Chinese Import Competition and Dampened Monetary Policy in the US Counties

Thomas Decker

Advisor: Dr. Neville Francis

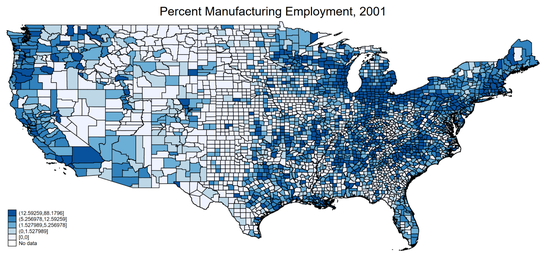
Abstract

The long decline in US manufacturing related to the emergence of China as a global economic superpower has been studied in myriad contexts, but whether it has dampened the effectiveness of US monetary policy remains unclear. As such a manufacturing loss would erode the interest rate channel of monetary policy transmission, there is good reason to believe that this is the case. Using local projections, this research finds a strong effect of Chinese import penetration in US counties from 1992-2008 on reducing monetary shock troughs. This finding is robust to a host of county level demographic and economic controls, as well as alternative shock series. The effect of import penetration at higher deciles is positive, increasing, and significant across employment, wage, and establishment responses. Further analysis finds the same relationship using data for 2008-2022. These results are important for policymakers inside and outside of the central bank, especially considering recent persistent inflation.

Motivation and Background

An emergent literature has studied the effects of the rise of China's economy on a range of outcomes in the US. Centering on the impact of increased import penetration leading to massive job losses (Acemoglu et al 2016), this prior research has found that losses began in the manufacturing sector and permeate outwards. Since manufacturing is regionalized (as shown in the figure below), the effects of China's rise are spatially heterogeneous.

One of the primary channels of monetary policy transmission is through the interest rate channel. This lever has both a supply-side, explored in this research, as well as a demand-side. As the central bank raises the interest rate, the cost of borrowing rises. For firms, this makes capital investments more expensive, and can be expected to lead to a contraction in the output level of capital-intensive firms, which are disproportionately in the manufacturing sector. For consumers, this makes taking on debt more of a burden, so the purchase of goods often bought on debt—appliances, cars, and durables broadly—can be anticipated to be delayed. Such goods are manufactured. Accordingly, the manufacturing sector is depressed on two fronts, and these contractionary effects can be expected to exhibit regional heterogeneity as well, since certain localities may be more severely impacted depending on the size of their manufacturing sector. Considering the rise of China, we can expect that because manufacturing has experienced a long-term, durable decline, the effect of monetary policy to contract (or expand) the economy is limited because of the erosion of this traditional mechanism.



Data and Empirical Model

To run estimations at the county level, I use data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW), containing employment, establishment, and total wage data from 1992 to present, disaggregated by industry. I use the monetary shocks of Bu, Rogers, and Wu (2021), which span from 1994-2022. Data on US manufacturing imports from China are from the replication package of Acemoglu et al (2016), originally from the UN Comtrade database. These data run from 1992-2011, and robustness exercises are performed with Census Bureau trade data from 2008-2022. The Comtrade data are annual, so to accord with the QCEW series, I estimate the underlying, unobserved quarterly difference in the log of imports via the Kalman filter. The import penetration variable is then derived as follows:

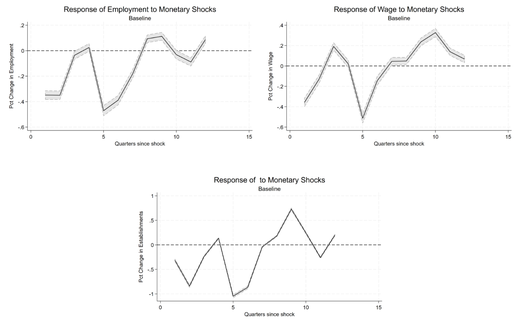
$$IPW_{it} = \sum_{j}^{J} \frac{e_{ijt} * M^*_{jt}}{e_{jt}}$$

Where e represents employment, M* the Kalman filter (or Census) differences in logs in Chinese imports, i indexes the county, j the industry (using the SIC87DD classification of Acemoglu et al (2016)), and t indexes time. The overlapping years of the Kalman filter data and Census data (2008-2011) have moderate high average correlations at the county level, suggesting that for most counties, the filter was effective. Rather than levels, the analysis uses deciles of import penetration to understand the relative effect of increased import competition.

To determine the baseline effect for the average county, I run a panel version of Jordà's (2005) local projections, specified as follows:

$$y_{it+h} - y_{it} = \beta_1^h r_{t-1} + \beta_2^h IPW_{it-1} + \sigma_1^h r_{t-1} * IPW_{it-1} + \sum_{l=1}^{L} \gamma_l^h \mathbf{z}_{it-l} + \mu_s + \theta_t + \epsilon_{it+h}$$

Where y is the QCEW outcome variable, in logs, r is the (lagged) monetary shock, IPW is the same as above, and **z** is a control vector of the lags of all three QCEW variables. I also add state and year fixed effects As before, t indexes time, and h indexes the forecast horizon. I estimate 12 quarters ahead, and control four lags of the variables. The coefficient of interest is then $\beta_1 + \sigma_1$, though a specification considering only the shock is also estimated. The baseline results are shown below, and these estimation run from 1994, the start of the shock series, to 2008, to avoid noise related to the financial crisis and zero lower bound period.

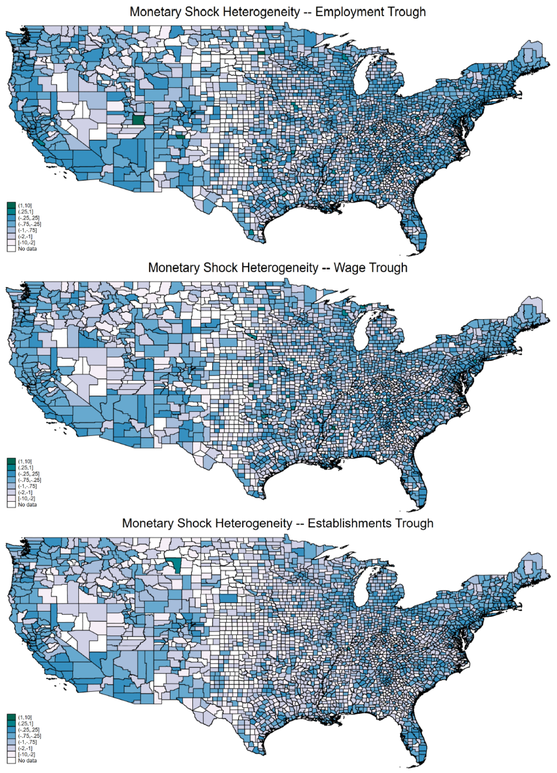


Note: figures show the cumulative response of each dependent variable to the BRW shocks, 1994-2008. Shaded regions show the 95% confidence intervals of the estimate at each horizon.

Note: figures show the cumulative response of each variable to the combined effect of the BRW shocks at the first (green), fifth (blue), ninth (red), and tenth (yellow) deciles. Shaded regions show the 95% confidence intervals of the estimate at each horizon.

County Level Heterogeneity

While the baseline reveal effects that are significant and match the expectations, estimations for each county will better allow the analysis of the differential effects of monetary policy. These estimations are analogous to the panel local projections, though without the state fixed effects, and the import penetration deciles. The trough monetary shock response for each county is shown below.



The maps show strong heterogeneity in the trough response of each county to the monetary shocks. They do not, however, reveal the impact of import penetration on the effectiveness of monetary policy, nor do they reveal the sources of the heterogeneity. We would expect that counties at the highest deciles of import penetration would have predicted responses closer to zero—meaning that monetary policy would have a dampened effect. To test this relationship, I run the trough response coefficients for all counties on their average import penetration decile over 1994-2008, as well as a host of other demographic and economic controls average over this period. Most notably, I include the manufacturing employment share, thus controlling for the remaining effect of the interest rate channel and ensuring that the effect of import penetration is not related to manufacturing itself. The abridged results are included in the table below. Relative to the negative constants of the trough regressions, the IPW decile coefficients are significant, positive, and increasing such that the tenth decile has the highest predicted response in each regression. This inverse relationship with the coefficient base and the deciles shows that as import penetration rises, the predicted trough responses moves closer to zero. That is, at the highest deciles of import penetration, there is a significantly reduced reaction to monetary shocks, all else constant..

Effect of IPW and Controls on Impulse Response Troughs

Variables	Employment	Wage	Establishments
Population, 1000s	0.0001***	0.0001**	0.0001**
	(0.000)	(0.000)	(0.000)
IPW Decile 2	0.2811**	0.2467	0.2895**
	(0.130)	(0.154)	(0.120)
IPW Decile 3	0.5932***	0.5128***	0.5361***
	(0.120)	(0.142)	(0.103)
IPW Decile 4	0.7728***	0.8403***	0.7463***
	(0.122)	(0.141)	(0.103)
IPW Decile 5	0.8472***	0.8991***	0.8813***
	(0.123)	(0.141)	(0.101)
IPW Decile 6	1.0198***	1.1164***	1.0689***
	(0.120)	(0.136)	(0.099)
IPW Decile 7	1.1386***	1.1885***	1.1442***
	(0.118)	(0.136)	(0.098)
IPW Decile 8	1.2412***	1.3030***	1.3417***
	(0.116)	(0.134)	(0.098)
IPW Decile 9	1.3451***	1.4046***	1.4815***
	(0.116)	(0.137)	(0.098)
IPW Decile 10	1.4262***	1.5096***	1.5561***
	(0.118)	(0.139)	(0.102)
Share Manufacturing	-0.0115***	-0.0159***	-0.0093***
	(0.003)	(0.004)	(0.002)
Constant	-3.3912***	-4.1839***	-2.3224**
	(1.174)	(1.159)	(0.905)

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors reported. Base categories are HS, White, Male, in Labor Force, and IPW Decile 1. Other demographic and economic controls are omitted here. All regressors are averaged from 1990-2010, except IPW, which is averaged from 1992-2008. The unabridged version can be found in the Appendix.

Conclusion

I estimate monetary policy responses for all US counties, the first paper to conduct such an analysis. I dissect the heterogeneity in these responses by regressing the troughs on a host of demographic and economic controls, as well as the import penetration deciles. The explanatory regressions reveal strong, significant, and consistent effects of higher import penetration in-line with the expectations espoused. That is, higher import penetration corresponds to troughs which are positive, significant, and increasing across deciles, as well as statistically different at the highest levels, relative to low deciles. These effects are robust across alternative shock series, consistent to considering only import penetration from 2008-2022, despite the leveling off of import penetration discussed by Autor, Dorn, and Hanson (2021), and are present across the responses of employment, wages, and establishments. As about 130 million people live in the highest decile of import penetration alone, these findings bear upmost importance for monetary and fiscal policymakers in designing optimal policy. Further, as central bankers look to understand and abate the persistent inflation from 2021 to present, the erosion of the firm-side interest rate channel certainly appears to be a component of this protracted inflation.

References:

Acemoglu, D., D. Autor, D. Dorn, G. H. Hanson, and B. Price (2016). Import Competition and the Great US Employment Sag of the 2000s. Journal of Labor Economics 34(S1), S141–S198.

Autor, D., D. Dorn, and G. H. Hanson (2021). On the Persistence of the China Shock. Working Paper 29401, National Bureau of Economic Research.

Jordà, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. American Economic Review 95(1), 161–182.

Acknowledgements: I would like to extend my sincere gratitude to my advisor Neville Francis for supporting me and pushing me to develop the thesis throughout this process. I also want to thank Klara Peter for her invaluable help while writing this thesis, especially in providing more recent data to ensure robustness and relevance of the results. Finally, I would like to express my appreciation for the constant feedback, support, and solidarity of the rest of the thesis cohort throughout the entirety of the writing of this paper.

Contact: Tommy Decker tdecker921@gmail.com