Supply chains for USD22tn market cap are on the move
For many years it has been generally accepted that jobs that had moved from Developed Market (DM) economies to Emerging Markets (EM) would never come back, and that supply chains would continue to be increasingly global and complex. More recently there have been hints of a reversal of that trend and here we provide new evidence of that reversal. In a survey we conducted of our analysts who cover 3,000 companies, we found that companies in more than 80% of 12 global sectors (USD22tn market cap) in each of North America, Europe and Asia-Pacific (ex-China) have implemented or announced plans to shift at least a portion of their supply chains from current locations. Granted, most of these relocations are small compared to their installed base, but the breadth of the shift suggests to us that the trend of globalization to localization is real.

What are the driving forces propelling the shift?
What is striking is that there are so many reasons why companies are re-assessing their supply chains. Importantly, some reasons are financial, but not all. On the financial side, tariffs are obvious, but newer automation has also meaningfully narrowed the labor cost differential that made the original outsourcing so attractive and the tax arbitrage has also narrowed. On the non-financial side, national security is a growing factor as are the ESG (environmental, social and governance) concerns of high carbon footprints associated with long supply chains and potentially problematic employment practices. In our view, these movements are “tectonic”: slow moving, persistent with major changes to the business environment for global companies.

SE Asia, India, notably N. America intended destinations
Not surprisingly, South East Asia and India were the planned destinations for half of North American and Asian supply chains. Much more surprising was that companies in about half of all global sectors in North America declared intent to ‘reshore’. This was particularly true for high-tech sectors and industries for which energy is a key input. If borne out, this could represent the first reversal in a multi-decade trend.

Investors underexposed to beneficiaries
We don’t think investors are fully prepared for this tectonic shift. In our view, the US could be a significant beneficiary of this process, while Chinese firms are perhaps most at risk. Even more striking, our survey found almost universal intent to use automation. This suggests our forecast of a doubling in industrial robots to 5mn units by 2025 may prove conservative, with bullish implications for capex and manufacturing. While our Economics team expects a cyclical recovery in US manufacturing by mid-2020, valuations and fund positioning suggest investors are not positioned for a sustained recovery in manufacturing. Increased spending in automation and manufacturing would have multiplier effects on the broader economy and be beneficial for financial services that cater to them.
Figure 1: Tectonic shifts in global supply chains

#1: 30-year structural shift in manufacturing
The combined % of manufacturing value-add for US and EU has declined 25% over 30 years.

#2: Supply Chains are changing direction
12 ‘global sectors’ with $22tn MCap have started to move the direction of their supply chains.

#3: Supply Chains are heading to N. America and Asia South
Companies in almost half of global sectors in North America intend to restore and/or plan to move to Asia South.

#4: Automation makes supply chains shift possible
Automation was cited as a key enabler of shifting supply chain in 90% of instances for North America and Asia ex-China.

#5: We forecast a doubling of robots by 2025
Better technology and pricing will speed-up adoption.

#6: Manufacturing has multiplier effects on the economy
6 indirect jobs are created for every new job in manufacturing.

#7: Near record manufacturing job openings in the US
About 400K US factory jobs are unfilled - close to the highest level in nearly 2 decades.

#8: Banks are likely beneficiaries
Banks in North America and Asia South will benefit from greater activity in trade finance, working capital loans, forex and treasury services, middle market and transaction management services.

#9: Industrials, automation, banks
Industrials, automation and banks are likely beneficiaries of the shifts in supply chain.

#10: Our proprietary indicators show green shoots of recovery
43% of our indicators are ‘bullish’, the highest proportion since early 2019.
Executive summary

The past three decades have witnessed a dramatic expansion in international trade and the globalization of supply chains. Our macro teams already see a protracted pause in globalization. We go one step further and argue, in a break with the past, that the world has entered an unprecedented phase during which supply chains are brought home, moved closer to consumers, or redirected to strategic allies. This would have profound implications for automation and manufacturing, and creates myriad opportunities for the geographies to which supply chains are being redirected.

Although supply chains have evolved for decades, the current shift appears qualitatively different due to:

1. The reasons cited for change: tariffs and national security were the most frequently cited reasons for change. While trade negotiations, such as the recently signed US-China Phase 1 deal, may eventually cause tariffs to be rolled back, we believe that concerns about national security are unlikely to dissipate.

2. The destination of change: we were not surprised to find that South East Asia and India were the planned destinations for half of North American and Asian supply chains. This is a function of attractive labor costs in Asia-South (although we expect lower productivity and sub-optimal infrastructure to present challenges).

3. The method by which these changes are being facilitated: we were surprised to find that companies in about half of all global sectors for North America have declared an intent to ‘reshore’. This was particularly true for high-tech sectors and industries for which energy is a key input. This finding, if borne out, could represent the first reversal in a multi-decade trend. It is also worth noting that several Asian, as well as European responses cited North America as an intended destination, presumably in an effort to move closer to their customer base.

Finally, we were struck by the universal declaration of intent to use automation in future locations. This was equally true of North American, as well as Asian companies. We found a notable variation from European companies on this subject with an equal proportion of responses suggesting regulatory changes, tax benefits and subsidies likely also be used to mitigate the friction associated with shifting their supply chains.

Implications

Disruptive change creates opportunities, as well as risks. Shifting supply chains are no different. Countries that depended on labor-cost differentials could be worse off unless they innovate, possess a large pool of domestic consumers, or are strategically aligned with developed markets. North America and South Asia, the apparent destination for supply chains could benefit from increased capex, job creation and higher wages, as well as their multiplier effects on the broader economy.

On current trends, we project a doubling of the global installed base of robots to 5mn units by 2025. These forecasts might, in fact, prove to be conservative due to a trifecta of demand and improved flexibility and productivity. To elaborate, our findings on automation imply a burgeoning of demand, the first signs of which might also be manifesting in our Factory Automation indicator, which is signaling an upward change. Our thematic research team believes better computing, along with improvements in optical sensing, machine vision, voice recognition, environmental sensors, motion actuators and touch haptics are driving improved productivity and opening new possibilities for automation.
These tectonic shifts could have **important implications for the capex cycle and the manufacturing sector**. This is particularly true for the US, which has faced long-term headwinds in manufacturing. Our Economics team expects a cyclical recovery in US manufacturing and are forecasting an ISM rebound to 55 by mid-2020 (up from 47.2 at present). We also note that unfilled manufacturing jobs have grown to a multi-year high in the US and Mexico, which is highly integrated with the US manufacturing ecosystem, continues to experience a rising share of manufacturing as a proportion of GDP.

Market multiples and fund positioning suggest **investors are not positioned for a sustained US manufacturing recovery**. Any sustained recovery in capex and manufacturing would have **multiplier effects on the broader economy**. These include jobs (an estimated six indirect jobs created for every new job in manufacturing), higher wages, greater R&D spending, more tax revenues and the creation of industrial clusters. **What is good for an economy is also good for financial services that cater to these economies**. We expect banks in North America and Asia South to benefit from greater activity in trade finance, working capital loans, forex and treasury services, middle market and transaction management services.

**Figure 4: Every dollar in final sales of manufactured products supports USD1.33 in output from other sectors**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Economic activity generated by $1 of Sector GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>1.29</td>
</tr>
<tr>
<td>Agriculture, forestry &amp; hunting</td>
<td>1.11</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>0.87</td>
</tr>
<tr>
<td>Construction</td>
<td>0.65</td>
</tr>
<tr>
<td>Arts, entertainment &amp; food</td>
<td>0.59</td>
</tr>
<tr>
<td>Information</td>
<td>0.53</td>
</tr>
<tr>
<td>Educational &amp; health care</td>
<td>0.48</td>
</tr>
<tr>
<td>Retail trade</td>
<td>0.42</td>
</tr>
<tr>
<td>Other services, except govt.</td>
<td>0.36</td>
</tr>
<tr>
<td>Professional and business services</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Source: Bureau of Economic Analysis
BofA Global Research Survey: assessing globalization from bottom-up perspective

While there is a plethora of literature on the implications of de-globalization from a top-down basis, there is a dearth of coverage of what is happening at the grassroots level. To fill the void, we polled all of our fundamental equity analysts covering more than 3,000 companies globally with a total market capitalization of USD67tn, to gauge the dependence of listed companies on other countries/regions in terms of revenue, costs, supply chain and technology. We designed four questionnaires based on the geographical distribution of the company under coverage: (1) North America; (2) Europe; (3) Asia Pacific (ex-China); and (4) China. Each analyst filled in a survey for each of the 24 GICS Industry groups (used interchangeably with ‘sectors’ from here on) under their coverage.

BofA Survey Takeaway #1: Supply chains are moving...

We were surprised by the breadth of the shift in supply chains. Within North America, of the 12 sectors (out of 24) that depend on overseas supply chains, companies in about 83% of sectors with market capitalization of USD13.8tn have either implemented or announced plans to shift at least a minor portion of their supply chains from their current locations. Likewise, in the Asia Pacific region (excluding China), companies in 83% of the global sectors with market capitalization of USD3.8tn have either already moved or intend to move, while 90% of the global sectors in Europe with market capitalization of USD4.8tn are doing the same. Granted that most of these relocations are still quite small in magnitude as compared to their installed base, but the sheer scale of the shift is telling us that globalization to localization is for real. And the most frequently cited reasons for change were tariffs and national security.

Figure 5: Supply Chain Shifts from their Current Locations – companies in 83% of global sectors in North America and in the Asia Pacific region (excluding China) have either implemented, or discussed plans to shift at least a portion of their supply chains from current locations, while 90% of global sectors in Europe are doing the same.

...out of China...

China, which accounts for a quarter of the global manufacturing value added, has been at the center of US protectionist trade policies. Unsurprisingly, our survey validates the conjecture that a lot of companies are moving production facilities out of China. The trade war is only part of the story. Rising wages, stricter environmental norms, a complex regulatory framework, and the government focus to transform into a high-skill service-oriented economy culminated in manufacturing exits starting a decade ago. The low-skill labor-intensive light tradable sectors like textiles and apparel, toys, footwear and furniture were the first to exit, and understandably so, given the lion’s share of
income (66%) in these industries goes to labor and labor costs in China have been rising rapidly over the past decade. To get a sense of the rise, Chinese labor costs (in USD terms per worker) were comparable to the rest of Asia in 2001, but are now a multiple of those in other large Asian countries. Even when adjusted for productivity, labor costs in China are well above other Emerging Asia markets (and even that in Singapore). So, the imposition of punitive tariffs and the ever-looming threat of even higher ones only exacerbated the exodus, not triggered it.

Companies in two-thirds of global sectors in North America have either implemented or announced plans to pull at least a portion of their supply chains out of China, while companies in 50% of country-sectors in the Asia Pacific (ex-China) region are doing likewise. And the biggest shifts are being undertaken by the consumer durables, retailing, tech hardware and semiconductor sectors. The first two are shifting mainly due to the increased cost-effectiveness of automation, while the latter two are in the cross hairs of the super power competition between the US and China, and hence likely face policy restrictions. However, it is interesting to note that 83% of the global sectors in Europe that have supply chains in China are staying put, with the rest deploying only a minor shift.

Figure 6: North American companies are ahead of their Asia Pacific (ex-China) and European counterparts in moving their supply chains out of China

[Diagram showing the shift of supply chain from China, with North America and Europe leading, followed by Asia Pacific ex-China]

Source: BofA Global Research

...and bound homeward and closer to the consumer

It is evident from our survey that companies are inclined to move their supply chains either back to within their national/regional borders or closer to the markets where their goods and services are consumed, which will lead to a more decentralized world.

Within North America, half of the global sectors are planning to relocate their supply chains back into the region, if not done so yet. South East Asia emerges as the other popular choice of destination for these companies.

In Europe, only 2 (17%) of the 12 global sectors are homeward bound, although eight others are planning to shift their supply chains to their respective epicenters of consumption. European retailers, on the other hand, are not doing any of the above – instead, they have either already moved or intend to move to South East Asia and India.

Similarly, in the Asia Pacific region (excluding China), barring Healthcare and Food & Staples Retailing, all others have either already moved or are planning to move their supply chains back within their national borders or their consumption centers. About 60% of the global sectors prefer South East Asia as their destination for relocation, followed by India (33%).
Chinese companies in global sectors have also started to warm-up to the idea of establishing/expanding supply chains in the markets where their end consumer resides. Similar to their Asian peers, South East Asia is their preferred choice for relocation, followed by India and North America.

**Figure 7: Companies are inclined to move their supply chains to Asia South and North America**

South East Asia – the preferred destination

Clearly, as the above charts show, South East Asia is slated to be one of the biggest beneficiaries of the realignment of supply chains as companies perceive it as a viable alternative to China. In cases where companies refrain from relocating onshore, it is the favored destination for setting up new supply chains, followed by India.

Re-shoring to North America

Our survey suggests that the trend is clear: global supply chains are on course to be uprooted and brought home, or transplanted to strategic allies. Manufacturing is moving back to North America after a hiatus of three decades, as evident from the number of job vacancies in the US. About 400,000 US factory jobs are unfilled – close to the highest level in nearly two decades – as companies compete for skilled labor in the midst of record-low unemployment. This is forcing manufacturers to go out of their way to entice job seekers, offering higher wages, signing bonuses, and relocation expenses, even for some hourly positions. The payouts are even more lucrative for specialist positions, such as welders, engineers and machine programmers, which are now in demand as production becomes more automated. To get around this, some companies have started grooming their current employees to perform sophisticated jobs such as programming computerized machines.

**Figure 8: About 400,000 US factory jobs are unfilled – close to the highest level in nearly two decades**
Cyclical and secular
Reshoring adds a “secular” component to a likely cycle recovery in US manufacturing. Currently the US manufacturing sector is in a mild recession, but regional surveys (Philadelphia, New York and Kansas Fed) hint at a turning point. The sector should benefit from continued strong demand from the US service sector, the US-China trade war ceasefire and the general rebound in global manufacturing trade. Our US economics team believes the manufacturing sector is on the cusp of recovery, with the likelihood of the US manufacturing ISM scaling a peak of around 55 by the summer.

Figure 9: Regional Fed business conditions signaling a cyclical recovery for the US manufacturing sector

Source: ISM, CEIC, Haver

Impact of local manufacturing
The reshoring of manufacturing facilities can have a multitude of far-reaching, lasting effects on the broader economy. It can boost the long-term growth potential of a country through productivity enhancement, research and development, jobs, creation of secondary and tertiary economies, etc.

Figure 10: Impact of local manufacturing

Source: BofA Global Research
**Manufacturing industries have the highest multiplier effects on the economy:**
Data from the US Bureau of Economic Analysis suggests a dollar spent on a manufacturing facility generates the highest economic activity and employment multiplier among all sectors. Taking secondary and tertiary effects into consideration, estimates suggest every dollar in final sales of manufactured products supports USD1.33 in output from other sectors, while six indirect jobs are created for every new job in a manufacturing business.

**Manufacturing industries drive innovation through R&D and industrial clusters**
According to a survey of businesses on R&D and innovation in the US, the ratio of domestic R&D spending-to-sales is significantly higher for manufacturing (5.5%) than non-manufacturing industries (3.6%). As a result, manufacturing industries have a much higher intensity of product/service launches as compared with non-manufacturing industries.

**Figure 11:** Only 15% of all non-manufacturing companies introduced a new product or service between 2014 and 2016, while 33% of manufacturing companies did so
![Bar chart showing the percentage of new or significantly improved products or processes introduced by manufacturing and non-manufacturing industries between 2014 and 2016.](chart1)

Source: National Science Foundation, National Center for Science and Engineering Statistics, and U.S. Census Bureau, Business R&D and Innovation Survey

**Figure 12:** Domestic R&D as a % of domestic net sales is higher for manufacturing vs non-manufacturing
![Bar chart showing the percentage of US domestic R&D as a % of domestic sales in 2016.](chart2)

Source: National Science Foundation, National Center for Science and Engineering Statistics

**BofA Survey Takeaway #2: Shifts in supply chain are time consuming and costly**

**Rome was not built in a day**
Shifting the entire supply chain for a company is not a day’s work. It is a structural shift with long gestation periods. Given such decisions invariably factor in the cost of sourcing, they require clarity on tariff policy and significant effort on the part of the importing companies. It is a glacial process, implying the current wave of supply chain moves underway is just the tip of the iceberg.

**Leaving China is not easy**
China’s industrial heartland has been touted as the “Goldilocks Zone” for offering the optimum mix of costs, quality, efficiency, human resources and infrastructure for the past 30 years. No wonder, it accounts for a quarter of the world’s manufacturing value added. To get a sense of the cost of leaving China, it is estimated one Chinese worker can manufacture about the same value of goods as four workers from four ASEAN countries combined. Take another example: the lead time to hit the shelves in US stores can take up to 40 days from Thailand, almost twice as long as from China.
Cost increases are coming; how well are companies prepared to handle them?

Unsurprisingly, the supply chain shifts are likely to be associated with rising costs.

Our survey reveals that in North America, companies in about half of the global sectors will experience moderate to high margin compression when they relocate onshore. With unemployment near 50-year lows, higher wages are going to eat into the profits of US corporates.

A key finding from our survey is that Chinese companies in global sectors are expecting some help from the government in terms of favorable regulations, tax benefits and subsidies.

**BofA Survey Takeaway #3: Automation is almost automatic**

Companies in about 60% of the sectors in North America have reasonable pricing power to offset the higher costs given the oligopolistic nature of most US corporates. Our analysts think companies in half of these sectors are likely to depend on subsidies, and regulatory and tax benefits to compensate for the additional costs. But the unanimous (almost) weapon to combat rising costs seems to be automation; our analysts report that all sectors but Software and Food, Beverage & Tobacco are considering it.

It is interesting to note while Consumer Durables & Apparel and Semiconductors are likely to be the worst-affected sectors in terms of margin compression, neither has significant pricing power and would need to use other mechanisms, primarily automation, to stay competitive.

The cost story is a bit different for Europe. As with the US, our analysts think that companies in two-thirds of the global sectors in Europe can employ cost pass-through techniques meaningfully to maintain margins. But surprisingly, European companies do not appear geared up adequately to use automation as a mitigant against margin compression – only a third has some form of automation/efficiency plan in place. They also expect limited support from the government (subsidies, regulatory/tax benefits, etc.).

We believe all global sectors in Asia Pacific have low to moderate pricing power, diminishing their ability to sustain current margins. But as in North America, companies in the Asia Pacific (ex-China) region appear to be empowering themselves with automation and other productivity enhancements to alleviate the impact of rising costs. Our analysts advise that close to half the sectors are also hoping to get either subsidies, or tax benefits, or some combination to ease the impact.
Figure 15: North America – the unanimous (almost) weapon to combat against rising costs seems to be automation – all but Software and Food, Beverage & Tobacco are considering it.

Source: BofA Global Research

Figure 16: Asia Pacific (Ex-China) – As in N. America, companies in Asia Pacific (ex-China) appear to be empowering themselves with automation and efficiency techniques to alleviate the impact of rising costs.

Source: BofA Global Research

Figure 17: European companies do not appear geared up adequately to use automation to mitigate margin compression – only one-third has some form of automation/efficiency technique in place.

Source: BofA Global Research
The shape of things to come

The trade discord that has started out with concerns around large imbalances may take a back seat as the US-China Phase 1 trade deal is finally signed, but after the US presidential election it may spread to other sectors, in our view. Especially, we see potential conflicts brewing in the financial and technology sectors, risking the decoupling of China and the US in these spheres. So far, the developments are largely in the realm of rhetoric as far as financial decoupling is concerned. But there are emerging risks worth monitoring. Post-WWII dominance of the US dollar, US dollar payment networks, SWIFT, multilateral lenders (IMF, World Bank) are all likely to be contested. The renminbi is the most likely candidate for internationalization, although it will likely be a slow process.

Figure 18: Increasingly hard-hitting sound bites for financial markets

Finance

Degree of tension
1. Limiting public funds’ exposure to China
2. Limiting private funds’ exposure to China
3. To delist ADRs
4. Freeze of Chinese assets in the US, including treasuries

5-Feb-2019: Global Equity Strategy
04 February 2020

5-Oct-19: National Economic Council director Kudlow said US had begun studying measures to protect US investors, although ADR delisting “not on the table”
6-Nov-19: US lawmakers introduced a new bill to ban federal pension fund from investing in China
5-Aug-19: Yuan/USD moved past 7.00; the US Treasury labelled China a currency manipulator
24-Jun-19: 3 Chinese banks found involved in probe on North Korean sanctions: potentially being cut off from the US financial system
12-Jun-19: Senator Rubio sent a letter to MSCI demanding information on its decision to include several Chinese firms and increase the weighting of Chinese
5-Jun-19: US lawmakers introduced a bill to force Chinese companies listed on American stock exchanges to submit to regulatory oversight

Source: BofA Global Research
Any escalation on the capital and technology front, in our view, would accelerate the tectonic shifts we have described in supply chains.

Figure 19: Keep an eye on tensions brewing in the technology sector

Degree of tension
1. Wide use of the Entity List and sanction measures
2. The implementation of the Emerging/Foundational Technology Lists
3. An export ban on dual-use technologies
4. Full high-tech embargo

Source: BofA Global Research
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