ECONOMICS

Regional

ASEAN Economics

Southeast Asia's Chip Race: Prospects and Perils

ASEAN's Electronics Recovery Lagging Korea, Taiwan

Several trade-sensitive ASEAN economies, including Malaysia, Singapore and Vietnam, are benefiting from an upturn in the global semiconductor and broader electronic cycle. But ASEAN's recovery during the current upswing has not been as strong because the rebound has been largely AI-centric. Frontier producers South Korea and Taiwan have seen double-digit export recoveries since early 2024 as expanding AI investments supercharged demand for leading-edge logic and memory chips. There are tentative signs of demand broadening, with positive PMI readings, fresh product cycles and new AI features, which will strengthen ASEAN's electronics recovery in the second half.

ASEAN Accounts for 23% of Global Chip Exports

ASEAN is the world's largest semiconductor exporter, accounting for 23% of global chip exports in 2022. Singapore (10.8%) and Malaysia (7%) are the leaders in ASEAN. Singapore fabricates memory and legacy chips fulfilling end-uses across industrial, automotive and consumer electronics, but does not produce advanced-node processor chips. Malaysia's edge lies in downstream assembly, testing & packaging, accounting for 7% of global ATP capacity. Philippines (2.5%), Vietnam (1.7%) and Thailand (1%) have smaller market shares of global semiconductor exports, which is limited to lower value-add segments, namely assembly, testing and packaging.

Malaysia, Vietnam Gaining Market & Investment Share

ASEAN is benefiting from the diversification of global chipmakers' supply chain beyond North Asia, amid intensifying US tech sanctions on China and rising tensions between China and Taiwan. Malaysia appears to be taking pole position in securing investments in the region's chip race. Approved investment commitments into Malaysia's electrical & electronics cluster nearly tripled in 2023 from the previous year. Malaysia and Vietnam have seen notable increases in their semiconductor export shares over 2015-2022, suggesting that both have been more successful in attracting chip-making investments. In contrast, Singapore's share of global semiconductor exports has declined by 2.9% points over 2015-22, but it has a thriving chip design and R&D industry. Value-added of its electronics industry has risen to 7.8% of GDP in 2023, from 6.7% in 2012. Thailand's share of global chip exports has dipped to 1% in 2022 from 1.4% in 2015. Philippines' and Indonesia's export shares remain small and were little changed.

Roadblocks: Subsidy Race, China's Chip Supply, Geopolitics

ASEAN is unveiling targeted industrial policies to ascend the semiconductor value chain and attract fresh investments. Three roadblocks may however hamper ASEAN's ambitions. First, the subsidies race among advanced economies – US, EU and Japan - may crowd out FDI as ASEAN have limited fiscal resources to outbid. Second, China's self-sufficiency drive is shrinking demand for imported semiconductors. China's import of chips peaked in 2021, and fell by 19% from US$463bn in 2021 to US$375bn in 2023. ASEAN-6 shipped -23.3% fewer chips to China in 2023 compared to 2021. Singapore, Malaysia, Vietnam and the Philippines would be most exposed to China's chip demand. Third, an expansion of US tech restrictions beyond China's shores could put ASEAN in the cross-hairs, as MNCs are banned from exporting advanced chips and high tech equipment to China.

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Southeast Asia's Chip Race: Prospects and Perils

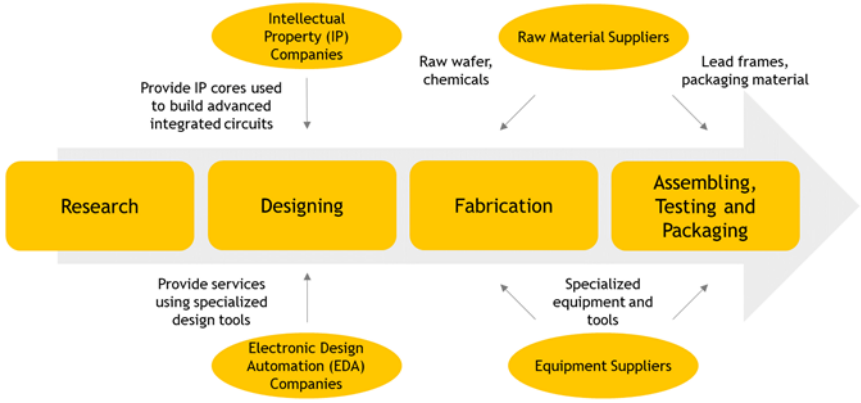
Semiconductor chips form the backbone of the modern global economy, and are set to become an even more important economic driver in the coming years.

Several trade-sensitive ASEAN economies, including Singapore, Malaysia, Vietnam and Thailand, will benefit from an upturn in the global semiconductor and broader electronics cycle in 2024. Beyond this year, the influx of semiconductor foreign direct investments will help drive manufacturing and export growth in ASEAN over the longer term.

ASEAN is benefiting from the diversification of global chipmakers' supply chain beyond North Asia, amid intensifying US tech sanctions on China and rising tensions between China and Taiwan. The upstream segments of fabrication and design are particularly coveted, viewed by policymakers as an opportunity to level up firm and worker capabilities, and create well-paid jobs (Fig 1).

We explore the region's semiconductor landscape and evaluate ASEAN countries' efforts to ascend the value chain. We highlight some roadblocks and risks to the industry and investment outlook.

Fig 1: Semiconductor Industry Value Chain

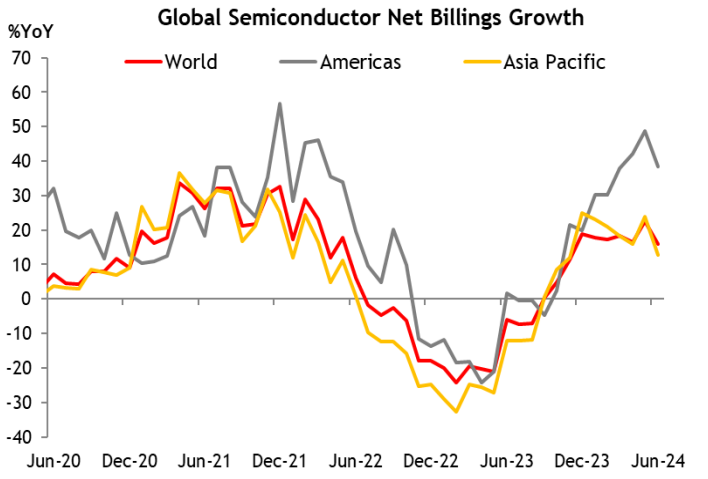


Source: "Beyond Borders: The Global Semiconductor Value Chain" Report, Semiconductor Industry Association, May 2016

ASEAN Electronics Exports: Lagging Global Recovery Due to Limited AI Exposure

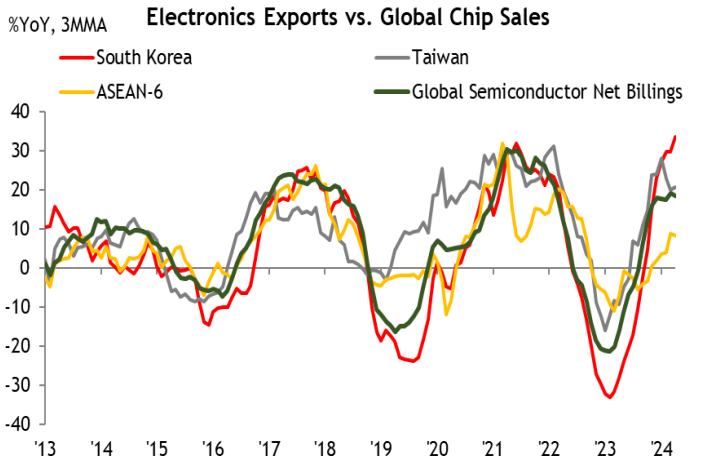
Global semiconductor sales staged a robust recovery in the first half of 2024, growing by +15.9% year-on-year in June, after contracting by -8.2% in 2023 (Fig 2). Global semiconductor billings were led by the Americas. Asian electronics exports rebounded but the improvement was uneven, with South Korea and Taiwan leading the recovery and ASEAN lagging (Fig 3).

Fig 2: Global Semiconductor Net Billings Reached US$54.5bn in June 2024, Jumped 15.9% From Year Ago



Source: CEIC

Fig 3: ASEAN's Electronics Exports Lagging Behind South Korea and Taiwan, As Global Chip Rebound Mainly AI-Centric



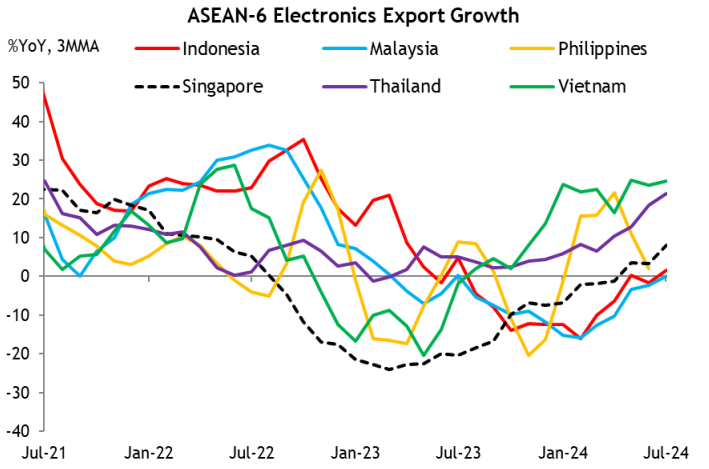
Note: Data in ASEAN-6 for Singapore refers to domestic electronics exports (i.e. excludes re-exports)

Source: CEIC

In contrast to past cycles, ASEAN's electronics exports have not recovered as strongly from the current upswing in global semiconductor demand, as the rebound has been mainly AI-centric. Frontier producers South Korea and Taiwan's exports have seen double-digit recoveries since early 2024 as expanding AI investments supercharged demand for leading-edge logic and memory chips (Fig 3). The rise of large language models like ChatGPT has led to skyrocketing demand for graphics processing units (GPUs).

Taiwan's TSMC is the sole supplier of Nvidia and Apple's most advanced chips. Korea's Samsung Electronics dominates production of high-bandwidth memory (HBM) chips, regular dynamic random access memory (DRAM) and solid state drives (SSD), which are in high demand for AI servers.

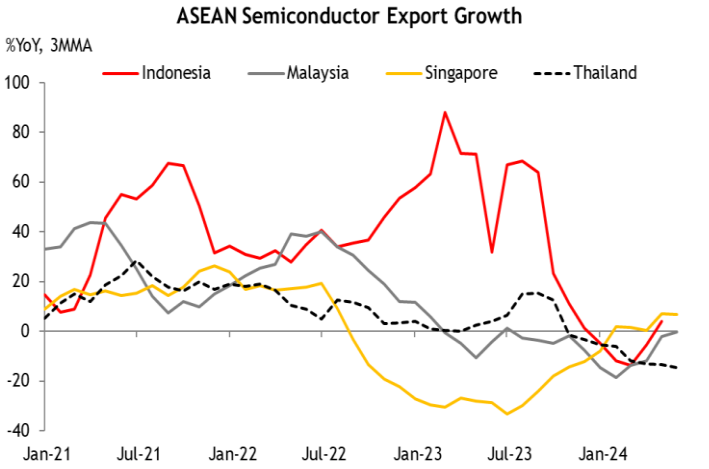
Fig 4: Singapore and Malaysia's Electronics Exports Still Patchy in 1H, Compared to a Robust Recovery in Vietnam



Note: Data for Singapore uses domestic exports (i.e. excludes re-exports)

Source: CEIC

Fig 5: Green Shoots of Recovery in Singapore, Malaysia and Indonesia Chip Exports



Note: Data for Singapore uses domestic exports (i.e. excludes re-exports)

Vietnam and Philippines data not available. Semiconductor products refers to integrated circuits.

Source: CEIC

ASEAN-6's electronics exports have been slower to recover, growing by just +2.2% in June (+8.3% on 3-month average basis; Fig 4). There are however tentative signs of a broader recovery in the second half.

Singapore's electronics exports have seen a modest recovery from their 2023 slump. Electronics NODX climbed +16.5% from a year ago in July (vs. -9.5% in Jun), with a year-to-date increase of +3.4%. Green shoots have been observed in IC shipments, which climbed +13.5% in July (vs. -8% in Jun) and +5.9% year-to-date.

Although a major chip producer, Singapore has had limited leverage to the AI boom, as its focus is on mature-node chips (i.e. 28nm or higher process nodes) – used in appliances, cars and industrial equipment – which are still weighed down by a global inventory oversupply. Nonetheless, Singapore has benefited from improving demand for NAND flash memory, as a major producer of high-end memory chips.

Malaysia's electronics exports fell -3.2% year-on-year in June (-7.4% YTD), as its semiconductor ecosystem has limited exposure to AI chips. IC exports rose +2.5% from a year ago in June, but contracted -6.9% in the first half.

Vietnam's electronics exports, in contrast, surged +23% in the first half, benefiting from a resurgence in demand for smartphones and other tech devices. Finished consumer devices make up the bulk of Vietnam's electronics exports, rather than chips.

Thailand's electronics exports rose by +11% in the first half, lifted by improving end user demand for computers and hard-disk drives. However, its semiconductor exports contracted by -13.5% in the first half, due to weak demand for auto and home appliance chips.

ASEAN's Electronics Recovery to Strengthen

We expect ASEAN's electronics recovery to strengthen and broaden over the second half and in 2025. A tech refresh cycle, normalization of excess retail inventories and new AI features are supporting a pickup in demand for consumer devices, which will be a boon to Vietnam and Thailand.

Sales of smartphones and personal computers (PCs) are improving. According to IDC, global smartphone shipments rose +9% year-on-year in the second quarter, extending their +12% growth in 1Q[1]. Worldwide PC shipments grew +3% in 2Q, its second quarter of growth following eight straight quarters of decline[2].

The pickup in final electronics goods sales should fuel an improvement in semiconductor demand, supporting Singapore and Malaysia's exports. Demand will broaden beyond advanced-node chips, given that smartphones depend on a wide range of memory chips and legacy chips for GPS, Wi-Fi, battery life and camera controls.

Rising optimism among Singapore's export-dependent electronics firms could be a bellwether of better electronics prospects for the region. Singapore's electronics PMI (51.0) stayed in expansion territory for the ninth straight month in July, with the export orders index picking up to 51.3 (Fig 6).

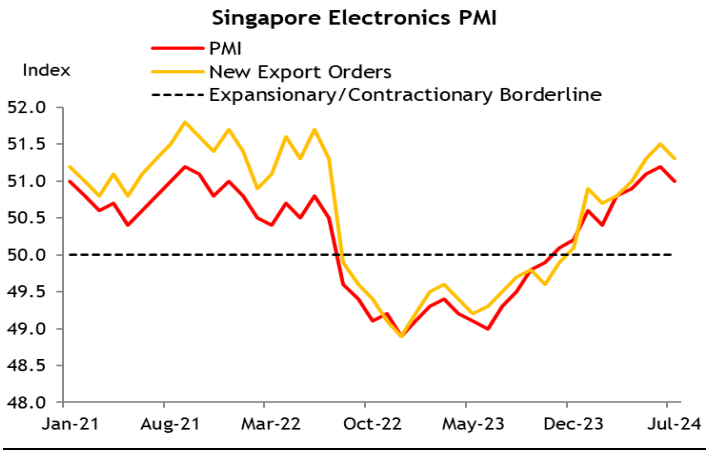
Similarly, Singapore's EDB manufacturing sector business expectations survey shows electronics and semiconductor firms becoming more upbeat (Fig 7). A net weighted 40% of electronics firms expect business conditions to improve in the second half (compared to 2Q). The optimism was largely attributed to the semiconductors segment (46%), which expects brightening demand for consumer electronics devices and robust growth in AI applications boosting orders for memory, storage and networking chips.

The Malaysia Semiconductor Industry Association (MSIA)'s inaugural electrical & electronics industry quarterly pulse survey showed that 60% of surveyed firms are optimistic about the third quarter, driven by demand for consumer electronics, automotive and artificial intelligence. Some 85% of companies plan to hire engineers and technicians in the third quarter.

Business conditions in tech powerhouses South Korea and Taiwan remain upbeat, boding well for the global electronics outlook. Taiwan's electronics & optical sector July PMI points to continued improvement (>50) in overall business conditions, export orders and positive 6-month prospects (Fig 8). Korea's manufacturing PMI stayed firmly expansionary for the third consecutive month in July (Fig 9).

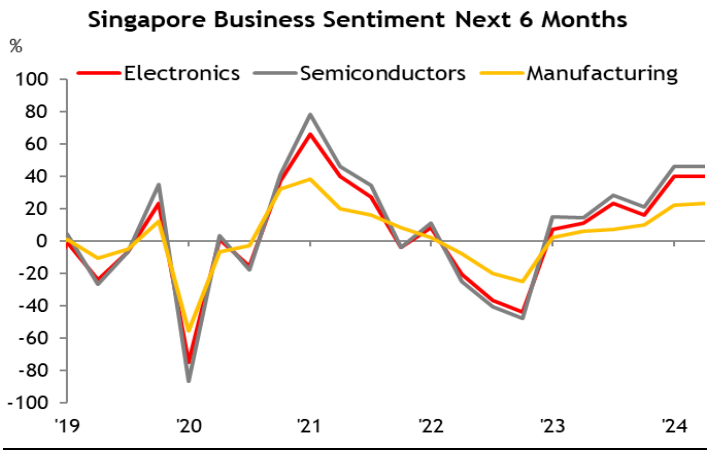
[1] IDC, "Worldwide Smartphone Market Forecast to Grow Nearly 6% in 2024, Driven by Stronger Growth for Android in China and Emerging Markets, According to IDC" 27 Aug 2024.
[2] IDC, "PC Recovery Continues as the Market Grows 3% in the Second Quarter, According to IDC", 9 Jul 2024.

Fig 6: Singapore - Headline Electronics & New Electronic Export Orders PMI Have Been Firmly in Expansion Territory And On Rising Trend



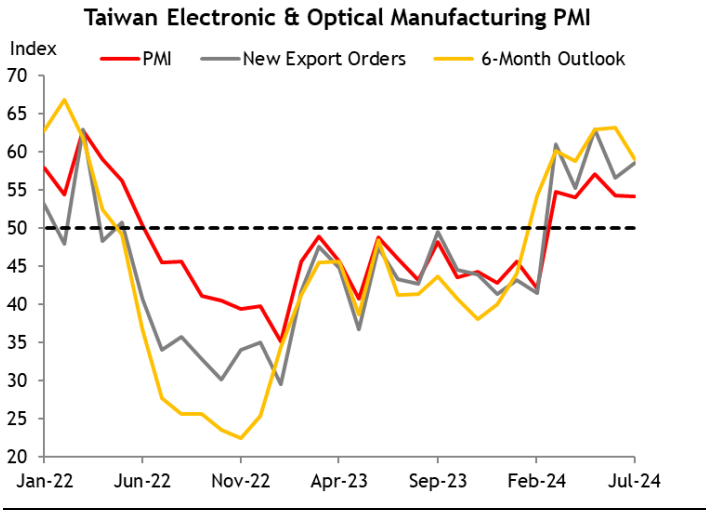
Source: SIPMM, CEIC

Fig 7: Singapore - Electronics Firms, Led by Semiconductor Segment, Becoming More Upbeat About 6-Month Ahead Business Prospects



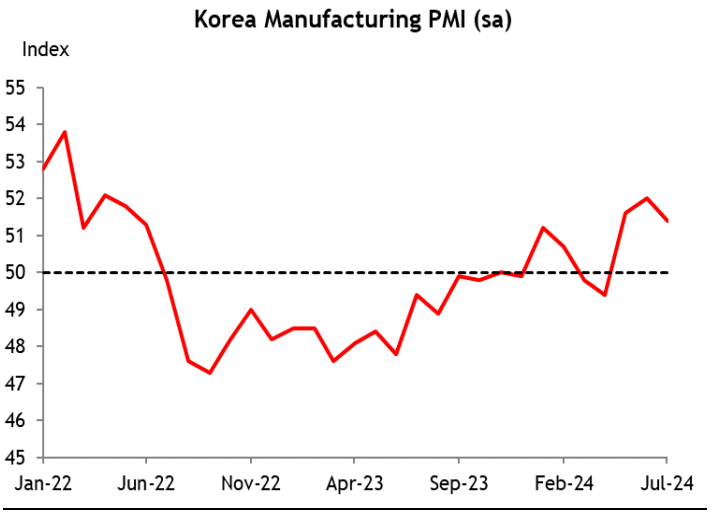
Source: EDB, CEIC

Fig 8: Taiwan - New Electronic & Optical Export Orders PMI Inched Up to 58.6 in Jul



Source: Chung-Hua Institution for Economic Research, CEIC

Fig 9: Korea - Manufacturing PMI Stayed Firmly in Expansion Territory For 3rd Straight Month in July



Source: S&P Global, CEIC

That said, several chip-segments in the supply chain may be slower to recover. The industrial equipment and automotive sectors continue to be laggards, although green shoots have been observed by leading chipmakers.

Industry bellwether Texas Instruments[3] projects 3Q sales rising modestly to US$3.94bn-US$4.26bn, from US$3.82bn in the second quarter (-16% YoY, +4% QoQ). The company mentioned that its largest market China has returned to growth after electronics producers finished drawing down inventories of unused components. About half of its industrial segment markets are still working through stockpiles, while others have resumed increasing orders[4].

NXP, the world's biggest auto chipmaker, reported that its automotive segment revenue fell -7% year-on-year as carmakers cut new orders amid a soft economy and slowing electric vehicle sales. The company warned that the inventory drawdown at top customers would stretch into the second half of 2024, and expects internal stock levels to begin declining in 4Q and normalize in 2025[5].

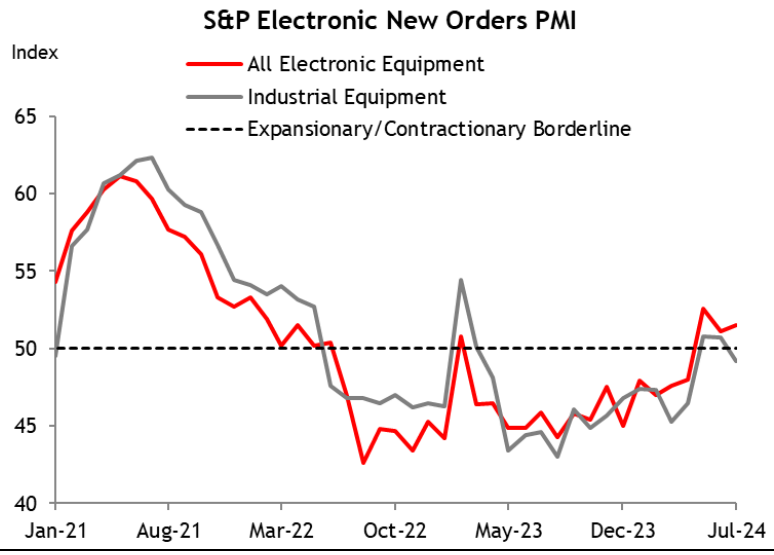
[3] Texas Instruments is the world's largest producer of analogue semiconductors and embedded processors, with the majority of its chips going into industrial and automotive applications.

[4] Bloomberg, "Texas Instruments Gives Sales Outlook Easing Downturn Fears, Signals Inventory Glut Ending", 24 July 2024.

[5] Reuters, "NXP Slides as Weak Forecast Stokes Demand Worries Among Auto Chipmakers", 23 July 2024.

Improving equipment capex may bode well for industrial chip sales. S&P's global manufacturing PMI new orders index for industrial equipment notched sequential expansion in May (50.8) and June (50.7) for the first time since March 2023 (Fig 10). The index dipped to 49.2 in July, but remains significantly higher than previous months. The overall electronic equipment new orders PMI has been in expansion territory for the past three months, after a 14-month slump.

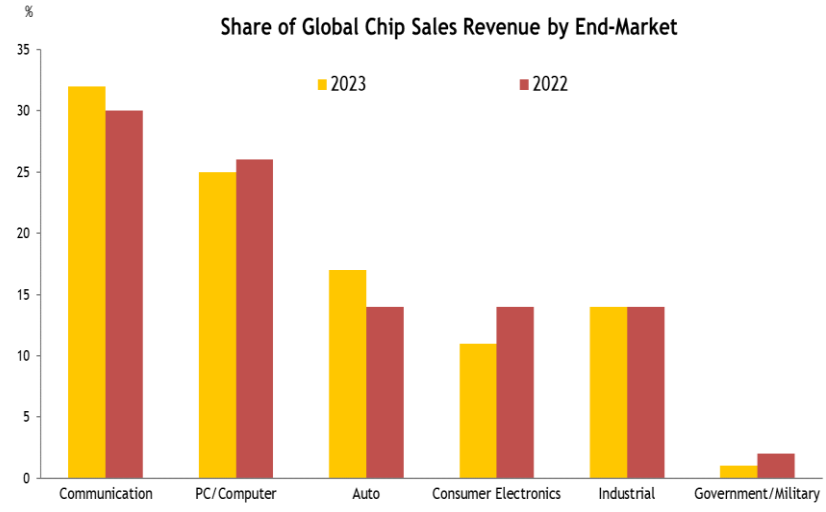
Fig 10: S&P Electronics New Orders PMI Expanded for the 3rd Month in July



Source: CEIC

The auto and industrial segments accounted for 17% and 14% of global semiconductor sales respectively, as of 2023 (Fig 11). Communication (32%) and PC (25%) segments account for the bulk of global chip sales.

Fig 11: Auto and Industrial Segments Accounted for 31% of Global Semiconductor Sales in 2023



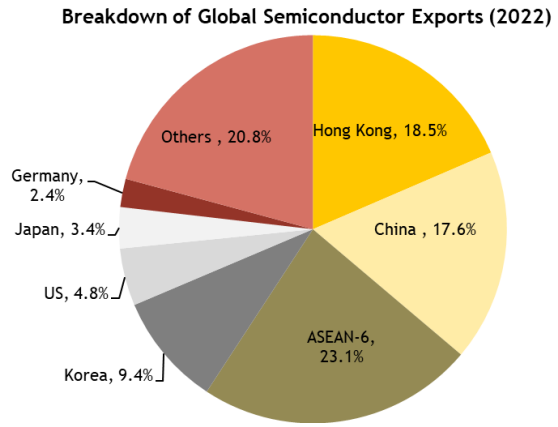
Source: World Semiconductor Trade Statistics (WSTS) Semiconductor End-Use Survey 2023, Semiconductor Industry Association

ASEAN: How Important Are Semiconductors and Electronics?

ASEAN is the world's largest semiconductor exporter, accounting for 23% of nominal global chip exports in 2022 (Fig 12).

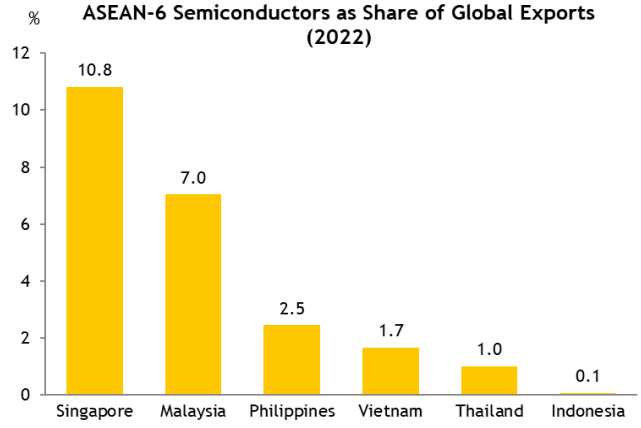
Singapore (10.8%) and Malaysia (7%) are the leaders in ASEAN in terms of semiconductor exports (Fig 13). Singapore has a comprehensive semiconductor ecosystem spanning across the value chain, from IC design, equipment, raw material and wafer fabrication, to packaging and testing. MNCs such as GlobalFoundries, Micron and UMC fabricate a variety of chips in the city state, including cutting-edge memory chips and mature-node chips fulfilling a wide range of end uses. These include industrial, automotive, consumer electronics, 5G systems and even passports and credit cards[6]. Singapore does not produce advanced-node processor chips, whose production is dominated by Taiwan, South Korea and the US.

Fig 12: ASEAN-6 and China Account for Bulk of Global Semiconductor Exports



Note: Semiconductors classified under Harmonized System (HS) codes 8541 and 8542
Source: UN Comtrade database

Fig 13: Singapore & Malaysia Main Sources of ASEAN Semiconductor Exports



Note: Semiconductors classified under Harmonized System (HS) codes 8541 and 8542
Source: UN Comtrade database

Malaysia has several mature-node fabrication plants, but the country's edge lies in downstream assembly, testing & packaging (ATP) activities. Malaysia accounts for 7% of global ATP capacity, the largest in ASEAN (Fig 14). Prominent MNCs with a presence in Malaysia include Intel, AMD, Texas Instruments and Infineon, in addition to homegrown companies like Inari Amertron (Table 1).

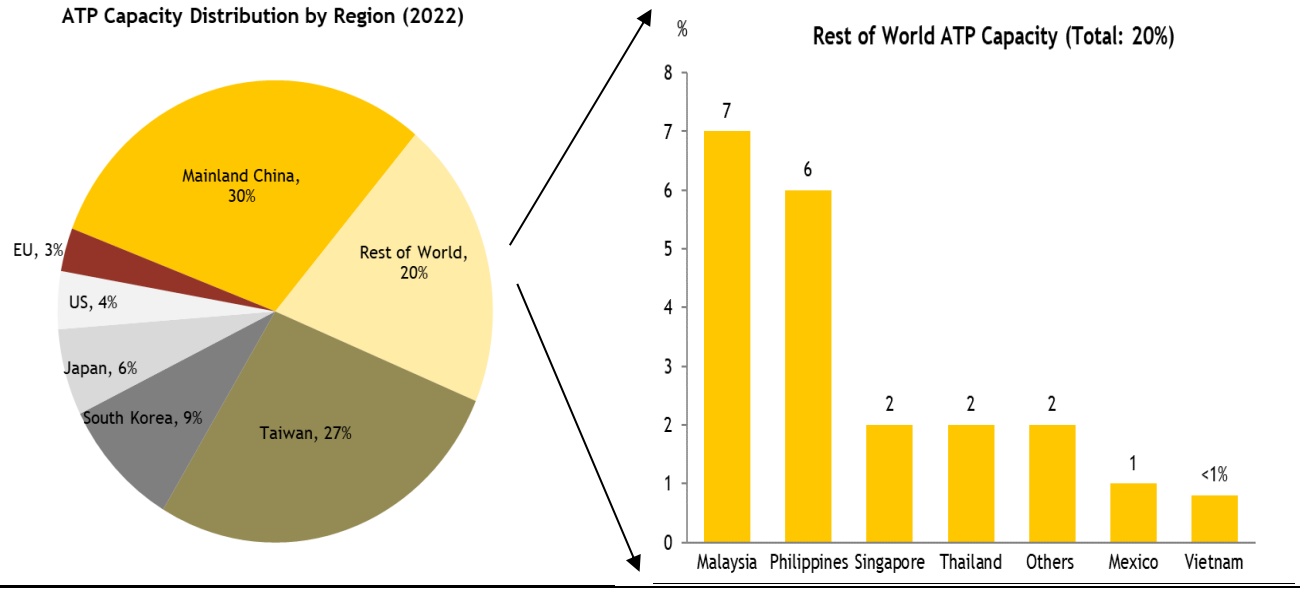
Table 1: Malaysia's Semiconductor Ecosystem

Region	Company	Part of Value Chain
Penang (island)	Intel, AMD, Broadcom, Inari Amertron, Globetronics Technology	Probe, package, assembly and test
	FoundPac, Pentamaster	Manufacturing (components, etc.)
	TT Vision	Equipment
	Oppstar, Infinecs, SkyeChip	Chip design
Penang (mainland)	Micron	Probe, package, assembly and test
	UWC, SFP Tech, Coraza, Simmtech	Manufacturing (components, etc.)
	Lam Research, Vitrox	Equipment
Klang Valley	Texas Instruments, KESM Industries	Probe, package, assembly and test
	JF Technology	Manufacturing (components, etc.)
	QES	Equipment
Negeri Sembilan	Nexperia,	Probe, package, assembly and test
	ON Semiconductor	Foundry or fabrication
Malacca	Texas Instruments, Infineon	Probe, package, assembly and test
	D&O Green Technologies	Equipment
Perak	Unisem, Carsem	Probe, package, assembly and test
Kedah	Silterra, Osram, Infineon	Foundry or fabrication
	AT&S	Manufacturing (components, etc.)
Sarawak	X-Fab	Foundry or fabrication
Johor	Malaysian Pacific Industries, Micron	Probe, package, assembly and test
	STMicroelectronics, Advanced Assembly Materials, Kitron	Manufacturing (components, etc.)
	Ferrotec Power Semiconductor, OSI Electronics	Equipment

Note: List may not be exhaustive
Source: Malaysia Semiconductor Industry Association, The Business Times[7]

[6] The Business Times, "Is the AI Chip Boom Bypassing Singapore?", 16 July 2024.
[7] The Business Times, "Malaysia's Chip Sector Booms Amid US-China Tech Clash", 29 Jul 2024.

Fig 14: Assembly, Testing & Packaging Capacity Distribution by Region



Note: Includes both Outsourced Semiconductor Assembly and Test (OSAT) and Integrated Device Manufacturer (IDM) facilities. Others include Indonesia, Canada, Brazil, Costa Rica, India, Israel, and Morocco.

Source: SEMI, US Department of State, The White House and IHS (via BCG and Semiconductor Industry Association[8])

The Philippines (2.5%), Vietnam (1.7%) and Thailand (1%) have smaller market shares of global semiconductor exports. Their roles in the supply chain are mainly limited to back-end segments, namely assembly, testing and packaging.

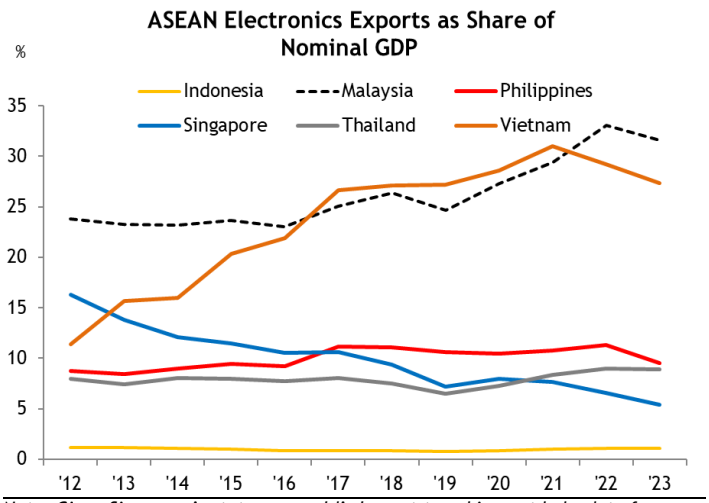
Malaysia and Vietnam are the most leveraged to global electronics demand, with electronic exports accounting for about 30% of GDP. The importance of the electronics industry has risen over the past decade, as both countries were more successful in attracting FDI. Since 2012, the GDP share of electronics exports has risen by +8% points in Malaysia, while climbing by +16% points in Vietnam. In value-added terms, Malaysia's electronics industry has risen to 6.7% of GDP in 2023, from 6% in 2015 (Fig 16).

Singapore has seen the value of its domestic electronics exports fall to 5.4% of GDP in 2023 from 16.3% in 2012. However, the value-added of its electronics industry has risen as a share of GDP, to 7.8% in 2023 from 6.7% in 2012 (Fig 16).

The divergence in Singapore's domestic exports and value-added over the last decade may reflect the shift in the electronics industry towards higher value-added products and activities. Services performed by fabless electronics firms, such as design or research may be captured as electronics value-added without a corresponding rise in goods exports[9]. The value of R&D, intellectual property usage charges and telecommunication, computer & information services exports (as a share of GDP) grew from 3.4% to 8.1%, over 2012 to 2023.

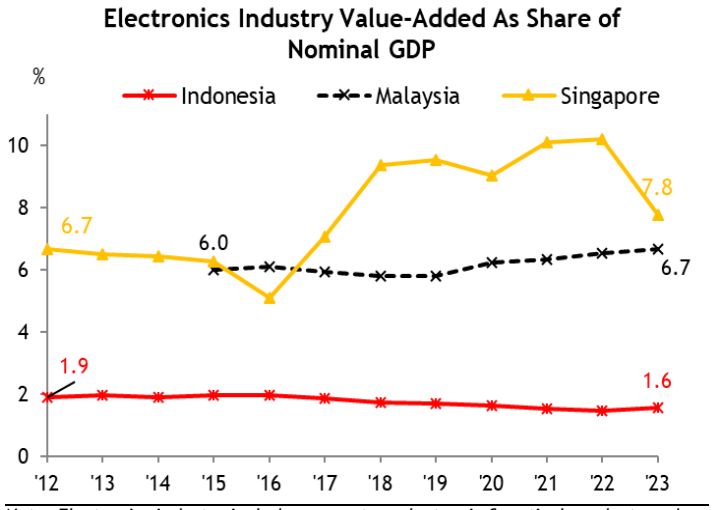
[8] Boston Consulting Group and Semiconductor Industry Association, "Emerging Resilience in the Semiconductor Supply Chain", May 2024.
[9] The Straits Times, "The Puzzle of Singapore's Weak Exports", 21 April 2014.

Fig 15: Malaysia and Vietnam Are ASEAN's Largest Electronics Exporters, While Singapore's Exposure is Declining



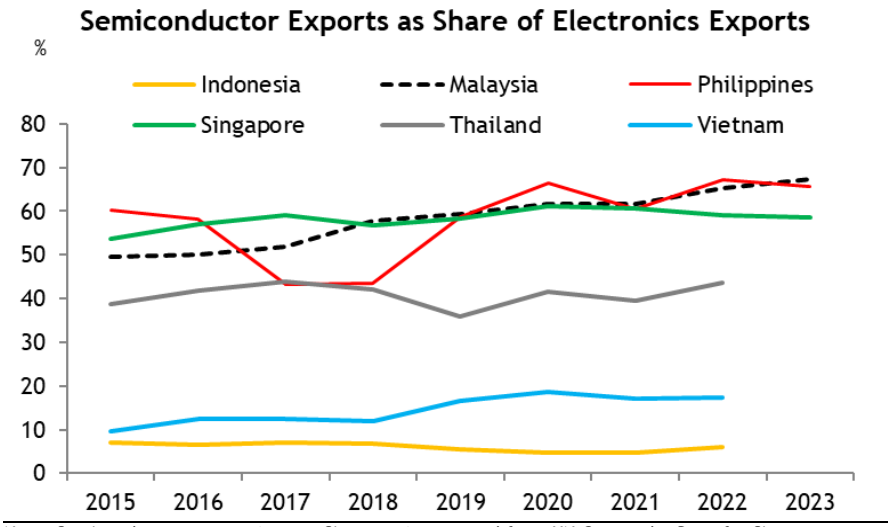
Note: Given Singapore's status as world's largest transhipment hub, data for Singapore uses domestic electronics exports (excludes re-exports).
Source: CEIC

Fig 16: GDP Share of Electronics Value-Added Rose Over Last Decade in Singapore and Malaysia, But Fell in Indonesia



Note: Electronics industry includes computer, electronic & optical products and fabricated metal products
Source: CEIC, Maybank IBG Research

Fig 17: Semiconductors Dominate Electronics Exports in Singapore, Malaysia and Philippines



Note: Semiconductor exports (except Singapore) extracted from UN Comtrade. Data for Singapore uses domestic exports for semiconductors and electronics. Overall electronics exports extracted from CEIC
Source: UN Comtrade, CEIC

Semiconductors make up the lion's share of electronics exports in Malaysia (67%) and domestic electronics exports in Singapore (59%) (Fig 17). Chips also account for a large proportion (66%) of the Philippines' electronics shipments, as an established node for chip packaging. Hard drives and semiconductors are the Philippines' key electronic products.

Semiconductors make up only 17% of Vietnam's electronics exports, as the country mainly serves as an assembly hub for final electronic devices. Nonetheless, Vietnam's chip exports have been gaining (vs. 10% of electronics exports in 2015) as it ascends the electronics value chain.

Indonesia has the smallest share of the electronics value chains, given that most of its exports are commodity-based. Electronics exports account for only 1% of GDP, while chip exports are minimal at 6% of electronics shipments. In value-added terms, the electronics industry makes up just 1.6% of GDP.

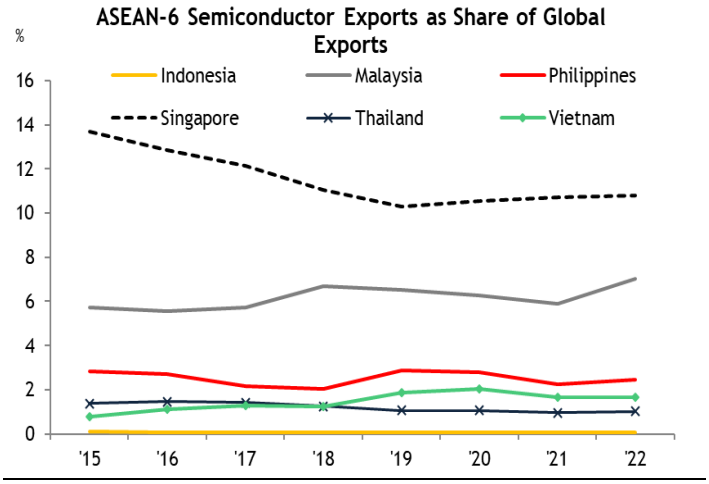
ASEAN Strengthening Foothold in Chip Value Chain

ASEAN's governments are seeking to capture a larger slice of chip value chains, tapping on the region's position as a neutral ground amid US-China geopolitical rivalry. In addition to preserving their downstream footholds, ASEAN is expanding into the upstream segments of chip fabrication and design.

Policymakers view the move upstream as an opportunity to ascend the value chain and boost potential growth. The knowledge and capital-intensive segments of IC fabrication and design could help to raise technological prowess and labor productivity.

In addition, chip fabrication and design activities may help to anchor and attract more investments in other emerging industries, as supply chain resilience becomes a key consideration after pandemic-era disruptions, rising trade barriers and US-China rivalry. ICs are crucial inputs for many modern technologies including electric vehicles, artificial intelligence, advanced medical equipment and renewable energy systems.

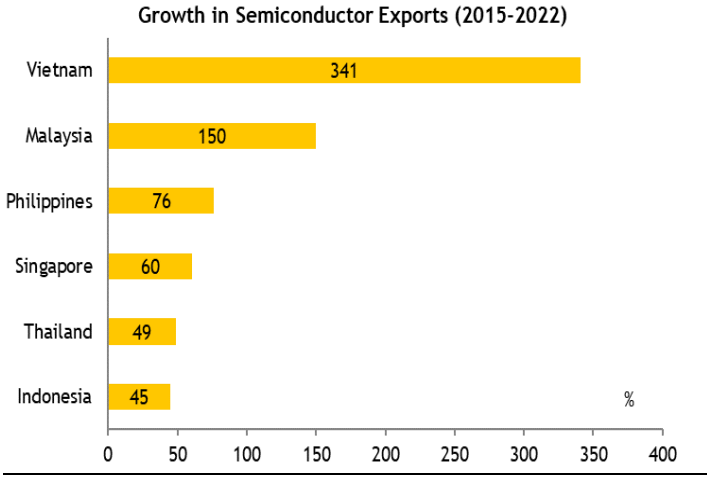
Fig 18: Vietnam and Malaysia's Semiconductor Market Share Has Risen, Singapore's Market Share Has Dipped



Note: Semiconductors are classified under Harmonized System (HS) codes 8541 and 8542.

Source: UN Comtrade database

Fig 19: Vietnam Saw Fastest Growth in Semiconductor Exports Over Recent Years, Albeit From a Low Base



Note: Semiconductors are classified under Harmonized System (HS) codes 8541 and 8542.

Source: UN Comtrade database

We use semiconductor exports as a proxy for semiconductor FDI, due to data limitations[10].

Malaysia and Vietnam have seen significant increases in their semiconductor export shares over 2015 to 2022 (latest available year), suggesting that both countries have been more successful in attracting chip-making investments. Malaysia's semiconductor export share has risen by 1.3% points as a share of global exports (from 5.7% to 7%) (Fig 18). Vietnam's semiconductor export share has more than doubled to 1.7% (vs. 0.8% in 2015), alongside +341% growth in chip exports over 2015-22 (Fig 19).

In contrast, Singapore's share of global semiconductor exports has declined to 10.8% in 2022 from 13.7% in 2015, which still remains higher than any other ASEAN country. Likewise, Thailand's share dipped to 1%, from 1.4% in 2015. Philippines' and Indonesia's export shares remains small and were little changed.

[10] Semiconductor exports are used as proxy for FDI, given limited data on semiconductor investments. An increase in foreign investments should boost productive capacity, raising exports.

Malaysia appears to be taking pole position in the region's chip race, due to its established supply chain, talent pool, abundant land and energy as well as affordable business costs. Both Malaysia and Singapore have established homegrown chip players in the downstream outsourced semiconductor assembly and test (OSAT) and automated test equipment (ATE) segments to support chipmakers (Table 2).

Table 2: Singapore and Malaysia Have Established Homegrown Chip Players in Outsourced Semiconductor Assembly and Test and Automated Test Equipment

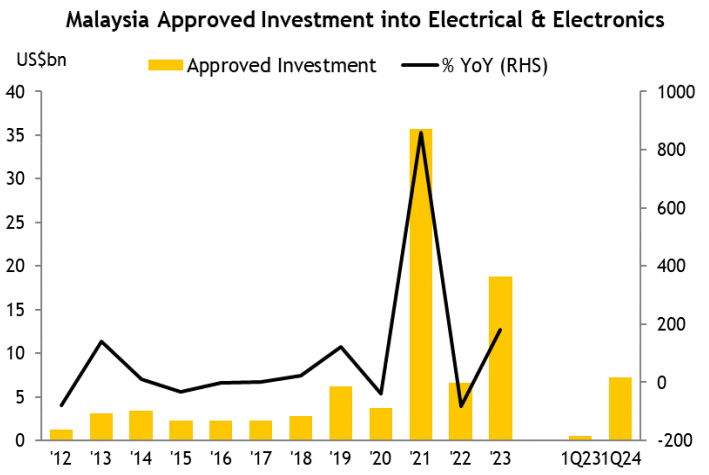
Company	Country	Key Products/Services
Inari Amertron Berhad	Malaysia	Outsourced semiconductor assembly and test services (mainly radiofrequency chips), electronic test and measurement equipment manufacturing
MPI Berhad	Malaysia	Assembly and testing, focusing in automotive and industrial chips
Vitrox Berhad	Malaysia	Automated machine vision inspection systems and system-on-chip embedded electronics devices for the semiconductor and electronics packaging industries
SAM	Malaysia	Precision tools and parts for semiconductor, telecommunications and disk drive industries
AEM Holdings	Singapore	Semiconductor test equipment
UMS Holdings	Singapore	Precision machining components and equipment modules for semiconductor equipment manufacturers, focus on industrial chips
Frencken	Singapore	High precision semiconductor equipment and components
Micro-Mechanics	Singapore	Consumable parts and precision tools used to assemble and test semiconductors
Grand Venture Technology (GVT)	Singapore	Providing services in precision machining, sheet metal fabrication, assembly and testing

Source: Compiled by Maybank IBG Research

Malaysia has seen nearly a tripling of approved commitments into its electrical & electronics cluster in 2023. The strength continued in 1Q 2024, with investments soaring nearly 20-fold year-over-year to US$7.3bn (Fig 20).

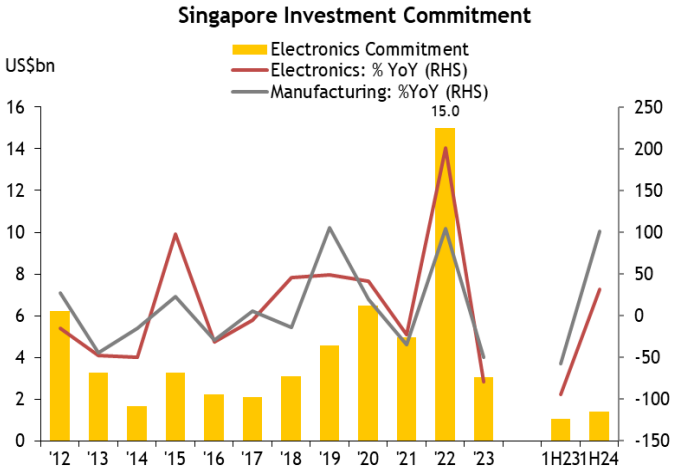
De-facto electronics hub Penang attracted RM60.1bn (US$12.8bn) in FDI in 2023, more than the total received over 2013 to 2020 combined. Intel is building its first overseas facility for advanced 3D packaging in Penang, and a chip assembly and testing factory in Kulim. Micron launched its second facility for assembly and testing in Penang last year. Infineon is building the world's largest 200mm silicon carbide power semiconductor fab in Kulim. Three Chinese semiconductor companies – China Wafer Level CSP, Ningbo SJ Electronics and Wuxi AMTE - announced their commitment to invest US$100mn in Penang in April 2024, bolstering Penang's growing IC design and advanced packaging ecosystem.

Fig 20: Malaysia - Investment into Electrical & Electronics Soared to US$7.3bn in 1Q24, Nearly 20-Fold From Year Ago



Source: CEIC

Fig 21: Singapore - Investment Commitments in Electronics Reached a Record High of US$15bn in 2022



Source: CEIC

Vietnam is newer to the semiconductor scene, but has been making inroads due to its successful "bamboo diplomacy[11]", strategic location and booming consumer electronics industry. Manufacturing FDI commitments surged +40% in 2023, and have climbed by +15.7% over the first 7 months from a year ago (Fig 22).

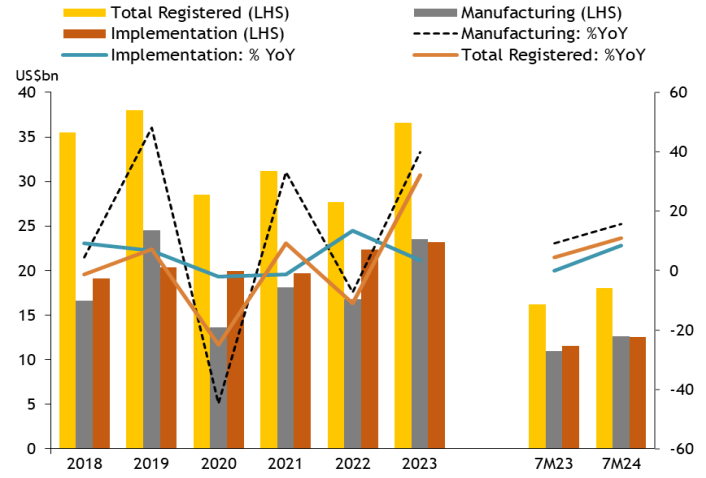
After a slew of pledges over the past two years from the likes of Samsung (packaging commitments and R&D centre), Amkor (packaging and testing) and Marvell (design centre), the most prominent commitment this year has been Amkor's decision to boost its investment. Amkor raised its FDI commitment to $1.6bn (+$1.07bn) in June, accounting for a third of total pledges in the month.

A fast-emerging area is chip design and R&D, due to Vietnam's emerging pool of affordable engineering talent (Fig 23). Since 2022, global giants including BOS semiconductors, Infineon, TSMC-affiliated GUC and Marvell have set up/plan to expand R&D centres. Local tech giant FPT launched its first line of power IC chips in 2022, designed locally and made in South Korea[12].

Electricity supply could be an Achilles heel, given the energy-intensive nature of chip manufacturing. There were acute power shortages in 2023, as power plant and grid infrastructure struggle to keep up with burgeoning demand. To beef up energy security, Vietnam has been developing more power plants, increasing coal imports, beefing Central-North transmission capacity (Quang Trach-Pho Noi line) and allowing factories to buy electricity directly from renewable energy suppliers[13] to attract private clean energy investments.

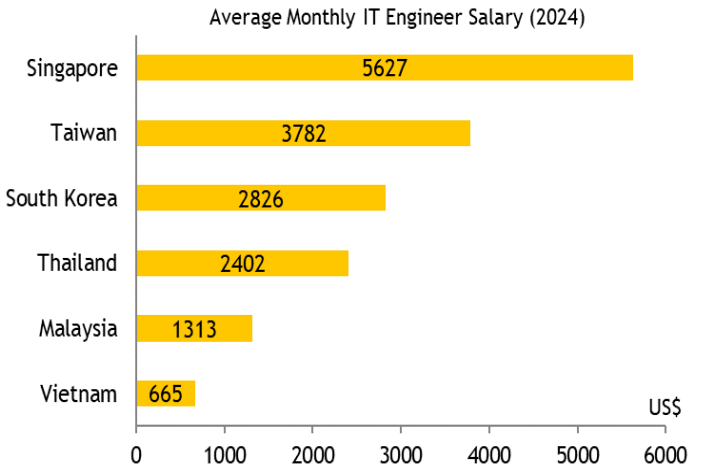
[11] "Bamboo diplomacy" describes Vietnam's independent and non-aligned conduct in foreign relations that balances competing geopolitical interests, which is strong and flexible like a bamboo.
[12] FPT, "Launching of The First Microchip Chip by FPT", 28 Sep 2022.
[13] Through its newly authorised direct power purchase mechanism (DPPA).

Fig 22: Vietnam – Manufacturing FDI Commitments Climbed +15.7% YoY in Jan-July, After +40% Surge in 2023



Source: CEIC

Fig 23: Vietnam – IT Engineer Salaries Are Much Lower Than Peers in Other Asian Countries



Source: Salary Explorer, Nikkei Asia[14]

Singapore remains top-of-mind for chipmakers due to its regulatory consistency, world-class logistics base, talent pool and mature ecosystem. However, high labor and energy costs, as well as space and water constraints are threatening to diminish its investment appeal as a manufacturing base, as the decline in its share of global exports suggests. Nonetheless, Singapore has a thriving chip design and R&D industry.

Singapore has attracted investments from the likes of GlobalFoundries, United Microelectronics and Applied Materials in recent years, receiving a record S$15bn of electronics investment commitments in 2022. Commitments soared +31.7% in the first half of 2024, rebounding from a -77.3% decline in 1H23 (Fig 21). More recently, NXP Semiconductors and TSMC-affiliated Vanguard announced a US$7.8bn joint investment to produce silicon wafers by 2027, used for the production of mature node chips.

The Philippines is benefiting from America's efforts to friend-shore the chip supply chain, as a key US ally. To attract foreign investment, the country passed reform measures to ease restrictions on foreign ownership and launched the "Build Better More program" to improve its infrastructure landscape.

The US plans to invest more than US$1bn in the Philippines to help double the number of semiconductor factories (from 13 currently), which is nine-fold of US FDI in 2023. The Philippine Board of Investments is collaborating with the US government to create the country's first lab-scale wafer fabrication plant. The fab will train 128,000 chip engineers and technicians by 2028 and help domestic enterprises prototype their chip designs[15].

Thailand has been slow to attract investments, possibly due to skill gaps and political developments. Nonetheless, foreign companies plan to boost investments to make printed circuit boards, to avoid geopolitical risk and leverage on recently-enacted tax breaks. Sony is investing Bt2.3bn (US$67mn) in the assembly of image sensors for automotive applications and display devices. The kingdom's specialties include analog automotive chips and power management chips for home appliances.

Indonesia has been a laggard in the region's chip race. The underdeveloped tech manufacturing base and a relatively uncertain regulatory environment may be holding the country back from attracting more investments. In addition, stringent import barriers and local content requirements may prove counterproductive, given the globally dispersed nature of the chip supply chain.

We provide salient examples of the region's recent semiconductor investments in Table 3.

[14] Nikkei Asia, "Vietnam Turns Chip Sector Magnet with Affordable, Quality Talent Pool", 14 Aug 2024.
[15] Evertiq, "Philippines Reveals Plans for First Wafer Fabrication Plant", 5 Feb 2024.

Table 3: Recent Semiconductor FDI Commitments in ASEAN

Company	Destination	Size (US$)	Details
Infineon	Malaysia	US$7.75bn	Infineon opened first phase of EUR7bn semiconductor manufacturing complex in Kulim in August 2024, set to become the world's largest silicon carbide power semiconductor manufacturing site once second phase completed. New plant will focus on making power semiconductors that can help with decarbonisation in automotive, industrial and data centre fields, and create total of 4k jobs.
Intel	Malaysia	US$7bn	Intel renewed commitment in December 2021 to invest US$7bn over a decade to US$14bn by 2032. Investments will build chip assembly and testing factory in Kulim and first overseas facility for advanced 3D packaging in Penang.
Micron	Malaysia	US$2bn	Micron inaugurated a $1bn assembly and testing facility in Penang in Oct 2023. Will invest additional $1bn to expand factory space to total of 1.5mn sq ft.
Texas Instruments	Malaysia	US$3bn	Announced in Jun 2023 that it will build a $2.1bn assembly and test plant in Kuala Lumpur and a $1.1bn plant in Malacca. Investments will create total of 1,800 jobs. New factories expected to begin production as early as 2025.
GlobalFoundries	Singapore	US$4bn	Opened US$4bn expansion fabrication plant in Sep 2023 that will produce an additional 450,000 wafers (300mm) annually, raising GlobalFoundries Singapore's capacity to 1.5mn wafers per year. Will create 1,000 jobs.
NXP and Vanguard International Semiconductor (TSMC affiliate)	Singapore	US$7.8bn	Building new factory from 2H 2024 to make silicon wafers with 12-inch diameter, more advanced than 8-inch wafers currently fabricated at Vanguard's existing Singapore plant. Wafers will be used for 130nm to 40nm mature node chips, serving functions such as power control in automotive, industrial, consumer and mobile products. Will create 1,500 jobs.
United Microelectronics Corporation (UMC)	Singapore	US$5bn	Taiwan's UMC building new wafer fab next to its existing 300mm fab in Singapore. First phase will have monthly 30,000 wafers with production expected to commence in late 2024. New fab will provide UMC's 22nm and 28nm processes, used for cars, IoT devices and PCs
Amkor Technology	Vietnam	US$1.6bn	Increased investment in Vietnam to US$1.6bn in June 2024 with additional investment of US$1.07bn in Bac Ninh province. New factory at Yen Phong 2C industrial park will start trial operations in 1Q 2025 and commence production in 3Q. Existing factory at the park was opened in Oct 2023, offers turnkey solutions from design to electrical testing, beginning with Advanced System in Package (SiP) and memory production.
Marvell	Vietnam	-	Will set up design centre in Ho Chi Minh City by end 2024 and plans to add new location in Danang. Marvell's work in Vietnam focuses on high-speed data centre optical connectivity, storage, and analogue and mixed-signal semiconductor technologies. Committed to grow workforce in Vietnam by 50%.
Hana Micron	Vietnam	US$1bn	First phase of semiconductor plant in Van Trung Industrial Park, Bac Giang was put into operation in Nov 2020. Aims to raise chip production investment to US$1bn by 2025, generating 4k jobs. Hana Micron specializes in manufacturing and processing of integrated circuit boards for mobile phones and other smart electronic devices.
Alchip Technologies	Vietnam	-	Taiwan's leading AI chip design services firm plans to increase headcount to up to 100 engineering staff in two to three years. Planning to open first Vietnam office in 2024.
US government	Philippines	US$1bn	In a Mar 2024 trade mission visit to Manila, US Commerce Secretary Gina Raimondo announced plans to invest more than US$1bn in the Philippines' tech sector and double the number of chip factories nationwide. The country has 13 semiconductor factories that focus on assembly, packaging and testing. Business executives from 22 businesses (Google, Visa, Microsoft, etc.) were present on the trip.
Sony	Thailand	Bt2.3bn (US$67mn)	Sony setting up new semiconductor fabrication building named Building 4, which will assemble image sensors for automotive applications and display devices (starting in 2025) and produce laser diodes for data centres (starting in 2024). New facility should add 2k employees within 3 years
Infineon	Indonesia	US$34mn	Announced in 2022 that it would expand existing backend operations in Batam, to meet demand for automotive ICs. Production is expected to start in 2024.

Source: Compiled by Maybank IBG Research

ASEAN: Industrial Policies to Ascend Value Chain

Governments in ASEAN are seizing the opportunity to ride on recent success, unveiling targeted industrial policies to ascend the semiconductor value chain.

Malaysia unveiled a National Semiconductor Strategy (NSS) in May, backed by US$5.3bn (RM25bn) in fiscal support and targeted incentives. The NSS will be implemented in three phases over the next decade. The government aims to court RM500bn of domestic direct investment and foreign direct investment in Phase 1; establish at least 10 homegrown companies in design and advanced packaging with at least RM1bn of revenues in Phase 2; and develop a global R&D hub for semiconductors. To beef up the talent pool, Malaysia aims to train and upskill 60,000 local engineers in the next five to ten years.

Vietnam's semiconductor strategy is focused on workforce training. The country aims to invest US$1bn to train 50,000 chip engineers by 2030. The government is collaborating with domestic and foreign partners to support local universities and training centres.

For instance, the Vietnam National Innovation Center (NIC) is working with chip design software giants Synosys and Cadence to supply their software to local universities. The agency is also working with the US' Arizona State University (the largest semiconductor engineer training establishment globally) to develop training programs, and with Google and homegrown tech giant FPT to provide university scholarships nationwide[16]. Vietnam aims to send about 1,500 engineers to take on chip design jobs overseas, and another 5,000 for other chipmaking roles to gain global experience[17].

Thailand plans to establish a national semiconductor board to formulate investment and development strategies for the industry. The Board of Investment offers enhanced corporate tax breaks for chip investments. In addition, a joint venture was recently set up between Hana Microelectronics and NewVersal, a subsidiary of state-owned oil & gas giant PTT to explore prospective investments in smart electronics[18].

Indonesia lacks a tailored semiconductor development strategy, but is applying its signature downstreaming playbook to harness its abundant silica resources, which can be processed to develop silicon wafers – a key raw material for semiconductors.

The Indonesian government is working on a 2025-35 roadmap for silica downstreaming, mulling a ban on quartz sand exports to guarantee domestic availability. Indonesia exported about U$58.6mn of quartz sand exports in 2023, being the 6th largest exporter globally of quartz sand (3.8% of global export value). Electronics has been identified as one of five priority sectors eligible for tax incentives in its "Making Indonesia 4.0" roadmap, aiming to attract investments by leveraging on its large domestic market and low labor costs.

Table 4 summarizes the details of each ASEAN country's industrial policies.

[16] Tuoitrenews.vn, "Vietnam to Invest $1bn in Training 50,000 Semiconductor Engineers", 20 Apr 2024.
[17] The Business Times, "Vietnam Pins Semiconductor Ambition on Robust Workforce Training", 2 Aug 2024.
[18] The Business Times, "Thailand Plays Catch-Up After a Slow Start in Region's Chip Race", 31 July 2024.

Table 4: Recent Chip-Related Industrial Policies and Strategies in ASEAN

Country	Details
Malaysia	Unveiled National Semiconductor Strategy in May 2024: - Phase 1: support modernization of OSAT, orientation towards advanced packaging, pursue FDI in power chips and cultivate local chip design champions - Phase 2: Pursue cutting edge FDI in logic and memory chips design, fabrication and testing - Phase 3: Support development of world-class local firms with expertise in semiconductor design, advanced packaging and manufacturing equipment firms while attracting buyers of advanced chips to pursue advanced manufacturing in Malaysia Launched its first chip design hub in Selangor in August 2024
Singapore	- Launched S$180mn (US$137.5mn) National Semiconductor Translation and Innovation Centre (NSTIC) in April 2024 to support companies with R&D, semiconductor prototyping, testing and small volume manufacturing. Focus will be on silicon photonics and flat optics. Centre will train local R&D talent and grant companies access to intellectual property developed by A*STAR and local universities - Concessionary tax rate of 5% or 10% for five years and tax exemptions on fixed capital expenditure - Government announced in Budget 2024 that it would invest a further S$3bn in the Research, Innovation and Enterprise 2025 (RIE2025) plan, bringing the total commitment to S$28bn - New 6-month training program for integrated circuit design launched in Aug 2024 to train up to 150 people over the next 5 years. Complements existing talent programs including Singapore Industry Scholarship (SgIS) and Industrial Postgraduate Programme (IPP) - Singapore Manufacturing 2030 vision: 10-year plan aimed at achieving 50% growth in manufacturing sector by 2030 by attracting investments in advanced manufacturing (electronics, semiconductors, automation, 3D printing, and robotics, etc.). Plan focuses on attracting frontier companies with specialized capabilities that can secure Singapore a niche in global value chains
Vietnam	- National Semiconductor Industry Strategy: Aims to nurture 50k chip engineers and designers by 2030. Apart from innovation centres, five universities will train semiconductor talents, including Vietnam National University, Ho Chi Minh City, Hanoi University of Science and Technology, FPT University, and the University of Da Nang - Plans to roll out cash incentives for high-tech firms under its upcoming investment support fund to defray added costs of Global Minimum Tax - Strengthen coordination with large local enterprises like Viettel, VNPT, FPT and CMC to research and evaluate development opportunities in the chip production chain - Support the supply of equipment for measuring and testing semiconductor chips
Thailand	- Established the National Semiconductor Board to formulate investment and development strategies for the industry - Investment in wafer manufacturing will get corporate tax exemption of 10 years, while advanced ICs, IC substrate and printed circuit board projects with investment in machinery of at least THB1.5bn will be granted an 8-year tax exemption - Joint venture was recently set up between Hana Microelectronics and NewVersal, a subsidiary of state-owned PTT to explore prospective investments in smart electronics
Indonesia	- No tailored semiconductor development strategy, but Economy Minister Airlangga Hartarto said in May that President Jokowi wants to build up trained human resources through scholarships and “training for trainers”, in order to “rebuild” its semiconductor ecosystem - Government wants to downstream Indonesia’s abundant silica resources, which can be processed to develop silicon wafers. Ban on quartz sand exports being considered
Philippines	- Government’s flagship Inclusive Innovation industrial Strategy aims to strengthen linkages to domestic and global value chains using industry 4.0 tech to create new products, services and business models - Government worked with key private sector companies to launch PATHS (Product and Technology Holistic Strategy), which identifies products and technologies that can increase the semiconductor industry’s global share over the next five years - Corporate Recovery and Tax Incentives for Enterprises (CREATE) took effect in 2021: allowed qualified exporters to enjoy four to seven years of income tax holidays, followed by 10 years of 5% special corporate income tax or enhanced deductions. - Passed amendments to Foreign Investments Act, relaxing restrictions to foreign participation in the economy

Source: Compiled by Maybank IBG Research

Roadblocks to ASEAN's Chip Race

Even as ASEAN's growing chipmaking prowess is buttressed by strong government efforts, there are potential roadblocks to these ambitions from intense global competition, China's rapidly rising prowess, and geopolitical entanglement. ASEAN will need to adapt and navigate these obstacles.

1. A Crowded Global Race

The subsidies race among advanced economies – US, Europe and Japan – and China may crowd out foreign direct investments into ASEAN, as the region's governments have limited fiscal resources to outbid these countries with deeper pockets. The flood of investments into new productive capacity may eventually lead to a supply glut and falling chip prices. Industrial overcapacity could tempt governments to ramp up trade barriers to protect domestic manufacturers, which could be detrimental to ASEAN's exports.

The world's superpowers are racing to localize production in advanced chips. The *US* leads with its 2022 CHIPS and Science Act, dangling US$39bn worth of grants, including a 25% tax credit to chipmakers within the country. Large grants have been offered to Intel (US$8.5bn) and Micron (US$6.1bn), two prominent investors in ASEAN.

The *European Union* has countered with its US$47bn European Chips Act, which was unveiled in 2023. The *German* government has agreed to provide multi-billion dollar grants to Intel and TSMC.

Japan has allocated US$26bn over the past three years to the trade ministry's chips campaign, since its launch in 2021. This includes three TSMC foundries in Kumamoto and Hokkaido, as well as its homegrown chipmaker Rapidus.

Even emerging economies like *Saudi Arabia*, *UAE* and *India* are directing substantial resources towards building their own local supply chains. For instance, India has a US$10bn incentive plan to attract chipmakers, providing fiscal support of up to 50% of a project's cost.

Fierce competition to develop ever more advanced chips may strain chipmakers' finances and impact their ability to deliver on expansion plans in ASEAN and other regions. A number of prominent chipmakers have recently announced job cuts after falling behind their rivals. Most notably, Intel, which is building an advanced chip packaging facility in Penang, announced plans in early August to slash more than 15,000 jobs and suspend dividend payments. The once-dominant chipmaker is struggling to compete with AMD and Nvidia in the AI race.

2. China's Chip Avalanche

ASEAN's chip industry could face headwinds from the China market – both because of rising supply competition from mainland manufacturers, and shrinking Chinese demand for imported semiconductors.

ASEAN chip exports to China have shrunk, since peaking in 2021. In the decade before 2021, the same exports rose +69.5% from US$48.7bn in 2011 to US$82.6bn in 2021.

The weakening trend is due to several key factors:

First, China has been importing fewer chips, even as its demand for chips grew. Mainland imports of chips peaked in 2021. They fell by a cumulative -19% from US$463bn in 2021 to US$375bn in 2023. Correspondingly, ASEAN-6 shipped -23.3% fewer chips to China in 2023, compared with 2021.

To buttress economic resilience, the Chinese government has been pursuing a policy of improving home-grown supplies of critical advanced components. Since 2015, it has adopted a "whole of state" approach to build capabilities in chip production. In terms of product scope, the country's chipmakers, such as Huawei and SMIC, are extending the repertoire of home-grown chips to 7nm and below.

Nonetheless, the Chinese firms are assessed to be not at a stage of being able to make advanced chips at scale.

Second, the Chinese chip industry is competing in the same legacy space as ASEAN producers. An August 2024 study by the Information Technology and Innovation Foundation (ITIF) in the US found that China's forte was in mature node chips of 28nm and above, with strong ability to compete on price in this segment. But ITIF assessed that China's industry leader, SMIC, was about five years behind global firms such as TSMC in the area of leading-edge logic chips.

According to TrendForce, some 26% of mature-node foundry capacity was located in China in 2022. China's market share of matured process capacity is expected to rise from 33% in 2024 to 45% in 2027 (Table 6).

Table 5: Advanced Process Foundry Capacity by Region

	2022	2024F	2027F
Taiwan	70%	66%	55%
South Korea	11%	11%	8%
US	10%	10%	22%
Japan	0%	0%	3%
China	8%	9%	6%
Others	0%	4%	5%
Total	100%	100%	100%

Note: Advanced process node is defined as a non-planar transistor architecture process, including ≤ 16/14nm nodes. Shares in 2024 and 2027 are Trendforce forecasts.

Source: TrendForce[19]

Table 6: Matured (Legacy) Process Foundry Capacity by Region

	2022	2024F	2027F
Taiwan	49%	42%	37%
China	26%	33%	45%
US	5%	4%	2%
South Korea	9%	9%	7%
Japan	3%	3%	3%
Others	9%	8%	6%
Total	100%	100%	100%

Note: Mature process node is defined as including ≥ 28nm nodes. Shares in 2024 and 2027 are Trendforce forecasts.

Source: TrendForce

In terms of the value chain, China's chip industry is investing heavily in not only fabrication, but EDA (electronic design automation), design and chip-making equipment, as well ATP (assembly, testing and packaging). From 2010 to 2022, the number of semiconductor design companies in the mainland multiplied six fold, from 582 to 3,243. In the ATP space, China accounts for 30% of global capacity (as of 2022; see Fig 14 above), with Chinese ATP firms accounting for 38% of market (as of Aug 2023).

The US' National Science Foundation reported that China's share of global semiconductor value added more than tripled from 9% in 2002 to 32% in 2022.

This trend is likely to continue, as Chinese chipmakers pour increasing investments into new capacity. In 2024, China is forecast to add more new chip manufacturing capacity than the rest of the world combined.

Singapore, Malaysia, Vietnam and the Philippines would be most exposed to China's chip demand, as a share of their total exports. In contrast, Indonesia and Thailand are the least exposed – as chips comprise a minuscule share of their total exports as well as their shipments to China.

Singapore and Malaysia's semiconductor sectors depend on China for around 17% for their exports. The Philippines depend on China for 12.9% for its external orders. Vietnam's fledgling chip industry relies on China for 37% of its foreign orders (Table 7).

[19] TrendForce, "[Insights] Trendforce: Foundry Capacity Market Share of Advanced Process to Decline in Taiwan, Korea until 2027, While US on the Rise", 14 May 2024.

Table 7: ASEAN Chip Exports: Singapore, Malaysia, Philippines and Vietnam More Dependent on China

Chips Exported to China: Year: 2022 (2012 figures are in brackets)	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
As a share of Total Chip Exports (%)	5.3 (5.7)	17.1 (25.8)	12.9 (12.3)	16.8 (17.9)	7.0 (5.8)	37.0 (45.3)
As a share of Total Exports to China (%)	0.1 (0.2)	31.4 (29.5)	36.0 (24.5)	35.5 (33.0)	2.6 (1.6)	13.3 (7.5)
As a share of Total Exports (%)	0.0 (0.0)	4.3 (3.7)	5.0 (2.9)	4.4 (3.5)	0.3 (0.2)	2.1 (0.8)
Exports to China as a Share of Total Exports (%)	22.6 (11.4)	13.6 (12.6)	13.9 (11.8)	12.4 (10.6)	12.0 (11.7)	15.6 (11.2)
Chips as a Share of Total Exports (%)	0.3 (0.4)	25.0 (14.4)	38.8 (23.6)	26.2 (19.6)	4.5 (3.2)	5.6 (1.9)

Note: *Semiconductors are classified under Harmonized System (HS) codes 8541 and 8542.*
Source: UN Comtrade

3. Entanglement in Geopolitical Rivalry

An expansion of US tech restrictions beyond China's shores could put ASEAN in the crosshairs.

The semiconductor industry will likely be top-of-mind for American policymakers, given its strategic nature and national security implications. The guardrails for receiving CHIPS subsidies demonstrate the US' resolve—recipients must not expand chip manufacturing in China. Lawmakers are also planning to bar CHIPS recipients from using Chinese-made equipment at their US factories.

The US has imposed restrictions on the export of advanced semiconductor equipment, advanced chips and EDA software to China. The US used the Foreign Direct Product rule in October 2022 to restrict the export of advanced chips and equipment for making chips smaller than 14nm to China, from anywhere in the world. The Foreign Direct Product rule gives the US government authority to restrict the sale of any product made using American software or technology, including products made in a foreign country.

It was recently reported that the Biden administration may be formulating plans to broaden the rule by lowering the amount of US content that determines whether foreign-made chip equipment are subject to US control. Equipment made in a third country, which incorporates a chip containing US technology, could be subject to export controls[20].

Shipments from countries in the A5 group (includes Japan, the Netherlands and South Korea) will be exempted from the new regulations, categorized by the US Commerce Department based on "factors like diplomatic relationships and security concerns". No ASEAN country is in the A5 group.

The widening US chip controls on China are likely to affect some MNCs based in ASEAN. Given the dominant market shares of American firms in chip design and EDA software, many semiconductor companies rely on US technology. For example, Applied Materials, the world's top maker of chip-manufacturing equipment, announced that the October 2022 curbs affected sales of its wafer fabrication equipment and related parts to China.

Additionally, the US could push to curb China's role in its semiconductor supply chain, by regulating imports of Chinese legacy chips amid China's aggressive capacity-building efforts. New restrictions may be levied on the basis of overcapacity, cybersecurity or concerns of growing dependence on Chinese chips.

While curbs on Chinese imports into the US may be a boon to ASEAN-based chipmakers (by reducing the competitive threat from China), the restrictions may hit ASEAN if they extend to third country imports manufactured with significant proportions of Chinese components, or products made by Chinese firms based overseas (see *ASEAN Economics – Trump 2.0 Trade Policies: Turbulence Ahead*, 5 July 2024).

[20] Reuters, "Exclusive: New US rule on Foreign Chip Equipment Exports to China to Exempt Some Allies", 1 Aug 2024.

Summary

ASEAN's semiconductor push holds significant promise. The region's non-aligned stance, mature ecosystems and policymakers' industrial strategies are attracting chipmakers from both sides of the US-China divide. We are positive that ASEAN will gain more heft in the global supply chain, led by Malaysia, Singapore and Vietnam.

Nonetheless, firms and policymakers will have to navigate considerable hurdles in their quest to ascend the value chain. These include a crowded global race with deep-pocketed competitors; China's push for semiconductor self-sufficiency; and potential US restrictions.

In the face of these challenges, ASEAN should look to diversify their exports beyond the US and China, to minimize the impact of any trade barriers. Beyond fulfilling external demand, there is also scope for the region's chipmakers to focus on niches and specialty chips that dovetail with the needs of domestic industries. Finally, grooming an indigenous core of chipmakers and suppliers will help cultivate a deeply rooted local industry, mitigating dependence on mobile foreign MNCs. A deeply embedded industrial ecosystem may also crowd in FDI and increase the stickiness of MNCs' local operations.

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