# Global Supply Chain Disruptions and Inflation During COVID-19

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**Abstract**

We investigate the role of supply chain disruptions during the COVID-19 pandemic on US Producer Price Index (PPI) inflation. We exploit pre-pandemic cross-industry variation in sourcing patterns across countries, and interact it with a measure of international supply chain bottlenecks during the pandemic. We show that exposure to global supply chain disruptions played a significant role on US cross-industry PPI inflation between January and November 2021. If bottlenecks had stayed at the levels of 2019, PPI inflation in the manufacturing sector would have been 2 percentage points lower in January 2021 and 20 percentage points lower in November 2021.

Keywords: Global value chains, COVID-19, inflation, demand and supply shocks

JEL Classification: F13, F14, F44

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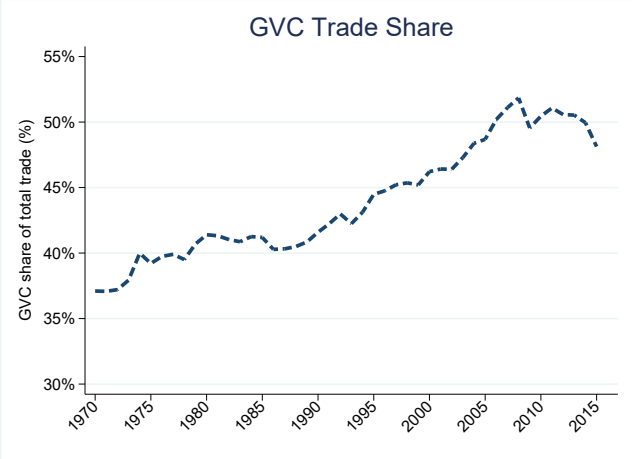
# 1 Introduction

The pandemic recession has been unique when compared to previous recessions. This was largely due to policies that led to behavioral changes. Lockdowns meant people were traveling less, both for work and for leisure, eating out less, and going to less entertainment, among other things. At the same time, work from home and fiscal stimulus packages increased the demand for certain goods such as technological goods, cars and furniture. These changes resulted in an overall shift away from consumption of services and toward consumption of durable goods.

The rapid increase in the demand for durable goods, together with the global nature of the pandemic has exposed vulnerabilities of the current production structure of these goods. Production of durable goods has become more fragmented, relying heavily on global value chains (GVC).[1] Instead of doing everything in-house, firms can outsource parts of their production processes to other countries. Figure 1 shows that GVC participation has been rising steadily over time, though it has plateaued in recent years (see Antràs, 2020).

Figure 1: GVC Participation over time




**Note:** The figure represents the evolution, between 1970 and 2015, in the share of total trade that requires inputs from at least two countries (World Development Report (2020), World Bank)

While GVC participation has advantages, as firms can benefit from outsourcing production to regions with a comparative advantage, they come with risks (LaBelle, Santacreu et al., 2021; Santacreu and LaBelle, 2021). Shocks that hit a particular stage of the production

[1]See LaBelle, Santacreu et al. (2021); Santacreu and LaBelle (2021) for a discussion on the rise of GVC.

process can propagate along the chain and expose firms dependent on these suppliers. Some of these risks did materialize during the current pandemic through global lockdowns (LaBelle, Leibovici, and Santacreu, 2021), low vaccination rates in emerging countries (Çakmaklı et al., 2021), and large shipping costs and disruptions in some key ports, putting additional pressure on supply chains.[2]

These risks can be exacerbated when supply chains rely heavily on critical inputs from one or few regions. Take the example of semiconductors. The advancement of technology in nearly every product has made semiconductors a vastly important input for the entire economy; however, their production largely relies on a few countries, such as Taiwan and China. A sharp increase in the demand for products that use this input may create large bottlenecks in this sector. Therefore, due to the global nature of supply chains, even a relatively small demand shock to a critical sector can propagate into a larger supply/demand disruption. This mismatch between supply and demand puts upward pressure on prices. In this article, we address the following question: to what extent did the global nature of supply chain disruptions contribute to Producer Price Index (PPI) inflation across US sectors?.[3]

The main challenge to answer this question is the limited access to real-time data on supply chain disruptions. We rely on the Purchasing Managers' Index (PMI) data from IHS Markit. This data, which is available with a subscription, comprises of monthly surveys sent to senior executives at private firms in 44 countries. We focus on two measures from this survey that capture supply chain disruptions: Backlogs and supplier's delivery times. Backlogs measure how the number of unfulfilled new orders has changed from the previous month; delivery times measure the average time it takes for suppliers to deliver inputs compared to the previous month. The two variables represent a rate of change over the previous month, and both capture demand and supply effects. Higher backlogs typically indicate that demand is increasing at a rate producers cannot meet while the opposite indicates there is unused production capacity resulting from a lack of demand. Hence, backlogs is a measure of how quickly suppliers can keep up with demand. The same logic applies to delivery times. As such, these measures can be use to infer demand and supply mismatches, contributing to price increases and inflation.

[2]See `https://www.stlouisfed.org/on-the-economy/2022/january/dynamics-international-shipping-costs`

[3]We focus on PPI inflation rather than Consumer Price Index (CPI) inflation, as the channels explored in the paper, i.e., bottlenecks and delivery times, are likely to have a more direct effect on producer prices. Increases in producer prices may then be passed onto consumers with a lag. As such, the PPI serves as a leading indicator for the CPI.

We begin by documenting three salient features of the data on supply chain disruptions. First, bottlenecks have become worse since January 2021 as implied by an increasing amount of unfulfilled orders, and longer delivery times. Second, delivery times and backlogs track PPI inflation quite well, with a correlation of about 90% for the period January 2020 to November 2021, in both cases. Third, supply chain disruptions and their contribution to PPI inflation have been heterogeneous across industries. Backlogs increased sharply in the automobile and technology equipment industries. This increase was followed by large increases in PPI inflation. In the pharmaceutical industry, however, bottlenecks remained relatively steady, which was reflected in a steady increase in PPI inflation over the same time frame. These results suggest that the supply/demand mismatch was worse in the technology equipment and in the automobile sectors than in the pharmaceutical sector.

We then ask the following question: Did US industries that were more exposed to global supply chain disruptions experience higher PPI inflation? To answer this question formally, we construct measures of industry exposure to supply chain disruptions, both domestic and foreign.[4] In particular, we exploit heterogeneous variation of an industry's sourcing patterns across countries, and interact it with backlog and delivery time changes, respectively, as measures of supply chain disruptions. If an industry in the United States relies heavily on intermediate inputs from a country where supply chain disruptions are severe, this industry will be more exposed. We consider both manufacturing and non-manufacturing sectors. To the extent that, for each industry, we keep the value added shares fixed at the levels of 2018, the interaction with the bottlenecks variables in our exposure measure captures the role of the supply shock to that particular industry.

Our empirical strategy consists on regressing industry PPI inflation on our measures of domestic and foreign exposure, including industry fixed effects. We focus on the period January 2021 to November 2021. We find that both domestic and foreign exposure have a positive effect on industry PPI inflation. However, only foreign exposure is statistically significant. These results hold when using either backlogs or supplier's delivery times as the measure of disruption. Moreover, the effects of global supply chain disruptions on PPI inflation are larger if the exposure variables are lagged by one month, suggesting that supply chain disruptions have a delayed impact on inflation. We then conduct the same regression analysis but split the industries into manufacturing and non-manufacturing sectors. In the

[4]We follow the methodology developed in LaBelle, Leibovici, and Santacreu (2021).

non-manufacturing sector, both domestic and foreign exposure have a positive and statistically significant effect on PPI inflation. In the manufacturing sector, however, only foreign exposure is statistically significant.

Finally, we ask the following question: what would have been PPI inflation during 2021 if backlogs in each country had followed their 2019 path? To answer this question, we do a back-of-the-envelope calculation in which we take the results from our regression analysis, and compute a counterfactual PPI inflation rate, using the data on bottlenecks from 2019. We find that PPI inflation in the manufacturing sector during 2021 would have been 2 percentage points lower in January and 20 percentage points lower in November of 2021.

Our results show that supply chain disruptions during the pandemic recession have been unprecedented. The shift in demand toward durable goods consumption and the heavy reliance on foreign suppliers to produce these goods has created a mismatch between supply and demand resulting in price increases. Sectors that rely more heavily on foreign inputs from countries that faced stronger disruptions experienced larger increases in PPI inflation.

This paper complements a short but growing literature on inflation and supply chains disruptions. Ha, Kose, and Ohnsorge (2021) analyze the driving forces of global inflation focusing on the 2020 global recession. Comin and Johnson (2020) study the role of trade integration and offshoring on inflation. Dunn and Leibovici (2021) discuss the extent to which supply chain disruptions account for the recent rise in inflation, focusing on the case of semiconductors. Finally, Amiti et al. (2021) study the effects of rising import prices on U.S. producer prices.

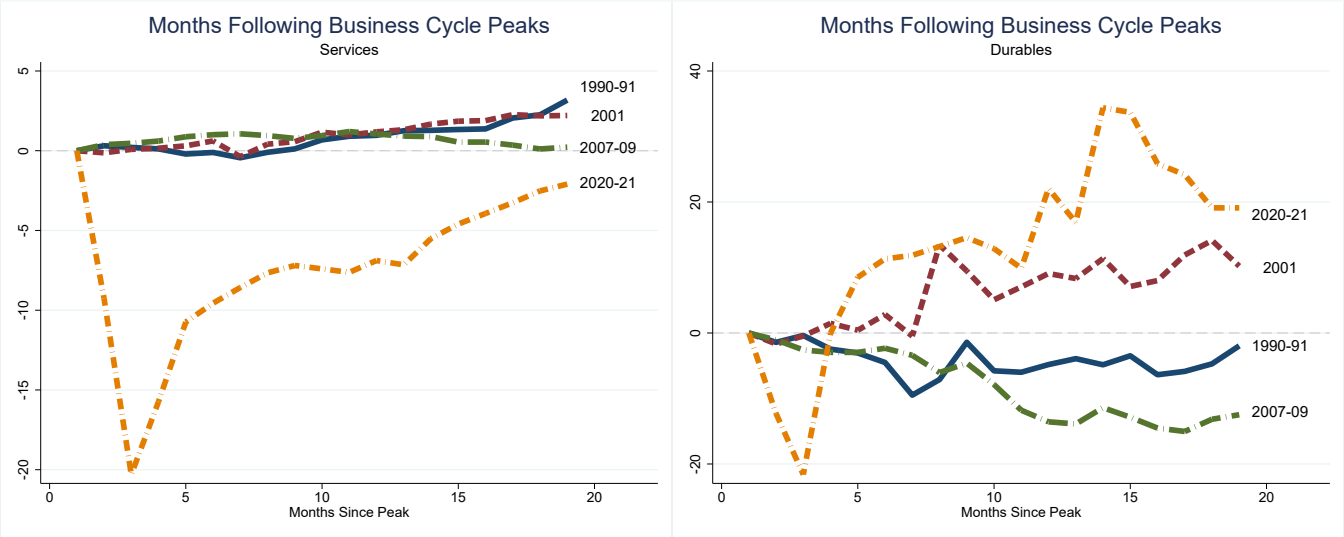
# 2 Supply Chain Disruptions During COVID-19

The pandemic recession has been different from previous recessions along several dimensions. One is related to consumption: There has been a shift in consumption away from services and toward durable goods. Figure 2 plots, for the pandemic recession and three earlier ones, the evolution of real consumption of services (left panel) and durable goods (right panel) for 17 months after the business cycle peak (with consumption normalized to one in each business cycle peak).[5]

[5]The plot shows monthly Real Consumption Expenditures By Major Product Type as reported on BEA release table 2.8.3 of durables goods, seasonally adjusted; the date of the business cycle peak for each of the four recessions is from the NBER Business Cycle Dating Committee (`https://www.nber.org/research/`

During a typical recession, services consumption tends to remain constant. In contrast, the pandemic recession was characterized by a sharp decline in consumption of services during the first months (over 20% decline in April 2020 from the peak in February 2020), which started recovering steadily after the initial shock. This recovery was helped when lockdowns were lifted and vaccines became widely available. Durable goods consumption, on the other hand, tends to drop and stay low for the duration of a recession, as consumers typically postpone consumption of these types of goods. During the pandemic recession, however, there was an initial sharp drop in durable goods consumption as expected , however this recovered quickly and remained 19% higher than the peak even 17 months later.

Figure 2: Consumption Patterns During Recessions




**Source: FRED, NBER and author calculations**

**Note:** The figure shows the evolution of real consumption in services (left panel) and non-durable goods (right panel) 17 months after the business cycle peak of the 1990-91, 2001, 2007-2009, and 2020-2021 recessions

The shift of demand toward durable consumption together with the fact that production of these goods takes place along complex supply chains, has translated into large bottlenecks. We show evidence of supply chain disruptions by plotting the evolution of backlogs (i.e, new orders that have not been completed or started yet) and supplier's delivery times (i.e, time that is takes for a manufacturer to receive inputs from suppliers) from June 2007 - November

`business-cycle-dating`). Plotting total consumption (i.e, including both durable and non-durable consumption) shows a similar evolution to that of non-durable consumption, but the changes are less striking (See `https://www.hamiltonproject.org/assets/files/COVID_Facts.pdf`).

2021 in Figure 3. Numbers greater than 50 represent increased backlogs (or lower delivery times) in terms of monthly changes with the reverse being true for values less than 50.[6]

Backlogs of work (left panel) and suppliers' delivery times (right panel) during the pandemic recession have behaved differently than during the Great Recession. The previous recession represents, in many ways, a typical demand shock. From the figure, we can see there was a slight increase in the rate of change of delivery times before quickly recovering. By the end of the recession in June 2009, delivery times had been actually getting shorter on a monthly basis for the previous six months. During this time backlogs were gradually disappearing as the recession deepened. In fact, there were no month-over-month backlog increases, denoted by an index greater than 50, from May 2008 until October 2009, four months after the recession officially ended. When looking at the current recession, delivery times consistently worsened on a monthly basis but the rate at which they have worsened has stabilized at a very high rate since June 2021. At the same time, backlogs initially experienced the typical loosening associated with a drop in demand before the supply chain shocks caused an even larger distortion and forced higher levels of backlogs. Backlogs have consistently worsened on a monthly basis since August 2020.

This illustrates an unprecedented supply and demand mismatch, contributing to price increases and, hence, inflation. Focusing on the period from January 2020 to November 2021, Figure 4 shows that bottlenecks, measured either with backlogs (left panel) or delivery times (right panel; Y-axis inverted so that higher numbers represent longer delivery times) track current PPI inflation closely.[7] Indeed, the correlation of PPI inflation with backlogs and with delivery times, respectively, during January 2020 and November 2021 is about 90%.

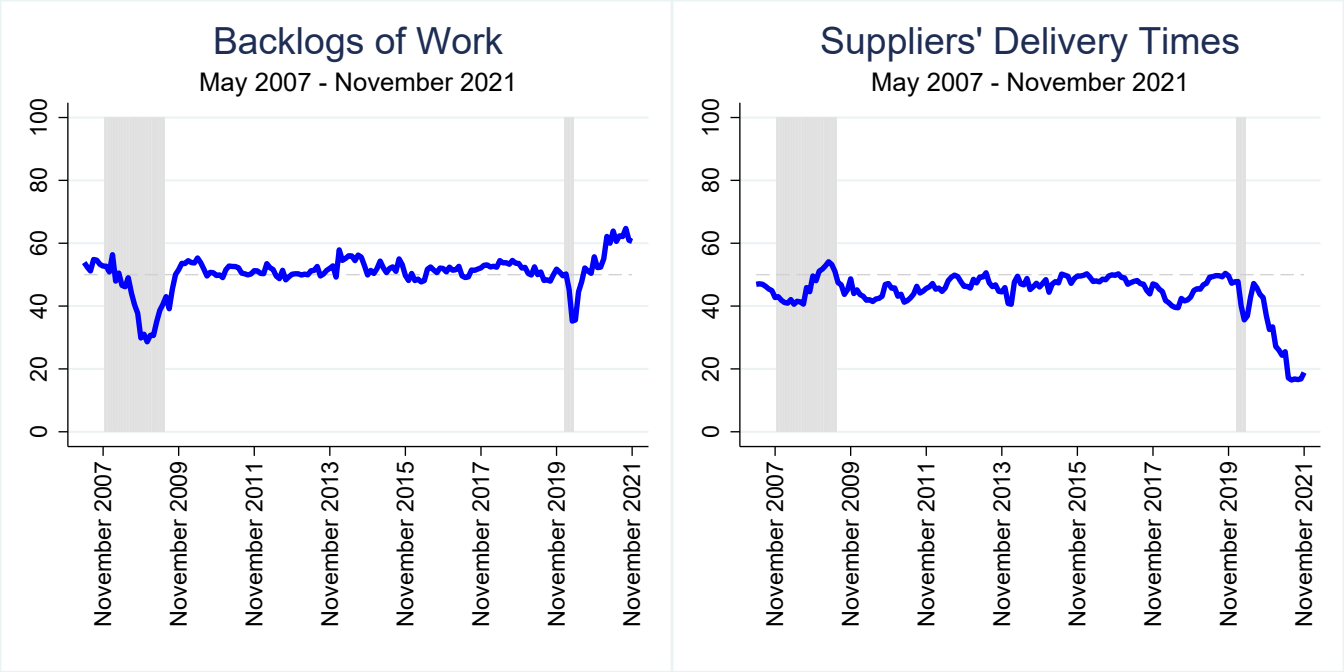
The evidence reported in Figure 4 masks large cross-sector heterogeneity. Figure 5 plots backlogs (left panel) for the world in three manufacturing sectors: automobiles and auto parts; technology equipment and pharmaceuticals.[8] The world automobile and parts sector

[6]Data are from IHS Markit. They survey upper-level executives in different industries across the world. The questions asked focus on the level of different aspects of production compared with one month ago. The results are summarized into a diffusion index with 50 being the no changes mark, distance from 50 signaling the monthly rate of change and above (below) 50 signaling expansion (contraction).

[7]We use BLS Producer Price Index year-over-year change rate as our measure of PPI inflation. We then standardize it to bring the scale in line with the IHS Markit data. In particular, we first de-mean and divide by its sample standard deviation; second, we multiply the resulting series by the standard deviation of the IHS backlogs measure and add the mean.

[8]We do not have data on sectoral backlogs for the United States; instead IHS Markit only reports disaggregated data for a few countries. To the extent that these countries have a similar production structure as the United States, we can assume that cross-sector bottlenecks in the United States follow the same

Figure 3: Delivery Times and Backlogs over time




**Source: IHS Markit**

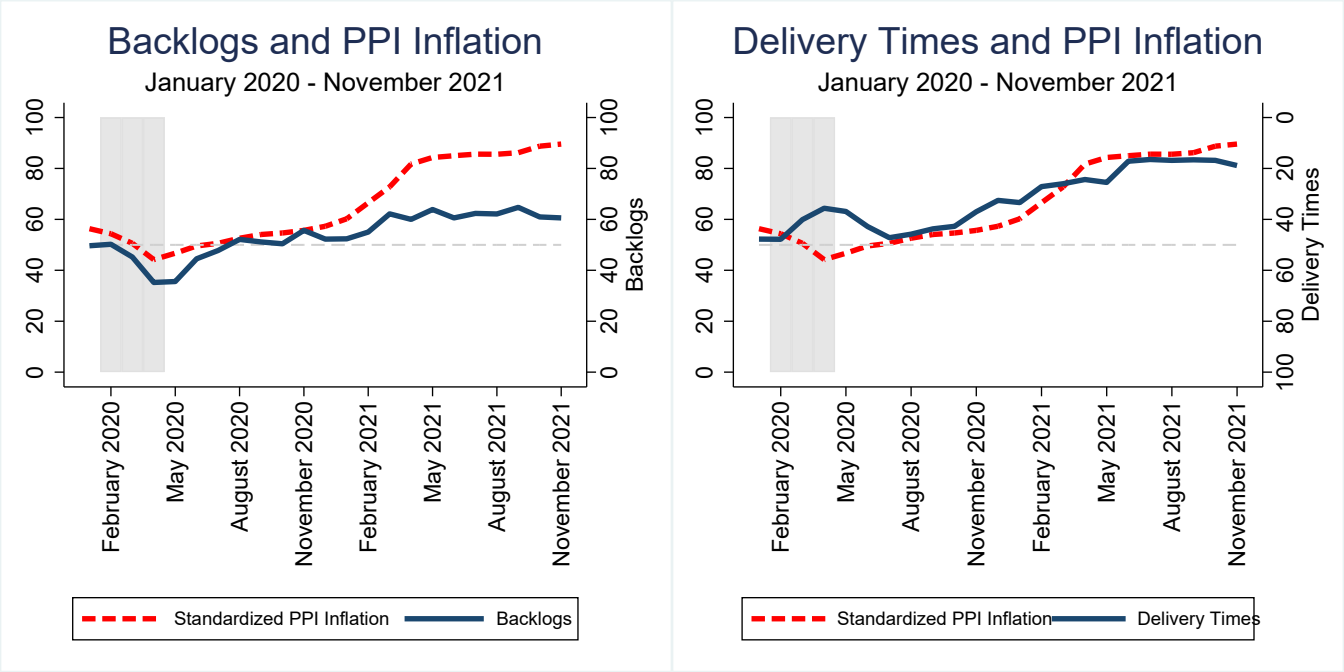
**Note:** The figure shows the monthly evolution of backlogs (left panel) and suppliers' delivery times (right panel) in the United States between June 2007 - November 2021

started experiencing tightening of supply chains by July 2020, which manifested as consistent increases in the monthly rate of change in backlogs. Strong demand for cars in the months following the start of the pandemic, paired with disruptions in the supply of certain key inputs such as semiconductors, led to large supply chain disruptions in this sector. In the case of Technology equipment sector, unused capacity remained relatively stable for months after bottoming out before beginning to tighten at a steep slope after the turn of the new year. The pandemic recession substantially increased demand for computers and electronics as people started working from home and fiscal stimulus packages allowed them to do so. The Pharmaceutical sector behaved differently from Automobile and parts and Technology equipment: bottlenecks and PPI inflation remained relatively steady in comparison. Hence, sectors that faced worse supply chain disruptions (i.e, automobile and technology equipment) also experienced steeper price increases.[9]

pattern.

[9] A number that goes from 42 to 47 does not mean that bottlenecks are increasing; rather, that the rate of loosening of supply chain is slowing down.

Figure 4: Backlogs, Delivery Times and PPI Inflation




**Source: IHS Markit, BLS and author calculations**

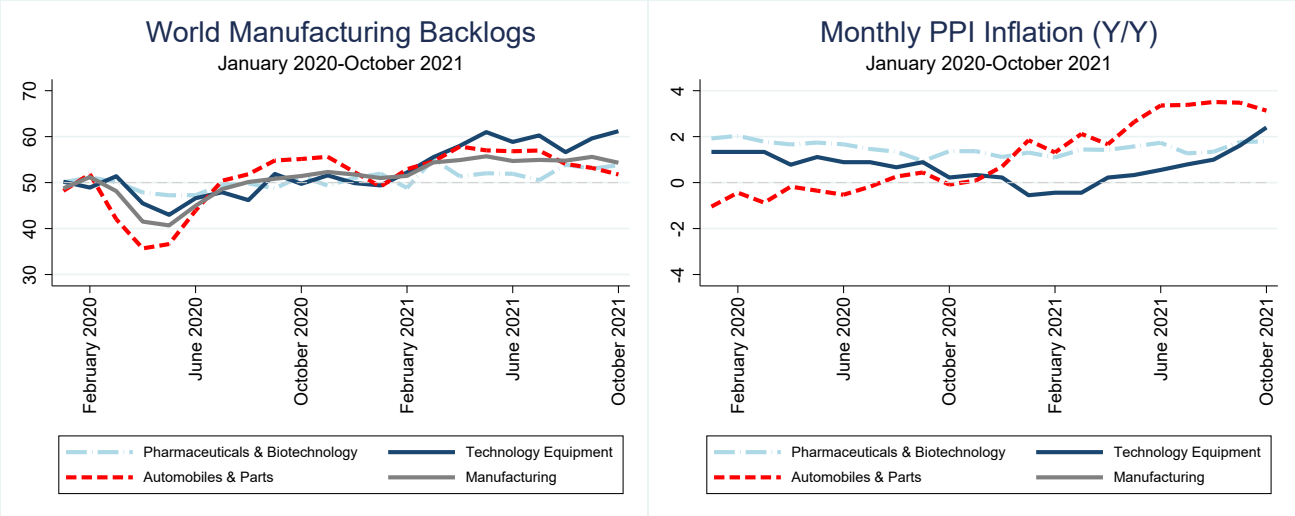
The figure shows the monthly evolution of backlogs and PPI inflation (left panel) and suppliers' delivery times and PPI inflation (right panel) in the United States between January 2020-November 2021

# 3 Global Supply Chain Disruptions and PPI Inflation

In this section, we investigate the channels through which an exposure to global supply chain disruptions may have contributed to inflation during the COVID-19 pandemic. Bottlenecks in an industry can be driven by either domestic or by foreign factors. For instance, if an industry relies heavily on intermediate inputs from countries that experience more bottlenecks, that industry will be more more exposed to foreign supply chain disruptions. If demand for that industry's products increases quickly, then foreign exposure may lead to price increases. In this section, we ask: To what extent did exposure to domestic and foreign supply chain disruptions contribute to US PPI inflation during the COVID-19 pandemic? To answer this question we construct, for each industry of the United States, a measure of exposure, domestic and foreign, of supply chain disruptions. Our empirical strategy consist on regressing PPI inflation on the exposure measures.

We follow the same methodology employed in LaBelle, Leibovici, and Santacreu (2021),

Figure 5: Backlogs and PPI Inflation by Sector




**Source: IHS Markit, BLS and author calculations**

**Note:** The figure shows the monthly evolution of world backlogs (left panel) and US PPI inflation (right panel) between January 2020 and October 2021 for three industries: Automobile and Parts, Technology equipment, and Pharmaceuticals

and compute, for each industry in the United States, a measure of GVC participation as the share of gross exports (GE) that has been produced with foreign value added (FVA) in 2018 for 32 countries and 26 industries, 15 of which correspond to the manufacturing sector.[10] This measure captures how much of the United States GE in a particular industry rely on intermediate imports from other countries. We then interact this variable with a measure of supply chain disruptions of each foreign supplier.[11] Our conjecture is that industries that are more exposed to global bottlenecks though GVCs experienced larger increases in PPI inflation.[12]

Industry $i$'s exposure to foreign ($f$) bottlenecks at time $t$, $E_{it}^{f}$, is computed as:

$$E_{it}^{f} = \sum_{j=1}^{N} \frac{\text{FVA}_{i}^{j}}{\text{GE}_{i}} B_{t}^{j} \tag{1}$$

[10]Data are from the OECD Trade in Value Added (TIVA) dataset, which reports the value added content by each origin country on the production of US goods and services that are consumed worldwide.

[11]Note that the backlog and delivery times measures are at the country-period level, whereas the FVA measure is at the country-sector level.

[12]The list of countries is Australia, Austria, Brazil, Canada, China, Colombia, Czech Republic, France, Germany, Greece, Indonesia, India, Ireland, Italy, Japan, Kazakhstan, Korea, Malaysia, Mexico, Myanmar, Netherlands, Philippines, Poland, Russian Federation, Spain, Switzerland,Taiwan, Thailand, Turkey, United Kingdom, USA, Vietnam.

where $\frac{\text{FVA}_i^j}{\text{GE}^j}$ is the share of gross exports from industry $i$ that are composed of value added from country $j$ in that industry; $B_t^j$ represents bottlenecks, either backlogs or delivery times, in country $j$ at time $t$; and $N$ is the number of foreign suppliers. A period is a month. We restrict the analysis to the period January 2021 to November 2021.

Similarly, we compute a measure of industry $i$'s exposure to domestic bottlenecks defined as:

$$E_{it}^d = \frac{\text{DVA}_i^{\text{US}}}{\text{GE}_i} B_t \tag{2}$$

where $\frac{\text{DVA}_i^{\text{US}}}{GE_i}$ is the the share of value added embedded in US gross exports supplied by the United States itself. $B_t$ is the United States bottleneck variable, either backlogs or delivery times.

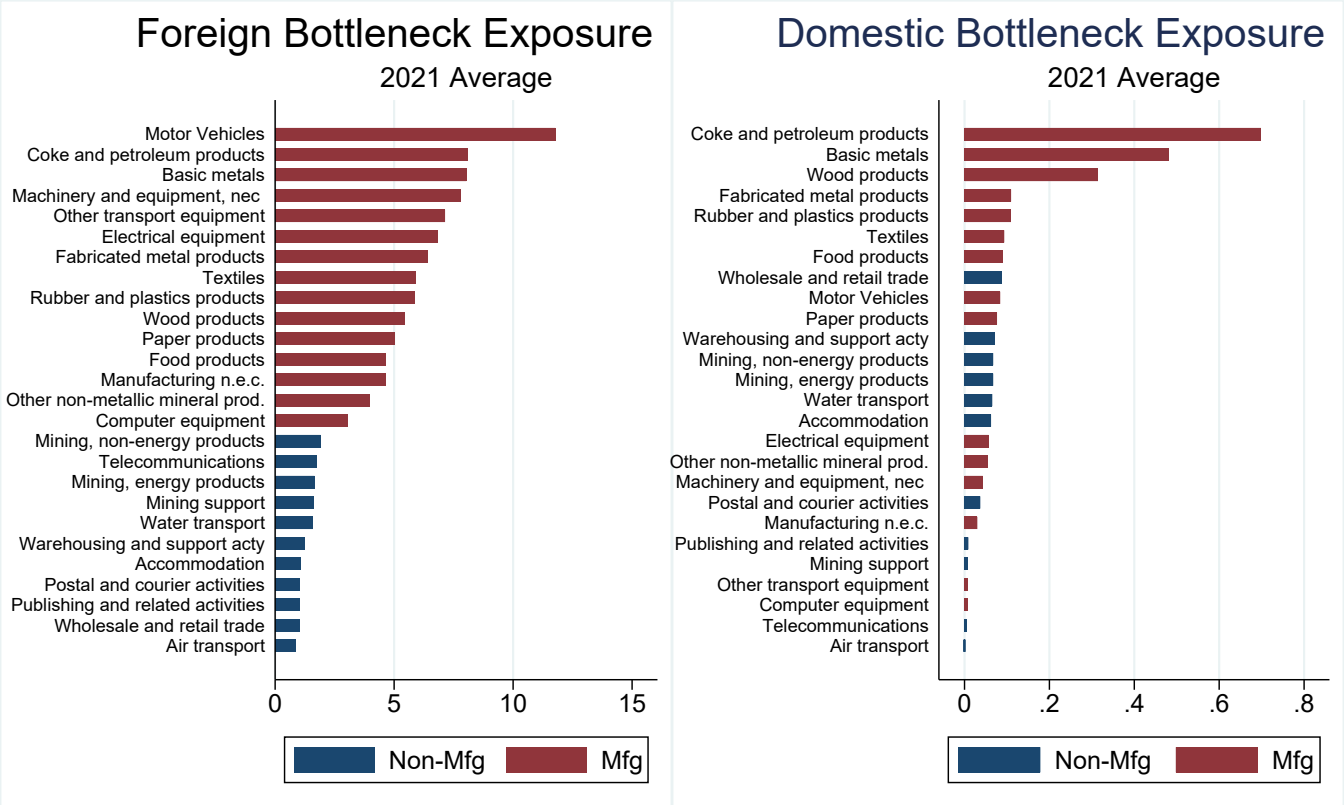
Figure 6 plots our measure of foreign exposure computed in equation (1) (left panel) and PPI inflation (right panel) for the 26 industries in the United States, averaged between January and November 2021. Manufacturing industries are, on average, more exposed to foreign bottlenecks than services. In the manufacturing sector, Motor vehicles, Coke and petroleum, and Basic metals are the most exposed industries. The reason is twofold. On the one hand, these industries rely heavily on foreign intermediate inputs. On the other hand, the main suppliers in these industries have faced strong supply chain disruptions during the pandemic. Consistent with the measure of foreign exposure, manufacturing industries experienced higher PPI inflation than services. In the manufacturing sector, Coke and refined petroleum and basic metals are among the industries with the highest increases in prices. Hence, there is seemingly a positive correlation between exposure to foreign supply chain disruptions and PPI inflation.

## 3.1 Empirical Strategy

Next, we study more formally the extent to which domestic and foreign exposure to supply chain disruptions may have contributed to US PPI inflation. In particular, we conduct the following linear regression:

$$\pi_{it}^{\text{PPI}} = \alpha_0 + \alpha_1 E_{it}^f + \alpha_2 E_{it}^d + I_i + u_{it} \tag{3}$$

Figure 6: Foreign and Domestic Exposure




**Source: TIVA, IHS Markit, BLS and author calculations**

**Note:** The figure shows, for 23 US industries averaged between January and November 2021, exposure to foreign backlogs (left panel) and year over year PPI inflation (right panel). Red bars represent manufacturing industries; blue bars represent services.

where $\pi_{it}^{\text{PPI}}$ represents the year-over-year PPI increase in industry $i$ at time $t$; $E_{it}^{f}$ is the exposure to foreign bottlenecks at time $t$, and $E_{it}^{d}$ is the exposure to domestic bottlenecks in industry $i$; $I_i$ captures industry fixed effects, and $u_{it}$ is the error term.

Table 1 reports the results. Foreign exposure, both in terms of suppliers' delivery times and backlogs, has a statistically significant effect on PPI inflation. For backlogs, increasing the month-over-month backlogs by 1% increases the industry inflation rate by 0.24 percentage points, while the same increase for delivery times causes an increase of about 0.26 percentage points. The R-squared is about 75%. Exposure to domestic bottlenecks, either measured as backlogs or delivery times, has no statistically significant effect on an industry's PPI inflation. This result may be capturing the high costs of restructuring a global supply chain that relies heavily on foreign suppliers. High fixed cost of setting-up global supply chains could be

resulting in stronger downstream production effects in an industry heavily dependent on imported intermediate inputs due to the inability to efficiently re-source intermediates.

Table 1: Exposure to Supply Chain Disruptions and PPI Inflation: Backlogs vs Delivery Times (January-November 2021)

| | Backlogs | Delivery time (inverse) |
|---|---|---|
| Domestic exposure | 0.00569 | 0.00314 |
| | (0.00364) | (0.00269) |
| Foreign exposure | 0.239*** | 0.255*** |
| | (0.0711) | (0.0703) |
| Cons | -0.598*** | 2.272*** |
| | (0.115) | (0.565) |
| Industry FE | YES | YES |
| $N$ | 286 | 165 |
| $R^2$ | 0.752 | 0.756 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Since supply chain disruptions may have a delayed effect on PPI inflation, we conduct the same regression in equation (3), but lagging the domestic and foreign exposure measures. The results are reported in Table 2. Foreign supply chain disruptions get propagated to domestic PPI inflation with one-month lag. This result is robust to the use of both backlogs and delivery times as the measure of supply chain disruption. [13] Hence, supply chain disruptions tend to have a delayed impact on PPI inflation.

Table 3 reports the results if we split the industries into manufacturing and non-manufacturing. Data on delivery times are only available for manufacturing sectors. Hence, we focus on backlogs as a measure of supply chain disruptions in Table 3. Notably, domestic exposure is only statistically significant when restricting the sample to the non-manufacturing sector. This result may reflect the fact non-manufacturing sectors typically rely far less on FVA than manufacturing goods. Therefore, they are more susceptible to domestic fluctuations overall. In the manufacturing sector, however, both domestic and foreign bottlenecks have a positive and statistically significant effect on PPI inflation. However, the effect of foreign supply chain disruptions is significantly larger than that of domestic bottlenecks. The R-squared is about 75% in the manufacturing sector and 58% in the non-manufacturing sector.

[13] The results are robust to including 2 month lags (not included in the draft).

Table 2: Exposure to Supply Chain Disruptions and PPI Inflation: Lags (January-November 2021)

| | Backlogs | Delivery times |
|---|---|---|
| Domestic exposure | 0.00755* | 0.000286 |
| | (0.00383) | (0.00444) |
| Foreign exposure | -0.154 | 0.0630 |
| | (0.0941) | (0.0872) |
| Domestic exposure (t-1) | 0.00340 | 0.000689 |
| | (0.00336) | (0.00366) |
| Foreign exposure (t-1) | 0.260*** | 0.205* |
| | (0.0777) | (0.118) |
| Cons | -0.628*** | 2.356*** |
| | (0.145) | (0.664) |
| $N$ | 260 | 150 |
| $R^2$ | 0.824 | 0.819 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Our results suggest that global supply chain disruptions, which reflect a mismatch between demand and supply shocks, can propagate to domestic PPI inflation. The propagation is larger in those sectors where GVCs are more important.

**Back-of-the-envelop calculation** We now ask the following question: what would have been PPI inflation during 2021, had bottlenecks in each country followed their 2019 path? To answer this question, we compute for each US industry in the manufacturing sector a counterfactual PPI inflation rate that uses country-level data on supply chain disruptions from January to November 2019. The focus is on the manufacturing sector, which has experienced worse supply chain disruptions due to its higher concentration in GVCs.

We proceed in several steps. First, we recalculate our measures of domestic and foreign exposure in equations (2) and (1), using country-level backlogs for each month of 2019. These counterfactual measures capture the exposure of each US manufacturing industry through GVC participation if backlogs had followed the same monthly change path as in 2019. Second, we substitute these measures into equation 3, using the estimated coefficients and industry fixed effects from the first column of Table 3. The result is a counterfactual

Table 3: Exposure to Supply Chain Disruptions and PPI Inflation: Manufacturing vs Non-Manufacturing (January-November 2021)

| | Manufacturing | Non-Manufacturing |
|---|---|---|
| Domestic exposure | -0.000149 | 0.0161*** |
| | (0.00548) | (0.00297) |
| Foreign exposure | 0.309** | 0.397** |
| | (0.0994) | (0.122) |
| Cons | -3.549*** | -1.355*** |
| | (0.978) | (0.172) |
| Industry FE | YES | YES |
| $N$ | 165 | 121 |
| $R^2$ | 0.747 | 0.574 |

Standard errors in parentheses

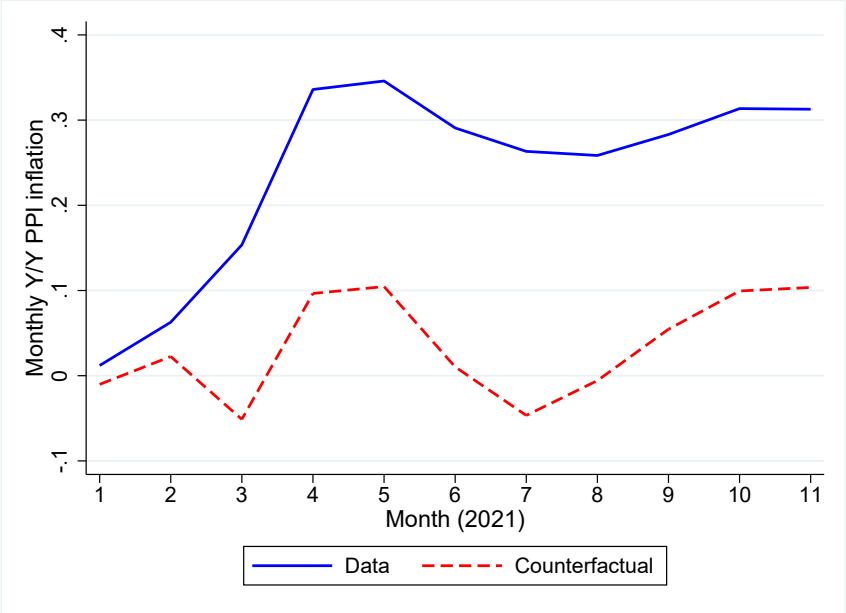
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

measure of PPI inflation for each manufacturing industry between January and November 2021. Third, we compute aggregate manufacturing PPI inflation, both in the data and in the counterfactual, as a weighted average across industries' PPI inflation in each month of 2021. The weights are provided by the BLS for December 2020.[14]

Figure 7 plots the evolution of year over year monthly manufacturing PPI inflation between January and November 2021 , both in the data (solid line) and in the counterfactual (dashed line). PPI inflation is always lower in the counterfactual than in the data, suggesting that bottlenecks during 2021 have significantly contributed to inflation. Differences between the data and the counterfactual are more striking in the later months of 2021. In particular, we find that manufacturing PPI inflation would have been 2 percentage points lower in January of 2021 and 20 percentage points lower in November of 2021, if bottlenecks monthly changes followed their 2019 path.

[14]See `https://www.bls.gov/ppi/#tables`.

Figure 7: Manufacturing Y/Y PPI inflation in the data and in the counterfactual




# 4 Conclusions

In this article, we investigated the role of global supply chain disruptions on PPI inflation across U.S. industries. We find that exposure to foreign bottlenecks through GVC played a significant role in transmitting the effects of supply chain disruptions to U.S. prices. Our findings are driven by a combination of demand and supply shocks and the heterogeneous exposure to these shocks across industries. Industries that rely on inputs from countries whose production has been most affected by disruptions also experienced large price increases due to the inability to keep up with demand. Whether inflation is temporary (i.e., a rise in the cost of living) or a more permanent phenomenon will depend, absent any policy intervention, on the ability of supply chain disruptions to ease in order to meet the higher demand. The unequal distribution of vaccines in emerging countries, the rise of new variants, and disruptions in shipping could add some additional pressure on supply chains, creating pessimism on inflation disappearing in the near future.

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