that dividends are relatively safe from the crisis. The vast majority of 92 sub-sectors are expected to pay dividends exceeding that of FY 2019 level, before the shortage crisis. This is underpinned by largely optimistic earnings trajectory across the broader economy including automobiles, industrials (such as electrical components and equipment, heavy construction, industrial machinery, and industrial suppliers) as below.

Does FY 2021 aggregate dividend exceed that of FY 2019?

Sector	Sub-sector	
	Yes	No
Automobile	Automobiles	
Construction and materials	Building materials and fixtures	
	Heavy construction	
Industrial goods and services	Aerospace	Transportation services
	Business support services	
	Business training and employment agencies	
	Commercial vehicles and trucks	
	Containers and packaging	
	Defense	
	Delivery services	
	Diversified industrials	
	Electrical components and equipment	
	Electronic equipment	
	Financial administration	
	Industrial machinery	
	Industrial suppliers	
	Marine transportation	
	Railroads	
	Trucking	
	Waste and disposal services	
Personal and household goods	Consumer electronics	
	Toys	
Technology	Computer hardware	Electronic office equipment
	Internet	
	Telecommunications equipment	
Telecommunications	Fixed line telecommunications	
	Mobile telecommunications	

Note. Sector classification by ICB level 2, sub-sector by ICB level 4
Source. IHS Markit

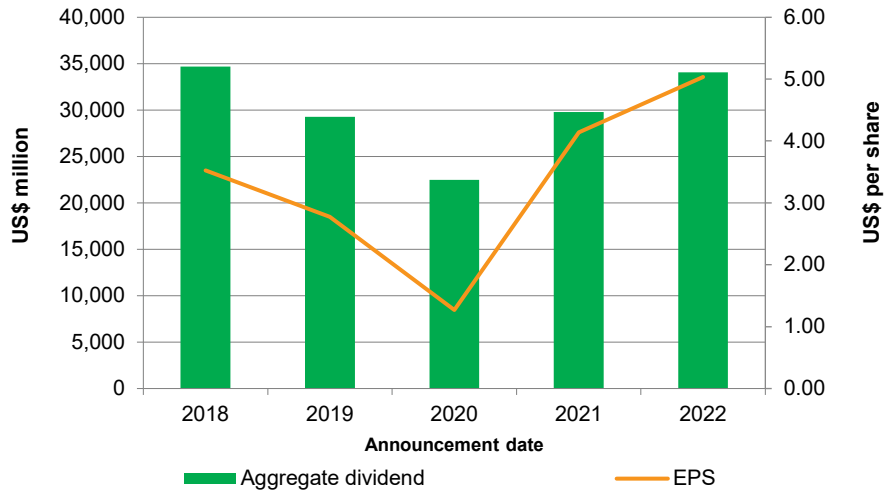
Automobile—Fewer cars, bigger profit?

The automobile sector is the first sector that flagged warning signs of the semiconductor crunch. Car manufacturers cut back on semiconductor orders owing to the COVID-19–induced demand shrink last year only to realize that low-yield automobile semiconductors were no longer the priority of semiconductor manufacturers. The increasing adoption of autonomous driving functions, as well as launching of electric vehicles (EVs) with the latest technology, only exacerbated the pain of the crunch as autonomous cars

require 2,000–3,000 semiconductors on an industry average and EVs consume about 600–900 chips, which is significantly more than the 200–300 semiconductors that a traditional carbon-emission vehicle needs per vehicle. This explains the accelerated demand of semiconductors for automobiles estimated by IC Insights in the beginning of this report.

Contrary to concerns, automakers have been navigating the semiconductor crunch fairly well thus far. Major global automakers did not only post sound earnings growth in the first quarter but some are also adjusting their annual earnings forecast upward as the second-quarter reporting season is approaching. The overall outlook for FY 2021 is upbeat for most global car makers, which is reflected by notable dividend growth. Of 27 dividend paying automobile companies in our analysis, 17 companies are set to increase dividends, including Mazda Motor, which guided dividend resumption for the fiscal year ending in March 2022.

Automobile dividend and earnings trend



Note: Data resfreshed on 12 July 2021
Source: IHS Markit, Factset

Pent-up demand, which lifted car prices with the easing of travel restriction, as well as automakers' strategic shift in their sales mix toward premium cars are among the reasons behind notable earnings growth despite producing fewer cars. Companies are exploring to replace parts with less-semiconductor-consuming components. In addition, various marketing tactics—such as deeper discounts on models for longer waiting times to dissuade customers from semiconductor-needed add-on features to boost sales—are employed.

Daimler, BMW, and Volkswagen, which have a significant portfolio of premium cars, will maintain a strong dividend growth of over 60% as these companies reported results that were better than market expectation. **Daimler**, which produces Mercedes-Benz cars, cut working hours for up to 18,500 employees and temporarily halted production at two plants in Germany. The company at the same time raised its profit outlook for 2021 driven by soaring Chinese demand, which boosted sales by 60% in the first quarter. The optimism is shared in our forecast, as we currently project Daimler's annual DPS to hike by 219% from €1.35 to €4.3 in FY 2021. **BMW** also announced that it is on course to meet its profit target for 2021. The management added that sales of its EV has more than doubled in the first quarter thanks to higher pricing and strong demand from China. Considering the company pays performance-linked dividend with a payout ratio of around 30–40%, we currently estimate its annual DPS to double.

The scene is slightly different among Asia Pacific automakers. While the proportion of luxury cars for consumers to splash out disposable income is smaller among Asia Pacific makers, companies such as Toyota,

Victims —Automobile

Company	ISIN	Currency	DPS FY21	DPS y/y%	EPS y/y%	Impact of semiconductor shortage on production
Daimler	DE0007100000	EUR	4.3000	219%	226%	Announced in April that will cut working hours for up to 18,500 employees and temporarily halt production at two platns in Germany
BMW	DE0005190003	EUR	3.8000	100%	120%	Commented in May that the management does not expect semiconductor shortage to have major impact on prouction
Volkswagen	DE0007664005	EUR	8.2000	71%	65%	Commented in May that the ocmpany is in "crisis mode" and chip shortage will hit profits in the second quarter
Stellantis*	NL0010877643	EUR	0.7000	68%	12835%	Lost output amounted to around 11% of planned production in the first three months, or about 190,000 units out of 1.58 million, affecting 8 out of 44 assembly plants.
SAIC Motor (A share)	CNE000000TY6	CNY	0.9600	55%	22%	Reported in April that the chip shortage will cut production by about 200,000 vehicles (3.2% of this year's sales target)
BYD (H share)	CNE100000296	CNY	0.2200	49%	7%	Relatively smaller impact as it has a subsidiary that is engaged in semiconductor production to meet its demand in chip consumption
Hyundai Motor	KR7005380001	KRW	4,000.0000	33%	320%	Historical high quarterly result in first quarter FY 2021 ; repeated 1–2 days of shutdown in the first quarter owing to semicondcutor shortage but no major impact observed yet. Relatively well-stocked compared with peers
Toyota Motor*	JP3633400001	JPY	260.0000	8%	15%	The management assured has announced that they are not seeing any major short term impact from semiconductor shortage - they stockpile all necessary equipments/parts months in advance
Honda Motor*	JP3854600008	JPY	110.0000	0%	1%	The management said in May that about 100,000 vehicles were affected last year by the chip shortage. However, the impact of loss incurred will be traded off by the end of this year.
Mitsubishi Motors*	JP3899800001	JPY	0.0000	Continued suspension	Turnaround	Cut production to 30,000 vehicle in June at five plants in Japan, Thailand, and Indonesia.
Nissan Motor*	JP3672400003	JPY	0.0000	Continued suspension	Turnaround	Guided net loss of ¥60 billion and negative FCF. The company will make half a million fewer cars in 2021 owing to the chip shortage
Ford Motor	US3453708600	USD	0.0000	Continued suspension	Turnaround	The management halted prdouction across eight plants in North America in June; lowered 2021 earnings estimated at US$2.5 billioin owing to the shortage
General Motors	US37045V1008	USD	0.0000	Continued suspension	45%	Chip shoprtage and rising comoodity price to inccur additional US$2 billion expense but expected to be offset by strong performance. Increased earnings forecast to US$8.5–9.5 billion

Note: For Japnese firms, FY 2021 figures represent fiscal year ending in March 2022; FY 2020 figures represents fiscal year ending in March 2021.
Stellantis: the merger between Peugeot S.A and Fiat Chrysler automobiles was completed in January 2021. FY 2020 DPS reflects the speical divdiends paid out to both companies share holders. FY 2021 dividend will be the first post-merger distribution. FY 2020 EPS reflects that of Fiat while FY 2021 EPS reflects Stellantis's outlook as a single entity. "

Source. IHS Markit, Factset, company filings

Hyundai, and BYD weathered through the crisis with relatively better semiconductor stockpiling. The world's largest car maker, **Toyota**, assured investors again in May this year that it does not see any major short-term impact from the shortage as it benefits from its famous just-in-time inventory management. The company saw its March quarter profit almost doubling and to maintain progressive dividend growth and to pay ¥260 per in the fiscal year ending in March 2022. **Hyundai** had to close production plants for one to two days repeatedly this year to slow down production, but the impact of semiconductor shortage has been limited thus far as it posted historically high result in first quarter FY 2021. The Korean automaker is mobilizing Hyundai Mobis, its

parts suppliers to domestically source automobile semiconductor. Hyundai Mobis acquired Hyundai Autron in December 2020 to boost semiconductor research and development (R&D). It recently entered into a joint R&D agreement with DG High tek, a local foundry. Similarly, Chinese EV automaker **BYD** did not report production issues as it sources semiconductors directly from its subsidiary, BYD Semiconductor Co, which it plans to spin off. Hyundai and BYD are both expected to see a rebound in annual dividend to pre–COVID-19 levels.

There are companies, however, that are experiencing a significant delay in rebound owing to production curbs. Continued dividend suspension is expected from Nissan, Mitsubishi, Ford and, General Motors as they fail to catch the wave of pent-up auto demand. The management of **Nissan** guided a net loss of ¥60 million, as well as negative FCF for the fiscal year ending in March 2022. The company added that the chip shortage would render the company to produce half a million fewer cars in 2021. **Ford** has cut production in eight of its factories and predicted a US$2.5–3 billion earnings loss caused by the shortage of semiconductors. **General Motors** is managing the situation better than its American peer. The company is strategically prioritizing semiconductor uses to full size trucks and SUVs with higher margins. However, the company said a US$1.5–2 billion impact on 2021 earnings is inevitable.

Consumer electronics—Sustained pandemic demand to offset chip shortage-led loss

Consumer electronics is another sector reported to be relatively hard-hit. With everyone working from home there was an increased demand for laptops, cell phones, computer monitors, and other personal electronic devices, as well as home appliances, which saw more use than normal. Consumer electronics players benefited much from the historically high demand during COVID-19, which inevitably led to an increase in semiconductor consumption. The revival of other sectors, such as industrials and automobiles, with vaccination rollout rendered consumer electronics in a position to compete so it can feed its increased appetite for the chips.

Major consumer electronics players all reported the impact of chip shortages at varying levels. From a dividend standpoint, however, we do not see the semiconductor shortage exerting a significant influence on their dividend trajectory thanks to optimistic earnings outlooks. Against a backdrop of concerns on pandemic demand softening with social distancing rules and travel restrictions easing, consumer electronics giants reported decent performances thus far. We are also seeing home appliance makers especially lifting product prices to share the burden of increasing chip price amid chip depletion. We highlight a few noteworthy names in the following.

Victims—Consumer electronics in entertainment

Company	ISIN	Currency	FY 2021 DPS	DPS y/y%	EPS y/y%
Microsoft	US5949181045	USD	2.19	10%	33%
Nintendo*	JP3756600007	JPY	1,430	-36%	-6%
Sony Group*	JP3435000009	JPY	65	18%	-39%

Note.FY21 and FY20 figures of companies starred respectively refer to figures for FY end in Mar 2022 and FY end in Mar 2021

Source. IHS Markit, Factset

We expect **Microsoft** to keep up around 10% of annual dividend increment for the fiscal year ending in June 2022. From the giant's financial statement, the More Personal Computing segment, which includes sales of Surface and Xbox, and accounts for about 30% of the company's total revenue, grew 19% y/y in the third quarter of the fiscal year ending in June 2021. Both Surface sales (up 12% y/y) and gaming revenue (up 50% y/y) contributed to the company's solid performance. Notably, Xbox hardware revenue grew 232% driven by

continued demand despite the management's comment that "the chip shortage will be with us for a while." We see personal computer (PC) sales and Xbox continuing to contribute to the company's upward dividend trajectory going forward.

The situation for **Sony** is somewhat similar. The Japanese electronics giant has presence in a much more diversified range of consumer electronics products, from game console to televisions, home sound system, cameras, and audio equipment. In its fiscal year ending in March 2021 annual earnings briefing, the management acknowledged that its Game & Network Services segment (about 30% of total revenue), as represented by the Play Station series, has been affected by the chip shortage and implied that the console sales could have been much higher without citing specific figures. Yet the sales of its latest model, PS5, has reached 7.8 million unit since launch and the management is positive on meeting its 14.8 million units sales goal in the coming year. On the base of this strong confidence, the company guided an interim dividend of ¥30 per share, which exceeds that of last year. We are expecting an annual ¥10 per share dividend increment to continue. We flag that the 39% plunge expected in earnings is mostly owing to non-consumer electronics related business lines such as Music (publication of music and image media platform) and Imaging & Sensing Solution (professional imaging solutions and medical goods), as well as switching in accounting policy to International Financial Reporting Standards (IFRS).

Nintendo is argued to be the most adversely affected consumer electronics player in the ongoing semiconductor famine. Following a solid financial year ended in March 2021. The management guided the upcoming year to be lackluster, with net profit to be down by 29% to ¥340 billion, primarily attributed to a 3.3 million unit decrease in sales (-11.5%) of Nintendo Switches in view of softening demand. The management acknowledged that procurement of semiconductors could pull the forecast figures further down. While market consensus is more upbeat (i.e., 6% down in earnings) than that of company guidance, we currently project over a 35% cut in Nintendo's annual dividend. The company's full devotion to video games in comparison with its aforementioned peers further increases uncertainty in the dividend stream as the company has a lack of other business area to cushion the impact on game console production should the chip supply situation deteriorate.

In the home appliances area, we see COVID-19 induced demand sustaining through this year in overall as all key players are expected to see remarkable earnings growth of more than 30% y/y. Similar to entertainment players, home appliance manufacturers have all warned about increasing price of microcontroller units, a type of semiconductor that is less advanced than that of smartphones or PCs but widely used for simple programming. However, no key players have reported a significant disruption in production to the point of eroding their earnings.

Victims—Consumer electronics in home appliances

Company	ISIN	Currency	FY 2021 DPS	DPS y/y%	EPS y/y%
LG Electronics	KR7066570003	KRW	1,700	42%	52%
Whirlpool Corp	US9633201069	USD	5.45	12%	37%
Electrolux	SE0000103814	SEK	27	238%	34%

Source. IHS Markit, Factset

LG Electronics has been very open about the impact the chip shortage is having on its businesses. Its management commented in April that "We've been sourcing about 70% to 80% of semiconductors for our home appliances from Japanese companies but we are fast diversifying the suppliers." As a result, LG may have to raise the price of its home appliance equipment by around 5% to 10% because of higher raw material price, including chips. Nevertheless, the company is breaking a multiyear record and is on track to take over Whirlpool as the largest home appliance company (excluding TV). In line with historically high earnings projected ahead, we are expecting LG electronics to increase its dividend to 1,700 won per share (up 42% y/y).

The impact of the semiconductor shortage to **Whirlpool** seems to be more severe than LG Electronics as it is struggling to meet demand. The CEO of Whirlpool, Marc Robert Bitzer, said in the company's first-quarter earnings call that backorders should be expected for some time to come and that consumers should assume that the second and third quarter will experience similar backorders, primarily owing to microcontroller supply; microcontrollers are used in more than half of the company's products. Despite growing backorders, the company reported net sales growth of approximately 24%, driven by sustained global industry demand and cost-based pricing actions. We expect the company to continue with the annual dividend increase, which was carried out for more than a decade.

Lastly, we expect the Swedish appliance company, **Electrolux**, to keep up with dividend increment as well. The company has already increased pricing to reflect the increased in semiconductor cost, which according to the management has offset their revenue. Nevertheless, the company has reported a sharp increase in sales to 30,303 million Swedish kronor in the second quarter and the current market estimate consensus indicate annual earnings growth of 40%. The company resumed dividend distribution only last year at a 50% payout ratio. Assuming the payout ratio will be held at the same level, we expect the company to pay 10 kronor per share for regular dividends (up 25% y/y) and FY 2021 annual dividends to amount to 27 kronor per share (up 237.5%).

Semiconductor nationalism—Risk wrapped in opportunity

As the semiconductor shortage exposed the vulnerability of economies, governments are on a race to achieve semiconductor self-sufficiency. The first half of 2021 was filled with news on governments committing billions of dollars to boost their local semiconductor scene. We summarized the various policies announced thus far and compared the chip vulnerability level by each market's reliance on import against domestic production in the following. Based on our research, mainland China is the most semiconductor-vulnerable among the key markets as its semiconductor production technology is lagging behind. Markets such as the US and Japan are also heavily dependent on imports as they mostly outsource manufacturing.

These government packages come as a double-edged sword for the semiconductor companies. While these government-led initiatives are certainly attractive opportunities to scale production and boost R&D, there are concerns that companies are pressured to overly commit on investment and stretch their financial health unnecessarily, which was discussed in this report earlier.

Although we are still in the middle of the semiconductor crunch, some street analysts have started raising concerns that massive production upscaling will backfire in the long run, repeating the oversupply-led downturn three years ago, only on a larger scale.

The intensifying tech protectionism also poses a major risk to semiconductor players. As the US-China trade war goes on, more companies are facing direct intervention. The US government banned Micron, Aixtron, and other equipment makers to sell to mainland Chinese top technology giants Huawei and ZTE last year.

Notable investment pledged by key semiconductor players

Company	Investment details
TSMC	To spend US$100 billion in 2021–23 to grow production capactiy
Intel	Two new factories (worth US$20 billion) to be built in Arizona; currently in discussion to build a new European factory
Samsung Electronics	To invest 171 trillion won in non-memory chips through 2030
SK Hynix	To spend 230 trillion won in domestic production sites by 2030

Source. IHS Markit

The notion of politicizing is expanding into international level as the US government tries to exert influence over non-US companies. Earlier this year, the US government prevented Dutch ASML, the only company in the world supplying ultraviolet lithography equipment essential in semiconductor production, to sell its product to mainland China. Recently, the US government even blocked a Chinese private equity firm from purchasing Magnachip, a South Korea-based small semiconductor manufacturer, signalling its firm stand on the US-China trade relation. This puts many firms in a difficult position as their business decisions could be interpretated as a political stance. With companies struggling to find a balance between commercial commitments and political alignment in the crossfire of the US-China trade war, we see uncertainty heightening in the near future.

Semiconductor vulnerability and government pacakges

Market	Semiconductor vulnerability level*	Dependency on import	Government package
US	High	38% of fabless, 90% foundry	• Up to 40% tax exemption for capex on semiconductor infrastructure (Chips for America Act) • Government support for semiconductor manufacturing and R&D expense (American Foundries Act) • Up to US$3 billion support for semiconductor manufacturing plants (2021 national defense authroisation act) • Announced US$50 billion semiconductor industry support scheme
EU	High	No import % available but EU only produce 10% of semiconductors	• Aims to reach 30% of global semiconductor market by 2030 • Announced €50 billion plan to support Plans to subsidize 20–40% of investment cost in semiconductor company
Mainland China	High	0.85	• Plans to localize semiconductor production under Manufacturing 2025 plan • Tax-exemption to manufacturers depending on the engineering difficulty level (E.g., <28 nm, 10 year exemption on corporate tax; <65 nm, 5 year corporate tax exemption) "
Taiwan	Low		• 15% tax exemption to semiconductor R&D expense • 5% tax exception on capital investment "
South Korea	Medium	98% of automobile semiconductor	• Announced US$451 billion package on building K-semiconductor belt for full semiconductor value chains • Expand tax exemption on R&D and PPE, • Ease regulation on high-pressure gas, chemicals • Water supply priority to semiconductor plant, subsidise up to 50% electricity usage.
Japan	High	64%	• Announced semiconductor to be national project; details to be revealed Invited TSMC for joint project, government to finance 50% of the cost

Note. *High semiconductor vulnerability means highly dependent on import; low mean self-sufficient; PPE = personal protective equipment
Source. IHS Markit

Appendix

Please visit Eclipse (https://ebs.ihsmarkit.com/) for detailed stock-level analysis.

80 key semiconductor players

Company	ISIN	Value chain	Market	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y%	FY 2021 EPS	FY 2020 EPS	EPS y/y%
Novatek Microelectronics	TW0003034005	Fabless	Taiwan	TWD	40.9	15.6	162%	51.815	19.4199	167%
Yageo	TW0002327004	Materials/ parts	Taiwan	TWD	25	10	150%	43.73	27.5788	59%
AMKOR Technology	US0316521006	OSAT	United States	USD	0.18	0.08	125%	2	1.4001	43%
Nanya Tech	TW0002408002	IDM—memory	Taiwan	TWD	2.87	1.2986	121%	6.69	2.5073	167%
U-Blox Holding	CH0033361673	Fabless	Switzerland	CHF	0.6	0	100%	3.33	-9.3162	turnaround
China Resources Microelectronics	CNE100003S06	IDM	Mainland China	CNY	0.13	0.0737	76%	1.29	0.7925	63%
Media Tek	TW0002454006	Fabless	Taiwan	TWD	62.6	37	69%	59.0934	26.0065	127%
Unimicron Tech Corp	TW0003037008	Materials/ parts	Taiwan	TWD	2.3	1.4	64%	5.67	3.7373	52%
JCET Group Co - A	CNE000001F05	OSAT	Mainland China	CNY	0.08	0.05	60%	1.265	0.8138	55%
Sumitomo Electric Industries*	JP3407400005	Equipment	Japan	JPY	50	32	56%	141.05	72.25	95%
United Microelectronics	TW0002303005	Foundry	Taiwan	TWD	2.4	1.5999	50%	3.38	2.4178	40%
NXP Semiconductors	NL0009538784	IDM	United States	USD	2.25	1.5	50%	9.64	0.1859	5086%
Siltronic	DE000WAF3001	Materials/ parts	Germany	EUR	3	2	50%	6.9671	5.36	30%
BE Semiconductor Industries	NL0012866412	Fabless	Netherlands	EUR	2.5	1.7	47%	2.9034	1.8244	59%
Infineon Tech	DE0006231004	Fabless	Germany	EUR	0.32	0.22	45%	1.13	0.2633	329%
ASE Technology	TW0003711008	OSAT	Taiwan	TWD	6.1	4.2	45%	9.5168	6.4687	47%
Realtek	TW0002379005	Fabless	Taiwan	TWD	20	14	43%	25.72	17.2379	49%
Silergy Corp	KYG8190F1028	Fabless	Taiwan	TWD	15	10.5	43%	50.85	35.7226	42%
NAURA Technology Group - A	CNE100000ML7	Equipment	Mainland China	CNY	0.15	0.109	38%	1.635	1.0935	50%
Inficon Holding	CH0011029946	Equipment	Switzerland	CHF	22	16	38%	27.1	18.9667	43%
Tokyo Electron*	JP3571400005	Equipment	Japan	JPY	1061	781	36%	2186.2048	1562.211	40%
Tianjin Zhonghuan Semiconductor - A	CNE1000000B8	OSAT	Mainland China	CNY	0.08	0.06	33%	0.82	0.377	118%
Sumitomo Chemical*	JP3401400001	Materials/ parts	Japan	JPY	20	15	33%	61.16	28.16	117%
Comet Holding	CH0360826991	Materials/ parts	Switzerland	CHF	1.7	1.3	31%	6.16	3.5618	73%
GigaDevice Semiconductor Beijing - A	CNE1000030S9	IDM—memory	Mainland China	CNY	0.5	0.4	25%	2.1786	1.3643	60%
ASM International	NL0000334118	IDM	Netherlands	EUR	2.45	2	23%	8.865	5.8355	52%
Hoya Corp*	JP3837800006	Materials/ parts	Japan	JPY	110	90	22%	412.88	335.77	23%

Note: For Japnese firms, FY 2021 figures represent fiscal year ending in March 2022; FY 2020 figures represents fiscal year ending in March 2021. For comparison purpose, Marvell Tech Group's FY 2021 figures represtn that of fiscal year ending in January 2022 and FY 2020 figures for fiscal year ending in January 2021

Source: IHS Markit, Factset

80 key semiconductor players (continued)

Company	ISIN	Value chain	Market	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y%	FY 2021 EPS	FY 2020 EPS	EPS y/y%
GlobalWafers	TW0006488000	Materials/ parts	Taiwan	TWD	22	18	22%	31.533	30.1068	5%
Sumco Corp	JP3322930003	Materials/ parts	Japan	JPY	33	27	22%	106.8	87.4821	22%
Powertech Technology	TW0006239007	OSAT	Taiwan	TWD	6.4	5.3	21%	10.672	8.6041	24%
Will Semiconductor - A	CNE100002XM8	Fabless	Mainland China	CNY	0.38	0.315	21%	5.22	3.262	60%
Shin-Etsu Chemical*	JP3371200001	Equipment	Japan	JPY	300	250	20%	891.1	706.76	26%
Sumitomo Bakelite*	JP3409400003	Equipment	Japan	JPY	90	75	20%	308.13	280.46	10%
SK Hynix	KR7000660001	IDM—memory	South Korea	KRW	1400	1170	20%	13665.5	6951.8853	97%
Microchip Tech*	US5950171042	Foundry	United States	USD	1.763	1.494	18%	7.88	6.59	20%
Kulicke & Soffa Industries*	US5012421013	OSAT	United States	USD	0.56	0.48	17%	4.58	0.8324	450%
ASML Hldg	NL0010273215	Equipment	Netherlands	EUR	3.2	2.75	16%	12.505	8.4956	47%
Huber & Suhner	CH0030380734	Foundry	Switzerland	CHF	1.5	1.3	15%	3.1471	2.6638	18%
DB HiTek	KR7000990002	Foundry	South Korea	KRW	400	350	14%	5310	3822.4814	39%
Texas Instruments	US8825081040	Fabless	United States	USD	4.22	3.72	13%	7.45	6.0456	23%
Lam Resh Corp	US5128071082	Equipment	United States	USD	5.2	4.6	13%	26.7	15.5493	72%
Air Products & Chemicals	US0091581068	Materials/ parts	United States	USD	5.84	5.18	13%	9.0554	8.594	5%
Analog Devices	US0326541051	Foundry	United States	USD	2.69	2.4	12%	6.27	3.3116	89%
Broadcom	US11135F1012	Fabless	United States	USD	14.4	13	11%	27.5731	6.6244	316%
Linde	IE00BZ12WP82	Materials/ parts	Germany	USD	4.24	3.852	10%	9.9437	4.7481	109%
Mitsui Chemicals*	JP3888300005	Materials/ parts	Japan	JPY	110	100	10%	403.18	298	35%
TSMC	TW0002330008	Foundry	Taiwan	TWD	11	10	10%	22.66	19.9722	13%
Skyworks Solutions	US83088M1027	Fabless	United States	USD	2	1.82	10%	10.3188	4.8356	113%
KLA Tencor Corp	US4824801009	Equipment	United States	USD	3.6	3.3	9%	14.13	7.7603	82%
Applied Matls	US0382221051	Equipment	United States	USD	0.94	0.87	8%	6.59	3.9509	67%
Denka*	JP3549600009	Materials/ parts	Japan	JPY	135	125	8%	336.35	264.24	27%
Entegris	US29362U1043	Materials/ parts	United States	USD	0.34	0.32	6%	3.2	2.1876	46%
Air Liquide	FR0000120073	Materials/ parts	France	EUR	2.9	2.75	5%	5.5487	5.1634	7%
Intel Corp	US4581401001	IDM	United States	USD	1.39	1.32	5%	4.62	4.9771	-7%
Cicor technologies	CH0008702190	Materials/ parts	Switzerland	CHF	1.05	1	5%	2.58	1.4392	79%
Qualcomm	US7475251036	Fabless	United States	USD	2.66	2.54	5%	7.7888	4.5797	70%

Note: For Japnese firms, FY 2021 figures represent fiscal year ending in March 2022; FY 2020 figures represents fiscal year ending in March 2021. For comparison purpose, Marvell Tech Group's FY 2021 figures represtn that of fiscal year ending in January 2022 and FY 2020 figures for fiscal year ending in January 2021

Source: IHS Markit, Factset

80 key semiconductor players (continued)

Company	ISIN	Value chain	Market	Currency	FY 2021 DPS	FY 2020 DPS	DPS y/y%	FY 2021 EPS	FY 2020 EPS	EPS y/y%
CMC Materials	US12571T1007	Materials/ parts	United States	USD	1.82	1.74	5%	7.84	4.9021	60%
Murata Manufacturing*	JP3914400001	Materials/ parts	Japan	JPY	120	115	4%	399.748	370.5103	8%
Stmicroelectronics	NL0000226223	IDM	France	USD	0.24	0.24	0%	1.7081	1.0845	58%
Asahi Kasei Corp*	JP3111200006	Materials/ parts	Japan	JPY	34	34	0%	111.705	57.4849	94%
Showa Denko	JP3368000000	Materials/ parts	Japan	JPY	65	65	0%	116.93	-523.0565	turnaround
Toppan Printing*	JP3629000005	Materials/ parts	Japan	JPY	40	40	0%	92.46	237.16	-61%
Cabot Corp	US1270551013	Materials/ parts	United States	USD	1.4	1.4	0%	4.9	-4.205	turnaround
DOW	US2605571031	Materials/ parts	United States	USD	2.8	2.8	0%	7.2	1.6421	338%
Semiconductor Manufacturing Intl	KYG8020E1199	Foundry	Hong Kong	USD	0	0	0%	0.71	0.6319	12%
Marvell Tech Group*	US5738741041	Fabless	United States	USD	0.24	0.24	0%	1.38	-0.41	turnaround
ON Semiconductor	US6821891057	Fabless	United States	USD	0	0	0%	1.91	0.5702	235%
Micron Technology	US5951121038	IDM—memory	United States	USD	0	0	0%	5.97	2.4207	147%
Qorvo	US74736K1016	Fabless	United States	USD	0	0	0%	6.4333	2.8573	125%
Xerox Corp	US98421M1062	Materials/ parts	United States	USD	1	1	0%	1.9	0.8517	123%
NVIDIA Corp	US67066G1040	Fabless	United States	USD	0.64	0.64	0%	7.0211	4.5911	53%
Photronics	US7194051022	Materials/ parts	United States	USD	0	0	0%	0.77	0.5214	48%
Teradyne	US8807701029	Equipment	United States	USD	0.4	0.4	0%	5.35	4.7204	13%
Advanced Micro Devices	US0079031078	Fabless	United States	USD	0	0	0%	2.17	2.103	3%
Foosung	KR7093370005	Materials/ parts	South Korea	KRW	0	0	0%	254	64.7067	293%
Renesas Electronics Corporation	JP3164720009	Fabless	Japan	JPY	0	0	0%	53.2825	26.5368	101%
Rohm*	JP3982800009	IDM	Japan	JPY	150	150	0%	415.25	376.234	10%
Advantest Corp*	JP3122400009	Equipment	Japan	JPY	110	118	-7%	358.36	353.8754	1%
Samsung Electronics	KR7005930003	IDM—memory	South Korea	KRW	1444	2994	-52%	5699	3841.0295	48%
Western Digital	US9581021055	IDM—memory	United States	USD	0	1.5	-100%	3.83	-0.8389	turnaround

Note: For Japnese firms, FY 2021 figures represent fiscal year ending in March 2022; FY 2020 figures represents fiscal year ending in March 2021. For comparison purpose, Marvell Tech Group's FY 2021 figures represtn that of fiscal year ending in January 2022 and FY 2020 figures for fiscal year ending in January 2021

Source: IHS Markit, Factset

IHS Markit Customer Care

CustomerCare@ihsmarkit.com

Asia and the Pacific Rim

Japan: +81 3 6262 1887

Asia Pacific: +604 291 3600

Europe, Middle East, and Africa: +44 (0) 1344 328 300

Americas: +1 800 447 2273

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