

2 The Singapore Economy

- The performance of the Singapore economy in Q1 2022 came in within expectations, growing by a modest 0.4% q-o-q SA, compared to the 2.3% expansion in Q4 2021. The trade-related and modern services clusters, which posted strong outturns in Q4 2021, contracted sequentially in Q1 2022. In comparison, the domestic-oriented cluster saw a broad-based expansion. Within the travel-related cluster, performance was uneven, with gains in the air transport and arts, entertainment & recreation (AER) sectors partially offset by a sharp pullback in the accommodation sector.
 - Supply shocks arising from the Russia-Ukraine conflict have introduced renewed uncertainties surrounding the outlook for the rest of the year, at a time when global supply chain frictions arising from the pandemic have yet to be fully resolved. Supply-driven price shocks are eroding real incomes and could lead to an aggregate demand shock. A static analysis of global trade and input-output linkages suggests that Singapore's direct and indirect exposures to Russia through the income and production channels are relatively small. However, the impact could be amplified by confidence effects arising from higher inflation, tighter financial conditions, and heightened uncertainty, which would restrain domestic consumption and investment.
 - Meanwhile, Singapore took a major step towards living with COVID-19 by easing domestic safe management measures and border restrictions substantially at the end of March. Reduced restrictions will bring forward the projected recovery in the domestic-oriented and travel-related sectors to Q2, earlier than the previous expectation of the second half of this year. However, external-oriented sectors such as manufacturing, wholesale trade, water transport and financial services could face some headwinds amid the less optimistic global economic outlook. Barring further escalation in the Russia-Ukraine conflict or a severe setback to the improving trajectory of the pandemic, the Singapore economy remains on track to grow by 3–5% in 2022, its second year of above-trend growth.
 - From a longer-term perspective, the restructuring of the Singapore economy has yielded greater productivity gains in the tradable sector over the past decade, with higher returns accruing to capital owners and specific segments of skilled labour. Consequently, the gap between wages in the tradable and non-tradable sectors has persisted over time. The next phase in Singapore's restructuring journey is likely to see this divergence narrow, as market forces and government policies, that incentivise investments in productivity-enhancing technologies and processes, for example, facilitate the adjustments. Lower- and middle-income households are likely to benefit most from this transition.
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2.1 Recent Economic Developments

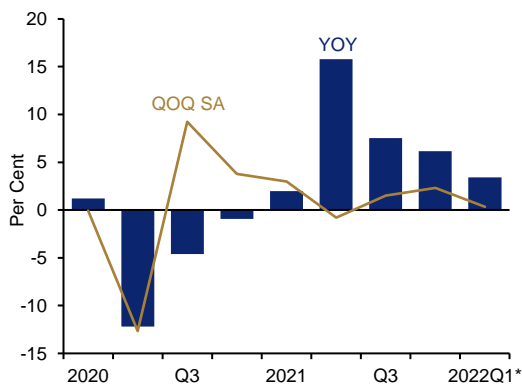
GDP growth slowed in Q1 as the trade-related and modern services clusters contracted sequentially

The Singapore economy picked up further at the end of 2021, growing by 2.3% q-o-q SA in Q4 2021, after some weakness in the preceding two quarters (**Chart 2.1**). GDP growth in Q4 was largely underpinned by strong outturns in the trade-related and modern services clusters (**Chart 2.2**). These clusters were less affected by the pandemic, with activity already surpassing pre-COVID levels by end-2020. However, the domestic-oriented and travel-related clusters remained below pre-pandemic levels even at the end of last year.

Not unexpectedly, the high growth momentum could not be sustained and the trade-related and modern services clusters contracted sequentially in the first quarter of 2022, resulting in a slowdown in overall GDP growth to 0.4% q-o-q SA (based on the *Advance Estimates*). In comparison, the domestic-oriented cluster saw a broad-based expansion. The performance was uneven in the travel-related cluster, with gains in the air transport and AER sectors partially offset by a sharp pullback in the accommodation sector. On a y-o-y basis, overall GDP increased by 3.4% in Q1 this year, moderating from the 6.1% expansion in the preceding quarter.

Chart 2.1 Singapore's GDP growth moderated in Q1...

Singapore's GDP growth

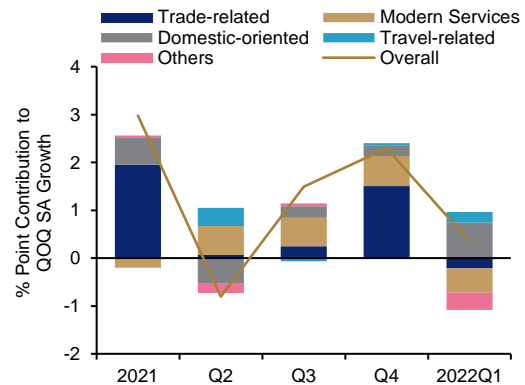


Source: DOS

* Advance Estimates

Chart 2.2 ... dragged down by trade-related activity and modern services

Contribution to GDP growth



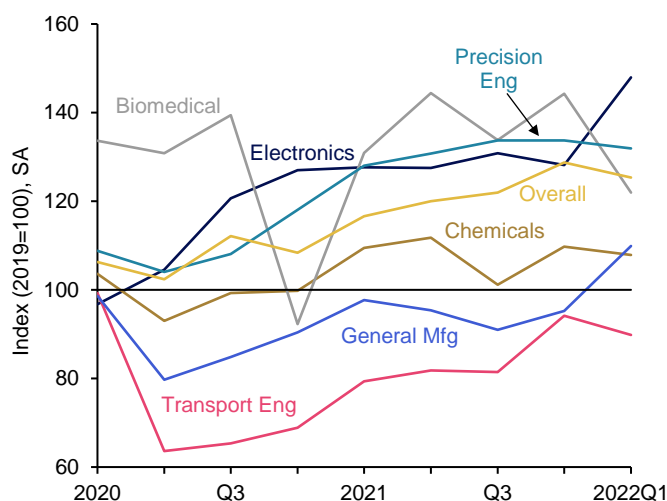
Source: EPG, MAS estimates

Manufacturing activity contributed most to the GDP slowdown in Q1

Singapore's Index of Industrial Production (IIP) contracted by 2.7% q-o-q SA in Q1 2022, reversing the 5.6% expansion in the preceding quarter which was mainly driven by the biomedical and transport engineering clusters (**Chart 2.3**). Both clusters subsequently saw a pullback in Q1 from the high base in Q4 2021. Meanwhile, electronics output surged in Q1, supported by strong global demand for semiconductors used in data centres and 5G products, following a mild contraction in Q4 2021. Elsewhere in the trade-related cluster, growth in wholesale trade slowed in Q1 2022, reflecting weaker outturns in the machinery, equipment & supplies subsegment.

Chart 2.3 Industrial production contracted in Q1, weighed down by the biomedical and transport engineering clusters

Index of industrial production (IIP)



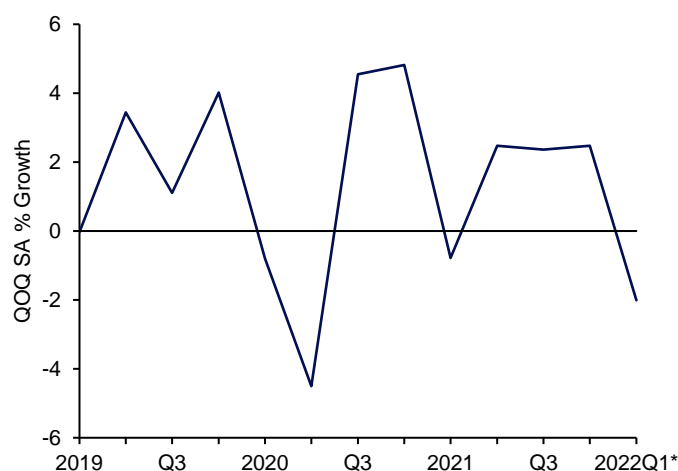
Source: EDB

Modern services lost some momentum after posting strong outturns in previous quarters

The modern services cluster expanded by 2.5% q-o-q SA in Q4 2021, before declining by 2.0% in Q1 this year (**Chart 2.4**). Growth in the cluster in Q4 was driven by the finance & insurance sector, which was in turn underpinned by the cyclical recovery in other auxiliary activities (mainly payments processing), fund management and banking, as the pandemic receded. Similarly, the firm expansion in the information & communications sector was supported by strong mobile phone sales amid new product launches, as well as ongoing corporate investments in digitalisation.

Chart 2.4 Modern services contracted sequentially in Q1 2022

VA growth of the modern services cluster



Source: DOS

* Advance Estimates

However, the growth momentum in modern services dissipated in Q1 this year, led by a decline in the information & communications sector. This was driven by lower outturns in games publishing activities, following several quarters of strong performance, which more than offset the expansion in the telecommunications and IT & information services segments.

Likewise, growth in the finance & insurance sector moderated from its Q4 outturn and was only marginally positive in Q1 2022, dragged down by the fund management and insurance segments. The fund management segment fell sharply, as ongoing geopolitical tensions and the prospect of policy tightening across major economies weighed on global equities. Meanwhile, the insurance segment contracted amid a decline in net premiums from general insurance, although this was partially offset by improved sales of single-premium life insurance products. In comparison, activity in the banks and other auxiliary segments continued to support growth. The banks segment was buttressed by higher loans and advances to residents in Jan–Feb, while the other auxiliary segment continued to benefit from a pickup in consumer spending.

The domestic-facing sectors benefited from the gradual easing of social restrictions

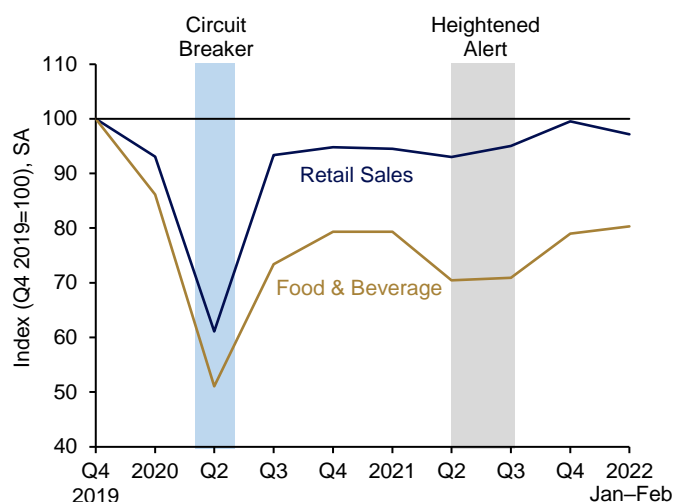
Domestic-oriented activities remained generally lacklustre in Q4 2021, weighed down by renewed tightening of COVID-19 safe management measures. Under the “Stabilisation Phase” which lasted for about two months from late September, some restrictions were re-imposed to moderate the transmission rate of the virus and ease the strain on Singapore’s healthcare system. These included the reduction in social gathering and dining-in group sizes from five to two persons and the return to a default work-from-home arrangement.

There was some improvement in the consumer-facing sectors from late November as social restrictions were eased (**Chart 2.5**). F&B sales expanded by 11.4% q-o-q SA in Q4 2021,

and a further 1.7% in Jan–Feb 2022, supported by the measured but progressive relaxation of dining-in and event restrictions. Sales of both restaurants and food catering services rose strongly by 24.0% q-o-q SA and 13.1% respectively in Q4, and by a further 5.9% and 3.4% in Jan–Feb. The land transport sector also expanded in Q1 following the contraction in the previous quarter. Public transport ridership picked up, as up to 50% of employees working from home were allowed to return to office at the beginning of 2022. In contrast, retail sales contracted by 2.4% q-o-q SA in Jan–Feb, following the 4.8% increase in Q4. Weaker sales were recorded at supermarkets as well as provision and sundry shops, with more households dining out at restaurants. Sales of computer & telecommunications equipment also contracted during this period. In general, the retail sector has outperformed the other consumer-facing industries over the last two years, in part reflecting the shift in demand towards essential and durable goods and away from high-touch services during the pandemic.

Chart 2.5 The F&B sector saw improved outturns in Q1 as social distancing measures were gradually relaxed

Retail and F&B sales volumes



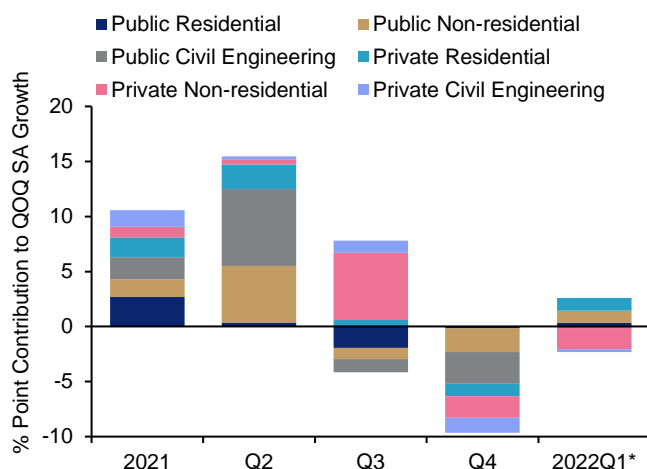
Source: DOS

In the construction sector, supply-side disruptions continued to affect activity in Q4 last year. The sector contracted by 2.1% q-o-q SA, as new border-entry restrictions¹ on migrant workers were put in place in early December because of the Omicron variant. As these restrictions were eased from late February, alongside some improvement in the supply of construction materials, the sector returned to growth of 2.8% q-o-q SA in Q1 2022. While public certified progress payments in the construction sector saw broad-based improvements in Jan–Feb, private certified progress payments dipped over the same period, weighed down by the commercial and industrial segments (**Chart 2.6**).

¹ Employers were not allowed to make new applications for Construction, Marine Shipyard and Process (CMP) S Pass and Work Permit holders, as well as other dormitory-bound work pass holders, to enter Singapore via Vaccinated Travel Lanes (VTLs). Such workers could only enter Singapore via ongoing industry initiatives or the Work Pass Holder General Lane.

Chart 2.6 Some recovery was seen in certified progress payments in certain subsegments in Q1, following the easing of border restrictions on construction workers

Nominal certified progress payments in the construction sector



Source: BCA and Haver Analytics

* Estimated based on Jan–Feb 2022 data

Note: Certified progress payments refer to the value of all construction works done and certified for progress payments of ongoing projects. Where construction works are carried out by the developer or owner himself and the architect does not certify progress payments, the expenses incurred on the construction work are taken to be the progress payments certified.

Travel-related activities registered a mixed performance in Q1

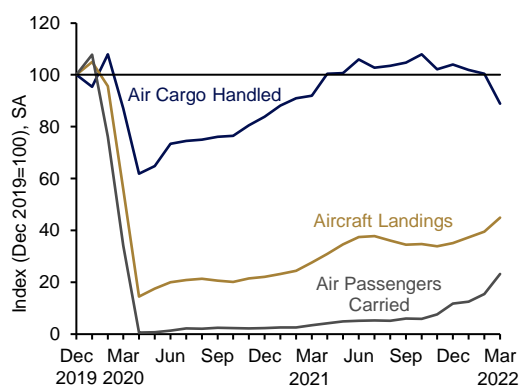
In Q4 2021, travel-related activity saw modest support from the reopening of borders to fully vaccinated visitors from selected economies under the Vaccinated Travel Lanes (VTL) scheme. Travel activity picked up further in Q1 with the launch of additional VTLs. MICE events² have also resumed on a larger scale since mid-August last year, with up to 1,000 vaccinated attendees permitted for each gathering. Average monthly air passengers carried doubled in Q1 2022 compared to Q4 last year, to 774,692 (**Chart 2.7**). Average monthly visitor arrivals also grew by 55.8% in Q1 this year to 82,040, after having tripled in Q4 from the previous quarter. Nonetheless, visitor arrivals were still only about 5% of their pre-pandemic levels in 2019.

The accommodation sector contracted in Q1 2022, extending the weakness from Q4. The decline was largely due to a sharp fall in government bookings. With the majority of COVID-19 patients being placed on the Home Recovery programme since October last year, there has been a steady decline in demand for hotel quarantines. The hotel occupancy rate fell to 61% in Q1 this year, from the monthly average of 71% in Q4 2021, reflecting an increase in the supply of available rooms as the release of government bookings was not fully absorbed by a rise in demand from visitor arrivals and staycations (**Chart 2.8**). The support from utilisation of Singapore Rediscover Vouchers has also waned compared to last year.

² MICE refers to meetings, incentives, conferences and exhibitions.

Chart 2.7 The air transport sector improved amid some pickup in visitor arrivals...

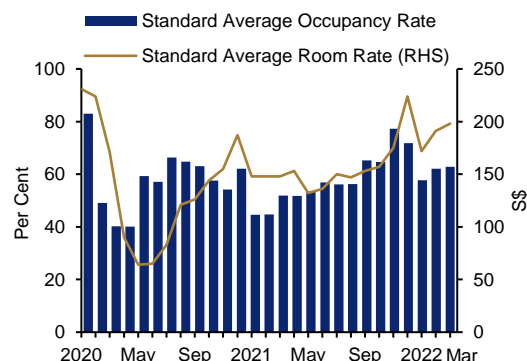
Air transport indicators



Source: CAAS and Haver Analytics

Chart 2.8 ... but the accommodation sector weakened

Hotel Bookings



Source: STB

2.2 Economic Outlook

The Russia-Ukraine conflict has dented Singapore's economic outlook, dampening the recovery momentum expected this year

The invasion of Ukraine and sanctions on Russia since late February have cast a pall over the economic outlook. The shock is, in the first instance, supply-driven, initially manifesting as higher inflation at a time when global supply chain frictions arising from the pandemic have yet to be fully resolved. Supply-driven price shocks will dent real incomes and could lead to a pullback in aggregate demand. These factors will continue to play out in the coming quarters, adding to significant uncertainty surrounding the ripple effects from the Russia-Ukraine conflict on Singapore's economic growth. According to the Singapore Commercial Credit Bureau (SCCB), the Business Optimism Index dipped slightly in Q2 2022 to +5.35% points, from +5.91% points in the previous quarter, primarily due to the geopolitical uncertainty from the war in Ukraine exacerbating risks of global supply chain disruptions in the short to medium term.

An analysis of the income and production channels shows that the spillover effects of the conflict on Singapore's economy appear to be relatively contained, mostly limited to Russia's role as a major global supplier of crude oil and natural gas. However, the impact could be amplified by confidence effects amid heightened volatility in global financial and commodity markets. Moreover, higher input costs could curtail production, while higher inflation and weaker confidence could also restrain domestic consumption and investment. The less optimistic global economic outlook will pose some headwinds to external-oriented sectors such as manufacturing, wholesale trade, water transport and financial services.

The additional drag on growth prospects from the conflict would be partially offset by a boost from the easing of domestic safe management measures and border restrictions from end-March. The loosening of restrictions brings forward the projected recovery in the domestic-oriented and travel-related sectors to Q2, compared to previous expectations of a H2 recovery.

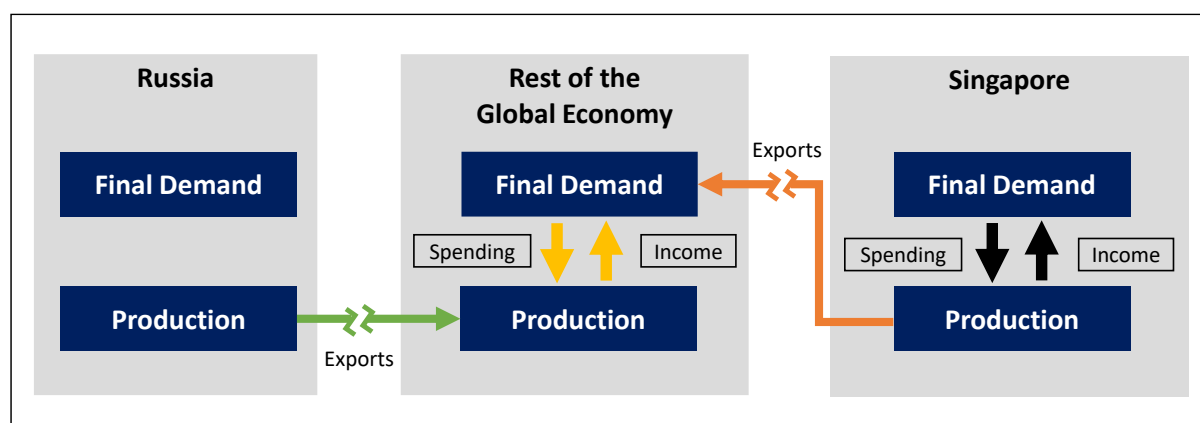
Economic linkages between Russia and Singapore are relatively limited, although downside risks could be amplified via confidence effects

Russia's role in the global economy is more as a major energy supplier, accounting for more than 10% of global crude oil and natural gas production, rather than a source of final demand. Singapore's direct trade exposure to Russia is minimal.³ In 2021, imports from Russia accounted for just 0.8% of Singapore's total goods imports, while exports to Russia comprised 0.1% of total exports. Even for petroleum and related products, Russia contributed only 2.8% of Singapore's imports, with Malaysia, UAE, China, Qatar and Saudi Arabia being the main sources. Aside from the effect on global commodity prices, there are two main channels of indirect exposures through which disruptions to Russia's exports could have knock-on effects on Singapore: spillovers from external demand (the income channel), as well as supply chain linkages (the production channel). These indirect channels were quantified using the latest available data from the 2018 OECD TiVA database.

Figure 2.1 traces the indirect income channel, where Singapore's key export partners with significant exposures to Russia suffer income losses, in turn reducing demand for our exports. The top five countries and regions with significant final demand VA originating from Russia in US\$ terms were the Eurozone, China, US, Japan and UK (**column 1 in Table 2.1**). As a share of each of these economies' total final demand, Russia's embodied VA is relatively small at less than 1% (**column 2**). Singapore is more vulnerable to a fall in final demand in China, followed by the US and Eurozone, based on its VA contribution (in US\$ terms) to the final demand of these economies (**column 3**). After scaling by these third countries/regions' exposure to Russia, Singapore's VA in the final demand of these markets is just 0.55% of Singapore's nominal GDP in aggregate (**column 5**). Such static quantification of interlinkages, however, does not account for the confidence effects from a larger pullback in overall final demand, especially if the conflict escalates or becomes prolonged.

Figure 2.1 From the income channel, Singapore's exposure to Russia is small...

Schematic diagram of Singapore's exposure to Russia through final demand in third countries/regions



Source: EPG, MAS

³ Economic linkages with Ukraine are even smaller.

Table 2.1 ... at only 0.55% of Singapore's GDP

Impact on Singapore's VA through final demand in third countries/regions

Country/Region	Russia's VA in Final Demand of Country/Region		Singapore's VA in Final Demand of Country/Region		
	(1) US\$ Million	(2) Share of Country/Region's Final Demand (%)	(3) US\$ Million	(4) Scaled by Country/Region's Exposure to Russia, US\$ Million [(2) x (3)]	(5) Share of Singapore's GDP (%)
Eurozone	113,477	0.9	25,241	229	0.06
China	67,459	0.5	35,713	180	0.05
US	38,359	0.2	30,641	56	0.02
Japan	17,628	0.4	14,439	53	0.01
UK	15,500	0.6	6,451	36	0.01
Total	464,094	0.6	365,726	2,082	0.55

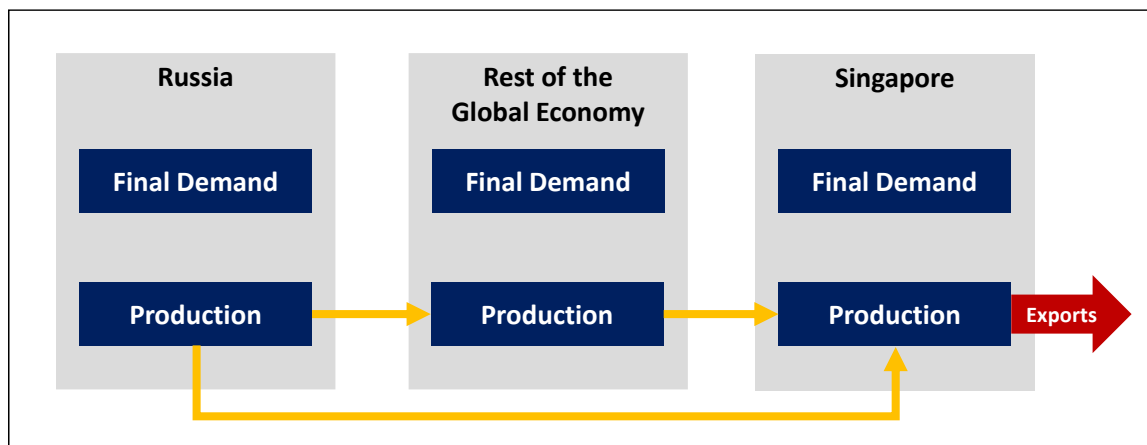
Source: 2018 OECD TIVA

The oil-dependent industries are more affected by the production channel given Russia's role as a major oil and natural gas producer

From the production perspective, Singapore is indirectly impacted through supply chain linkages when imported goods and services from its trading partners contain Russian components or inputs. Part of these imports are intermediate inputs used in the production of exports (**Figure 2.2**). The size of Russia's VA embedded in Singapore's total imports (i.e., the dollar value of components of Russia origin in imports) is around US\$5.5 billion, accounting for 1.5% of Singapore's total imports and for 1.5% of Singapore's GDP (**Table 2.2**).

Figure 2.2 From the production channel, Singapore is linked to Russia via its imports of intermediate inputs containing Russian components

Schematic diagram of supply chain linkages between Singapore and Russia



Source: EPG, MAS

Table 2.2 Russia's VA embedded in Singapore's imports is around 1.5% of Singapore's GDP...

Russia's VA embedded in Singapore's imports

Import Partners	Value (US\$ Million)	Share of Singapore's Total Imports (%)	Share of Singapore's GDP (%)
Eurozone	602	0.17	0.16
China	421	0.12	0.11
Denmark	148	0.04	0.04
Korea	129	0.04	0.03
Japan	111	0.03	0.03
Rest of the world	4,099	1.13	1.09
Total	5,510	1.52	1.47

Source: 2018 OECD TiVA

Note: The components may not sum up exactly to the total due to rounding.

The share of Russia's embedded VA in Singapore's exports is slightly smaller than that of imports, accounting for just 0.8% of total export value (or 0.9% of GDP). This share is significantly smaller than the VA of other economies embedded in Singapore's exports, such as the US, Eurozone, China, Japan and the UK (**Table 2.3**). From an industry perspective, the bulk of Russia's VA embedded in Singapore's exports is in refined petroleum products and water transport services, which are heavily dependent on oil (**Table 2.4**). This is not unexpected given Russia's role as a major oil and natural gas producer.

Table 2.3 ... while its VA embedded in Singapore's exports is slightly smaller

Origin of value added embedded in Singapore's gross exports

Origin	Value (US\$ Million)	Share of Singapore's Gross Exports (%)	Share of Singapore's GDP (%)
US	27,378	6.2	7.3
Eurozone	24,426	5.6	6.5
China	23,006	5.2	6.1
Japan	20,710	4.7	5.5
UK	6,479	1.5	1.7
Russia	3,497	0.8	0.9

Source: 2018 OECD TiVA

Table 2.4 Russia's VA embedded in Singapore's exports is concentrated in refined petroleum products and water transport services

Value added from Russia embedded in Singapore's gross exports by exporting industry

Exporting Industry	Value (US\$ Million)	Share of Singapore's Gross Exports (%)	Share of Singapore's GDP (%)
Water transport	925	0.2	0.2
Coke & refined petroleum products	916	0.2	0.2
Air transport	278	0.1	0.1
Chemical products	254	0.1	0.1
Electronics	236	0.1	0.1
All other sectors	888	0.2	0.2
Total (Russia Origin)	3,497	0.8	0.9

Source: 2018 OECD TiVA

Note: The components may not sum up exactly to the total due to rounding.

Even if the foreign VA embedded in Singapore's exports does not originate from Russia, production in the energy-dependent industries will be affected by recent sharp increases in global oil prices. **Table 2.5** lists the industries that require the largest amounts of energy-related inputs (in S\$ terms) based on Singapore's 2019 input-output tables. Energy-related inputs account for a particularly high share of total input requirements in the petrochemical (40.3%), air transport (31.5%) and water transport (14.4%) industries. Compared to the major global energy crisis in 1973, Singapore's dependence on energy has risen from 1.3% of overall inputs to 3.8% in 2019. The increase is due, in part, to greater downstream demand for refined petroleum products used as feedstock in the domestic petrochemical industry, which has expanded with the development of petrochemical complexes on Jurong Island over the decades. Meanwhile, oil dependence in the transport industries has also increased substantially. Higher energy prices will raise production costs in these industries significantly, with firms potentially cutting supply and passing on the cost increases to other intermediate stages of production.

Table 2.5 Energy-related inputs account for a larger share of total inputs in the petrochemical, air transport and water transport industries

Top energy-dependent industries

Industry	Petroleum, Electricity & Gas Inputs (S\$ Million)	Share of Total Inputs (%)
Water transport	15,680	14.4
Petrochemicals	12,942	40.3
Air transport	5,665	31.5
Wholesale trade	2,771	1.4
Semiconductor	1,318	1.3
Land transport	1,312	12.9
Real estate	741	2.3
F&B services	722	4.7
All industries (excluding energy sectors)	48,788	3.8

Source: DOS 2019 Singapore Input-Output Tables

Semiconductor companies should see limited near-term disruptions from the conflict as they have diversified their sourcing of raw materials

Compared to the petrochemical and transport industries, the semiconductor industry's reliance on oil or energy is smaller (**Table 2.5**). Instead, the exposure of the industry to Russia and Ukraine comes from their role as major suppliers of two crucial inputs: Russia produces 37% of the global supply of palladium⁴ and Ukraine supplies 70% of neon.⁵ Major global chip companies such as Micron, UMC and GlobalFoundries, which have production presences in Singapore, have thus far indicated limited disruptions as they have stockpiled raw materials and diversified sourcing since Russia's annexation of Crimea in 2014. Singapore imports palladium mainly from the UK and the US, rather than Russia, although some of Singapore's palladium suppliers may themselves be importing from Russia. In general, the constricted global supply of resources implies that future purchases would possibly need to be secured at higher unit prices.

The global semiconductor industry upturn could last longer than past cycles, but a normalisation of demand amid capacity expansion could presage an eventual consolidation

The domestic semiconductor industry has been riding the upturn in the global IT sector since 2019. Looking at past tech cycles, four phases can be identified from the interplay between global chip sales and inventory. The phases can be characterised as shown in **Table 2.6**.

⁴ U.S. Geological Survey (2022), "Mineral Commodity Summaries: 2022", January 31.

⁵ Chiao, J (2022), "Ukrainian-Russian conflict affects semiconductor gas supply and may cause rise in chip production costs, says TrendForce", TrendForce, February 15.

Table 2.6 The upturn of the tech cycle comprises the expansion and inventory accumulation phases, while the consolidation and adjustment phases tend to occur during a downturn

Phases in the global semiconductor industry

Phase	Global Chip Sales (% YOY)	Chip Inventory (% YOY)
Expansion	Positive	Negative
Inventory Accumulation	Positive	Positive
Consolidation	Negative	Positive
Adjustment	Negative	Negative

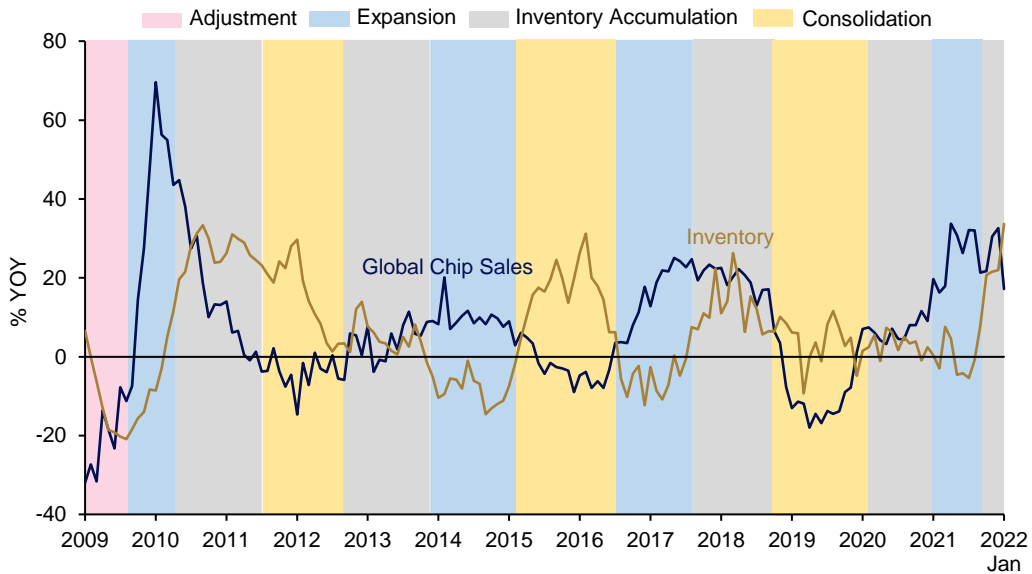
Source: EPG, MAS

Note: Chip inventory is weighted by the semiconductor export shares of South Korea, Taiwan, and the US.

In the current cycle, inventory dynamics in the wider electronics industry have been driven by the pandemic, followed by the outbreak of the war in Ukraine. At around the beginning of 2020, the industry entered the inventory accumulation phase (**Chart 2.9**). There was a surge in final demand for electronics amid global lockdowns and the attendant switch to working from home and domestic leisure activities, which accelerated the structural trend of digitalisation. The onset of the pandemic might also have induced panic buying and precautionary hoarding of chips by electronics manufacturers. The industry subsequently entered the expansion phase in late 2020, with robust growth in chip sales leading to a drawdown on chip inventory. The tight supply situation persisted throughout 2021, as indicated by global electronics PMI sub-indices on input prices, suppliers' delivery times and backlog of work (**Chart 2.10**). Towards the end of last year, the escalation in geopolitical tensions and persistent supply chain challenges triggered another round of hoarding. With the outbreak of the Russia-Ukraine conflict, the industry is expected to maintain inventory at a higher level for longer in the face of supply chain uncertainties. Together with still-firm global chips sales, the inventory accumulation phase of the cycle is expected to extend well into 2022.

Chart 2.9 The inventory accumulation phase of the IT cycle will likely extend into 2022

Global chip sales and inventory growth

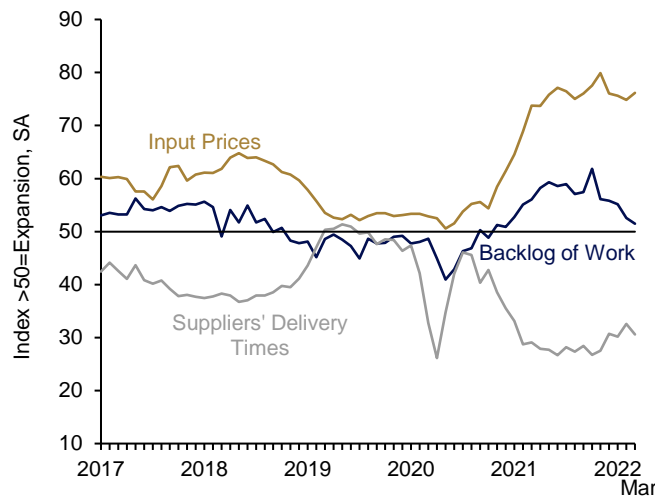


Source: WSTS and Haver Analytics

Note: Chip inventory is weighted by the semiconductor export shares of South Korea, Taiwan, and the US.

Chart 2.10 PMI sub-indices for global electronics indicate that supply remains tight

PMI sub-indices for the global electronics industry



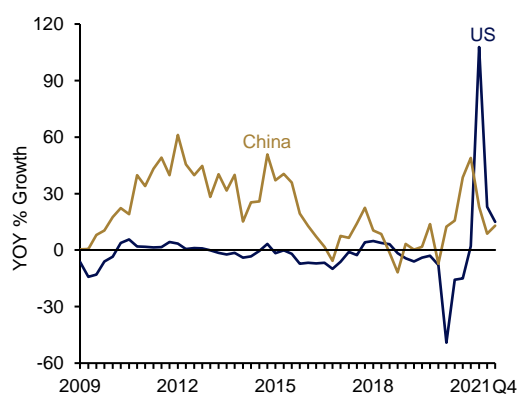
Source: IHS Markit

The global IT industry is in its third year of expansion, a longer upturn than previous cycles. Demand—particularly for advanced, higher-end chips—continues to be underpinned by structural support from the 5G market, cloud services and data centres, as well as from automotive and industrial applications. Nonetheless, in the coming quarters, global chip sales growth is expected to moderate from the rapid pace in 2021. Market research firm Gartner

has projected global semiconductor revenue to increase by 13.6% in 2022, compared to 26.3% in 2021. Investment and consumption demand for electronics, which was robust during the height of the pandemic, has shown signs of normalisation in recent quarters. Notably, after rapid growth in H1 2021, growth in consumption of IT products in the US and China decelerated in H2 (Chart 2.11). More recently, Apple has reportedly cut its planned output of iPhone and AirPods devices, citing the Russia-Ukraine conflict and high inflation as factors weighing on demand for consumer electronics. Similarly, growth in investment demand for technology equipment in the US has eased since the latter half of 2021 (Chart 2.12).

Chart 2.11 Growth in consumption of IT products has moderated since H2 last year...

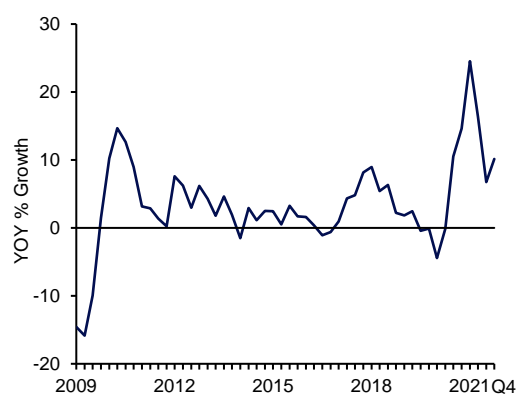
Consumption of IT products in US and China



Source: Haver Analytics

Chart 2.12 ... alongside slower growth in investment demand for technology equipment

US investment in technology equipment



Source: Haver Analytics

Note: The US fixed investment for information processing equipment is used as a proxy for investment in technology equipment.

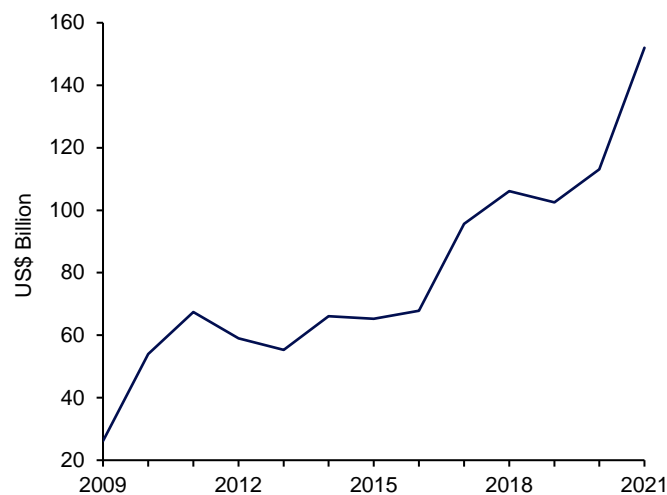
Meanwhile, supply expansion has continued apace, with global semiconductor capital spending increasing strongly by 34% to US\$152 billion in 2021 (Chart 2.13). Chip shortages and heightened geopolitical tensions have prompted governments to reassess their countries' positions across the semiconductor value chain, roll out new industrial policies, and undertake significant investments in semiconductor manufacturing and R&D. In the US, the CHIPS for America Act will boost chip manufacturing capacity by establishing a US\$52 billion fund to subsidise domestic manufacturing and research. Meanwhile, China's 14th Five Year Plan (2021–2025) aims to step up support for semiconductor production, including by reducing or exempting the industry from taxation, and by helping to build supply chains and to cultivate talent.

The global semiconductor value chain is mainly located in advanced economies such as the US, South Korea, Japan and Europe. However, a few economies hold significant market share in specific segments. For example, South Korea accounted for the principal share of global value added for memory chips at 59% in 2019, while China and Taiwan comprised 38% and 27%, respectively, of the value added for assembly, packaging, and testing (Chart 2.14). Going forward, there is a risk of further concentration in the semiconductor value chains within a handful of leading economies undertaking significant investment projects. Minor disruptions in the supply of chips from these locations could be amplified into significant supply bottlenecks and shortages globally.

In addition, there is potential for some overcapacity in 2023 as large-scale expansions begin to come onstream towards the end of this year. This is particularly the case for semiconductors in the relatively mature technology space, including certain dynamic random access memory (DRAM) chips that are used in personal computers and servers where the bulk of the capacity increase is occurring, rather than cutting-edge chips suitable for building central processing units (CPUs), graphics processing units (GPUs), artificial intelligence (AI) accelerators and networking processors, which are currently only produced by leading firms such as Samsung, TSMC and Intel.⁶ The risk of oversupply (especially in the memory segment) could weigh on chip prices, and thus nominal global chip sales. With the projected moderation in demand amid strong capacity expansions, the industry will likely enter a consolidation phase in 2023.

Chart 2.13 With slowing final demand but strong capex, the semiconductor industry could face some oversupply in 2023

Global semiconductor equipment spending

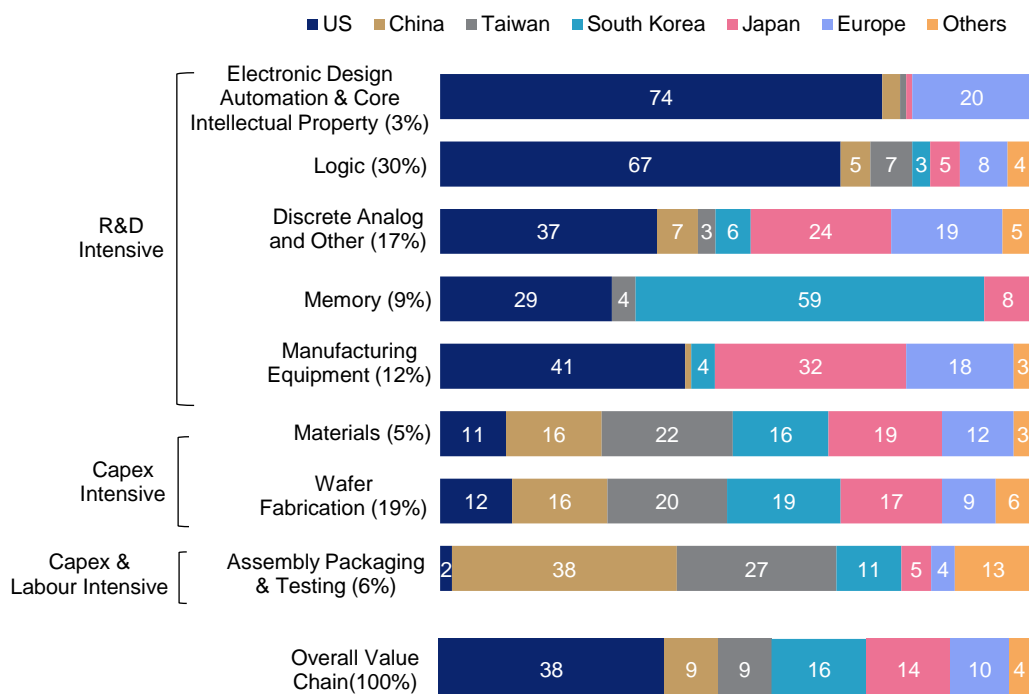


Source: Statista

⁶ Chips in the relatively mature technology space are in the 22 to 90 nanometer range, while cutting-edge chips require 10-nanometer or finer nodes.

Chart 2.14 Some segments of the global semiconductor value chain are highly concentrated in a few economies

Global semiconductor value added by activity and geography, 2019



Source: Semiconductor Industry Association, "2021 State of the US Semiconductor Industry"

Singapore’s trade-related sectors are likely to grow at a more moderate pace this year

Against this backdrop, the domestic electronics industry could see slower growth in 2022. Nonetheless, medium-term prospects for the industry remain bright. Singapore continues to attract investments by leading semiconductor firms. For instance, GlobalFoundries and UMC are building new wafer fabs for specialty integrated circuits used in growth areas such as internet of things (IoT), communication and automotive applications, with production expected to commence in 2023–24.^{7,8} At the same time, companies are pushing innovation boundaries, with the world's first "Lab-in-Fab" (an R&D line within a manufacturing facility) by STMicroelectronics in partnership with A*STAR and ULVAC expected to start volume production in Singapore by end-2022.⁹

While overall growth in the precision engineering cluster is projected to moderate this year from the double-digit expansion in 2021, the machinery & systems industry will remain supported by resilient demand for semiconductor equipment amid sustained capital investments by global semiconductor companies. Meanwhile, growth in the chemicals

⁷ Wu, D (2021), "U.S. Firm GlobalFoundries Invests \$4 billion in Singapore Chip Plant", Bloomberg, June 22.

⁸ Jennings, R (2022), "Why Taiwan's UMC is building a \$5 billion chip-making factory in Singapore", Forbes, February 28.

⁹ Leow, A (2020), "Chipmaker STMicroelectronics, A*STAR unit and Japan's ULVAC in Singapore R&D tie up", The Business Times, October 28.

cluster could be weighed down by the weaker outlook for the petrochemical industry, where elevated feedstock costs, together with a slowdown in demand from key export markets such as China, could compress margins and output. Slower growth could be offset in part by the petroleum refining industry, where prices of refined petroleum products such as gasoline and jet fuel might be supported by the continued recovery in fuel demand as more countries relax COVID-19 restrictions. Refining margins would be boosted if the rise in product prices outstrips crude feedstock costs.

As for the other trade-related sectors, wholesale trade and water transport are also expected to see slower growth in 2022, on account of lower global trade growth and ongoing supply disruptions arising from the Russia-Ukraine conflict. Europe's ports are suffering from congestion caused by customs checks to comply with sanctions. Analysts also warn of a labour squeeze in the global shipping industry where Ukraine and Russia account for 14% of commercial seafarers. Renewed COVID-19 lockdowns in major port cities in China such as Shanghai and Shenzhen have hampered logistics. Modern supply chains are complex and difficult to disentangle, and the war in Ukraine, with its associated sanctions, and ongoing COVID-19 restrictions are likely to continue hindering trade flows. These disruptions could contribute to shortages of key inputs and introduce frictions that would slow the delivery of goods to final consumers.

Growth in the financial sector could soften amid market uncertainties

The prognosis for the financial sector has weakened alongside the softer outlook for the global economy and a fall in business and financial market sentiment. The most significant negative impact is likely to be felt in the fund management segment, which could experience a material slowdown in growth compared to previous years' strong expansions. Global equities could underperform in the months ahead, reflecting the prospect of tighter-than-expected monetary policy settings in advanced economies. While the segment's longer-term structural trend of rising wealth inflows from the region remains intact, the short-term outlook could weaken amid the slowdown in regional economies, such as China.

In addition, the cyclical moderation in growth of the domestic and regional economies is likely to curb demand for credit and insurance. Accordingly, both the banks and general insurance segments are likely to expand at a more modest pace than predicted earlier. Similarly, growth in the payments processing industry could soften on the back of weaker consumer sentiment, even if it remains supported by the structural shift to e-payments.

In the quarters ahead, the downside risks to the financial sector remain elevated. First, slower growth and heightened inflation in the global economy owing to a prolonged Russia-Ukraine conflict or a resurgence in COVID-19 could inhibit demand for credit and insurance. Second, a faster-than-expected pace of policy tightening in advanced economies could dent market sentiment and lead to a repricing of financial assets. Finally, a more significant slowdown in the Chinese economy could have a broad-based impact on the financial sector, including through lower trade credit demand.

The substantial easing of mobility restrictions from Q2 will hasten recovery in the consumer-facing and travel-related clusters

With the cresting of the Omicron wave, mobility restrictions were eased significantly from end-March. Social gathering group sizes were doubled to 10 people, while the share of employees working onsite and the capacity limit for larger events was increased to 75%, from the earlier 50%. These restrictions were fully lifted from end-April. Nightlife businesses were also allowed to reopen from mid-April, after more than two years of closure. In addition, a new and simplified travel scheme, the Vaccinated Travel Framework, replaced the Vaccinated Travel Lanes scheme, with most restrictions lifted for fully vaccinated travellers to Singapore. These measures should bring forward the projected recovery in the domestic-oriented and travel-related sectors to Q2, instead of the latter part of 2022, as projected previously.

Nevertheless, the travel-related clusters are not expected to fully recoup their pandemic losses in the near term, as the uncertainty from the Russia-Ukraine conflict and spikes in prices could weigh on consumer sentiment. Further, there is a risk of a structural decline in business travel. The accommodation sector could take time to recover fully as tourists, particularly from countries in the region whose vaccination rates are lower, return only gradually, even as domestic demand for staycations wanes. To speed up the recovery in the tourism sector and capture pent-up travel demand, the government has earmarked nearly \$500 million in various initiatives to attract visitors to Singapore. These include curating and creating attractions and events with a sustainability and wellness focus, as well as defending Singapore's position as a "Global-Asia" node for business tourism. For example, Singapore recently hosted the Singapore International Water Week and CleanEnviro Summit Singapore and, in the coming months, will host other large-scale MICE events, such as Asia Tech x Singapore, Food&HotelAsia and Design Fair Asia.

Sectoral growth drivers will broaden in 2022, with overall GDP growth expected to come in at 3–5%

All in, GDP growth is projected at 3–5% in 2022, in the absence of further disruptions caused by the war in Ukraine or a severe worsening of the pandemic. The projected growth outcome represents a moderation from the 7.6% expansion in 2021, but would still be above trend for the second consecutive year. The drivers of growth should broaden to the domestic-oriented and travel-related clusters over the course of this year, with the substantial easing of domestic safe management measures and border restrictions. Accordingly, sectors which bore the brunt of the pandemic are projected to stage a more decisive recovery and contribute more significantly to GDP growth in 2022 compared to last year. The trade-related cluster, which led the recovery in 2021, could see its contribution shrink this year, while the contribution of modern services is expected to be stable. By the end of 2022, output levels in some segments of the economy are still expected to remain below pre-pandemic levels, although they would be significantly above their respective troughs. These include the travel-related industries of air transport, accommodation and AER, as well as the domestic-oriented industries such as land transport, construction and administrative & support services.

2.3 The Next Phase of Economic Restructuring in Singapore

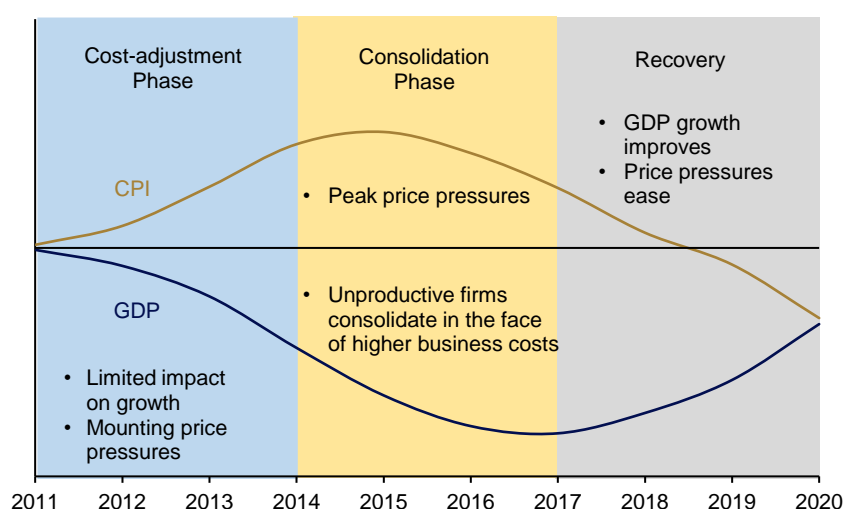
Singapore's restructuring journey in the last decade has led to productivity-driven growth

The Economic Strategies Committee (ESC) was formed in 2009 to develop strategies for Singapore to achieve sustained and inclusive growth. One of the key recommendations was a shift from a labour-driven to a productivity-driven growth model. A productivity growth target was set at 2–3% per annum, which would in turn support annual economic growth of 3–5%. In the course of this restructuring journey, the economy was expected to experience several phases of adjustments (**Figure 2.3**). In the initial cost-adjustment phase (2011–13), nominal wages would rise strongly, with CPI inflation staying above its historical average, reflecting tight labour market conditions, even as real GDP began to slow. In the consolidation phase (2014–16), GDP growth would slow discernibly while wage growth remained elevated. The steep rise in business costs could have caused some unproductive firms to consolidate or wind down their businesses in Singapore. In the recovery phase (2017–19), there would be a notable improvement in productivity (measured in terms of real VA per paid hour worked), and cost pressures were expected to ease. GDP growth was projected to pick up at the end of the decade.

Overall, the macroeconomic outcomes have been broadly in line with the path that had been envisaged (**Table 2.7**). From 2011 to 2019, GDP growth took a step down from the previous decade and became increasingly driven by productivity improvements. However, CPI inflation was capped in the latter half of the decade, in part due to the weakness in global oil prices. With inflation edging down and nominal wage growth picking up, there was a rise in real wage growth.

Figure 2.3 The 2010s saw three distinct phases of macroeconomic transition

Stylised profile of real GDP and CPI levels



Source: EPG, MAS estimates

Note: This chart depicts a stylised profile of the path of GDP and CPI over the transition period in comparison to a baseline scenario envisaged in 2011.

Table 2.7 Productivity improved following a period of transition

Average annual change in key macroeconomic variables

% YOY	2001–10	Cost-adjustment (2011–13)	Consolidation (2014–16)	Recovery (2017–19)	2011–19
Real GDP	5.9	5.2	3.5	3.1	3.9
Nominal wages	3.3	5.2	4.3	4.1	4.5
CPI-All items inflation	1.6	4.1	0.0	0.5	1.5
MAS Core Inflation	1.7	2.1	1.1	1.4	1.6
Real VA per paid hour worked	2.3	1.2	1.7	3.0	2.0
Contribution of productivity to real GDP growth	39%	23%	48%	97%	50%

Source: DOS, MOM and EPG, MAS estimates

Note: Real VA per paid hour worked is computed using real VA per worker and average weekly total paid hours worked per employee.

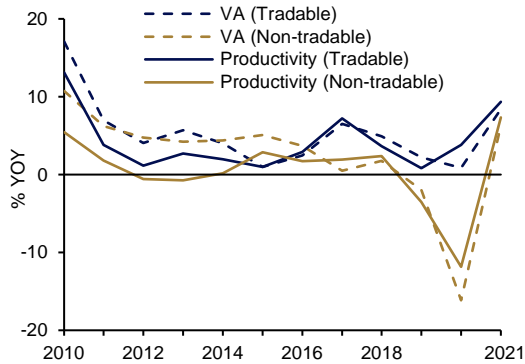
The overall transformation has been accompanied by widening divergence between the tradable and non-tradable sectors since the mid-2010s

The strong growth in overall wages and productivity during the recovery phase masked sectoral disparities within the Singapore economy. In the latter half of the 2010s, prior to the outbreak of COVID-19, both labour productivity and real VA growth were higher in the tradable than in the non-tradable¹⁰ sectors (**Chart 2.15**). Consequently, the VA share of the tradable sector in the economy increased to 73% by 2021, from around 65% in the mid-2010s (**Chart 2.16**). At the industry level, sectors involved in export activity, such as manufacturing, finance & insurance, information & communications and professional services, recorded stronger VA growth on average over 2017 to 2019, compared to the domestic-facing sectors such as retail trade and F&B services (**Chart 2.17**).

¹⁰ The tradable sectors comprise manufacturing, wholesale trade, transportation & storage, finance & insurance, information & communications, professional services and accommodation. The non-tradable sectors consist of F&B services, retail trade, real estate, construction, administrative & support services and other services industries.

Chart 2.15 Tradable sectors recorded higher VA and productivity growth than non-tradables...

Real value added and productivity growth

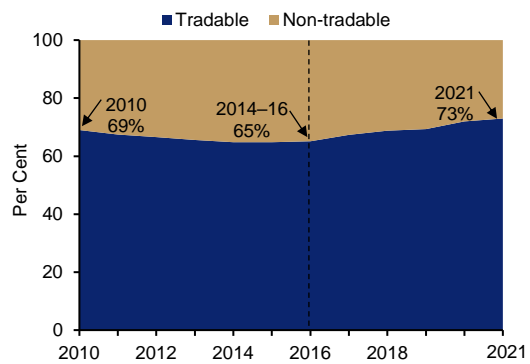


Source: DOS, MOM and EPG, MAS estimates

Note: Labour productivity refers to real VA per paid hour worked and is estimated using real VA, employment and average weekly total paid hours worked per employee.

Chart 2.16 ... and contributed an increasing share of VA over the last decade

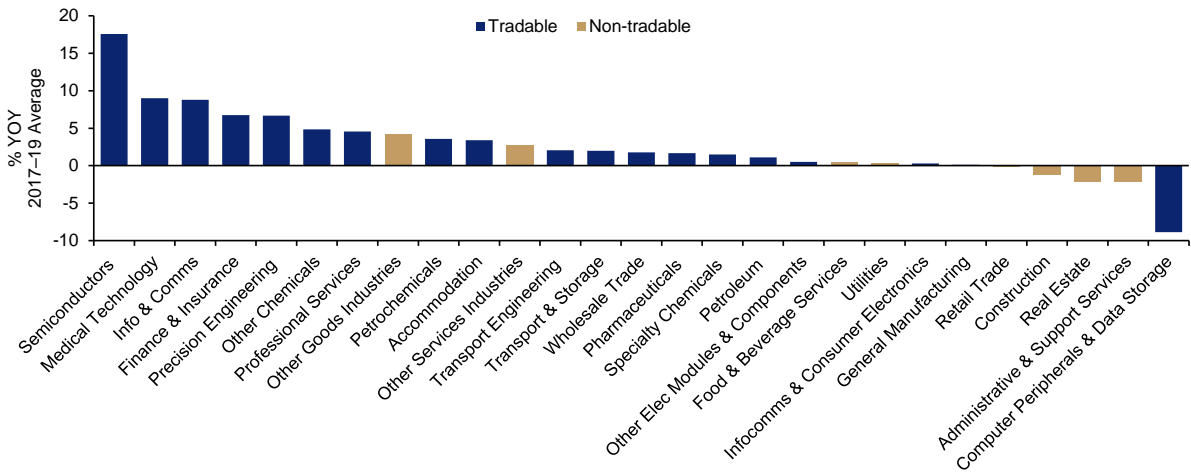
Share of nominal value added



Source: DOS and EPG, MAS estimates

Chart 2.17 Industries within manufacturing and modern services posted stronger VA growth in the latter part of the 2010s

Real value-added growth by sector



Source: DOS, EDB

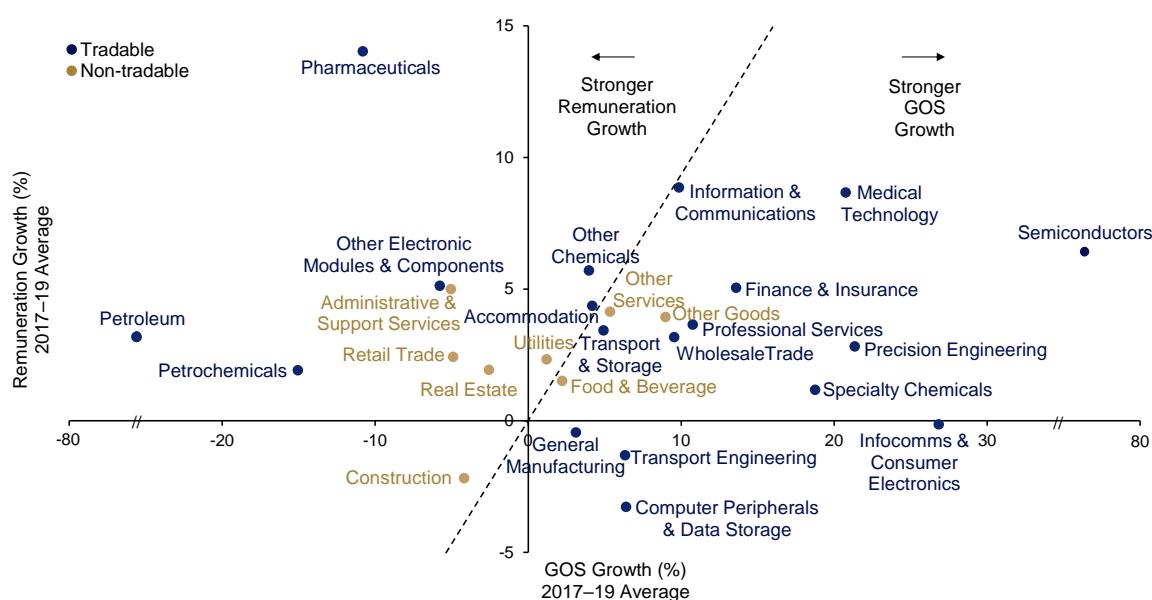
Note: IIP growth is used for the manufacturing industries.

Returns in the high-growth segments accrued mainly to capital owners and specific clusters of skilled workers

To examine the impact on the income shares of labour and capital, **Chart 2.18** shows a scatterplot of the average growth of nominal remuneration and gross operating surplus (GOS) by industry for the period 2017–19. Industries to the left of the dotted line registered stronger remuneration growth over the period, while those to the right posted stronger GOS growth. The tradable sectors tend to cluster to the right, indicating that capital owners gained a larger share of the strong value-added growth in these sectors in the years before the pandemic. In comparison, the non-tradable sectors are concentrated near the origin, indicating both weaker profitability and remuneration growth.

Chart 2.18 Capital owners in higher-growth tradable sectors gained a larger share of the VA created

Nominal GOS and remuneration growth by sector

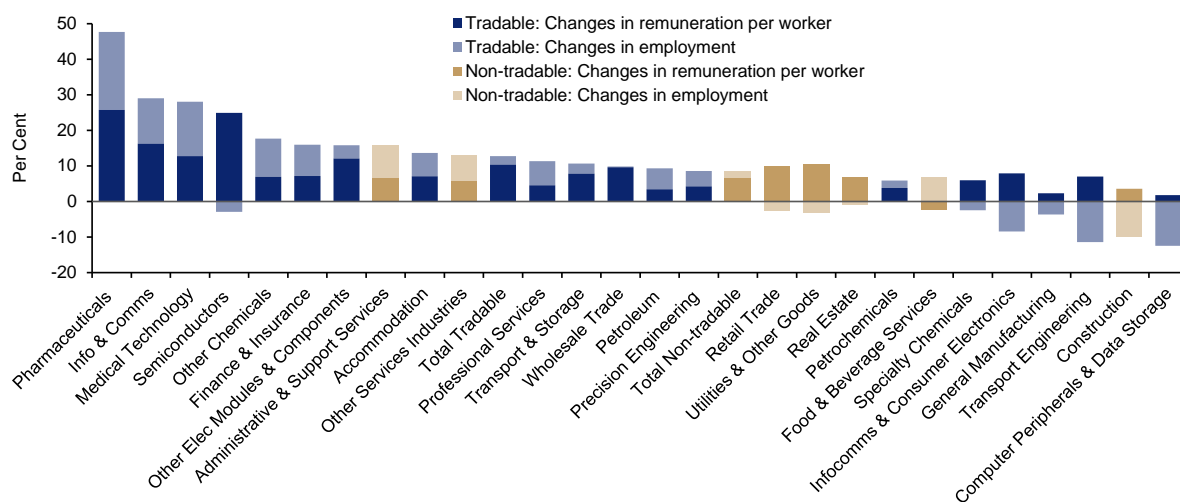


Source: DOS, EDB and EPG, MAS estimates

Similarly, a decomposition of remuneration growth showed stronger growth in remuneration per worker and employment in the tradable sectors compared to the non-tradable sectors. Skilled workers in specific clusters of tradable activities such as pharmaceuticals, information & communications, medical technology and semiconductor industries benefited from higher wage growth (**Chart 2.19**). However, there was also notable consolidation in the general manufacturing, transport engineering and computer peripherals & data storage industries, which recorded declines in employment during this period. Gross monthly income from work of full-time employed residents in the non-tradable sector continued to lag that of their counterparts in the tradable sector (**Chart 2.20**).

Chart 2.19 Skilled workers in certain tradable activities benefited from higher wage growth

Decomposition of remuneration growth, 2016–19

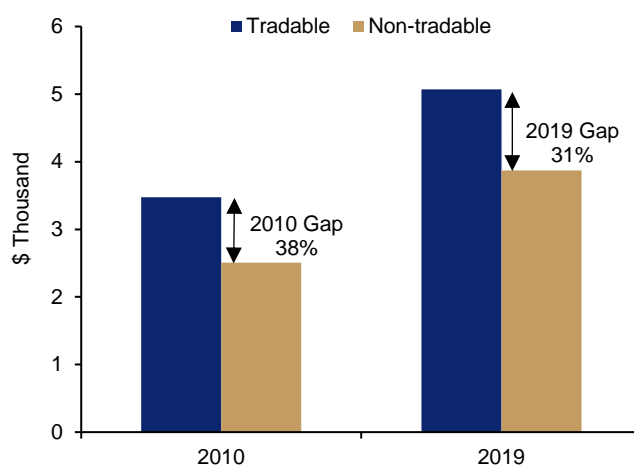


Source: DOS, EDB and EPG, MAS estimates

Note: Remuneration growth within each sector is further decomposed into changes in average remuneration per worker and changes in employment.

Chart 2.20 Median income in the non-tradable sector continued to lag behind the tradable sector

Median gross monthly income from work of full-time employed residents in the tradable and non-tradable sectors



Source: MOM and EPG, MAS estimates

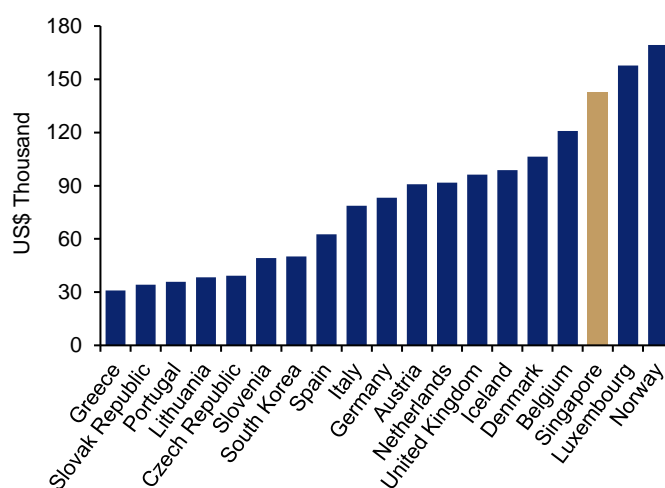
Note: Data shown are for June of each year and includes employer CPF. The gap in median gross monthly income from work is computed as the excess of median gross monthly income from work in the tradable sector compared to that in the non-tradable sector in the respective year.

Higher levels of productivity in the tradable sector have not translated into higher wages and prices in non-tradables

Singapore's tradable sector has one of the highest productivity levels in the world, exceeding that of most OECD countries (**Chart 2.21**). According to the Samuelson-Balassa hypothesis, countries with high productivity in the tradable sector tend to have higher overall price levels, compared to countries with lower productivity. High productivity in the tradable sector should lead to high wages in the tradable sector. If labour markets are competitive, labour will reallocate to the tradable sector as workers move into the high-wage industries. This leads to scarcity of labour in the non-tradable sector, bidding up wages there. As wages in the non-tradable sector rise, output prices in the sector increase, driving up overall price levels correspondingly.

Chart 2.21 Productivity in Singapore's tradable sector has exceeded that of most OECD countries

Tradable sector labour productivity (GVA per worker), 2019



Source: OECD

Empirical studies provide robust support for the validity of the Samuelson-Balassa hypothesis. Countries with high productivity in the tradable sector tend to have high wages and prices in the non-tradable sector compared to countries with lower productivity. However, this phenomenon generally did not occur in Singapore, with wages and prices in the non-tradable sector remaining substantially lower than those in the tradable sector. The divergence could be attributed to the abundant supply of foreign workers in the non-tradable sector, including in many domestic-oriented services, which has impeded the working of the Samuelson-Balassa transmission mechanism by dampening wage and price increases in the non-tradable sector.

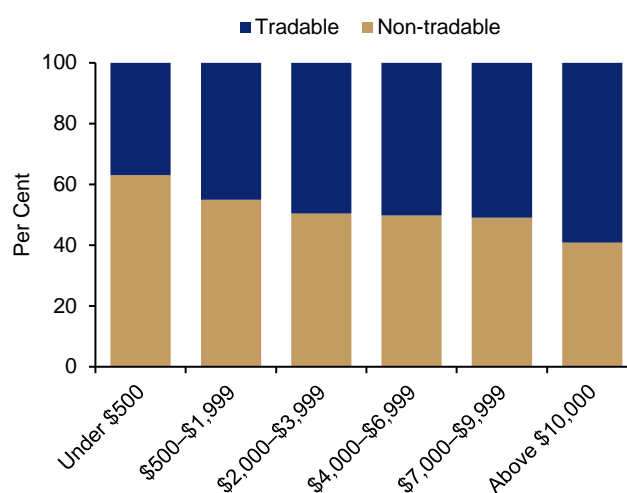
Lower- and middle-income households should benefit from larger wage increases in the next phase of restructuring

In the next phase of Singapore's restructuring, the wage gap between the tradable and non-tradable sectors is likely to narrow, driven by market forces and government policies. First, as growth in the resident labour force slows compared with the past decade, the resident workforce in the non-tradable sector is projected to grow at a slower rate than that in the tradable sector, reflecting residents' preference for working in the latter, particularly in modern services. Second, with foreign worker policy likely to remain tight especially at the lower end of the skills spectrum, the constraints posed by resident labour supply should become more binding, thereby lifting wages in the non-tradable sector and reducing the wage gap. Finally, ongoing government policies, such as the expanded Progressive Wage Model to raise incomes for low-wage workers, will also help to support non-tradable sector wages.

There would be important distributional gains from this transition.¹¹ Based on EPG estimates, lower- and middle-income households will likely see the largest increases in real wages, as the boost to their nominal employment incomes outweighs higher non-tradable prices in their consumption baskets. A larger proportion of lower-income workers are employed in the non-tradable sectors, such as F&B and accommodation services (**Chart 2.22**), that would see relatively large wage increases during the transition. In comparison, higher-income households may see relatively small increases in nominal income, as business income and employment income from the tradable sector account for relatively large shares of their total income.

Chart 2.22 With a higher proportion of lower-income workers employed in non-tradable sectors, lower- and middle-income households could see larger distributional gains

Share of workers in tradable and non-tradable sectors by gross monthly income from work bands, June 2017



Source: MOM and EPG, MAS estimates

Note: Data excludes employer CPF contributions.

¹¹ The results are based on EPG's estimation through merging data from MOM's *Comprehensive Labour Force Survey*, June 2017 and Department of Statistics' *Household Expenditure Survey* 2017/18.

In summary, the restructuring of the Singapore economy over the past decade has yielded greater productivity gains in the tradable sector. Spillovers to the non-tradable sector have been weaker than expected, resulting in a persistent wage gap between the two sectors. This wedge will likely narrow in the next phase of Singapore's restructuring journey, due to a combination of market forces and government policies. While it will entail a temporary period of adjustment in the form of higher business costs, the eventual rise in productivity in the non-tradable sector should help to offset these pressures. Lower- and middle-income households would also benefit the most from this transition through an increase in their real incomes.