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The industrial Midwest, sometimes referred to disparagingly as the "Rust Belt," has long been recognized as a distinct economic region and an important contributor to the US economy. Prior research has emphasized the role that losses in the manufacturing sector have played in the plight of several Midwestern states and cities, particularly in the late 1970s and early 1980s. We identify a hypothetical industrial heartland region consisting of MSAs that have high concentrations of 1969 earnings in manufacturing relative to the US average and that are located within the geography often associated with the Rust Belt. For comparison purposes we also identify a set of manufacturing-intensive MSAs outside the region and a set of MSAs with low manufacturing concentrations (service-intensive MSAs). We then identify cross-sectional correlations in the economic performance of MSAs during and following losses in manufacturing employment and evaluate whether the industrial heartland region has a distinct response to those losses. We identify two major shocks to manufacturing employment: 1979 to 1983 and 2001 to 2010. While the second episode was slower to develop, the employment losses in manufacturing that were sustained during it are nearly as large as in the first episode. The size of manufacturing loss is reliably correlated across MSAs during and following these two manufacturing shocks with measures of economic performance including nonmanufacturing employment, unemployment, population, and per capita income levels. In addition, we find that manufacturing employment losses typically are associated with larger declines in economic performance in the MSAs of the industrial heartland than in other manufacturing-intensive MSAs or in service-intensive MSAs. Despite substantially lower shares of employment and earnings of manufacturing within the industrial heartland in 2001, the effect of the second manufacturing employment shock is substantial (particularly for real per capita income).

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Introduction

The Rust Belt has attracted a substantial amount of attention in the popular press and in many political campaigns as a manufacturing region in a substantial decline. Sean Safford (2009) suggests that the term entered widespread use “during the presidential campaign of 1984 when Walter Mondale criticized Ronald Reagan for turning the industrial Midwest into a ‘rust bowl’.” The economic decline of the region has been covered in several popular accounts including Longworth (2009) and Vance (2016). Of course, in order for the rust belt to develop there had to be a significant concentration of manufacturing activity in the region to lose. Krugman (1991) notes that “US manufacturing was concentrated in a relatively small part of the Northeast and the eastern part of the Midwest. This manufacturing belt took shape in the second half of the nineteenth century, and proved remarkably persistent.” Teaford (1993) notes that even during the nineteenth century manufacturing was shifting west from where it had originally developed on the east coast, particularly for heavier categories of manufacturing. This trend was accelerated by the growth of the auto industry in the early twentieth century. While manufacturing came to be part of the character of the region, this concentration of manufacturing made the region particularly susceptible to later changes in trade and technology that impacted employment.

This paper constructs an “industrial heartland” region based on the popularly defined geographical boundary along with 1969 data on MSA levels of concentration in manufacturing. We estimate the economic performance of the region and compare it to other MSAs, both manufacturing-intensive MSAs and MSAs with below-average concentrations in manufacturing (service-intensive MSAs). There are very stark differences evident among these MSAs, with service-intensive MSAs generally showing higher employment, population, and often income growth than manufacturing-intensive MSAs, and the other manufacturing-intensive MSAs in turn outperforming the MSAs of the industrial heartland. These differences suggest it will be worthwhile to examine the role of manufacturing employment losses on outcomes, with a focus on two periods in which manufacturing losses are large and outcomes in these groupings of MSAs are distinctly different.

Prior research has focused on the performance of this region (and closely analogous locations) during the very large manufacturing shocks that occurred in the late 1970 and early 1980s, notably Blanchard and Katz (1992) and Feyer, Sacerdote, and Stern (2007). We reexamine this period, but also identify a similarly large shock to manufacturing employment beginning in 2001. In both periods a strong cross-sectional correlation between shocks to manufacturing and the economic outcomes of MSAs is evident. The recent literature on the local labor market effects of trade and technology (among other examples, Autor et al., 2013, and Acemoglu and Restrepo, 2017) has called attention to the potential differential effects based on the technologies employed, which are likely to vary regionally. Given the ongoing interest in this region and its long-standing and ongoing connection to manufacturing, it is valuable to reexamine the effects of manufacturing job losses in the industrial heartland.

The focus of this paper is on evaluating and measuring economic performance of the industrial heartland and other regions at the MSA level. We examine the responses of nonmanufacturing employment, unemployment, population, and per capita income levels to manufacturing job losses around two major shocks to manufacturing: 1979 to 1983 and 2001 to 2010. While the second episode of manufacturing employment losses was slower to develop, employment losses in the sector are nearly as large. The size of the manufacturing losses is reliably correlated to economic outcome measures across MSAs during and following these two manufacturing shocks. We then examine whether the impacts of manufacturing employment shocks are larger or smaller in the industrial heartland than in our two comparison groups of MSAs. We find substantial and statistically reliable cross-sectional patterns in the economic performance measures of interest during and following both manufacturing shocks. There also seem to be potentially larger effects in the region that we identify as the industrial heartland. Finally, despite substantially lower shares of employment and earnings of manufacturing within the industrial heartland in 2001, the effects of the second manufacturing employment shock are substantial (particularly for real per capita income).

2.0 Previous literature

The region we look to define in this paper as the industrial heartland is not an officially designated Census region. It incorporates most of the "East North Central" Census division, although Southern Illinois, Southern Indiana, and the Upper Peninsula of Michigan were more focused on mining and agriculture in 1969. Conversely, other areas seem quite similar and are frequently included in discussions of the region, such as Pittsburgh and some of the upstate New York cities (Buffalo and Rochester), even though the states in which these cities are located are in the Middle Atlantic Census division. The industrial heartland is similar but not identical to regions studied in earlier works. Meyer (1989) and Krugman (1991) examine the rise of the "manufacturing belt," defining it in terms of a dense concentration in heavy manufacturing dating from the late 19th and early 20th centuries. The locations cited in these papers are consistent with the MSAs of the industrial heartland except the industrial heartland excludes the cities east of the Appalachian Mountains, which in many cases had different industrial focuses. Our list of industrial heartland MSAs is also consistent with the more historical account of the development of the "industrial Midwest" in Jon Teaford (1993) and also the historical account of the use of the "Rust Belt" as a regional definition in High (1997). Finally, accounts of the economic development of the United States draw attention to the region, noting that "…[s]patial redistribution of the manufacturing sector is one of the most important developments in the twentieth-century United States…" Heim (2000). More recent analyses of Rust Belt effects also require definitions, although they tend to focus on convenient grouping of states, for example, Faberman (2002) or Alder, Lagakos, and Ohanian (2014). While no particular definition appears to dominate in the literature, there are many common features in prior definitions, and the industrial heartland region roughly accords with the literature.

The performance of the region, broadly and variously defined, has been an active research focus. Alder, Lagakos, and Ohanian (2014) apply a general equilibrium model to identify factors underlying the weak performance of Rust Belt states. The focus of this research is on the average productivity of manufacturing in the region, and while their research is related to this work, our model will imply cross-sectional patterns of growth rather than examine the patterns over the episodes of manufacturing job loss. Pendall, Poethig, Treskon, and Blumental (2017) examine the performance of Great Lakes states since 2000 and project performance going forward. Their results are similar to the trends shown in Section 5, but these authors focus more on mobility and population counts rather than the cross-sectional patterns of manufacturing job losses and growth within the region. This paper is most related to the examination of the decline in manufacturing in the late 1970s and early 1980s by Blanchard and Katz (1992), where they employ panel data to model the joint fluctuations of employment, unemployment, wages, and prices at the state level. They find reliable patterns of swift recovery in unemployment and a more gradual recovery in per capita incomes, while employment losses are essentially permanent. By drawing attention to the effective adjustments that had been made to large shocks in the Rust Belt states, Blanchard and Katz's work helped to shape the view that mobility allows effective adjustments to regional shocks in the United States. Feyer, Sacerdote, and Stern (2007) examine similar issues using county and MSA data but use cross-sectional variation in performance during and in a fixed period following the sharp downturn in the steel and auto industries. Our analysis follows the general approach of Feyer, Sacerdote, and Stern (2007) but examines both manufacturing shocks and directly explores the potential for the industrial heartland region to have distinct effects associated with the shocks.

Finally, there is the growing literature that examines the effects of trade and technology by exploiting variation in local labor markets' exposure to affected manufacturing activities and employment. This literature provides an interesting background for the patterns of manufacturing job loss seen in the two episodes that are the focus of this paper and some of the associated impacts. Autor, Dorn, and Hansen (2013) show significant employment, population, and per capita income effects for commuting zones based on their exposure to trade with China. Acemaglu and Restrepo (2017) show similar effects on local labor markets associated with the use of industrial robots between 1990 and 2007. Research on the causes of local labor market employment losses, particularly in manufacturing, are very interesting, but we will have nothing to add on the sources of job losses, as the job loss that is the outcome of these analyses is our explanatory variable. If mobility is incomplete and potentially varies regionally, then impacts of trade and technology can have meaningfully different impacts, as these papers tend to show. That makes the issue of this research still relevant as an effort to measure how effectively local labor markets do or do not adjust over time and to evaluate the potential for regional variation in outcomes beyond the differential impacts associated with varying levels of manufacturing job loss.

3.0 Data sources

In order to define regions that cut across state boundaries and include only parts of states, not entire states, this analysis focuses on metropolitan statistical areas (MSAs). The Bureau of Economic Analysis provides most of the data series we require at an annual frequency from 1969 to 2015, using counties aggregated to 2010 MSA definitions. This includes employment in manufacturing, overall employment levels, the share of local earnings derived from manufacturing, population counts, and per capita personal income levels. The BEA data may be suppressed if the numbers pertain to few employers, but applying broad industries at the MSA level of analysis relatively few cells are undisclosed. In these cases, we treat the MSA observation as missing and report the regressions and averages for the smaller sample.

One complication in these data series is the change from the SIC coding system to NAICS in 2000. This change appears to cause a discrete shift down in the number of manufacturing jobs and in the amount of earnings associated with manufacturing in most MSAs. For example, the manufacturing share of earnings in the average MSA on a NAICS basis was 9.6% lower in 2000 than had been reported on an SIC basis for 1999. While most MSAs saw a sizable decrease in the share of their earnings associated with manufacturing after the transition to the NAICS coding, there are several MSAs that actually saw increases. To avoid drawing inappropriate conclusions about the declining size of the manufacturing sector, the change in coding is clearly shown in all charts where it could be relevant, and the statistical analysis does not use any differences that span the 1999 to 2000 coding transition. The statistical analysis uses both manufacturing definitions, but none of the measured log changes in manufacturing (or nonmanufacturing employment) span the coding change.

The data on unemployment rates come from the Bureau of Labor Statistics. The currently published BLS unemployment rates at the MSA level only go back to 1990. The BLS also provided us with data from 1976 to 1999 that is no longer published because of incompatibilities with the current approach to unemployment statistics, along with a description of known problems in the data. Most of the problems cluster around years where new Census population estimates are adjusted or when MSA boundaries are adjusted. We examined the data for anomalous movements in population-focused statistics, such as the employment level, to identify possible breaks. Individual cases with large movements in population associated with sharp unemployment rate movements are treated as missing observations. With a few exceptions, unemployment rates looked stable across points where population adjustments caused other problems. We believe this is due to population factors canceling out in the unemployment rate, so we only use unemployment rates from this dataset. This does limit our ability to discuss participation margins that Feyer, Sacerdote, and Stern (2007) consider.

4.0 Defining the region

There is no official definition of the Rust Belt or the industrial heartland despite abiding interest in the topic. Reasonable representations can be found for the region, but there are subtle differences in where the lines are drawn. We adopt and make more specific various accounts of the region, including Safford's (2009) definition: "… an area of the United States spreading from New York through Pennsylvania and Ohio and on to the shores of Lake Michigan… known for a proliferation of rusting factories, declining home prices, population loss, high unemployment, and general economic malaise."[1] The MSAs we include are located in this region and generally have higher concentrations of 1969 earnings in manufacturing than the US average. Because we

[1] Sean Safford (2009) page 3.

are focused on a Midwestern or "heartland" concept, we do not include cities to the east of the Appalachian Mountains, although we do include both upstate New York industrial cities and western Pennsylvania. The western boundary is indefinite, with many accounts including St. Louis. We include St. Louis as well as smaller downstate Illinois cities that were manufacturing intensive in 1969. We exclude some the smaller MSAs on the fringes of the area, which seemed more connected to sectors other than manufacturing. Figure 1 shows the included MSAs in our working definition of the industrial heartland.[2]

Using this simple definition of the industrial heartland, 64 of the nation's 382 MSAs are included. Only two of these 64 MSAs received a lower share of their 1969 earnings from manufacturing than the national average for MSAs in 1969, which stood at 34.8%: Terre Haute, Indiana (32.5%) and Wheeling, West Virginia (31.1%). We include both of these cities as they are central to most descriptions of the region and they did have significant manufacturing employment. The appendix table lists the MSAs in the industrial heartland along with their 1969 (SIC basis) and 2015 (NAICS basis).

For comparison purposes we split the remaining 318 MSAs into two categories based on whether the share of their 1969 derived manufacturing was above or below the national average. There were 95 MSAs outside of the industrial heartland that had shares of earnings from manufacturing above the national average. These we call "other manufacturing-intensive MSAs." In this analysis, these areas represent a set of MSAs similarly exposed historically to

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[2] While some counties that currently have substantial manufacturers are excluded from this definition, we are aiming for a 1969 definition. Because today's MSA boundaries include many counties that were previously viewed as mostly rural the level of concentration in the early period is probably understated. Using MSAs instead of counties also avoids most nondisclosure problems. BEA data outside metropolitan areas is more frequently subject to nondisclosure rules which suppress employment figures when there are only a small number of employers in a given industry.

manufacturing declines but which are by definition outside of any purely regional impacts associated with the industrial heartland. Finally, the remaining 223 MSAs are identified as "service-intensive MSAs." These MSAs had concentrations in manufacturing below the national average and they lie outside the industrial heartland region. While identified as service-intensive to distinguish the grouping, these MSAs could have concentrations in any number of nonmanufacturing sectors, including mining, construction, and government. Due to the large number and sizes of the MSAs, this aggregate category is closer to the national average.

Figure 2 shows the evolution of the share of manufacturing earnings in the three regions. While the industrial heartland almost always has the highest share of earnings derived from manufacturing, the share has declined from about 45% (SIC coding) in 1969 to under 20% after 2009 (NAICS). Other manufacturing-intensive MSAs have nearly as high an average manufacturing concentration throughout the period and, in the end, are essentially at the same level of concentration as the industrial heartland. Service-intensive MSAs generally have about half the level of earnings coming from manufacturing as the average of industrial heartland MSAs. While the switchover to NAICS coding certainly appears to affect each series, the longer-run trends are clear before and after the coding shift.

5.0 Manufacturing employment losses and patterns in industrial heartland economic performance

As figure 2 shows, manufacturing has been steadily and persistently declining as a share of earnings for the past three decades in all of our three MSA categories. However, assessing the importance of manufacturing to regional economies by studying earnings shares hides sharper changes in employment because periods with sharper losses affect earnings from other sectors as well.

Total manufacturing employment levels in the three regions, shown in Figure 3, reveal more dramatic changes in the location of manufacturing employment.[3] In 1969, the MSAs of the industrial heartland had a population of 40.6 million, or about a quarter of the MSA-resident population of the United States, and of those 40.6 million, 5.7 million were employed in manufacturing, accounting for about a third of manufacturing employment in metropolitan areas. By comparison, the population of other manufacturing-intensive MSAs was 37.2 million, of which 5.2 million were employed in manufacturing, while the service-intensive MSAs were far larger with a population of 97.0 million, of which 6.3 million were manufacturing employees. From 1979 to 1983, manufacturing employment in the industrial heartland declined by 1.2 million jobs. Declines in the other two categories of MSAs occurred but were considerably smaller. A second major decline in manufacturing employment occurred from 2001 to 2010, and while this episode was longer than the first and the decline in manufacturing employment occurred more slowly, the loss in manufacturing jobs in the industrial heartland also accumulated to 1.2 million. Because manufacturing employment was smaller in the second episode, the decline in manufacturing employment represents a larger share of the region's manufacturing employment but a smaller share of its overall employment. Large declines in manufacturing also occurred during this second period in the two comparison sets: 1.2 million in other manufacturing-intensive MSAs and 1.5 million in the service-intensive MSAs.

Figure 3 also shows that the episodes were characterized by distinct patterns of recovery. After the first episode of manufacturing job losses, few manufacturing jobs returned to the industrial heartland, but the other two categories of MSAs recovered more of the manufacturing

[3] In all of these comparisons current MSA boundaries are used, so many counties are included in metropolitan areas that would have been considered rural in 1969. This has the effect of expanding the metropolitan population numbers in the early periods and lowering aggregate manufacturing intensity, but it enables consistent comparisons across time.

jobs they had lost. This period represented a significant regional shock that was balanced largely within the United States. In contrast, the employment losses were more generally shared in the second episode, and while we have less time in which to evaluate the recovery process, it appears to be a little stronger in the industrial heartland.

The cross-sectional patterns within these changes will be the sole source of independent variation in our statistical analysis. Before turning to a statistical analysis of economic performance measures, it is helpful to review the relative patterns of economic performance in these three categories of MSAs to see the scale and timing of the changes.

5.1 Nonmanufacturing employment

The decline in manufacturing employment has affected nonmanufacturing employment, but the impact is significantly different across the three categories of MSA. Figure 4 shows that nonmanufacturing employment has been growing far faster in areas that were historically less focused on manufacturing. Because the overall employment levels are far higher in the service-intensive MSAs, all three series are indexed to their 1969 level in Figure 4. In addition, nonmanufacturing employment in the industrial heartland clearly grew more slowly (up just about 50% in 48 years) than in other manufacturing-intensive MSAs. During both periods of manufacturing loss, nonmanufacturing employment growth looks to have slowed more in the industrial heartland. This is particularly evident in the 1979 to 1983 period, when nonmanufacturing employment declined in the industrial heartland, while the other two categories of MSAs actually experienced gains in nonmanufacturing employment despite the back-to-back recessions in the period.

5.2 Unemployment rates

One of the strong conclusions of the prior research by Blanchard and Katz (1992) and Feyer, Sacerdote, and Stern (2007) is that regions faced with large unemployment shocks in the United States are able through the reactions of households to achieve unemployment rates typical of the nation within a brief recovery period. This tendency is very evident in Figure 5, which plots labor-force-weighted unemployment rates for the three categories of MSAs beginning in 1976 when the BLS estimates are first available. The average unemployment rate in the industrial heartland peaked at 11.9% in 1984, but 5 years later it was back down to the pre-shock level of 6.0%. This was still 1.6% higher than the average unemployment rate in other manufacturing-intensive MSAs and 0.8% higher than in service-intensive MSAs. It was not until the 1990-91 recession, which impacted these other regions to larger degree, that the unemployment rate in the industrial heartland dropped below the unemployment rates in the other two categories of MSAs. The second period of manufacturing employment loss initially coincided with an expansionary period, which resulted in a falling unemployment rate in the industrial heartland. The rate declined more slowly than in the other MSA categories and was several tenths higher when the 2007-9 recession started. During the recession, unemployment reached 10.3% in the industrial heartland and was still higher than in the other categories of MSAs. In the subsequent recovery unemployment rates in the industrial heartland declined sharply and were quite close to those of the other MSA categories by 2015.

5.3 Population

Among the basic indicators of the success of a region is its attractiveness for population growth, but population movements are also a primary mechanism for unemployed households to respond to persistent employment shocks. Prior research has highlighted the role of population growth as a mechanism for adjustment but has not directly measured the impact on the industrial heartland. Accounting for differently sized starting populations, the values shown in Figure 6 are indexed to their 1969 levels. Figure 6 shows that trend population growth has differed across the three categories of MSAs, with service-intensive MSAs doubling in population and the industrial heartland's population rising only 12% above its 1969 level. Very weak population gains are not a reflection of manufacturing-intensive MSAs in general, as the population in other manufacturing-intensive MSAs increased 52%. The other pattern notable in Figure 6 is a population decline following the 1979 to 1993 manufacturing shock in the industrial heartland. The industrial heartland population series shows a local peak in 1979 at 41.4 million and then declines 1% by 1986. After this point, the population gradually rises in the industrial heartland including during the second major period of manufacturing job loss.

5.3 Per Capita Income

Per capita income represents a clear connection to the prosperity of households that remain in the region. Manufacturing employment shocks might be expected to impact the income of affected communities, but the adjustment response after the shock might also alter the average income based on the new mixture of available jobs and the composition of the workforce. Figure 7 shows the average per capita personal in 2015 dollars for the three categories of MSAs.[4]

The long-term pattern of income growth by MSA type is striking. In 1969, the per capita income levels of the three categories of MSAs are remarkably equivalent. Despite the historical reputation for manufacturing centers as high income, this did not appear to be the case as a general rule, even if some MSAs of the industrial heartland (Chicago, Detroit, Cleveland, and Rochester) did rank among the highest 10 percent of US MSAs for per capita income levels.

[4] Series deflated using the BLS annual CPI series.

Each category of MSA has both high and low income MSAs in 1969. By 2015, industrial heartland MSAs have a clearly lower real per capita income level, and only Chicago ranks in the top 10 percent of MSAs for per capita income.

The industrial heartland income gap opened up most substantially from 2001 to 2008, but there were clear differences in outcomes across regions throughout the period from 1969 to 2015. The initial manufacturing employment shock's impact on per capita incomes in the industrial heartland is also evident, if smaller. During the longer period, both the industrial heartland and the other manufacturing-intensive MSAs, along with service-intensive MSAs to a lesser degree, saw declines in per capita income with the back-to-back recessions, but the recovery in the industrial heartland did not keep up with the other manufacturing centers. Interestingly, in the early 1990s, incomes grew more rapidly in the industrial heartland and caught up with incomes in the other manufacturing-intensive MSAs. This pattern ended in the late 1990s when the gap between the industrial heartland and other regions began to open up. Real per capita income levels in the industrial heartland were on average lower in 2005 than they were in 2000. Following the Great Recession, real per capita income levels in the industrial heartland were again lower than they were in 2000. While per capita incomes have grown following the Great Recession, the gap between the industrial heartland and the other MSAs has not meaningfully closed.

6.0 Measured impacts of two episodes of manufacturing decline

The regressions in this paper follow the spirit of Feyer, Sacerdote, and Stern (2007). They examine the average response of a variety of economic performance indicators (employment, nonmanufacturing employment, unemployment rates, population, and real per capita income) to a specific manufacturing shock, in our case measured by the log change in manufacturing employment. Separate regressions are run for the period during which manufacturing declines are high, a five-year period following the shock, and the period combining the shock and the recovery. In general, the regressions have the following form, with observations at the MSA level:

$$\boldsymbol{D\ log\ Y_t = \alpha_t + \beta_t D\ log\ M_{t=s} + regional\ controls}\ \Bigg|\ \boldsymbol{t = \begin{Bmatrix} s = shock\ period \\ r = 5\ yr\ recovery \\ e = shock\ and\ recovery \end{Bmatrix}}$$

These regressions use the cross-sectional variation in the change in manufacturing employment to predict the change in a given economic indicator in each MSA, at this point with no distinction as to whether the MSA is in the industrial heartland or not. For the initial regression Census divisions are used to control for general regional patterns, following Feyer, Sacerdote, and Stern (2007).

Table 3 shows regression results for the first manufacturing shock, 1979 to 1983,[5] for nonmanufacturing employment, unemployment, population, and real per capita income. Like prior research on the Rust Belt, we find significant effects of the manufacturing shock on all variables of interest during the shock and recovery period. Manufacturing shocks impact nonmanufacturing employment at roughly a 20% level (a coefficient of 0.21). Unemployment rates were boosted in proportion to manufacturing losses (a coefficient of -0.08), while population (0.15) and income (0.15) decline proportionally with the manufacturing losses during the shock period. Also as in prior research, we find offsetting unemployment effects in the recovery period (0.06), despite ongoing losses of nonmanufacturing employment (0.19) and continuing, if diminished, income effects (0.04) during the recovery period. The adjustment that

[5] Feyer, Sacerdote, and Stern (2007) use a slightly longer period. The results of our regressions are very similar with the longer period, but after examining the manufacturing data nationally and in the industrial heartland, we determined that the sharp decline in manufacturing is better dated as starting in 1979.

prevents unemployment from staying higher appears to occur through weaker population growth that is larger during the recovery period than in the initial shock (0.21 versus 0.15 during the shock period, which is a statistically significant difference given the standard errors). Effects over the full episode show a reduced impact of the manufacturing shock on unemployment, but as of 1988 there are still clear impacts of the manufacturing decline on the cross-sectional economic performance of all MSAs. These effects would be larger in the industrial heartland given the average size of the manufacturing shock in the different MSAs.

When the second manufacturing shock hits in 2001, the share of income derived from manufacturing (as measured in NAICS) is now roughly half the value recorded before the start of the first shock in each category of MSA (Figure 2). That would certainly suggest reduced impacts to declines in manufacturing employment, along with the longer period of the shock, which might allow more adjustment to occur in the "shock period." The coefficients in Table 4 are in fact somewhat smaller, but the general pattern is maintained. Nonmanufacturing employment is reduced about 10% in proportion to the manufacturing shock (coefficient of 0.10), with similar initial impacts on population (0.08) and real per capita income (0.11). In contrast to first manufacturing shock, the estimates of the recovery period effects are all smaller than those of the shock period. Nonmanufacturing employment and incomes are not substantially lower for impacted MSAs during the recovery period, and the bounce back in unemployment is enough to more than offset the initial rise (a coefficient of 0.02). Population continues to decline relative to the general trend (a coefficient of 0.05) in places that experienced the manufacturing shock. The effects across the MSA types are essentially zero for unemployment over the full episode, but nonmanufacturing employment, population, and real per capita income are substantially lower in impacted areas following the second manufacturing shock.

The estimates in Tables 3 and 4 look for equivalent effects of manufacturing job loss (and gain) in both MSAs with and without prior manufacturing concentrations, but Figures 3 to 7 suggest the possibility of differential outcomes depending on whether the MSA is in the industrial heartland and whether the MSA was or was not manufacturing-intensive in 1969. Tables 5 and 6 alter the regression by interacting the coefficient on the manufacturing shock with indicators for the industrial heartland, manufacturing-intensive MSAs, and service-intensive MSAs. Because the industrial heartland MSAs are most of the east north central Census division's MSAs, we could not use Feyer, et al. controls, but it is still helpful to control for trends other than the manufacturing pattern. We added controls based on MSA-specific trends in the prior 5 years to account for other trends.[6] While not shown, the results of regressions with the new control strategy but no MSA-type interaction with the manufacturing shock are quite similar to the results shown in Tables 3 and 4[7]. In the more flexible form the regression equation becomes:

$$\boldsymbol{D\ log\ Y_t = \alpha_t + \beta_{ct}(I_c * D\ log\ M_{t=s}) + D\ log\ Y_{t=p}}\ \Bigg|\ \boldsymbol{t} = \left\{\begin{matrix} \boldsymbol{p = prior\ 5\ years} \\ \boldsymbol{s = shock\ period} \\ \boldsymbol{r = 5\ yr\ recovery} \\ \boldsymbol{e = shock\ and\ recovery} \end{matrix}\right\}$$

It is clear in Table 5 that the scale of effects is different in the three types of MSAs. The estimated effects are substantially larger in the industrial heartland than in both the manufacturing-intensive and service-intensive MSAs, The regressions have tightly estimated coefficients that make many of these differences in coefficients statistically significant as well.

[6] The log change over the five-year pre-periods is used for all variables except unemployment prior to the first shock because MSA unemployment rates are not available prior to 1976, so a three-year log change is used in that case.

[7]

On nonmanufacturing employment, the shock has an impact of 0.29 in the industrial heartland versus 0.22 in other manufacturing-intensive MSAs and 0.17 in service-intensive MSAs. The effects of manufacturing losses on unemployment rates, population, and income are also larger in the industrial heartland during the shock period. That said, it is informative that all of the coefficients remain statistically significant and of the same sign as the constrained regressions, implying that the overall patterns of outcomes following manufacturing losses (or, in relatively uncommon cases, gains) were associated with similar effects in each type of MSA. The effects on real per capita income in the recovery period are also similar although notably smaller and less precisely estimated. The average results for during, after, and the full episode will be examined in the next section, but the full episode effects (not shown) are generally a bit larger but similar.

The effects of manufacturing employment decline are also larger in the industrial heartland than in the other types of MSAs during the second manufacturing shock and nearly as large as the effects seen during the first manufacturing shock, with the notable exception of the unemployment rate. For example, the measured effect on nonmanufacturing employment has a coefficient of 0.23 during the second shock versus 0.29 during the first shock in the industrial heartland, and versus 0.12 and 0.06 for the second shock in the manufacturing-intensive and service-intensive MSAs, respectively. The change of the coefficients for population and real per capita income between the first and second manufacturing shocks in the shock period are not statistically significant in the industrial heartland. The differential effects are also large relative to the other manufacturing-intensive MSAs and service-intensive MSAs, both of which appear to see less of an impact from manufacturing loss in the second period. At the same time, the unemployment effects are substantially smaller in each type of MSA during the second manufacturing shock. The recovery results are also smaller and less precisely estimated, although generally in the same direction, following the second manufacturing shock.

7.0 Factors explaining post-shock economic performance

The regressions indicate important correlations between manufacturing decline and MSA outcomes and reveal that those correlations are larger at times in the industrial heartland. These results suggests that the two manufacturing shocks played a key role in affecting the time patterns of economic performance revealed in Figures 3 to 6. In order to assess the role of manufacturing on the average time patterns within the three MSA types, we compare the average changes in the data, with $\beta_t D\ log\ M_{t=s}$ from the simple model, with an equal manufacturing effect for all MSA types, with $\beta_{ct}(I_c * D\ log\ M_{t=s})$for the less-constrained model, along with the prediction from the unconstrained model incorporating prior trends. The two partial model estimates are adjusted to be comparable to the sample mean for comparison purposes, which in effect incorporates the aggregate time pattern implicit in the constant and dummy variables. This comparison is designed to reveal whether the variation in the included component can predict the time differences seen in the data, based on regressions that use only cross-sectional variation to identify the effects. Figure 8 shows these alternatives for total employment. In the regression section the focus was on nonmanufacturing effects in order to avoid double counting the shock in a nontransparent way, but at this point the effects on nonmanufacturing employment are clear, so we focus on the socially relevant total employment. The graph in the upper left panel of Figure 8 shows the average employment growth in the three types of MSAs during and after the manufacturing shock. The graph in the upper right is just Xβ for the manufacturing shocks from the simple model shown in Table 3. Accounting for cross-sectional variation in the manufacturing shock does a reasonable job of replicating the ordering of the effects, although it tends to mute the differences between the industrial heartland and service-intensive MSAs. Allowing for the effects of the manufacturing shock, not surprisingly, does let the model fit the industrial heartland and service-intensive MSAs better, as shown in the bottom left panel. In this panel, there is only a relatively small understatement of the effects on the industrial heartland. The final chart, bottom right, brings in the prior trend data into the predictions, which allows the model to get very close to the underlying data, although the overall pattern is fit remarkably well with just information on the manufacturing shocks. Overall, this sequence of predictions confirms that the cross-sectional variation in the manufacturing shock within the MSA types is consistent with the relative total employment trends of the MSA types during and after the first manufacturing shock.

This analysis of prediction patterns is extended to nonmanufacturing employment, population, and real per capita income in Figure 9. Unemployment effects are not shown because the time pattern is similar between MSA types, and differences are easily replicated with the relatively simple manufacturing effects model. The relatively good fit of relative employment trends based on cross-sectional variation is maintained when the focus is on the indirect employment shown by nonmanufacturing employment (in the first row), where both the simple model and the regional effects model are able to mimic the patterns in the raw data. The second row shows the predicted population effects, and while the manufacturing shock coefficients are statistically significant, they only replicate the general ordering of the population growth patterns, and leave other factors to explain the population losses seen in the industrial heartland. When pre-existing trends are included in the predictions (not shown), the model is able to essentially replicate the pattern seen in the data (left panel of the second row). These results suggest that only part of the MSA-type/regional migration patterns were driven by employment shocks, as pre-shock trends significantly altered the population shifts. The third row of Figure 9 examines the real per capita income effects, which again show substantial prediction differences across the categories of MSAs based on the variation within the MSAs in the size of the manufacturing shock. So while population shifts require a strictly regional source of variation, income effects seen in the industrial heartland, where they decline initially and bounce back in the recovery period, are more tightly connected to manufacturing shocks. The one category that the model fails to fully fit with the manufacturing shock is the strength in income growth during the recovery period seen in other manufacturing-intensive regions, even when manufacturing shock effects are allowed to vary by MSA type.

As the regression tables show, the estimates from the first and second manufacturing shocks are different. Figure 10 compares the predictions of restricted models with the underlying patterns by MSA type. In this case, while the ordering of the size effects can replicated with just the simple manufacturing shock model shown in the top right panel, the fit of these predictions does not reproduce the weakness in employment growth in the industrial heartland or the strength in service-intensive MSAs. Allowing the effects of the manufacturing shock to vary by MSA type (shown in the bottom left panel) improves the match with the changes seen in the data, but still leaves employment growth overstated in the industrial heartland.

The model does considerably better when the pre-period trends are accounted for as in the full predictions, as shown in the bottom right panel. So while the manufacturing shock has a statistically significant effect on total employment growth during and following the second manufacturing shock, it is necessary to include regional effects to match the relative outcomes on employment growth. Figure 11 shows the results for the other outcome measures excluding unemployment, and the time pattern is similar across the MSA types, although the shock and recovery effects are a little larger in the industrial heartland. The first row is very similar to total employment, which is not surprising given the low manufacturing share of employment at this time. Regional variation is necessary to mimic the patterns of relative employment growth, although the effects of the manufacturing shock do imply an ordering of employment growth. The population estimates, shown in row 2, show that the manufacturing shocks, while statistically significant in some cases, are unable to replicate the overall patterns of population growth across MSA types. The final row of Figure 11 is more interesting given the very large shift in income growth seen in Figure 7 for the industrial heartland starting with the second manufacturing shock. While the simple manufacturing shock model can get only the ordering of the income growth correct, allowing the effects of manufacturing shocks to vary by MSA type enables the model to replicate the relative levels of real per capita income growth. The cross-sectional variation with MSA types identifies a pattern that is ultimately able to fit the income growth seen across MSAs during and following the second manufacturing shock.

It is also worth noting that the income effects are still quite evident after 5 years of recovery. Looking at the first manufacturing shock period, Blanchard and Katz (1992) find a slower recovery of income than unemployment, but the recovery in income is well underway 5 years later. These estimates of the industrial heartland income effects are persistent at 5 years, as the recovery period does not show any substantial bounce back relative to the other MSAs.

8.0 Conclusion

Blanchard and Katz (1992) examined the Rust Belt around the time period that we refer to as the first manufacturing shock, 1979 to 1983, in their “Regional Evolutions” paper. Their time-series approach shows a reasonably smooth adjustment to a major employment shock primarily experienced in the states of the East North Central Census division. Feyer, Sacerdote, and Stern (2007) examine the same period and show that a focused period of job losses in steel and automobile production is associated with significant changes in employment at both county and MSA levels of aggregation, but it has relatively little effect on longer-term unemployment rates. The key result of both papers is that, at least in the United States, regions swiftly adjust to very large employment shocks primarily through changes in population. Blanchard and Katz also find that regions recover their average income levels following an employment shock, although the recovery in incomes is more gradual.

We examine this early period of job losses in the industrial heartland, along with a later manufacturing shock from 2001 to 2010 that is associated with a very similar levels of job loss. Our results are consistent with the prior results for the first manufacturing shock for the specific geography of the industrial heartland. It continues to the be case that employment losses spread well beyond the manufacturing sector, and that unemployment rates drop swiftly following the job losses in large part due to significantly slower population growth. However, even in the first manufacturing shock, our estimates indicate that the income effects were larger in the industrial heartland and that some of this effect persisted past 5 years.

Our results for the second manufacturing shock are qualitatively similar in the industrial heartland, even though the industrial heartland has diversified away from manufacturing, deriving 26% of earnings from manufacturing in 2000 compared to 35% in 1978 (both on an SIC basis). Other manufacturing-intensive MSAs, along with service-intensive MSAs, also experience large manufacturing losses in this manufacturing shock. Nonetheless, the size of the loss in manufacturing employment in the industrial heartland is more strongly correlated with the size of the loss in nonmanufacturing employment within the industrial heartland MSAs than in the other types of MSAs. Despite larger job losses, the unemployment rates still recover swiftly in the industrial heartland, due to the slower rate of population growth. In this second episode, weaker population growth seems to be more of a persistent trend in the industrial heartland MSAs than a reaction to manufacturing job losses. The biggest difference between the two episodes is that the income effects are larger and more persistent in the second. The industrial heartland sees substantially slower income growth during the second manufacturing shock, and in the following 5-year period income levels still have not recovered. This an important issue to examine further because it implies a much less sanguine take on the nature of regional evolution the industrial heartland, despite the ongoing diversification of the region.

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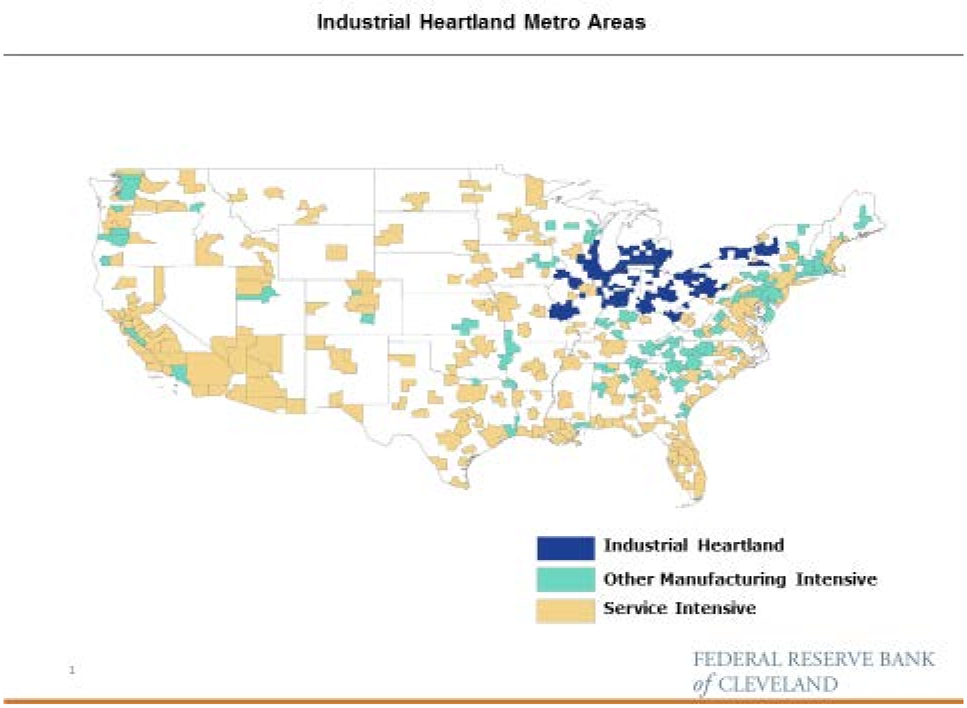
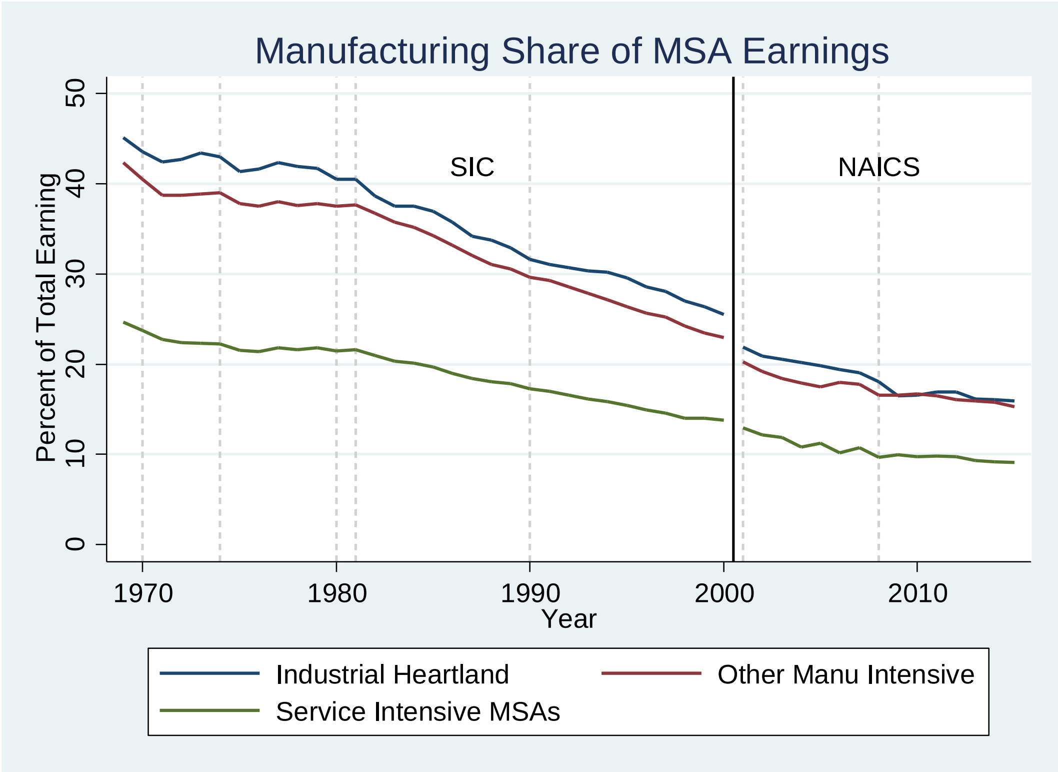
Figures

Figure 1: Map of the Industrial Heartland



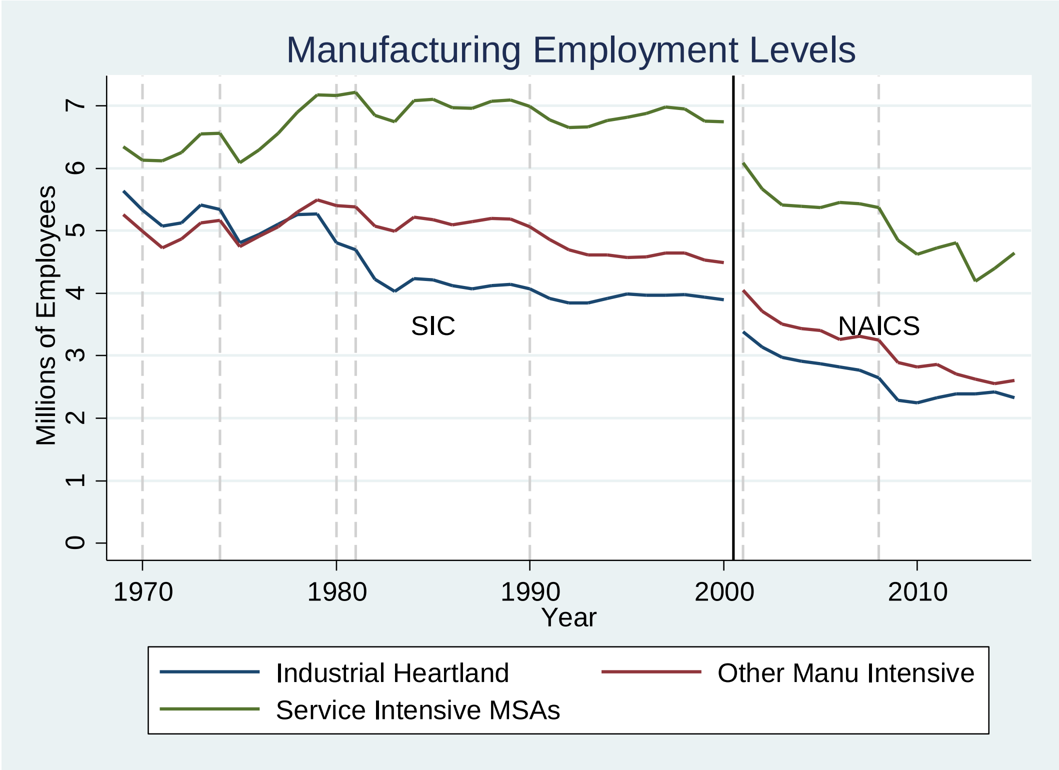
Source: Author and BEA

Figure 2:



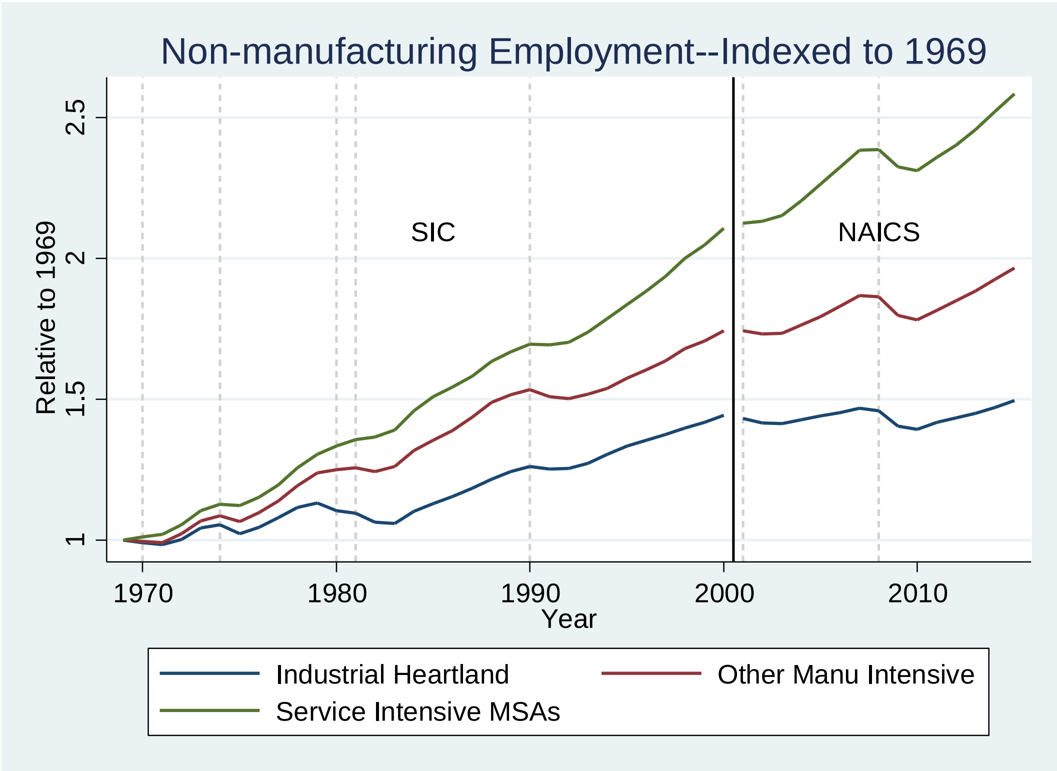
Source: Author’s calculations using BEA data. NBER peaks shown in grey dashed lines.

Figure 3:



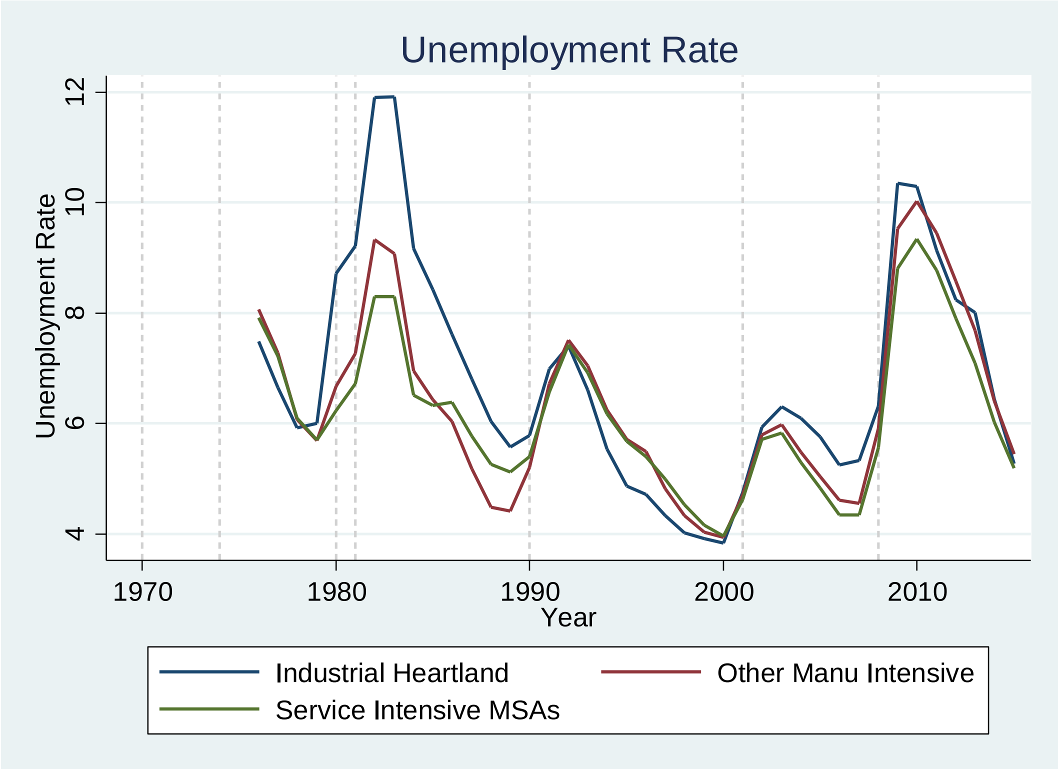
Source: Author's calculations using BEA data. NBER peaks shown in grey dashed lines.

Figure 4:



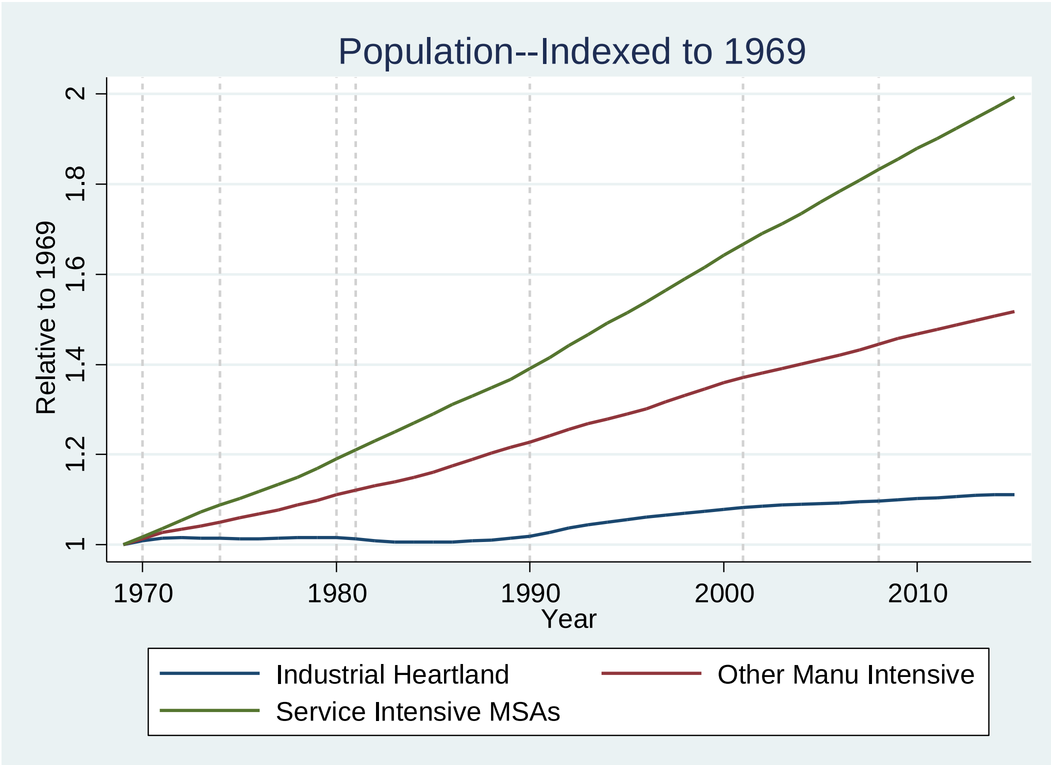
Source: Author's calculations using BEA data. NBER peaks shown in grey dashed lines.

Figure 5



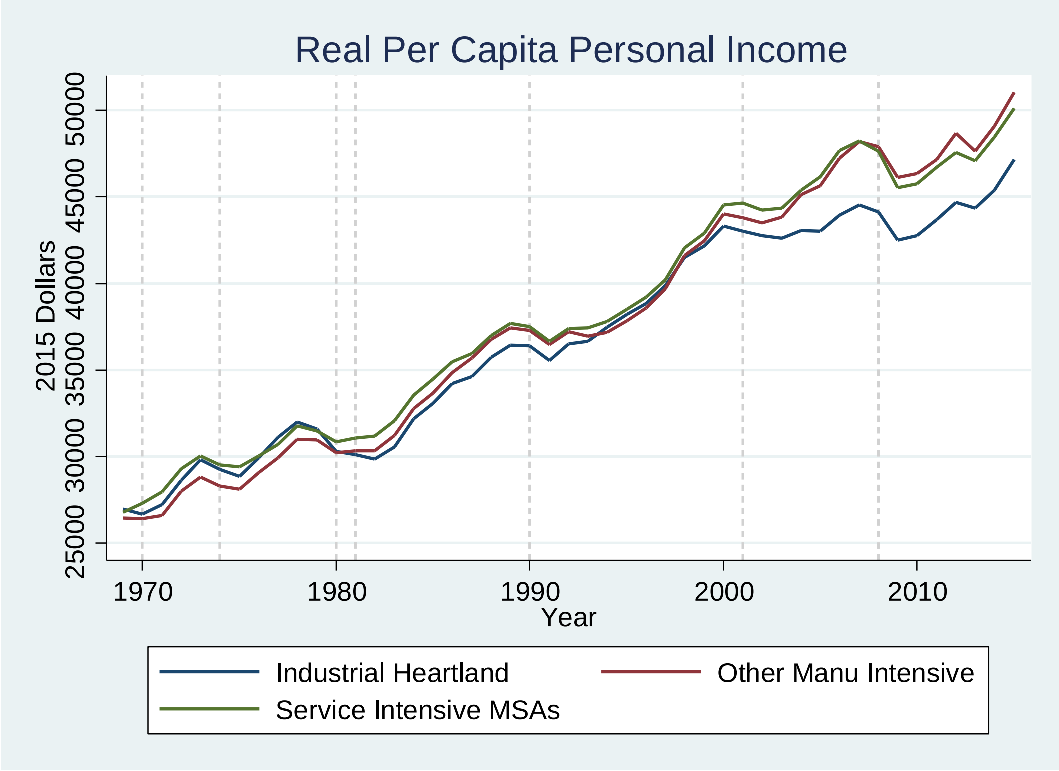
Source: Author's calculations using BLS data, including archival data not consistent with current BLS methods. NBER peaks shown in grey dashed lines.

Figure 6



Source: Author's calculations using BEA data. NBER peaks shown in grey dashed lines.

Figure 7



Source: Author's calculations using BEA and BLS data. NBER peaks shown in grey dashed lines.

Figure 8

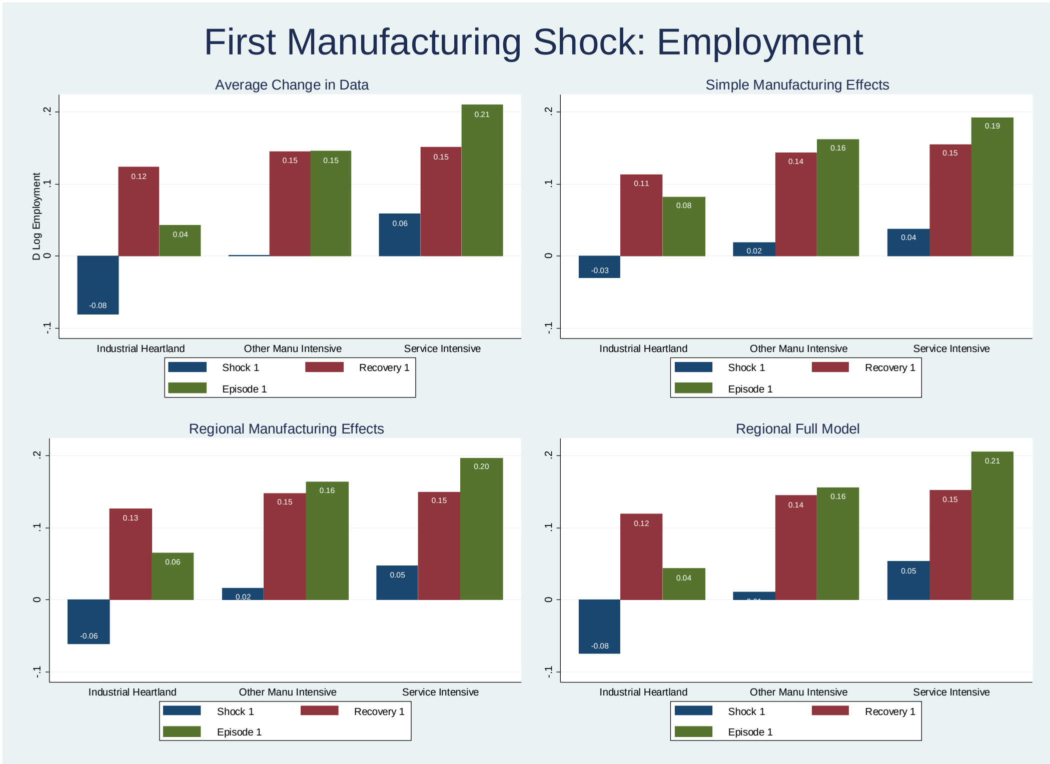

First Manufacturing Shock: Employment
Average Change in Data
Simple Manufacturing Effects
Regional Manufacturing Effects
Regional Full Model
D Log Employment
Industrial Heartland
Other Manu Intensive
Service Intensive
Shock 1
Recovery 1
Episode 1

Figure 9

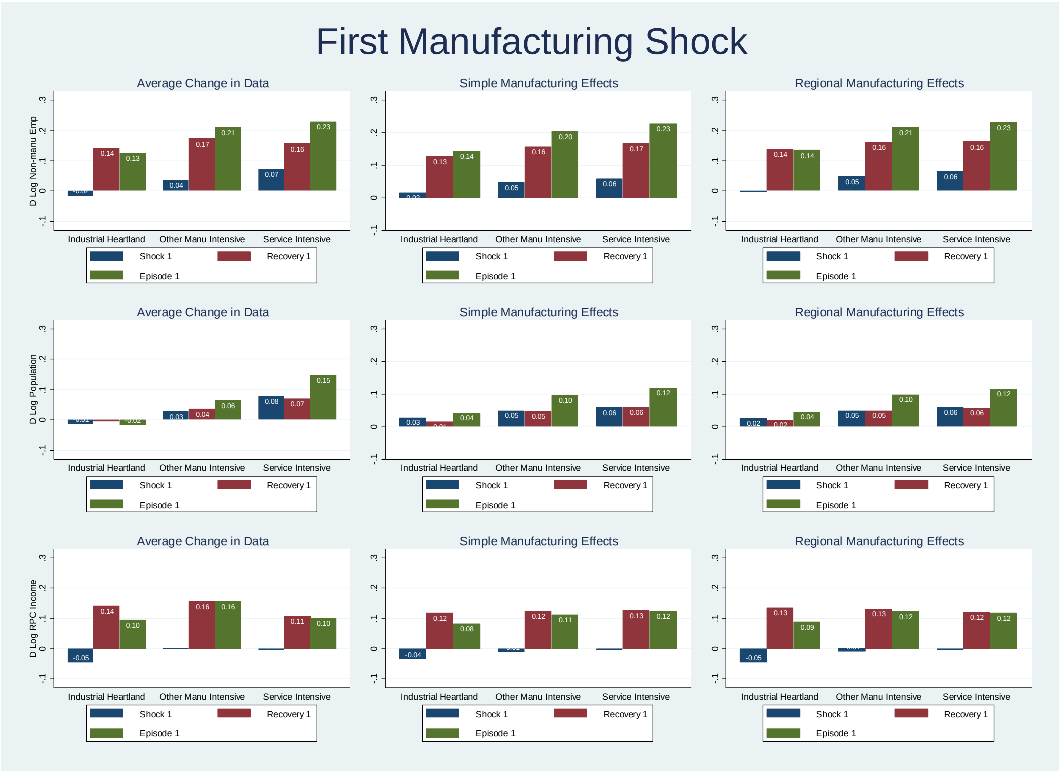
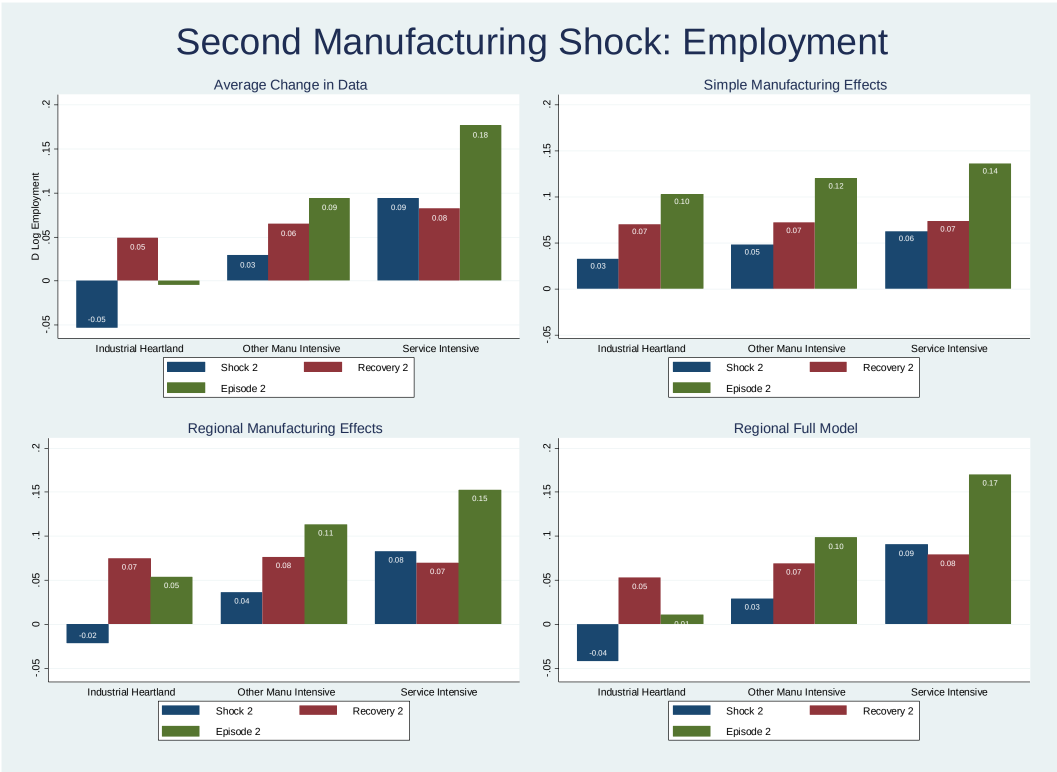

First Manufacturing Shock
Average Change in Data
Simple Manufacturing Effects
Regional Manufacturing Effects
D Log Non-manu Emp
D Log Population
D Log RPC Income
Industrial Heartland
Other Manu Intensive
Service Intensive
Shock 1
Recovery 1
Episode 1

Figure 10


Second Manufacturing Shock: Employment
Average Change in Data
Simple Manufacturing Effects
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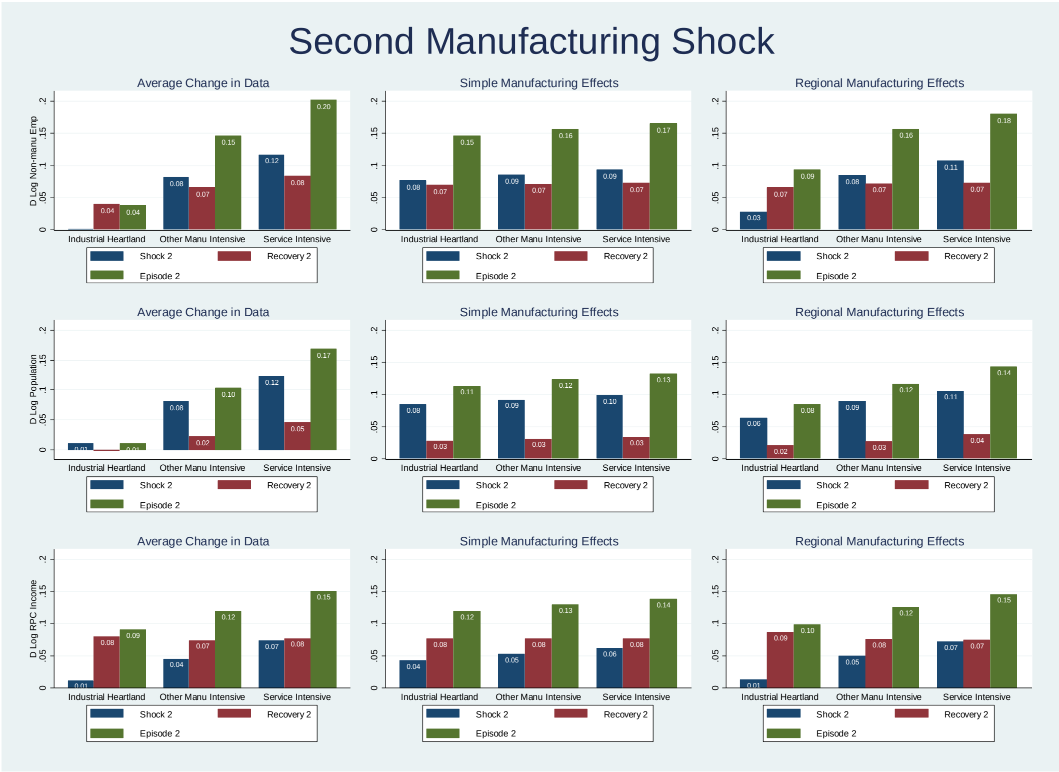
Regional Full Model
D Log Employment
Industrial Heartland
Other Manu Intensive
Service Intensive
Shock 2
Recovery 2
Episode 2

Figure 11


Second Manufacturing Shock
Average Change in Data
Simple Manufacturing Effects
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D Log Non-manu Emp
D Log Population
D Log RPC Income
Industrial Heartland
Other Manu Intensive
Service Intensive
Shock 2
Recovery 2
Episode 2

Tables

Table 1: Manufacturing employment shock by region

	First Manufacturing Shock			Second Manufacturing Shock		
MSA Type	10th Percentile	Mean	90th Percentile	10th Percentile	Mean	90th Percentile
Industrial Heartland	-0.40	-0.27	-0.13	-0.66	-0.40	-0.20
Other Manufacturing Intensive	-0.27	-0.12	0.02	-0.51	-0.32	-0.11
Service Intensive	-0.24	-0.06	0.15	-0.50	-0.24	0.04

Table 2: Summary Statistics for Economic Outcomes

	Mean	Std. Dev.	Minimum	Maximum
Shock 1: 1979-83				
Employment	0.022	0.086	-0.219	0.346
Non-manufacturing employment	0.049	0.073	-0.131	0.343
Unemployment rate	0.041	0.026	-0.016	0.148
Population	0.051	0.062	-0.055	0.295
Real per capita income	-0.011	0.058	-0.339	0.179
Recovery 1: 1983-88				
Employment	0.145	0.087	-0.159	0.525
Non-manufacturing employment	0.159	0.091	-0.170	0.526
Unemployment rate	-0.042	0.026	-0.145	0.017
Population	0.049	0.072	-0.199	0.366
Real per capita income	0.125	0.070	-0.210	0.292
Shock 2: 2001-10				
Employment	0.054	0.094	-0.199	0.787
Non-manufacturing employment	0.089	0.086	-0.104	0.819
Unemployment rate	0.047	0.019	0.006	0.129
Population	0.094	0.080	-0.117	0.525
Real per capita income	0.056	0.082	-0.516	0.384
Recovery 2:2010-15				
Employment	0.072	0.052	-0.081	0.265
Non-manufacturing employment	0.072	0.052	-0.084	0.266
Unemployment rate	-0.041	0.016	-0.095	-0.004
Population	0.032	0.039	-0.092	0.232
Real per capita income	0.076	0.048	-0.075	0.311

Table3: Manufacturing Employment Impacts Following First Shock

	Non-Manu Emp	Unem Rate	Population	RPC Income
Shock Period: 1979 to 1983				
Manu Shock	0.208***	-0.078***	0.147***	0.154***
	(0.02)	(0.01)	(0.02)	(0.01)
constant	0.085***	0.012*	0.026*	0.065***
	(0.01)	(0.01)	(0.01)	(0.01)
R^2	0.4	0.35	0.5	0.45
Recovery Period: 1983 to 1988				
Manu Shock	0.188***	0.062***	0.212***	0.042*
	(0.02)	(0.01)	(0.02)	(0.02)
constant	0.232***	-0.035***	0.059***	0.219***
	(0.02)	0.00	(0.01)	(0.01)
R^2	0.35	0.45	0.42	0.46
Full Episode: 1979 to 1988				
Manu Shock	0.397***	-0.017**	0.360***	0.196***
	(0.03)	(0.01)	(0.03)	(0.02)
constant	0.317***	-0.023***	0.085***	0.284***
	(0.03)	0.00	(0.02)	(0.02)
R^2	0.4	0.45	0.5	0.55
N	382	380	382	382

* p<0.05, ** p<0.01, *** p<0.001
Regressions also include a full set Census division dummy variables

Table4: Manufacturing Employment Impacts Following Second Shock

	Non-Manu Emp	Unem Rate	Population	RPC Income
Shock Period: 2001 to 2010				
Manu Shock	0.101***	-0.015***	0.082***	0.110***
	(0.02)	0.00	(0.02)	(0.02)
constant	0.094***	0.044***	0.059**	0.105***
	(0.02)	0.00	(0.02)	(0.02)
R^2	0.3	0.34	0.33	0.25
Recovery Period: 2010 to 2015				
Manu Shock	0.015	0.020***	0.035***	-0.001
	(0.01)	0.00	(0.01)	(0.01)
constant	0.063***	-0.026***	0.020*	0.066***
	(0.02)	0.00	(0.01)	(0.01)
R^2	0.16	0.37	0.24	0.13
Full Episode: 2001 to 2015				
Manu Shock	0.116***	0.005	0.117***	0.108***
	(0.03)	0.00	(0.03)	(0.02)
constant	0.156***	0.017***	0.079**	0.171***
	(0.03)	0.00	(0.03)	(0.02)
R^2	0.28	0.2	0.33	0.3
N	342	373	375	375

* p<0.05, ** p<0.01, *** p<0.001
Regressions also include a full set of Census division dummy variables

Table 5: Differential Impacts of Manufacturing Shock by Region: 1979 to 1988

Shock Period: 1979 to 1983				
	Non-Manu Emp	**Unem Rate**	**Population**	**RPC Income**
Indust Heartland	0.287***	-0.122***	0.143***	0.193***
* Manu Shock	(0.03)	(0.01)	(0.02)	(0.02)
Other Industrial	0.218***	-0.080***	0.127***	0.137***
* Manu Shock	(0.04)	(0.01)	(0.02)	(0.03)
Service MSA	0.171***	-0.052***	0.089***	0.127***
* Manu Shock	(0.02)	(0.01)	(0.01)	(0.02)
D Non-Manu Emp 74-79	0.158***			
D Unem Rate 76-79		0.03		
D Population 74-79			0.486***	
D Real PC Income 74-79				-0.117*
R^2	0.38	0.34	0.66	0.22
Recovery Period: 1983 to 1988				
Indust Heartland	0.136**	0.115***	0.179***	-0.04
* Manu Shock	(0.04)	(0.01)	(0.03)	(0.03)
Other Industrial	0.119*	0.094***	0.159***	-0.07
* Manu Shock	(0.06)	(0.01)	(0.04)	(0.04)
Service MSA	0.227***	0.036***	0.179***	0.067*
* Manu Shock	(0.03)	(0.01)	(0.02)	(0.03)
D Non-Manu Emp 74-79	0.023			
D Unem Rate 76-79		-0.02		
D Population 74-79			0.345***	
D Real PC Income 74-79				-0.257***
R^2	0.13	0.3	0.44	0.07
N	381	380	382	382

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

Table 6: Differential Impacts of Manufacturing Shock by Region: 2001 to 2015

Shock Period: 2001 to 2010	Non-Manu Emp	Unem Rate	Population	RPC Income
Indust Heartland	0.228***	-0.041***	0.131***	0.188***
* Manu Shock	(0.02)	(0.01)	(0.02)	(0.03)
Other Industrial	0.115***	-0.022***	0.087***	0.124***
* Manu Shock	(0.03)	(0.01)	(0.02)	(0.03)
Service MSA	0.055*	-0.014**	0.049***	0.073**
* Manu Shock	(0.02)	0.00	(0.01)	(0.02)
D Non-Manu Emp 95-00	0.467***			
D Unem Rate 95-00		-0.399***		
D Population 95-00			1.051***	
D Real PC Income 95-00				-0.326***
R^2	0.33	0.22	0.68	0.17
Recovery Period: 2010 to 2015				
Indust Heartland	0.039*	0.042***	0.055***	-0.006
* Manu Shock	(0.02)	(0.01)	(0.01)	(0.02)
Other Industrial	0.029	0.020***	0.050***	0.025
* Manu Shock	(0.02)	(0.01)	(0.01)	(0.02)
Service MSA	0.034*	0.012**	0.020*	0.040**
* Manu Shock	(0.01)	0.00	(0.01)	(0.01)
D Non-Manu Emp 95-00	0.504***			
D Unem Rate 95-00		0.211***		
D Population 95-00			0.411***	
D Real PC Income 95-00				0.280***
R^2	0.34	0.19	0.47	0.09
N	339	373	375	375

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

Appendix Table: Industrial Heartland MSAs

FIPS Code	Metropolitan Statistical Area	Manufacturing Share (percent) 1969	2015
10420	Akron, OH	52.6	15.7
11460	Ann Arbor, MI	59.6	12.2
12980	Battle Creek, MI	54.3	28.3
13020	Bay City, MI	47.8	16.6
13780	Binghamton, NY	55.2	21.5
14020	Bloomington, IN	41.3	22.5
15380	Buffalo-Cheektowaga-Niagara Falls, NY	47.5	15.3
15940	Canton-Massillon, OH	54.1	23.3
16980	Chicago-Naperville-Elgin, IL-IN-WI	38.8	11.7
17140	Cincinnati, OH-KY-IN	42.6	suppressed
17460	Cleveland-Elyria, OH	44.5	15.9
18020	Columbus, IN	67.8	53.6
18140	Columbus, OH	35.7	10.0
19180	Danville, IL	50.2	28.5
19340	Davenport-Moline-Rock Island, IA-IL	43.7	18.4
19380	Dayton, OH	54.9	15.9
19500	Decatur, IL	46.2	34.7
19820	Detroit-Warren-Dearborn, MI	49.5	16.3
21140	Elkhart-Goshen, IN	63.8	52.8
21300	Elmira, NY	47.6	22.0
21500	Erie, PA	53.0	26.0
22420	Flint, MI	62.6	14.7
23060	Fort Wayne, IN	46.1	21.4
24340	Grand Rapids-Wyoming, MI	45.9	27.2
26580	Huntington-Ashland, WV-KY-OH	41.0	suppressed
26900	Indianapolis-Carmel-Anderson, IN	42.2	13.2
27100	Jackson, MI	50.9	23.1
27500	Janesville-Beloit, WI	53.6	20.5
27780	Johnstown, PA	43.3	10.7
28020	Kalamazoo-Portage, MI	52.2	24.8
28100	Kankakee, IL	48.8	22.9
29020	Kokomo, IN	71.1	52.8
29200	Lafayette-West Lafayette, IN	39.3	suppressed
29620	Lansing-East Lansing, MI	48.8	16.2
30620	Lima, OH	48.3	29.7
31900	Mansfield, OH	55.4	27.0
33140	Michigan City-La Porte, IN	54.4	24.8
33220	Midland, MI	71.2	9.8

33340	Milwaukee-Waukesha-West Allis, WI	46.2	18.2
33780	Monroe, MI	48.4	18.6
34620	Muncie, IN	54.6	14.2
34740	Muskegon, MI	60.2	31.9
35660	Niles-Benton Harbor, MI	59.8	37.4
37620	Parkersburg-Vienna, WV	49.8	suppressed
37900	Peoria, IL	47.5	26.9
38300	Pittsburgh, PA	40.7	8.9
39540	Racine, WI	58.9	39.9
40380	Rochester, NY	52.4	16.4
40420	Rockford, IL	59.5	30.7
40980	Saginaw, MI	57.8	22.4
41180	St. Louis, MO-IL	38.3	12.4
43100	Sheboygan, WI	56.0	44.8
43780	South Bend-Mishawaka, IN-MI	44.0	17.6
44220	Springfield, OH	50.6	19.8
45060	Syracuse, NY	37.6	12.8
45460	Terre Haute, IN	32.5	23.5
45780	Toledo, OH	43.5	22.8
46540	Utica-Rome, NY	48.8	14.5
48260	Weirton-Steubenville, WV-OH	61.8	21.2
48540	Wheeling, WV-OH	31.1	7.0
49660	Youngstown-Warren-Boardman, OH-PA	56.5	21.0