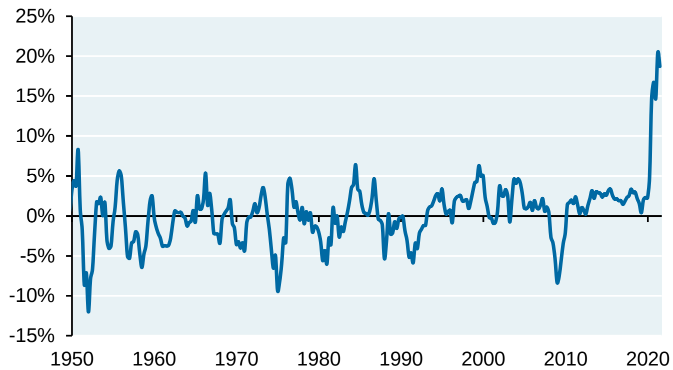
Topics: early signs of goods bottlenecks easing; the more persistent issue of US labor shortages; the US, Taiwan, China, treaty changes and semiconductor capacity; an update on the most over-indebted US states

"Help Wanted". We expect semiconductor, vehicle and other goods bottlenecks to resolve themselves in the months ahead, and interpret declining business surveys as the result of a temporary supply shock and not a sign of inadequate demand. As a result, growth should rebound in 2022, and positions that benefit from reflation should benefit (energy, value and cyclicals). However, while goods bottlenecks will dissipate, the US will still face tight labor markets and rising wages that are at odds with current Fed policy

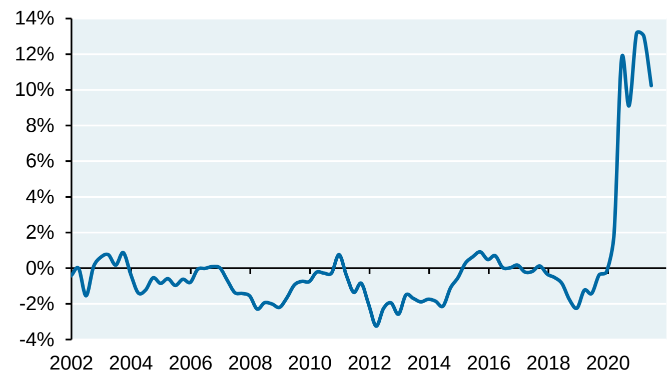
Our prior note looked at semiconductor, vehicle, goods, shipping and other physical bottlenecks that are leading to lower growth forecasts for the next 2 quarters. We're starting to see signs of improvement: a small decline in anchored LA/Long Beach containerships, freight rates falling from peak levels, a decline in commercial rail delays from 14 days in August to 3.5 days and a 20% increase in Taiwanese production of 8-inch wafers typically used in automotive systems since January of this year. Bottlenecks should continue to gradually improve over the next few months. As a reminder, the fundamental catalyst for the current situation is the **surge in goods spending in the US and Europe relative to services**, an abnormal pandemic-related change that supply chains were not ready for. Combine the semiconductor intensity of Western goods imports with high levels of COVID restrictions in Asia, and you have the ingredients for a massive supply shock. As mRNA vaccination rates rise in Asia and community spread declines, a relaxation in worker density and other COVID protocols should follow.

A surge in US goods spending
Difference in rolling 5 quarter growth rates, goods - services



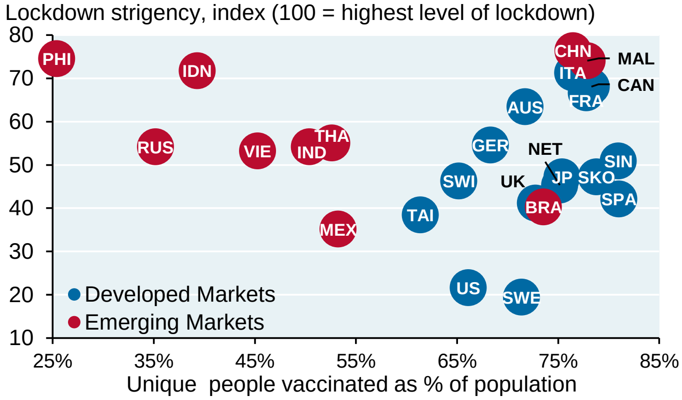
Source: BEA, JPMAM. Q2 2021.

A surge in Europe goods spending
Difference in rolling 5-quarter growth rates, goods - services



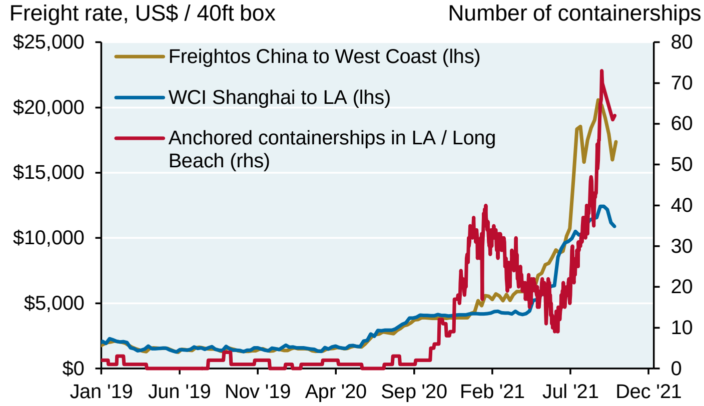
Source: Eurostat, JPMAM. Q2 2021.

Lockdown stringency vs vaccination rates
Lockdown strigency, index (100 = highest level of lockdown)



Source: OWID, University of Oxford, JPMAM. October 17, 2021.

Container freight rate and anchored containerships
Freight rate, US$ / 40ft box Number of containerships



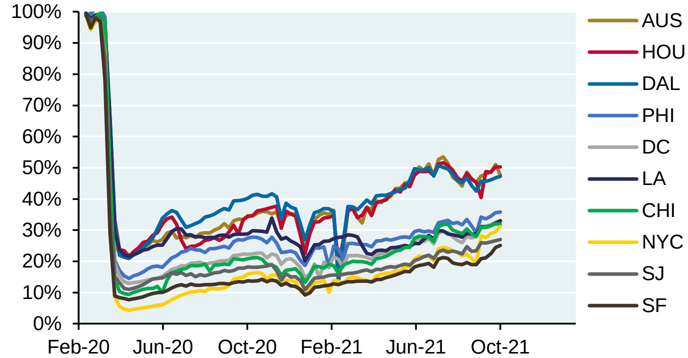
Source: Cornerstone Macro, Bloomberg. October 17, 2021.

In the US, in-person spending on pandemic-sensitive services is recovering alongside oil and airline spending; the outlier is white collar office utilization rates, the most vaccine-resistant variable of all. **All things considered, we expect normalization of US and European goods spending relative to services in the months ahead, which should reduce physical bottlenecks further.**

Social distancing spending, card present transactions
Spending change vs 2019, 7 day smoothing

Source: Internal Chase data, JPMAM. October 11, 2021. Social distancing: retail, lodging, restaurants, parks, theaters and other recreational services.

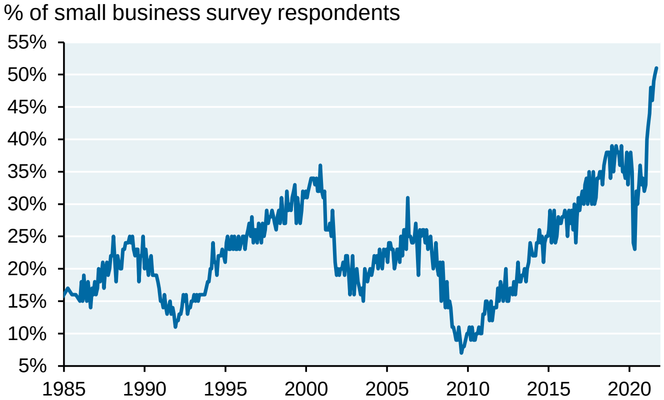
Office utilization rates by metro area
Based on keycard/fob data



Source: Kastle. October 13, 2021.

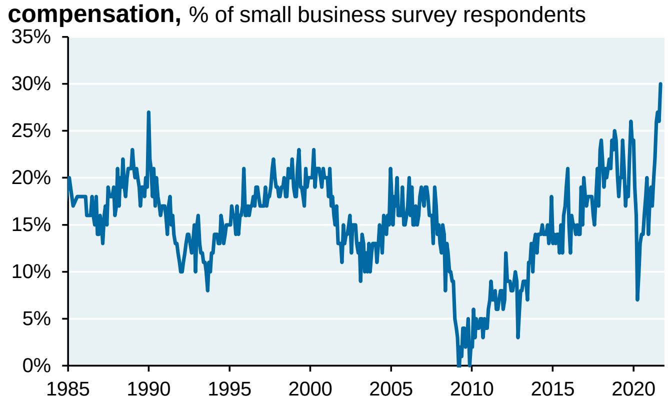
US labor markets, however, may not normalize so quickly. Company surveys show all-time peaks regarding plans to raise worker compensation since they're having trouble filling jobs, and regarding plans to raise prices. Wage increases are now eating into overall business optimism; historically, the chart on the lower right tends to track changes in S&P margins reasonably well, although not all the time.

US small businesses with hard to fill job openings
% of small business survey respondents



Source: Bloomberg, NFIB. September 2021.

US small businesses planning to raise worker compensation, % of small business survey respondents

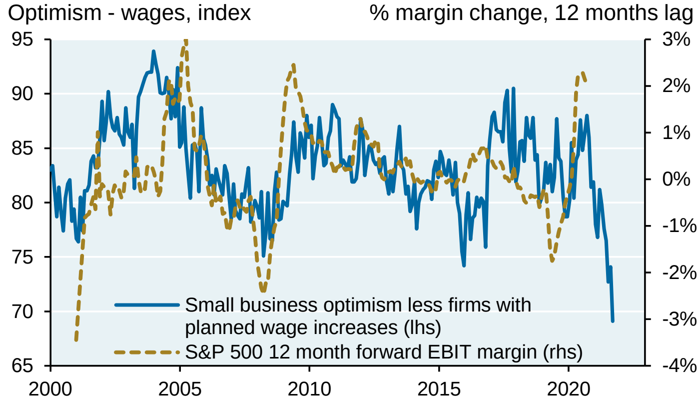


Source: Bloomberg, NFIB. September 2021.

US small businesses planning to raise prices
Net % of small business survey respondents

Source: NFIB, JPMAM. September 2021.

A proxy for margins projects a decline
Optimism - wages, index % margin change, 12 months lag

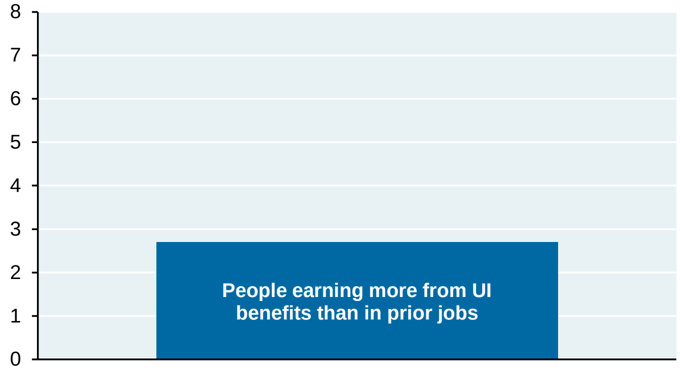


Source: Factset, Bloomberg, NFIB. September 2021.

Where have all the workers gone? That's a good question. Let's use estimates to add up all the workers missing from the labor force since the pandemic began[1].

- The impact of COVID unemployment (UI) benefits on labor force participation is still unclear. While benefit expiration in July and August led to an increased job finding rate among unemployed workers, it did not lead to higher labor force participation. In any case, let's start with the estimated number of **people receiving UI benefits as of September 1 that exceeded their prior salaries** (2.7 million out of 5.3 million UI recipients)
- During the pandemic, **1.5 million more people retired than usual** compared to what was a steady linear trend beforehand. There's some research indicating that rising stock markets and housing prices boost retirement rates, but the sudden spike in retirements starting in March 2020 suggests that COVID is the main catalyst here

Worker shortages: UI benefits > wages
Millions of workers



Source: BLS, Census, GS, JPMAM. October 2021.

Worker shortages: excess retirees
Millions of workers

Source: BLS, Census, GS, JPMAM. October 2021.

- **Visas granted to immigrants and non-immigrant temporary workers** collapsed during the pandemic. While visas are starting to recover, the pandemic decline resulted in ~700,000 people missing from the labor supply. Visa shortfalls during the pandemic add to a backlog of around 1 million people waiting to receive employment-based visas. More immigration data: highly educated immigrants who qualify for green cards wait an average of 16 years before receiving them. Also: Trump cut the number of family preference green cards, which increased availability of employment-based green cards by 122k. But only 40k were granted by the September 30 deadline; the rest may be lost for good absent Congressional action
- An **increase in self-employment** also plays a role. While such individuals are still in the labor force, self-employment spiked by 800,000 once the pandemic hit. The largest job switching categories: **people leaving manufacturing and agriculture for construction and transportation** (i.e., ride-hailing). So, the shortages you read about regarding goods and food production are in part attributable to this trend

Worker shortages: immigration decline
Millions of workers

Source: BLS, Census, GS, JPMAM. October 2021.

Worker shortages: self-employment
Millions of workers

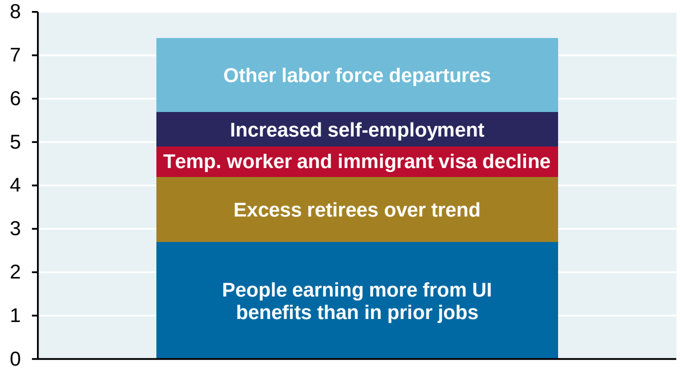
Source: BLS, Census, GS, JPMAM. October 2021.

[1] *"Will Worker Shortages Be Short-Lived?",* Joseph Briggs, Goldman Sachs, October 4, 2021.

Everyone else. Another 1.7 million people left the labor force during the pandemic for reasons other than those stated above. This category includes:

- Some of the 3 million respondents to a September Census household survey saying that **concerns about getting or spreading COVID** are why they're not working (this is around half the pre-vaccine level from late 2020, but still a large number)
- Some of the 4 million people citing **child care constraints** in the same survey, even after the reopening of schools (i.e., people not working due to providing care for children not in school or daycare). This figure declined by roughly half once schools opened in September

Worker shortages: other departures
Millions of workers



Source: BLS, Census, GS, JPMAM. October 2021.

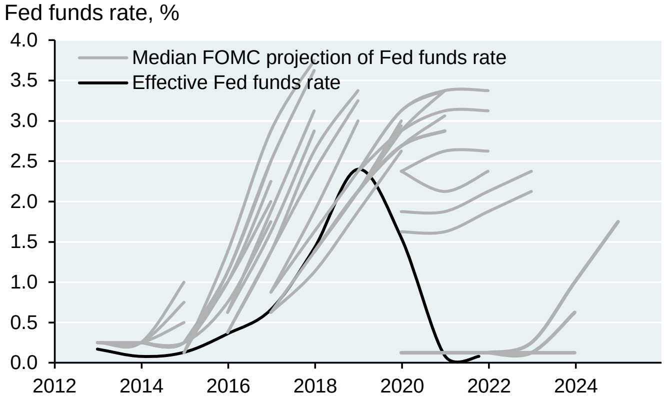
Workers currently intending to re-enter the labor force
Million workers not in the labor force who want a job

Source: BLS. September 2021.

According to BLS surveys and our estimates, ~2 million people out of the 7.5 million missing workers intend to search for work again at some point, and we do expect increased labor supply by year-end. **But it might not be enough to restore the pre-COVID balance of supply and demand in the labor market, which was already pretty tight. As a result, wage pressures and labor shortages may be an endemic feature of the post-COVID US economy and put pressure on the Fed by the middle of next year**. Note: on the issue of job mismatches, the latest data suggest that this is more of a geographical problem than an industry problem right now, with the largest worker shortfalls relative to vacancies in North Carolina, Georgia, Indiana and Wisconsin.

By the way, the Fed staff and FOMC participants revised up their near-term inflation forecasts but continue to expect inflation to moderate in 2022. The staff forecasts that inflation will fall back below 2% in 2022 and only return to 2% in 2024. **I disagree with them**. As a reminder, Fed forecasts for policy rates ended up being wrong for most of the last decade:

Fed projections vs actual Fed funds rate: Oops!
Fed funds rate, %



Source: Federal Reserve, JPMAM. October 15, 2021.

Help Wanted, Part 2: The era of a possible US defense umbrella over Taiwan has long since passed

The market cap of the World Semiconductor Index finally surpassed the market cap of the World Energy Index in 2020, an indication of a world that's more reliant each year on technology. Taiwan has the largest global share of semiconductor capacity at 21%, including a 50% share of higher value added logic chip capacity; and Taiwan's TSMC has a market cap that is more than double Intel. The likely US response to any actions by China that constrict Taiwanese semiconductor supply would be a lengthy and expensive effort to rebuild US semiconductor production capacity (now just a 12% share), rather than a defense of Taiwan itself.

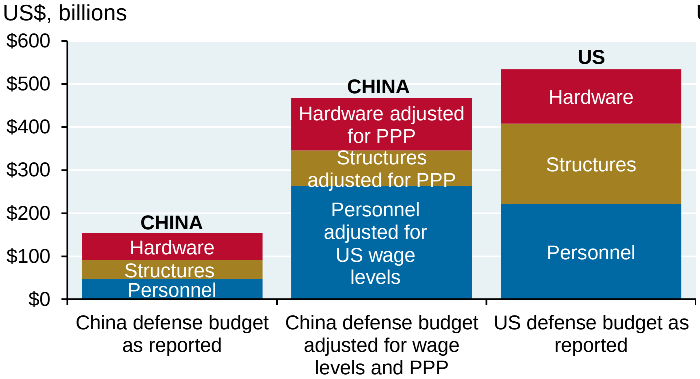
A lot of clients have asked about Taiwan given increased sabre-rattling by China. The latest: China sent a record number of jets into Taiwanese air space, President Xi said that complete reunification of the motherland "must and will be fulfilled", and also warned that the Chinese people have a glorious tradition in opposing separatism. Taiwan's defense minister said that tensions with China are at their worst in 40 years.

To be clear, the US is not obligated by treaty to defend Taiwan from attack. A Sino-American Mutual Defense Treaty was put in place in 1955 and did obligate the US to defend Taiwan, but this treaty was abrogated permanently by the US in 1979 in exchange for China establishing diplomatic relations with the US, and Chinese support for American actions in Communist Afghanistan (when the US was arming the Afghan mujahideen). The Sino-US mutual defense treaty was replaced by the Taiwan Relations Act of 1979, which instead obligates the US to provide Taiwan with "sufficient defense capabilities". While US arms sales to Taiwan of $11 billion in 2019 were the highest on record, this may not amount to much if a military conflict occurs.

After normalizing for wage differences and purchasing power, China's military spending is ~90% of US levels. As part of a special section in this year's Outlook, I spoke with the author of a RAND Corporation report on Chinese military capabilities. **The RAND analysis indicates that China has changed the balance of power in the region, substantially eroding the ability of the US military to defend Taiwan even if it chose to**.

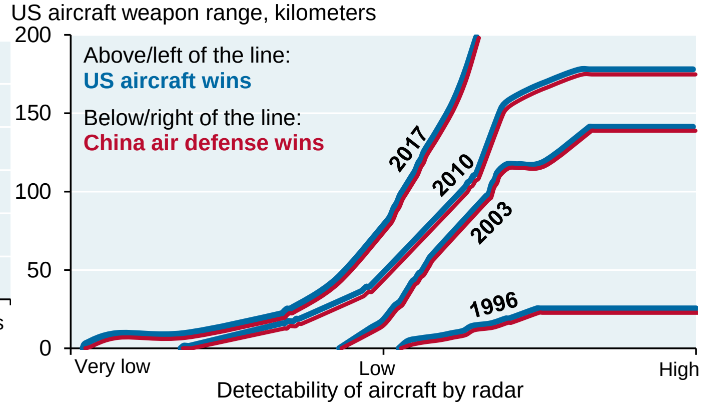
The second chart below shows the evolution of US air superiority against Chinese surface to air missile systems. The area above and to the left of each curve represents RAND estimates of how often US forces would prevail as a function of US aircraft missile range and detectability. For example, in 1996, only highly detectable US aircraft with shorter range missiles would lose in battle. By 2017, US aircraft needed to be much less detectable and more weaponized due to improvements in Chinese air defense systems. Similar findings: the share of Chinese ships destroyed by US submarines in a 7 day campaign scenario fell from 100% in 1996 to 40% by 2017, and the estimated US air force fighter wing capacity required to defeat China in an attrition battle rose by 7x. Since the RAND publication was released, China has added more destroyers, cruisers, aircraft carriers and assault ships; hypersonic and intermediate range missiles; anti-submarine warfare; and long range bombers.

China and US military spending
US$, billions



Source: *"China's Defense Budget in Context"*, Frederico Bartels, Heritage Foundation. March 2020.

US aircraft vs Chinese air defense: modeled outcomes
US aircraft weapon range, kilometers



Source: RAND Corporation, Heginbotham et al. 2015.

See Appendix for additional semiconductor facts and figures

Help Wanted, Part 3: Highly indebted states are still going to need help, even with improved solvency ratios

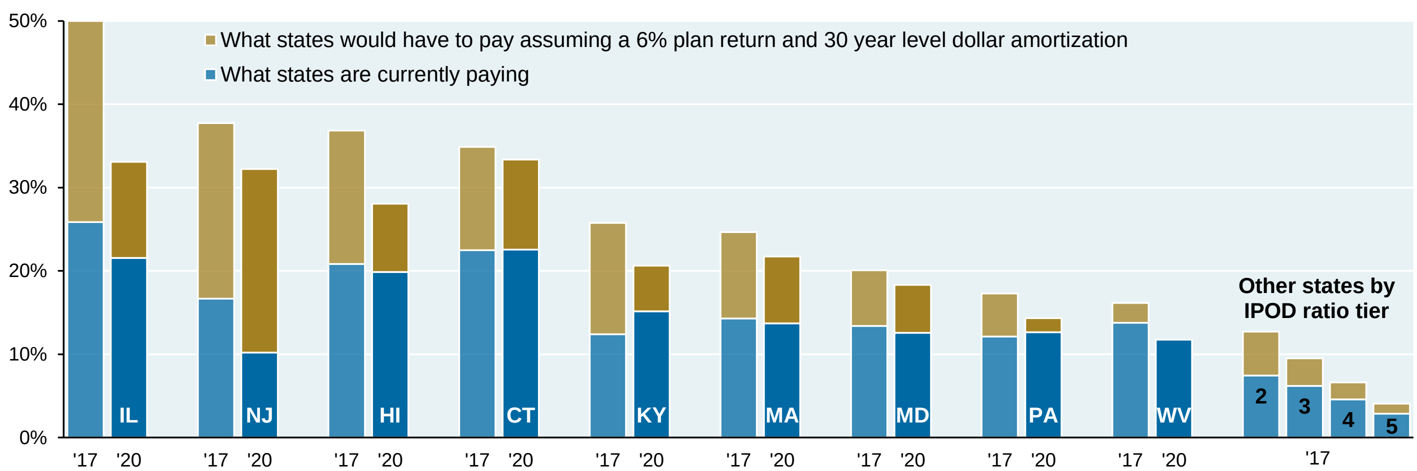
COVID has not turned into the municipal disaster that many feared a year ago. State revenues have been more resilient than expected, and according to the National Association of State Budget Officers, 38 states reported FY2021 general fund revenues above initial forecasts. The March 2020 CARES Act provided $150 billion to state and local governments; another $125 billion was authorized in December 2020; and in March 2021, Biden's American Rescue Plan made another $350 billion available to states and local entities. From a big picture perspective, **a lot of state and local financial burdens were shifted onto the Federal government.** While less explicit than a Federal bailout of underfunded pensions, the 2020/2021 acts were still wealth transfers from citizens of less indebted states to citizens of highly indebted states.

That said, we wanted to take a look at the most indebted states right before COVID began (which is the latest data available from state consolidated annual financial reports). As a reminder, our IPOD ratio looks at the share of state revenues required to service bonded debt and to amortize all unfunded pension and retiree healthcare obligations over the next 30 years assuming a discount rate/investment return of 6%. As you can see below, most ratios improved since our last analysis in 2017, some substantially.

The reasons for improved ratios differ by state and include rising asset values, tax increases, reductions in retiree healthcare plan coverage, a cap on salaries used for pension accruals and contributions to underfunded plans (see Appendix for more details). The Illinois improvement is impressive; but how many times can you increase state taxes on companies and individuals? In 2020, Illinois recorded its 7th straight year of population loss, the most since World War II and the second largest of any state in raw numbers or % of population. Illinois is the only state whose population loss accelerated each year for the past seven years.

The bottom line: highly indebted states (most of which are controlled by DEM legislatures and governors) still have to dedicate almost a third of state revenues to unfunded pension and retiree healthcare obligations[2], despite the best of all possible market environments to drive asset values higher. While financial repression and Federal transfers have given these states a reprieve, a diversified municipal portfolio is still recommended for residents of these states, even at the expense of paying state taxes on out-of-state bonds.

2017 vs 2020: The cost of unfunded pensions and retiree healthcare as a % of state revenues
% of state revenues required to pay the sum of interest on net direct debt, the state's share of unfunded pension and retiree healthcare liabilities, and defined contribution plan payments



Source: J.P. Morgan Asset Management, State Annual Financial Reports, Moody's. FY 2020. Each tier contains 10 states.

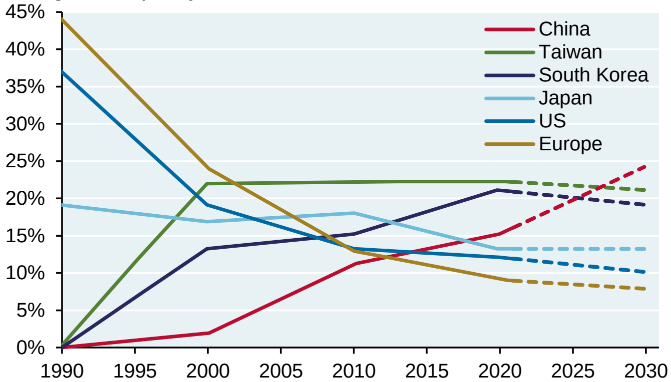
[2] While unfunded pensions are not explicitly cross-defaulted with general obligation bonds, our research indicates that in almost every case when pensions or retiree healthcare obligations were restructured by cities, bondholders suffered writedowns that were just as large or even greater. Examples include Central Falls RI, Harrisburg PA, Vallejo CA, Jefferson County AL, San Bernardino CA, Stockton CA and Detroit MI.

Appendix

Semiconductor facts and figures [SIA Semiconductor Factbook, IC Semiconductor Research, TrendForce]

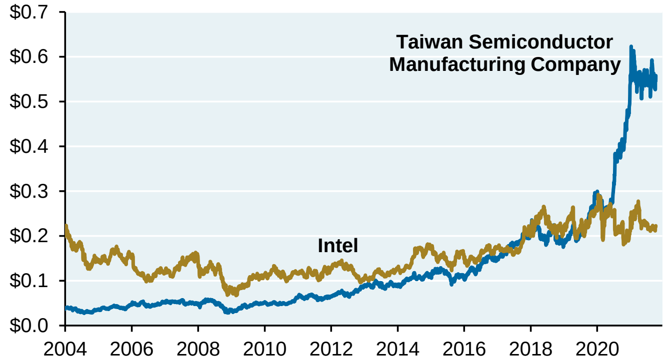
- Semiconductor categories include microprocessor and logic devices (42% of sales); memory storage devices (25% of sales); devices that translate light, voice and touch analog signals into digital signals (13% of sales); and discrete optoelectronics and sensors generally used to generate or detect light
- While the US has 47% market share of global semiconductor revenues, only ~40% of US production capacity is located in the US. The rest is located in Singapore, Taiwan, China, Europe and Japan
- Taiwan has the highest share of semiconductor capacity at 21%, followed by Korea at 20%, Japan and China at 15% and the US at 12%. Taiwan also a 50% share of higher value added logic chip capacity
- Taiwan also controls 60% of the semiconductor foundry market by revenue, which refers to outsourced semiconductor production (for companies like AMD, Apple, Qualcomm, Nvidia and Huawei)

Semiconductor manufacturing capacity by region
% of global capacity



Source: SIA, Bloomberg. February 2021. Dotted lines represent estimates

TSMC vs Intel market capitalization
US$, trillions



Source: Bloomberg. October 19, 2021.

State specific catalysts for changes in municipal IPOD ratios, FY2017 to FY2020

- Illinois: a state personal tax increase from 3.75% to 4.95% and a corporate tax increase from 5.25% to 7.00% helped propel revenues higher by 44%. Furthermore, pension service costs declined due to a cap on the salary used for state pension accruals
- New Jersey: large decline in current pension service costs due to changes in benefit terms (interest credited for first two years of time period from termination to retirement instead of the entire period); reduced health care plan coverage terms
- Hawaii: Revenues increased by 10% annually, more than the median state and much faster than pension payments growth
- Kentucky: Large decline in current period service costs for the Kentucky Teachers Plan (for reasons that are not entirely clear)
- Pennsylvania: Faster revenue growth than pension payments growth, and reductions in OPEB plan coverage
- West Virginia: A State Senate bill now requires the state to make a large annual contribution to the state retiree healthcare plan (which boosted the funding ratio from 21% to 38%)

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