Global Trade in Flux

Politics, Policy and the Reconfiguration of Supply Chains

Citi GPS: Global Perspectives & Solutions

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GLOBAL TRADE IN FLUX

Politics, Policy, and the Reconfiguration of Supply Chains

Manufacturing supply chains are undergoing a worldwide reshaping, driven by a combination of economics, geopolitics, technology and policy intervention.

Underpinning this in recent years has been a growing desire to build resilience to shocks by reducing concentration risk, rising protectionism, and rising geopolitical risks associated with US-China strategic competition.

All three of these factors are likely to lead to increased demand to diversify production and import reliance from China. The process has been moving very slowly in aggregate. This is partly due to China's compelling cost competitiveness, and the lagging impact of its industrial policies that have delivered market share gains in certain segments, offsetting supply chain shifts away from China.

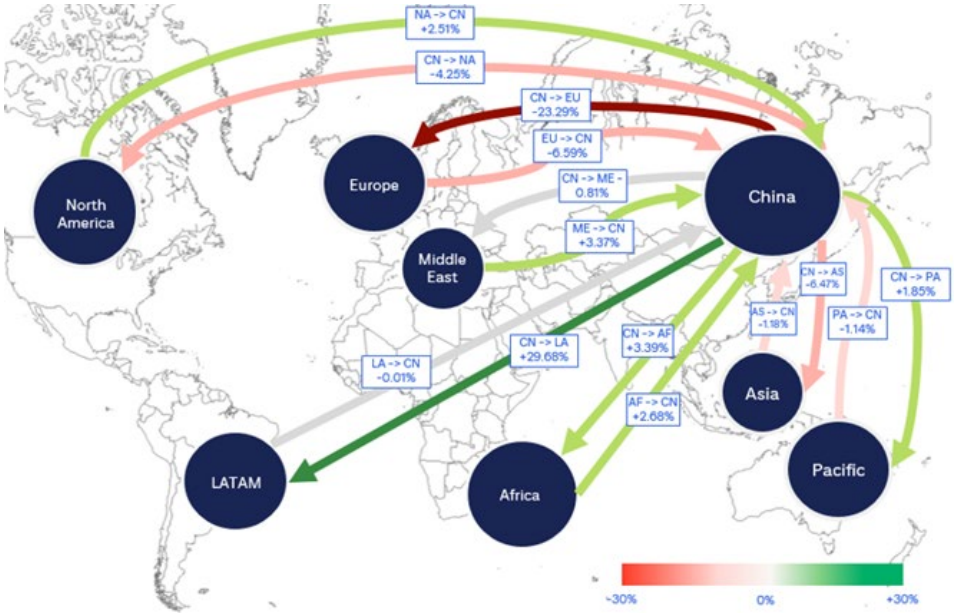
But we think China's global manufacturing share will gradually recede from here, providing ripe opportunity for some Latam and Asian economies to take market share – both are particularly well positioned given their proximity to either a large end-market (Latam, India) or to an already large existing supply chain ecosystem (East Asia).

In fact, these two regions – Latam and Asia –are already increasingly inter-linking thanks primarily to the China-Latam bilateral trade that has exploded in recent years.

Latam continues to be primarily a commodity exporter to China, while it imports mostly manufactured goods from China, more recently further buoyed by the role of China's cleantech exports (including EVs, solar and batteries).

Leveraging Citi's proprietary corporate payments data, Figure 1 shows almost +30% increase in payment flows from China to Latam over the last three years.

Figure 1. Change in Payment Flows between China and Major Regions: 2024 vs 2021



Source: Citi Global Data Insights, Citi Treasury and Trade Solutions

The challenge for Latam's future growth prospects is how can it diversify away from commodities and increase value addition and product complexity.

While there is some marginal sign that China's investment into Latam is diversifying from extractive industries, the progress on this still looks limited so far, as it seems investments are shifting from energy to metals. The goal is that friendshoring and Latam's ability to leverage its strategic relationship with China, US, Europe and the rest of Asia can advance this agenda.

We argue that Latam is ideally placed to benefit from friendshoring given its geographical proximity to the US and having the most regional trade agreements in the world. Early evidence from trading patterns suggests Mexico is seeing the biggest gains in market share of US imports. However, production relocation is still not evident in the Mexico FDI data, and it's not clear how much China is using Mexico as a platform for North America. The Caribbean, Central America and Costa Rica could all be potential winners.

There are also clearer signs that accelerated supply chain shifts are materializing in parts of ASEAN and India. ASEAN's success in attracting supply chains come from its own efforts to boost competitiveness, where there is already a deep manufacturing ecosystem built over many decades that can't be replicated elsewhere, especially in electronics.

ASEAN also has pursued structural reforms to improve the domestic investor climate and provide various fiscal and tariff reducing policy inducements. India's strategy involves improving competitiveness through high quality physical infrastructure, various fiscal support policies (taxes, preferential liked incentives) and leveraging its fast-growing domestic market.

Beyond broad based manufacturing relocation, **another important shift in global supply chains relates to semiconductors.** This is driven by policy interventions motivated by national security concerns to both reduce the concentration of high-end semiconductor fabrication in Taiwan, and to contain China's technological ambitions with the West imposing punitive export controls.

This generates three major implications:

1) Less profitability for large investments of high-end chips as leading Western companies lose access to China-related revenues, while technological innovation in China will require a larger amount of time and costs due to US-related sanctions.

2) Greater likelihood of overinvestment in legacy chip segments that China is increasingly producing and exporting, hurting other existing players.

3) Decoupling of technology supply chains could generate new opportunities for Latam over time if the US succeeds in boosting its share in global semiconductor fab capacity, providing more leeway to shift US demand for more labor-intensive Assembly, Test & Packaging (ATP) processes to countries like Mexico, Costa Rica and Panama.

A tougher challenge for the West will be to de-risk supply chain in critical minerals, needed to fuel clean energy solutions and in various technological applications, as they continue to be dominated by China. The upstream segments tend to be dominated by select resource rich emerging countries in Indonesia, South Africa and the Democratic Republic of Congo, whilst the midstream and downstream segments are dominated by China.

Based on announced projects so far, IEA estimates that there has been limited progress in diversifying supply and that geographical concentration of mining operations will remain high in their forecast period up to 2030F. Rising resource nationalism in some resource rich places can be a deterrent to investment – we already see some of these issues impacting Bolivia and Chile.

In general, China is not easily giving up its global manufacturing dominance as it is also seeking to de-risk its own supply chain from "unreliable" suppliers and defend its market share through the pursuit of industrial policies and supportive fiscal policies for infrastructure and industrial upgrading. The unbalanced supply-friendly versus demand-deficient fiscal policy support (so far) is leading to deflationary risks that has further buoyed its cost competitiveness. We outline four actions that China is taking in response to Western de-risking.

Lastly, **we discuss the potential for US to achieve a manufacturing renaissance**. For now, there is no clear evidence of this happening, and over the longer term, manufacturing has seen a sustained decline in its role in the US economy. We make the case for the possibility of a forthcoming renaissance.

But it remains to be seen whether such government interventions will succeed in generating a more competitive sector, or rather blunt efficiency and bring other unintended consequences.

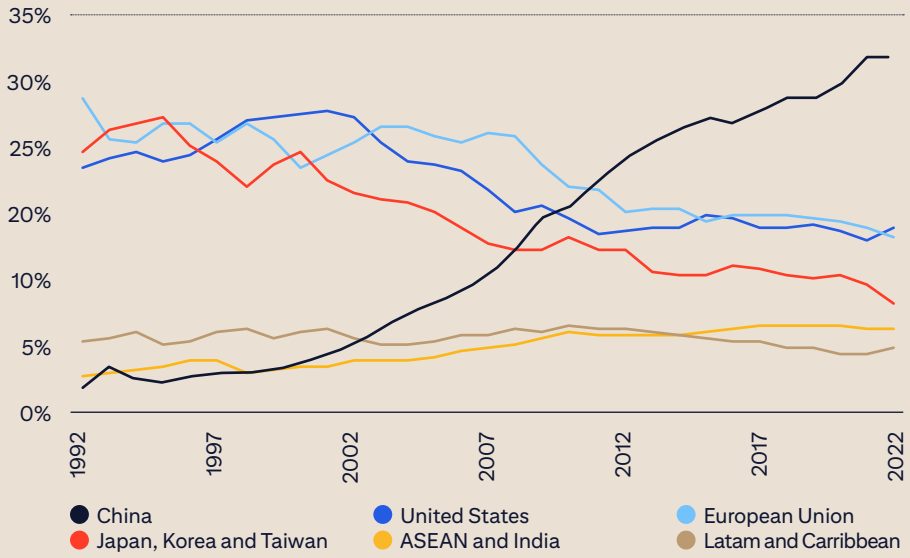
Global Trade in Flux

China's Resilience

China's manufacturing sector has been remarkably resilient despite being the target of trade and investment de-risking efforts by the West.

Share of Global Manufacturing Value Added, in Current USD

Source: UNIDO, Citi Research

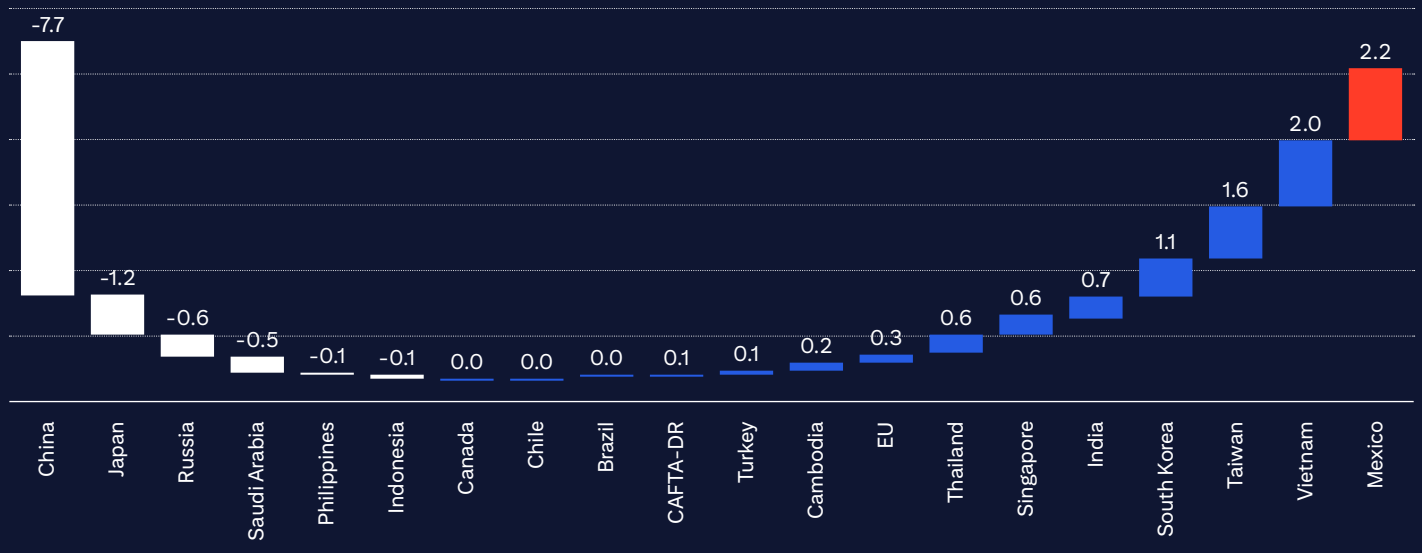


China Loses, Mexico Gains in US Imports Share

From 2017 to the 1H24, China has lost 7.7pp in market share in US imports on the back of decoupling. Mexico has benefitted most from this trend, gaining 2.2pp in market share in those US imports.

Gains in US import shares (pp) (Jan-Jul 2017 vs. Jan-Jul 2024)

Source: US Census Bureau, Citi Research

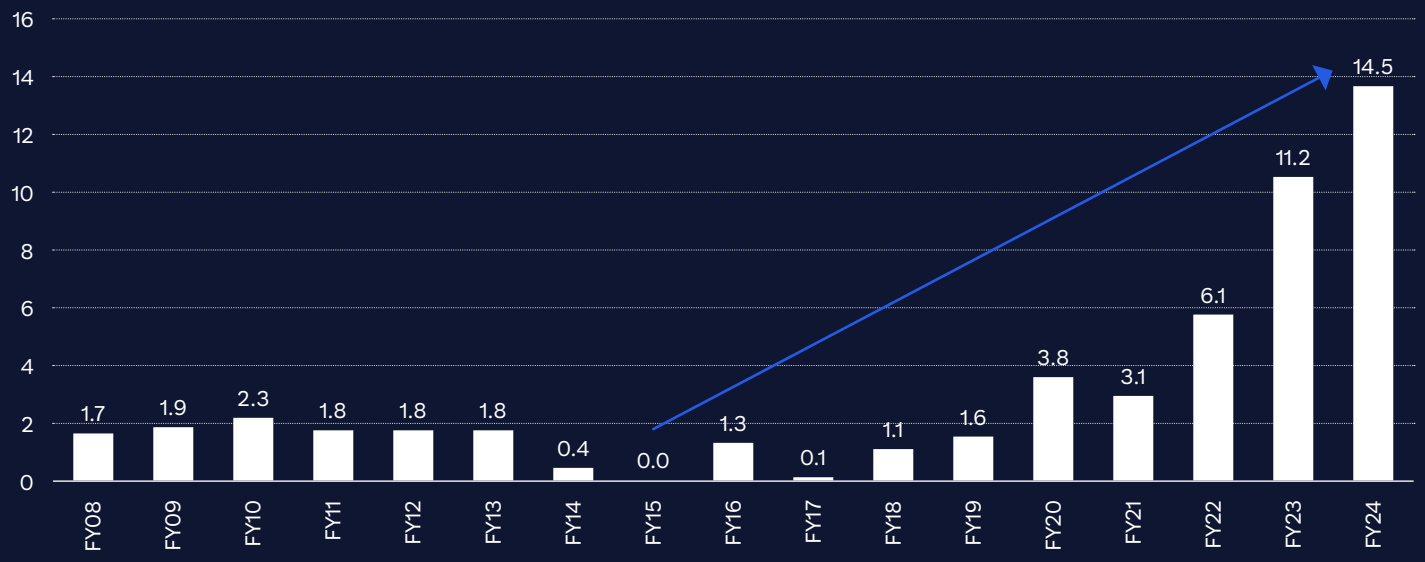


India's Mobile Rise

Production relocations to India have been most prominent in the mobile phone space, where annual mobile phone exports have grown over nine-fold in the past 5 years.

Mobile phone exports, India (USD Billions)

Source: Citi Research, ICEA

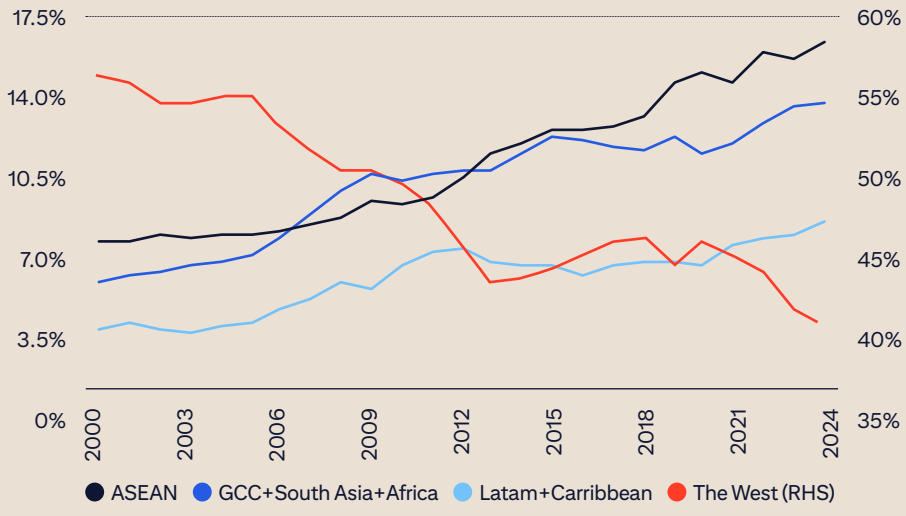


ASEAN Trumps West

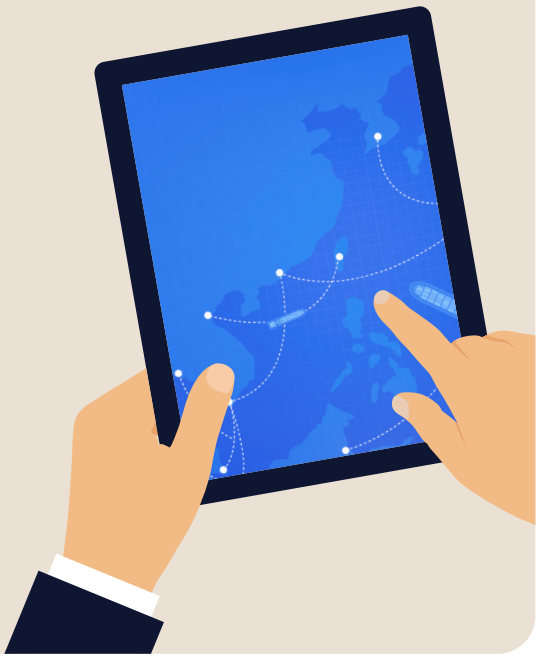
Some of the surge in exports to the Global South is a reaction to rising protectionism in the West, especially in the US, leading Chinese companies to diversify into new markets.

Geographical Destination of China's Exports

Source: Haver, Citi Research



Note: The "West" – US, CA, UK, EU, NO, JP, AU & NZ



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How Globalization is Changing

Johanna Chua

We think a combination of economics, geopolitics, technology and policy interventions are significantly changing the contours of global trade.

The most common metric by which globalization is measured is via goods trade intensity of GDP.

Following a brisk period of rapid trade growth in the 1990s-2000s, spurred by spread of neoliberal economic policies that fostered a widespread dismantling of trade barriers, and an ICT revolution that paved the way for the proliferation of Global Value Chains (GVCs, i.e. the fragmentation of production across borders), we saw rapid rise in goods trade intensity, reaching its peak in 2008, the year of the onset of the global financial crisis (GFC).

It had stalled since then—partly driven by cyclical forces (weak AE goods-intensive capex demand post GFC) but also partly by structural economic drivers. For example, China's rapidly growing size and productive capacity, alongside technology upgrading, has led to a significant shift towards reshoring of intermediate goods. In fact, goods trade intensity of China's economy peaked in 2006, two years earlier than the global aggregate. (Figure 2)

However, we think part of this stalling goods intensity may have also been driven by disruptive technology, with a seismic shift from "physical" to "digital" following the boom in mobile internet right after the global financial crisis, (iPhone was launched in 2007), and arguably a shift in value added from hardware to software.

Related to this, we've argued in our previous work that **globalization of services never stalled**, especially if we adjust for disruption in travel services during the pandemic. In fact, digitally delivered service exports have grown rapidly in recent years, far outpacing both goods and other services trade. (Figure 3)

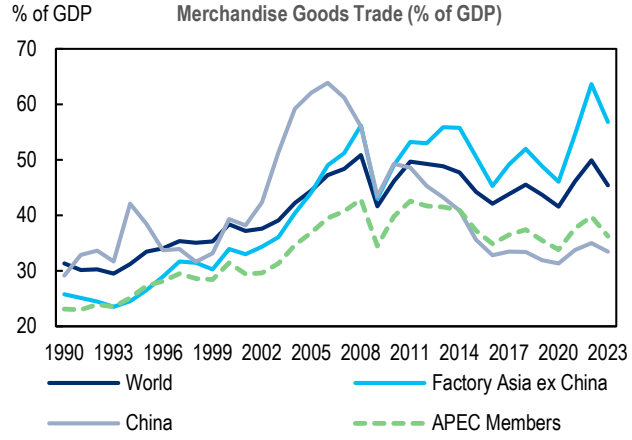
While trade in *final* services can face regulatory restrictions, work by Baldwin et al. notes that trade in *intermediate* services has been far more porous[1], and the widespread shift to remote work during the pandemic likely accelerated this shift.

In other words, "*if you can work from home, why not work from Bangalore?*"

We see this as an important driver for globalization, and associated productivity growth, for years to come.

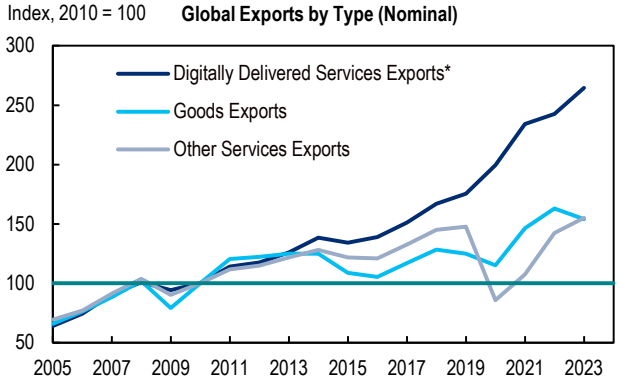
[1] R. Baldwin, R. Freeman and A. "Deconstructing Deglobalization: The Future of Trade is in Intermediate Services," *Asian Economic Policy Review*, Vol 19, Issue1, January 2024

Figure 2. Goods trade intensity of global GDP has stalled since the Global Financial Crisis; Trend within "Factory Asia" diverges



Source: WTO, Citi Research

Figure 3. Rise in globalization of services continue unabated, led by digitally delivered services



Source: WTO, Citi Research

In more recent years, the salient trade issues are three-fold:

1) Building a more resilient supply chain that can better withstand various shocks (climate, pandemics, geopolitics), and thus, arguing for reducing concentration risk;

2) Rising protectionist-leaning populism in the West led by the US;

3) Geopolitical risks associated with US-China strategic rivalry and ideological rifts emerging between “the West” and China.

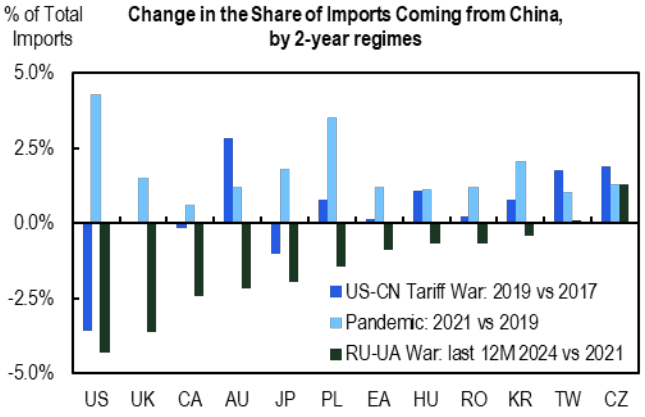
The latter has led to the elevation of national security objectives in trade and investment policies, especially in the environment where asymmetric leverage in supply chains can be increasingly “weaponized”.

Among these three more recent issues shaping trade and investment, we think the geopolitical angle to fragmentation likely sounds the most caution towards the future.

We think China’s position during the Russia-Ukraine invasion in 2022 was a watershed moment that pushed broader Western de-risking efforts against China. This was not yet visible during the 2018-19 Trump tariff war, when it was largely only the US that de-risked from China, or during the pandemic, when import reliance on China grew (Figure 22. FDI flows into LatAm are stagnant..

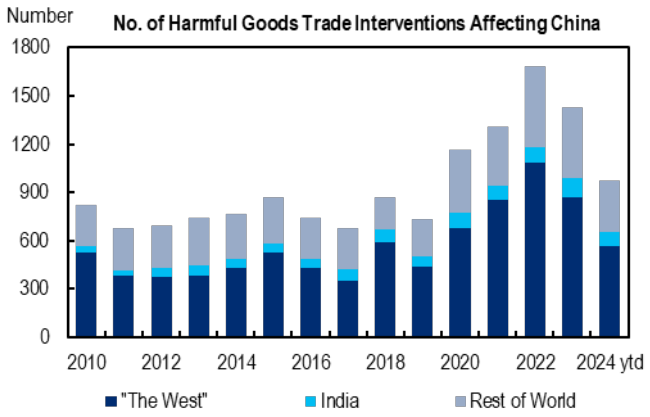
In recent years, we’ve seen a notable rise in harmful goods trade interventions against China, mostly from the “collective West” (Figure 5)

Figure 4. Share of Chinese imports by "Western" allies outside of the US only notably fell since the Russia-Ukraine war



Source: Haver, CIti Research

Figure 5. The "West" has been the main driver in the rise of harmful goods trade interventions impacting China*



Source: Global Trade Alert, Citi Research; Note: *Data downloaded on 3 Nov 2024

These emerging geopolitical fissures have spawned economic studies trying to assess the potential costs of geoeconomic fragmentation; i.e. policy-induced changes in cross border flows guided by strategic considerations.[2]

The relative resilience of global trade to GDP in recent years suggests that these fragmentation risks have been mitigated so far, both due to mixed incentives across Western economies to de-risk from China (e.g. EU, Korea de-risking much less than the US) and the emergence of non-aligned EM countries that are able to function as conduits and/or alternative downstream production bases at relatively manageable costs.

Another development is the resilience of China's manufacturing sector despite being the target of trade and investment de-risking efforts by the more affluent tech-leading Western block. China's share of global manufacturing value added hovered close to 30% in 2023 and its goods export market share has stayed relatively stable in recent years at 14.5-15% of world exports— both these figures are still higher than pre-pandemic and pre-US tariff war levels. This not only demonstrates the tremendous stickiness and inertia in supply chains, but China's compelling cost competitiveness aided by supply-friendly fiscal policies and the lagged effects of its industrial policies, especially as it relates to clean technologies that are now yielding China significant market share gains.

Nonetheless, we think **China's manufacturing share will likely gradually recede going forward for three reasons.**

First, we think the incentive to diversify supply chains from China will be too strong and persistent for the three reasons cited earlier – supply chain resilience, desire to mitigate tariff/non-tariff barriers against China, as well as geopolitically induced policy risks.

In fact, we worry that the definition of what constitutes "national security" restrictions on China appears to be broadening, encompassing not only dual-use civil-military technology, but categories relating to data (e.g. US considering outright bans on EV software from China).

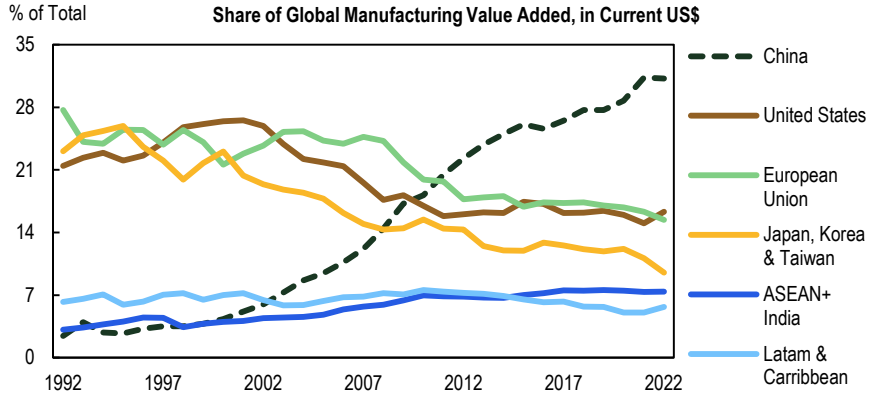
[2] Definition taken from G. Gopinath et. Al. "Changing global Linkages: A New Cold War?" *IMF Working Paper No 24/76*, April 2024.

Second, we think China's weaker, longer-term growth prospects and stiff domestic competition is another reason for companies, including Chinese ones, to want to diversify production out of China.

Lastly, the underperformance of China's gross FDI inflows will likely mean reduced technology transfers from the leading frontier, which will come at a competitiveness 6cost over time.

The reconfiguration of global manufacturing provides ripe opportunities for other countries in Latin America and Asia to gain market share in a complex geopolitical landscape where global trading and production networks remains continually in flux.

Figure 6. Global Distribution of Manufacturing Value Added, Select Major Markets



Source: UNIDO, Citi Research

New Trade Corridor: China & LatAm

Ernesto Revilla

Felipe Juncal

Johanna Chua

The presence of China in Latin America has grown significantly in the last two decades.

This increased presence can be essentially understood as an attempt to gain influence in a region that is strategic (for its proximity to the U.S. and representing a significant proportion of economic activity and population in the western hemisphere), that has significant financial and technological necessities, and that for several reasons, has been a low priority for U.S. foreign policy. A recent 21-page *Foreign Affairs* essay penned by US Secretary of State Antony Blinken emphasizing the importance of US alliances, for example, barely mentioned Latin America.[3]

China's trade and financial ties in the region have increased considerably since its entry into the World Trade Organization (WTO) in 2001. Initially, **Latin America became more exposed to the development of the Chinese economy due to the demand for commodities**, which fueled the commodity boom in the second half of the 2000s and which has become a strong determinant for LatAm's economic activity. Indeed, the LatAm growth cycle has become closely tied to the commodities cycle (Figure 7).

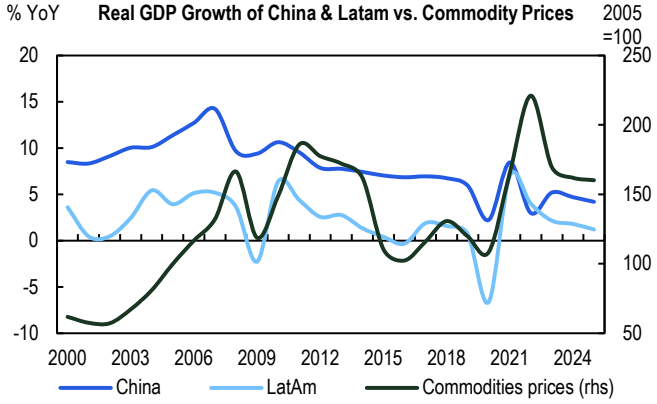
Bilateral trade has exploded. Exports from the region to China increased from practically nothing in 2000 to close to $244 billion in 2023 (Figure 8). Imports, also from a negligible base, now add to close to $247 billion, for total bilateral trade of around $490 billion.

LatAm has always had a trade deficit with China that increased consistently until reaching a peak in 2015 (1.8% of GDP). In 2023 the trade deficit between LatAm and China was $2.8 billion [4], although Mexico explains most of that deficit (Figure 9), as it is not the traditional Latin American exporter of commodities to the Asian country.

China's importance as a trading partner for the region has continued to increase. It now represents 13% of all exports from LatAm, while almost 10% of all imports of the region now come from China (Figure 10).

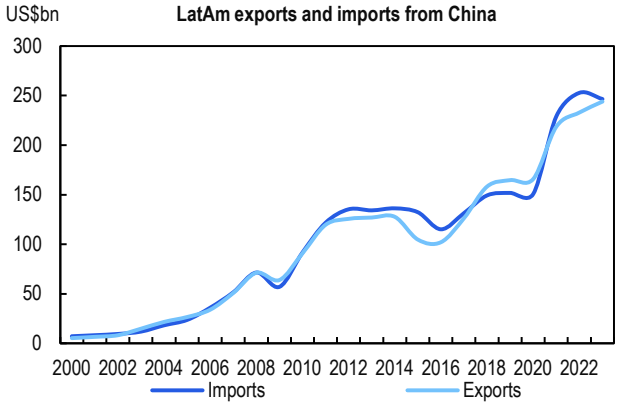
[3] Antony J. Blinken, "America's Strategy for Renewal – Rebuilding Leadership for a New World," *Foreign Affairs.* Vol. 6, No. 3, November/December 2024.
[4] worldbank.org/countryprofile/en/chn

Figure 7. LatAm is more closely intertwined with China, especially through commodity prices



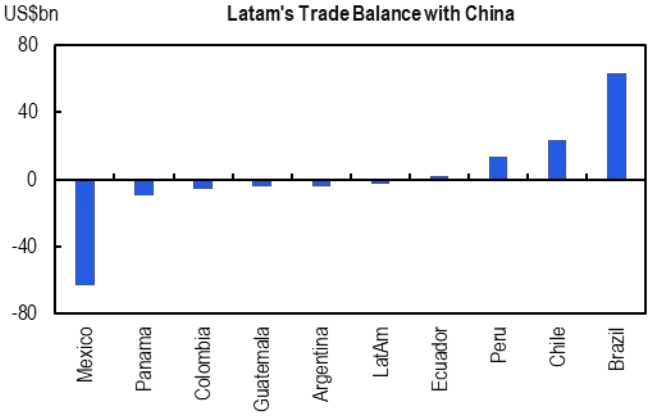
Source: World Bank, IMF, Citi Research

Figure 8. Increasing commercial trade ties between China and LatAm



Source: Haver Analytics, Citi Research

Figure 9. LatAm's Deficit with China Is Mainly Due to Mexico



Source: WITS, World Bank, Citi Research

Figure 10. LatAm's Export Share to China and China's Import share from LatAm

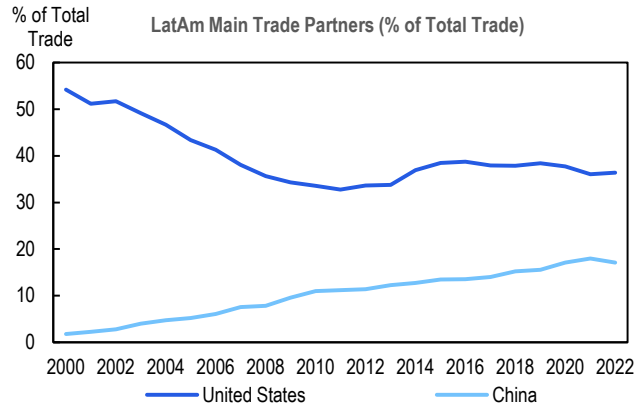
Source: Haver Analytics, Citi Research

By and large, LatAm continues to be a commodity exporter to China. Seventy percent of all LatAm exports to China fall in four commodity categories: soybeans (and other oilseeds), iron ore (and concentrates), crude oil, and copper (including ores and concentrates).

Brazil leads the market in soybeans and iron ore, Chile in copper, the oil export market to China is divided between Brazil, Venezuela, and Colombia, while Peru participates marginally in iron ore and copper. This is mostly a South American story.

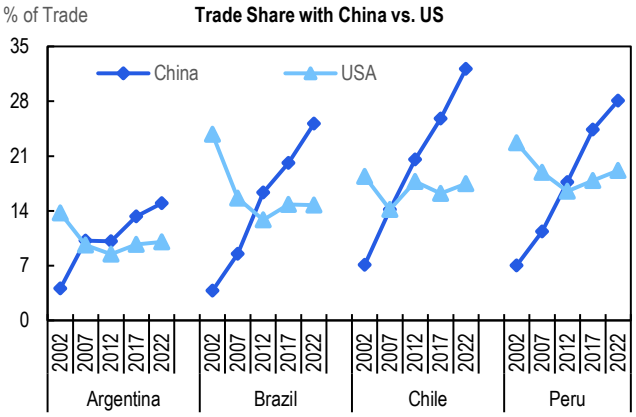
Indeed, China is now the main trading partner for Brazil, Peru, and Chile firmly displacing the U.S. to the second place in all three cases (Figure 9). Brazil exports a more diversified mix of agricultural commodities, metals, and energy commodities, and some manufactures to China, while Peru and Chile have a non-diversified export mix of mostly copper (plus a few manufactured goods).

Figure 11. Historical trend in LatAm's Trading share with US vs. China



Source: WITS, World Bank, Citi Research

Figure 12. LatAm commodity exporters - US vs. China trade shares



Source: WITS, World Bank, Citi Research

LatAm imports from China mostly manufactured goods, primarily capital goods but also some intermediate inputs and consumer goods. The commercial relationship between China and LatAm is skewed structurally from inception towards the supply of commodities in exchange for manufactured goods.

More recently, China's exports to the region jumped almost 60% in just three years alone with new growth areas emerging. In particular, the largest source of increase came from electric machinery, which includes solar panels and batteries, etc.) and vehicles -- together accounting for almost 40% of the jump.

It is important to note that the surge in Chinese exports into LatAm is relatively broad-based, extending to steel, textile/garments and broader manufactured finished goods, a reflection of China's recent gains in cost competitiveness fueled by unbalanced policy mix.[5]

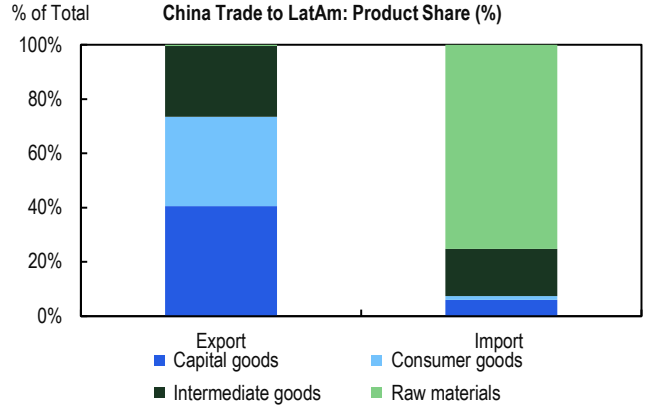
The challenge for LatAm's future growth prospects is how can it diversify its industrial base away from commodities and increase value addition and product complexity. In general, commodity exports add little value to the raw material, while value added increases with the complexity of manufactures.

In this sense, China can progress through the complexity-value-added ladder (as has already been the case), but LatAm cannot as easily do so under this current bilateral trade model, especially as China goods exports continues to make significant inroads into LatAm markets given its cost competitiveness.

We are already seeing some occasional protectionist backlash against Chinese imports, e.g. Brazil imposing tariffs on Chinese goods. Balancing the tradeoff between strong commodity exports to China with LatAm's desire to develop its own industrial base will likely define the future China-LatAm trade relationships.

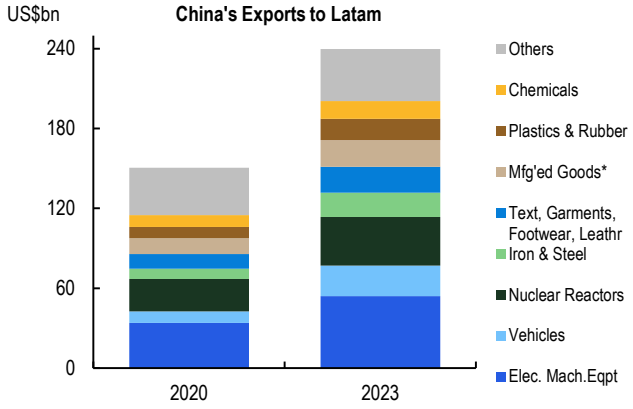
[5] See *EM Monthly: China's Manufacturing Glut and its Global Ramifications*

Figure 13. Latam's Trade Relations with China: "Our commodities for your manufactured goods"



Source: World Bank, WITS, Citi Research

Figure 14. More recent surge in China's exports to Latam incorporate significant cleantech components



Note: **Manufactured goods include Toys, Games, Sports Equipment, Furniture, Beddings, Carpet, Umbrella, Musical Instruments, Clocks, Tools/cutlery, glassware, other misc. manufactured goods

Source: UN Comtrade, Citi Research

We next discuss financing linkages between China and Latam. First, we note that official financing has slowed down. After solidifying the trade relationship in the 2000s, China has been a more important lender to LatAm since the Great Recession.

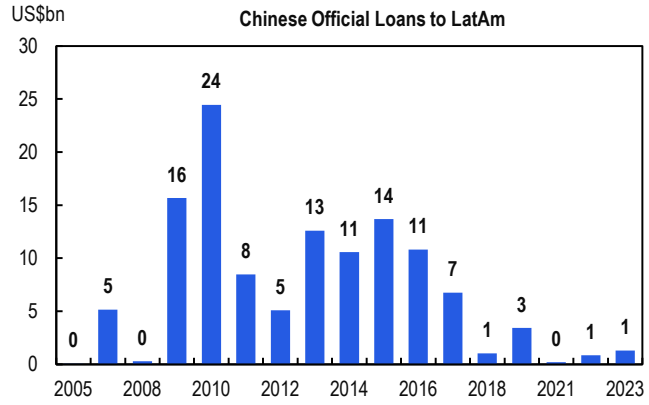
According to an important database of loans from Chinese policy banks to LatAm (the China–Latin America Finance Database from the Inter-American Dialogue), since 2010, China has been more active as a lender to Latin America, but with a slowdown after 2016.

The bulk of this financing is associated with the energy and transportation sector (56% of the total from 2019 to 2023). Venezuela is a particular case, getting $59 billion (or 49% of the total). Other than Venezuela, Brazil (with 27%), Ecuador (10%), Argentina (6%), and Bolivia (3%) received most of the Chinese lending in the last years.

It's no surprise that the countries receiving Chinese financing had political regimes more sympathetic to the Chinese government and further from the United States. Chinese loans often come with less stringent conditions than those from other international organizations, making it easier for Latin American countries to turn to them.

Other data sources show increased Chinese investment activity in LatAm since 2016 (Figure 16). From a database on Chinese overseas investment and construction in the region (the China Global Investment Tracker by the American Enterprise Institute), one can also see a more consistent and deliberate presence of China in the region. In the period 2019 to 2023, China has invested $73 billion in the region, a similar number compared to $70 billion in the years 2005-2011, but less than in 2012 – 2018 where they invested $110 billion.

Figure 15. Chinese official financing has been on a trend decline in LatAm...



Source: The Dialogue, Citi Research

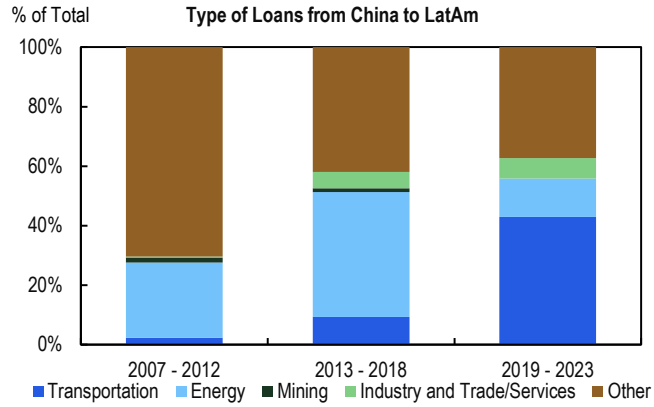
Figure 16. ...but other data sources tracking Chinese investment announcements suggest still a robust presence in the region

Source: AEI, Citi Research

Chinese investment in LatAm is marginally diversifying away from the extractive industries. Originally, Chinese investment in LatAm consisted mainly of Chinese's state-owned companies investing mostly in the extractive industries (oil, gas, metals, and agriculture), to ensure natural resources to fuel its economy.

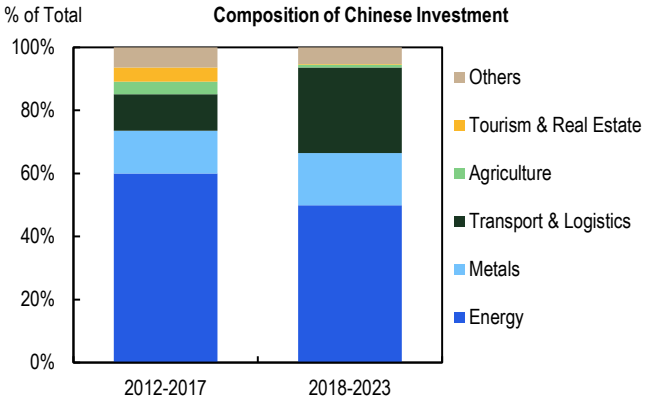
Now, while there is still a significant extractive component, there is also more investment in transportation, utilities, and health sectors. (Figure 17).

Figure 17. Loans from Chinese policy banks are becoming more diversified



Source: The Dialogue, Citi Research

Figure 18. AEI data also show increased diversification of Chinese investments



Source: AEI, Citi Research

The dependence on trade with China, in some South American countries, makes them potentially vulnerable to the region's economic diversification objectives, and could also potentially reduce the region's autonomy in foreign policy. Nearshoring opens opportunities to diversify and develop manufacturing capacity, reducing this economic and financial dependence.

Latin America should continue leveraging friendshoring to build strategic relationships not only with China but with the U.S., Europe, and the rest of Asia. This would require reforms and incentives to attract foreign direct investment (FDI), improve infrastructure, and develop productive capacities. The next five years are key for the region to capitalize on the opportunity.

Latam at the Crossroads of a Big Nearshoring Opportunity

Ernesto Revilla

Felipe Juncal

Latin America is ideally placed to benefit from friendshoring, but challenges remain.

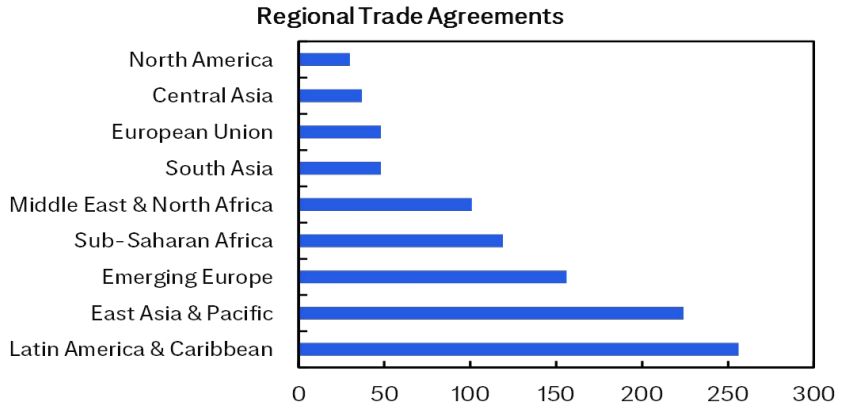
Latin America has played an important role in the restructuring of global value chains that has occurred given the seismic shifts of the Pandemic, tensions between the US and China, and geopolitical headwinds.

Latin America's Friendshoring Potential

The main advantage for Latin America is its geographical location: close enough to North America, the biggest consumer market in the world, but also with easy access to Europe and Asia through the Atlantic and Pacific.

Its relative better demographics, and political stability (again, in relative terms) also help. Trade agreements such as the USMCA, DR-CAFTA, and Mercosur facilitate trade and regional competitiveness. Latam has the largest number of regional trade agreements in the world (Figure 19), making it a wide open and experienced region in global trade and investment.

Figure 19. Latin America has the most regional trade agreements in the world



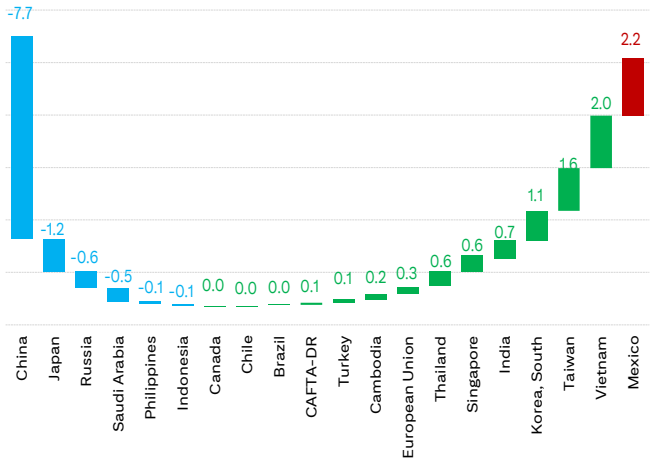
Source: WTO, Citi Research

The region has already benefitted from shifts in global trade patterns. From 2017 to the 1H24, China has already lost 7.7pp in market share in US imports as decoupling from the US has happened. Mexico has benefitted most from this trend, gaining 2.2pp in market share in those US imports.

Asian countries –Vietnam, Taiwan, South Korea, India, Singapore, and Thailand-- come next. The market share has remained practically constant for CAFTA-DR countries, as well as for Chile and Brazil (Figure 20).

By end-use products, the region has gained market share in important catalogued inputs for manufacturing, such as car and truck parts, steelmaking, television and video, and medical equipment (Figure 21).

Figure 20. Mexico has significantly gained market share in US imports.



Source: US Census Bureau, Citi Research

Figure 21. Since 2017, the region has gained important market share in some US imports

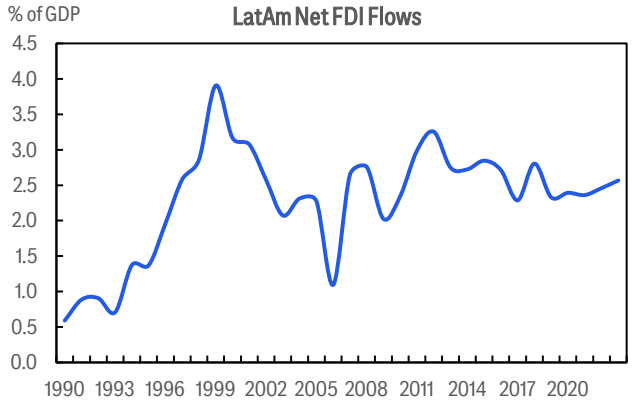
Note: The countries included in the region's imports are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Uruguay, Venezuela.

Source: US Census Bureau, Citi Research

However, nearshoring is still not evident in FDI data. In the region, foreign direct investment (FDI) flows have shown moderate growth over the past decade (Figure 22).

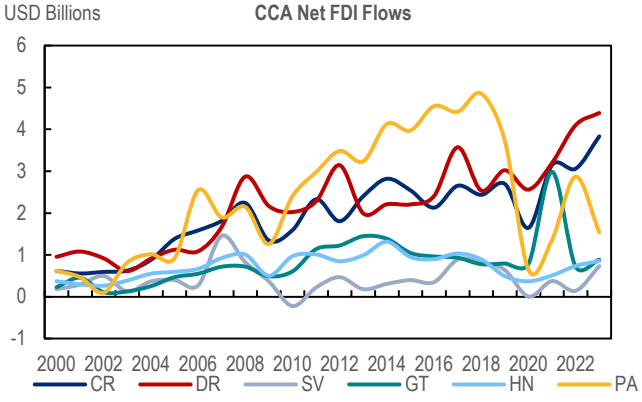
This stands in contrast to the big expectations from nearshoring/friendshoring trends for the region. In the last 10 years, FDI flows have represented 2.6% of GDP well below the peak of 3.9% reached in 1999. In Central America, FDI flows have remained practically constant, except for important cases such as increases in Costa Rica due to investments in technology, and investments in tourism in the Dominican Republic, as well as a decline in flows to Panama since 2020 (Figure 23).

Figure 22. FDI flows into LatAm are stagnant.



Source: ECLAC, World Bank, Citi Research

Figure 23. CCA is not the exception.



Source: Haver Analytics, Citi Research

Where is the nearshoring evidence for Mexico? In the case of Mexico, FDI flows (Figure 24), and in particular 'new investments' (Figure 25), continue to be below

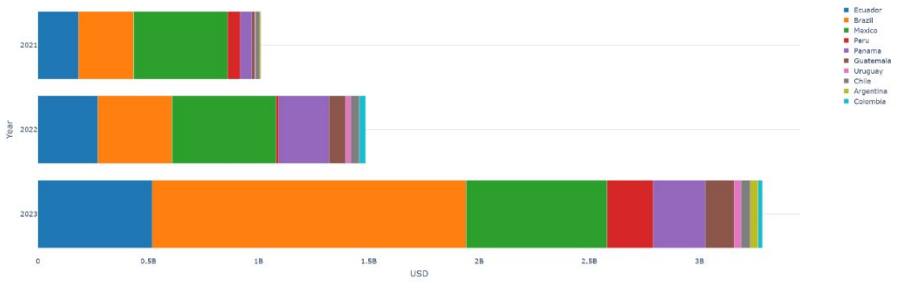
historical levels and particularly compared to the period 2013-2014 when the country was pushing through a productivity-enhancing reform agenda.

It may be the case that the recent negative trend is not necessarily a consequence of the recent Constitutional reforms that have dented investor confidence, but that projects will take longer to materialize.

Still, we think the narrative of increasing trade tensions between the US and China will be stronger than idiosyncratic noise and benefits from the nearshoring trend will be reflected in the FDI indicator in the future. The level, however, will necessarily be more muted that what it would otherwise be in the absence of Mexico's institutional deterioration.

Based on Citi's proprietary corporate payment flow data, Figure 24 shows that Chinese companies are using Latam countries as a springboard for North America with Brazil being the top beneficiary, followed by Mexico, over the past three years. The growth of total payments to Chinese subsidiaries has more than doubled for the same period.

Figure 24. Payments from North America to Subsidiaries of Chinese Companies in Latam



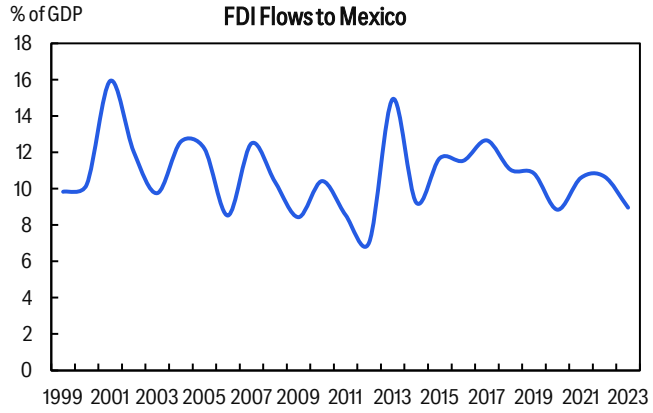
Source: Citi Global Data Insights, Citi Treasury and Trade Solutions

Mexico's import share from China did rise about 3ppts to 20% of total imports since 2017, prior to the US-China tariff escalation. Some concerns remain that the 'reinvestment of profits' figure in Mexico's FDI might be driven by Chinese companies in Mexico relocating production to take advantage of the renegotiated USMCA and using structures that make it difficult to establish the origin of the inflows.

In addition, China's outright share of FDI flows has gained relevance in recent years, although the comparison base is still low. In 2022, it stood at 1.6% of the total, but these figures may be understated if Chinese companies use overseas subsidiaries to invest in Mexico.

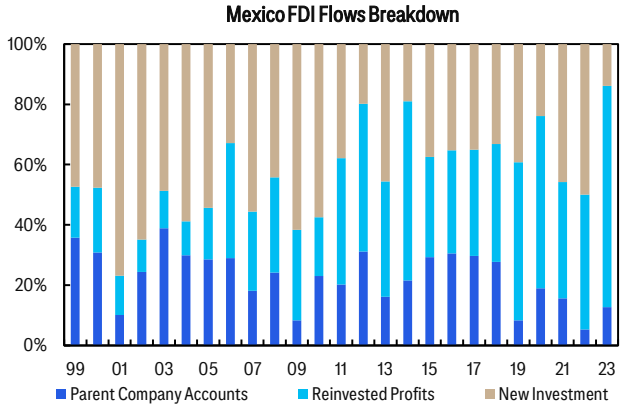
So far, FDI coming from the United States remains stagnant, around 45% of the total. Going forward, this will be a crucial statistic to watch to gauge the reshaping of trade and investment flows.

Figure 25. FDI flows are low too, in Mexico.



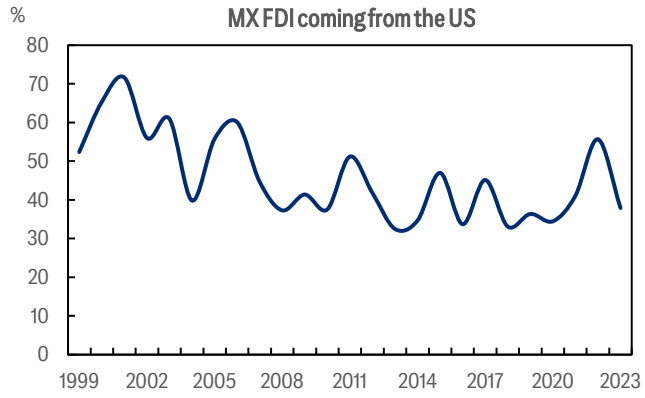
Source: Banxico, Haver Analytics, Citi Research

Figure 26. New investments have not taken off.



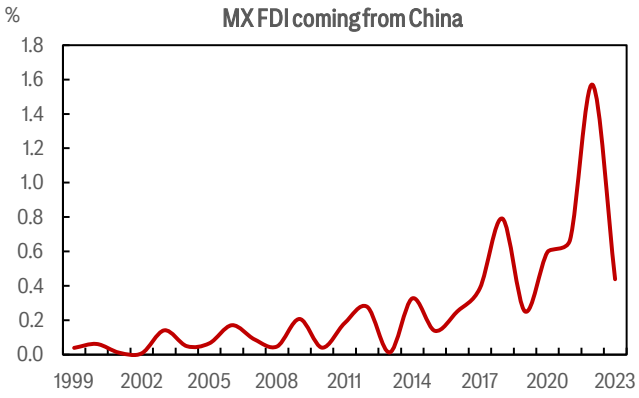
Source: Banxico, Haver Analytics, Citi Research

Figure 27. FDI flows coming from the US have been stagnant.



Source: Banxico, Haver Analytics, Citi Research

Figure 28. China FDI flows to Mexico have increased from a very low level.

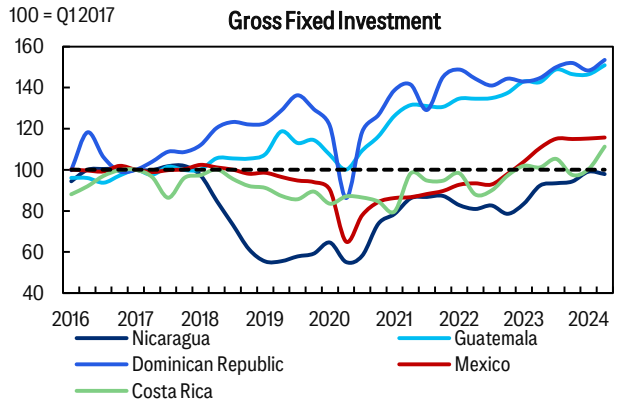


Source: Banxico, Haver Analytics, Citi Research

The Caribbean and Central America, also potential winners, show varied dynamism of investment in recent years. Gross fixed investment levels remain low in some countries in the region, such as Nicaragua and Costa Rica, following the imposition of tariffs by the United States on China in 2017.

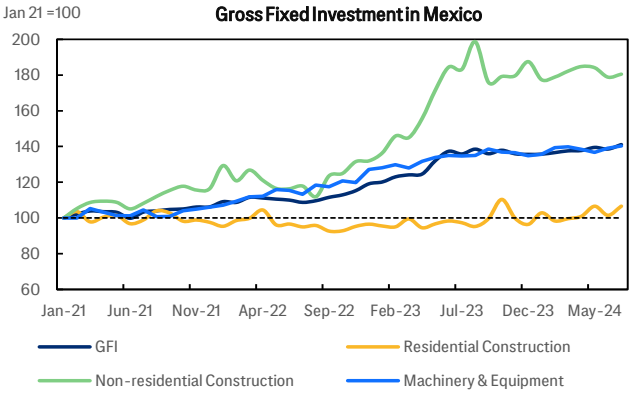
The case of Mexico is worth highlighting as in recent years this indicator has seen an increase mainly driven by non-residential construction, associated with government infrastructure projects and some industrial areas, and machinery and equipment has also expanded at a strong pace over the past years (25% since returning to pre-pandemic levels/10% yearly). This trend seems to have stalled in 2H24.

Figure 29. Mixed behavior in gross fixed investments in the region.



Source: National authorities, Haver Analytics, Citi Research

Figure 30. Gross fixed investment surprisingly strong in Mexico



Source: INEGI, Citi Research

Challenges remain as bottlenecks will have to be addressed to capture the potential. Mexico's economy has developed a solid manufacturing industry in recent decades, but other countries, such as Brazil, Colombia, and Costa Rica, are quickly strengthening their manufacturing capabilities as well.

The region still faces significant challenges in developing a solid manufacturing industry, in terms of the business climate, infrastructure, labor competitiveness, human capital, and productivity. A telling sign of the difficulty of addressing the challenge is that today no Latin American country is undertaking an ambitious agenda to increase productivity, except possibly Argentina with its ambitious microeconomic reform agenda.

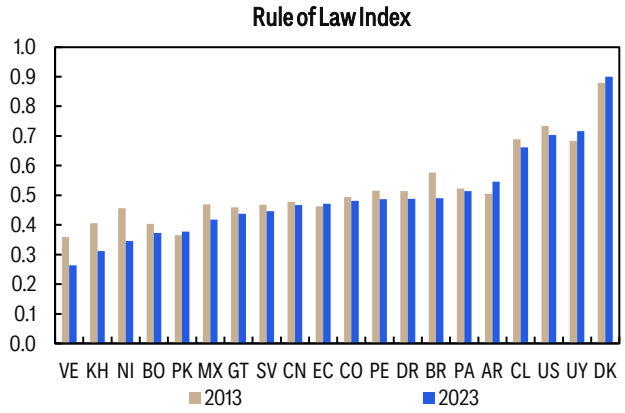
Investment in infrastructure remains a priority for the region. One of the primary challenges facing nearshoring in Latin America is the region's underdeveloped infrastructure logistics and issues related to the rule of law.

Inconsistent enforcement of laws, regulatory uncertainty, and inefficiencies in transport infrastructure increase costs and hinder the seamless integration into global supply chains. LatAm countries rank lower in various infrastructure quality and logistics performance indices compared with South Asia countries, according to the World Bank.

And the political cycle matters. In Colombia, the policies under President Gustavo Petro have led to investor concerns over tax and labor reforms. In Mexico, the influence of the Morena party has brought regulatory changes and increased state intervention, particularly in the energy sector, impacting investor confidence and uncertainty through the predictability of the judges' decisions with the recent judiciary reform.

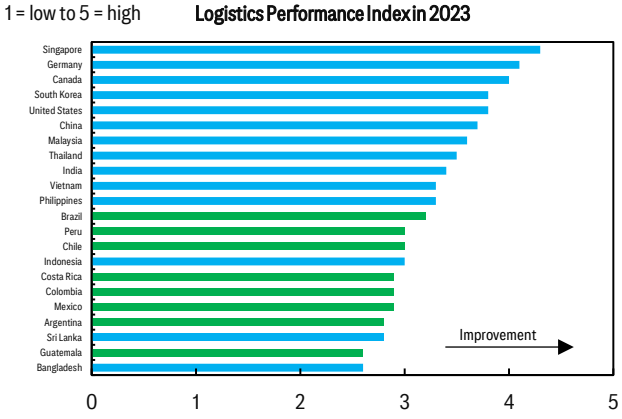
Additionally, the political instability seen in countries like Guatemala, Peru and Ecuador has amplified uncertainty, creating obstacles to attracting foreign investment and securing the regional advantages that nearshoring could offer.

Figure 31. Some countries of the region rank low in rule of law.



Source: World Justice Project, Citi Research

Figure 32. Logistics is a key disadvantage of Latam vs Asia peers

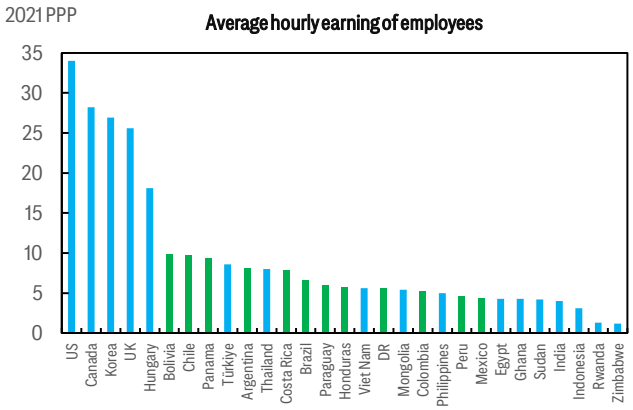


Source: World Bank, Citi Research

Despite these challenges, Latin America offers competitive advantages in labor costs and educational improvements, positioning the region as a strong alternative for nearshoring initiatives. The wage structure remains favorable compared to both North American and Asian counterparts especially for sectors like manufacturing and assembly.

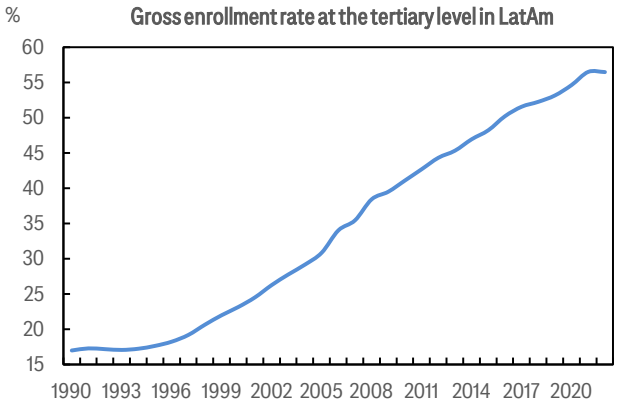
Additionally, the region has made notable strides in educational attainment over recent years, with a growing pool of skilled labor in technical fields and an increasingly bilingual workforce. These factors, combined with the proximity to the U.S. market, give Latin America a competitive edge by offering cost-effective and skilled human resources, reinforcing its attractiveness for firms seeking to diversify and de-risk their supply chains.

Figure 33. Wage competitiveness for LatAm countries.



Source: ILO, Citi Research

Figure 34. Human capital in the region.



Source: ECLAC, Citi Research

ASEAN + India – Already Seeing Accelerated "China+1" Shifts

What the numbers are telling us

Wei Zheng Kit

Baqar Zaidi

Samiran Chakraborty

Yuanliu Hu

Clearer signs have emerged of an accelerated *structural* shift in supply chains away from China towards ASEAN and India in recent years.

First, shifting FDI flows within Asia, with FDI into China falling below that into ASEAN and India for the first time, since late 2023. While cyclical forces have dominated the ebb and flow of FDI inflows in 2022-2023, FDI into China has seen a *continuous* precipitous drop since early 2022, falling below ASEAN for the first time in 3Q23, and more recently below India in 2Q24.

Putting this in perspective, while FDI into China was 4 times larger than that into ASEAN (ex SG) and 5 times larger than that into India between 2012-2021, it had fallen to less than a quarter of ASEAN's by 1H24, and just half of India's.

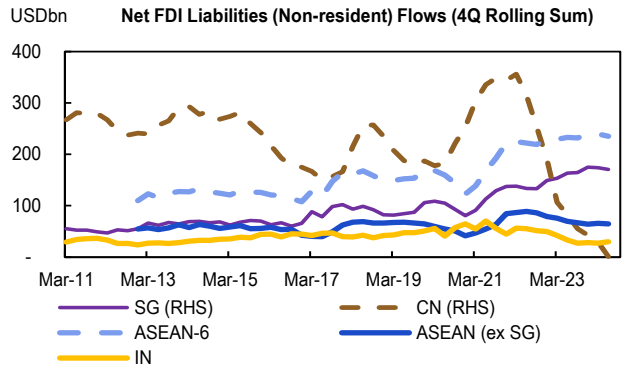
Perceptions of a less supportive domestic policy environment alongside weak domestic demand have likely prompted Chinese business to go abroad.

Second, the unprecedented, broad based surge in manufacturing investment approvals into ASEAN since 2023, which could translate into a stronger recovery in FDI inflows in the next 2 years.

Nonetheless, the >100% YoY surge in investment approvals in early 2024 took place despite a *contraction* in manufactured exports and was remarkably broad based across most ASEAN economies (except the Philippines). Such a pronounced decoupling suggests structural imperatives dominating cyclical considerations and is a similar trend to what was observed during 2018-2019 at the onset of the US-China trade war.

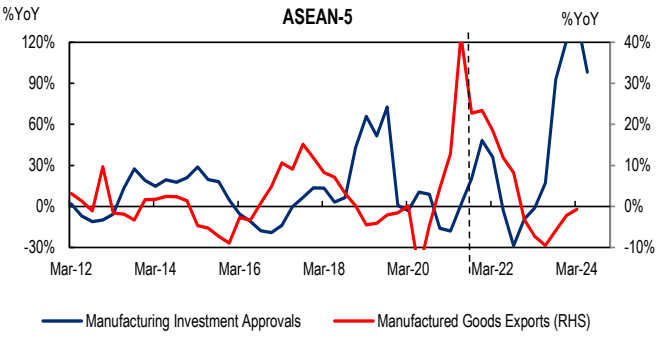
While realized FDI inflows remained soft as of 1H24, we think this largely reflects the cyclical uncertainties from the earlier export slowdown in 2023. Historical lags suggest we could see an accelerated pace of realization into actual FDI inflows sometime in 2025-26F.

Figure 35. FDI into China has fallen over 90% since 2022, falling below FDI into ASEAN since 3Q23 and India since 2Q24



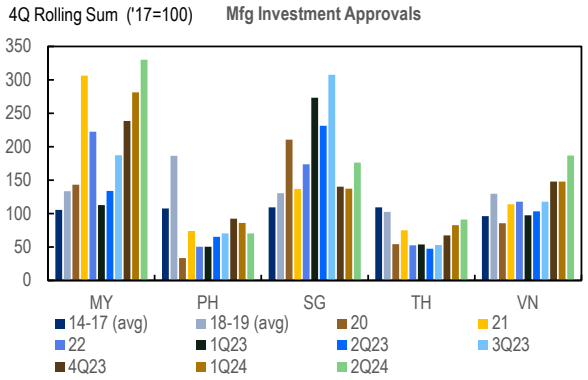
Source: CEIC Data Company Limited, Haver Analytics, Citi Research

Figure 36. Manufacturing investment approvals into ASEAN have more than doubled YoY since 2023, despite an outright contraction in manufactured exports, with a similar decoupling seen in 2019



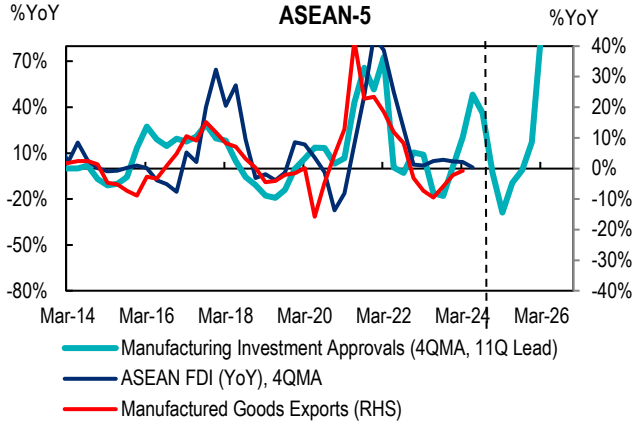
Source: Citi Research, Haver Analytics

Figure 37. The recent surge in investment approvals was broad based across most ASEAN economies, except in PH (and perhaps SG)



Source: CEIC Data Company Limited, Haver Analytics, Citi Research

Figure 38. Manufacturing investment approvals should translate more meaningfully into FDI sometime in 2025 or 2026



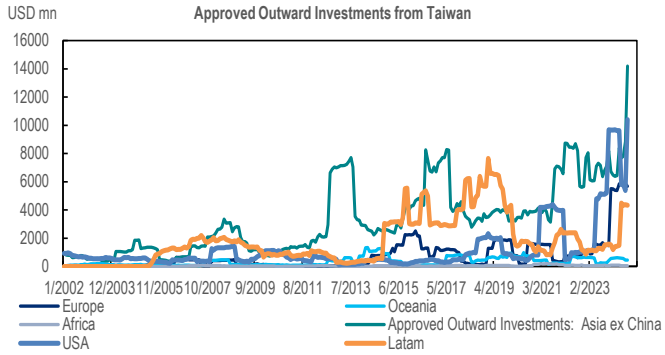
Source: Citi Research, Haver Analytics

Economic and geopolitical de-risking has provided the additional impetus for accelerated supply chain shifts, not just from China, but more recently Taiwan. Beyond cost considerations and tariff circumvention, an important motivation behind supply chain shifts has been risk management.

First triggered by the widespread factory shutdowns during the pandemic, the Russia-Ukraine conflict accentuated risks from an all-out conflict. Besides firms originating from mainland China, Taiwanese firms have also accelerated their outward investments to geographically diversify production, with "friendshoring" motivated investments in Asia ex China recently overtaking high profile "re-shoring" driven investments in US and Europe.

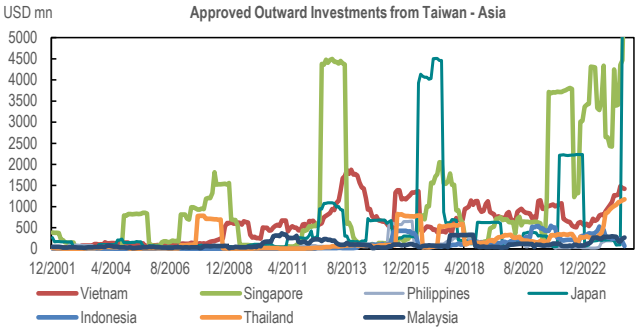
Lumpy semiconductor wafer fab investments in Singapore (UMC, Vanguard) and Japan (TSMC) have dominated the headlines, but Vietnam and Thailand have also become more important since 2023.

Figure 39. Approved outward investments from Taiwan into Asia (ex China) have overtaken those to US and Europe since early 2024…



Source: CEIC Data Company Limited, Haver Analytics, Citi Research

Figure 40. …dominated by lumpy investments in Singapore and Japan; investments in Vietnam and Thailand have also picked up



Source: Citi Research, Haver Analytics

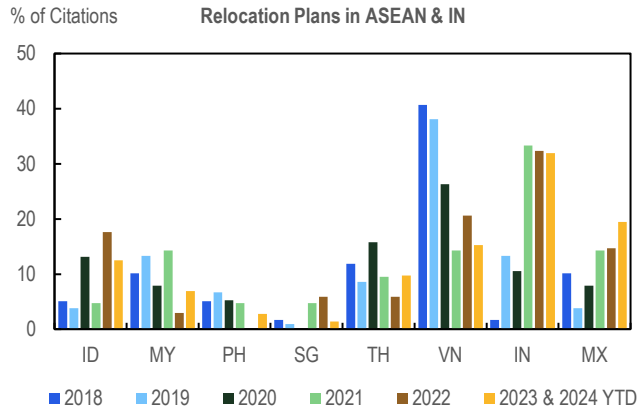
Our proprietary database of companies' announcement of production relocation away from China reveals *greater geographical spread* but also increased *sectoral concentration* of supply chain shifts since covid.

First, there has been increased geographical diversification in supply chain shifts since covid beyond Vietnam since 2021, with India emerging as the largest recipient of relocations. Vietnam received the lion's share of production relocations citations in 2018-2020 (36.6%), but its share had halved to 16.5% in 2021-2024, whilst other ASEAN economies, especially Indonesia (2018-2020: 5.9%, 2021-2024: 12.6%), Malaysia and Thailand saw more relocations in recent years, with Indonesia and Thailand particularly active in EV related investments, and Malaysia stronger in the electronics space.

More importantly, India's share of citations more than tripled from 9.4% to 32.3% in the same period, alongside Mexico (2018:2020: 6.4%, 2021-2024: 17.3%). Production relocations to India have been most prominent in the mobile phone space, where annual mobile phone exports have grown over nine-fold in the past 5 years.

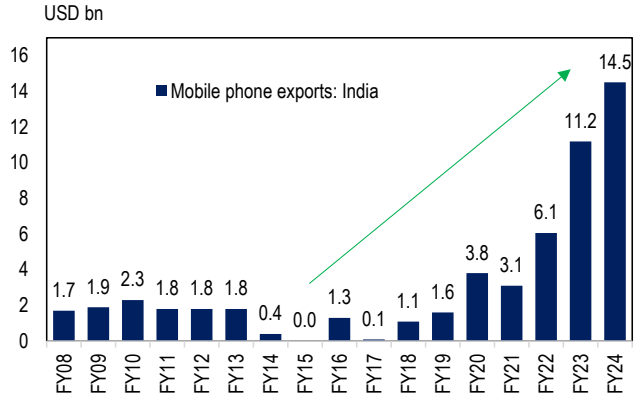
Beyond mobile phones, India has also seen relocation announcements in a wide range of other industries such as pharmaceuticals, furniture, EVs, air-conditioning, amongst others. These announcements have yet to translate into a perceptible sustained jump in realized manufacturing FDI, possibly due to the time lag in companies reassessing their India strategy and implementing projects, as well as higher global interest rates raising the hurdle rate of return for FDI (Figure 43).[6]

Figure 41. Vietnam's dominance as relocation destination was overtaken by India since 2021



Source: CEIC Data Company Limited, Haver Analytics, Citi Research

Figure 42. Supply chain shifts have enabled India's mobile phone exports to grow nine-folds since FY2019…



Source: Citi Research, ICEA

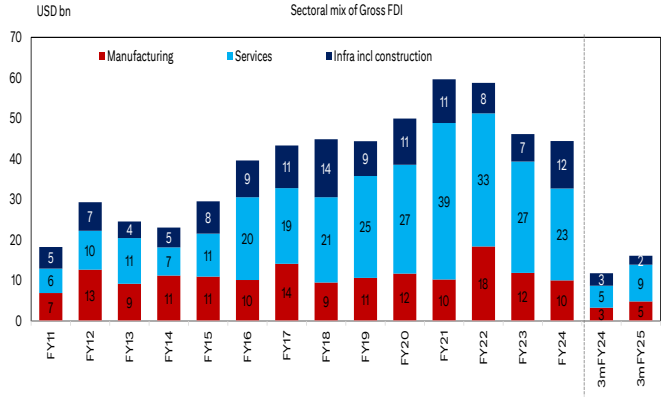
Second, production relocations have been increasingly centered around the electronics sector in recent years. Pre-covid relocations included a more diverse mix of sectors, including more labor-intensive sectors more adversely impacted by China's rising labor costs and US import tariffs.

[6] We would be wary of interpreting the very weak *net* FDI into India (gross FDI has been more resilient) as this figure has been likely distorted by the repatriation of private equity/ venture capital investments buoyed by rich valuations.

Whilst electronics accounted for 49% of relocation announcements in 2018-2019, this proportion had risen to 69% in 2023-2024. Swings in the global electronics cycle have likely been a more recent driver, but US-China technology de-coupling has been a more enduring driver (Figure 44).

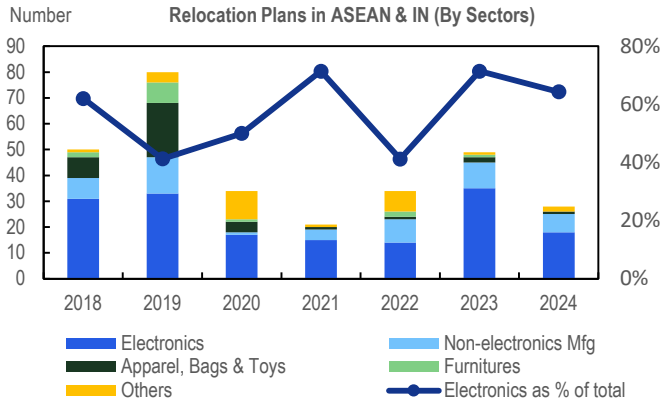
While "friendshoring" considerations have undoubtedly favored ASEAN as a production location for US and ASEAN firms, another consideration has been the economies of agglomeration arising from deep existing electronics supply chains since the 1960s-1970s (especially in MY and SG), which have resulted in a competitive cost and relatively skilled local workforce.

Figure 43. …though apart from 2022, India has yet to see a sustained perceptible jump in FDI into the manufacturing sector



Source: Citi Research, RBI, CEIC Data Company Limited

Figure 44. Proportion of relocations in electronics rose significantly in 2023, reflecting both cyclical forces and tech decoupling



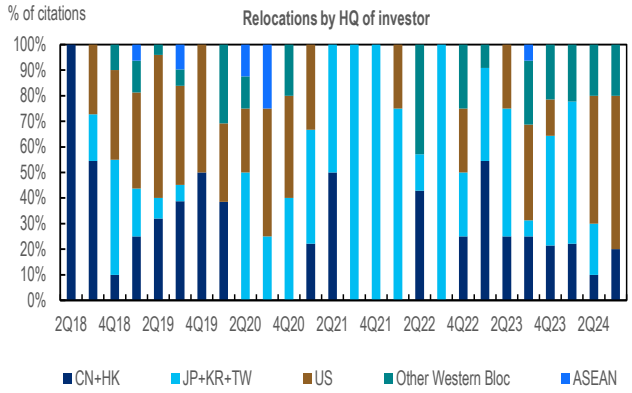
Source: Citi Research, Alphasense

Third, whereas firms headquartered in China and Hong Kong played a more important role in supply chain relocations pre-covid, firms from US and its allies have become increasingly important, especially into 2024 (Figure 45).

Given ASEAN's relatively neutral stance, it has been able to attract "friendshoring" driven relocations from both sides of the geopolitical divide since 2018, with companies headquartered in China and HK accounting for 29% of relocations since 2018, while US and other western companies accounted for 43% in the same period, with 25% of relocations by firms from Japan, Korea and Taiwan.

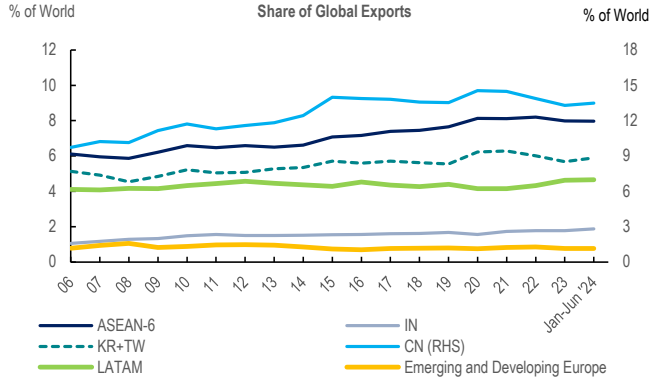
Nonetheless, Chinese firms were clearly more dominant in 2018-2019, accounting for 35% of the total, falling to just 17% in 2020-2021, and 26% since 2022. While the proportion of US firms in relocations fell from 39% in 2018-2019 to 22% in 2022-2024, this was more than offset by a near doubling of relocation from its allies in North Asia (from 17% to 31%) and other western countries (from 6% to 20%).

Figure 45. Firms headquartered in US and its allies accounted for 73% of relocation citations in 2022-2024 (2018-2019: 62%), with relocations by China+HK firms accounting for 26% in 2022-2024 (2018-2019: 35%)



SourceAlphasense, Citi Research

Figure 46. Supply chain shifts have broadly enabled the rest of Asia to gain global export market share at the expense of China since 2018, even as China saw periodic gains in 2020-21 and 1H24



Source: Citi Research, Haver Analytics

Supply chain shifts have already enabled the rest of Asia to gain global export market share since 2018, especially in electronics, with recent tariff hikes likely to spur further gains in rubber gloves. Partly as a result of production relocation, China's share of global exports stagnated at 13.5-13.6% between 2018-1H24, even as the ASEAN-6 economies saw their share rise 0.5%-pts between 2018 and 1H24 to 8%, led by Vietnam and Malaysia, with India's, Korea's add Taiwan's share each also rising 0.3%-pts.

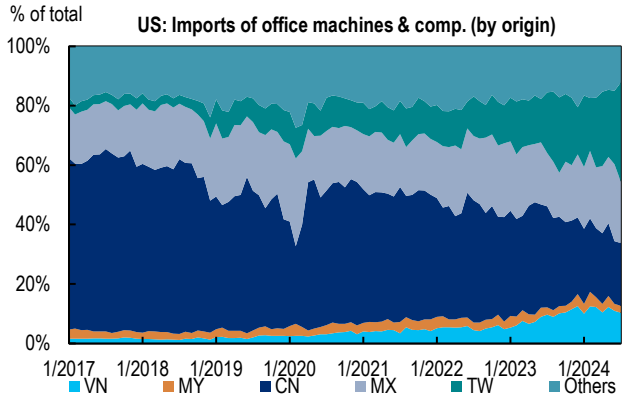
To be sure, China did see periodic bouts of export share gains, e.g amidst production shutdowns elsewhere during covid (in 2021-201), and more recently in 1H24 as its excess capacity in manufactured exports eroded ASEAN market share (Figure 46).

Nonetheless, over the longer period, ASEAN's market share gains have been most evident in the US import market for computers and electronics, where China's share fell 24%-pts since the start of 2019, displaced by Vietnam (+8%) in the same period, though overshadowed by Taiwan on its close links to the AI-related.

Outside of electronics, ASEAN is also likely to see opportunities for further export market share gains in other products, where there is also significant overlap in revealed comparative advantages vis-à-vis China.

In general, while China could likely hold its ground in products where it has an overwhelmingly dominant market share (>70%) in the near term, over the long run, our modified net export similarity index with China (focusing on manufactured goods with large share of US imports) – suggest I**ndia and Vietnam have the greatest similarities in industrial structure**, are thus could benefit most from supply chain shifts out of China.

Figure 47…especially in the US import market for computers and office machinery equipment



Source: CEIC Data Company Limited, Haver Analytics, Citi Research

Figure 48. Modified Net Export Similarity Index with China for Commodity Codes SITC 7, 8 (3 digits) and 6 (2-digits)

	2002	2008	2012	2016	2018	2019	2020	2021	2022	2023
IN	31	38	39	36	32	35	35	33	35	47
VN	22	27	50	46	47	45	45	44	43	43
PL	9	24	29	31	34	39	38	38	41	43
IT	35	36	44	42	42	44	39	40	41	42
TR	28	43	46	42	42	44	45	42	41	40
CZ	30	34	30	34	37	38	37	38	37	40
HU	38	37	30	23	27	23	25	26	28	34
TW	49	33	32	34	31	33	30	32	32	32
ID	50	33	36	32	26	27	27	27	29	29
TH	48	41	35	32	30	30	28	28	27	27
MY	41	43	35	35	31	34	28	28	34	27
MX	33	23	25	26	26	26	28	28	25	26
GE	17	21	15	19	21	22	22	24	22	26
JP	16	23	19	18	18	18	16	21	23	25
KR	44	29	27	31	21	21	17	20	22	22
PK	20	25	29	22	20	20	22	18	18	19
SG	24	25	11	21	16	11	9	14	15	17
LK	26	18	23	15	15	14	12	12	13	16
PH	23	29	35	23	21	19	19	20	17	15

Source: UN Comtrade, Citi Research

India has also seen some increase in goods export market share beyond electronics. India has significant export market share in petroleum, metals, machinery, electronics, pharmaceutical products. Consequently, share of high-tech exports in India's total good export has almost doubled to 13% in 2023 compared to 2010.

Even from geographic-mix perspective, India has marginally gained export market share in both the EU and the US. But it has lost market share in some labor-intensive industries like textiles (most likely to Asian peers including China).

Figure 49. India goods exports: Gained market share in petroleum, electronics, machinery etc.

India market share in each product's global exports (%)			
Product type	2016	2023	Change in market share, bps
Petroleum	2.2	3.6	139
Machinery	1.0	1.5	52
Electronic & Electricals	0.3	0.8	46
Oil & Fats	1.1	1.4	39
Metals	1.9	2.2	28
Food & Beverage	2.2	2.4	21
Furniture	0.7	0.9	20
Chemical & Pharma	2.4	2.5	13
Leather & rubber	1.8	1.9	10
Coal	0.1	0.1	4
Plastics	0.9	0.9	0
Autos	1.2	1.2	0
Other manufacturing	2.1	1.9	-23
Others	0.7	0.5	-27
Crude ex Fuel	1.6	1.3	-29
Footwear	2.2	1.6	-63
Textile	4.6	3.8	-78
Jewellery	16.1	15.2	-91
Total	**1.6**	**1.8**	**19**
Total ex Petroleum	**1.6**	**1.6**	**4**

Source: Citi Research, UNCTAD

Figure 50. India goods exports: Gained market share in the EU and the US

India's share in total goods import of each region				Region's share in India's total exports: 2023
Product type	2016	2023	Change in market share	
World	1.6	1.8	19	
South Asia	9.9	11.1	122	6.0
Sub-Saharan Africa	5.7	7.6	194	8.9
MENA	5.2	5.1	-7	18.8
US	2.0	2.4	44	17.6
Ocenia	1.4	2.3	94	2.0
ASEAN	2.3	2.3	-7	9.2
LatAm	1.2	1.5	32	4.7
EU	0.8	1.1	26	17.4
North Asia	1.2	0.9	-28	5.1
China	0.6	0.7	11	3.8

Source: Citi Research, UNCTAD

Inducements for Supply Chain Relocation

ASEAN

ASEAN's success in attracting supply chains reflects its own efforts to increase competitiveness. ASEAN's success in attracting its share of supply chain relocations suggests it also been able to hold its own against competition from re-shoring, and to a lesser extent nearshoring (to LatAm and CEE) for a few reasons.

First, ASEAN's deep manufacturing supply chains, which have been established since the 1960s and 1970s, cannot be easily replicated overnight in other markets. This is illustrated by the numerous obstacles TSMC faced at its US plants, including recruitment struggles and difficulties in bringing in workers from Taiwan, leading to production delays.

In contrast, economies of agglomeration from an established network of local suppliers and human capital, have significantly lowered relocation costs for companies, beyond that from already competitive land and labor costs.

For brownfield FDI, these factors have also significantly reduced the time between securing investment approvals and commencement of production for exports, possibly to as short as a little more than a year.

Case in point is the island of Penang, which draws FDI mainly on efficiency seeking motives, helped its deep ecosystem, being home to more than 300 MNCs and SMEs, growth of complementary clusters, support from state investment promotion agencies, sustainable pool of talent and good infrastructure/accessibility).

Second, ASEAN's own domestic structural reforms and policy efforts have also helped. For example, Indonesia's passing of the Omnibus law in 2020 tackled long standing issues on labor market rigidities, while policies to encourage down streaming in resource-based sectors have boosted processing investments, increasing domestic value addition.

In Thailand, to reach its target of 30% of total auto production in zero emission vehicles by 2030, the excise department in Dec 2023 increased subsidies and reduced excise taxes for EVs, conditional upon producers locally producing 2 vehicles for each imported vehicle by 2026, and 3:1 by 2027.

These incentives have significantly increased investments in the sector, especially from Chinese manufacturers. In Vietnam, the EU-Vietnam FTA (in force since Aug 2020) has increased market access to the EU for Vietnamese based exporters, hence increasing its attractiveness to exporters to the European market.

In Malaysia, the Penang state government's comprehensive investment promotion strategy has ensured MNCs become deeply rooted in the local economy, via infrastructure and skills development, and promoting a domestic vendor network[7]. In Singapore, generous tax incentives have, over the years, significantly defrayed its relatively high cost of land and labor. In lieu of the pending implementation of the global minimum tax in 2025 which could raise the effective tax rates of low tax

[7] For more details, see *Malaysia Technology: The Penang Factor, 5G and Superior Returns; Inari is Top Pick*

jurisdictions like Singapore, alternative tax incentives for MNCs via the Refundable Investment Credit (RIC) could help provide sufficient offsets.[8]

Third, efforts to promote regional integration, such as the Regional Comprehensive Economic Partnership (RCEP), which was signed in Nov 2021, also help make ASEAN more competitive by encouraging companies to source more inputs and produce more within RCEP.

Another more recent example currently taking shape is the planned Johor Singapore Special Economic Zone, which will likely see modern hub related services activities and advanced manufacturing in Singapore combined with more land, labor and energy intensive manufacturing and other activities (e.g data centers) in Johor. A successful Johor-Singapore SEZ could be extended to Indonesia to revive to Singapore-Johor-Riau (Sijori) growth triangle of the 1990s.

India

India's strategy to attract supply chains has revolved around a combination of improving competitiveness through reforms and leveraging the increasing size of the Indian economy. India had already reformed its FDI laws and investment limits are not a challenge for most industries. Apart from this, there is focus on following factors.

First, building up of high-quality physical infrastructure and digital initiatives to reduce the logistics cost (India's rank in World Bank's Logistics Performance Index has improved to #38 in 2023 from #44 in 2018).

Second, India had already cut corporate income tax rates sharply in 2019, to reduce the gap with Asian peers. Moreover, for foreign companies, corporate tax rate has just been cut to 35% from 40% earlier in order to attract foreign capital.

Third, with MNCs looking for supply chain resilience, India is pitching itself as the soon to be third largest economy with large domestic market, increasing macro resilience and low geopolitical risk.

Fourth, fiscal support through the Production Linked Incentive (PLI) scheme and semiconductor related scheme are expected to garner around USD 60bn in investment. Around 40% of the investment target for PLI schemes has already been achieved with investment in autos, pharma, renewable energy and specialty steel (Figure 51).

Fifth, while not part of RCEP, FTA negotiations have gained momentum with focus on advance economies. This includes recent agreements with the UAE, Australia and EFTA, with negotiations underway with the UK and the EU.

Some risks to ASEAN relocation

While less of a concern in India given its pursuit of more restrictive trade and investment policies against Chinese entities, we should not ignore risks to ASEAN from countervailing tariffs from US and EU on products dominated by Chinese firms.

[8] Under Singapore's RIC scheme, up to 50% of qualifying expenditures can get tax credits that can help offset against corporate income taxes, and any unutilized tax credits can be refunded as cash within four years after conditions are satisfied.

In particular, relocation to ASEAN of certain activities that are overwhelmingly dominated by Chinese manufacturers could invite greater scrutiny by US trade authorities, and in turn counter-vailing tariffs on related exports from ASEAN.

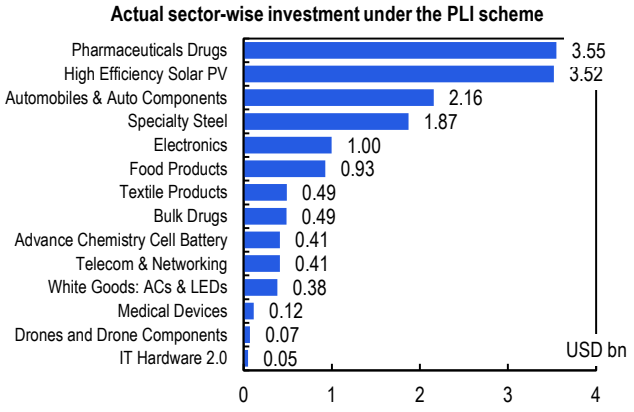
This risk is probably not small, since Chinese companies accounted for around 29% of all relocation announcements since 2018. We already saw one high profile case involving solar panels exported from ASEAN being hit by US tariffs.

This is a sector where Chinese firms have made significant investments in ASEAN, and the earlier two-year exemption on tariffs for US solar panel imports from Malaysia, Thailand and Vietnam was lifted in June 24, along with investigation on dumping and government subsidies.

Vietnam is particularly interesting case. Around 37% of all Chinese relocations since 2018 went to Vietnam, which saw a surge in imports from China at the same time that we saw Vietnam's own exports to the US rising.

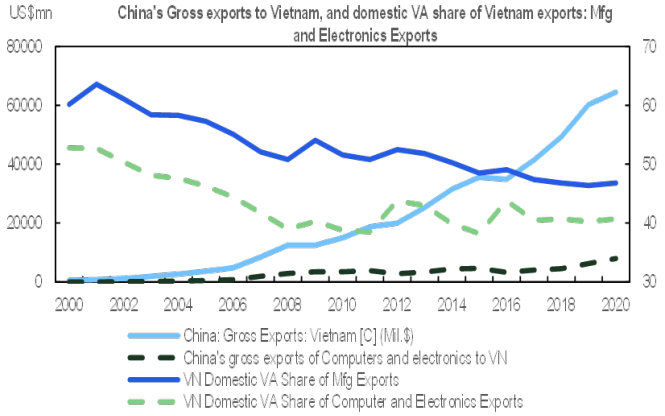
Interestingly, this surge in Chinese exports to Vietnam accompanied a continued decline in Vietnam's domestic value added in its own exports, raising the possibility that Chinese manufacturers may have simply re-routed exports to the US and other markets through VN, with minimum domestic value addition within Vietnam.

Figure 51. India: Status of Production Linked Incentive Scheme



Source: Citi Research, PIB, Economic Survey

Figure 52. China's manufactured exports to Vietnam surged in tandem with a surge in VN's exports to the US and came amidst a continued decline in VN's domestic value added share of exports



Source: Citi Research, Haver Analytics

The National Security Imperative for Reconfiguring Semiconductors

Jin-Wook Kim

Semiconductors is at the heart of modern electronics, and powers just about any equipment – smartphones, automobiles, appliances, computers, industrial machineries, etc. But over the last few decades, the semiconductor supply chain, largely due to their capital- and knowledge- intensity, has evolved to become highly concentrated among key players.

One notable concern is the dominance of Taiwan (via TSMC) for the fabrication of the most advanced chips, leading to significant national security concerns, especially in light of US-China strategic rivalry and worries over China-Taiwan conflict risks.

Global semiconductor supply chain has been specialized by several key players. A semiconductor is designed with EDA (electronic design automation) tools based on core Intellectual Properties. Wafer fabrication requires large capital investment on equipment, stable supply of materials and final ATP (Assembly, Test & Packing) process.

For example, the US has been specialized in design, EDA & core IP and equipment & tools while the US has been dependent on high-end wafer fabrication to Taiwan and South Korea. Netherlands (through ASML) is the dominant producer of lithography machines used to produce computer chips, and when it comes to EUV (extreme ultra-violet) lithography to produce high-end chips, it has an absolute monopoly. China has been specialized in materials, massive investment for low-end chip wafer fabrication and labor-intensive ATP (Assembly, Test & Packing) process.

Beyond reducing production concentration risk, another dimension to US's national security strategy is its attempts to contain China's technological ambitions in leading edge technologies – an initiative that gained broad bipartisan support.

There has been concern among US policymakers that the US may be losing their technological edge to China through an aggressive Chinese industrial strategy focusing on high technology products. Not only does this lead to significant economy opportunity costs for the US, but **as technology can have dual economic and military uses,** could also eventually lead to strategic disadvantage in the battleground of future of modern warfare.

Figure 53. Global semiconductor supply chain has been specialized by several key players

Chip supply chain revenue distribution (2022)	US	EU	Japan	South Korea	Taiwan	China	ASEAN & others
Design	51%	10%	9%	13%	8%	6%	4%
EDA (Electronic Design Automation) & core IP	68%	25%	-	-	3%	3%	-
Equipment & Tools	47%	18%	26%	3%	-	3%	3%
Materials	9%	6%	12%	18%	28%	18%	10%
Wafer Fabrication	10%	8%	17%	17%	18%	24%	7%
ATP (Assembly, Test & Packaging)	3%	3%	6%	9%	28%	30%	20%

Note: Exhibit 3 of 'Emerging Resilience in the Semiconductor Supply Chain', the Semiconductor Industry Association (SIA) and the Boston Consulting Group, May 2024

Source: Citi Research, SEMI; Yole Group; BCG Analysis

The decoupling of technology supply chains largely consists of two parts: (1) the US-driven tech sanctions against China and (2) policies for building domestic wafer fabrication capacity across the major economies ().

- **First, the US has imposed the exports control against China of the following:** the semiconductor EDA (Electronic Design Automation), AI chips as well as manufacturing equipment for high-end chips beyond key thresholds (e.g. 28 nm segment logic, 18nm DRAM and 128 layers NAND).[9] The Netherlands and Japan, the key manufactures of chip production equipment, have been cooperative with the US's sanctions against China.

Figure 54. Select industrial policies related to semiconductors with announced outlays

Country	Initiative	Investment/Subsidy (in US$bn)	Date	Country	Initiative	Investment/Subsidy (in US$bn)
China	Established China Integrated Circuit "Big Fund"	$21bn	Feb-24	US	Grant & loan for Global Foundries*	$2.975bn
EU	Joint microelectronics research (FR, DE, IT & UK)	$2bn	Feb-24	Japan	Subsidies for Kioxia/Western Digital	$1.65bn
China	Chip Fund 2nd fundraising	$28.9bn	Mar-24	US	Grant & loan for Intel*	$19.5bn
Japan	Supporting domestic chip manufacturing	$6.8bn	Mar-24	China	Chip Fund 3rd fundraising	$27bn
Germany	EC's IPCEI program for microelectronics	$12bn	Apr-24	Japan	Subsidies for Rapidus Corp to produce 2nm chip	$3.9bn
India	Incentive program to attract chipmakers & display	$10bn	Apr-24	US	Grant & loan for Texas Instruments*	$4.6bn
France	Investing in joint EU chip project (France 2030)	$5.45bn	Apr-24	US	Grant & loan for Micron	$13.64bn
USA	CHIPS & Science Act (for fab prod'n & R&D)	$52.7bn	Apr-24	US	Grant & loan for TSMC*	$11.6bn
UK	UK semiconductor strategy	$245mn in 2023-25; $1.23bn in 10 years	Apr-24	US	Grant for Samsung*	$6.4bn
EU	European Chips Act	$46.7bn in pub-priv	May-24	S.Korea	A financial support including infrastructure	$19bn
Japan	Subsidies for Micro chip plant	$1.3bn	May-24	Malaysia	Nat'l Semicon Strategy of fiscal support/incentives	$5.3bn

Source: US Congressional Research Service ("Semiconductors and the CHIPS Act, Note: *Grants and loans are part of the CHIPS & Science Act.

- **Second, the US and other Western allies have increased production capacity for advanced logic chips and memory chips by providing various subsidies** (). For example, the CHIPS act aims to secure more than 28% of global capital expenditures in 2024-2032[10]. Germany and Japan have also incentivized Taiwan's foundry business to construct advanced logic production facilities within their borders.

- **Third, Taiwan and South Korea have continued direct & indirect R&D subsidies and tax incentives while supporting public infrastructures.**[11] In ASEAN region, major semiconductor companies have announced capex and expansion plans in Malaysia and Singapore. Malaysia, Philippines, Vietnam, Singapore, Thailand and Mexico are expected to secure more ATP capacity thanks to the industry's needs for building more geopolitically and geographically diverse supply chains.[12]

- **Fourth, China has continued to invest and develop its own semiconductor supply chain despite the US's technological sanctions as it aims for technological self-reliance** (more discussion later on "China's response to Western de-risking" section)**.** The series of the National Integrated Circuit Industry Investment Fund (so called 'Big Funds') have contributed for large scale

[9] Karen M. Sutter et al., Semiconductors and the CHIPS Act: The Global Context, Congressional Research Service, September 2023
[10] 2024 STATE OF THE U.S. SEMICONDUCTOR INDUSTRY, The Semiconductor Industry Association (SIA), September 2024
[11] Karen M. Sutter et al., Semiconductors and the CHIPS Act: The Global Context, Congressional Research Service, September 2023
[12] 'Emerging Resilience in the Semiconductor Supply Chain', the Semiconductor Industry Association (SIA) and the Boston Consulting Group, May 2024

legacy chip production capacity.[13] Amid the state's direct supports, Chinese tech industries have driven own innovation while gradually reducing its dependence on Western technology.[14]

Figure 55. The US, EU and Japan has attracted Taiwan's foundry industry to improve logic chip production capacity

Global wafer fabrication capacity (2022)	US	EU	Japan	South Korea	Taiwan	China	ASEAN & others
DRAM	3%	-	7%	52%	20%	18%	-
NAND	3%	-	30%	30%	4%	26%	7%
Logic: below 10nm	0%	-	-	31%	69%	-	-
Logic: 10-22nm	28%	13%	-	4%	40%	6%	8%
Logic: 28nm+	8%	4%	10%	5%	30%	33%	9%
DAO (Discrete, Analog & Optoelectronics/sensors)	14%	17%	25%	7%	5%	25%	9%
Total	10%	8%	17%	17%	18%	24%	7%

Note: Exhibit 6 of 'Emerging Resilience in the Semiconductor Supply Chain', the Semiconductor Industry Association (SIA) and the Boston Consulting Group, May 2024

Source: Citi Research, Department of Commerce; SEMI; BCG Analysis

In our view, the decoupling of technology supply chain will likely generate three major implications.

First, the decoupling of technology supply chain for relatively high-end products could lead to less profitable return of large investment. The US tech companies would partially lose China-related revenue, effectively reducing its own fuel for innovation.[15]

Even with the US's own subsidies, several key projects could fail from the US's soil due to industrial issues, including cost competitiveness. For China, technological innovation beyond the key thresholds could require substantially larger amount of time and cost due to the US-driven sanctions.

Second, the decoupling of technology supply chains for relatively low-end products will likely be limited. Despite the challenges, China made significant inroads in boosting its chip producing capacity, and its semiconductor exports have been robust this year thanks to stronger global demand.

Third, the decoupling of technology supply chain may generate new opportunities for Latin America in long-run. The US government aims to increase semiconductor production capacity in the coming decade.[16]

Latin America could capture the new opportunities for ATP thanks to three factors: (1) cheaper labor cost, (2) geographical proximity to the US and (3) separate technology supply chain from China. In July 2024, the US government launched the CHIPS ITSI Western Hemisphere Semiconductor Initiative to improve semiconductor ATP capabilities in Mexico, Panama, and Costa Rica.

[13] Sujai Shivakumar et al., Balancing the Ledger - Export Controls on U.S. Chip Technology to China, CSIS, February 2024

[14] For an earlier discussion, see *China Economics: Qualifying Import Substitution: The Semiconductor Case*

[15] Sujai Shivakumar et al., Balancing the Ledger - Export Controls on U.S. Chip Technology to China, the Center for Strategic and International Studies (CSIS), February 2024

[16] 'Emerging Resilience in the Semiconductor Supply Chain', the Semiconductor Industry Association (SIA) and the Boston Consulting Group, May 2024

Critical Mineral Supply Chains

Anita McBain

Johanna Chua

Tom Mulqueen

Both the global energy transition and geopolitical trends are game-changing considerations for those assessing and responding to issues around mineral criticality.

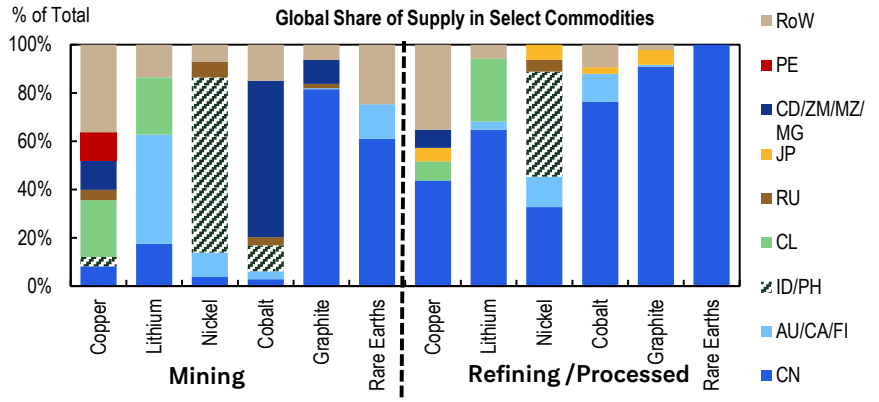
Critical minerals are defined as mineral resources that are both essential to economic or national security and have supply-chains that are vulnerable to disruption. This is subjective to individual countries or regions, but global efforts to decarbonize energy sources and geopolitical concerns around strategic rivalries and resource nationalism represent commonalities in how policymakers are defining and classifying critical minerals.

Metals have a growing economic importance as a vital component of various clean energy solutions and will play a significant role in global decarbonization efforts. The direction of travel is clear, and the final text from COP28 UAE in 2023 called for a transition away from fossil fuels with expected continued ambition as we head towards COP29 in Azerbaijan in 2024.

Supply-chains for many of these metals also face growing risks of disruption due to geopolitical considerations. The impact of Russia's invasion or Ukraine and growing strategic and economic tensions with China have also highlighted vulnerabilities in reliance on rival countries for mining and/or processing of key resources, heightening supply-chain vulnerabilities, and critical mineral concerns.

China's dominance in this industry is a particular concern for the West, as it accounts for >40% of the world's refined copper, >60% of lithium chemicals, >70% of refined cobalt, and dominates graphite and rare earths (Figure 56). If we were to base numbers on asset ownership, China's role in nickel, copper, and cobalt mining would be much larger than is indicated in Figure 56 due to equity investments. For example, China reportedly owns 72% of DRC's active copper and cobalt mines.[17]

Figure 56. China has a dominant role in key critical minerals based on data for 2023



Source: IEA Global Critical Minerals Outlook 2024, Note: CN: China, AU/CA/FI - Australia, Canada, Finland, ID/PH - Indonesia, Philippines, CL- Chile, RU- Russia, JP - Japan, CD, ZM/MZ/MG - Dem. Rep of Congo, Zambia, Mozambique and Madagascar, PE: Peru; RoW- Rest of the World

Rising resource nationalism could also be a deterrent to investment. Countries rich in resources essential for the energy transition are taking steps to leverage this fact to maximize their value. Indonesia is a stand-out example over the

[17] L. Johnson, "China's interests in Africa are being shaped by the race for renewable energy," *The Conversation* (2 Sep 2024).

last decade in its bans of exportation of ore and efforts to encourage down streaming in key metals such as nickel, copper, and tin. Lithium carbonate is a key component in EV batteries, and while Australia is the world's largest lithium producer, the lithium triangle in Latin America – comprised of Argentina, Bolivia and Chile – is estimated to hold 58% of the world's largest lithium reserves

However, domestic politics and resource nationalism has been a deterrence to investments – e.g. Bolivia's policies requiring full state control of mining operations in the country. While Argentina and Chile have friendlier investor policies, Chile's recent National Lithium Strategy in 2023, aimed at boosting production and investment also incorporates a plan for the government, either directly or via its SOEs, to control lithium operations, is also raising concerns over resource nationalism.[18]

To achieve an orderly transition, delivering a more secure and sustainable supply of metals classified as critical is necessary to prevent supply-shocks, economic bottlenecks, and associated inflationary pressures.

As a result, investors have an opportunity to direct financing towards minerals classified by policymakers as critical and take advantage of associated efforts to drive more responsible and secure sourcing of these vital resources.

Efforts to "friendshore" by western democracies (shifting supply-chains to more strategically-aligned countries) may include financial incentives, such as tax credits for EVs in the US under the Inflation Reduction Act, where 50%+ of the battery component value comes from the US or allied countries (IEA, 11-Jul 2024).

However, we would argue that provisions in IRA relating to FTA requirements and exclusion of "foreign entity of concern" (FEOC) have complicated access to tax credits, and thus, likely have slowed associated investments.

Critical minerals are increasingly vital to climate mitigation and climate adaptation. Given this importance, it is worth highlighting the risk that inflated prices of these materials pose to energy security, climate security and national security. Inflated prices could result in increased input costs for technologies critical to the energy transition, resulting in increased capital expenditure to deliver net zero goals, or derail efforts to hit these goals entirely.

Supply chains for critical minerals need to adapt to be more sustainable and resilient. In a supply chain exposed to future shocks from extreme weather events, conflict or even a cyberattack, there is a need to understand the transparency, traceability, and reliability of a key component.

The global supply of critical minerals has been dominated by a select few resource rich countries such as Indonesia, South Africa, and the Democratic Republic of Congo (DRC) in the upstream segment, whilst the midstream and downstream segment has largely been controlled by China.

Based on announced projects so far, IEA estimates that there has so far been limited progress in diversifying supply, with the geographical concentration of mining operations set to rise further or remain high in their forecast period up to 2030F. For refined materials, IEA still estimates that 70-75% of supply growth in refined lithium,

[18] See I. Mazzoco, R. Berg & R. Bledsoe. "Driving Change- How EVs are Reshaping China's Economic Relationship with Latin America," *CSIS* (Sep 2024).

nickel, cobalt and rare earths will come from the top three producers, and for battery grade graphite, almost 95% of growth continues to come from China.[19]

The world needs to mine more critical minerals to meet growing demand for electrical vehicles (more lithium, nickel, cobalt, copper, aluminum, manganese, graphite), wind energy (copper, aluminum, manganese, chromium, and zinc), solar energy (silver, tin, copper, aluminum, silicon) and the grid infrastructure necessary to support them (copper, aluminum).

Critical minerals require significant capital flows to meet global decarbonization targets. The pace of the transition has been debated particularly against the backdrop of 2024 electoral outcomes. Ultimately, the demand for minerals in supporting low-carbon infrastructure is expected to grow. A sustained supply of these important minerals can stabilize the mineral pricing volatility and manage demand-pull inflation.

Recycling has a role to play in supporting a sustainable supply of critical minerals and technology innovation enables recycling capabilities through potentially increasing recovery rates of critical minerals and utilization rates of secondary resources. Policy incentives such as the U.S. Inflation Reduction Act (IRA) and regulation such as the EU Critical Minerals Act have driven mineral recycling efforts across industries and regions.

[19] International Energy Agency. *Global Critical Minerals Outlook 2024* (May 2024).

China Fights Back - Responses to Western De-Risking

Johanna Chua

China's resilient manufacturing dominance…so far

China is hardly standing still, and to some extent, had already been preparing for this Western de-risking to happen. This comes as it seeks to de-risk its own supply chains from both "unreliable" suppliers, defend its own dominant position in global manufacturing, and find alternative markets either as an end-consumer or a conduit economy to reroute trade and access the US market, which has become increasingly protectionist.

China's manufacturing dominance in value added and trade has been remarkably resilient so far (). Despite significant escalation of trade restrictions/export controls targeting China in recent years, the country has managed to keep its market share for goods exports stable, while its share of global manufacturing value-added (MVA) is still close to 30% of the world MVA in 2023, 90% larger than the next largest contributor, the US, and more than twice the MVA from all of EU.

The large gap between its MVA and its export share reflects China's significant reshoring capabilities, especially for upstream industrial goods, mitigating import dependence, which we think another form of self-insurance.[20]

This resilience likely comes partly from the lagged impact of its industrial policies, which can be traced back when the strategic emerging industries (SEI) initiative was launched in 2010.[21]

While initially motivated by the desire for economic development in the aftermath of the 2008-09 Global Financial Crisis, we think in recent years this has been increasingly driven by tech self-reliance and supply chain dominance objectives as a matter of national security.

Figure 57. China's share of global goods exports and manufacturing value added have been remarkably resilient

Source: IMF Direction of Trade, UNIDO, World Bank, Citi Research

Figure 58. China's real manufacturing FAI growth has been robust even when IP growth was subdued

Source: OECD, Citi Research

[20] As part of the 14th Five-Year Plan,

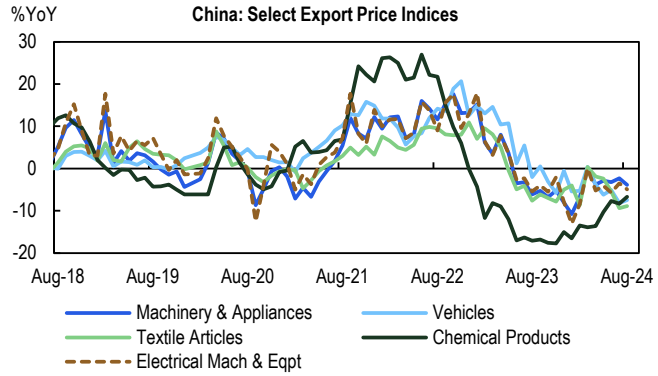
[21] X. Wang, K. Sun & Z. Xiao. "Industrial Policy and the Rise of China's Strategic Emerging Industries," presented at the *American Economic Association* (2022)

China's unbalanced supply versus demand policies in recent years has likely buoyed its cost competitiveness. Despite relatively weak global goods demand in 2022-23 and a continued decline in net FDI, supply-side friendly industrial policies has led to China's manufacturing FAI growth in real terms being resilient.

This was happening alongside anemic domestic demand (amid a real estate downcycle, domestic state policy/regulatory and geopolitical uncertainties) alongside inadequate countercyclical policy support, arguably setting China up for Japanification with risk of entrenching deflationary expectations.

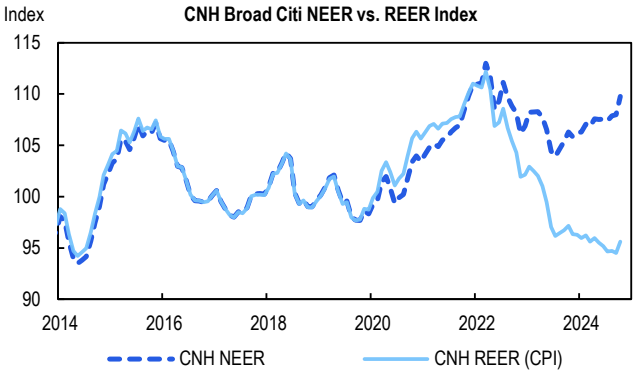
China's unbalanced growth strategy of friendly supply-side vs weak demand-side policies has led to its export goods prices declining for the last year (). As China's inflation had been so much lower than its trading partners, its real effective exchange rates have sharply depreciated since mid-2022 (more so in PPI terms), setting itself up to be very price competitive in the global goods markets.

Figure 59. China - Export goods prices of major commodities have been in deflationary territory for the last year



Source: China General Administration of Customs, CEIC, Citi Research

Figure 60. China's effective exchange rates have depreciated in real terms as its inflation remains below that of its trading partners



Source: CEIC, Citi Research

We outline four major actions China is taking in response to Western de-risking, and how these actions are continually changing the global trade:

Action #1: Expand export markets in the "Global South"

China's exports to the "Global South" have taken on new momentum in the last 4 years, even beyond what can be fully explained by the rising economic size of the Global South.

An interesting feature of China's export surge to the EM is that China's trade surplus has been sharply growing – i.e. the trade increase appears asymmetric – China's higher export value vis-à-vis its imports from EM, even beyond what we have seen in its trade relationship with advanced economies.

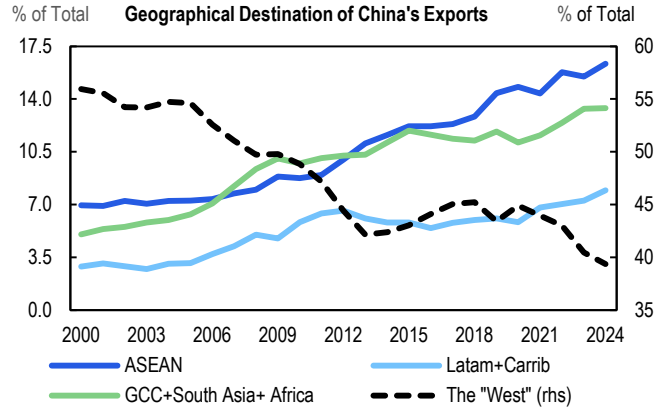
In fact, the dominant driver of China's goods trade surplus in recent years had come from emerging markets (led by ASEAN and GCC).

There are at least three drivers of this surge in China's exports to Global South.

- **First**, some of the surge in exports to the Global South is a reaction to rising protectionism in the West, especially in the US, leading to Chinese companies looking to diversify into new markets, or using some markets in EM, like ASEAN, Mexico, Costa Rica or Eastern Europe, as a way to re-routing of trade flows to create backdoor access to Western markets which remains very important due to

their size/ profitability, with China providing intermediate goods (see next section).

Figure 61. China's Exports to Global South have Risen vs DM



Source: Haver, Citi Research, Note: The "West" - US, CA, UK, EU, NO, JP, AU & NZ

Figure 62. China's rising goods trade surplus has come from EM

Source: Citi Research, Note: *We update 2024 figures up to the 12 month rolling 2024 data as of August using China customs data

- **Second,** some of these trade patterns reflect China's meaningful gains in broad-based manufactured goods amid significant price competitiveness, exacerbated by its own supply-side friendly policies vs. deficient support for domestic consumers, fueling intense domestic price competition, and the impetus for companies to shift their excess capacity overseas.

  China's rising industrial competitiveness as it moves further upstream in higher value added goods, is increasingly displacing the more industrialized manufacturing economies of the "Global North", across a broad array of goods, alongside displacing domestic share in China, which in turn is reducing a form of North-South trade flows.

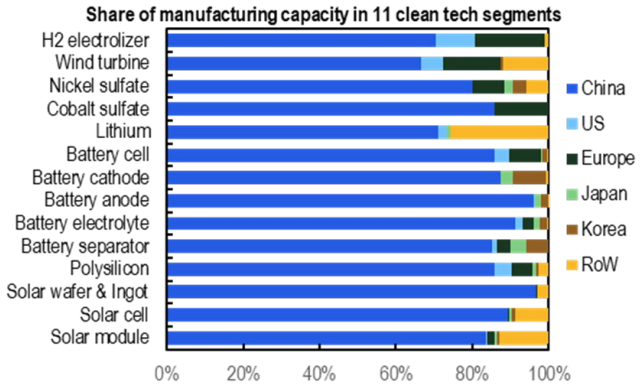
- **Third**, we think this also reflects structural changes in global goods demand with China's significant capital investments in cleantech over the last decade resulting in staggering cost declines in solar panels, batteries, and EVs that in turn is helping accelerate their adoption in EM, at a faster than expected pace.[22]

  As the World Bank recently noted, middle income countries are deploying clean technology at a faster pace than high income countries despite coming from lower levels of adoption rates.[23] This is opening up significant expansion in South-South trade (and eventually direct investment) flows given China's supply chain dominance in these key technologies, helping China displace other more

[22] For example, see IEA. "Global EV Outlook 2024: Moving towards increased affordability" (Apr 2024).
[23] See chapter 5 of *World Bank Development Report 2024- The Middle-Income Trap.* (August 2024)

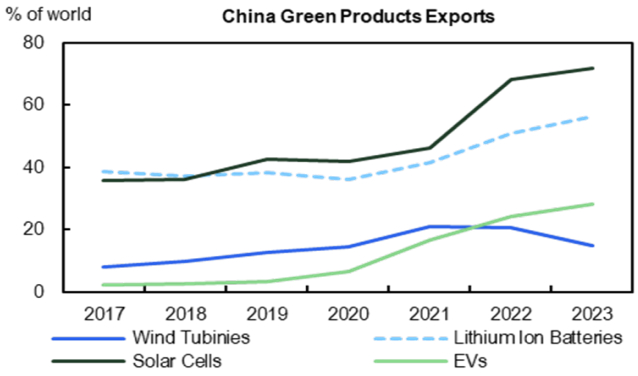
developed economies like US, EU and Japan in key export markets[24], even amid Western onshoring policies.[25]

Figure 63. Production Capacity of 14 Key Clean Technology Sectors



Source: Bloomberg NEF

Figure 64. China's global export market share in green tech products has risen sharply since 2021



Source: UN Comtrade, Citi Research; Note: Data for solar sells before 2021 used a broader category of "electrical apparatus & photosenstive"

Another interesting trend has been not only the rise of Chinese outward direct investment (ODI), but the changing composition of these ODI ().

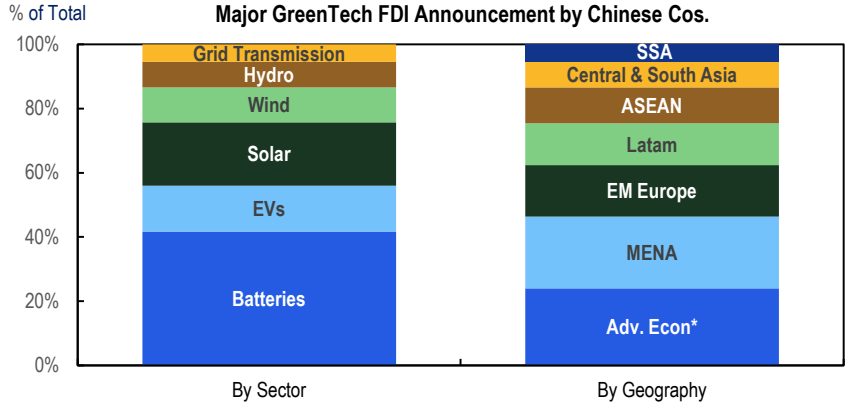
In the past, much of China's ODI has been significantly fueled by acquisitions related to energy and mining (which is more capital vs labor-intensive), but recent ODI trends have significantly shifted towards the manufacturing sector, and we believe some of this represents moves by China to leverage its dominant position in cleantech and entrench its technology ecosystem in fast growing EM markets.

Australian-based think-tank Climate Energy Finance (CEF) notes we have seen **a sharp increase in Chinese outbound FDI announcements in cleantech sector**, making over $100bn in cleantech ODI announcements since 2023.[26]

Over three-quarters of these investments have gone to the "Global South", but in the NEV sector alone, 96% have gone to the Global South, with notable announcements in Saudi Arabia, Brazil, Indonesia, Hungary, Mexico and Turkey.

[24] A. Vagneur-Jones & S. Padilla. "China's Clean-Tech Dominance Grows Despite Onshoring Push." BloombergNEF. 10 Apr 2024.
[25] We would argue provisions relating to FTA requirements and exclusion of "foreign entity of concern" (FEOC) have complicated access to tax credits, and thus, slowed associated investments with the US Inflation Reduction Act.
[26] T, Buckley, X. Dong & A. Jonson. "Green capital tsunami: China's >$100 billion outbound cleantech investment since 2023 turbocharges global energy transition", *Climate Energy Finance,* Oct 2024.

Figure 65. China has made over $100bn in Clean Tech outbound FDI announcements since 2023, mostly to the "Global South"



Source: Climate Energy Finance, Citi Research

Action #2: Third-party trade and production rerouting

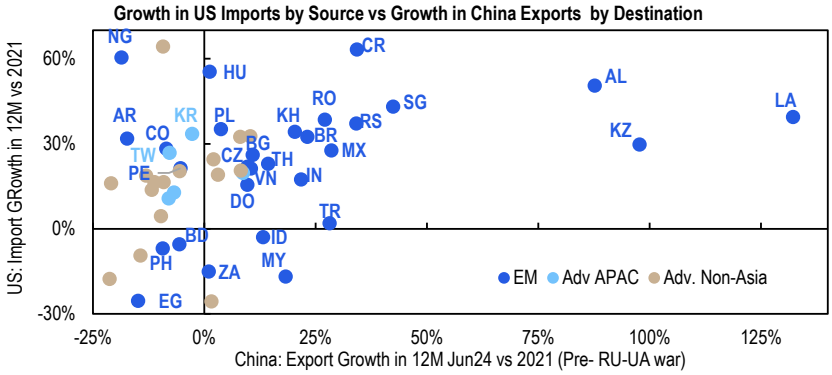
Heightened US trade barriers and regulatory risks in recent years are also inducing China producers (beyond Western ones) to find alternative production bases to mitigate these additional costs.[27] (These motives also coincide with protracted weakness in China's domestic demand that is fueling another rationale for relocation).

The US market is still highly attractive for Chinese producers and has shown exceptional resilience. Even as the US's trade deficit with China shrank 25% in 12m leading to July 2024 vs 2017 (pre-Tariff war), hinting at US de-risking away from China imports, US's overall goods trade deficit widened over 34% in the same period, with Mexico and Vietnam being the largest source of deficit increase.

If we are to look for clues where some of the Chinese production or even goods could be rerouted are finding a backdoor to the US, we look at which economies have seen a surge in Chinese imports in recent years (I.e. pre-2022) beyond what would be plausibly explained by their domestic demand) as well as where there has also been a surge in exports to the US, indicative of so. Indeed, we find this pattern of coincidentally strong US import sourcing accompanying strong Chinese exports tend to be populated by EM economies. The standout countries tend to be small ones like Laos and Albania, but we also see strong dual trade flows (US-import-from/strong-China-exports to") in some ASEAN countries (Singapore, Cambodia, Vietnam and Thailand) [28], Latam (Costa Rica, Mexico, Brazil Dominican Republic), and some less developed parts of Eastern Europe (Serbia, Romania, Bulgaria).

[27] For discussion, see L. Alfaro & D. Chor. "Global Supply Chains: The Looming "Great Reallocation"", NBER Working paper # 31661 (Sep 2023) and H. Qiu, H. Shin, L. Zhang. "Mapping the realignment of global value chains". BIS Bulletin No. 78 (Oct 2023).
[28] We think some of the relative weakness in Malaysia's direct exports to US could be masking trade flows going through Singapore which has an FTA with the US.

Figure 66. Since the Russia-Ukraine conflict, we've seen US imports surge in parts of EM where China's exports have also surged



Source: Haver, IMF Direction of Trade, Citi Research

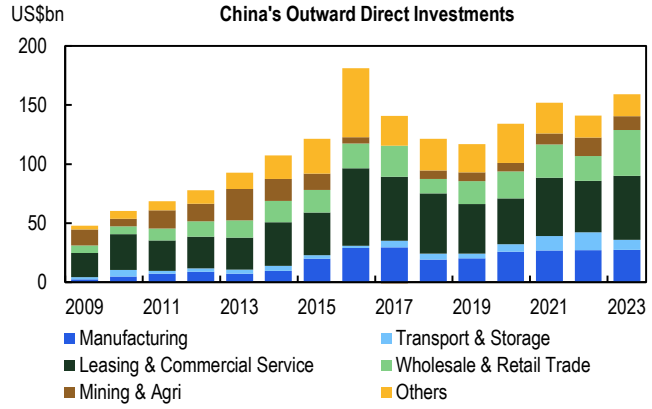
We can also detect some rerouting of Chinese production through third markets is via China's outward direct investment (ODI). China's reported ODI through Hong Kong likely exaggerates the flows, either because Chinese subsidiaries in HK are used to roundtrip flows back to China, or HK subsidiaries are used as a way to channel capital out of China to circumvent capital controls, and thus, should be classified as portfolio outflows.

Regardless, even if we exclude HK, we have seen a steady rising trend of Chinese ODI, and more interestingly, from a sectoral composition, a rising hare of ODI in manufacturing related sectors.

For instance, the share of China's ODI in manufacturing in ASEAN more than doubled to 41% of total in 2019-2023 vs 20% in 200-2015. FDI statistics from China reported by other countries are also visible in some "backdoor-US trade route" hotspots like Mexico and Vietnam, where the share of FDI from China has risen in recent years though may be understated in Mexico's case.[29]

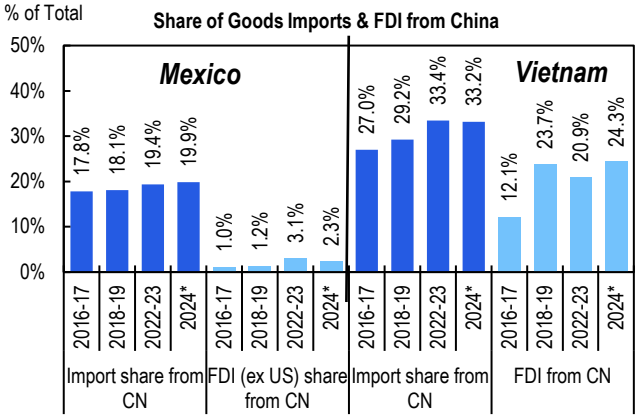
[29] Given increased scrutiny of Chinese investments into Mexico, their true origins can be concealed from FDI statistics if the Chinese company takes on another country origin (e.g. Cayman Islands etc).

Figure 67. China's rising share of non-financial ODI in manufacturing & trade related sectors has been rising while mining/agri share has fallen



Source: China Ministry of Commerce, CEIC, Citi Research, *We infer 2024 data using YoY growth in 1H24

Figure 68. Vietnam and Mexico have seen rising import share and FDI from China in recent years



Source: CEIC, Citi Research

Action #3: Boosting technological leadership and self-sufficiency

We think industrial policy in China in recent history started out as a path to boosting productivity and long-term growth but has become increasingly motivated by national security concerns. China's experience with its tech companies like Huawei being put on the US "entity list" in 2019 or being subjected to export controls on semiconductor and chipmaking equipment in 2022 highlight the risks China faces on being too reliant on Western-supplied technology.

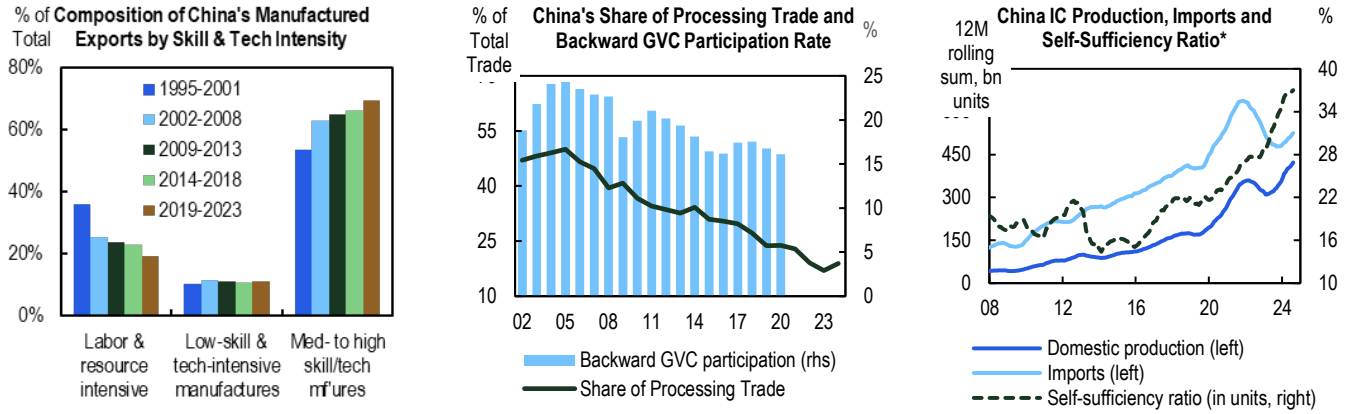
Beyond achieving tech self-sufficiency to de-risk oneself from "unreliable partners", the race for tech supremacy is also being fueled by the pursuit of geopolitical leverage.

After all, the country that leads in critical technologies of the future not only can achieve financial clout, but also asymmetric economic leverage (i.e. making others more dependent on you than you are dependent on them), not to mention military dominance given how crucial technological advancements have become – from AI, cyber, robotics, quantum mechanics, and the like – for future warfare.

China has a long track moving up the value-added curve to make tech self-sufficiency a viable, albeit costly, geopolitical strategy. Over the last two decades, China has seen the skill- and tech- intensity of its exports rise and has significantly displaced imported upstream intermediate goods with local substitutes. We capture the latter by noting the reduction in China's backward global value chain linkages, i.e. the share of foreign inputs in China's exports, and declining share of processing trade.[30].

[30] "Processing trade" is customs declaration procedure in China where finished products are assembled from foreign made components which are then processed into finished goods which are then exported.

Figure 69. China's exports has seen rising skill & tech intensity, has seen reduced its reliance on foreign-made inputs into its exports and is making some inroads towards achieving chip self-sufficiency



Source: Source: UNCTAD (left chart), CEIC & OECD TiVA (middle chart), China Customs, Wind, Haver (right chart), Citi Research (all charts)

Semiconductors have been a key focus for China's drive for self-sufficiency given US moves to limit or delay China's ability to acquire and produce advanced semiconductor technologies using export controls. While China is making inroads in reducing its chip imports in lieu of stepped-up domestic production, one US think-tank estimates that China is still about 2-5 years behind the US and its allies in most facets of semiconductor design and fabrication.[31]

But in many other critical technologies such as cleantech, China is already leading. And if research leadership is any guide for future commercial application, one study notes that across 64 critical technologies of the future, China is already leading in 57 of them (vs US leading on 7)[32].

In the case of EVs, for example, China's dominance across the vertical supply chain including the upstream mineral processing and battery production, has been a critical factor driving its competitiveness across the downstream vehicle sector.

While the pressure for China to shift its EV production elsewhere will grow amid tariff backlash even among the "Global South", China clearly wants to retain its leverage over the upstream segments— the Ministry of Commerce recently held a meeting with more than a dozen automakers reportedly advising them to make sure the advanced EV technology stays in China.[33]

Action #4: Secure reliable suppliers for primary and resource goods—and in the critical minerals supply chain

China's imports are increasingly comprised of primary and resource-based goods – a natural corollary to its inroads in onshoring other upstream intermediate goods and components, as discussed earlier in "Action#3". Beyond the arithmetic, if we look at the composition, the bulk of the rise of primary and resource-based

[31] Stephen Ezell. *How Innovative is China in Semiconductors?*, Information Technology & Innovation Foundation (ITIF), Hamilton Center on Industrial Strategy (August 2024)
[32] J. Leung, S. Robin & D. Cave. "ASPI's two-decade Critical Technology Tracker: The rewards of long-term research investment." ASPI (August 2024);
[33] L. Lew. "China Asks Its Carmakers to Keep Key EV Technology at Home," *Bloomberg* (12 Sep 2024).

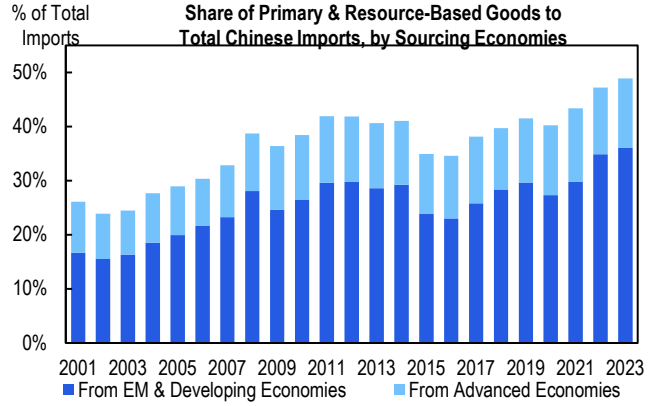
imports come from the "Global South". In fact, primary and resource-based goods are the overwhelming share of Chinese imports from Latam (excluding Mexico) and Africa.

This is likely a function of the economic structure of these economies, especially the less developed ones more reliant on primary sector vs. a very underdeveloped manufacturing sector-e.g. AfDB estimates that natural resources and essential ecosystem services account for 62% of Africa's GDP.[34]

However, we think there are two other drivers of the sharp rise in China's imports of key commodities from the "Global South". First, the more volatile geopolitical landscape has raised the prominence of food, energy and resource security as part of China's overall national security strategy, leading to two things:

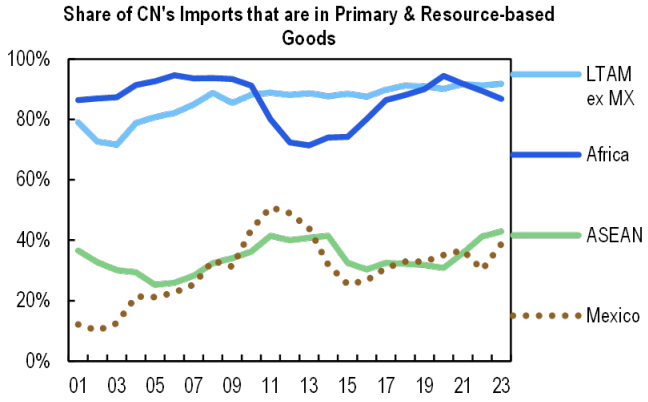
- **A push towards diversifying sourcing,** one prominent example being China's efforts to reduce its dependence on Australia for ~60% of its iron ore imports (Brazil is another 20%), spurring Chinese investments in iron ore projects in Sierra Leone, Guinea, Algeria, Cameroon, and Congo, alongside supporting transport infrastructure[35]. China has also been reportedly diversifying soybean imports from the US in lieu of Brazil, Russia, and Argentina due to trade policy uncertainties.[36]

Figure 70. China's imports are increasingly comprised of primary and resource based goods from the "Global South"



Source: UNCTAD, CIti Research

Figure 71. Concentration of Chinese imports in primary and resource-based goods is particularly high in Latam (ex-Mexico) and Africa



Source: UNCTAD, Citi Research

- **Related to the first, finding more reliable suppliers where we think China can arguably exert more leverage** – either via pseudo-monopsonistic power, debt-funded capital investment for infrastructure and/or resource extraction, or securing outright equity ownership. We argue that many economies in the "Global South" offer China that asymmetric leverage, e.g. more financially constrained African countries, Russia and Iran.

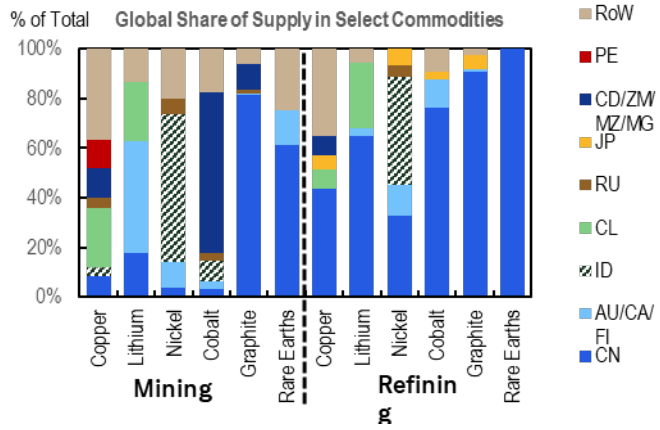
[34] African Development Bank (AfDB). *African Economic Outlook 2023: Mobilizing private sector financing for climate and green growth in Africa.* (2023)
[35] J. Nyabiage. "China is planning to break its dependency on Australia and Brazil for iron ore. Africa is key." *South China Morning Post* (16 May 2024).
[36] "China to further diversify soybean imports for stable supply: experts," *Global Times*, (11 July 2024).

A second key driver of China's rising commodities-related trade with the Global South is its quest for critical metals and minerals needed for cleantech and other advanced technologies. China already has a massive head start versus the West, accounting for >40% of the world's refined copper, >60% of lithium chemicals, >70% of refined cobalt, and dominating graphite and rare earths.

If we base numbers on asset ownership, China's role in nickel, copper, and cobalt mining would be much larger than what is indicated in Figure 72. For example, China reportedly owns 72% of DRC's active copper and cobalt mines.[37]

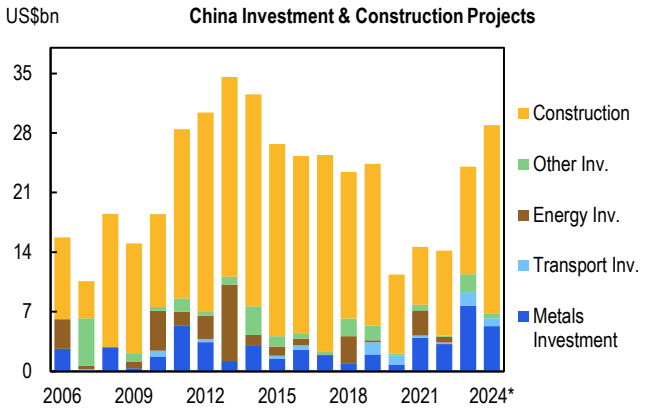
Beyond long-term strategic planning, we would argue that China has three main advantages vis-à-vis the West in defending their dominance: First, longer track record of government support and subsidies, either direct or indirect via below-market loans, tax breaks, high-level "G-to-G" engagements, among others; Second, a coordinated approach of bidding for mining concessions that also come with provision of construction loans for costly infrastructure;[38] and third, an institutional set-up arguably more adaptable to investing in countries with weaker governance standards than what Western entities can content with.

Figure 72. China has a dominant role in key critical minerals based on data for 2023



Source: IEA - Global Critical Mineral Outlook 2024

Figure 73. China's Announced Outbound Investment & Construction Projects in Africa - Rebounding since 2023



Source: American Enterprise Institute & Heritage Foundation, China Global Investment Tracker, July 2024,,

China is already demonstrating an ability to leverage its dominant position in critical metals for interrelated commercial and geopolitical objectives. Not only has it used its vertical dominance of the battery supply chain to outcompete West in the EV market, but it has also pursued various export restrictions since 2023. In July 2023, China imposed export restrictions on gallium and germanium, used in various tech applications (chips, 5G, infrared).[39] In October 2023, China

[37] L. Johnson, "China's interests in Africa are being shaped by the race for renewable energy," *The Conversation* (2 Sep 2024).

[38] According to a CSIS case study, the success of a Chinese consortium in outbidding Australia's Fortescue for Guinea's bauxite and iron ore concession in 2019 came from their ability to combine their offer with the construction of costly infrastructure projects. See B. Boland et al. "CCP in West Africa: How Chinese Party State Actors Secured Critical Minerals in Guinea." CSIS (June 2022)

[39] According to the U.S. Geological Survey, China produces 98% of the world's gallium and 60% of its germanium. See "China's Gallium and Germanium Export Restrictions Risk Chip Production Shortages." Trendforce. (Aug 2024)

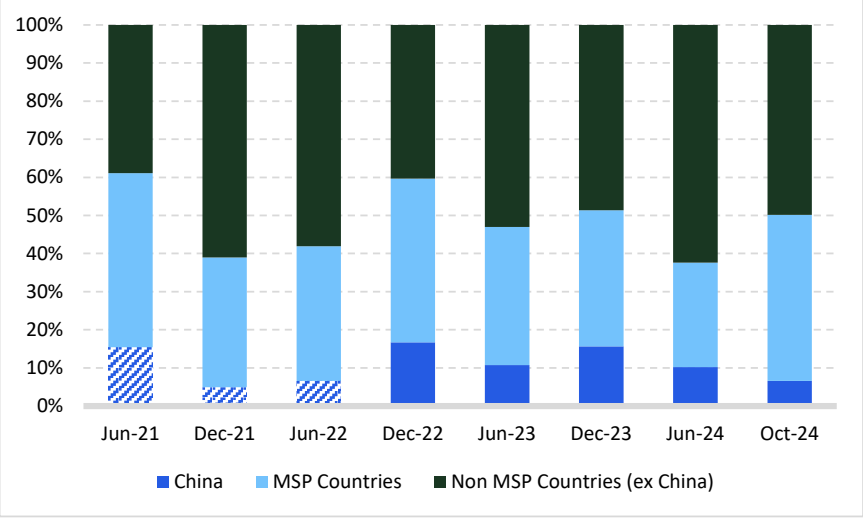
said it will require export permits for some graphite products to protect national security.

In December 2023, China announced an export ban on technology to make rare earth magnets (including technology to extract and separate critical minerals) in a bid to maintain its clout.[40] More recently, in August 2024, China announced export controls on some antimony products—used in various defense equipment applications– citing national security concerns.[41]

These actions by China should only galvanize other countries' pursuit of their own secure critical mineral supply chains –the US-led -Minerals Security Partnership, which recently added India in its fold, is precisely created for this purpose.

From the shipments of critical minerals as depicted in Figure 74, there has been some initial indication of declining Chinese exports of these minerals after the MSP launch, it's not clear we are seeing significant progress on this front at this juncture yet..

Figure 74. Critical Minerals Export Countries: % by Category



Source: Citi Global Data Insights, Dun & Bradstreet

This would imply that if the West also wants to achieve its climate transition goals efficiently, there will likely be a limit to how much the West can truly de-risk its supply chains from China at this juncture – and from China's perspective, that's probably precisely the goal.

[40] S. Liu & D. Patton. "China bans exports of rare earths processing tech over national security," *Reuters* (22 Dec 2023).
[41] According to the US Geological Survey, China is the largest producer of antimony, accounting for 48% of production.

Can the US Achieve Manufacturing Renaissance?

Nathan Sheets

Rob Sockin

Cole Langlois

Over the last several years, we've seen some powerful structural developments that—while still just "green shoots"—could potentially take hold and drive a sustained strengthening in US manufacturing. These factors include an ongoing reshoring of manufacturing activity, the availability of cheap and abundant natural gas, and synergies from the burgeoning US AI sector.

Also, while we are generally wary of industrial-policy initiatives, interventions by the Biden Administration, including the CHIPS Act and the Inflation Reduction Act, seem to have been surprisingly successful in supporting the manufacturing sector.

Our sense is that a resurgence in US manufacturing would be a positive development for the manufacturing sectors across APEC, and likely globally. Our expectation is that the underlying technological drivers would quickly diffuse across borders, so any US manufacturing gains would soon bring similar advances in other countries. Thus, we anticipate that such an episode would have a distinctly "win-win" flavor.

The following two thoughts provide further framing. First, to be clear, US manufacturing is not actually in the midst of a renaissance at present. Rather, the sector faces significant cyclical headwinds, given the strong dollar, still-restrictive Fed policy, and the persistent softness of consumer demand for goods. More generally, the sector looks to have essentially trodden water since the time of the Global Financial Crisis. As such, this discussion admittedly remains preliminary and somewhat speculative.

Second, Donald Trump's return to the White House for a second term could appreciably shift the trajectory of US manufacturing. Our analysis focuses mainly on the major economic forces that are in play, assuming that the political environment doesn't become a first-order driver of performance. Of course, the sweep of political events could move in much different directions

.

A Snapshot of the US Manufacturing Sector

We begin with a snapshot of the current contours and performance of the US manufacturing sector. Manufacturing currently accounts for 11.7% of the value added produced by the US private economy. By comparison, it uses labor relatively efficiently, employing just 9.7% of the workforce.

The manufacturing sector has an important global footprint, contributing nearly 80% of US goods exports. It is comparatively energy intensive, accounting for over one-third of the economy's power consumption.[42] It is also credit intensive, reflecting the financing of capital goods.

Correspondingly, manufacturing's shares of bank credit and total indebtedness are also well above its share of value added. The average employee in the sector in 2022 earned $101,000, a 20% premium compared with the US average. A large part of this premium reflects that manufacturing workers clocked more hours—40.1 hours versus 34.4 hours. Workers in the sector are more productive than others on

[42] Other major sources of end-use energy demand include transportation (37%), the residential sector (15%), and the commercial sector (13%).

a “per employee” basis, but the gap disappears in terms of “output per hour.” Finally, we note that manufacturing is somewhat more unionized than the rest of the economy but, even so, labor’s share of the sector’s value added is similar.

Figure 75. Snapshot of Manufacturing’s Role in the US Economy (2023)—Part I*

	Level	Share of US Total (%)
Nominal Value Added (Billions of US$)	2840	11.7
Employment (Thousands of Workers)	12942	9.7
Goods Exports (Billions of US$)	1602	79.4
Energy Consumption (Trillion BTU)	26099	34.9
Bank Credit (Billions of US$)	2250	14.0
Total Debt (Billions of US$)	3417	16.2

Source: Citi Research, BEA, Census, BLS, EIA, FRB, Note: * Economy wide data are for the private sector.

Figure 76. Snapshot of Manufacturing’s Role in the US Economy (2023)—Part II*

	Manfacturing	Economy Wide Avg
Total Compensation (Thousands $)*	101.0	84.2
Hours per Worker (Weekly)	40.1	34.4
Output per Worker (Thousands, $)	219.5	182.6
Output per Hour ($)	109.3	109.0
Labor's Share of Value Added*	48.2	48.2
Share Unionized	9.1	6.9

Source: Citi Research, BLS, BEA, Note: * Data are for 2022.

We summarize the industry composition of the US manufacturing sector in Figure 77. As shown in the first column, particularly large manufacturing industries include chemicals, food & beverage, computers & electronics, and other durables. Together, these four sub-sectors account for 55% of manufacturing value added. Also including transportation and petroleum brings the total from the six largest sub-sectors up to nearly 70%.

A related observation is that the distribution of manufacturing output is just slightly tilted toward the production of durable goods. Employment, however, is more heavily skewed toward durables. Among the durable-goods subsectors, the largest employers are transportation, fabricated metals, and other durables. On the non-durables side, food & beverages is the largest employer, accounting for 16% of total manufacturing jobs.

Figure 77. Composition of U.S. manufacturing Sector (2023)

	Nominal Value Added	Employment	Nominal Exports	Energy Consumption*	Natural Gas Consumption*
	Sectoral Shares of Manufacturing Total (%)				
Durables	53.2	62.6	63.2	22.2	21.3
Nonmetallic Minerals	2.7	3.3	0.8	4.4	4.8
Primary Metals	3.0	2.9	4.6	7.8	9.3
Fabricated Metals	6.6	11.2	3.5	1.3	1.7
Machinery	7.1	8.8	10.4	0.8	0.8
Computers & Electronics	10.8	8.6	14.4	0.6	0.5
Electrical	2.7	3.2	4.4	0.4	0.5
Transportation	6.2	13.8	18.4	1.8	2.2
Other Durables	14.1	10.8	6.6	5.2	1.5
Nondurables	46.8	37.4	36.8	77.8	78.7
Food & Beverage	11.8	16.1	5.7	6.6	10.0
Textiles & Apparel	1.0	2.2	1.4	0.5	0.5
Paper	2.6	2.8	1.6	10.5	7.9
Printing	1.5	2.9	0.3	0.3	0.3
Petroleum	7.6	0.8	8.0	21.8	14.7
Chemicals	18.7	7.0	17.4	36.7	44.2
Plastics	3.4	5.7	2.5	1.3	1.1

*Energy data is for 2018.
Source: Citi Research, BEA, BLS, Census, EIA

Exports are similarly skewed toward durable goods. Transportation is the largest exporting sector, closely followed by chemicals and then computers & electronics, and machinery. Together, these sectors generate 60% of manufacturing exports.

Energy consumption is heavily dominated by the non-durables industries. The chemicals sector is far and away the largest user, accounting for 36.7% of the manufacturing sector's energy consumption. The sector is particularly benefiting from the availability of cheap abundant natural gas, and it accounts for 44% of the manufacturing sector's natural gas usage.

Chemicals and petroleum together consume nearly 60% of the total energy used by the manufacturing sector. Paper, primary metals, other durables are also intensive users of energy.

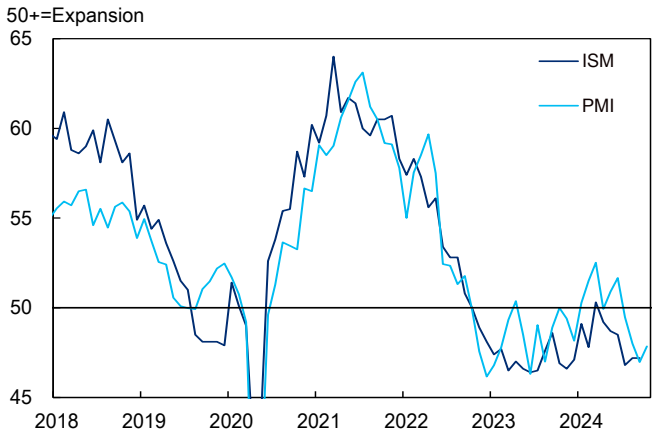
Recent Cyclical Performance

After rebounding sharply from the pandemic downdraft, the US manufacturing has seen a period of entrenched weakness. Coming out of the pandemic, consumers had amassed pent-up demand for services experiences, especially travel and recreation activities that were often judged "too risky" during the pandemic. The resulting rotation of spending to services and away from manufacturing has been powerful and sustained.

The evolution of the manufacturing ISM and PMI confirms this narrative. These "soft" measures of manufacturing activity have generally languished in recessionary territory in recent years. Late last year and early this year, it looked as if conditions might be improving, but in recent months the indexes have again retreated. In contrast, the corresponding series for the services sector have been much stronger and have generally pointed to solid services performance.

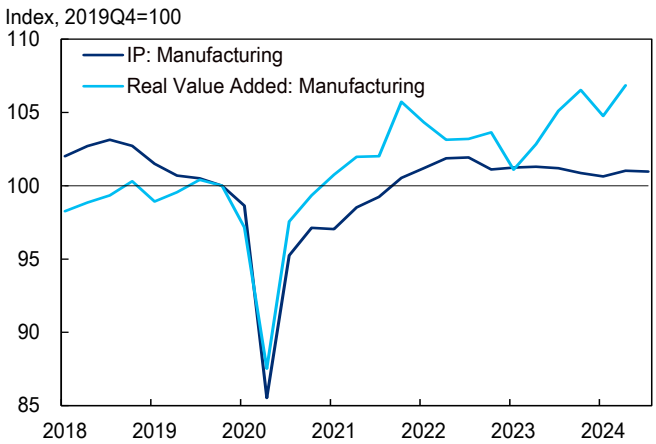
But the hard data for the manufacturing sector paint a more mixed picture. On the one hand, the industrial production manufacturing data are every bit as soft as the PMIs suggest. This measure of manufacturing rebounded to its pre-pandemic level in mid-2021 and has essentially moved sideways over the past three years.

Figure 78. US Manufacturing "Soft Data": PMI & ISM



Source: Citi Research, S&P Global, ISM

Figure 79. US Manufacturing: IP & Real Value Added

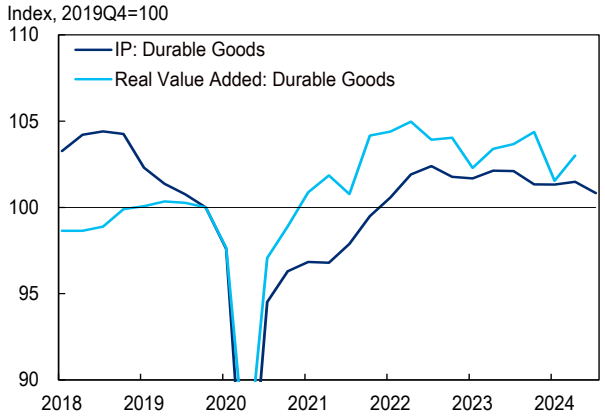


Source: Citi Research, FRB, BEA

The story for real manufacturing value-added, as reported in the National Income Accounts, is distinctly different. This measure of manufacturing performance peaked in mid-2021 more than 5% above its pre-pandemic level. But it contracted thereafter, falling back to the industrial production index by 2023:Q1. Subsequently, however, the two series have again diverged. While manufacturing IP has stagnated, real manufacturing value-added has risen a solid 7%, suggesting that the manufacturing sector may be shaking off its post-pandemic lethargy.

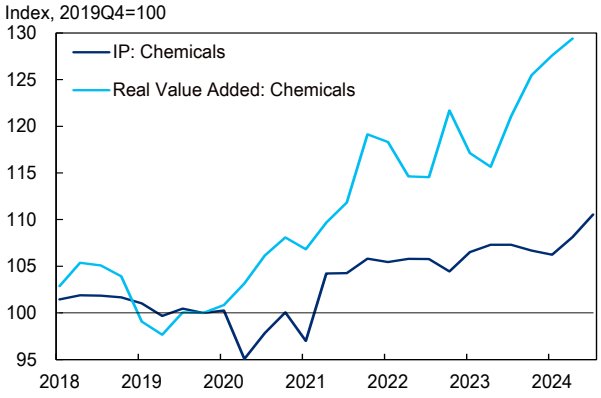
Looking at disaggregated data, we see little difference between IP and value added in their assessment of durables manufacturing, where the two measures are both weak. But the recent divergence is more marked for non-durables manufacturing, where value-added recently has expanded more than 10%, while non-durables IP has remained flat. At a more granular level, the divergence is most striking for chemicals and petroleum manufacturing.

Figure 80. Durable Manufacturing: IP & Real Value Added



Source: Citi Research, FRB, BEA

Figure 81. Chemical Manufacturing: IP & Real Value Added



Source: Citi Research, FRB, BEA

We conclude this section by looking at manufacturing employment. After falling sharply during the first months of the pandemic, manufacturing employment recovered much more gradually than real value-added, not moving above the pre-pandemic level until early 2022 and then flattening out.

By our reckoning, the relatively gradual recovery of employment through late 2020 and 2021 highlights the constraints that then prevailed on the availability of workers. The demand for goods was surging and firms were desperately short of employees.

Subsequently, from late 2021 to early-2023, manufacturing value added contracted, but employment in the sector continued to gradually rise. While this might be interpreted as "labor hoarding," a more compelling explanation is that firms were gradually returning to pre-pandemic employment levels as workers became available.

In this context, it's notable that employment levels have broadly remained flat since early 2023, even as manufacturing value added has moved back up. Thus, to the extent that previous years saw labor hoarding, the effects have likely now been reversed.

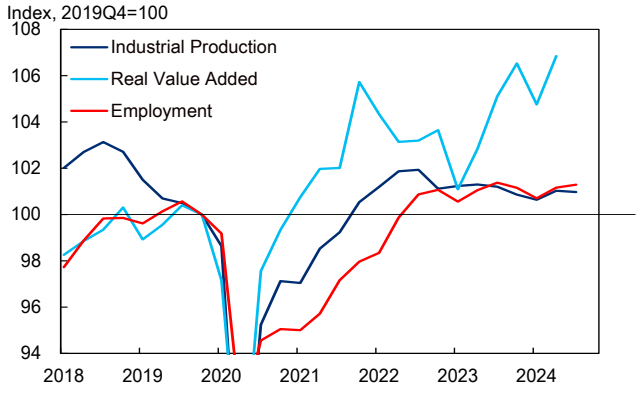
In addition, US goods exports have only recently shown some signs of life, but in nominal terms they remain below mid-2022 levels. Exports with most major trading partners, including APEC members, has failed to pick-up. Exports to Canada, China, Japan, and Korea are all flat to down over the last two years. Trade with

Mexico meanwhile has started to gain steam, and trade with Australia as well as several East Asian economies such as Malaysia and Vietnam has shown some strength. Outside of APEC, trade with the EU has recently picked up, although until recently it had recorded virtually no growth in recent years.

Looking at trade by major component, the recent improvement in US goods exports has largely come from non-auto capital goods, especially surging exports of advanced technology products. This growth has been concentrated in information and communication exports, and specifically in trade with economies in Asia.

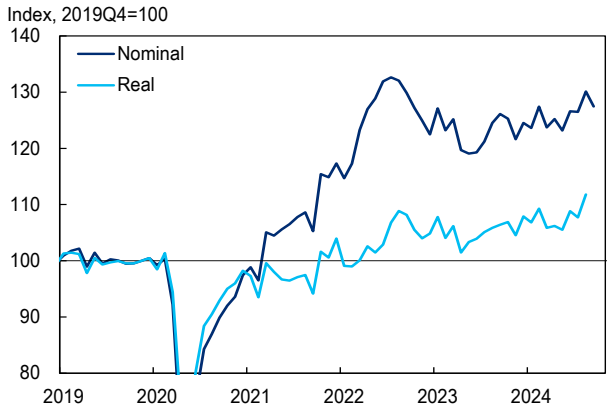
Consumer goods have seen some mild improvement, while industrial supplies have moved sideways. Autos have struggled and are still not much above their cycle lows. The struggles of the auto sector are also manifest in the industrial production data, although the value-added statistics paint a somewhat more encouraging picture.

Figure 82. Manufacturing: Activity Measures & Employment



Source: Citi Research, FRB, BEA, BLS, Haver Analytics

Figure 83. US Goods Exports



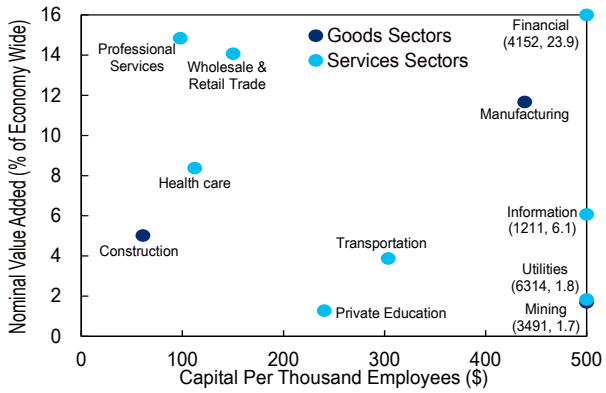
Source: Citi Research, Census, Haver Analytics

We conclude by noting two additional cyclical factors that have created headwinds for the manufacturing sector: First, the Fed's sharp hiking cycle; and second, the historically elevated dollar.

Higher interest rates are particularly challenging for the manufacturing sector because consumer durables and capital goods often require financing to facilitate purchases. Similarly, some parts of the manufacturing sector are relatively capital intensive and, hence, sensitive to rising financing costs.

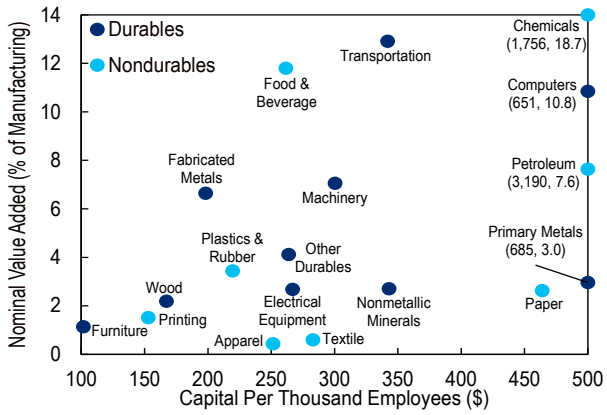
Manufacturing has a comparatively high capital-to-labor ratio. Figure 84 shows capital-labor ratios for the manufacturing subsectors. Several large subsectors—chemicals, computers & electronics, petroleum, and primary metals—are substantially more capital intensive than the average manufacturing subsector.

Figure 84. Capital Labor Ratios & Share of Value Added*



Source: Citi Research, BLS, BEA, Haver Analytics; Note: *Data for 2023

Figure 85. Capital Labor Ratios & Share of Mfg Value Added



Source: Citi Research, BLS, BEA, Haver Analytics

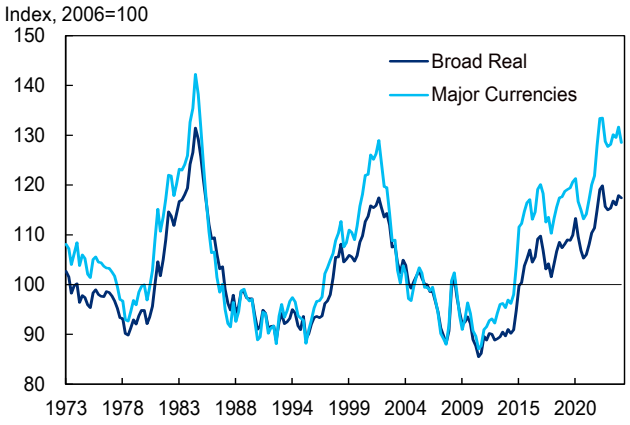
The US dollar has strengthened in recent years, to sustained levels seen only during previous peaks in the mid-1980s and early-2000s. In our view, the dollar's strength has largely echoed the Fed's relatively aggressive hiking cycle and the ongoing outperformance of the US economy, especially compared with other DM economies.

With the Fed now easing policy, some of these upward pressures are likely to abate. But with the US economy continuing to show resilience, the timing and pace of the dollar's retreat toward more historically normal levels remains an open question.

Bottom line, the available data are somewhat mixed in their narrative but taken together suggest that, even if parts of the US manufacturing sector are seeing a cyclical upswing (such as chemicals manufacturing), many other parts of the sector are currently just treading water.

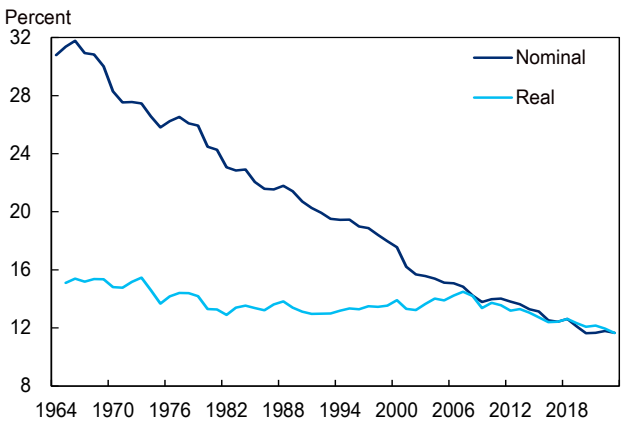
As such, it's fair to say that any "renaissance" for US manufacturing is still more a hypothesis than a concrete outcome that has been achieved. This may in part reflect that cyclical conditions remain challenging.

Figure 86. US Dollar Measures



Source: Citi Research, FRB, Haver Analytics

Figure 87. Manufacturing's Share of Private GDP



Source: Citi Research, BEA, Haver Analytics

Longer-Term View

In this segment, we take a longer-term view of the evolution of the manufacturing sector. Figure 86 shows manufacturing's share of the economy since the mid-1960s in both nominal and real terms. The manufacturing sector's share of nominal output hovered around 30% through the 1960s, but in the early 1970s began to decline.

By the late 1970s, this share had fallen to around 25%, and by the mid-1990s it dipped below 20%. Manufacturing's share continued to decline for much of the 2000s, and in recent years it has hovered near 12%—a historical low. The manufacturing sector's share of real output which excludes price growth has been much more stable, but it has also edged down over time.

The sharper decline in manufacturing's nominal share of the economy, compared with its real share, can be explained by sharply diverging patterns in manufacturing and economy-wide prices. From the 1980s to the mid-2000s, prices were roughly flat in the manufacturing sector while they doubled for the overall economy.

After the GFC, prices began to gradually climb in the manufacturing sector, though they still expanded more slowly than prices in the broader economy. Only over the last few years have prices experienced similar growth across manufacturing and non-manufacturing.

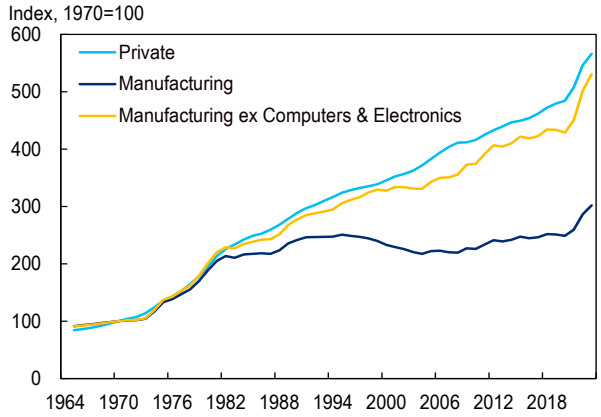
Digging deeper into these figures, the slower growth of prices in the manufacturing sector for much of the last few decades can largely be attributed to declining prices for electronics and related products.

The reason these prices have fallen substantially on balance over the last few decades is that prices in the national accounts are quality-adjusted. A computer today can process much more information than one 15 or 20 years ago, which means a dollar is able to purchase more processing power.

While the appropriate methodologies for quality adjusting these prices is an area of immense debate, there is little doubt that some type of quality adjustment is reasonable, especially for computers and similar items.

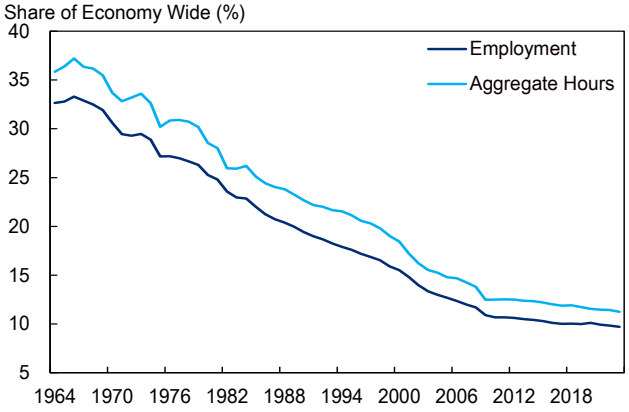
Turning to the labor market, in the mid-1960s, the manufacturing sector accounted for about one-third of overall employment and over 35% of total hours. These shares recorded a largely uninterrupted and consistent decline until the GFC, after which they have continued to move down but at a much slower rate. Similar to the manufacturing sector's share of value-added, its shares of the labor market are currently near the lowest levels of the last sixty years.

Figure 88. Price Deflators by Industry



Source: Citi Research, BEA, Haver Analytics

Figure 89. Manufacturing: Employees & Hours (% of Overall)



Source: Citi Research, BLS, Haver Analytics

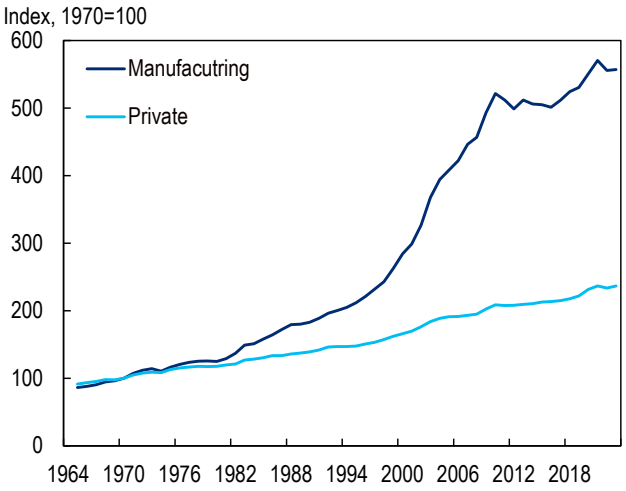
Productivity in the manufacturing sector meanwhile performed remarkably well for long stretches of the last several decades. From the mid-1970s until the GFC, real output per hour in manufacturing vastly outstripped that of the overall private sector—expanding almost five-fold compared with the broader economy's roughly two-fold increase.

Over the last fifteen years, however, manufacturing productivity has only modestly exceeded that of the overall economy.

Productivity in the manufacturing sector meanwhile performed remarkably well for long stretches of the last several decades. From the mid-1970s until the GFC, real output per hour in manufacturing vastly outstripped that of the overall private sector—expanding almost five-fold compared with the broader economy's roughly two-fold increase.

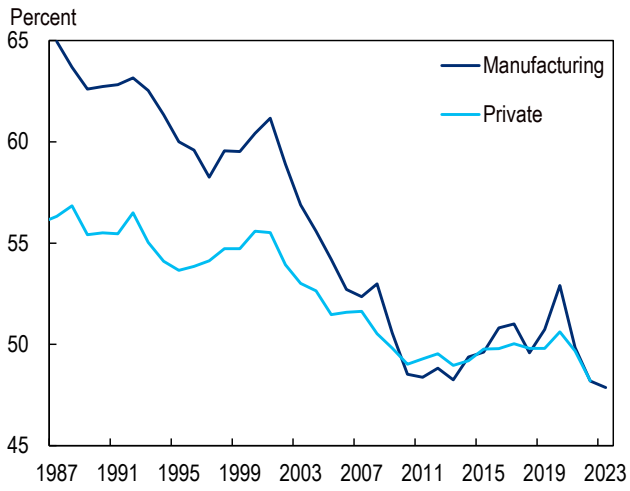
As the sector's employment has declined, labor's share of output has declined as well. As shown in Figure 9, in the late 1980s, labor's share of value-added in the manufacturing sector was just under 65%—well above the economy-wide average near 55%. Subsequently, it recorded a sustained decline, eventually moving below the average of the overall economy in the years after the GFC. Labor's share of value-added in manufacturing subsequently climbed back up in the period preceding the pandemic, but it has again fallen sharply and recorded new lows.

Figure 90. Real Output Per Hour



Source: Citi Research, BLS, BEA, Haver Analytics

Figure 91. Labor Compensation (% of Value Added)

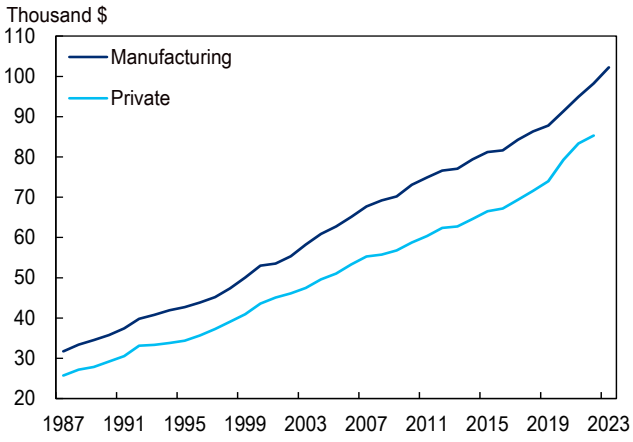


Source: Citi Research, BLS, BEA, Haver Analytics

One additional point worth noting, is that workers in the manufacturing sector have consistently been well paid. Compensation growth in the manufacturing sector has broadly kept pace with overall compensation growth in the economy and, given higher hours worked in the sector, total compensation has also been higher. While manufacturing has accounted for less and less employment over time, workers that are in the sector have generally been compensated well.

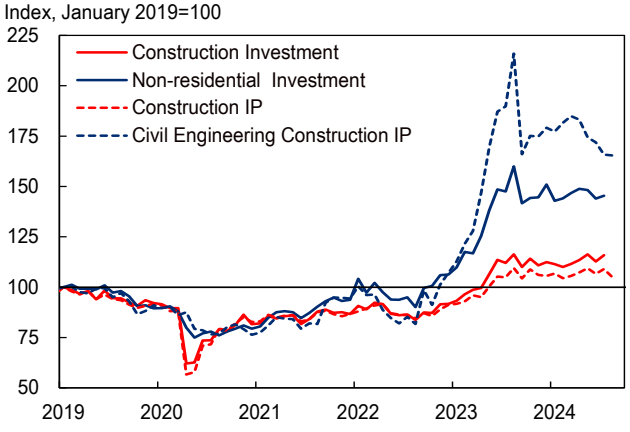
All told, the longer-term evaluation of the manufacturing sector underscores that it has seen a sustained decline in its role in the economy. While there were some signs that the sector had been gaining some life in the 1990s and early 2000s, the GFC dealt a powerful blow to this progress. These strains have been largely reinforced by the weak goods backdrop of the last few years.

Figure 92. Total Compensation Per Employee



Source: Citi Research, BLS, Haver Analytics

Figure 93. Mexico: Construction Activity & Investment



Source: Citi Research, National Institute of Statistics and Geography, Haver Analytics

The Case for a Forthcoming Renaissance

The available data hardly point to a renaissance in the US manufacturing sector to date. Even so, we see emerging evidence that this may be in the pipeline. Deep global economic forces look to be in play that may yet drive structural strengthening in the sector's performance.

These include the ongoing shift in globalization away from China, the development of AI, and the availability of cheap and abundant natural gas. In addition, while industrial policy and other efforts by the US government to foster the sector carry distinct risks, recent interventions to support manufacturing seem to have packed more punch than we would have anticipated.

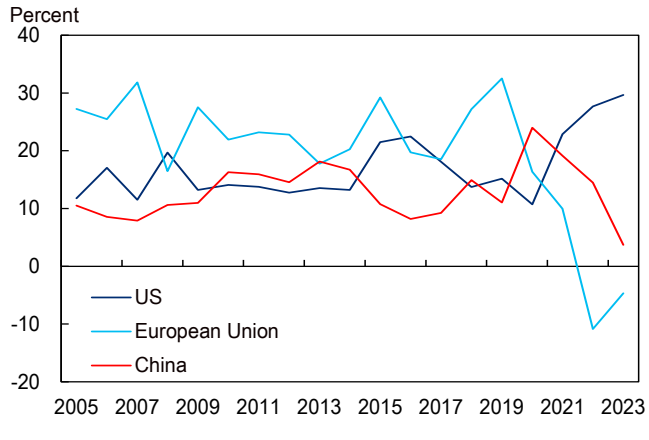
The Shifting Profile of Globalization.

As we have documented in previous work, we read the evidence as not pointing to "de-globalization" but, rather, to a rebalancing of globalization and global flows *away from China*.[43]

The winners of this rebalancing process include other countries in Asia, such as Vietnam as well as India. In this context, Mexico is benefiting from its proximity to the United States and significant "near-shoring" flows. While the available FDI data remain inconclusive on this point, the data for construction investment and industrial production are strongly supportive. Civil engineering construction has been particularly buoyant in recent years.

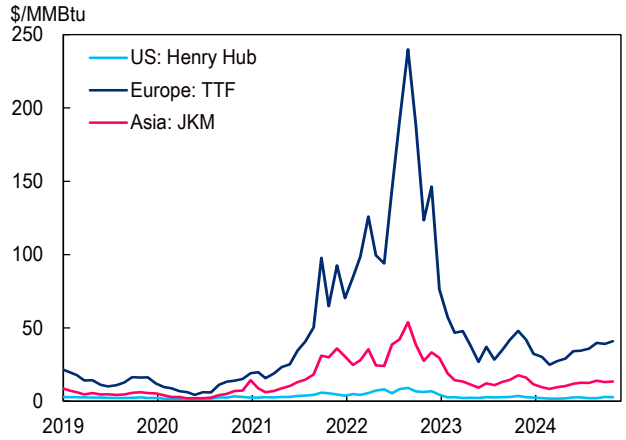
In parallel, the United States is seeing a boost from reshoring. Global FDI flows highlight this point. In recent years, the US share of global FDI has jumped, from less than 15% in 2019 to nearly 30% last year. In tandem, flows to China have fallen off sharply, but remain positive. This highlights that China is not seeing a massive reversal of previous inflows but, rather, flows that had been directed toward China are now increasingly going elsewhere.

Figure 94. Country FDI Inflows (% of Global Inflows)



Source: Citi Research, OECD

Figure 95. Natural Gas Prices



Source: Citi Research, Bloomberg

[43] Our previous work includes Globalization vs. Deglobalization: What's Next? and also Supply Chain Financing: Building Resilience as the New Definition of "Global" Emerges.

Notably, **the falloff in FDI to the euro area has been even more severe than for China, with outflows in both of the last two years.** This reflects heightened uncertainties in the region associated with the Russia-Ukraine war. As a related matter, the curtailment of natural gas flows from Russia has driven up gas prices in Europe, especially relative to the United States where gas is abundant.

More broadly, the recent Draghi Report highlighted concerns about Europe's structural competitiveness in key sectors, especially tech. These challenges are also reducing Europe's attractiveness as an investment destination.

The clear conclusion is that the United States looks to be one of the winners as the contours of this "New Globalization" emerge. And these gains are likely to accrue largely to the US manufacturing sector.

The Development of AI

Our sense is that the accelerating emergence of generative AI is poised to transform the global economy.[44] And the United States is at the epicenter of the AI revolution. This reality is likely to offer some benefits to US manufacturing.

First, the production of the necessary hardware and other capital goods to support AI is likely to be done by US tech firms, which are part of the manufacturing sector. While US tech firms have a global production footprint, much of their value added (and profits) will ultimately be booked in the United States.

Second, and perhaps more importantly, US manufacturing firms will have ready access to AI applications and expertise. This proximity should speed the diffusion of AI applications in the sector relative to many other geographies. As a corollary, our sense is that at least part of the upsurge in US FDI inflows noted above reflects the pull from the burgeoning AI sector.

Cheap and Abundant Natural Gas.

Natural gas prices in the United States have been low and stable compared with other key regions. The gas-hungry chemicals sector has been a particular beneficiary of the comparatively low prices, as demonstrated by the sector's rapid growth in recent years.

Another result has been much lower US electricity prices, which have benefited the manufacturing sector more broadly.

Industrial Policy, Tariffs, and Other Government Interventions.

The manufacturing sector is increasingly the target of interventions by US policymakers seeking to foster its competitiveness. During the Biden Administration, this effort has taken the form of the CHIPS Act and the IRA.

While this legislation also had other objectives, supporting the US manufacturing sector was high priority.

In sync with the approval and implementation of these fiscal packages, the US has seen an upsurge in manufacturing construction, which points to a burgeoning in the sector.

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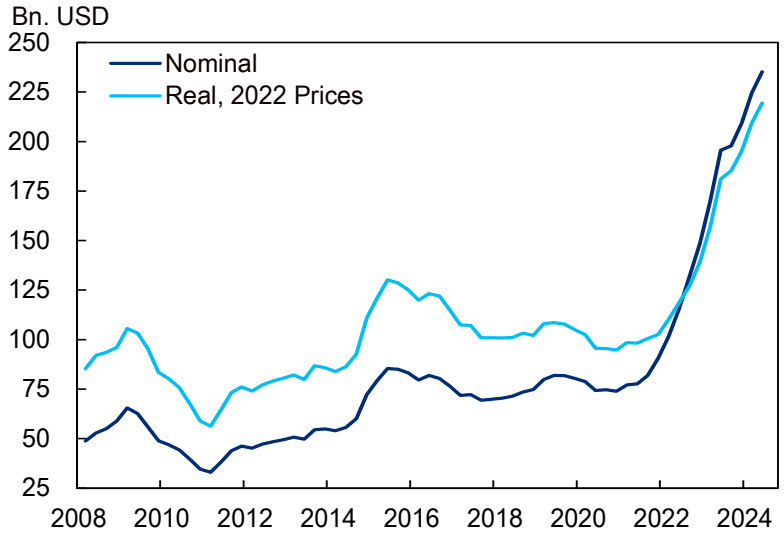
[44] For more details, see our recent "Must C" Report, The Digital Transformation of the Global Economy: Riding the Wave of Virtual Progress.

We judge the strong recent performance reflects stimulus from the fiscal packages—but it also importantly reflects the imprint of the other structural developments that we have outlined in this section.

Figure 96. US Manufacturing Construction Spending



Source: Citi Research, Census, Haver Analytics

Over the past decade, tariffs have become a more common tool of US economic policy, and this is likely to remain true in Donald Trump's second term as President. While a full analysis of the macro effects of tariffs is beyond the scope of this paper, it's fair to say that further tariffs would be expected to have *mixed effects* on the performance of the US manufacturing sector.

They would improve the competitive position of US firms producing import-competing goods. But, at the same time, the tariffs would drive up costs of imported intermediate inputs. The clear conclusion is that, even within US manufacturing, tariffs would generate winners and losers. For the economy as whole, tariffs tend to act like a negative supply shock, driving up prices and restraining real GDP.

Bottom line, it remains to be seen whether such government interventions in favor of US manufacturing will succeed in generating a more competitive sector or, rather, blunt its efficiency and bring other unintended consequence.

Concluding with a word of caution

The case for a renaissance in US manufacturing is interesting and provocative, but hardly clear cut. Much of the sector is still entrenched in cyclical weakness and continues to face a historically elevated dollar. We expect the dollar's strength to unwind over time, but the exact trajectory is uncertain.

Structurally, many of the headwinds that have restrained the US manufacturing sector for decades remain in place. US wage levels exceed those in other parts of the world, so labor-intensive manufacturing activities will naturally flow elsewhere.

In addition, the US economy has proven itself particularly adept in the services sectors. And any hard-headed examination of the country's comparative advantage would likely tilt in that direction.

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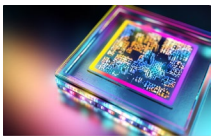

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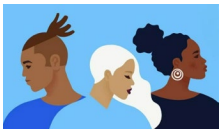

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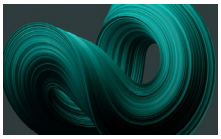

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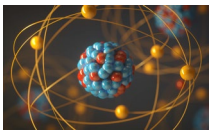

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