

Special Commentary — May 4, 2021

## Implications of the Semiconductor Shortage on Auto Production

### Summary

- The global semiconductor shortage has become even more pronounced over the past few weeks, and one of the most visible disruptions is in the manufacturing of motor vehicles.
- Semiconductors represent just 1.3% of the total inputs used by the domestic autos & parts manufacturing industries, but they are an essential component.
- Major domestic automakers have announced factory closures amid semiconductor shortages. Both Ford and GM have estimated the hit to earnings this year attributable to chip shortages is in the neighborhood of \$1 billion to \$2 billion.
- Motor vehicle & parts production accounts for 7.5% of total manufacturing in the United States, so a reduction in auto production would likely slice a few percentage points off manufacturing output this year.
- Production hurdles are occurring amid a surge in demand for automobiles and already exceptionally low inventories. The autos inventory-to-sales ratio at retail dealers has collapsed and has been hovering around the lowest levels since October 2001.
- The demand and supply imbalance is giving way to higher prices of both new and used vehicles, which will likely be a noticeable source of higher inflation this year.
- Production cuts may also lead manufacturers to temporarily layoff workers. But, if manufacturers forgo typical summer shutdowns, seasonal layoffs are also apt to be skipped and generate a bigger boost to employment growth this summer.

Economist(s)

#### Tim Quinlan

Senior Economist | Wells Fargo Securities, LLC  
tim.quinlan@wellsfargo.com | 704-410-3283

#### Sarah House

Senior Economist | Wells Fargo Securities, LLC  
sarah.house@wellsfargo.com | 704-410-3282

#### Shannon Seery

Economist | Wells Fargo Securities, LLC  
shannon.seery@wellsfargo.com | 704-410-1681

### Macro Problems from Microchips

The economy is still on track for its fastest full year of growth in a generation, but it could be growing even faster if it were not for ongoing supply chain constraints. The backdrop of key material shortages and order backlogs was the subject of a special report last month, "[Supplies Inspection](#)." Many of the emerging risks we highlighted in that publication have become even more pronounced over the past few weeks across a wide range of input components, arguably none more so than semiconductors. We revisit those themes here and attempt to measure how these worsening supply chain dynamics could impact our forecast for manufacturing production, particularly for autos.

The inevitable upward pressure on prices is a key risk. Input costs continue to rise broadly as evident in the prices paid component in the April ISM manufacturing survey shooting to its highest level in more than a decade. So far, automakers have been able to pass those prices on with some measures like auto prices hitting records for both new and used vehicles.

In the long run, the chip shortage may spur additional investment in domestic manufacturing to secure a stable domestic supply of these critical inputs. But in the short run, we see a clear downside risk for manufacturing output.

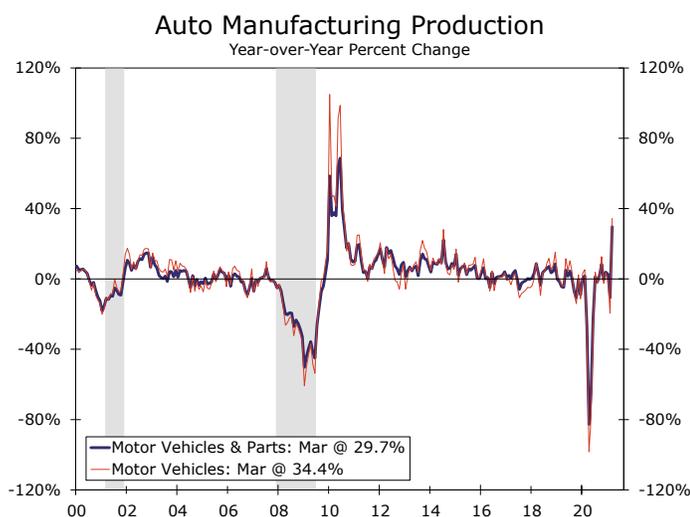
## Motor Vehicle & Parts Production Is Poised for a Slowdown

While semiconductors are critical to many types of manufacturers, one of the most visible disruptions at the moment is in the manufacturing of motor vehicles. If your guess were that aluminum, steel, glass and plastic were the primary commodity inputs needed to build a car, truck or SUV, your intuition is not wrong; micro-chips represent just 1.3% of the total inputs used for auto & parts manufacturing industries.<sup>1</sup> In other words, chips are tiny but very important components. They have become essential for everything from management of engines for improved fuel economy to safety features such as driver assist alerts and collision avoidance features like emergency braking. Making a modern vehicle without semiconductors is like making Risotto Milanese without the saffron; without that tiny ingredient, it just doesn't work.

In recent weeks, major domestic automakers here in the United States have announced temporary factory closures amid these shortages just as their counterparts overseas have had to make similar proclamations. As [Figure 1](#) makes clear, this comes just as the year-over-year change in motor vehicle & parts production is surging at a rate last seen when we emerged from the prior recession and when the 2009 Cash-for-Clunkers stimulus program helped goose demand.

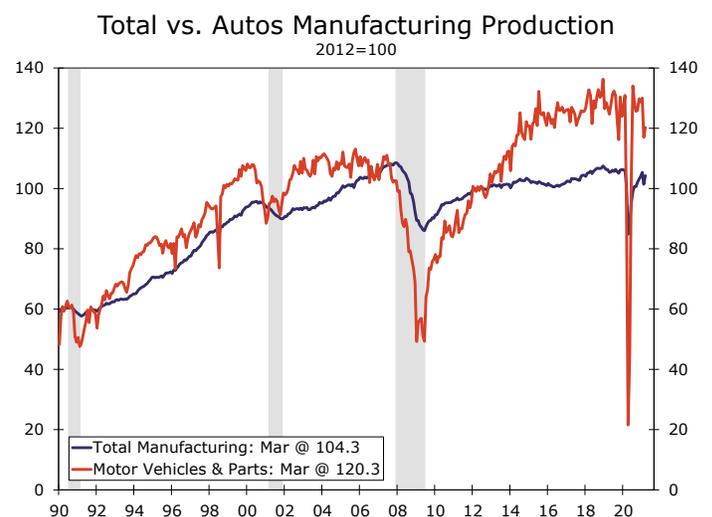
We can do some basic arithmetic to ballpark the impact to production. Motor vehicles & parts represent 5.5% of total industrial production in the United States.<sup>2</sup> Recall that manufacturing accounts for roughly three-quarters of production with the balance roughly split between utilities and mining. So if we look at motor vehicles & parts as a proportion of just manufacturing output, its share rises to 7.5%. If the domestic auto sector had to operate at 50% capacity, we could see a temporary drag of a few percentage points on manufacturing output or perhaps a couple of percentage points on headline industrial production. As [Figure 2](#) shows, motor vehicle & parts production has rebounded more swiftly than overall manufacturing production, a trend that has already started to reverse as the chip shortage has intensified.

Figure 1



Source: Federal Reserve Board and Wells Fargo Securities

Figure 2



Source: Federal Reserve Board and Wells Fargo Securities

## Bad Timing for Production Delays

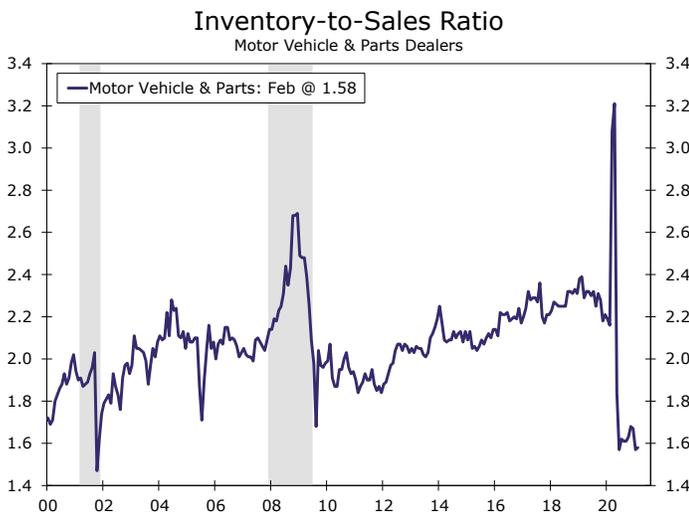
The frustrating reality is that these production hurdles are occurring amid a groundswell in demand for automobiles spawned during the pandemic era when public transport and ride-sharing lost some of its appeal. As more and more people get vaccinated and as spending shifts toward services, perhaps at the expense of continued outlays on goods, the window of opportunity for automakers could be closing.

With nearly 40% of U.S. semiconductor inputs imported, this is a matter of global supply chains, but even domestic suppliers are short-handed at the moment, leading U.S. automakers to scale back output. Both Ford and GM have estimated the hit to earnings this year attributable to chip shortages is in the neighborhood of \$1 billion to \$2 billion. President Biden has called for additional

funds to support investment in domestic semiconductor plants. There are a handful of semiconductor manufacturing plants under way in the United States already; whether this episode spurs further investment in the manufacturing and transportation sectors will depend partly on whether businesses see the surge in demand as temporary or the start of a long-term reorientation toward goods spending. Another key consideration will be the extent to which businesses want to limit their exposure to far-flung global supply chains by keeping operations closer to home, even if that comes with some higher costs.

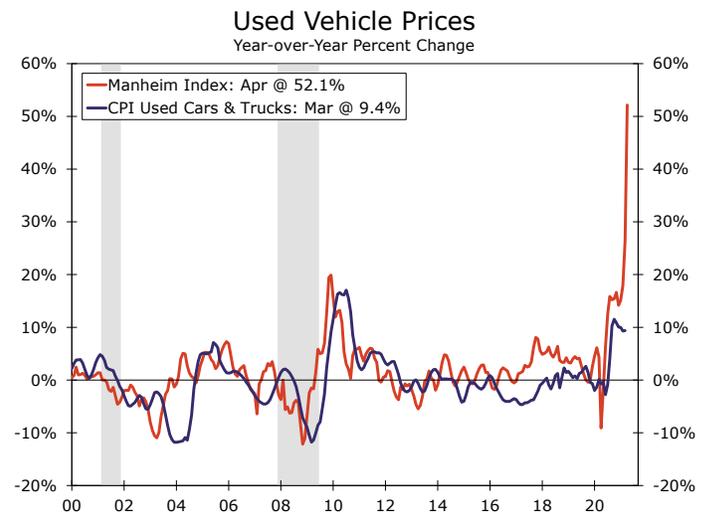
The reductions in production come at a time when inventories are already exceptionally low. Between efforts to avoid public transportation and stimulus checks that go a long way toward down payments, sales rose to a three and a half year high in March and moved even higher in April to a level not matched since 2005. Even before that burst in sales, inventories of motor vehicle & parts were down 12% from their pre-COVID level. In perhaps the clearest sign of demand and supply for autos already being out of balance, the inventory-to-sales ratio at retail dealers has collapsed and has been hovering around the lowest levels since October 2001 (Figure 3).

Figure 3



Source: U.S. Department of Commerce and Wells Fargo Securities

Figure 4



Source: Manheim, U.S. Department of Labor and Wells Fargo Securities

### That's the Last One of That Model on the Lot, It'll Cost You

The imbalance is already leaving its mark on prices. The average expenditure per new light truck or car hit an all-time high in February and incentive spending is declining according to both J.D. Power and Cox Automotive.<sup>3</sup> The dearth of new vehicles and stronger pricing is also cascading into the used vehicle market. Wholesale prices for used vehicles have shot up 17% since the start of the year, bringing the year-over-year gain to 52% (Figure 4). It is only a matter of time before the price paid by consumers jumps another notch higher. We expect price growth for both new and used autos to re-accelerate over the next few months. With vehicles accounting for 6.4% of the CPI, the persistent squeeze on inventories as production is unwillingly scaled back is likely to be a noticeable source of higher inflation this year.

### Mixed Employment Picture as Factories Swap Furloughs for Summer Shutdowns

The forced production cutbacks will hurt more than companies' bottom lines as they lose out on sales, but also slow the jobs recovery over the near term as manufacturers temporarily layoff workers. Despite booming sales in March, employment at motor vehicle & parts producers slipped by 1,000 workers after accounting for seasonal effects. We expect the shutdowns will further restrain the recovery in motor vehicle manufacturing employment over the next few months. However, if manufacturers forgo typical summer shutdowns, as Ford has indicated, in an effort to make up for lost production, seasonal layoffs are also apt to be skipped and generate a bigger boost to employment growth this summer.

## Endnotes

<sup>1</sup> We use the Bureau of Economic Analysis' input-output tables to calculate the share semiconductors (NAICS 3344) represent in the auto & parts manufacturing sector (NAICS 3361). ([Return to Section](#))

<sup>2</sup> All weights in this report are 2019 weights from the Federal Reserve Board's Industrial Production Report to reflect pre-COVID production shares. ([Return to Section](#))

<sup>3</sup> See "[April New-Vehicle Sales to Break Record Despite Low Inventory; Buyers Will Spend More on New Vehicles Than Any Other April](#)" (J.D. Power) and "[Auto Sales Remain Healthy Even With Incentive Spending at 5-Year Low](#)" (Cox Automotive). ([Return to Section](#))

**Subscription Information**

To subscribe please visit: [www.wellsfargo.com/economicsemail](http://www.wellsfargo.com/economicsemail)

The 2021 Annual Economic Outlook: *Aftershocks and Divergence in the Post-Pandemic Economy* is available at [wellsfargo.com/economicoutlook](http://wellsfargo.com/economicoutlook)

Via The Bloomberg Professional Services at WFRE

And for those with permission at [research.wellsfargosecurities.com](http://research.wellsfargosecurities.com)

**Economics Group**

Jay H. Bryson, Ph.D.	Chief Economist	(704) 410-3274	<a href="mailto:jay.bryson@wellsfargo.com">jay.bryson@wellsfargo.com</a>
Mark Vitner	Senior Economist	(704) 410-3277	<a href="mailto:mark.vitner@wellsfargo.com">mark.vitner@wellsfargo.com</a>
Sam Bullard	Senior Economist	(704) 410-3280	<a href="mailto:sam.bullard@wellsfargo.com">sam.bullard@wellsfargo.com</a>
Nick Bennenbroek	International Economist	(212) 214-5636	<a href="mailto:nicholas.bennenbroek@wellsfargo.com">nicholas.bennenbroek@wellsfargo.com</a>
Tim Quinlan	Senior Economist	(704) 410-3283	<a href="mailto:tim.quinlan@wellsfargo.com">tim.quinlan@wellsfargo.com</a>
Azhar Iqbal	Econometrician	(212) 214-2029	<a href="mailto:azhar.iqbal@wellsfargo.com">azhar.iqbal@wellsfargo.com</a>
Sarah House	Senior Economist	(704) 410-3282	<a href="mailto:sarah.house@wellsfargo.com">sarah.house@wellsfargo.com</a>
Charlie Dougherty	Economist	(704) 410-6542	<a href="mailto:charles.dougherty@wellsfargo.com">charles.dougherty@wellsfargo.com</a>
Michael Pugliese	Economist	(212) 214-5058	<a href="mailto:michael.d.pugliese@wellsfargo.com">michael.d.pugliese@wellsfargo.com</a>
Brendan McKenna	International Economist	(212) 214-5637	<a href="mailto:brendan.mckenna@wellsfargo.com">brendan.mckenna@wellsfargo.com</a>
Shannon Seery	Economist	(704) 410-1681	<a href="mailto:shannon.seery@wellsfargo.com">shannon.seery@wellsfargo.com</a>
Hop Mathews	Economic Analyst	(704) 383-5312	<a href="mailto:hop.mathews@wellsfargo.com">hop.mathews@wellsfargo.com</a>
Nicole Cervi	Economic Analyst	(704) 410-3059	<a href="mailto:nicole.cervi@wellsfargo.com">nicole.cervi@wellsfargo.com</a>
Sara Cotsakis	Economic Analyst	(704) 410-1437	<a href="mailto:sara.cotsakis@wellsfargo.com">sara.cotsakis@wellsfargo.com</a>
Coren Burton	Administrative Assistant	(704) 410-6010	<a href="mailto:coren.burton@wellsfargo.com">coren.burton@wellsfargo.com</a>

## Required Disclosures

This report is produced by the Economics Group of Wells Fargo Securities, LLC, a U.S. broker-dealer registered with the U.S. Securities and Exchange Commission, the Financial Industry Regulatory Authority, and the Securities Investor Protection Corp. Wells Fargo Securities, LLC, distributes this report directly and through affiliates including, but not limited to, Wells Fargo & Company, Wells Fargo Bank N.A., Wells Fargo Clearing Services, LLC, Wells Fargo Securities International Limited, Wells Fargo Securities Europe S.A., Wells Fargo Securities Canada, Ltd., Wells Fargo Securities Asia Limited and Wells Fargo Securities (Japan) Co. Limited. Wells Fargo Securities, LLC is registered with the Commodity Futures Trading Commission as a futures commission merchant and is a member in good standing of the National Futures Association. Wells Fargo Bank, N.A. is registered with the Commodity Futures Trading Commission as a swap dealer and is a member in good standing of the National Futures Association. Wells Fargo Securities, LLC and Wells Fargo Bank, N.A. are generally engaged in the trading of futures and derivative products, any of which may be discussed within this report.

The information in this report has been obtained or derived from sources believed by Wells Fargo Securities, LLC to be reliable, but Wells Fargo Securities, LLC does not guarantee its accuracy or completeness, nor does Wells Fargo Securities, LLC assume any liability for any loss that may result from the reliance by any person upon any such information or upon any opinions set forth herein. Such information and opinions are subject to change without notice, are for general information only and are not intended as an offer or solicitation with respect to the purchase or sale of any security or other financial product or as personalized investment advice. Wells Fargo Securities, LLC is a separate legal entity and distinct from affiliated banks and is a wholly owned subsidiary of Wells Fargo & Company. © 2021 Wells Fargo Securities, LLC

### Important Information for Non-U.S. Recipients

For recipients in the United Kingdom, this report is distributed by Wells Fargo Securities International Limited ("WFSIL"). WFSIL is a U.K. incorporated investment firm authorized and regulated by the Financial Conduct Authority. For the purposes of Section 21 of the UK Financial Services and Markets Act 2000 ("the Act"), the content of this report has been approved by WFSIL, an authorized person under the Act. WFSIL does not deal with retail clients as defined in the Directive 2014/65/EU ("MiFID2"). The FCA rules made under the Financial Services and Markets Act 2000 for the protection of retail clients will therefore not apply, nor will the Financial Services Compensation Scheme be available. For recipients in the EEA, this report is distributed by WFSIL or Wells Fargo Securities Europe S.A. ("WFSE"). WFSE is a French incorporated investment firm authorized and regulated by the Autorité de contrôle prudentiel et de résolution and the Autorité des marchés financiers. WFSE does not deal with retail clients as defined in the Directive 2014/65/EU ("MiFID2"). This report is not intended for, and should not be relied upon by, retail clients.

SECURITIES: NOT FDIC-INSURED - MAY LOSE VALUE - NO BANK GUARANTEE