Oligopolies, Prices, Output, and Productivity

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Abstract

American industries have grown more concentrated over the last forty years. In the absence of productivity innovation, this should lead to price hikes and output reductions, decreasing consumer welfare. Using public data from 1972-2012, I use price data to disentangle revenue from output. Difference-in-difference estimates show that industry concentration increases are positively correlated to productivity and real output growth, uncorrelated with price changes and overall payroll, and negatively correlated with labor's revenue share. Productive industries (with growing oligopolists) expand real output and hold down prices, raising consumer welfare, while maintaining or reducing their workforces, lowering labor's share of output.

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Does America have a monopoly problem? Market power within narrowly defined industries has risen over last forty years. Various papers have systematically and comprehensively laid out the implications of concentration on profits, productive factors, and markups.[1] However, research has not systematically measured consumer welfare and prices, a first order concern for antitrust authorities (Shapiro, 2010).[2] In the simplest economics examples (Tirole, 1988), monopolies charge higher prices and restrict output, maximizing profits and reducing consumer welfare. However, monopolies could be caused by innovation from "superstar" firms or scale economies, leading to falling prices or increased output (Tirole, 1988; Armstrong and Porter, 2007). After showing that gains in market concentration are highly correlated with productivity improvements, I test the relationship of prices, quantities, and market concentration across the vast majority of the US economy. I then link these changes on the consumer side to productivity and labor shares.

I directly quantify how changes in industry concentration in the medium to long-run are related to changes in prices and real output by combining price data with revenue data.[3] A 10% increase in the market share of the four largest firms is correlated with a 1% increase in real output. Finding that higher output, but not price, is linked with higher concentration rates, I turn to the role of productivity. Industries with the most real productivity growth (as opposed to revenue-based productivity)[4] are those with the largest increases in industry concentration. A 10% increase in the market share of the largest four firms is linked to a 1.6% increase in labor productivity. With both industry concentration and productivity, output growth is not accompanied by payroll growth. Growing monopolists and oligopolists are able to produce more output with fewer, but higher paid workers. A 10% increase in the market share of the largest four firms is correlated with a 1.3% decrease in the labor's share of revenue.[5]

Research investigating consumer surplus generally addresses three main questions. First, has consumer surplus fallen over time? Second, could current consumer surplus be higher? Third, what does the future hold? This paper aids in answering the first question on a systematic, economy-wide basis. The second question often requires detailed modeling of supply and demand and has been done for selected industries, but lacks economy-wide coverage. In particular, if new technologies create natural monopolies, is there a role for regulation and intervention? Monopolies may pass the benefits from technical innovation as profits, partially offsetting increases in markups. As market power is related with real productivity improvements, this paper leads credibility to this story. The third (and perhaps most important) question primarily lies in the realm of speculative analysis, paving the way for future work.

[1] See Autor et al. (2017); Barkai (2016); Furman and Orszag (2015); Grullon et al. (2016); Gutiérrez and Philippon (2017); De Loecker and Eeckhout (2017); White and Yang (2017).

[2] Markups are relevant to consumer welfare, but if only paired with marginal and average cost data. See De Loecker and Eeckhout (2017) for detailed markup data.

[3] What does it mean for output expansion without falling prices? There are a few simple and consistent stories. Marginal cost reductions may be correlated with increases in demands. For example, an increase in demand enlarges the total market, allowing for new natural monopolies. Additionally, changes in marginal cost could be linked with unobservable quality, inducing demand.

[4] I primarily consider real labor productivity for data availability reasons; however, the Appendix shows results are robust to considering total factor productivity.

[5] Without considering general equilibrium effects, the net effect of oligopoly growth appears to be Pareto improving. This is distinct from Pareto optimal; there may be further Pareto gains from regulating a natural monopoly and redistributing the gains.

The results from this paper tie directly with a large and growing body of literature and public discussion.[6] The rising trend toward monopolization has been linked to the growth of superstar firms, declining labor compensation (Furman and Orszag, 2015; Autor et al., 2017; Azar et al., 2017), and increased profits (Barkai, 2016). This missing link in this literature comes from the focus on upstream factor markets, not on downstream customers. This paper explicitly considers prices and uses this price data to disentangle revenue and real output, allowing consumer welfare comparisons. This approach considering prices and output is complementary with Barkai (2016) and Autor et al. (2017), which use the similar datasets to fully describe trends in labor shares.[7] Peltzman (1977) runs a similar analysis, but focuses solely on manufacturing sector from 1947 through 1967. De Loecker and Eeckhout (2017) use data on publicly traded companies to show that markups have increased, but cannot link this to prices. This paper is highly amenable with higher markups, as that could indicate large fixed costs that reduce marginal production costs. In contrast, Gutiérrez and Philippon (2017) find that declining competition may be responsible for reduced levels of investment.[8]

The finding that productivity and oligopoly are intertwined is related to the discussion of both the business dynamics of the US economy (Decker et al., 2016) and the proliferation of automatization (Acemoglu and Restrepo, 2016, 2017). Industries that become more productive require fewer workers. Industries that become monopolies hire fewer workers. This paper adds to the discussion by finding that these two set of industries are largely identical. Productivity (and the automatization, computerization, and the robotics that underpin it) enhancements do not appear 'free' and exogenous. Improvements are much more common in industries that move towards higher levels of monopolization. This paper cannot assign causality. Does productivity improvement lead to higher market shares, or does higher market shares lead to productivity investments? If productivity enhancements require large sunk costs, such as employing more expensive workers and building up intellectual property, this may prevent entry of new firms. Karabarbounis and Neiman (2013) point out that the decline in labor share can be accounted by the decline in the price of capital, but is there a minimum efficient scale to use this capital?[9]

Additionally, there have been many case studies that focus on the role of industry concentration, prices, outputs, consumer welfare, and innovation. In the 1950s, cross-industry analysis of profit rates and market concentration was formalized by Bain (1951); however, this literature suffered from measurement and endogeneity issues[10] and was supplanted by "New Industrial Organization (IO)." (Bresnahan, 1989; Sutton, 1991). Forming the bulk work in recent empirical industrial organization, "New IO" did away with cross-industry analysis and placed more structure on individual industries to understand the interaction of market power, profits, and consumer welfare.[11]

[6] For example: Porter (2016) and The Economist (2016).

[7] Autor et al. (2017) performs similar analysis on productivity just within the manufacturing sector and finds broadly comparable results. Azar et al. (2017) finds that wages fall with industry concentration (monopsony). We do not find this due to likely compositional shifts. The authors control for worker types (especially geography), we consider the average wage paid across all workers. Individual worker pay may fall, but there may be a shift to different worker types/

[8] Gutiérrez and Philippon (2017) show that investment is negatively correlated with market share, but do not consider if higher investment led to higher market shares in the first place.

[9] In the medium run explored in this paper, the change in the price of capital is largely constant between industries - and therefore cannot be recovered in a difference-in-difference framework.

[10] See Schmalensee (1989) and Peltzman (1977).

[11] See Armstrong and Porter (2007).

A recent and complementary literature also addresses market concentration from both international trade and macroeconomic perspectives (Mongey, 2016; Head and Spencer, 2017; Hottman et al., 2016).[12]

A new series of papers have aimed at directly understanding the results of the aggregate trend of consolidation on various outcomes. Antón et al. (2016); Azar et al. (2016a,b) shows that prices and executive wages increase due to corporate ownership concentration. Within wholesale trade, Ganapati (2016) shows that while market concentration and prices may both increase, downstream customers may still benefit as higher operating profits cover substantial fixed costs to improve customer experiences and increase total overall sales. Results from these studies are mixed and likely also suffer from various forms of publication bias. Looking solely at price, Kwoka Jr (2012) performs a meta-analysis using results from a series of retrospective merger reviews and finds that there is a small average increase in price following mergers. However, that analysis is limited by the prior studies drawn on and the low number of mergers studied[13]. Blonigen and Pierce (2016) show that mergers do not seem to improve firm productivity. I consider aggregate market power expansion, which often occurs naturally, as opposed to through M&A behavior.[14]

I describe the data in Section 1, before considering the relationship of changes in market concentration to economic outcomes in Section 2. I consider the role played by productivity in Section 3 before concluding.

1 Data

Data comes from three main data sources. First, the U.S. Census Bureau's Economic Censuses (EC), conducted ever five years from 1997 to 2012, provide market concentration figures by North American Industry Classification System (NAICS) codes. The same surveys from 1972-1992 compiled data by Standard Industry Classification (SIC) codes. Second, the Manufacturing Industry Database compiled jointly by the National Bureau of Economic Research and the U.S. Census Bureau's Center for Economic Studies (NBER-CES) provides detailed manufacturing industry statistics, including both input and output price levels. Third, for non manufacturing industries, the U.S. Bureau of Economic Analysis (BEA) provides price index and output volume data from 1977 to 2012. All data, including market shares and prices, refer to domestic producers. While manufactured goods prices may have fallen in aggregate (Feenstra and Weinstein, 2017), I focus on the price of domestically produced goods and follow the international trade literature in assuming there is imperfect substitutability between foreign and domestically produced goods.[15]

[12]Mongey (2016) uses a general equilibrium model to understand the role of market power on monetary policy. Head and Spencer (2017) argue for the return to oligopolistic competition in analysis of international trade. Hottman et al. (2016) show significant departures from monopolistic competition models for the largest firms in retail purchase datasets.

[13]48 data-points over 40 years.

[14]Two classic examples are Walmart and Amazon, who primarily grew through organic growth,

[15]Robustness checks from the Appendix adds four further data sources, covering international trade, hourly wages, and regulatory barriers. I directly control of import penetration and the growth of China following permanent normalization of trade relations. Imports have the expected effect, lowering prices, output, workers and wages. Additionally the baseline results hold when dropping all manufacturing sectors.

While firm sales are relatively straightforward to compute, market shares are more difficult to construct. One must identify competitors/industries, allow for companies to compete in multiple segments, and account for varying substitution margins between firms and markets. To simplify the analysis, industry definitions follow those computed by the US Census, across all establishments of all firms within a particular NAICS or SIC code. Industries are defined at the 6-digit NAICS level and at the 3 or 4-digit SIC level (depending on historical data availability). I measure market concentration using the aggregate market shares of the four largest firms by revenue (following Autor et al. 2017).

This combined dataset has market concentration, revenues, prices indices, employment, and payroll by industry every five years. I then derive real output, labor productivity, average wage and labor's share of revenue from these initial data points. This covers the majority of the U.S. private sector, with over 75% of gross output in 2012. I measure revenues shares using gross output and productivity as gross output per worker (following Decker et al. 2016). See Appendix A for a fuller summary. The appendix considers alternative measures for productivity (total factor productivity and hourly gross output) and for market shares (the Herfindahl-Hirschman index and manufacturing import shares)

1.1 Concentration Trends

The largest firms have grown disproportionately in size over the last forty years. Figure 1 shows the average market share growth of the largest four firms (4-Firm Share) across industries in five year intervals. For example, between 1997 and 2002, the largest four firms increased their market share by an average of 2.5 percent. Data for 1992-1997 is unavailable due to a change in the U.S. Census Bureau's industry classification system. If changes in this time period are recovered through interpolation, the market share of the largest four firms in the average industry increased nearly 10 percentage points from 1977-2012, reaching nearly 40% by 2012. I refer the reader to Autor et al. (2017) for a fuller description of this trend.

2 Market Concentration and Outcomes

Baseline regressions are of the following form:

$$\Delta_5^{s,t} \log\left(X_{it}\right) = f_x\left[\Delta_5^{s,t} \log\left(Concentration_{it}\right)\right] + \epsilon_{it}$$

Observations are indexed by industry i and year t. $Concentration_{it}$ denotes the market concentration of industry i at time t. The residual ϵ_{it} reflects any residual unexplained variation and measurement error. Outcome variables X come from the following interlinked outcomes of

economic interest:

$$\begin{aligned}
\Delta_5^{s,t} \log\left(Price\right) & \\
\Delta_5^{s,t} \log\left(Real\ Output\right) &= \Delta_5^{s,t} \log\left(Revenue/Price\right) \\
\Delta_5^{s,t} \log\left(Labor\ Productivity\right) &= \Delta_5^{s,t} \log\left(Real\ Output/Employees\right) \\
\Delta_5^{s,t} \log\left(Average\ Wage\right) &= \Delta_5^{s,t} \log\left(Wages/Employees\right) \\
\Delta_5^{s,t} \log\left(Employees\right) &= \Delta_5^{s,t} \log\left(Quantity/Labor\ Productivity\right) \\
\Delta \log\left(Payroll\right) &= \Delta_5^{s,t} \log\left(Average\ Wage \times Employees\right) \\
\Delta_5^{s,t} \log\left(Wage\ Share\right) &= \Delta_5^{s,t} \log\left(Wages/Revenue\right)
\end{aligned}$$

The operator $\Delta_5^{s,t}$ performs multiple functions, it takes a five year difference of the variables and demeans variables by top-level sector and year. The five-year time difference reflects medium-run changes and reflects data availability. Sectors s refer to top-level NAICS and SIC codes.[16] This controls for aggregate inflation and growth, as well as secular sectoral effects (such as the relative growth of healthcare and the relative decline in manufacturing). The non-parametric functions $f_x\left(\cdot\right)$ are identified off a difference-in-difference form. This form is convenient as it is (a) parsimonious, (b) requires only publicly available data, and (c) allows for simple decompositions and extensions.

The primary issue to running regressions that directly test their relationships is that prices and quantities are equilibrium objects. Shifts in both supply and demand can alter both variables (Schmalensee, 1989). Lacking straightforward exogenous shifters of market concentration, these regressions are presented as correlational and are not used to calculate any counterfactual (which likely would need (a) macroeconomic effects and (b) detailed modeling of both the supply and demand sides).

The various relationships summarized by the function $f\left(\cdot\right)$ are illustrated in Figure 2. Outcomes can be simply summarized: increases in industry concentration are significantly correlated with higher output, higher revenue, higher labor productivity, average wages, and lower labor income shares. Monopolization is not correlated with significant changes in prices, employment, or aggregate payroll. Specifically a 10% increase in the market share of the largest four firms leads to 1% increase in output, flat prices, 2% increase in labor productivity, 0.5% increase in wages, 0.5% decrease in employment, flat total payroll, and 1% decrease in labor's share of output.

The choice of four firm concentration shares and real labor productivity are motivated by data availability. Alternative measures of productivity on a smaller sample of industries, such as using hours worked or total factor productivity yield similar results. Alternative measures of concentration, such as the Herfindahl–Hirschman Index, yield similar results. Additionally simplified regressions where $f\left(X\right) = \alpha X$ are conducted with industry-clustered standard errors, with similar results. See the appendix for details.

Two endogeneity concerns warrant further discussion. First, a negative demand shock could lead to higher concentration and lower prices. In light of the expansion in output, this seems

[16] Such as manufacturing, retail, wholesaling, etc.

improbable. An ideal dataset would include a true demand instrument, however in the appendix I control for pre-trends in demand by including lagged output and a one-period change in lagged output. Results are largely unchanged. Second, a productivity shock may be driving these results. As shown in the baseline results in Figure 2, productivity is highly correlated with market concentration. Omitting productivity in the baseline results would lead to potentially misleading results. Growth in output may not be due to oligopoly growth; the true underlying factor may be productivity growth.

3 Productivity

The third panel of Figure 2 highlights the strong relationship between productivity and market concentration. To investigate, I rerun a similar specification as before, but now use:

$$\Delta_5^{s,t} \log(X_{it}) = f_x \left[\Delta_5^{s,t} \log(Labor\ Productivity_{it}) \right] + \epsilon_{it}$$

The variables X represent real output, prices, payroll, mean wages, employees, and labor share. The results are presented in Figure 3. All relationship are similar to those for market concentration, but magnified and precise. Higher labor productivity is correlated with higher output, lower prices, constant payroll, higher wages, fewer employees, lower labor shares.[17]

To better compare these relationship between productivity and market concentration, I run regressions of the form:

$$\Delta_5^{s,t} \log(X_{it}) = \alpha_1 \left[\Delta_5^{s,t} \log(Concentration_{it}) \right] + \alpha_2 \left[\Delta_5^{s,t} \log(Labor\ Productivity_{it}) \right] + \gamma Z + \epsilon_{it},$$

where Z is a vector of top-level sector-year fixed effects. For comparability, concentration and productivity are standardized by subtracting means and dividing by their standard errors. Results are presented in Table 1. Assuming away measurement error, it appears that almost the entirety of the correlation of market concentration and the other observed market outcomes is absorbed by productivity. There is a small positive correlation between prices and market concentration, but as shown in Figure 2, this is completely offset in aggregate as growth in productivity is highly correlated with concentration.[18] However both market concentration and productivity are measured with error, preventing a true disentangling of market power and productivity.[19] Over the last 40 years, productivity growth has been intrinsically tied with the rise of monopolies and oligopolies.

[17] As with before, alternative measures of productivity on a smaller sample of industries, such as using hours worked or total factor productivity yield similar results. See the appendix for results.

[18] Assuming away measurement error, this means there is a small negative effect of monopoly, a one standard deviation increase in monopoly power offsets 1/5 of the price decrease from a one standard deviation increase in productivity. How should a observer interpret this? The most pessimistic reading is that after controlling for productivity, monopolies do increase prices. But this argument assumes that all other conditions including productivity remain constant. In the light of the close linkage of productivity and concentration, this seems untenable. In Table 5 in the appendix, looking at only non-manufacturing firms that account for over 80% of the economy, this link between price and industry concentration vanishes.

[19] As shown in the appendix, measures of regulation seem to be uncorrelated with either productivity or market power.

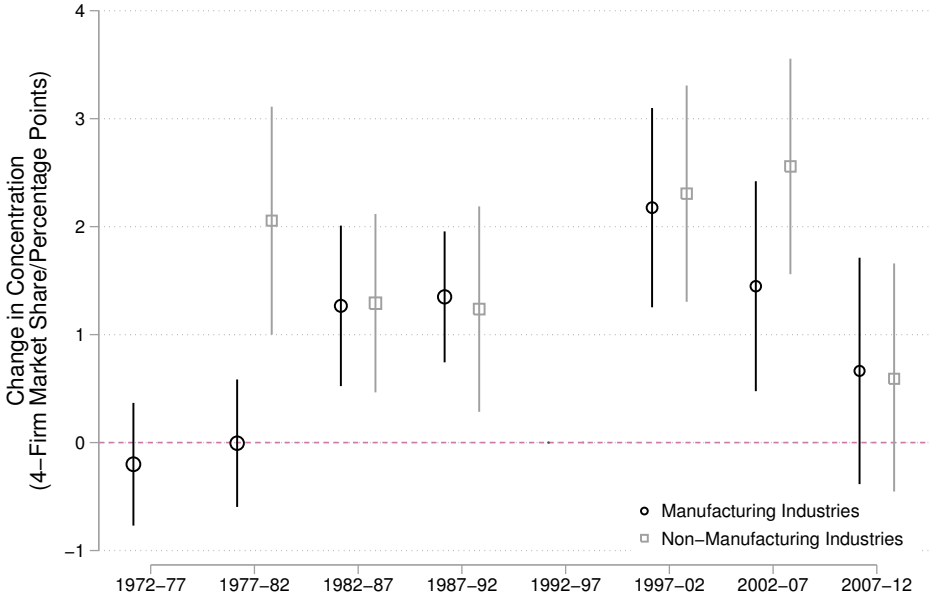
4 Discussion

This paper aims to provide another piece of evidence in the ongoing debate over increases in market power. Industry concentration that is driven by the very largest firms should theoretically lead to higher prices and lowered output in the absence of true productivity innovation. However, concentration increases do not correlate to price hikes and correspond to increased output. This implies that oligopolies are related to an offsetting and positive force - these oligopolies are likely due to technical innovation or scale economies. My data suggests that oligopolies are strongly correlated with innovations in productivity.

These price and quantity regressions are purely within-industry results and lack causality. They may suffer from omitted variable biases. Results are from 5-year difference-in-difference estimates and assume away general equilibrium effects. However, they show clear patterns between prices, quantities, productivity, and market concentration. Many - if not most - industries could be developing new and novel economies of scale. In retail, Walmart (Holmes, 2011) and Amazon (Houde et al., 2017) both exploit economies of scale to lower their marginal cost and increase market shares. While market power may increase, consumers benefit in the short to medium run through price reductions and real choice increases.[20] On the other hand, these effective firms do not expand their workforces, creating more while holding payroll constant.

[20]For an international trade context, see Atkin et al. (2015).

Figure 1: Average Change in Market Share of 4-Largest Firms over 5-year intervals



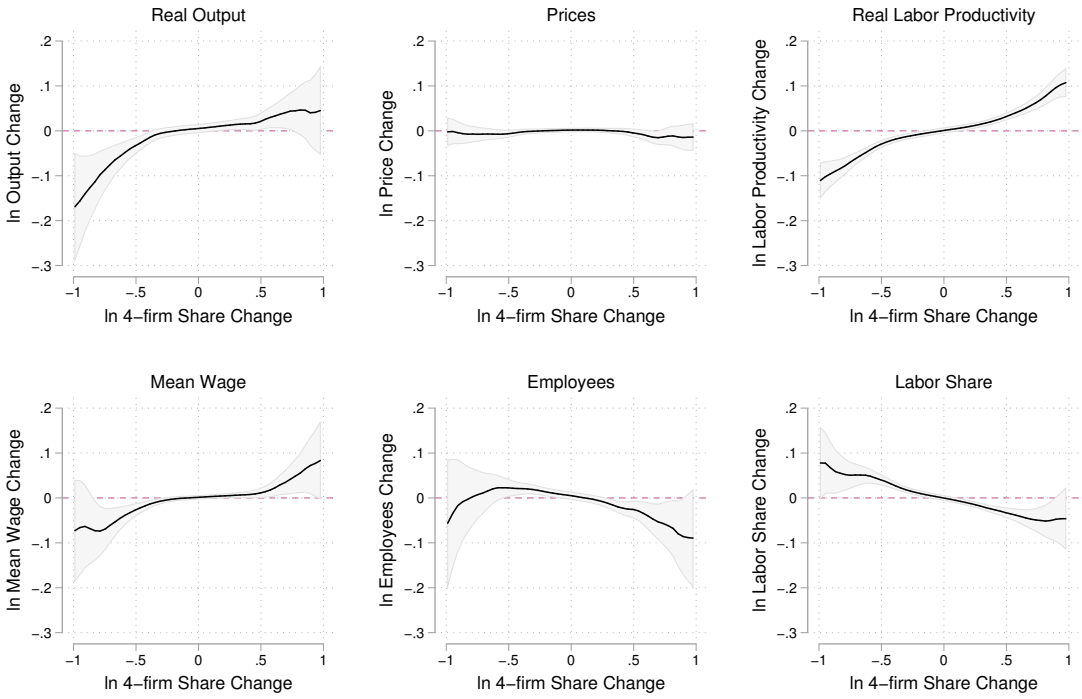
Notes: Results from a regression of change in 4-firm concentration shares by time period. From 1972-1992, average of 4-digit SIC codes for manufacturing industries and lowest levels of aggregation for non-manufacturing industries (A mixture of 3 and 4 digit SIC codes). From 1997 onwards, average of 6-digit NAICS codes for all industries. Data for non-manufacturing firms in 1972 is incomplete. Data from 1992 and 1997 are from non-comparable industrial classification systems.

Table 1: Market Concentration and Productivity Regressions

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.00230	0.00992***	0.00763	0.206***
	(0.00474)	(0.00253)	(0.00564)	(0.0276)
Std Δ Ln Productivity	0.159***	-0.0520***	0.107***	
	(0.0116)	(0.00746)	(0.0120)	
r2	0.331	0.588	0.311	0.151
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	-0.00452	-0.00230	-0.00682	-0.0144*
	(0.00745)	(0.00474)	(0.00868)	(0.00660)
Std Δ Ln Productivity	0.0543***	-0.0543***	-0.0000528	-0.107***
	(0.0111)	(0.0116)	(0.00826)	(0.0100)
SectorYearFE	X	X	X	X
N	4349	4349	4349	4349
r2	0.378	0.195	0.238	0.417

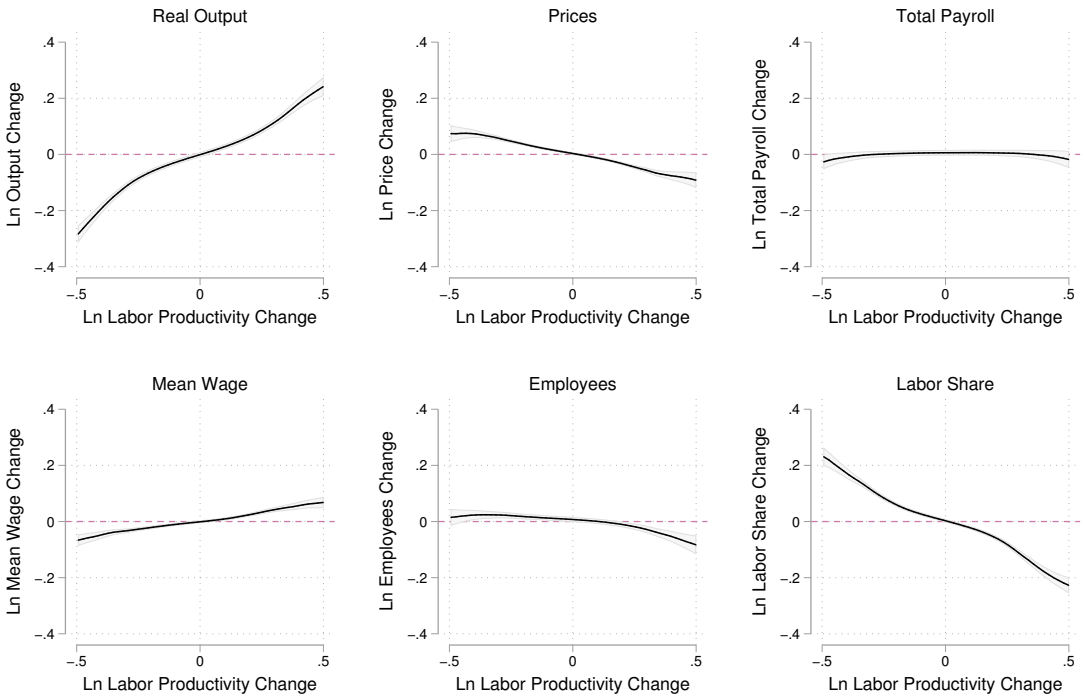
Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data

Figure 2: Correlation of Economic Outcomes to Market Concentration



Notes: Results from a non-parametric regression of 5-year changes change in the combined market share of the four largest firms by time period using residuals after demeaning for year-sector means. For example, the first panel roughly implies that a 1 standard deviation increase in market concentration is correlated with to 0.1 standard deviation increase in real output. From 1972-1992, data uses 4-digit SIC codes for manufacturing industries and lowest levels of aggregation for non-manufacturing industries (A mixture of 3 and 4 digit SIC codes). From 1997 onwards, 6-digit NAICS codes for all industries. Data from 1992 and 1997 are from non-comparable industrial classification systems.

Figure 3: Correlation of Economic Outcomes to Labor Productivity



Notes: Results from a non-parametric regression of 5-year changes in labor productivity using residuals after controlling for year-sector means. From 1972-1992, data uses 4-digit SIC codes for manufacturing industries and lowest levels of aggregation for non-manufacturing industries (A mixture of 3 and 4 digit SIC codes). From 1997 onwards, 6-digit NAICS codes for all industries. Data for non-manufacturing firms in 1972 is incomplete. Data from 1992 and 1997 are from non-comparable industrial classification systems.

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Appendix

A Data Appendix

For data from 1972-1992, the US Census does not publish statistics using a unified SIC system (the exception being in the Manufacturing sector, where in 1992 the Census published a retrospective tabulation unifying past SIC codes). There are two regimes, a 1972 system and a redefinition in 1987, with minor modification in between. Similarly, from 1997-2012 the US Census does not publish statistics using a unified NAICS system, with each of the 1997, 2002, 2007 and 2012 EC using a slightly different variation of NAICS codes. As this paper uses this publicly available data,[21] I do not merge or alter the Census defined markets and base the analysis on consistently defined SIC/NAICS codes.[22] Market shares cannot be computed in real units of output, so they are computed using the revenue share of all the facilities a given firm operates within a SIC/NAICS category within the United States. the U.S. Bureau of Economic Analysis (BEA) provides price index and output volume data from 1977 to 2012.[23]

Price indices and supply side controls for manufacturing data are drawn from the NBER-CES database in 4-digit SIC basis before 1997 and in 6-digit NAICS basis after 1997.[24] Price indices for non-manufacturing data come from BEA tables at the most disaggregate level of aggregation provided. As prices and quantities also reflect overall macroeconomic inflation and growth, the analysis in the next section will include year fixed effects and sectoral trends. All of these measured prices are derived from underlying data collected primary by the Bureau of Labor Statistics for the creation of producer and consumer price indices.

Table 3 shows the coverage of the data used from 1972 through 2012. There is continuous coverage for the manufacturing sector over the entire time period at an high level of detail. Coverage is at the 4-digit SIC and 6-digit NAICS levels. Coverage for non-manufacturing sectors is spottier. For wholesale and retail trade, coverage is from 1977 through 2012. However, this is at a higher level of aggregation than the manufacturing sector. From 1982 through 1992, this is at the 3-4 digit SIC level. From 1997 through 2012, this is at the 4-6 digit NAICS level. This level of aggregation is due to the limited availability of consistent price indices at finer levels

[21] See Ganapati and Greaney (2017) for analysis using a harmonized NAICS codes as published by Fort and Klimek (2016); results are stable to NAICS codes changes. In general, releasing additional, harmonized market share data from Census and administrative US sources is difficult, as disclosure would likely reveal confidential sales and revenue data for the largest firms.

[22] For example, from 1997-2007, the Census published statistics for NAICS industries "311222 Soybean processing" and "311223 Other oilseed processing" separately. In 2012, the Census combined these two industries into a new industry "311224 Soybean and other oilseed processing". I do not merge market share statistics for these two industries and treat them separately. This has the practical effect of decreasing the number of usable observations and increasing the number of industry fixed effects.

[23] This data is not originally collected by the BEA; rather, the BEA aggregates Census and Bureau of Labor Statistics data to produce aggregated and consistent statistics. Prices are simply official government statistics, based on weighed prices, observed and collected by the Bureau of Labor Statistics. This is in contrast with the exact price indices in macroeconomic, international trade, and industrial organization models that can directly measure welfare under sets of modeling assumptions.

[24] The NBER-CES data is currently only updated through 2011. I use values from 2011 NBER-CES database to correspond to the 2012 EC. Result are robust to the omission of 2012 data.

of aggregation. Service data exists from 1977 through 2012. For 1977 and 1982, the data only covers personal (as opposed to business services) at the 3-4 digit SIC level. For 1982 and 1993, the data covers both personal and business services at the 3-digit level. From 1997 onwards, the data covers all services at the 4, 5 or 6-digit NAICS level. From 1977 through 1992, some transportation sectors (such as those related to automotive transport) and communication sector (such as mass media) data are included in the Service Economic Censuses at the 3-digit SIC level. From 1997 onwards, these sectors, joined by the Utilities and Finance are included at the 3- or 4-digit NAICS levels.

For the manufacturing sector under both SIC and NAICS codes, I add import and export data using concordances from Feenstra (1996, 1997); Pierce and Schott (2009) to better understand the role of import competition. To further consider this role, I directly use the timing of the normalization of trade with china (PNTR) from Pierce and Schott (2016) to look at a exogenous supply shock. To better decompose the difference between the number of hours worked and the number of employees, I add in number of worker hours by industry from the Bureau of Labor Statistics. Lastly for regulation, I use the RegData 3.0 database that quantifies the number of federal regulations pertaining to a NAICS sector by year. The database runs a machine learning algorithm on the entire corpus of federal regulation appearing the the Federal Register from 1970-2016. I consider the change in the number of "Industry Relevant Regulations" at the 6-digit NAICS level.

Table 2: Summary statistics

Variable	Mean	(Std. Dev.)	N
4-Firm Concentration	36.2	(21.9)	4349
log(4-firm Concentration)	3.3	(0.8)	4349
log(Output)	13.7	(2.2)	4349
log(Price)	1.7	(2.2)	4349
log(Revenue)	15.4	(1.6)	4349
log(Labor Productivity)	7.8	(5.6)	4349
log(Mean Wage)	3.4	(0.6)	4349
log(Employees)	5.9	(4.1)	4349
log(Payroll)	9.3	(4.2)	4349
log(Labor Share)	-6.1	(3.4)	4349
4-factor TFP index 1997=1.000	1	(0.3)	2743
8-Firm Concentration	47	(24.9)	4336
50-Firm HHI	756	(688.5)	1234
log(Mean Wage)	3.4	(0.6)	4349
log(Capital Price)	1.4	(2.1)	3937
Hourly Labor Productivity	11.2	(1.7)	3046
log(Hourly Pay)	3.6	(2.1)	3046
log(Labor Hours)	3.5	(1.3)	3046
Import Penetration	0.2	(0.2)	2426
Federal Industry Regulations	23458.1	(40917.6)	2229

Table 3: Industry Coverage for both Price Indices and Concentration Statistics

	1972	**1977**	**1982**	**1987**	**1992**	**1997**	**2002**	**2007**	**2012**
Classification			SIC				NAICS		
Agriculture and related									
Mining									
Construction									
Manufacturing	X	X	X	X	X	X	X	X	X
Transportation		Partial	Partial	Partial	Partial	X	X	X	X
Communication		Partial	Partial	Partial	Partial	X	X	X	X
Utilities						X	X	X	X
Wholesale trade		X	X	X	X	X	X	X	X
Retail Trade		X	X	X	X	X	X	X	X
Finance, Insurance and Real Estate						X	X	X	X
Services		Partial	Partial	X	X	X	X	X	X

B Results Robustness Appendix

Non-manufacturing Sector Only: See Table 4 for a replication of the baseline tables, subset to only non-manufacturing firms. Manufacturing data may be contaminated by import data (see table 8 for a comparison) and is therefore hard to directly compare.

Using 50-firm Herfindahl-Hirschman index (HHI) Market Shares (Manufacturing sector only): See Table 5 for a replication of the baseline tables, using the Herfindahl-Hirschman index (HHI) computed using the 50 largest firms

Controlling for Material and Capital prices: See Table 6 for a replication of the baseline tables, controlling for input price indices in both materials and capital.

Using TFP (Manufacturing sector only): See Table 7 for a replication of the baseline tables using total factor productivity instead of labor productivity.

Using Hourly Productivity: See Table 8 for a replication of the baseline tables using hourly employee productivity instead of labor productivity.

Including Imports (Manufacturing sector only): See Table 9 for a replication of the baseline tables controlling for import shares and exogenous changes in PNTR status. Import share is computed as $\frac{imports}{domestic+imports}$. PNTR status comes from Pierce and Schott (2016). It is important to note here that the output prices and market concentrations are for domestic production only.

Including Regulation: See Table 10 for a replication of the baseline tables controlling observed federal regulations.

Controlling for Demand Pre-trends: See Table 11 for a replication of the baseline tables controlling for both lagged production and lagged production growth rates.

Table 4: Only Non-Manufacturing Firms

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.0477***	-0.00421*	0.0435***	0.233***
	(0.0123)	(0.00181)	(0.0124)	(0.0454)
r2	0.138	0.461	0.185	0.150
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.00596	-0.0126	-0.00660	-0.0501***
	(0.0165)	(0.00762)	(0.0162)	(0.0108)
SectorYearFE	X	X	X	X
N	1606	1606	1606	1606
r2	0.0952	0.148	0.185	0.135

(b) 4-Firm Market Shares & Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.00941	0.00111	0.0105	0.233***
	(0.00789)	(0.00238)	(0.00854)	(0.0454)
Std Δ Ln Productivity	0.164***	-0.0228***	0.141***	
	(0.0229)	(0.00506)	(0.0226)	
r2	0.339	0.498	0.335	0.150
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	-0.0180	0.00941	-0.00861	-0.0191
	(0.0141)	(0.00789)	(0.0166)	(0.0136)
Std Δ Ln Productivity	0.103***	-0.0941***	0.00862	-0.133***
	(0.0214)	(0.0229)	(0.0155)	(0.0210)
SectorYearFE	X	X	X	X
N	1606	1606	1606	1606
r2	0.267	0.225	0.186	0.375

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data

Table 5: Using 50-Firm Herfindahl-Hirschman index (HHI) Concentration Measures

(a) 50-Firm HHI

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 50-Firm HHI	0.00980	0.00613	0.0159	0.142***
	(0.0116)	(0.00544)	(0.0127)	(0.0323)
r2	0.0377	0.154	0.0852	0.0635
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 50-Firm HHI	0.00881**	-0.0205	-0.0117	-0.0276***
	(0.00298)	(0.0107)	(0.0118)	(0.00534)
SectorYearFE	X	X	X	X
N	1150	1150	1150	1150
r2	0.0422	0.0168	0.0195	0.206

(b) 50-Firm HHI & Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 50-Firm HHI	-0.0172	0.0177***	0.000476	0.142***
	(0.0107)	(0.00412)	(0.0129)	(0.0323)
Std Δ Ln Productivity	0.190***	-0.0814***	0.109***	
	(0.0134)	(0.0168)	(0.0227)	
r2	0.257	0.329	0.144	0.0635
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 50-Firm HHI	0.00581	-0.0172	-0.0114	-0.0119**
	(0.00307)	(0.0107)	(0.0120)	(0.00436)
Std Δ Ln Productivity	0.0211***	-0.0229	-0.00187	-0.110***
	(0.00406)	(0.0134)	(0.0151)	(0.0147)
SectorYearFE	X	X	X	X
N	1150	1150	1150	1150
r2	0.0941	0.0210	0.0196	0.451

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data

Table 6: Controlling for Factor Input Prices

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.0365***	0.000813	0.0373***	0.226***
	(0.00746)	(0.00154)	(0.00744)	(0.0218)
S.log(Material Price)	0.0116	0.732***	0.744***	-1.497***
	(0.0914)	(0.0732)	(0.117)	(0.319)
S.log(Capital Price)	-0.0177	0.0691	0.0514	-0.821
	(0.120)	(0.0557)	(0.106)	(0.555)
r2	0.118	0.641	0.265	0.202

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.0133***	-0.0116*	0.00167	-0.0356***
	(0.00192)	(0.00552)	(0.00572)	(0.00404)
S.log(Material Price)	0.0415**	0.330***	0.372***	-0.372***
	(0.0153)	(0.0921)	(0.0945)	(0.0437)
S.log(Capital Price)	0.0501	0.157	0.207*	0.156*
	(0.0364)	(0.114)	(0.104)	(0.0706)
SectorYearFE	X	X	X	X
N	3937	3937	3937	3937
r2	0.556	0.172	0.258	0.248

(b) 4-Firm Market Shares & Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.00254	0.0131***	0.0105	0.226***
	(0.00573)	(0.00194)	(0.00621)	(0.0218)
Std Δ Ln Productivity	0.173***	-0.0543***	0.118***	
	(0.00917)	(0.00612)	(0.00978)	
S.log(Material Price)	0.270**	0.651***	0.921***	-1.497***
	(0.0912)	(0.0584)	(0.132)	(0.319)
S.log(Capital Price)	0.124	0.0244	0.149	-0.821
	(0.107)	(0.0405)	(0.110)	(0.555)
r2	0.317	0.705	0.343	0.202

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.00625***	-0.00254	0.00371	-0.00684**
	(0.00173)	(0.00573)	(0.00596)	(0.00226)
Std Δ Ln Productivity	0.0312***	-0.0402***	-0.00904	-0.128***
	(0.00386)	(0.00917)	(0.00984)	(0.00585)
S.log(Material Price)	0.0882***	0.270**	0.358***	-0.563***
	(0.0167)	(0.0912)	(0.0970)	(0.0526)
S.log(Capital Price)	0.0756**	0.124	0.200	0.0512
	(0.0276)	(0.107)	(0.104)	(0.0470)
SectorYearFE	X	X	X	X
N	3937	3937	3937	3937
r2	0.599	0.185	0.259	0.614

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data

Table 7: Controlling for Total Factor Productivity (Manufacturing Only)

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.0304***	-0.000775	0.0296***	0.0850*
	(0.00667)	(0.00157)	(0.00695)	(0.0406)
r2	0.120	0.512	0.231	0.0394
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.0107***	-0.0209*	-0.0103	-0.0337***
	(0.00220)	(0.00898)	(0.00963)	(0.00422)
SectorYearFE	X	X	X	X
N	2743	2743	2743	2743
r2	0.676	0.0785	0.252	0.189

(b) 4-Firm Market Shares & Total Factor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.00669	0.00955**	0.0162	0.0850*
	(0.00860)	(0.00346)	(0.0101)	(0.0406)
Std Δ Ln TFP	0.153***	-0.0687***	0.0846*	
	(0.0433)	(0.00985)	(0.0346)	
r2	0.327	0.622	0.309	0.0394
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.0105***	-0.0250**	-0.0145	-0.0308***
	(0.00220)	(0.00887)	(0.00952)	(0.00386)
Std Δ Ln TFP	0.00138	0.0486	0.0500	-0.0346***
	(0.00262)	(0.0256)	(0.0278)	(0.00771)
SectorYearFE	X	X	X	X
N	2743	2743	2743	2743
r2	0.676	0.112	0.278	0.234

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data

Table 8: Use Hourly Measures of Productivity

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.0304***	-0.000775	0.0296***	0.204***
	(0.00667)	(0.00157)	(0.00695)	(0.0294)
r2	0.120	0.512	0.231	0.0938
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.00862**	-0.0160	-0.00739	-0.0327***
	(0.00310)	(0.00823)	(0.00809)	(0.00380)
SectorYearFE	X	X	X	X
N	3045	3045	3045	3045
r2	0.496	0.116	0.260	0.216

(b) 4-Firm Market Shares & Hourly Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.00457	0.0172***	0.0126	0.204***
	(0.00795)	(0.00290)	(0.00907)	(0.0294)
Std Δ Ln Productivity	0.131***	-0.0687***	0.0621***	
	(0.00705)	(0.00781)	(0.0102)	
r2	0.274	0.629	0.288	0.0938
	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	-0.00198	-0.00457	-0.00655	-0.0192***
	(0.00273)	(0.00795)	(0.00818)	(0.00315)
Std Δ Ln Productivity	0.0521***	-0.0562***	-0.00416	-0.0662***
	(0.00501)	(0.00705)	(0.00804)	(0.00540)
SectorYearFE	X	X	X	X
N	3045	3045	3045	3045
r2	0.594	0.154	0.260	0.369

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data

Table 9: Controlling for Import Penetration (Manufacturing Only)

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.00412	0.00861	0.00449	0.193***
	(0.0177)	(0.00741)	(0.0186)	(0.0513)
S.log(Import Penetration)	-3.074***	-0.326	-3.400***	-2.122*
	(0.473)	(0.247)	(0.495)	(1.079)
PNTR Status x Post 1999	-0.238**	-0.0946**	-0.332***	0.503**
	(0.0827)	(0.0335)	(0.0913)	(0.182)
r2	0.242	0.152	0.302	0.0726

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.0120**	-0.0452**	-0.0333*	-0.0377***
	(0.00448)	(0.0144)	(0.0156)	(0.00858)
S.log(Import Penetration)	-0.205**	-2.622***	-2.827***	0.573***
	(0.0724)	(0.409)	(0.416)	(0.163)
PNTR Status x Post 1999	0.0569***	-0.345***	-0.288***	0.0443
	(0.0156)	(0.0755)	(0.0760)	(0.0361)
SectorYearFE	X	X	X	X
N	1002	1002	1002	1002
r2	0.0642	0.260	0.259	0.201

(b) 4-Firm Market Shares & Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.0403**	0.0244***	-0.0160	0.193***
	(0.0147)	(0.00661)	(0.0185)	(0.0513)
Std Δ Ln Productivity	0.188***	-0.0816***	0.106***	
	(0.0107)	(0.0202)	(0.0223)	
S.log(Import Penetration)	-2.675***	-0.500*	-3.175***	-2.122*
	(0.406)	(0.212)	(0.497)	(1.079)
PNTR Status x Post 1999	-0.332***	-0.0535	-0.385***	0.503**
	(0.0749)	(0.0329)	(0.0889)	(0.182)
r2	0.478	0.330	0.363	0.0726

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.00891*	-0.0403**	-0.0314	-0.0155*
	(0.00452)	(0.0147)	(0.0160)	(0.00673)
Std Δ Ln Productivity	0.0159***	-0.0254*	-0.00945	-0.115***
	(0.00460)	(0.0107)	(0.0115)	(0.0175)
S.log(Import Penetration)	-0.171*	-2.675***	-2.847***	0.328
	(0.0670)	(0.406)	(0.412)	(0.217)
PNTR Status x Post 1999	0.0489***	-0.332***	-0.283***	0.102**
	(0.0146)	(0.0749)	(0.0756)	(0.0329)
SectorYearFE	X	X	X	X
N	1002	1002	1002	1002
r2	0.0960	0.266	0.260	0.465

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data, Pierce and Schott (2016, 2009); Feenstra (1996)

Table 10: Controlling for Measures of Federal Industry Regulation

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.0431***	0.00241	0.0455***	0.259***
	(0.00957)	(0.00206)	(0.00964)	(0.0301)
S.log(Regulations)	0.0981*	0.0268	0.125**	0.126
	(0.0398)	(0.0181)	(0.0408)	(0.126)
r2	0.140	0.202	0.197	0.200

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.0138***	-0.0120	0.00181	-0.0437***
	(0.00276)	(0.00698)	(0.00741)	(0.00581)
S.log(Regulations)	0.0135	0.0712*	0.0846**	-0.0402
	(0.00908)	(0.0304)	(0.0309)	(0.0247)
SectorYearFE	X	X	X	X
N	2229	2229	2229	2229
r2	0.157	0.226	0.252	0.258

(b) 4-Firm Market Shares & Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.000606	0.0153***	0.0147	0.259***
	(0.00718)	(0.00335)	(0.00844)	(0.0301)
Std Δ Ln Productivity	0.169***	-0.0499***	0.119***	
	(0.0111)	(0.0111)	(0.0151)	
S.log(Regulations)	0.0767*	0.0331	0.110**	0.126
	(0.0304)	(0.0176)	(0.0356)	(0.126)
r2	0.339	0.313	0.284	0.200

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.00537*	-0.000606	0.00477	-0.00995**
	(0.00255)	(0.00718)	(0.00784)	(0.00362)
Std Δ Ln Productivity	0.0326***	-0.0440***	-0.0114	-0.130***
	(0.00539)	(0.0111)	(0.0121)	(0.00979)
S.log(Regulations)	0.00933	0.0767*	0.0861**	-0.0237
	(0.00867)	(0.0304)	(0.0307)	(0.0171)
SectorYearFE	X	X	X	X
N	2229	2229	2229	2229
r2	0.241	0.241	0.253	0.598

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data, Mercatus Center

Table 11: Controlling for Lagged Demand and Pre-trends

(a) 4-Firm Market Shares

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	0.0331***	0.00144	0.0346***	0.200***
	(0.00915)	(0.00187)	(0.00946)	(0.0305)
L.log(Output)	0.00730	0.00144	0.00875	-0.00559
	(0.00499)	(0.00256)	(0.00556)	(0.0188)
LS.log(Output)	0.0999*	-0.0191	0.0808*	-0.0261
	(0.0394)	(0.0123)	(0.0392)	(0.0840)
r2	0.138	0.408	0.155	0.159

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.0139***	-0.00957	0.00432	-0.0303***
	(0.00409)	(0.00621)	(0.00657)	(0.00600)
L.log(Output)	-0.000971	0.00849*	0.00752	-0.00122
	(0.00196)	(0.00418)	(0.00432)	(0.00327)
LS.log(Output)	0.0103	0.105**	0.116**	0.0350*
	(0.0100)	(0.0384)	(0.0391)	(0.0147)
SectorYearFE	X	X	X	X
N	2770	2770	2770	2770
r2	0.371	0.152	0.215	0.117

(b) 4-Firm Market Shares & Labor Productivity

	Δ Ln Output	Δ Ln Price	Δ Ln Revenue	Δ Ln Labor Productivity
Std Δ Ln 4-Firm Share	-0.00256	0.0107***	0.00815	0.200***
	(0.00635)	(0.00279)	(0.00751)	(0.0305)
Std Δ Ln Productivity	0.178***	-0.0462***	0.132***	
	(0.00868)	(0.00732)	(0.0122)	
L.log(Output)	0.00830*	0.00118	0.00948	-0.00559
	(0.00406)	(0.00240)	(0.00521)	(0.0188)
LS.log(Output)	0.105**	-0.0203	0.0842*	-0.0261
	(0.0380)	(0.0109)	(0.0394)	(0.0840)
r2	0.371	0.480	0.270	0.159

	Δ Ln Mean Wage	Δ Ln Employees	Δ Ln Payroll	Δ Ln Labor Share
Std Δ Ln 4-Firm Share	0.00551	-0.00256	0.00295	-0.00520
	(0.00312)	(0.00635)	(0.00664)	(0.00373)
Std Δ Ln Productivity	0.0418***	-0.0350***	0.00679	-0.125***
	(0.00728)	(0.00868)	(0.00987)	(0.00925)
L.log(Output)	-0.000738	0.00830*	0.00756	-0.00192
	(0.00171)	(0.00406)	(0.00432)	(0.00250)
LS.log(Output)	0.0114	0.105**	0.116**	0.0317*
	(0.00962)	(0.0380)	(0.0392)	(0.0124)
SectorYearFE	X	X	X	X
N	2770	2770	2770	2770
r2	0.433	0.164	0.215	0.459

Notes: Robust standard errors clustered on BEA industry codes. Observations at the NAICS 6-digit level for 1997-2012 and at the SIC 3 and 4-digit level for 1972-1992. Data from 1992 and 1997 are from non-comparable industrial classification systems. Market shares and productivity changes are standardized by subtracting means and dividing by standard errors. Sources: Author's Calculations based on US BEA, BLS, Census, NBER-CES data,