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What Works to Help Manufacturing-Intensive Local Economies?

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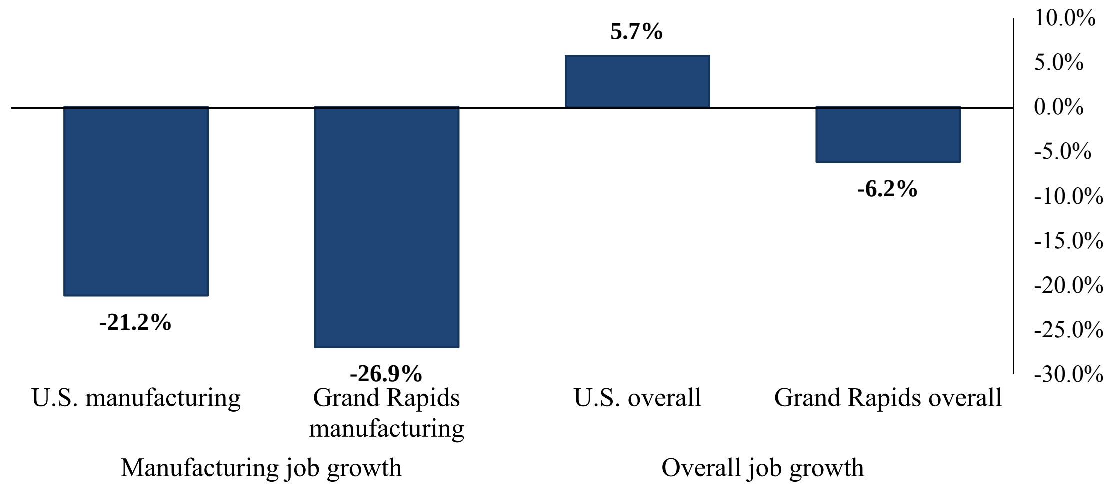
INTRODUCTION

The mediocre job growth of the United States since 2000 has generally been much worse in the most manufacturing-intensive communities, that is the communities that had above average shares of their jobs in manufacturing industries. For example, consider the recent business cycle with the worst manufacturing decline, from the business cycle peak of 2000 to the peak of 2007, and the manufacturing-intensive community of Grand Rapids, Michigan (Figure 1).

Figure 1 Job Trends, Grand Rapids and U.S., 2000–2007



NOTE: Overall job growth is private-sector job growth. Job growth percentages are calculated as percentage differences (e.g., difference from 2000 to 2007 divided by average of 2000 and 2007). Job data are from the Upjohn Institute's WholeData database, which is derived from County Business Patterns data, using an algorithm originally developed by Isserman and Westervelt (2006).

Grand Rapids is "manufacturing intensive" in that the share of manufacturing jobs in total jobs in Grand Rapids is significantly above the national average share. As of 2000, manufacturing's share of total jobs in Grand Rapids was twice the average national share.[1]

[1] Specifically, the Grand Rapids "location quotient" for manufacturing jobs—the share of manufacturing jobs in total jobs, divided by the same share for the nation—was 2.00 in the year 2000.

From 2000 to 2007, the nation had modest job growth: private-sector job growth was 5.7 percent. But over the same period, private jobs in Grand Rapids declined by 6.2 percent.

This overall jobs decline in Grand Rapids was largely due to local manufacturing's collapse. From 2000 to 2007, manufacturing jobs in Grand Rapids dropped by 26.9 percent, somewhat greater than the national decline in manufacturing of 21.2 percent. But because Grand Rapids' manufacturing intensity was twice the national average, the Grand Rapids manufacturing decline was much more severe as a percentage of total jobs. As a percentage of total private-sector jobs, manufacturing jobs from 2000 to 2007 in Grand Rapids declined by 7.1 percent; in the United States, the decline in manufacturing jobs as a percentage of total employment was "only" 2.7 percent. As will be discussed in more detail later, we expect changes in manufacturing jobs to have some "multiplier" effects on other local jobs in suppliers or retailers. An average manufacturing job multiplier would be expected to be in the range from 2 to 3: for every one job lost or gained in manufacturing, one or two additional local jobs are lost or gained. With a multiplier in this range, the Grand Rapids manufacturing job loss from 2000 to 2007 fully explains why the area's overall job growth was over 11 percentage points less than the nation's.[2]

What can be done to help manufacturing-intensive communities? Is the answer simply slashing local business costs—for example, by cutting local wages and local business taxes? Is the answer large tax incentives, such as the over $4 billion recently offered by Wisconsin to Foxconn, in exchange for Foxconn opening up a flat-screen TV manufacturing facility near Racine?

[2] The difference in the manufacturing decline as a percentage of total employment in Grand Rapids (−7.1 percent) versus the United States (−2.7 percent) was −4.4 percent. The difference in overall job growth in Grand Rapids (−6.2 percent) versus the nation (5.7 percent) was −11.9 percent. Dividing the total employment-decline difference by the manufacturing decline as a percentage of the total difference yields 2.70—or, in other words, the overall job decline could be explained if manufacturing in Grand Rapids had a multiplier effect of 2.70, which seems quite plausible.

This report argues against these simple economic development strategies, which directly slash business costs. Across-the-board wage cuts or business tax cuts can sometimes create jobs, but at a very high price per job created. Untargeted business tax reductions may even be counterproductive, by cutting education and other public services which support long-term local economic development. Business tax incentives may sometimes work, but only if targeted on high-multiplier businesses, and financed without significantly cutting productive public services such as education.

What policies are more likely to work? A more cost-effective approach emphasizes targeted public spending programs, which either 1) increase the quantity or quality of local labor demand or 2) improve the quality of local labor supply. The local fiscal multipliers of public spending are surprisingly high, according to recent evidence, so such spending can have significant short-term effects in creating jobs. But the *long-term* economic development benefit is from public spending's "supply-side" effects: the expanded public spending programs can help the local community become a better place to create and grow competitive businesses.

Based on research, among the public services that can cost-effectively promote local economic development are customized services to small and medium-sized businesses. Such services include customized job training. Customized job training is typically run by local community colleges; the training is "customized" in that it trains existing or new employees of a specific employer, and provides the specific job skills needed by that individual employer. Other cost-effective customized business services include manufacturing extension services. Such manufacturing extension services are targeted at small and medium-sized manufacturers. Manufacturing extension provides such manufacturers with access to lower-cost, high-quality advice on how to improve their sales and productivity.

Long-term economic development also can be cost-effectively promoted by well-targeted investments in improving the quality of local human capital. Such human capital investments can take several forms: high-quality preschool, higher K–12 spending, high school career academies, scholarship programs that increase educational attainment at local colleges and universities, job training programs run by community colleges that are closely tied to employers' skill needs, and wage subsidy programs that encourage businesses to hire and provide on-the-job training to the unemployed. A high percentage of the participants in such human capital programs will remain in the local economy for most of their working careers. According to research studies, higher local skills are a key factor promoting long-term local economic development.

Finally, long-term economic development can be increased by increases in land supply, both for new business development and new housing development. More land supply for business development can directly boost local labor demand by providing a broader array of available sites. More land supply for housing development can indirectly boost local labor demand by leading to lower local prices and nominal wages, which will lower business costs. Increasing land supply availability is in part accomplished by regulatory changes in zoning and land use rules. But land supply is also affected by a wide variety of infrastructure improvements. For example, improving highways or mass transit, or installing utility lines, makes more land readily available for development. For many older cities, cleaning up brownfields also can pay off, promoting both neighborhood development and the overall area. In distressed neighborhoods, public service investments can encourage job growth.

This report will proceed as follows:

1) First, the report shows how the post-2000 decline in manufacturing jobs has disproportionately affected manufacturing-intensive communities.
2) Second, the report summarizes the research evidence on the benefits and costs of alternative local economic development strategies, such as business tax incentives and customized business services.
3) Third, the report presents evidence on the success of some manufacturing-intensive communities, and examines what explains that success.[3]

THE ECONOMIC CHALLENGE FACING MANUFACTURING-INTENSIVE COMMUNITIES

The economic challenge facing manufacturing-intensive communities is the huge job decline in U.S. manufacturing. This decline was most intense over the 2000-to-2007 business cycle, but has continued since then at a lesser rate.

As Table 1 shows, U.S. manufacturing jobs declined 21.2 percent from 2000 to 2007. From 2007–2015, U.S. manufacturing jobs declined another 13.8 percent.

Why have U.S. manufacturing jobs declined? Some media reports suggest that U.S. manufacturing output growth is fine, but that manufacturing job growth is depressed by automation. But research by Susan Houseman (2018) has shown that this narrative is false: most of the post-2000 decline in U.S. manufacturing jobs is *not* due to automation. Instead, the post-

[3] This report builds on previous work that also quantifies the benefits and costs of state and local economic development policies (Bartik 1991, 1992, 2001, 2005, 2010, 2016, 2018). This report differs from this previous work in the following ways: 1) this report focuses on manufacturing-intensive communities, 2) this report is significantly more comprehensive in the range of economic development policies considered, 3) this report is updated to include the latest research findings, and 4) this report includes significant new empirical work that examines the success or failure of manufacturing-intensive communities. This report differs from some other related research reviews—for example, the recent book by Wolman et al. (2017) that considers what makes a region "resilient" in response to a wide variety of economic shocks—in that this report focuses on trying to quantify in dollar terms the benefits and costs of economic development policies.

Table 1 Trends in Jobs in the United States (in millions of jobs or in percentage changes)

	2000	2007	2015	2000-2007 absolute change	2007-2015 absolute change	2000-2015 absolute change	2000-2007 % change	2007-2015 % change	2000-2015 % change
All private jobs	113.888	120.599	124.048	6.712	3.449	10.161	5.7	2.8	8.5
Mfg jobs	16.471	13.320	11.605	(3.151)	(1.714)	(4.865)	(21.2)	(13.8)	(34.7)
Mfg as % of private jobs	14.5	11.0	9.4						
Mfg % difference out of private jobs							(2.7)	(1.4)	(4.1)

NOTE: Data come from Upjohn Institute's WholeData database, which is derived from County Business Patterns. All measures of jobs are in millions of jobs. Declines in jobs are indicated with parentheses. Percentage change is calculated as percentage differences on base of average of first and second periods.

2000 decline in U.S. manufacturing jobs is due to U.S. manufacturing firms losing market share.[4] This loss of market share is a combination of increased U.S. imports of manufactured goods and decreased U.S. manufacturing exports. With the exception of computers and electronics, U.S. manufacturing output is not doing well. In the computer and electronics sectors, more positive trends in productivity and output are due not to automation but to statistical adjustments for product quality improvements. The U.S. has lost world market share in the manufacturing of computers and electronics.

The post-2000 decline in U.S. manufacturing's market share and jobs has had major consequences, both for U.S. workers and for manufacturing-intensive areas. Low manufacturing job growth is a drag on the entire U.S. economy. A conservative estimate is that the manufacturing job multiplier is at least somewhere between 2 and 3—for every one job in manufacturing, there are at least one or two other jobs created in the economy.[5] As shown in

[4] Why have U.S. manufacturing firms lost market share? A full exploration of that question is beyond the scope of this paper. Research by Campbell (2016) suggests that for the 1995–2008 period, at least two-thirds of the decline in U.S. manufacturing jobs can be explained by changes in the real exchange rate, and by persistence of U.S. job declines due to "hysteresis" effects.

[5] A multiplier of 2 or 3 is a reasonable estimate for manufacturing for local areas. For example, BEA input-output multipliers at the local level for manufacturing seem to average around 2.5 (e.g., see their Kansas City estimates for multipliers at BEA [1997]). Moretti (2010) reports empirically based multipliers of 2.59 if we only include impacts of manufacturing on nontradable industries, and 2.85 if we also include possible impacts on other manufacturing. Moretti's multipliers would tend to be somewhat greater than input-output multipliers because they include potential agglomeration economies. These multipliers would be the multiplier effects before considering negative feedback effects from higher wages and prices, as these multipliers reflect the realized relationship between manufacturing job changes after considering such feedback effects and other job changes that also consider such

Table 1, the manufacturing job decline, as a percentage of total jobs, was 2.7 percent from 2000 to 2007 and another 1.4 percent from 2007 to 2015. With a multiplier of 2 to 3, this implies that if U.S. manufacturing jobs had just stayed stable, overall U.S. employment growth would have been boosted by 5 to 8 percentage points in the 2000 to 2007 period, and by 3 to 4 percentage points in the 2007 to 2015 period.

Manufacturing-intensive areas have done even worse. In Table 2, I focus on the 324 "commuting zones" that in 2000 were significantly above average in their share of total employment in manufacturing jobs.[6] "Commuting zones" are defined by the U.S. Department of Agriculture as groupings of counties within which there are sufficient commuting flows that one would expect relatively quick adjustment of wages and employment rates throughout the commuting zone in response to shocks to local labor demand or labor supply. Commuting zones are broadly similar to metropolitan areas in how they classify counties, but have the advantage that all 3,000-plus counties in the United States, including counties in rural areas, are classified into a commuting-zone area. The entire United States is divided into 709 commuting zones.

To get an idea of what areas are "manufacturing intensive," among the 324 manufacturing-intensive commuting zones are these 15 areas above one million in 2010 population: Detroit, Michigan; Cleveland, Ohio; Silicon Valley, California; Charlotte, North

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feedback effects. Multipliers at the national level might be even higher, at 6 or 7, because they consider effects on suppliers throughout the nation. For example, an unconstrained version of the REMI model estimates a national manufacturing jobs multiplier of 6.65 (Robey et al. 2017). At the national level, however, one needs to consider constraints stemming from Federal Reserve Policy and exchange rates. If U.S. manufacturing somehow became more competitive and expanded its exports, this would presumably have some offsetting effects on the exchange rate. In addition, if the expansion of jobs from manufacturing and its national multiplier put some upward pressure on wages and prices, presumably this would lead to some responses from the Federal Reserve. Estimating the net national impact is a difficult issue. However, the realized multiplier after considering feedback effects may still be considerably higher than 2 or 3, depending upon how exchange rate responses and Federal Reserve responses affect manufacturing relative to other industries.

[6] A "manufacturing-intense" commuting zone (CZ) is somewhat arbitrarily defined as a CZ whose manufacturing "location quotient" (share of area jobs in manufacturing divided by national share) exceeded 1.19 in the year 2000. As it turns out, this cutoff came in a gap in the distribution of CZ location quotients, and it seemed to classify commuting zones in a way that made intuitive sense.

Table 2 Trends in 324 Commuting Zones (CZs) That Were Manufacturing-Intensive in 2000 (in millions of jobs or in percentage terms)

Panel A: Selected Comparisons of 324 CZs to U.S. as a Whole									
Population as % of U.S., 2010	26.8								
Private jobs as % of U.S., 2000	26.9								
Manufacturing jobs as % of U.S., 2000.	44.5								
Manufacturing job decline as % of U.S., 2000–2015	46.4								
Panel B: Trends in 324 manufacturing-intensive commuting zones									
	2000	2007	2015	2000–2007 absolute change	2007–15 absolute change	2000–2015 absolute change	2000–2007 % change	2007–2015 % change	2000–2015 % change
All private jobs	30.580	30.283	29.754	(0.297)	(0.529)	(0.827)	(1.0)	(1.8)	(2.7)
Manufacturing jobs	7.336	5.771	5.081	(1.565)	(0.690)	(2.255)	(23.9)	(12.7)	(36.3)
Manufacturing as % of private jobs	24.0	19.1	17.1						
Manufacturing % change out of private jobs							(5.1)	(2.3)	(7.5)
Panel C: United States as a Whole									
	2000	2007	2015	2000–2007, absolute change	2007–2015, absolute change	2000–2015, absolute change	2000–2007, % change	2007–2015, % change	2000–2015, % change
All private jobs	113.888	120.599	124.048	6.712	3.449	10.161	5.7	2.8	8.5
Manufacturing jobs	16.471	13.320	11.605	(3.151)	(1.714)	(4.865)	(21.2)	(13.8)	(34.7)
Manufacturing as % of private jobs	14.5	11.0	9.4						
Manufacturing, % change out of private jobs							(2.7)	(1.4)	(4.1)

NOTE: Derived from Upjohn Institute's WholeData version of County Business Patterns. Commuting zones are considered manufacturing-intensive if location quotient for manufacturing exceeds 1.19 in the year 2000. Jobs are in millions. Percentage change over time is calculated as percentage difference on average of two time periods.

Carolina; Lancaster/Harrisburg/Lebanon, Pennsylvania; Milwaukee, Wisconsin; Providence, Rhode Island; Grand Rapids, Michigan; Buffalo, New York; Lehigh Valley, Pennsylvania; Manchester, New Hampshire; Greensboro/Burlington/Danville, North Carolina and Virginia; Dayton, Ohio; Rochester, New York; and Greenville, South Carolina.

As shown in Table 2, these manufacturing-intensive areas had a little more than one-quarter of total U.S. jobs in 2000. But because of their manufacturing intensity, these areas had almost half of all U.S. manufacturing jobs in 2000. Because of this manufacturing intensity, this one-quarter of the United States suffered almost half of the 2000-to-2015 loss in U.S. manufacturing jobs.

As a result, this manufacturing-intensive one-quarter of all local economies not only lost manufacturing jobs since 2000 but also suffered declines in overall employment, both in the 2000–2007 period and in the 2007–2015 period. The job loss was 1.0 percent from 2000 to 2007 but increased to 1.8 percent from 2007 to 2015. But the percentage lag from the U.S. overall growth was greatest in the earlier 2000–2007 period, when these manufacturing-intensive areas were 6.7 percentage points behind U.S. overall growth of 5.7 percent. In the latter 2007–2015 period, these 324 manufacturing intensive areas were "only" 4.6 percentage points behind the U.S. average growth of 2.8 percent.

As can be seen in Table 2, these manufacturing intensive areas did not suffer because manufacturing in these areas had a worse percentage job loss than the manufacturing base. The percentage loss was similar in the manufacturing-intensive areas to the U.S.

But because these manufacturing-intensive areas had a higher percentage of their jobs in manufacturing, the manufacturing job loss had a larger aggregate effect on the overall economy. During the 2000–2007 period, the manufacturing job loss in these 324 CZs, as a percentage of total jobs, was 5.1 percent, versus 2.7 percent for the United States, a difference of 2.5 percentage points.[7] With a multiplier of 2 to 3, one would expect these manufacturing-intensive areas to have a job lag of 5 to 8 percentage points behind the United States. The actual job lag was 6.7 percentage points, so these manufacturing-intensive areas did exactly as expected based on their manufacturing intensity from 2000 to 2007.

In the later 2007–2015 period, these manufacturing-intensive areas experienced a manufacturing job loss of 2.3 percent as a percentage of total employment, compared to a figure for the entire United States of 1.4 percent of total employment, a difference of 0.9 percentage

[7] 2.5 rather than 2.4 due to rounding.

points. With a multiplier of 2 or 3, this manufacturing loss gap would be expected to cause these manufacturing areas to lag behind the United States in overall growth by 2 or 3 percentage points. This is perhaps a little more than half of the 4.6 percentage point gap in total job growth that is observed. Of the remaining job gap, plausibly some of that gap may be due in part to lagged effects of the 2000–2007 loss of manufacturing jobs.

To summarize: the economic development fate of manufacturing-intensive areas has been significantly worse than that of the United States from 2000 to 2015, and this can largely be explained by the job declines in U.S. manufacturing.

WHAT JOB-CREATION POLICIES CAN BEST HELP MANUFACTURING-INTENSIVE AREAS?

What can work to help manufacturing-intensive communities? This section reviews the research evidence on specific job-creation policies.

My analysis will focus on costs and benefits per local job-year created. What is a job-year? It is a job that is created for one year. For jobs that persist for multiple years, I calculate the average cost or benefit for each job-year over those years.[8]

An oft-suggested job-creation strategy for economically struggling communities is this: become more competitive by lowering your business costs. Perhaps local workers need to accept lower wages. Perhaps local taxpayers need to accept higher household taxes or public service cuts, to pay for lower business tax rates or higher business incentives.

[8] More specifically, I calculate the present value of costs or benefits, divided by the present value of job-years created. The present value of both dollar costs and benefits, and job-years, are calculated with the commonly-used social discount rate of 3% (Bartik, 2011; Moore et al., 2004).

As this section of the report will show, this simple business-cost-reduction strategy is not supported by research. Lower real wages or lower business taxes may create jobs, but the cost per job-year created is too high. Lower business taxes have particularly high costs per job-year created if the lower business taxes are financed by cutting public investments in local residents' skills.

Higher business tax incentives can be more effective, but they still are relatively costly per job-year created. Greater cost-effectiveness of tax incentives requires that they be more targeted.

More effective economic development strategies invest in programs whose cost-reduction effects for business are some sizable multiple of their social costs to the general public. Such cost-effective policies include business-targeted services that raise business productivity, such as customized job-training programs and manufacturing extension programs. Such cost-effective policies services also include human capital development services targeted at households, such as high-quality preschool education, improvements in the quality of K–12 education, and demand-oriented job training programs. Finally, cost-effective policies may include regulatory changes, infrastructure improvements, and brownfield cleanups to provide more land for new development.

However, before getting into the research evidence on the costs of different job-creation policies, the next subsection reviews the evidence on job creation's benefits. How much is another local job really worth? What dollar amount per "job-year" should state and local governments be willing to pay?

What Is a Local Job Worth?

At the local level, a new job is worth a lot less than what it pays. This is because the research literature suggests that when local job growth goes up, most of the new jobs go to in-migrants, not local residents.[9]

There is no escaping the following logic: any increase in local employment must be divided up between an increase in the local employment-to-population ratio and an increase in the local population. After all, local employment mathematically equals the product of the employment-to-population ratio times the population. One or the other, or both, must go up when local jobs increase.

To put it another way, when new local jobs are created, they generate a job vacancy chain that is only terminated when the new local jobs go to either 1) local residents who otherwise would not be employed or 2) newcomers to the local area. In the first round of hiring, it might seem that the new local jobs could also go to a third category: 3) local residents who were already employed. But the hiring from this third category, local residents who are employed, leads to another local job vacancy. That job vacancy in turn is filled in the same three ways. As the job vacancy chain proceeds, eventually all the new jobs result in either jobs for local residents who otherwise would not be employed, or jobs for in-migrants. Those local residents who otherwise would not be employed include two groups: local residents who were officially unemployed; and local residents who were not searching for jobs and hence were not considered to be in the labor force.

[9] What about from a national perspective? From a national perspective, should the gains to in-migrants who take the new jobs be counted? Not necessarily. If job growth had not gone up in this one local area, the in-migrant could have moved elsewhere and have been almost equally well off. The marginal in-migrants attracted to this local area by this area's job creation are relatively indifferent between staying where they are, or moving to other local areas, versus moving to the specific local area in question. See Bartik (1991).

The research literature suggests that within a very few years, this logic plays out so that when new jobs add *x* percent to area employment, local population goes up by over 80 percent of *x* percent. More precisely, a good estimate is that the percentage of new jobs that go to the local nonemployed is about 15 percent.[10] The remaining 85 percent goes to in-migrants.[11]

Average wages per full-time equivalent (FTE) worker in the U.S. economy are around $60,000 per year.[12] Therefore, in terms of local residents' earnings from higher employment-to-population ratios, the average new local job is worth about 15 percent times $60,000 per year, or around $9,000 per job-year.

Benefits from a local job-year are also due to other factors, but these factors are more minor. Local jobs may also provide some fiscal benefits and property-value boosts, but these benefits are significantly less than benefits from a higher employment-to-population ratio (Bartik 2018). Local jobs may boost local real wages, but this has costs for local employers. In addition, we might want to allow for some losses due to reduced nonworking time, which may have some net positive value even if unemployment has stigma effects.[13]

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[10] This percentage goes up when the prevailing local unemployment rate is high (Bartik 2015). Better local job training and matching systems might also be able to increase this percentage, but the efficacy of such policy reforms is unknown.

[11] The 15 percent and 85 percent figures come from a model of local economies that compares the present value of jobs created over an 80-year period with the present value of the jobs that go to local residents over that same 80-year period (Bartik 2018). These estimates rely on Bartik (2015) but also make plausible inferences about long-run depreciation of effects due to mortality and out-migration.

[12] This figure is from 2015, and is from the U.S. Bureau of Economic Analysis. All dollar figures in this report, unless otherwise mentioned, are in 2015 dollars.

[13] The issue of the net value of non–work time is not settled. Some estimates suggest that the purely private value of non–work time might be 13 to 35 percent of earnings, including any unemployment benefits (Borgschulte and Martorell 2016), and that incremental changes in non–work time might be valued at 60 percent of earnings (Mas and Pallais 2017). On the other hand, direct survey evidence on determinants of human happiness find very negative effects of both individual unemployment and overall unemployment, sufficient to imply that being involuntarily unemployed might have a negative value (see review by Bartik [2012]).

Overall, plausible values for the benefits per job-year from new local jobs probably are somewhere in the range from $5,000 to $20,000 per job-year.[14] Job creation policies that exceed that range will find it more challenging to have net benefits. Job creation policies whose costs are between $5,000 to $20,000 may have positive net benefits—but these net benefits are likely to be moderate in size and dependent on the details of the policy and the local labor market. For truly sizable benefit-cost ratios, local job creation policies probably need to achieve costs per job-year of $5,000 or less. Are there local policies that can do so?

Lowering Real Wages is Much Too Costly to be Cost Effective as a Job Creation Strategy

Lower real wages will boost area job growth, but at a high cost per job-year. Based on empirical research, the long-run "elasticity" of local job growth with respect to local real wages—the percentage increase in local jobs as a ratio to the percentage decline in local real wages—is around minus 1.5.[15] This means that if local real wages were to decline by 10 percent, local jobs would eventually increase by about 15 percent.

Given that local wages average around $60,000 per year, a 10 percent average decline in wages would be about $6,000 per job-year. This 10 percent decline in wages would boost local job growth by about 15 percent. The long-run cost per job would then be about $40,000 per job-year—the $6,000 in wages sacrificed on the 100 percent of existing jobs, divided by the 15 percent job boost.[16]

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[14] The model in Bartik (2018) yields a present value of benefits per present value of jobs created of $12,160. This model includes local residents' earnings benefits, fiscal benefits, property-value benefits, and other local business effects, but assumes that foregone nonemployed time has exactly zero social value. This model also assumes 1.2 percent real wage growth per year.

[15] This elasticity of −1.5 is assumed in Bartik (2018) and in Kline and Moretti (2014b). Beaudry, Green, and Sand (2014) have estimates that imply a long-run metro area elasticity of about −1.5. Hamermesh (1993) suggests a range for the labor demand elasticity with respect to the wage, not holding output constant, from −1.0 to −1.5, but this is at the national level, where one expects the labor-demand elasticity to be less in absolute value.

[16] This rough calculation uses actual percentages and a 10 percent real wage reduction. The long-run costs would be a little less if we used logarithms, at about $35,000 per job-year.

However, this long-run cost arrives only slowly, which raises the effective cost per job year. Estimates suggest that local economies, in response to a shock, converge to a new equilibrium at a rate of around 9 percent per year.[17] To put it another way, only a minority of firms can immediately take advantage of lower wages to expand production.

The slow adjustment means that lower wages have much higher costs in the short run. For example, after one year, employment would only have adjusted 9 percent of the full adjustment. As a result, after one year the ratio of real-wage reductions to the employment increase would be 11 times its long-run costs (1 / 0.09 = 11), or more than $400,000 ($40,000 / 0.09 = $444,444).

However, if we take a long-term perspective, the costs per job-year created are only moderately increased by the slow adjustment. The social-discount-rate literature suggests that future income should be moderately discounted, at about 3 percent annually.[18] This implies that future dollar values are discounted but still important. For example, a dollar 10 years from now is worth $0.74 today, and a dollar 20 years from now is worth $0.55 today. Therefore, because 9 percent per year adjustment means most adjustment takes place within 10 years, the long-term costs are more important than short-term costs in the present-value calculation. Overall, if we take the present value of lower wage costs, divided by the present value of jobs created, the sluggish adjustment to lower wages increases the average cost per job-year by a little more than a quarter. Costs per job-year would be around $50,000.[19]

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[17] See Helms (1985), or, more recently, Bartik (2017a) or Suárez Serrato and Zidar (2016).

[18] See review by Bartik (2011, Chapter 7), or Moore et al. (2004).

[19] This calculation assumes 9 percent adjustment per year and a 3 percent social discount rate, and it uses absolute percentages and a 10 percent wage reduction. More precisely, the present value of forgone wages divided by the present value of job-years created is around $52,000. If we used the logarithms of wages and jobs to make the calculation, and a log percentage wage reduction of 0.10, we get a present-value cost per present value of job-years of around $46,000. In addition, if we also allowed for real-wage increases over time, we would get somewhat higher costs per job created, but also somewhat higher benefits per job. But the higher costs per job would dominate as the benefits in terms of higher employment rates tend to depreciate over time, while the wage reductions persist. As

Why don't lower wages do more to boost local job growth? One possible reason is that lower wages also affect lower worker morale and raise worker quits, thus lowering worker productivity. As a result, lower wages don't lower business costs as much as one might think. Another possible reason is that lower wages may also redistribute income from local labor to owners of capital; this redistribution may negatively affect demand for local goods and services. Finally, different local economies in the United States are quite imperfect substitutes for one another, because of local ties of both labor and capital, and therefore modest cost changes of any kind do not have overwhelming effects on local job growth.

Business Tax Cuts Are Also Costly per Job-Year, Particularly if Financed by Cutting Productive Public Services

Based on empirical research, business tax cuts have a larger effect per dollar than wage cuts in increasing local jobs. A 10 percent reduction in state and local business taxes – while still holding the quality of public services constant -- would be expected to increase long-run jobs in an area by 5 percent.[20] State and local business taxes average around $7,000 per job.[21] Therefore, in the long run, holding public services constant, business tax cuts will have a cost per job created of around $14,000 per job—a 10 percent cut in business taxes will reduce business taxes by $700 per job but will increase jobs by 5 percent, so the annual cost per job-year created is $700 / 5% = $14,000.

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mentioned above, the model in Bartik (2018) gets a present value of benefits from jobs created, divided by present value of job-years created, of around $12,000, with a 1.2 percent annual real-wage trend assumed. The same model, with 1.2 percent annual real-wage trend, gets a present-value cost of real-wage reductions versus the present value of jobs created of $76,000 in the logarithmic formulation, and $86,000 in the absolute percentage formulation. I ignore this in this report, as these assumptions about real-wage trends may be questionable and are not needed for this report's arguments.

[20] This 0.5 elasticity is the average for studies using area fixed effects and controlling for public services in the comprehensive review of the literature by Bartik (1992). This elasticity is also consistent with the meta-analysis of the research literature by Phillips and Goss (1995). A 0.5 elasticity is also consistent with more recent work by Suárez Serrato and Zidar (2016).

[21] State and local business taxes average about 5 percent of business value-added (Bartik 2017a; Phillips, Sallee, and Peak 2016). Business value-added is about $140,000 per full-time equivalent (FTE) worker (BEA).

However, as with lower real wages, the economy doesn't instantly adjust to lower business taxes. For example, if the economy adjusts at 9 percent per year, the cost per job created in the first year is 11 × $14,000, or over $150,000.

However, as with real wages, if one takes a long-term perspective, with a modest social discount rate, the long-term costs per job-year tend to dominate. If one takes a present-value average of the tax cost per job-year created, the cost per job created is increased a little over one-quarter, to around $18,000 per job-year.[22]

But business tax cuts must be financed in some way. Given that state and local governments must balance their budgets, business tax cuts must be financed by either cuts in public spending or increases in other taxes. Either public spending cuts or tax increases will have negative "demand-side" and "supply-side" effects on local economic development. The negative demand-side effects occur because either public spending cuts or tax increases will reduce demand for locally produced goods and services. The negative supply-side effects occur because either public spending cuts or tax increases may reduce the quantity or quality of local inputs supplied to business. For example, either public spending cuts or tax increases may reduce the quantity or quality of local labor supply.

Based on recent research evidence, these local demand-side and supply-side effects of spending cuts or tax increases may be surprisingly high, even in the short run (Bartik 2017b; Suárez Serrato and Zidar 2016; and Zidar 2017). That is, the so-called fiscal multiplier effects of state/local spending changes or tax changes are surprisingly high: relatively modest changes in

[22] This again uses absolute percentage adjustments, a 3 percent social discount rate, and a 9 percent adjustment per year, and it assumes no real wage growth over time. The logarithmic formulation for a 10 percent tax reduction gets a present-value cost of around $17,000 per job-year. If we assume 1.2 percent real-wage growth per year, the cost per job-year figure goes up to around $30,000 in the absolute percentage formulation, $28,000 in the logarithmic formulation.

state/local spending or taxes have large job creation or destruction effects. To put it the opposite way, the cost per job created or destroyed by state/local spending changes or tax changes is surprisingly low. In addition, it is plausible that these short-run fiscal multipliers may understate the long-run economic development effects of state/local budget policy, particularly for education spending and infrastructure spending.

Consider first the local economic development effects of public spending cuts. Recent research suggests that the short-run "job multiplier" of public spending cuts at the local level, reflecting in part short-run demand effects, is about $34,000 (Bartik 2017b; Suárez Serrato and Wingender 2016). This means that each $34,000 in public spending cuts destroys one local job. Therefore, if business tax cuts are financed by cutting public spending, the short-run negative effects of the lower public spending probably exceed the short-run positive effects of the business tax cuts. Even in the long run, the negative effects of public spending cuts on local jobs will be more than half as large as the jobs created by business tax cuts.

Therefore, even ignoring longer-run effects, these short-run fiscal multiplier effects of public spending cuts significantly increase the net costs of job creation because of business tax cuts. With a $18,000 present-value cost per job-year created by business tax cuts, and each $34,000 in public spending destroying one job, one can calculate the net cost per job created of business tax cuts financed by public spending cuts. This net cost per job created from this balanced budget change works out to be about $38,000 per job-year.[23]

These fiscal multiplier effects only include the demand-side and supply-side effects of public spending cuts that occur in the short run. Long-run effects may occur from some types of public spending cuts. Consider public spending cuts in K–12 education. Jackson, Johnson, and

[23] $38K = 1 / [(1/$18K) − (1/$34K)].

Persico (2016) calculate that higher K–12 public school spending forced by court orders increases long-run earnings sufficiently that the present value of such earnings is 4.95 times the increased K–12 spending.[24] The implication is that the earnings losses from cutting K–12 spending will be a sizable multiple of the spending cuts. Most of these earnings increases will take place far in the future, when former K–12 students reach their peak earnings years in their 40s and 50s, but the present-value calculations discount these future earnings increases to their value today.

At the local level, about 55 percent of those who spent their childhood in a metro area will spend most of their working career in the same metro area (Bartik 2009). The implication is that local spending cuts to K–12 education may directly lower local wages by about 2.72 times the spending cut (2.72 = 55% × 4.95).

Furthermore, research by Moretti (2004) suggests that improving some individuals' education creates sizable education "spillovers" on others' wages. An individual's wages depend not only on her own education and skills, but also on the education and skills of other workers in the same metro area. These spillovers of others' education on my wages may reflect several economic forces:

- Higher skills of my fellow workers may directly increase my productivity.
- Higher skills of all workers at a workplace may enable an employer to be more aggressive in implementing new technology than if only some workers are skilled.
- Skills of workers at some firms may lead to new ideas that improve the productivity of other nearby firms.

[24] This recalculates the benefit-cost ratio using a 3 percent real discount rate. Jackson, Johnson, and Persico (2016) get a lower ratio of about 3 using a 6 percent real discount rate.

- Better skills in a firm's local suppliers may improve the firm's competitiveness and ability to pay higher wages.

Moretti's research suggests that education and skill improvements that directly increase some individuals' wages by *x* percent will have spillover effects on others in the same metro area of about 86 percent of the direct effect, or a total multiplier of 1.86. [25]

As a result, K–12 spending cuts will directly lower local wages by 2.72 times the spending cut, and will have spillover costs of 86 percent of that value, or 2.34 times the spending cut. The total loss in local earnings will have a present value of 5.06 times the spending cut (= 2.72 + 2.34).

Based on these short-run and long-run effects of education spending cuts, the net cost per job created from business tax cuts financed by education spending cuts would be quite high. This net cost would be over $230,000 per job-year created ($230,000 = $38,000 + $38,000 × 5.06).

Net costs would be high even if only a portion of the public spending cuts come from spending with such additional long-run costs. For example, about 22 percent of state and local public spending is on K–12 education. Even if we assume that no other type of public spending has similar additional long-run costs, the net costs of business tax cuts financed by across-the-board public spending cuts would be high. These costs would be over $80,000 per job created ($80,000 = $38,000 + $38,000 × 22% × 5.06). And, as we will see below, other types of public spending, such as infrastructure spending, may also have sizable effects on local economic development and local job creation in the long run.

[25] Moretti (2004) estimates that a 1 percentage point increase in the college graduate share of a local economy increases others' earnings by about 1.2 percent. Bartik, Hershbein, and Lachowska (2016) estimate that getting a college degree, compared to getting a high school degree, increases an individual's earnings by 140.3 percent. Therefore, the direct individual effect from 1 percent extra college-educated in the population is about 1.4 percent (140 percent × 1 percent), and the external spillover effect is 1.2 percent (1.2% / 1.4% = 86%).

What about business tax cuts financed by increases in household taxes? Recent research by Zidar (2017) suggests household tax increases can have sizable short-run local fiscal multiplier effects, but only for household tax increases on the bottom 90 percent of the income distribution. For households in the bottom 90 percent of the income distribution, each $39,000 in higher household taxes destroys one job. No effect on local jobs is found from tax changes for the top 10 percent of the income distribution. This much lower or near-zero effect for the highest-income households may reflect in part that their consumption of local goods and services is not much affected by modest changes in tax liabilities.

Suppose we consider the net job creation effects of business tax cuts, financed by across-the-board increases in state and local household taxes. Estimates suggest that for the average state, about 58 percent of household taxes are paid by the bottom 90 percent of the income distribution.[26] The resulting net cost per job-year created of household-tax-financed business tax cuts is around $24,600 {$24,600 = 1 / [(1/$18K) −0.58 × (1/39K)]}. This calculation may understate costs per job by omitting some additional long-run costs. For example, if higher household taxes lead to less employment in the short run, this lesser amount of work experience may reduce job skills of local workers in the long run.

How will state and local business tax cuts generally be financed? Probably the method of financing will vary greatly from state to state, and over time. What matters will be the particular politics of a given time and place. A relatively "neutral" assumption is that the average business tax cut is financed half by public spending cuts and half by household tax increases. Under this neutral assumption, the net cost per job-year created by business tax cuts will be $46,600 (= {1 + 0.50 × 0.22 × 5.06} × {1 / [(1 / $18K) – 0.50 × 0.58 × (1 / $39K) – 0.50 × (1 / $34K)]}.

[26] Calculations by Bartik (2018), based on ITEP (2015).

The upshot is that it is hard to make the case for across-the-board state and local business tax cuts, at least if viewed solely as a local economic development strategy. Benefits per job created are in the range of $5,000 to $20,000 per job-year. Costs per job-year are around $46,600 under neutral financing assumptions, half through public spending cuts and half through household tax increases. Some types of financing are much worse. Financing by cuts in K–12 spending costs over $230,000 per job-year. A case could be made for business tax cuts financed by household tax increases on the top 10 percent. This upper-income-financed business tax cut would result in costs of $18,000 per job-year created, which is toward the upper end of possible benefits per job-year. But even in this case, the benefit/cost ratio at best is only slightly above one.[27] In any event, financing business tax cuts with increased taxes on upper-income households would require an unlikely political coalition that is interested in both lowering business tax burdens and increasing tax progressivity.

Business Tax Incentives

One alternative to across-the-board business tax cuts is business tax incentives. By "business tax incentives," this report means tax reductions that are targeted on specific businesses making investment and job creation decisions. Sometimes these tax reductions are a legal entitlement that go to any business in specified categories (e.g., manufacturing firms) making particular types of investment and job creation decisions (e.g., job creation over a particular size threshold). Other times, these tax reductions are awarded with discretion, but

[27] The modest benefit-cost ratio means the *efficiency* benefits of this policy package would be modest. From a distributional perspective, the benefits from jobs created tend to be distributed progressively (Bartik 1994). Hence, an upper-income-financed business tax cut might make sense if one applied distributional weights to the gains and losses of different income groups.

nonetheless are commonly awarded to many businesses making job creation or investment decisions.

Business tax incentives provided by state and local governments in the United States currently add up to about $43 billion annually (Bartik 2017a).[28] The two largest types of such incentives are 1) job creation tax credits and 2) property tax abatements. A typical job creation tax credit (JCTC) allows a new or expanded business facility to keep some or all of the state income tax withholdings of the new workers it hires, for some number of years. (The workers are still credited by the state with making their required tax payments.) Depending upon the state income tax rate, such credits might be 3 percent of wages or more. Some JCTCs go for as long as 15 years. Under property tax abatements, new or expanded business facilities pay reduced property taxes on the new facility and its associated machinery and equipment. Such property tax abatements also are frequently awarded for a multiple-year period—in some cases up to 20 years. Because property taxes are the largest state and local business tax, averaging about half of state and local business taxes and sometimes being as large as $3,500 per worker job-year, such property tax abatements also can be quite sizable.

The targeting of business tax incentives has two advantages, both of which reduce such tax incentives' potential costs per job created relative to across-the-board business tax cuts. First, because business tax incentives are typically targeted on businesses considering new business investment or job creation decisions, tax incentive effects are more immediate. In other words, across-the-board business tax cuts are inefficient because they include the many businesses that are not currently considering investment decisions. Including all businesses results in considerable lags in effects. Business tax incentives avoid that inefficiency. Thus, business tax

[28] This uses the $45 billion incentives figure from Bartik (2017a) but subtracts out the 5 percent of all incentives that are customized job training.

incentives have costs per job-year created of about the same as the long-run costs per job of business tax cuts—around $14,000 per job-year. Depending upon various assumptions about how the business tax incentives are structured, and how rapidly incented jobs depreciate, costs per job-year created are likely to be somewhere in the range from $10,000 to $20,000 per job-year.[29] One recent report estimates that the average U.S. incentive package is likely to have costs per job-year created of $16,000.[30]

These costs per job created are much greater than typical incentive costs. The average state and local incentive package is around $1,600 per job-year.[31] If 100 percent of the incented jobs would not have been created "but for" the incentive, then the cost per job-year would be only $1,600. But the available research on business taxes and incentives suggests that business investment decisions are not nearly cost-sensitive enough for incentives of $1,600 per job-year to trigger 100 percent of incented location or expansion decisions. In other words, state and local governments offer incentives to many location and expansion decisions. Many of these investment decisions would have occurred anyway; any state or local area will, even without incentives, attract many new location decisions or expansion decisions. The availability of incentives triggers additional location and expansion decisions. But given the wide variation across different areas in labor productivity, wage costs, transportation costs to market, and other

[29] For example, the cost per job-year created from a typical incentive package may depend upon the extent to which it is front-loaded or back-loaded. Businesses use very high discount rates in making investment decisions (Poterba and Summers 1995). These high discount rates mean that front-loaded incentives have greater effects on business location and expansion decisions relative to the present value of their costs from a social perspective. The effect of front-loading versus back-loading on incentive costs per job-year created is shown in Bartik (2018).

[30] In simulations from a model developed for a forthcoming paper (Bartik 2018), it is estimated that if incentives are structured over time like the typical incentive package (Bartik 2017a), and if incented jobs depreciate at the rate of depreciation of manufacturing real estate (2.89 percent annually), then the present value of incentive costs divided by the present value of jobs created will be about $16,000, with present value calculated at a 3 percent real discount rate.

[31] This calculation is far less than the annual amount given if all firms get the maximum job-creation tax credit and property tax abatement, for two reasons. First, not all states have such generous incentives. Second, the calculation here considers the costs per job-year over an 80-year time horizon at a 3 percent discount rate, and most incentives die out after, at most, 20 years. This enormously lowers the net cost per job-year.

costs, the number of additional investment decisions triggered by a subsidy of $1,600 per job-year is modest. A typical incentive package might tip 10 percent of all incented decisions. This 10 percent tip rate implies the true cost per job-year is not the $1,600 average incentive cost per job year, but rather $1,600 / 10 percent, or 10 × $1,600, or $16,000 per job-year. State and local governments could do better, if only they had mind readers on staff to target just the investment decisions that would not have been made "but for" the incentive. But as reliable mind readers are nonexistent, state and local governments have little hope of tightly targeting incentives on marginal investment decisions. A higher percentage of location and expansion decisions can be tipped by increasing the incentive magnitude. But increasing incentive magnitude increases not only the tipping probability but also the costs, with little effect on the cost per job created.[32]

The targeting of business tax incentives also has a second advantage: such incentives can be targeted at what regional economists call "export-base" businesses. Such export-base businesses are thought to be better targets than other local businesses because export-base businesses will have higher local job multipliers. By "export-base" businesses, regional economists mean a much broader category than businesses that sell their goods and services outside the United States. Export-base businesses include any business that sells its goods or services outside the local area. Export-base businesses also include businesses that sell their goods or services locally, but principally compete for business with "imports" from outside the local economy. In contrast, non–export base businesses sell their goods and services to local buyers and largely compete with other local businesses selling to the same customers.

[32] For example, the highest-incentive states have incentives of about three times the average state. If we triple incentives to $4,800 per job-year, and this tips 30 percent of all incented firms making location or expansion decisions, then implied costs will still be $16,000 per job-year. As we increase incentive costs per job, at some point there are likely to be decreasing marginal returns, as it is impossible to tip more than 100 percent of incented firms.

If an export-base business expands in a local economy, that business brings new dollars into the local economy. The expansion of this business may reduce sales of other competing businesses, but such effects occur for competing businesses outside the local area. The new dollars brought into the local economy are spent in part on local suppliers. This leads local suppliers to add jobs and is one type of multiplier effect on local jobs. In addition, the workers in the expanded export-base business and its local suppliers will spend some of their increased earnings at local retailers, which will lead these local retailers to add jobs, and this adds another type of multiplier effect on local jobs. If an incentive or tax cut or other policy induces the creation of x jobs in an export-base business, the total job creation in the local economy will be some multiplier $m \times x$ jobs, where m is greater than 1. X jobs would be created in the incented firm, and $(m - 1) \times x$ jobs in local suppliers and retailers.

In contrast, if some non-export-base business is induced by state or local policy to expand in a local economy, most of that business's increased sales will be taken away from its local competitors. For example, if some incentive or tax cut causes a local McDonald's restaurant to expand, it seems unlikely that this will significantly expand the overall number of local fast-food restaurant jobs. Even if the incentive or tax cut is "successful" in inducing the McDonald's to expand, the likely consequence is that the Burger King down the street downsizes or closes. The net "multiplier" of the incented jobs is close to zero—even if the incentive triggers x jobs in the incented businesses, total jobs in the local economy will go up by some multiplier m times x jobs, where m will be much closer to 0 than to 1.

From the viewpoint of creating local jobs, across-the-board business tax cuts are inefficient because they go to the majority of business that are non-export-base. Probably about two-thirds of all private employment is non-export-base.[33] The majority of business tax cuts that go to non-export-base businesses do little to boost local jobs.[34]

In contrast, business tax incentives can be designed to target only export-base businesses. In practice, state and local governments do largely target incentives at export-base businesses, with some prominent exceptions. Average incentive levels for export-base businesses are about nine times the average incentive levels for non-export-base businesses.

Therefore, business tax incentives provided to manufacturers or other export-base businesses can have multipliers of greater than 1, meaning that the direct jobs created in the incented business lead to some spillover jobs created in other businesses. For manufacturing, a reasonable assumption about the net multiplier, considering both positive effects due to agglomeration economies and negative effects due to more local jobs increasing local prices, is about 2.[35]

Therefore, if the cost per direct job of business tax incentives will generally be about $10,000 to $20,000 per job-year, and the net multiplier effect is around 2, the cost per all job-years created will be in the range of $5,000 to $10,000. For the average business incentive package, for which the direct cost per job-year created is calculated to be $16,000 (Bartik 2018), the cost per job-year created including multiplier jobs would be $8,000.

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[33] As might be apparent, export-base is a matter of degree, with some gray areas where it is difficult to classify all firms in an industry as being export-base or non-export-base. For example, most hospitals may be non-export-base, but this is not true of the Mayo Clinic. Bartik (2017a) classifies 45 NAICS industry categories as export-base, comprising 33.7 percent of total U.S. employment.

[34] Business tax cuts for non-export-base businesses will have some limited effects on local jobs, to the extent to which the businesses are locally owned and these business tax cuts lead to some increase in consumption spending on local goods and services by the local business owners.

[35] Moretti estimates a multiplier for manufacturing, including effects on both tradables and nontradables, of around 2.85. The model used in Bartik (2018) suggests that wage and price feedbacks will reduce the net multiplier associated with such an initial multiplier to about 1.96. Note that this net multiplier compared to the original manufacturing shock is about one-third lower than the gross multiplier before feedback effects. This gross multiplier before feedback effects is the appropriate multiplier to use when analyzing realized multipliers in data on local communities' manufacturing and nonmanufacturing sectors, as the feedback effects will reduce both manufacturing and nonmanufacturing proportionally.

If the business tax incentives could be financed without any other costs for the local economy, then we would say that the benefits and costs of business tax incentives would be closely balanced. Benefits are likely to be somewhere in the range from $5,000 to $20,000 per job-year. Costs are likely to be in the range of $5,000 to $10,000 per job-year. Whether any particular project would have benefits greater than costs would depend upon many details (Bartik 2018). On the benefits side, benefits per job-year will be influenced by many factors. For example, what proportion of the jobs go to the local nonemployed? Given whether local public services and infrastructure have excess capacity, how does that affect the magnitude of fiscal benefits? On the cost side, costs per job will vary depending upon whether the incentives are front-loaded. Front-loading reduces the social costs of tipping location and expansion decisions of myopic business decision makers.

However, the financing of the incentives may have significant economic costs. Business tax incentives for particular firms making location and expansion decisions may be financed by across-the-board business tax increases for all businesses, household tax increases, and public spending cuts of various kinds. This financing raises business tax incentives' net costs per job created. If we assume that before financing costs are considered, gross costs per job-year created would be $8,000, the following are the calculated net costs per job-year under various financing alternatives:

- *Business tax financing*: $14,400 = {1 / [(1/$8K) − (1/$18K)]}.
- *Household tax financing on the bottom 90 percent*: $10,100 = {1 / [(1/$8K) − (1/$39K)]}.
- *Household tax financing on the top 10 percent*: $8,000 (assuming zero fiscal multiplier of tax increases on this upper-income group).

- *Average state/local tax mix financing*: Based on figures that 44 percent of state and local taxes are business taxes and 56 percent are household taxes (Phillips, Sallee, and Peak 2016), we get net costs per job created of $10,800 = 1 / [(1/$8K) – 0.44 × (1/$18K) – (1 − 0.44) × (0.58) × (1/$39K)].[36]
- *K–12 spending-cut financing:* $63,400 = (1 + 5.06) × {1 / [(1/$8K) − (1/$34K)]}.[37]
- *Across-the-board public spending cut financing, conservative assumptions about long-run spending productivity:* Assuming that only 22 percent of public spending cuts have long-run productivity costs similar to K–12 education cuts, net costs of financing business tax incentives 100 percent by across-the-board public spending cuts are $22,100.
- *"Neutral" mix of tax-increase financing and public-spending-cut financing:* Assuming 50 percent of business-tax-incentive financing comes from across-the-board tax increases, and 50 percent from across-the-board public spending cuts, we get $16,600.

Therefore, for incentives to manufacturing firms with "average" net multiplier effects of 2, the incentive policy's likelihood of net benefits is highly dependent on how the incentives are financed. Incentives financed by cutting productive public spending—such as by cutting spending on K–12 schools—are very unlikely to make sense. Costs per job-year created are over $60,000, which far exceeds the likely benefits per job-year in the $5,000–$20,000 range. Average incentives are more likely to make sense if they are financed by increased taxes, not by public spending cuts. Within the tax-financing approach, progressive tax increases on higher income groups lead to lower net costs of job creation.

[36] In this equation, the various offsets are multiplied by the tax shares that are appropriate. Forty-four percent of overall taxes are business taxes; (1 – 44 percent) are household taxes, and of those household taxes, 58 percent are paid by the bottom 90 percent.

[37] In other words, there are short-run and ongoing fiscal multiplier costs at $34K in public spending cuts destroying one job, and additional costs in forgone earnings for future generations at 5.06 times the initial costs per job.

Incentives are more likely to pay off if we restrict incentives to only firms with the highest multipliers. For example, Moretti (2010) estimates that some high-tech manufacturing businesses may have gross multipliers (before considering feedback effects) as high as 6.0. The model by Bartik (2018) suggests that the resulting net multiplier, after considering feedback effects from higher wages and higher local prices, might be around 4.[38] With a net multiplier of 4, the cost per job of business tax incentives drops to $2,500–$5,000 per job-year, with a plausible “average” incentive package cost of $4,000 per job-year.

This $4,000 per job-year would be the cost of high-multiplier targeted incentives if they were financed only by increases on taxes of households in the top 10 percent. But financing such high-multiplier incentives by K–12 spending cuts still wouldn’t make sense. Estimated costs of high-multiplier targeted incentives financing by K–12 spending cuts are $27,500 per job created.

On the other hand, incentives financed by “neutral” budget policy, or better yet by tax financing, will have lower costs. If financed by “neutral” budget policy, half though spending cuts and half through tax increases, the net cost of high-multiplier incentives are $7,100 per job-year. If financed by across-the-board tax increases, net costs per job-year are $4,600.

High-multiplier targeting requires restricting incentives to only a portion of the range of industries currently provided with tax incentives. Depending upon how many industries truly have high multipliers, this restriction could result in significant reductions in resources devoted to incentives.[39] For example, Moretti’s high-tech manufacturing sector makes up less than a quarter of total manufacturing jobs.[40] If incentives were reformed to only provide incentives to

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[38] The estimated net multiplier after feedback effects is 3.91.

[39] The magnitude of multipliers is an active area of research. For example, Moretti’s evidence has recently been re-examined by Van Dijk (2018), although Van Dijk does not re-estimate the high-tech multipliers.

[40] Moretti mentions machinery and computing equipment and electrical equipment. These two areas comprised 2.5 million of the 12.1 million in FTE manufacturing jobs in 2015, according to BEA.

Moretti's high-multiplier industries, total resources devoted to incentives might be reduced by over $30 billion annually.[41]

Customized Business Services: A Proven Way to Lower the Costs of Creating Local Jobs

Creating jobs by handing out cash to lower business costs is relatively expensive per job created. Each dollar of business tax cuts or business tax incentives can at best lower business costs by one dollar. To lower the costs of job creation, one alternative is to see if there are policies that, for a given dollar of social costs, will lower business costs by more than one dollar. One such type of policy is high-quality customized business services that improve business productivity.

For customized business services, the most rigorous evidence for high productivity boosts per dollar is for manufacturing extension services and customized job training. Other customized services—for example, small-business development centers, business incubators, and business visitation programs—may also be cost-effective, but rigorous evidence is lacking.

Manufacturing extension services provide small- and medium-sized manufacturers with advice on how to improve their technology, workplace organization, and sales. Some of this advice is provided directly by staff of these manufacturing extension offices. Other advice is provided by referrals to reliable private consultants or faculty at local universities. Some advice is provided free, whereas other advice is provided for a fee. However, even with the fees, there is usually some explicit or implicit subsidy that reduces the costs to the business of using these advisory services.

[41] Bartik (2017a) shows estimated annual incentive costs of around $45 billion in 2015. Around 95 percent of these costs are for business tax incentives. Reducing tax incentive costs by 75 percent would reduce annual business-tax incentive costs by $32 billion. This assumes that incentive costs would be reduced by about as much as the relative employment shares in different industries.

Why should public policy seek to provide such advisory services? Why doesn't the private market make sure that high-quality business advisory services are provided efficiently?[42] The benefit-cost argument for public intervention in this market is that without such intervention, small and medium-sized manufacturers will not get advisory services whose benefits exceed the costs of providing this information. That is, many small and medium-sized manufacturers could benefit from better advice on ever-evolving technology and markets. Such advice is relatively cheap to provide relative to the benefits, but an adequate private market is not automatically created to provide such beneficial advice. Obviously, there is a private market for advice. But evaluating the quality of information one does not possess is challenging. Manufacturing extension services help improve the market for advice by identifying advice of better quality. In addition, small and medium-sized businesses may have financial or cash flow issues that inhibit their ability to pay for high-quality advice. Finally, there are spillover benefits from better advice that go beyond the private benefits of the advice to the individual manufacturer receiving assistance. Some subsidy for the advice is rationalized by the benefits of greater manufacturing productivity for local economies and local workers. These market failures, due to imperfect information on quality, financing constraints of small business, and spillover benefits, justify some public policy intervention to improve the access of small and medium-sized manufacturers to higher-quality advisory services.

The Manufacturing Extension Partnership in the U.S. Department of Commerce helps support manufacturing extension offices in each state, with these offices often having multiple locations within a state. Annual federal funding for MEP is currently around $130 million per

[42] Bartik (1990) and Kline and Moretti (2014a) are two attempts to review a wide variety of possible market failure rationales for various types of government interventions in local economic development.

year.[43] This federal funding generally gets at least a 2-for-1 match by state and local funding and fee revenue. Therefore, annual resources devoted to manufacturing extension in the United States are currently around $400 million.

Customized job training programs provide businesses with job training that is designed to fit the individual business's specific skill needs. The training is provided to workers already employed by the individual business, or workers whom the business intends to hire after their successful completion of training. Customized job-training programs in different states have diverse designs. Sometimes customized training programs are provided as part of incentive packages for a new facility location or a facility expansion. Sometimes a customized training program is provided to a business's incumbent workers as part of an attempt to retain jobs (Hollenbeck 2013). Customized training is usually an in-kind service provided by local community colleges, although the training may be provided at the business's sites. But in some programs, the customized training is provided via a grant to the individual business to deliver training using its own personnel.

A rationale for government subsidies or provision of customized job training is that businesses may underinvest in training. Even though such training is "customized," much of the training provides skills that are general enough to be useful to a variety of employers. Therefore, many employers will be reluctant to invest in training that enables workers to get higher wages at other employers. In addition, many small and medium-sized businesses may lack expertise in providing training. Finally, some small businesses may find it difficult to afford the money and time required for high-quality intensive training. For all these reasons, customized training may

[43] The 2019 proposed federal budget from the Trump administration calls for eliminating this program—see https://www.vox.com/2018/2/13/17004590/trump-budget-cuts-manufacturing-michigan-west-virginia.

provide skills whose boost to local labor quality and wages exceeds the costs to government of providing the training.

Total costs of customized training programs are estimated to be around $600 million (Hollenbeck 2013).[44] But this is below historical levels, which were around $900 million in 2006.[45] During the Great Recession, states significantly cut customized training programs.

For both manufacturing extension and customized training, natural experiments provide good evidence that these programs have "multiplier" effects on reducing business costs. For each dollar spent on these programs, business costs decrease by a multiple of at least 5 times greater.

For manufacturing extension, Jarmin (1998, 1999) examined how these programs affected the manufacturing productivity of assisted firms. The firms assisted by manufacturing extension were compared with similar firms that happened to be located further away from local manufacturing extension offices.[46]

Based on Jarmin's estimates, the productivity increase effects of manufacturing extension occur in the year in which the extension services were provided, and they persist for at least one additional year. If the productivity effects last for only two years, the resulting cost savings to the firm would be 5.4 times government costs of providing extension services.

For customized job training, Holzer et al. (1993) examined how customized job training assistance to an individual manufacturing firm affected the rate at which the firm's products needed to be scrapped because of quality issues. The firms that received customized job training

[44] This updates Hollenbeck's estimate for FY 2011 spending, the latest available, to 2015 dollars. The exact estimate is $607 million in 2015 dollars.

[45] This updates Hollenbeck (2008) to 2015 dollars. The exact estimate is $884 million.

[46] More specifically, Jarmin (1999) succeeded in using a variable measuring whether an extension office was located in the metro area in which a manufacturing firm was located as an instrumental variable for whether a manufacturing firm received extension services.

services were compared with similar firms that applied for customized job training services, but that applied too late in the training program's fiscal year to receive assistance.[47]

Based on Holzer's estimates, the training grants reduced scrappage rates, both in the year in which the grant was received, and in at least the subsequent year. If these reduced scrappage rates are valued at the price of output, and if the reduced scrappage rates last for only two years, the cost savings to the firm would be 4.9 times the government costs of providing training services.

From these estimates, one would expect either manufacturing extension or customized job training to be much more efficient than business tax incentives in reducing costs. As a result, manufacturing extension or customized job training should be more cost-effective than business tax incentives in inducing firms to locate jobs in a location, expand jobs in that location, or retain jobs there. As discussed above, the estimated cost per directly induced jobs of business tax incentives might be in the range of $10,000 to $20,000 per directly induced job-year. With a multiplier of 2, the cost per total local job-year created might be in the range of $5,000 to $10,000. Business tax incentives by their very design only lower business costs by at most one dollar per dollar of government cost. If manufacturing extension or customized job training lower business costs by at least five times their government costs, the implication is that these programs would have a cost per directly induced job of no more than one-fifth the cost of business tax incentives. In other words, the cost per directly induced job of manufacturing extension or customized training would be in the range of $2,000 to $4,000 per job-year, or even less if their cost-reduction effects last beyond what is directly observed in the available studies.

[47] The program did not seem to apply any screening criteria for training grants other than "first come, first served."

With a multiplier of 2, these customized business services would have a cost per local job-year created of $1,000 to $2,000, or even less.

More direct evidence also suggests that these customized business services have low costs per job created. A study by Hoyt, Jepsen, and Troske (2008) of economic development incentives in Kentucky compared the effectiveness of customized job training and tax incentives in affecting overall job growth in Kentucky counties. Because these estimates consider total job growth, they correspond to estimates of affecting job growth that include multiplier effects. They estimated that customized job training created jobs at a cost of around $1,700 per job-year. This cost is around one-tenth of the cost per job created of tax incentives, which are estimated at $16,000 per job-year.

In addition, some studies have directly asked firms how manufacturing extension or customized job training have affected job creation. Economists are suspicious of such survey evidence, as they tend to assume that survey respondents may lie if they want to help promote the program's continuation. However, for manufacturing extension and customized job training, these programs provide firms with in-kind services rather than cash. It is unclear why firms would want to promote such services unless firms find these services to be useful.

For manufacturing extension, Ehlen (2001) concludes from survey evidence that the short-run cost per job-year, even if the created jobs lasted only one year, is around $19,000. For customized job training, Hollenbeck (2008) concludes from survey evidence that the short-run cost per directly induced job, even if the induced jobs only last one year, is around $16,000.

The present value of program costs per present value of job-years will then depend on how fast these directly induced jobs depreciate. Even with relatively conservative depreciation assumptions, one ends up with relatively low costs per directly induced job-year. For example, suppose we assume that directly induced jobs depreciate at the rate of annual depreciation of manufacturing capital stock, which is around 7.4 percent.[48] Suppose we further use a social discount rate of 3.0 percent. Then the present discounted cost per present discounted value of job-years created will be about one-tenth of the short-run cost per job-year created. Therefore, the implication is that manufacturing extension has a present value of costs per present value of job-years directly induced of about $1,900, and customized job training's costs per present value of job-years created is about $1,600. With a multiplier of 2, the cost per local job-year created is half as much, at $800 to $1,000 per job-year created.

Thus, there is good evidence that some customized business services can create local jobs at a cost of $1,000 to $2,000 per job-year. As mentioned, the benefits of an extra local job year are likely to be in the range of $5,000 to $20,000 per job-year. Therefore, the benefit-cost ratio of such customized services can be sizable—probably at least 2-to-1, and more likely over 5-to-1.

This discussion ignores the fiscal multiplier effects from these services. On the cost side, the financing of such services, from higher taxes or lower public spending, will have some local job effects, as was true of the financing of business tax cuts, or business tax incentives. On the benefits side, providing some services directly creates some jobs by hiring extra personnel to provide the customized training or manufacturing extension advice. However, because customized business services are so cheap per job created, the fiscal effects associated with their financing and spending are quite modest, at least compared to business tax cuts or incentives. In addition, there are some offsetting fiscal benefits from the spending on the customized services. Therefore, in general these fiscal effects do not much change the conclusion that customized business services are cheap per job created. The only exception is for financing from reduced

[48] These depreciation figures come from BEA.

education spending, or other very high productivity public services. Such financing can offset wholly or in part any benefits from customized business services.

In Table 3, I consider how fiscal effects alter the costs per job-year created of customized business services. These costs per job-year created from different financing are compared with the case of business tax incentives. For the calculations, I assume a base cost per job-year created, without considering fiscal effects of financing and spending, of $2,000 per job-year created for customized business services, and $8,000 per job-year created for business tax incentives. For customized business services, this is a conservative assumption. As discussed above, the true baseline costs, without fiscal effects, might be less than $1,000 per job-year created.

Table 3 Costs per Job-Year Created of Customized Business Services vs. Business Tax Incentives, with and without Fiscal Effects (thousands of dollars per job-year)

	Customized business services	Business tax incentives
Without considering fiscal effects	2	8
Financing by across-the-board tax increases	2	10.8
Financing by reduced K–12 spending	12.1	63.4
Financing by across-the-board public spending reductions	4.2	22.1
Financing “neutrally”: half tax increases, half spending reductions	3.1	16.6

NOTE: All costs are in thousands of dollars per job-year. Costs are rounded to nearest hundred. For customized business services, costs reflect both how they are financed and the fiscal benefits of more spending on these services.

Even with such financing effects, if we avoid drastically slashing the most productive public services, customized business services have a cost per job-year created that is typically less than the $5K–$20K range of likely local benefits from an additional job-year.[49] Customized

[49] As an example of the calculation, the $3,100 cost per job-year created from “neutral” financing of customized business services is the result of the following calculation: $3.1K = (1 + 0.11 × 5.06) × (1 / [(1/$2k) − 0.22(1/$18K) − 0.28 × 0.58 × (1/$39K) − 0.50 × (1/$34K) + (1/$34K)]. The first term reflects the opportunity cost of the 11 percent that goes to school financing. The terms in brackets reflect the costs of 22 percent of the finding from increased business taxes, 28 percent times 58 percent of financing from the bottom 90 percent of households, half financing from public spending cuts, and the fiscal multiplier benefit from the direct spending on the services.

business services probably are at least five times more cost effective than business tax incentives in creating local jobs.

Customized business services have this further advantage: such services are most useful to small and medium-sized businesses, and many of these businesses are locally owned, which increases local multipliers. Small and medium-sized businesses benefit the most because such businesses are the most likely to have information barriers and financial barriers that make it more difficult for them to obtain high-quality manufacturing advice or job training on their own. If such small and medium-sized businesses are locally owned, local ownership has been shown in various studies to lead to greater use of local suppliers. This greater use of local suppliers might increase the local multiplier by 0.25 (Civic Economics 2007, 2013). In addition, local ownership means that any profit increase caused by these business services accrues to local owners. These local owners will spend some of this profit increase on local consumption goods, further spurring local demand. This contrasts with business tax incentives that go to nonlocal business owners, with the resulting profit increase generally not being spent locally. Some simulations suggest that local ownership may lower net costs per job created by around 10 percent (Bartik 2018).

Customized business services may also have a political economy advantage: business demand for such services is to some extent limited by their effectiveness. In the case of business tax cuts or business tax incentives, there is an unlimited demand by business for cash provided by such tax reductions. More cash will always have a high demand from any business. In contrast, for customized business services, there will not be business support for such services unless they have some usefulness in reducing business costs. Political support from business for services will tend to increase with the services' effectiveness. This political dynamic creates some useful pressure on customized service providers to make sure their services are in fact effective in lowering business costs.

Public Services to Boost Human Capital Can Boost Wages

As mentioned above, the evidence suggests that increased K–12 spending can boost local wages, with the present value of the resulting local wage boost being estimated at about five times the spending increase (more precisely, 5.06).[50] High-quality human capital programs also can work if their intervention is earlier or later in the life-cycle.

In the early education area, child care is very expensive, but even so, some high-quality child care programs have high local benefit/cost ratios. For example, the Abecedarian program, which was provided from six weeks after birth to age five in North Carolina, has local benefits for increased earnings that are estimated to have a present value of a little over three times program costs (more precisely, 3.31 times as great).[51] About 40 percent of these benefits occur in the form of greater earnings for the former child participant. The other 60 percent occur because

[50] To what extent is the local earnings boost from educational investments due to changes in the *quantity* of local jobs created, versus changes in the *quality* of local jobs created? Research has not definitively answered this question. However, the available research suggests most of the effect is on the quality of jobs, although there are some effects on the quantity of jobs. For example, Wolman et al. (2017) summarized Hungerford and Wassmer's (2004) review of the literature on the effects of K–12 spending on both personal income and jobs. Based on Helms (1985), Hungerford and Wassmer and Wolman et al. conclude that a property-tax financed increase of 0.1 percent of state personal income devoted to K–12 spending will increase nominal state personal income in the long run by 0.74 percent. This same fiscal change, based on Harden and Hoyt (2003), will lead to a 0.136 percent increase in state jobs. Based on Bartik (1991), each 1 percent increase in jobs increases local prices by 0.2 percent, so the 0.136 percent increase in jobs should increase local prices by 0.0272 percent, which implies that real personal income increases by 0.7128 percent. In addition, based on Bartik (2018) and the literature cited therein, each 1 percent increase in jobs increases population by 0.85 percent in the long run, so the 0.136 percent increase in jobs should increase local population by 0.116 percent. The result is that, due to a property-tax-financed increase in K–12 spending by 0.1 percent of state personal income, the state employment-to-population ratio would go up by 0.020 percent, and state real personal income per capita would go up by 0.5972 percent. The per capita earnings increase due to higher employment-to-population ratios would be about 3 percent of the real personal income per capita increase (3% = 0.020 / 0.5972). See later empirical results in the current report on the local benefits from more college graduates, which also find that these benefits from more local education are more on the job quality side than the job quantity side.

[51] This figure is derived from taking the state returns calculated in Bartik (2011), adjusted from state to metro areas using the information in Chapter 9 and then adjusting for the spillover effects of education based on Moretti (2004).

of both short-term and long-term increases in earnings for the parents of participants. Free child care for five years enables many parents to accumulate more work experience and more education. This additional work experience and education increases parental wages and earnings in the long run, even after the program's services have ceased when the child turns five.

High-quality preschool provides future earnings benefits for the local area that are almost six times program costs (more precisely, 5.72).[52] These benefits are almost all due to increased future earnings for former preschool participants who end up living in the same metro area.

After K–12, college scholarship programs also can pay off. The Kalamazoo Promise scholarship program, which provides up to 100 percent tuition to any graduate of Kalamazoo Public Schools, increases college completion by about one-third (Bartik, Hershbein, and Lachowska 2017). The likely local earnings benefits from this program, only counting increased earnings due to the roughly 40 percent of program participants who are likely to return to Kalamazoo, are estimated to be over twice program costs.[53]

Job training programs have a bad reputation. But job training that is high quality, which provides skills that employers are looking for, can have a high payoff. A review of the literature on job training programs by Card, Kluve, and Weber (2017) suggests that training programs can increase employment rates by at least 5 percentage points. Training programs that subsidize employers to hire the unemployed, and that provide on-the-job-training, can increase employment rates by at least 15 percentage points.

[52] This figure takes the figures from Bartik (2014), adjusts them to a typical metro area using Chapter 9 in Bartik (2010), and then applies the spillover estimates of Moretti (2004).

[53] This calculation takes the 5.32 benefit-cost ratio from Table 7 in Bartik, Hershbein, and Lachowska (2016), and multiplies it by 40 percent. This calculation also ignores that a large percentage of the program's scholarship costs provides a benefit to college students by subsidizing their tuition costs, even for students for whom the scholarship does not alter educational attainment. If we multiply a 40 percent local share of college graduates who stay in the local economy, times the ratio of earnings benefits to local additional resource costs, we get a benefit-cost ratio of 6.51 (Bartik, Hershbein, and Lachowska, 2016, Table 8).

Hollenbeck and Huang's (2014) reviews of job training programs in the state of Washington suggest that training programs that go beyond basic skills to provide training for specific employer job needs can provide a high payoff. For example, Hollenbeck and Huang find that community college programs that provide worker professional and technical education, or worker training, have medium-term earnings impacts of over $4,000 per year, with a training cost of around $8,000 per trainee. Projected over a lifetime, these training programs would have local earnings benefits of many multiples of their costs.

A recent randomized control trial of Project Quest, a San Antonio program that targeted in-demand health care jobs, found very high returns (Elliott and Roder 2017). The program costs about $10,000 per trainee, and it increased earnings for training participants versus similar controls by $5,000 annually, as of six years after program entry, with earnings effects growing over time.

Thus, human capital programs throughout the life cycle, from birth to adulthood, can produce large earnings benefits. Furthermore, because many of the former program participants will spend most of their working career in the same metro area, these higher earnings benefits will occur locally, further boosting the local economy through demand effects. Research suggests that higher skills in a local area make up a key business climate factor, helping attract businesses considering location and expansion decisions (Glaeser and Saiz 2004).

However, several concerns might be raised about training programs. One concern is whether these programs produce short-term gains. The second concern is whether these programs do enough to directly create jobs.

On the short-term gains side, some of these programs do produce short-term earnings gains. High-quality child care and job training programs can certainly produce significant earnings gains for a local economy within a five-year time horizon.

Other programs yield their major benefits over much longer time periods. The long-term nature of the most important benefits is true of preschool programs, as well as K–12 programs. However, these programs do provide some short-run job creation programs by the direct and multiplier effects of hiring additional K–12 and preschool staff. As mentioned previously, the local fiscal multiplier for public spending implies each extra $34,000 in annual spending will create one job-year (Suárez Serrato and Wingender 2016).

This cost will have to be paid for by increased state and local taxes. These increased taxes can, potentially, quickly offset any short-run job creation effects. For example, financing by higher business taxes may destroy jobs.[54] However, if the financing is done without increasing business taxes, then there may be significant and persistent short-run and medium-run job creation benefits. As mentioned previously, estimates by Zidar (2017) suggest that if these taxes are on households in the top 10 percent of the local income distribution, the negative local job effects of higher household taxes will be negligible.

If public spending increases are financed by across-the-board increases in household taxes, some negative effects on job creation will occur because of increased taxes on the bottom

[54] In the very short run, business tax increases only destroy about one job per $156,000 in tax cuts. In that case, the short-run job creation effects of public spending increases financed by across-the-board tax increases will be $55,000 per job ($\$55K = [(1/\$34K) - 0.44 \times (1/\$156K) - 0.56 \times 0.58 \times (1/\$39K)]$), based on Zidar's estimate that taxes on the bottom 90 percent have a fiscal effect of $39K per job, ITEP's (2015) estimate that 58 percent of household state and local taxes are paid by the bottom 90 percent, and Phillips, Sallee, and Peak's (2016) estimate that business taxes are 44 percent of overall state and local taxes. However, because the economy converges at 9 percent toward a new long-run equilibrium because of higher business taxes, the cost per job created if the financing is from higher business taxes will escalate. By Year 12, the across-the-board tax increases will actually destroy jobs. This is before the economic development benefits from better preschool or better elementary school will really begin paying off for local economic development. If we arrange the financing from higher household taxes, this avoids those medium-term economic development costs.

90 percent of the income distribution. Based on estimates by Zidar (2017) and ITEP (2015), the net costs of a household tax–financed increase in public spending will end up leading to a cost per job created of around $69,000 per job-year.[55]

Neither a cost of $34,000 per job-year nor one of $69,000 per job year is sufficiently low for these demand effects alone to justify these programs from a local economic development perspective. As mentioned above, the local value of jobs is probably between $5,000 and $20,000 per job-year. Therefore, the benefits from the short-run job creation of hiring additional preschool teachers or K–12 teachers might offset 15 to 45 percent of public spending increases financed by increased taxes on the top 10 percent, and 7 to 20 percent of the public spending increases financed by increased household taxes in general. However, the point is that if short-run effects are a concern, there are methods of financing preschool or K–12 programs that will provide some offsetting short-run and medium-run gains from job creation, while waiting for the long-run wage increases.

The second concern is that these programs might be perceived as not doing enough to directly create jobs, even in times or places where unemployment is high. This is a legitimate concern. For example, demand-oriented job training programs are difficult to run effectively when employers are not doing much hiring.

However, in times or places where unemployment is high, job training programs might usefully focus on well-targeted short-term wage subsidies for employers for creating new jobs to hire the long-term unemployed. One possible model is a program the state of Minnesota ran in the 1980s, called the Minnesota Emergency Employment Development (MEED) program. MEED provided wage subsidies equivalent in today’s dollars to about $12 per hour, for up to six

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[55] $69K = 1/((1/$34K) − 0.58 × (1/$39K)).

months, for both private and public employers who were willing to commit to hiring the long-term unemployed and retaining them after the subsidy period was over.[56] The jobs also had to be newly created jobs, rather than just job vacancies—a policy that helped reduce the displacement effects of the program on other workers.

A crucial aspect of MEED's program design was that it was not run as a tax credit or other program under which individual employers and workers were automatically program-eligible. Rather, the program was administered by local job training agencies with considerable discretion. Specifically, these local job training agencies had the discretion to screen both unemployed workers and employers, and to decide which ones were the best fit for the program. By screening the unemployed, the program was able to identify long-term unemployed workers who, with some training, could be work-ready in both hard skills and soft skills. Such screening helps avoid stigma effects that sometimes make wage subsidy programs counterproductive. (Many employers don't want to hire someone whom the government has designated as disadvantaged.[57]) By screening prospective employers, the MEED program could identify employers who were willing to take some risk in the workers they hired, with appropriate training and screening. The MEED program was also able to make some effort to screen out employers who might seek to use a wage subsidy program in socially costly ways, such as hiring workers they would have hired anyway, or in firing workers after the wage subsidy had expired and then hiring a new, subsidized worker.

Both case studies and survey evidence suggest that the MEED program led to some new job creation and new hires. Estimates suggest that the program created new jobs at a rate of a

[56] See review of MEED program in Bartik (2001).

[57] The classic article making this case is Burtless's (1985) analysis of a wage subsidy program for the disadvantaged that seemed to reduce the probability of the subsidized workers getting jobs. However, this was an entitlement program that encouraged welfare recipients to advertise their disadvantaged status.

one-time cost of $31,000 for one job.[58] If the jobs depreciate at 7.39 percent annually, and 3 percent is the figure used to discount future jobs, then the net cost per job-year is about $3,100 per new job. If these jobs are export-base jobs (Minnesota's program gave a priority to export-base jobs) that have a multiplier of about 2, then the net present value cost per present value of job-year is around $1,600.

Therefore, MEED's job creation costs are similar to those of the more effective customized business services. This should not be surprising; MEED was to a large extent supplying customized services to business clients, both by screening potential job hires and providing some upfront training, before providing the wage subsidy. However, in addition, MEED specifically targeted these newly created jobs toward the long-term unemployed. This may increase the likely benefits of new jobs, as more of the new jobs will go to the local unemployed, and fewer to in-migrants.

MEED evaluation is based on survey evidence, not on a good comparison group. But as mentioned, a meta-analysis of the training literature suggests that wage subsidy programs can increase employment rates by at least 15 percentage points (Card, Kluve, and Weber 2017). In addition, a study of a subsidized employment program in Florida suggests that earnings in the subsidized jobs group, compared to a similar eligible but unassisted group, increased by more than $2,000 during the initial post-program year (Roder and Elliott 2013). These results are promising, although it would be desirable to have more evidence from studies with more rigorous designs.

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[58] Surveys of business clients suggest that 57.6 percent of program jobs would not have been created "but for" the MEED program (Rode 1988). These employers do not have a strong incentive to lie, as the program did not require that the jobs would not have been created without the subsidy. If the average wage subsidy is $12 per hour for 1,000 hours, the wage subsidy cost is $12,000 per subsidized worker. Assume that an additional 50 percent is added to the total cost for administrative costs, job developer costs, and job-support-coach costs, or $6,000 per subsidized worker. The cost per subsidized worker is then $18,000. Dividing by 57.6 percent gives a one-time job-creation cost of $31,000.

Increasing Effective Land Supply for Development Can Boost Jobs while Redistributing Income to Nonlandowners

Local business costs can also be reduced, and local job growth induced, by increasing the effective supply of local land available for development. The efficiency of this approach depends upon whether the additional land supply can be made available in a cost-effective way, in which the business-cost reduction is considerably less than the social cost of making the additional land available for development.

Making additional land available for business development can have powerful effects on job creation. These effects may be underappreciated by many academic economists, but are well known by economic developers and others interested in attracting businesses to locate or expand in a local economy. Having more business sites that are high-quality and can quickly be developed has direct effects on job creation, by allowing businesses to more easily and more quickly expand to meet their economic needs. In off-the-record interviews of business executives about why they chose a particular city or state, the availability of a good site is often mentioned as a prime location factor.[59] For example, one firm was asked by a researcher whether its location choice was due to the business-tax incentives provided by state and local governments. The CEO candidly said that these incentives were irrelevant. The firm's location decision had been solely determined by the availability of a vacant factory suitable to its needs, which allowed the firm to quickly get into production at the new site.[60]

Business costs can also be lowered by making additional land supply available for housing development. Making additional land supply available for housing development lowers

[59] Source: interviews by this report's author with business executives.

[60] The importance of high-quality sites is also another reason why business tax incentive effects can sometimes be exaggerated. Even if the incented firm would not have located in this local area "but for" the incentive, the prime business site they chose might have attracted some other firm.

business costs by helping lower nominal wages, as additional land makes it easier to attract households to the local area. These nominal wages will not only lower business labor costs, but they will also lead to lower prices of other local goods and services, which will further lower local business costs.

Effective local land supply can be increased through several mechanisms: regulatory changes, brownfield cleanup, redevelopment of distressed neighborhoods with a combination of tax incentives and extra services, and infrastructure investment in highways and other utilities. For regulatory changes, numerous studies have documented that local zoning regulations, building-permit regulations, and building codes can have powerful effects on local development—for example, by significantly affecting local housing costs (Glaeser and Gyourko 2017; Hsieh and Moretti 2017; Saiz 2010; Saks 2008). For most of the United States, housing is priced at close to production costs. But about 15 percent of metropolitan areas have housing that is priced at 25 percent or more above estimated production costs. At the extreme, there are a few areas, such as the San Francisco area, in which housing is priced at close to three times production costs (Glaeser and Gyourko 2017).

In some cities, brownfields are a significant impediment to new development. Estimates suggest that in urban areas, vacant or abandoned land has an 85 percent probability of having some type of real or perceived environmental contamination from former uses (De Sousa 2013). The EPA estimates that the United States has more than 450,000 brownfields. Dealing with brownfields requires addressing legal liability issues, developing reasonable cleanup standards, and then actually paying for and doing the cleanup.

Many distressed neighborhoods are problematic for redevelopment because of dilapidated properties, deteriorated infrastructure and public services, high crime, and other problems. Programs such as enterprise zones, federal Empowerment Zones, and tax increment financing have attempted to overcome these problems by providing some combination of tax breaks for investment or job creation or job hiring in the distressed neighborhood, combined with public services and infrastructure to address some of the neighborhood's problems.

Finally, highways and other infrastructure alter the effective land supply in a local area. If a highway increases access of a site to workers, suppliers, and markets, it makes that land supply more cost-effective for new business development. If mass transit makes a site more accessible for workers, that site also is more effectively available for development. Other public utility infrastructure also can increase the effective supply of land.

How much do local costs have to go down to create one job? As discussed above, the research on effects of real wages suggests a cost per job-year of $50,000, whereas the literature on business tax cuts suggest a lower cost of about $18,000 per job-year. These would be costs that would apply to local cost reductions that are applied generally to all business, rather than being targeted at export-base businesses. Both logic and some empirical evidence suggest the lower cost of $18,000 per job-year is probably closer to the truth. Real-wage changes may have reduced effects because real-wage changes generate some offsetting productivity effects, which would not be true of changes in local nominal wages and other local costs. In addition, estimates from Saks (2008) of the effects of housing supply restrictions are roughly consistent with such a cost per job-year.[61]

[61] Saks (2008, Table 4) estimates that local housing supply restrictions cause local demand shocks to have lower employment-rate effects. The ratio of the one-year employment growth effects of housing supply restrictions to the effects of housing supply restrictions on nominal wages is about (−0.06/0.07) = −0.86. The ratio of housing supply restriction effects on job growth to effects on housing prices is (−0.06/0.15) = −0.4. Other research suggests that the elasticity of overall local prices to housing prices is about 0.50. This 0.50 can be empirically estimated from the data in Aten (2006). Therefore, the ratio of the effects on job growth to imputed effects on overall prices would be [−0.06/(0.15 × 0.50)] = −0.8. This is quite similar to the imputed response to nominal wages. If we simply take the average of these two effects at −0.83, the implication is that a 1 percent increase in an area's costs causes a one-year reduction in jobs of −0.83 percent. If the economy adjusts at a 9 percent rate toward the long-run equilibrium,

But the relevant issue is, "What are the social costs of bringing around such a local cost reduction?" If policies can be identified that lower local business costs by more than their social costs, then this cost per job-year can be considerably reduced.

In the case of zoning and housing permit restrictions on local housing supply, the contention of many economists is that many of these restrictions are economically inefficient, in that the new housing development that is prevented does not produce sufficient negative externalities to justify these restrictions. Some evidence supports this position (Turner, Haughwout, and van der Klaauw 2014). Therefore, relaxing at least some restrictions on housing supply would not have any efficiency cost, but rather would produce an efficiency gain.[62] In other words, there is a "free lunch" for at least some reductions in housing supply regulations to promote local job growth: the local job growth can be achieved at no economic cost, or even at an economic gain, even before considering the social benefit from an additional job.

In addition, reducing housing supply restrictions may affect the income distribution progressively. Lower housing costs redistribute income from current owners to nonowners. This would have a net progressive effect on the income distribution, because housing owners are wealthier than nonowners.

Brownfield redevelopment also can create local jobs cost-effectively. Based on case study evidence, brownfield projects focused on job-creating projects have a cost per permanent job created of $13,000 (Paull 2008). If we assume such jobs depreciate at the rate of depreciation of manufacturing capital (7.39 percent), and if we use a 3 percent discount rate, then the net

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the implied long-run elasticity is −0.83/0.09 = −9.2. If this cost elasticity is assumed to apply to overall value-added, and the result is entered into a gradual adjustment model, the long-run present value of reduced costs per present value of job-years is around $20,000. This calculation uses actual percentages and a 10 percent cut in value-added costs.

[62] Of course, there may be housing regulations or zoning rules that protect public safety (e.g. reducing fire risk) or promote neighborhood amenities by more than their costs (e.g., some protection of historic buildings). The point is that some current regulations and rules may be excessive.

present value of cost per net present value of job-years created will be around $1,300. If these projects are creating non-export-base jobs, much of this job creation would be offset by the loss of other local jobs, due to firms competing for the same local sales. But if the brownfield projects target manufacturing or other export-base jobs, then these brownfield jobs would have a multiplier effect. At a multiplier of 2, the net present value of cost per job-year is under $700.

For redevelopment of distressed neighborhoods, the evidence suggests that tax credits alone don't work. Rather, services need to be added to address the neighborhood's underlying problems. For example, numerous states since the 1980s have at various times designated distressed neighborhoods in cities, and some distressed rural areas, as enterprise zones. These enterprise zones typically have emphasized tax credits, either for investing in these distressed neighborhoods or for hiring or creating jobs in these distressed neighborhoods. The research on state enterprise zone programs is generally negative. Most studies find few effects of enterprise zones on designated zones (Elvery 2009; Greenbaum and Landers 2009; Lynch and Zax 2011; Neumark and Kolko 2010; Neumark and Simpson 2015; Peters and Fisher 2002). Apparently, these state and local tax credits alone were insufficient to turn about most distressed areas.

The federal Empowerment Zone program, created in 1993, appears to have had more positive results.[63] The most rigorous study of the federal Empowerment Zone program suggests that the initial Empowerment Zone designation of zones in six cities did have significant effects on zone jobs, zone earnings of zone residents, and zone house values (Busso et al. 2013). This study is quasi-experimental: it compared the census tracts in the six Empowerment Zones with matched similar tracts in other cities; these matched similar tracts in other cities either were rejected in the initial grant round or approved in later grant rounds. This matching with rejected

[63] Or at least there are more positive results stemming from the initial version of Empowerment Zones, which included these large block grants for neighborhood services.

or later applicants should lead to the treatment tracts and matched tracts being similar in both observed and unobserved characteristics that might predict zone economic outcomes, which increases the odds that the estimated zone "effects" are truly due to the zone policy.

Why did Empowerment Zones have effects on designated areas, unlike most state enterprise zone programs? The most likely hypothesis is that unlike most state enterprise zone programs, the original Empowerment Zone program added a large dose of public services. The federal Empowerment Zone program not only provided tax credits for zone employers that hired zone residents, but also provided each zone with block grants of $100 million. The value of this block grant was equivalent to more than $100 per zone resident per year for the 10-year period of the program. These block grants could be used for a wide variety of purposes to address zone problems. A sizable portion of these block grants were spent on business assistance or workforce development.[64] The hypothesis is that if you want to help redevelop a distressed neighborhood, which by definition is a neighborhood with problems, cash incentives alone are insufficient—services need to be provided to overcome the problems. To make land available for redevelopment requires overcoming the barriers to development.

The estimates in Busso et al. (2013) suggest that for a cost of about $1.3 billion (in 2015 dollars), the Empowerment Zone program created about 78,000 jobs.[65] The cost per job was then about $17,000. If we assume these jobs depreciate at 7.39 percent per year and we use 3 percent as a discount rate, the present value cost per present value of job-years is about $1,700. The

[64] Estimates reported in Busso et al. (2013), Table 2, from Hebert et al. (2001), suggest that the total block grant expenditure on access to capital, business assistance, and workforce development was about half the block grant spending.

[65] This calculation assumes that the Empowerment Zone program in these six cities had a cost in Year 2000 prices of about $950 million—$400 million in block grants plus about $55 million per year in wage subsidies paid out over 10 years. The job creation figure of 78,000 is based on Busso et al.'s propensity-score-weighted estimates in column (3) of their Table 4, along with their Table 10 estimates that post-intervention employment in the z ones was about 403,000.

ultimate effect on area jobs depends upon whether these extra zone jobs are export-base jobs or not export-base jobs. If export-base jobs, these jobs will have a multiplier, lowering cost per job-year to under $1,000. If these created zone jobs are not export-base jobs, then the cost per net area job-year will go up, because many of the jobs created in the zone neighborhoods will be offset by lost jobs elsewhere.

Another approach to promoting neighborhood development is tax increment financing (TIF) districts. Under TIF districts, any increases in the neighborhood from a base period in some type of tax revenue (usually property tax revenue) are used to finance bond issues that pay for public infrastructure in the targeted neighborhoods, or that are spent on some combination of special public services or cash incentives for business in the targeted neighborhood. That is, this "incremental" tax revenue is diverted from its normal recipients (e.g., the county government, the city, schools, other special-purpose governments), and is instead used to support some type of special services or programs in the targeted neighborhood. The available literature suggests that TIF districts make some difference to the targeted neighborhoods. However, the TIF neighborhood's increase in jobs only increases total jobs in the overall local area if the TIF is adding industrial jobs; commercial jobs added in a TIF neighborhood tend to depress commercial job growth elsewhere in the local economy, outside the TIF neighborhood (Byrne 2010; Dye and Merriman 2003; Weber 2013).

Effective land supply can also be increased through infrastructure improvements. For example, consider the effects on land "quality" due to building new highways. These new highways increase the quality of land supply by providing additional sites with better access, both to output markets and to workers. This better access will result in additional business activity.

How costly is it to create jobs through infrastructure improvements? The difficulty in estimating how infrastructure affects jobs is that infrastructure improvements will usually be determined "endogenously." The "endogeneity" is that highways and other infrastructure are built in response to increased local economic development. In other words, job creation may be causing infrastructure improvements. The resulting positive correlation between infrastructure improvements and job creation need not reflect a causal effect of infrastructure on jobs.

To identify how infrastructure affects jobs, we would need the following data: First, we need data on a real-world scenario in which infrastructure investments in some areas were determined independently of the area's future job-creation potential. Second, we need to also have data on comparison areas with similar future job-creation potential that did not receive similar infrastructure investments. Perhaps the best recent paper that has such data is the Kline and Moretti (2014b) paper on the Tennessee Valley Authority (TVA).

TVA stands out as perhaps the nation's most expensive and extensive regional development program.[66] Begun in 1933, TVA sought to spur the economic development of a large depressed region consisting ultimately of almost all of Tennessee, as well as significant parts of southwest Kentucky, northern and central Mississippi, northern Alabama, and smaller portions of northern Georgia, along with a few areas in Virginia and North Carolina. The economic strategy relied on building numerous dams to provide more reliable and less costly electricity to the region, along with public works expenditures on a navigation canal and highways, and also some services to boost public health and education and promote better farming and environmental practices. The bulk of the federal subsidies for TVA were delivered from 1940 to 1960, although considerable subsidies continued until about 2000. Total federal

[66] The TVA descriptions and data are based on Kline and Moretti (2014b).

subsidies for TVA amounted to more than $25 billion (2015 dollars) over the entire 1940–2000 period.

Kline and Moretti compare various economic outcomes, such as manufacturing job growth, in TVA-assisted counties to non-TVA-assisted counties. These comparisons control for a wide variety of baseline conditions in the TVA counties and the comparison counties. In addition, they consider the sensitivity of these results to various comparison groups. The most convincing comparisons are to counties that were located in seven other proposed regional authorities, modeled after TVA, that were seriously proposed in Congress and were almost enacted into law, both in 1937 and in 1945. These proposed authorities, located in the South, Midwest, and West, were similar to TVA, in that they were depressed and predominantly agricultural areas that were thought to be possible to revitalize through improving the local infrastructure.

Kline and Moretti find large effects of TVA on economic outcomes, either compared to all other U.S. counties, all other counties in the South, or all counties in these proposed authorities. In particular, TVA's investments appear to have caused strong and persistent increases in manufacturing jobs. The results occur for all comparison groups, although they tend to be slightly smaller for the comparisons to the other proposed authorities. In the results that compare TVA to the other proposed authorities, and that allow effects of TVA to vary over time, the cumulative percentage effect of TVA on manufacturing jobs in the TVA region by the year 2000 was to increase manufacturing employment by 32 log percentage points. The implied effect on manufacturing jobs in the year 2000 would be to increase manufacturing jobs by 250,000 jobs.

TVA's manufacturing jobs impact seems quite persistent. Even after the largest subsidies stopped in 1960, the TVA effect on manufacturing employment seemed to continue to increase rather than to depreciate. Kline and Moretti interpret this lack of depreciation of the manufacturing jobs effect, even though the TVA infrastructure would depreciate, as evidence for some type of agglomeration economies. Once economic development policy has successfully boosted manufacturing jobs in a region, that boost may be self-sustaining if manufacturing productivity is boosted by the presence of other manufacturing firms.

Suppose one assumes that the year 2000 percentage effect of TVA on manufacturing jobs in the TVA region continued at the same percentage level from 2000 to 2015. This seems a conservative assumption; Kline and Moretti estimate that even after TVA subsidies were drastically cut in 1960, TVA seemed to still be boosting manufacturing job growth, which implies that the percentage effect on manufacturing jobs would continue to increase over time. After 2015, suppose we assume that the job creation impact of TVA stayed the same over time.[67] With these calculations, the 2015 present value cost of TVA, divided by the present value of manufacturing job-years created from 1940 into the future, would be about $1,000.[68] With a manufacturing multiplier of 2, the cost per total job-years created in the TVA region would be about $500 per job-year.

The TVA experience suggests that even though infrastructure spending can be very expensive, it can in some cases be a relatively cost-effective way of creating manufacturing jobs.

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[67] Because manufacturing in the TVA region declined from 2000 to 2015, as it did in the United States, this implies that the total jobs impact of TVA declined from 250,000 in 2000 to 166,000 in 2015.

[68] In present-value 2015 dollars, total subsidies for TVA over the 1940-to-2000 period totaled $37.1 billion. Total 2015 present value of job-years created was 35.9 million. Note that 30.4 million of those job-years are from 1940 to 2000, so this calculation is not very dependent on the assumption that the future number of jobs created will stay at 166,000 each year.

CAN MANUFACTURING-INTENSIVE COMMUNITIES SUCCEED? AND WHAT ROLE DO RESEARCH-SUPPORTED ECONOMIC DEVELOPMENT STRATEGIES PLAY IN THEIR SUCCESS?

Thus, research evidence suggests that providing high-quality customized services to business, along with human capital development and infrastructure improvements, can help cost-effectively promote the economic development of manufacturing-intensive communities. But this research evidence is for the effects of particular services, and frequently only looks at the success of individual businesses. Is there evidence that these services actually help a manufacturing-intensive community's overall success? For that matter, in the recent time period, since 2000, are there manufacturing-intensive communities that have survived the dramatic decline of U.S. manufacturing in this period, and actually succeeded economically? Is so, what is their secret? This section reviews the evidence of the success of some manufacturing-intensive communities in recent years, and assesses whether it seems to be associated with specific economic development services.

Successful and Unsuccessful Manufacturing-Intensive Communities Since 2007

This subsection looks for signs of whether some manufacturing communities have been successful in recent years. The search for success focuses on manufacturing communities that are at least medium-sized. For small manufacturing-intensive communities, overall success or failure might be more likely due to one individual facility opening up/expanding or closing/contracting. What happens to one individual facility is more likely due to idiosyncratic features of that facility than to community-wide characteristics. Out of all the manufacturing-intensive communities in the United States, the search for success is limited to the 105 such commuting zones that as of 2010 had a population of 200,000 or greater.

The "success" of a community can be defined in many ways. In this report, "success" is defined based on a commuting zone meeting both of two criteria: 1) the commuting zone's growth rate of private employment had to exceed the national average from 2007 to 2015, and 2) the commuting zone's growth rate of private employment had to be positive, on net, from 2000 to 2015.[69] The purpose was to identify manufacturing-intensive communities that were able to do better than the national average in the most recent period (2007–2015), even if they had done poorly in the 2000-to-2007 period, when the national manufacturing decline was most severe. However, the second criterion was added in order to focus on communities that were successful enough in the 2007-to-2015 period that they more than offset any losses suffered from 2000 to 2007. Some experimentation with other ways of identifying successful manufacturing-intensive communities ended up coming up with similar lists.

Table 4 compares these 22 "successful" commuting zones, both with the 83 larger manufacturing-intensive commuting zones that were "unsuccessful" in that they did not meet both success criteria, and with the United States. As can be seen in the table, these larger CZs had over a third of total U.S. manufacturing employment in 2000, and over a third of the total decline in national manufacturing employment from 2000 to 2015, even though their overall employment share of the United States was only about 20 percent.

During the earlier 2000 to 2007 period, the "successful" 22 CZs already were doing better than the 83 "unsuccessful" CZs, although not better than the United States as a whole.

[69] There is one issue in the County Business Patterns data that is used here. County Business Patterns has had a growing proportion of employment that is "statewide" and is not locatable in any particular commuting zone. This percentage grows from 0.45 percent in 2000 to 2.07 percent in 2007 and 3.45 percent in 2015. Much of this "statewide" employment appears to be in employment service agencies that list employment by their main office, as they are the employer of record, even though their employees may work elsewhere. This problem means that county-locatable jobs grew 1.40 percent from 2007 to 2015 in the United States, compared to the growth of all jobs of 2.82 percent. I used 1.40 percent as the cutoff to determine whether a CZ exceeded the national average growth from 2007 to 2015.

Table 4 Trends in 22 "Successful" CZs vs. 83 "Unsuccessful" CZs, out of all 105 Manufacturing-Intensive Larger CZs (jobs measure in millions of jobs, or in percentage terms, as indicated)

Panel A: Selected Comparisons to U.S. as a Whole	
"Successful" 22 CZs as % of U.S. total	
Population as % of U.S., 2010	4.4
Private jobs as % of U.S., 2000	4.5
Manufacturing jobs as % of U.S., 2000	6.7
Manufacturing job decline as % of U.S, 2000–2015	7.0
"Unsuccessful" 83 CZs as % of U.S. total	
Population as % of U.S., 2010	16.0
Private jobs as % of U.S., 2000	16.9
Manufacturing jobs as % of U.S., 2000	27.1
Manufacturing job decline as % of U.S., 2000–2015	29.1

Panel B: Trends in Successful and Unsuccessful CZs									
"Successful" 22 CZs									
	2000	2007	2015	2000–2007 absolute change	2007–2015 absolute change	2000–2015 absolute change	2000–2007 % change	2007–2015 % change	2000–2015 % change
All private jobs	5.127	5.303	5.559	0.176	0.256	0.432	3.4	4.7	8.1
Manufacturing jobs	1.111	0.851	0.773	(0.260)	(0.078)	(0.338)	(26.5)	(9.6)	(35.9)
Manufacturing as % of private jobs	21.7	16.0	13.9						
Manufacturing % change out of private jobs							(5.0)	(1.4)	(6.3)
"Unsuccessful" 83 CZs									
All private jobs	19.197	18.726	18.211	(0.471)	(0.515)	(0.986)	(2.5)	(2.8)	(5.3)
Manufacturing jobs	4.456	3.471	3.040	(0.985)	(0.431)	(1.416)	(24.8)	(13.2)	(37.8)
Manufacturing as % of private jobs	23.2	18.5	16.7						
Manufacturing % change out of private jobs							(5.2)	(2.3)	(7.6)

Panel C: U.S. as Whole (Table 2)									
	2000	2007	2015	2000–2007 absolute change	2007–2015 absolute change	2000–2015 absolute change	2000–2007 % change	2007–2015 % change	2000–2015 % change
All private jobs	113.888	120.599	124.048	6.712	3.449	10.161	5.7	2.8	8.5
Manufacturing jobs	16.471	13.320	11.605	(3.151)	(1.714)	(4.865)	(21.2)	(13.8)	(34.7)
Manufacturing as % of private jobs	14.5	11.0	9.4						
Manufacturing % change out of private jobs							(2.7)	(1.4)	(4.1)

NOTE: 105 manufacturing-intensive larger CZs analyzed here are those with 2000 manufacturing location quotient greater than 1.19 and 2010 population greater than 200,000. Successful CZs are those whose 2007-to-2015 job growth exceeded the national average and whose 2000 to 2015 job growth was positive. All job data taken from Upjohn Institute's WholeData version of County Business Patterns. Jobs are in millions. Percentage change over time is calculated as percentage difference out of the average of two time periods.

During this period, the 22 CZs grew at 3.4 percent versus −2.5 percent for the 83 unsuccessful CZs and 5.7 percent for the United States as a whole. This relative success of the 22 CZs must have been due to better nonmanufacturing performance, as these 22 CZs experienced a similar negative shock to overall employment from declining manufacturing as did the 83 "unsuccessful" CZs, at −5.0 percent for the 22 CZs versus −5.2 percent for the 83 CZs. The 22 CZs were slightly less intensive in manufacturing as of 2000 than the 83 unsuccessful CZs, but they actually saw a larger percentage decline in their manufacturing base, and these offsetting effects led to a similar negative shock to manufacturing jobs as a percentage of total employment. Overall, the 22 CZs in the 2000-to-2007 period did surprisingly well relative to the U.S. economy. Their overall job growth performance was only 2.4 percentage points behind the U.S. economy (3.4 percent versus 5.7 percent), despite having a considerably more negative shock to manufacturing as a share of total jobs, a difference of −2.3 (–5 percent in these 22 CZs versus –2.7 percent in the United States as a whole. With a multiplier of 2 or 3, one would have expected these 22 CZs to lag behind the U.S. economy by 5 to 7 percentage points, not 2.3 percentage points.

In the latter period, 2007–2015, the 22 successful CZs did much better than the 83 unsuccessful CZs and than the United States as a whole, as one would expect based on the criteria used to select successful CZs: 4.7 percent job growth for the 22 successful CZs, versus −2.8 percent for the 83 unsuccessful CZs, versus 2.8 percent for the United States. The 22 CZs gained 256,000 jobs, which is 7.4 percent of the total U.S. job gain over this period of 3.449 million jobs, even though these 22 CZs are less than 5 percent of the total U.S. population. This 2007–2015 success seems to be partly due to better manufacturing performance, and partly to better nonmanufacturing performance. For manufacturing, these 22 CZs on average still lost manufacturing jobs from 2007 to 2015, but at a lesser rate than the 83 unsuccessful CZs or in the United States at a whole, at −9.6 percent in the 22 CZs, versus −13.2 percent in the 83 unsuccessful CZs, versus −13.8 percent for the United States. As a result, these 22 CZs' loss of manufacturing jobs, as a percentage of total employment, was only −1.4 percent, versus −2.3 percent for the 83 unsuccessful CZs. This 0.9 percent better manufacturing performance, with a multiplier of 2 or 3 for manufacturing, would be enough to explain a 2-to-3 percentage point better overall employment performance for these 22 CZs, versus the 83 CZs. Therefore, manufacturing probably played some role in the success of some of these 22 CZs.

On the other hand, manufacturing is not the only explanation of success. The 22 successful CZs overall showed employment growth from 2007 to 2015 of 4.7 percent, versus −2.8 percent for the 83 unsuccessful CZs, a gap of 7.6 percent. Manufacturing alone seems unlikely to explain the entire gap.

A Closer Look at the 22 Successful CZs

Table 5 lists some characteristics that describe the growth performance of each of these 22 "successful" manufacturing-intensive commuting zones. The commuting zones are sorted in order of 2010 population, from most to least populous.

The table shows that the "successful" communities are geographically diverse, although with some geographic clustering. In addition to some areas in the south, particularly in Georgia, North Carolina, Texas, and Arkansas, there also are successful areas in the upper Midwest—in Wisconsin, Iowa, Minnesota, and Michigan—as well as success in such diverse areas as Burlington, Vermont; the Lehigh Valley in Pennsylvania; and Silicon Valley in California.

Table 5 Description of 22 "Successful" Larger, Manufacturing-Intensive Commuting Zones

Commuting zone description	2010 population	2000 employment	2007 employment	2015 employment	2000 mfg jobs	2007 mfg jobs	2015 mfg jobs	2000 mfg location quotient	2000-2007 overall growth	2007–2015 overall growth	2000–2007 mfg growth	2007–2015 mfg growth
Silicon Valley	2.514	1.183	1.110	1.193	0.222	0.144	0.101	1.295	(6.3)	7.2	(42.4)	(35.5)
Charlotte NC area	2.067	0.837	0.923	0.940	0.150	0.108	0.092	1.240	9.7	1.9	(32.7)	(16.2)
Grand Rapids MI area	1.411	0.590	0.554	0.590	0.171	0.130	0.137	2.003	(6.2)	6.2	(26.9)	4.9
Lehigh Valley PA area	1.272	0.448	0.467	0.481	0.096	0.073	0.073	1.489	4.2	2.9	(27.2)	(0.4)
Augusta GA area	0.583	0.183	0.186	0.191	0.047	0.033	0.022	1.768	1.3	2.7	(33.8)	(38.8)
Gainesville FL area	0.557	0.130	0.176	0.194	0.037	0.037	0.040	1.960	30.5	9.8	0.5	8.9
Cedar Rapids/Iowa City IA area	0.500	0.217	0.223	0.233	0.043	0.039	0.038	1.371	2.5	4.6	(9.3)	(2.9)
Fayetteville AR area	0.463	0.145	0.189	0.200	0.034	0.031	0.026	1.594	26.0	5.6	(8.0)	(15.9)
Asheville NC area	0.458	0.157	0.164	0.166	0.031	0.021	0.020	1.380	4.4	1.7	(37.6)	(5.2)
St. Cloud MN area	0.337	0.116	0.132	0.136	0.024	0.023	0.021	1.413	12.9	2.8	(2.4)	(8.3)
York County SC area	0.336	0.083	0.090	0.096	0.023	0.016	0.014	1.882	8.6	6.0	(34.6)	(12.4)
Burlington VT area	0.334	0.144	0.148	0.152	0.026	0.021	0.017	1.259	2.4	2.6	(20.4)	(22.5)
Eau Claire WI area	0.327	0.120	0.128	0.132	0.028	0.026	0.027	1.594	6.1	3.5	(6.2)	4.5
Clarksville TN area	0.322	0.072	0.078	0.079	0.021	0.017	0.016	1.990	8.4	1.8	(21.8)	(0.6)
Longview TX area	0.314	0.093	0.109	0.115	0.019	0.018	0.018	1.405	15.3	5.1	(4.5)	(1.0)
Waco TX area	0.306	0.103	0.103	0.113	0.019	0.015	0.016	1.275	(0.2)	8.9	(26.3)	7.3
Coweta County GA area	0.263	0.073	0.071	0.076	0.024	0.017	0.019	2.277	(3.6)	7.0	(36.0)	14.6
Rochester MN area	0.253	0.112	0.128	0.130	0.021	0.017	0.013	1.276	12.9	1.8	(16.9)	(28.5)
Waterloo/Cedar Falls IA area	0.225	0.086	0.086	0.096	0.019	0.018	0.017	1.536	0.4	11.0	(5.2)	(4.0)
Jonesboro AR area	0.215	0.067	0.066	0.067	0.022	0.016	0.013	2.335	(1.0)	1.8	(36.6)	(16.9)
La Crosse WI area	0.208	0.081	0.083	0.088	0.015	0.012	0.013	1.283	2.5	5.8	(19.9)	4.5
Dubuque IA area	0.203	0.087	0.090	0.091	0.021	0.018	0.017	1.653	3.4	1.4	(15.8)	(1.9)

NOTE: All population and jobs numbers are in millions. Percentage changes are percentage differences on base of the average of two time periods. All jobs figures come from Upjohn Institute's WholeData version of County Business Patterns.

Over the 2007–2015 period, some manufacturing-intensive communities succeeded despite weaknesses in manufacturing, whereas other areas succeeded in part because they did considerably better than the nation in manufacturing. Of the 22 commuting zones, seven actually had worst percentage job loss than the United Sates in manufacturing from 2007 to 2015, during which U.S. manufacturing jobs shrank by −13.8 percent. On the other hand, six of the commuting zones had positive growth in manufacturing jobs from 2007 to 2015. Another five of the communities had a performance in manufacturing jobs that was 10 percentage points better than that of the nation (that is, these five areas lost manufacturing jobs, but the loss was less negative than −3.8 percent, which is considerably better than the U.S. average job loss of 13.8 percent). The remaining four areas lost manufacturing jobs and did somewhat better than the nation, but not 10 percentage points better.

There are four "successful" commuting zones whose 2010 population exceeded 1 million: the Silicon Valley area; the Charlotte, North Carolina, area; the Grand Rapids, Michigan, area; and the Lehigh Valley, Pennsylvania, area. Of these four areas, two, Silicon Valley and Charlotte, had manufacturing job performance from 2007 to 2015 that was worse than the nation's. The other two areas, Grand Rapids and the Lehigh Valley, had manufacturing job performance that was significantly better than the nation's. We will now turn to exploring in a little more depth the job performance of these four larger "successful" commuting zones. How have Silicon Valley and Charlotte succeeded despite the poor performance of their local manufacturing industries? Is the above-average performance of manufacturing in Grand Rapids and the Lehigh Valley due to one standout manufacturing industry, or is their superior economic performance in manufacturing more broadly based?

A Shift-Share Analysis of Silicon Valley, Charlotte, Grand Rapids, and the Lehigh Valley

To get some insight into what might be causing the "success" of these four larger manufacturing-intensive areas—Silicon Valley, Charlotte, Grand Rapids, and the Lehigh Valley—this subsection does a shift-share analysis of their growth patterns from 2007 to 2015, and, for comparison, from 2000 to 2007.

Shift-share analysis divides the growth in an area's jobs (or any other variable describing the size of the local economy) into two components: 1) a share component and 2) a shift component. The share component is the jobs growth that would occur if each industry in the local economy had simply grown at the national-average growth rate for that industry over that time period. The shift component is what remains, which is the jobs growth due to individual industries growing faster or slower than their national counterparts.

For an "export-base" industry, the share component's prediction of growth will be realized if the industry has merely kept its market share of national demand for that industry. The shift component reflects the industry gaining or losing market share in the national market. This gain or loss of market share presumably reflects local variables that make this location a more or less cost-effective location, due to variables affecting either the prices of local inputs or the productivity of local inputs.

For a non-export-base industry, the shift-effect component will largely reflect what happens to local demand for an industry's products. Therefore, retail trade industries will tend to have a positive "shift effect" if an area's manufacturing industries are doing better. Local demand for retail goods will be higher because more workers will be employed in manufacturing industries and their suppliers.

Export-base industries include almost all manufacturing industries. In addition, export-base industries include some nonmanufacturing industries, such as software. But the analysis becomes more complicated because many nonmanufacturing industries in local economies are hard to definitively classify as export-base versus non-export-base. Many nonmanufacturing industries will be to some extent export-base and to some extent non-export-base, with the export-base proportion varying across local areas and over time. For example, "hospitals" to some extent serve local demand. But some hospitals with a strong reputation—think of the Mayo Clinic or the Cleveland Clinic—may clearly be an export-base industry to the nation, and even some less prestigious hospitals may attract patients from outside the local economy. Therefore, interpreting the "shift effect" for many nonmanufacturing industries can be an art, not a science. A positive shift effect in retail trade or food and drinking places is probably due to local trends in other industries. But a positive shift effect in hospitals or other health care, or in management or administration industries, can be due either to local demand or to local firms gaining share in the national market

The overall local shift effect can be divided in a straightforward way by industry. Each industry's shift effect is simply the change in overall local jobs due to the difference between that industry's percentage growth rate in the local area, and the national percentage growth in that industry, when applied to base-period jobs in the area in that industry. However, there are a variety of ways of dividing the share effect into individual industry components. As done in previous work (e.g., Bartik 1988), the share effect for each industry is calculated as the differential growth that occurs due both to the industry having different percentage growth in the nation than the all-industry average, and to the industry having an above- or below-average share of local jobs compared to the nation. The share effect for this industry asks essentially the following question: how much higher or lower would the area's growth have been if we reset the area's base-period share of jobs in that industry at the national average, and reallocated the jobs in the industry to average-growth industries. The share effect is positive if an area has an above-average share in a high-growth industry *or* if the area has a below-average share in a low-growth industry. The share effect is negative if an area has an above-average share in a low-growth industry OR if the area has a below-average share in a high-growth industry.

The below analysis does shift-share analysis with industries defined at the three-digit level, which implies 87 industries. Calculations are done for the overall shift and share effect for 2000–2007 and 2007–2015. These together sum exactly to the local area's differential growth from the nation in each time period.

The analysis then looks at the sum of the share and shift effects over all manufacturing industries, and over all nonmanufacturing industries. Because these areas are relatively intense in manufacturing—that is, they have above-average shares—and because manufacturing has tended to be below average in growth, we expect that for all four areas, the sum of the share effect over all manufacturing industries will be negative in both time periods. Because manufacturing lost fewer jobs in the 2007–2015 period than in the 2000—2007 period, we expect for all four areas that the sum of the share effect over all manufacturing will become less negative from the former to the latter time period.

What contributes to high or low shift effects is harder to predict. For each area, we will see whether the shift effect shows some unusual changes from the period 2000–2007 to the period 2007–2015, in either manufacturing or nonmanufacturing. If it does so, we will look at which individual industries appear to be the largest contributors to the changes in the area's shift effect, either for manufacturing or nonmanufacturing, from the 2000–2007 period to the 2007–2015 period.

Silicon Valley

After experiencing much slower job growth than the nation from 2000 to 2007, Silicon Valley experienced much faster growth from 2007 to 2015.

As Table 6 shows, after job growth of 12.0 percent slower than the nation from 2000 to 2007, Silicon Valley grew 4.6 percent faster than the nation from 2007 to 2015.[70] Comparing the two periods, Silicon Valley's relative growth improved by 16.6 percentage points. The table then shows how in each time period, and in the difference between the two time periods, this differential growth is "explained" by share effects and shift effects in manufacturing versus

Table 6 Shift-Share Analysis of Silicon Valley (%)

	2000 to 2007	2007 to 2015	Difference, latter period minus earlier period
Differential growth compared to U.S.	−12.03	4.59	16.62
Share effect sum, manufacturing	−2.26	−0.75	1.51
Share effect sum, non-manufacturing	−0.28	0.79	1.07
Shift effect sum, manufacturing	−1.78	−1.80	−0.02
Shift effect sum, non-manufacturing	−7.72	6.35	14.07

NOTE: Based on Upjohn Institute's WholeData version of County Business Patterns, analyzed at 3-digit NAICS industry level of detail. All numbers are contributions to overall percentage growth of area.

nonmanufacturing industries. The sum of the share effect plus shift effect rows exactly equals the differential growth.

Of this huge swing, a little is due to manufacturing growing a bit better nationally—that is, the share effect for manufacturing becomes somewhat more positive. But the overwhelming

[70] The growth numbers are slightly different from those implied by the previous table, because up until now percentage growth has been defined using arc elasticity—that is, the percentage change is calculated on a base of the initial and final level of jobs. The shift-share analysis uses percentage changes defined on a base of the initial level of jobs, which is more convenient computationally for shift-share.

part of this shift is due to the shift effect summed over nonmanufacturing industries turning from a large negative percentage to a large positive percentage. The swing in the nonmanufacturing shift effect is from −7.7 percentage points to a positive 6.4 percentage points, a swing of 14.1 percentage points. In Silicon Valley, for some reason nonmanufacturing industries grew much more slowly than their national counterparts from 2000 to 2007, but then turned around and grew much faster than their national counterparts from 2007 to 2015.

What nonmanufacturing industries contributed the most to this turnaround? We can quantify the contribution of each of the 56 nonmanufacturing industries. If we focus attention on which industries contributed 0.70 percent or more to the 14.07 percent swing in the nonmanufacturing shift effect, we get eight industries. Table 7 presents these eight industries. For each industry, Table 7 shows their employment in the Silicon Valley in 2000, 2007, and 2015, the contribution of the shift effect for this industry to the overall shift effect for each time period, and finally, in the rightmost column, the contribution of the industry to the overall swing in the nonmanufacturing shift industries from the earlier to the later period.

Table 7 Silicon Valley Performance in Selected Non-Manufacturing Industries

Industry	Jobs, 2000	Jobs, 2007	Jobs, 2015	Shift 2000–2007 (%)	Shift 2007-2015 (%)	Shift Difference (%)
Administrative and support services	104,247	62,242	68,297	−4.06	−0.06	4.00
Food services and drinking places	72,372	80,499	101,218	−0.48	0.73	1.21
Management of companies and enterprises	53,111	51,395	61,172	−0.53	0.60	1.13
Merchant wholesalers, durable goods	62,144	61,836	84,899	0.06	2.00	1.94
Publishing industries (except Internet)	35,529	29,657	37,946	−0.42	1.15	1.57
Specialty trade contractors	45,517	42,872	38,380	−0.64	0.22	0.86
Telecommunications	21,861	10,041	10,296	−0.67	0.18	0.86
Data processing, hosting, and related services	4,028	3,402	14,402	−0.08	0.86	0.94

NOTE: All job information comes from Upjohn Institute's WholeData version of County Business Patterns. Job numbers are actual job numbers. Shift effects show how that industry's differential local performance contributes to total local job growth, and are stated in percentage terms.

What this table suggests is that Silicon Valley's improved performance in the latter period largely reflects the resurgence of tech industries after the dot-com bubble crashed in the early 2000s. Silicon Valley's performance improved significantly in administrative and support services, management of companies and enterprises, merchant wholesalers for durable goods, publishing industries (which includes software), telecommunications, and data processing and hosting. All of these industries would be directly affected by how the tech industry fares in Silicon Valley. Specialty trade contractors would be favorably affected by increased building and construction activity in Silicon Valley, at least compared to the rest of the nation, where the housing bubble lowered such construction activity. And the nonexport industry "food services and drinking places" would be lifted up by a general rebound in the area economy.

Charlotte Area

After experiencing considerably faster growth than the nation from 2000 to 2007, Charlotte's growth from 2007–2015 slowed significantly. Charlotte's overall 2007–2015 growth was actually somewhat lower than national growth. Charlotte is still considered in our list of "successful" areas because its growth from 2007 to 2015 was somewhat faster than overall growth of jobs that can be located in specific counties.

As shown in Table 8, Charlotte's slower growth in 2007–2015 than in 2000–2007 was largely due to nonmanufacturing industries shifting their growth trends relative to their national counterparts.

From 2000 to 2007, Charlotte's nonmanufacturing industries grew much faster than their national counterparts, overall directly contributing 8.0 percent to growth. This slowed in the next period to these industries growing at a more similar rate to their national counterparts.

Table 8 Shift-Share Analysis of Charlotte Commuting Zone (%)

	2000 to 2007	2007 to 2015	Difference, latter period minus earlier period
Differential growth compared to U.S.	4.30	−0.98	−5.28
Share effect sum, manufacturing	−1.83	−0.31	1.52
Share effect sum, nonmanufacturing	−1.26	−1.60	−0.33
Shift effect sum, manufacturing	−0.65	−0.05	0.60
Shift effect sum, nonmanufacturing	8.04	0.97	−7.07

NOTE: Based on Upjohn Institute's WholeData version of County Business Patterns, analyzed at three-digit NAICS industry level of detail. All number are contribution to overall area growth in percentage terms.

Charlotte's deteriorating nonmanufacturing performance was offset to some extent by manufacturing doing better nationally in the latter period. In the former period, manufacturing's poor national performance in this manufacturing-intensive area directly subtracted 1.8 percent from Charlotte's growth, and even more if one considers multiplier effects. In the latter period, Charlotte's manufacturing intensity only directly subtracted 0.3 percent from growth due to poor national performance. This 1.5 percent swing in manufacturers' national performance would be expected, with multiplier effects, to have contributed at least 3 percent to better Charlotte growth in the latter time period. This offset to some extent the deterioration in nonmanufacturing's differential performance in Charlotte.

In addition, there is no sign that Charlotte manufacturing did differentially better than its national counterpart industries in either time period. In both time periods, Charlotte manufacturing tended to do somewhat worse than its national counterparts, and by about the same amount in both time periods.

To explore a bit what specific industries have contributed to these trends, Table 9 focuses on nonmanufacturing industries that in absolute value contributed at least 0.7 percent to the overall differential shift effect in nonmanufacturing during the period 2007–2015 compared to 2000–2007. Table 9 shows these four industries.

Table 9 Nonmanufacturing Industries in Charlotte That Made the Largest Contributions to Changing Growth Trends

Industry	Jobs, 2000	Jobs, 2007	Jobs, 2015	Shift 2000–2007 (%)	Shift 2007-2015 (%)	Shift Difference (%)
Credit intermediation and related activities	26,678	57,821	48,013	3.17	−0.16	−3.33
Nursing and residential care facilities	15,260	22,432	21,992	0.54	−0.39	−0.93
Specialty trade contractors	36,054	42,481	30,930	0.30	−0.51	−0.80
Professional, scientific, and technical services	45,090	50,246	59,624	−0.31%	0.59	0.90

NOTE: All job information comes from Upjohn Institute's WholeData version of County Business Patterns. Job numbers are actual job numbers. Shift effects show how that industry's differential local performance contributes to total local job growth, and are stated in percentage terms.

As this table shows, the big picture in Charlotte is that its growth from 2000 to 2007 was driven by growth in some finance-related industries and in health care. Health care growth then slowed down to some degree. But the bigger story is the dramatic slowdown in the growth of finance during the 2007–2015. Presumably this is related to the financial crisis in the U.S. economy. On the other hand, the Charlotte area did show good growth in some scientific and technical services from 2007 to 2015, which added to its overall growth. In addition, because manufacturing losses in the nation were not as extreme, Charlotte's above-average share of jobs in manufacturing industries was less of a problem.

Grand Rapids, Michigan, Area

As Table 10 shows, the Grand Rapids, Michigan, area dramatically improved its performance relative to that of the nation in the 2007–2015 period, compared to 2000–2007.

Table 10 Shift-Share Analysis of Grand Rapids Commuting Zone (%)

	2000 to 2007	2007 to 2015	Difference, latter period minus earlier period
Differential growth compared to U.S.	−11.86	3.52	15.38
Share effect sum, manufacturing	−3.02	−1.81	1.22
Share effect sum, nonmanufacturing	−1.03	−0.02	1.00
Shift effect sum, manufacturing	−1.94	4.05	5.99
Shift effect sum, nonmanufacturing	−5.87	1.30	7.17

NOTE: Based on Upjohn Institute's WholeData version of County Business Patterns, analyzed at three-digit NAICS industry level of detail. All numbers are contributions to overall area growth in percentage terms.

After growing in jobs more slowly than the nation by a margin of 11.9 percentage points from 2000 to 2007, Grand Rapids grew more rapidly than the nation by 3.5 percentage points from 2007 to 2015, a gain in relative performance of 15.4 percentage points.

Of this improvement in performance, much and perhaps all of it could be explained by the manufacturing sector. Because the nation's manufacturing losses were less severe in the latter period than in the earlier period, Grand Rapids' concentration of jobs in manufacturing was less of a problem in that latter period of 2007–2015. In the former period, Grand Rapids' manufacturing concentration, combined with the slow growth in manufacturing nationwide, directly reduced Grand Rapids' overall growth by 3 percent, compared to a hypothetical world in which Grand Rapids had the average national share in all manufacturing industries. In the latter period, this growth drag from Grand Rapids' above-average share in manufacturing, and slow national manufacturing growth, shrank to "only" 1.8 percentage points less growth in jobs. The result was that better national growth in manufacturing directly boosted Grand Rapids jobs by 1.2 percent in the latter period relative to the former period.

Even more importantly, Grand Rapids' relative performance in manufacturing industries, compared to its national counterparts, greatly improved in the 2007–2015 period over the earlier 2000–2007 period. In the former period, manufacturing industries in Grand Rapids grew more slowly than their national counterparts; this differential local growth directly reduced Grand Rapids' overall job growth by 1.9 percentage points relative to that of the nation. In the latter period, Grand Rapids' manufacturing industries tended to gain market share and grow faster than their national counterparts; this differential manufacturing industry growth directly boosted Grand Rapids' overall job growth relative to the nation's by 4.1 percentage points. The overall swing in the market shares of Grand Rapids' manufacturing industries from the 2000–2007 period to the 2007–2015 period directly caused Grand Rapids' relative growth to pick up by 6.0 percent in 2007–2015 over that of 2000–2007.

With even a modest multiplier, the less severe losses in manufacturing in 2007–2015, and the gain in market shares of Grand Rapids' manufacturers, would be able to explain the overall swing in Grand Rapids' relative performance over time. Together, these sum to about 7.2 percent (1.2 percent due to better national growth, 6.0 percent due to gains in Grand Rapids' market share in manufacturing). A multiplier of a little more than 2 would "explain" why Grand Rapids' relative growth performance improved by 15.4 percent in 2007–2015 compared to 2000–2007.

Let's look at some industry detail, both to see which manufacturing industries improved their performance in manufacturing, and to check on what is going on in specific nonmanufacturing industries. Table 11 looks at the specific manufacturing industries that contributed at least 0.7 percent to the overall improvement in Grand Rapids' job performance.

Table 11 Manufacturing Industries in Grand Rapids that Made Especially Large Contributions to Changing Relative Growth Trends

Industry	Jobs, 2000	Jobs, 2007	Jobs, 2015	Shift 2000–2007 (%)	Shift 2007–2015 (%)	Shift Difference (%)
Chemical manufacturing	11,179	6,114	8,132	−0.66	0.41	1.07
Fabricated metal product manufacturing	19,693	15,543	17,691	−0.29	0.60	0.89
Food manufacturing	11,374	10,234	14,182	−0.16	0.65	0.81
Furniture and related product manufacturing	24,901	14,299	12,876	−0.96	0.55	1.50

NOTE: All job information comes from Upjohn Institute's WholeData version of County Business Patterns. Job numbers are actual job numbers. Shift effects show how that industry's differential local performance contributes to total local job growth, and are stated as contributions to overall area growth in percentage terms.

The key point from Table 11 is that the improvement in Grand Rapids' manufacturing market share is not due to just one industry, but rather is broad-based. In particular, Grand Rapids' improvement in manufacturing is not attributable solely to the performance of one of its specialized industries, the furniture industry, in which Grand Rapids had a location quotient of

7.39 in 2000 and 5.96 in 2007. Grand Rapids did dramatically improve its relative performance in the furniture industry, but this mainly served to lower the job losses in this industry given the industry's overall national job losses. But Grand Rapids also dramatically gained market share in many other manufacturing industries. The gain in market share was most dramatic in industries as diverse as chemical manufacturing, fabricated metal product manufacturing, and food manufacturing.

Another way to put it is that from 2007 to 2015, Grand Rapids gained over 8,000 jobs in the three manufacturing industries of chemical manufacturing, fabricated metal products, and food manufacturing. With a multiplier of 2 or 3, this would add 16,000 to 24,000 jobs to Grand Rapids over this time period, compared to an overall growth of jobs in Grand Rapids over this period of 35,000 jobs.

What if we look at individual nonmanufacturing industries? Do relative trends in these industries seem plausibly driven by manufacturing trends? Table 12 shows the nonmanufacturing industries in Grand Rapids that had a gain in market share in 2007–2015, relative to 2000–2007, sufficient to contribute 0.7 percent or more to overall job growth.

Of these five nonmanufacturing industries, increases in market share in four of them seem plausibly driven by manufacturing trends: 1) management of companies, 2) wholesalers of durables, 3) motor vehicle dealers, and 4) specialty trade contractors. Increased overall demand will increase motor vehicle sales and building activity. Expansion of manufacturing may increase management activity and wholesaling of durable goods. However, trends in the ambulatory health care industry may reflect Grand Rapids gaining market share within a broader regional market.

Table 12 Nonmanufacturing Industries in Grand Rapids That Made Especially Large Contributions to Changing Growth Trends

Industry	Jobs, 2000	Jobs, 2007	Jobs, 2015	Shift 2000–2007 (%)	Shift 2007–2015 (%)	Shift Difference (%)
Ambulatory health care services	19,366	22,874	30,557	−0.30	0.54	0.85
Management of companies and enterprises	13,168	14,103	19,119	−0.03	0.75	0.79
Merchant wholesalers, durable goods	19,671	16,404	21,332	−0.50	0.85	1.35
Motor vehicle and parts dealers	9,516	6,936	9,006	−0.48	0.39	0.87
Specialty trade contractors	20,565	15,597	16,084	−1.22	0.54	1.77

NOTE: All job information comes from Upjohn Institute's WholeData version of County Business Patterns. Job numbers are actual job numbers. Shift effects show how that industry's differential local performance contributes to total local job growth, and are stated as contributions to overall area growth in percentage terms.

Lehigh Valley Area

Table 13 summarizes the overall shift-share analysis of the Lehigh Valley area. In the 2007–2015 period, relative to the 2000–2007 period, the Lehigh Valley area significantly improved its performance relative to that of the United States. In the earlier period, Lehigh Valley grew about 1.6 percentage points less than the United States. In the latter period, despite the area's concentration in manufacturing, the Lehigh Valley area grew slightly faster than the United States.

Table 13 Shift-Share Analysis of Lehigh Valley Commuting Zone (%)

	2000 to 2007	2007 to 2015	Difference, latter period minus earlier period
Differential growth compared to U.S.	−1.57	0.12	1.69
Share effect sum, manufacturing	−2.57	−0.96	1.60
Share effect sum, nonmanufacturing	0.22	0.55	0.33
Shift effect sum, manufacturing	−0.24	2.19	2.43
Shift effect sum, nonmanufacturing	1.02	−1.65	−2.67

NOTE: Based on Upjohn Institute's WholeData version of County Business Patterns, analyzed at three-digit NAICS industry level of detail. All numbers are contributions to overall area growth in percentage terms.

This greater relative performance seems to be more than explained by the Lehigh Valley improving its performance in manufacturing. In contrast, the Lehigh Valley seems to be held back by problems in nonmanufacturing. Due to manufacturing not losing as many jobs nationally in the latter period, the manufacturing-intensive Lehigh Valley area did better simply because of national trends. The Lehigh Valley's manufacturing intensity, and the poor national manufacturing performance, directly cost the Lehigh Valley a loss of 2.6 percent in overall employment in the 2000-to-2007 period. In the latter period, with manufacturing job losses somewhat less, this negative job effect shrank to −1.0 percent, an improvement of 1.6 percent.

Furthermore, the Lehigh Valley seemed to gain much more market share in manufacturing in the 2007–2015 period. In the earlier 2000–2007 period, Lehigh Valley manufacturers slightly lost market share relative to their national counterparts, with this loss directly contributing −0.2 percent to slower growth. In the latter period, Lehigh Valley manufacturers did better than their national counterparts, with this gain in market share directly contributing 2.2 percent to overall Lehigh Valley growth. This swing increased Lehigh Valley's relative job performance by 2.4 percent, comparing 2007–2015 with 2000–2007 (2.2 percent minus −0.2 percent).

Overall, the manufacturing trends in Lehigh Valley would have predicted an even greater economic improvement than what in fact happened. Together, the lower national manufacturing job losses, and Lehigh Valley's gain of market share, would have directly predicted a 4.0 percent increase in jobs from manufacturing alone (1.6 percent from the manufacturing share effect, 2.4 percent from the greater manufacturing shift effect). With a multiplier effect of even 2, one would have expected Lehigh Valley's job performance to have improved by 8 percentage points relative to the nation's, rather than the actual observed improvement of 1.7 percent.

What happened? It appears that nonmanufacturing performance deteriorated in the Lehigh Valley. Nonmanufacturing gained market share in the earlier period, then lost market share in the latter period. This shift in nonmanufacturing performance directly subtracted 2.7 percent from local growth, with possible multiplier effects.

Let's look in more detail at specific industries in the Lehigh Valley, first in manufacturing, and then in nonmanufacturing. Table 14 looks at four industries that directly contributed 0.3 percent or more to the improvement in Lehigh Valley manufacturing performance. As Table 14 shows, after losing considerable jobs in these four industries from 2000 to 2007, the Lehigh Valley gained jobs in these industries from 2007 to 2015, due to gaining market share. Overall, after losing more than 10,000 jobs in these four industries from 2000 to 2007, the area gained more than 2,500 jobs in these four industries from 2007 to 2015.

Table 14 Manufacturing Industries in the Lehigh Valley That Made Especially Large Contributions to Differential Growth Trends

Industry	Jobs, 2000	Jobs, 2007	Jobs, 2015	Shift, 2000–2007 (%)	Shift 2007-2015 (%)	Shift Difference (%)
Computer and electronic product mfg.	7,037	1,487	1,777	−0.72	0.14	0.86
Fabricated metal Product Mfg	9,313	7,387	7,631	−0.17	0.17	0.35
Food Mfg	8,191	6,663	7,558	−0.31	0.15	0.45
Transportation equipment mfg	5,502	3,943	5,189	−0.15	0.32	0.47

NOTE: All job information comes from Upjohn Institute's WholeData version of County Business Patterns. Job numbers are actual job numbers. Shift effects show how that industry's differential local performance contributes to total local job growth, and are stated as contributions to overall area growth in percentage terms.

What happened in nonmanufacturing? Table 15 highlights five nonmanufacturing industries that contributed −0.4 percent or more to the deterioration in Lehigh Valley's market share in nonmanufacturing in 2007–2015, compared to 2000–2007.

A major role appears to be played by trends in a finance-related industry, credit intermediation. After greatly expanding in the Lehigh Valley from 2000 to 2007, this industry lost many local jobs from 2007 to 2015. This plausibly had some relationship to the U.S. financial crisis. In addition, the Lehigh Valley lost jobs in telecommunications. It also seems

Table 15 Nonmanufacturing Industries in Lehigh Valley That Made Especially Large Contributions to Differential Growth Trends

Industry	Jobs, 2000	Jobs, 2007	Jobs, 2015	Shift, 2000–2007 (%)	Shift 2007–2015 (%)	Shift Difference (%)
Admin. and support services	28,730	27,778	24,827	−0.59	−1.28	−0.69
Credit intermediation and related act.	7,869	11,669	7,948	0.55	−0.44	−0.98
Hospitals	18,929	25,531	29,820	1.08	0.68	−0.40
Nursing and residential care facilities	13,372	16,493	17,424	0.18	−0.29	−0.47
Telecommunications	3,612	4,652	3,078	0.37	−0.16	−0.53

NOTE: All job information comes from Upjohn Institute's WholeData version of County Business Patterns. Job numbers are actual job numbers. Shift effects show how that industry's differential local performance contributes to total local job growth, and are stated as contributions to overall area growth in percentage terms.

there was a loss of some administrative and support services, perhaps due to losing some regional headquarters activities. Finally, after gaining some market share in health-related industries, this trend slowed in the latter period.

A Regression Analysis of What Explains 2007–2015 Job Growth "Success" in These 105 Larger Manufacturing-Intensive Commuting Zones

This subsection returns to a broader analysis of what determined job growth from 2007 to 2015 in these 105 larger manufacturing-intensive commuting zones. Is there any sign that customized business services have played any role in relative trends across these local economies? Have worker skills played a role? What about worker wages? Business taxes and business incentives?

To explore this issue, this subsection reports results from a regression analysis with data on these 105 commuting zones. Specifically, the regression has as a dependent variable the 2007–2015 growth of private sector jobs. The regression attempts to predict private job growth with a variety of possible local determinants, including variables related to local economic development policy and local human capital policy.

This regression is at least descriptive of what is correlated with recent trends in local job growth for manufacturing-intensive communities. Many of the right-hand-side variables are potentially "endogenous," in that unobserved variables driving growth could be correlated with these variables. The regression does not purport to rely on any good "quasi-experimental" evidence or "natural experiment" evidence, in which some exogenous change in some variable is driving the right-hand variables and providing strong, robust evidence of causal impacts.

However, the regression evidence is suggestive. The regression includes controls for many possible determinants of 2007–2015 growth that could bias results. In particular, the regression controls for past job growth, from 2000 to 2007, which controls for at least some unobservable variables that could drive future job growth from 2007 to 2015, and which might be correlated with local real wages and business taxes and other right-hand-side variables. The regression also includes a "share effect" control, which measures what growth would occur if each local industry in 2007 grew at the rate of its national counterpart from 2007 to 2015. This controls for various industry-mix contributions to growth, which might be correlated with the other right-hand variables. As an additional industry-mix control, the regression also controls for the 2007 share of employment in manufacturing. The regression includes dummy variables controlling for four geographic regions (East, Midwest, South, West), and this serves to control for some unobservable variables related to climate and history that might both drive 2007-to-2015 growth and be correlated with other right-hand side variables. Finally, the regression controls for the size of the local area, in total employment as of 2007, which controls for the possibility that job growth trends might favor large versus small commuting zones and be correlated with other right-hand-side variables. Because of these controls, the "effects" of the various right-hand-side variables are effects holding constant some potentially very important variables that might drive 2007-to-2015 growth trends and be correlated with the right-hand-side variables, thus biasing a causal implication of the results. While the regression estimates might still be biased by other unobserved determinants of growth, the regression estimates are more likely to reveal some causal influences than regressions that included fewer potentially important controls.

The relevant policy-related variables that are included are as follows:

- Real worker wages in 2007, controlling for the education and age mix of the local workforce
- Local prices in 2007
- Overall business taxes on export-base industries, as a percentage of export-based value-added, averaged over the 2007–2015 period
- Overall business tax incentives for export-base industries, as a percentage of export-based value-added, averaged over the 2007–2015 period
- Customized job training spending on export-base industries, as a percentage of export-base value-added, average over the 2007–2015 period
- Job creation reported in survey of clients of manufacturing extension services, over the 2007—2015 period;
- The percentage of college-educated in the commuting zone's population, as of 2007.

The dependent variable is the change from 2007 to 2015 in the logarithm of total commuting zone private-sector employment (that is, it is the change in private employment in log percentage terms). The other right-hand-side variables are generally also specified in logarithmic terms, unless they are already implicitly measured in proportional terms, in which case the variables are kept in proportional terms. Table 16 provides a list of the variables included in the regression, with a brief definition and some descriptive statistics.

Table 16 Descriptions and Statistics for Variables in Regression of Determinants of 2007–2015 Job Growth in 105 Larger, Manufacturing-Intensive Commuting Zones

Variable in regression	Mean	Standard deviation	Min.	Max.	5th percentile	25th percentile	Median	75th percentile	95th percentile
Change in ln of private jobs, 2007–2015	−0.0192	0.0502	−0.1386	0.1099	−0.1052	−0.0503	−0.0157	0.0134	0.0618
ln(hourly real wage), adjusted for gender/age/education mix	2.9350	0.0464	2.7763	3.0271	2.8545	2.9067	2.9456	2.9616	3.0008
ln(local prices)	−0.1344	0.0707	−0.2532	0.2492	−0.2231	−0.1773	−0.1423	−0.1099	−0.0164
Business taxes/value-added	0.0432	0.0164	0.0000	0.0637	0.0000	0.0397	0.0445	0.0563	0.0594
Tax incentives/value-added	0.0141	0.0104	0.0000	0.0417	0.0000	0.0052	0.0111	0.0197	0.0295
Customized job training spending/value-added	0.0005	0.0008	0.0000	0.0038	0.0000	0.0000	0.0002	0.0005	0.0016
Indicator for missing tax and incentive data	0.0571	0.2332	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
Share effect prediction of growth in ln(private jobs)	0.0137	0.0173	−0.0595	0.0562	−0.0108	0.0074	0.0142	0.0238	0.0346
log job growth predicted due to claimed MEP jobs created	0.0096	0.0140	0.0001	0.1109	0.0009	0.0030	0.0051	0.0118	0.0283
Change in ln of private jobs, 2000–2007	0.0031	0.0765	−0.1747	0.3076	−0.1010	−0.0514	0.0021	0.0349	0.1295
ln of mfg to private job ratio, 2007	−1.6444	0.2601	−2.1459	−0.9750	−2.0173	−1.8520	−1.6256	−1.4645	−1.1925
ln(private jobs), 2007	11.9975	0.7515	10.9391	14.3700	11.1125	11.4095	11.8868	12.3969	13.5017
Proportion of ages 25–64 with college degree or more, 2007	0.2256	0.0588	0.1085	0.3979	0.1377	0.1834	0.2233	0.2599	0.3290

NOTE: All data is for sample of 105 manufacturing-intensive commuting zones with population exceeding 200,000 in 2010. Jobs data is from Upjohn Institute WholeData database's version of County Business Patterns data. Dependent variable is the change in the natural logarithm of total private jobs in each of these 105 CZs, 2007–2015. Hourly real wage, local prices, and proportion with a college degree are all measured from 2007 American Community Survey. See Data Appendix for more details on construction of variables.

The resulting regression estimates are presented in Table 17. The estimates are first described qualitatively. The discussion then moves on to interpreting some of the magnitudes of the coefficient estimates for the right-hand-side variables that are most policy relevant. These quantitative magnitudes are relevant to helping determine what policies can cost-effectively help manufacturing-intensive communities.

Qualitatively, the results provide little support for some traditional ideas about how to help distressed communities. In particular, private job growth in these commuting zones during

Table 17 Regression of Commuting Zone Job Growth, 2007–2015, on Commuting Zone Characteristics, for 105 Manufacturing-Intensive Larger Commuting Zones

Dependent variable: Change in ln(private jobs) from 2007 to 2015	
Right-hand-side variable	**Coefficient [standard error in brackets]**
ln(local prices)	0.179* [0.106]
ln(local real wages), controlling for age/gender/education	0.0182 [0.106]
Business taxes/value-added	1.263* [0.686]
Tax incentives/value-added	−0.934 [0.662]
Customized job training/value-added	11.73* [6.440]
Indicator for missing tax/incentive data	0.0201 [0.0322]
Share effect prediction of growth in ln(private jobs)	0.0360 [0.392]
log job growth predicted due to claimed MEP jobs created	0.860*** [0.242]
Proportion of ages 25–64 with college degree or more	0.372*** [0.125]
ln of manufacturing to private job ratio, 2007	0.00436 [0.0305]
ln(private jobs), 2007	−0.00959 [0.00766]
Change in ln of private jobs, 2000 to 2007	0.139** [0.0665]
Dummy variable for Northeast region	−0.0109 [0.0131]
Dummy variable for Midwest region	0.00314 [0.0113]
Dummy variable for West region	−0.0433 [0.0294]
Constant term	−0.0664 [0.299]
Observations	105
Adjusted ***R***-squared	0.319

NOTE: Variables described in prior table (Table 16). Heteroskedasticity-robust standard errors in brackets. Asterisks indicate statistically significantly different coefficient from zero at various two-sided confidence intervals, as follows: * $p < 0.1$; ** $p < 0.5$; *** $p < 0.01$.

this time period does not appear to be affected in any large and expected way by making wages, local costs, business taxes, or business tax incentives more competitive. The real wage coefficient has the wrong sign, although it is statistically insignificantly different from zero.

Local prices also have the wrong sign, at least if one expected them to have a negative effect as a measure of local costs, and are marginally statistically significantly greater than zero. Business taxes on export-base industries have the wrong sign, in that higher business taxes are correlated with higher job growth, and lower business taxes with lower job growth; this unexpected business tax effect is marginally statistically significant. Business tax incentives also have the "wrong" sign, in that higher business tax incentives are correlated with subsequent lower job growth; however, this tax incentive effect is not statistically significantly different from zero.

On the other hand, variables associated with customized business services and local job skills tend to have the right sign and are sometimes statistically significant. Higher customized job-training spending on export-base industries (mostly manufacturing industries in most states) has a positive effect on job growth, and this effect is marginally statistically significant. The claimed job creation due to manufacturing extension services is positively related to growth, and this effect is statistically significant. Finally, the percentage of the local population with a college degree has a positive effect in these manufacturing-intensive areas, and this effect is statistically significant.

But what is implied by these coefficient estimates' quantitative magnitude? For each policy variable, the coefficient estimate will be analyzed to see what it implies for how that policy variable might affect growth, how that effect compares with what might be expected based on prior research, and what it means for the costs of different policies per job created.

Real wages

Given the imprecision with which the real wage coefficient is estimated, the 95 percent confidence interval for this coefficient estimate extends to a real wage elasticity of response of employment of −0.2 [= 0.0182 −1.987 × 0.106], where 1.987 is the appropriate *t*-statistic to form a 95 percent confidence interval for a *t*-distribution with 89 degrees of freedom, which is the case for this regression).

This −0.2 is obviously less negative than the long-run real wage elasticity from the research literature of −1.5. However, this −1.5 real wage elasticity applies in the long run for export-base employment and multiplier effects of export-base employment that might be sensitive to local costs. Non-export-base local employment should not directly vary with local costs.

If the economy adjusts by about 9 percent per year to its long-run equilibrium, the adjustment over the 8 years from 2007 to 2015 would be 47 percent of the long-run change (47 percent = 0.91 to the eighth power). Based on Bartik (2017a), export-base employment is 33.7 percent of total local employment. With a multiplier of 2, 67.4 percent of local jobs would directly or indirectly respond to local costs. A 1.5 long-run real-wage elasticity for 67.4 percent of local employment would correspond to an eight-year elasticity for total local employment of −0.5 (= −1.5 × 47 percent × 67.4 percent).

Therefore, the real-wage elasticity estimated here is estimated sufficiently precisely to rule out elasticities that are more negative than one-half the research consensus. At least for these manufacturing-intensive communities in this recent time period, lower real wages seem less important in driving job growth than is implied by the research literature.

It then follows that based on these estimates, the costs of achieving job growth through lower real wages would be even higher than is implied by the research literature elasticity of −1.5. There is little support in these estimates for lowering real wages as a strategy for helping manufacturing communities.

The real-wage coefficient could of course be biased. Even controlling for past growth, region, and industry-mix-predicted future growth, it is possible that expected future job growth could lead to higher real wages today, which would bias the estimated real-wage coefficient toward zero.

Local prices

Given the standard error in the coefficient on the local prices' variable, the 95 percent confidence interval at its most negative extends to a local price elasticity of jobs of −0.03 (= 0.179 – 1.987 × 0.106).

If local prices only affect local job growth by affecting local costs, we would expect a far more negative elasticity. If local costs have a similar effect per dollar to state and local business taxes, we would expect a long-run elasticity of −10, at least for the export-base and related jobs that are locally cost-sensitive. The research literature's consensus on the long-run elasticity of local business activity with respect to state and local business taxes, holding public services constant, is −0.5. State and local business taxes have typically averaged about 5 percent of business value-added, which is one measure of costs. The implied elasticity with respect to costs would be −0.5 / 5 percent = −10.

Given that this is an eight-year elasticity, the expected elasticity would be 47 percent of the long-run elasticity. Furthermore, if only export-base jobs and their multiplier jobs were negatively affected by local costs, then the elasticity of total jobs would be 67.4 percent of the elasticity for export-base-related jobs. Therefore, the expected elasticity with respect to costs for total jobs after eight years might be −10 × 47 percent × 67.4 percent = −3.2.

Because of this, the empirical estimates in this regression for effects of local prices on jobs can only be reconciled with prior research on the effects of business costs by assuming that local prices have some positive non-cost-related effects on local jobs. The local price variable is constructed from measures of local housing prices. It is certainly possible that local housing prices might have household wealth effects that lead to local prices being correlated with local consumption demand (Howard 2017).

These housing price effects on local consumption demand need not imply that increases in land available for local industrial use wouldn't positively affect local job growth. However, it does raise some doubt as to whether relaxing housing supply constraints, thus lowering housing prices, will always and everywhere be a net boost to local job growth. A complete analysis of how housing supply regulations affect growth must consider wealth effects on local consumption demand.

Alternatively, perhaps local housing prices are in part endogenously determined by expectations or predictors of future job growth, even controlling for the other growth determinants in the regression. In that case, any causal effects of higher local prices discouraging future job growth might be biased in this regression because of expected future growth increasing housing prices.

Business tax elasticity

With the estimated standard error, the 95 percent confidence interval for the business tax variable's effect extends to −0.1. This is far less negative than would be expected. When business taxes are measured as a proportion of value-added, the research consensus implies a long-run jobs elasticity with respect to this business tax variable, holding public services constant, of −10. If only export-base-related jobs respond to this business tax variable, and if we consider an eight-year effect rather than a long-run effect, the expected jobs effect of this business tax variable is reduced to −3.2 (= −10 × 67.4 percent × 47 percent).

Why are the business tax effects so small in these estimates? One possibility is that the business tax effects estimated here include effects due to lower public spending and lower public services, as these public service variables are not included in the regression. If this explanation is valid, then the implication is that the lower public services associated with lower business taxes offset most of any benefits of lower business taxes for job creation.

Alternatively, the business tax variable's true effects might be estimated with bias because business taxes are endogenously chosen by state and local policymakers. If policymakers tend to choose lower business taxes when they expect lower future job growth, then this will tend to bias estimated business taxes toward zero, or even cause lower business taxes to actually be associated with lower future growth. This depends upon the reverse causation, from expected future growth to lower business taxes today, being stronger than the direct causation, from lower business taxes to future job growth, even holding constant other determinants of future growth.

If the −0.1 business tax effect is valid, it implies that the cost per job created from business tax reductions is much greater than discussed above, by a factor of about 30. And if the point estimate is correct, lower business taxes, once one allows for public service effects, tend to reduce future local job growth.

Tax incentive elasticity

With the estimated standard error, the maximum positive value for the incentive variable coefficient encompassed by the 95 percent confidence interval is 0.4. For similar reasons as discussed above, for these effects to be consistent with the effects of business taxes in the literature, the estimated effect of this incentive variable would have to be 3.2.

As with the business tax variable, there seem to be two competing hypotheses for why the incentive estimate is not more positive. The first is that incentives may have some negative effects on public spending on public services, which could offset most or all of any positive effects of incentives on job growth.

The competing hypothesis is that the incentive estimated effect is biased because of endogeneity. Even holding constant various predictors of 2007–2015 job growth, it is possible that policymakers may choose higher incentives when for unobserved reasons they expect 2007–2015 job growth to be lower.

If the point estimate is true, a policy of increasing incentives actually reduces job growth. And even if we go to the most positive effects of incentives on job growth that is consistent with these estimates, we would get a cost-per-job-created of incentives of around 10 times what we would expect from the research literature.

Customized job training

If customized job training had effects similar per dollar to overall business taxes, we would expect the coefficient on the customized job training variable to be 3.2. If customized job training has effects on job creation that are five times as great as tax variables of the same costs, as was argued in a previous section of this report, we would expect a coefficient on the customized job training variable of 15.8.

The actual coefficient estimate is 11.7. This estimate is about 3.7 times what would be expected based on the tax literature. However, the 95 percent confidence interval for this coefficient estimate extends up to 24.5. Therefore, we cannot reject that customized job training might have effects per dollar of five times the average effect in the research literature of business tax variables. Of course, the 95 percent confidence interval also encompasses zero, so at that confidence level we cannot reject the hypothesis that customized job training is irrelevant to job growth. The customized job training coefficient is marginally significantly different from zero if we instead use a 90 percent confidence interval.

Overall, the point estimate implies slightly higher costs per job for customized job training than previously calculated. Costs per job would be higher by a factor of 5.0 / 3.7, or by about 35 percent. Customized job training in the above discussion was estimated to have a cost per job created of between $800 per job-year and $2,000 per job-year. A 35 percent increase would bring these costs up to between $1,080 and $2,700 per job-year. This is still probably less than half of even lower-bound estimates of the benefits per job-year. Financing costs might slightly raise these costs per job-year, depending upon the type of financing.

Manufacturing extension

The manufacturing extension variable is measured as the logarithmic percentage change in total jobs that would be predicted from just adding in the jobs claimed to be created or retained because of manufacturing extension, based on surveys of extension clients. If manufacturing's multiplier effect is 2, then we would predict the coefficient on this variable to be 2.

The actual estimated coefficient is 0.86 and is highly statistically significant, with a *t*-statistic of over 3.5. If the manufacturing multiplier effect is 2, the coefficient estimate implies that 43 percent of the jobs claimed in client surveys to be created by manufacturing extension are actually due to manufacturing extension.

As mentioned in a previous section, the results from Ehlen (2001), based on previous surveys of manufacturing extension clients, implies a cost per job-year created by manufacturing extension of around $950. But Ehlen's estimates assume that 100 percent of the client-survey-claimed jobs are due to manufacturing extension. If only 43 percent of client-claimed jobs are actually due to manufacturing extension, the cost per job-year created increases by a factor of 1 / 0.43 to about $2,200 per job-year. This would still be relatively cheap compared to likely local benefits of a job-year, even with offsets added in from plausible financing mechanisms.

College graduate proportion

The college graduate proportion variable has a point estimate of 0.37, which is highly statistically significantly different from zero (*t*-statistic of about 3). The estimated effect of college graduation percentage on growth in these manufacturing intensive commuting zones is roughly consistent with previous research. For example, Glaeser and Saiz (2004) find a 10-year elasticity of MSA population growth with respect to the college graduation percentage that ranges from 0.41 to 0.58 in the various specifications.

Is this coefficient of 0.37 "large"? Does it imply that increasing the local college graduation percentage is a cost-effective way of increasing local job growth? A useful way of gauging the size of this college graduation effect on local job growth is to translate this effect into a job-creation effect per college graduate. In this sample of 105 commuting zones, the average number of 25 to 64-year-olds is 311,503. One more college graduate would increase the college graduation percentage by 0.000321 percent. The coefficient of 0.37 implies this would increase the ln of 2015 commuting zone employment by 0.000119 percent. In these 105 commuting zones, average 2015 private employment was 226,384. This implies that each additional college graduate in 2007 increases 2015 jobs by 0.27 jobs. If we assume this eight-year change is an adjustment of only 47 percent of the full long-run adjustment to a higher employment level, the long-run increase in jobs per additional college graduate would be 0.57.

But what is the social cost of public policy inducing one more college graduate? Is it low enough that this social cost is significantly less than the estimated benefits per job-year of $5,000 to $20,000?

From looking at the research literature on education policy initiatives that increase educational attainment, the answer seems to be this: the *financial cost* of inducing one more college graduate may be high, but the true *social cost* is likely to be negative—that is, inducing one more college graduate has social benefits even before considering local job-growth effects. If there are social benefits from one more college graduate, ignoring local job-growth effects, then any such local job growth effects are just icing on the cake.

For example, in a recent benefit-cost analysis of the Kalamazoo Promise scholarship program (Bartik, Hershbein, and Lachowska 2016), the financial cost of the program was roughly $18,000 per participant. The program induced an additional bachelor's degree from about 10 percentage points of participants. Therefore, the cost per college graduate was about $180,000. At a discount rate of 3 percent, this is equivalent to an ongoing annual cost of $5,400.

If each college graduate induces 0.57 jobs, the annual cost per job induced would be about $9,500. This is roughly in the range of social benefits of job creation of $5,000 to $20,000.

But a full benefit-cost analysis of the Kalamazoo Promise suggests the program has net benefits, not costs, ignoring job-growth effects. The present value of earnings increases for participants is 4.66 times the costs of the scholarships. Furthermore, from a full benefit-cost perspective, most of the scholarship dollars have offsetting transfer benefits for recipients (e.g., reducing student debts), and hence are not true social costs.[71]

A Closer Look at Grand Rapids and the Lehigh Valley

As mentioned above, among larger manufacturing-intensive communities, Grand Rapids and the Lehigh Valley stand out. These two communities seem to have manufacturing sectors that have been unusually resilient and have shown some good growth trends in the last 10 years.

What does case study evidence on Grand Rapids and the Lehigh Valley show? Fortuitously (or perhaps not so much, as success attracts attention), both Grand Rapids and the Lehigh Valley have been subject to relatively recent in-depth case study analyses. The discussion below is largely based on Atkins et al. (2011) and Safford (2009). The former is a Brookings Institution case study comparison of eight manufacturing-intensive areas. The Brookings case

[71] How do the benefits from the job creation effects of one more local college graduate compare with the total economic benefits of one more local college graduate? As mentioned above, Bartik (2018) finds that one more local job has annual benefits equivalent to about $12,000. If one more college graduate increases local jobs by 0.57, then the annual benefits attributable to job-creation benefits from one more college graduate are around $7,000 (= $12,000 × 0.57). Bartik, Hershbein, and Lachowska (2016) find that a college graduate, compared to a high school graduate, has career earnings higher by about $840,000, in 2015 dollars. At a 3 percent social discount rate, this is equivalent to annual earnings being higher by $25,000. With an education spillover of 86 percent, as implied by the research of Moretti (2004), the total local earnings benefits of one more local college graduate will be about $47,000 annually. The job-creation benefits of $7,000 are about 15 percent of this overall local earnings total. Therefore, most of the benefits from more college graduates are due to higher-quality local jobs, not simply a higher quantity of local jobs. This is consistent with the earlier discussion of the research literature on K–12 spending, which concluded that most local benefits take place through higher job quality, not a higher job quantity.

study singled out Grand Rapids as the only one of the eight areas that had experienced much recent manufacturing growth. The latter is a book-length discussion of why the Allentown–Lehigh Valley area was able to respond much better to the steel industry's collapse in the late 1970s and early 1980s than the seemingly similar Youngstown, Ohio, area responded.

From these case studies of these two areas, what are some common themes?

1. *Both Grand Rapids and the Lehigh Valley were already doing better than other manufacturing-intensive areas well before the big collapse of U.S. manufacturing after 2000.* As the Brookings study of Grand Rapids shows, despite the post-2000 problems, Grand Rapids had a net gain in manufacturing employment of 28 percent from 1980 to 2005 (Atkins et al. [2011], Table 1). This performance was far better than the other seven communities considered in the Brookings study. Safford (2009) documents that from 1983 to 2000, compared to Youngstown, Allentown was more successful in diversifying its manufacturing away from steel and other declining industries into more "knowledge-based" manufacturing industries such as electronics, instruments, and chemicals, and that as a result, average earnings per worker grew far faster in the Allentown/Lehigh Valley area than in Youngstown from 1983 to 2000.

What this suggests is that the success of manufacturing-intensive areas such as Grand Rapids and the Lehigh Valley is due to long-term area characteristics and perhaps long-term policies. Success in economic development is not achieved overnight, but rather requires long-term commitments to policies that work.

2. *Despite these two areas' success prior to 2000 and after 2007, both areas suffered significant problems in the 2000-to-2007 period.* This has already been documented above, in our presentation of the shift-share analyses of the two economies. When the national economic headwinds facing manufacturing were extremely severe, in the 2000 to 2007 period, almost no

manufacturing-intensive areas were able to show much success, at least with their manufacturing sector. Grand Rapids and the Lehigh Valley were no exception. But when the national picture on manufacturing changed from "disastrous" in 2000–2007 to "mediocre" in 2007–2015, the underlying competitive strengths of Grand Rapids and the Lehigh Valley were once again revealed.

3. *Both Grand Rapids and the Lehigh Valley area have invested heavily in cluster strategies that seek to provide business services, land, human capital, and financing to groups of interrelated firms.*

The Brookings study highlights the economic development efforts of The Right Place, the lead economic development organization in the Grand Rapids area. A huge part of this organization's economic development efforts involved emphasis on clusters of related industries. According to Brookings, "As part of [the Right Place's] retention efforts, it convened industry cluster groups for information exchange, gave financial and strategic advice to stabilize privately held family firms facing intergenerational transitions, and provided and coordinated assistance to small and medium-sized manufacturers." (Atkins et al. [2011], p. 14) The latter included The Right Place staffing a co-located Grand Rapids–area branch office of the Michigan Manufacturing Technology Center, the Michigan affiliate of the national Manufacturing Extension Partnership. As Brookings mentions, these clusters, which focused on both retention and expansion issues, were formed "for more than a dozen industry groups," each of which were "supported by a Right Place staff member" and were focused on specific issues, frequently meeting for a year or two to deal with some issue before disbanding (p. 14).

The Right Place program today continues to highlight specific manufacturing clusters. The particular industries identified in The Right Place's most recent report on manufacturing in west Michigan are office furniture, automotive, medical devices, food processing, aerospace, and defense (The Right Place 2018).

The Safford (2009) study highlights the Lehigh Valley's successful effort to attract one of Pennsylvania's four regional centers for the Ben Franklin Technology Partnership, whose "idea was to create public-private partnerships that would build on the state's higher education infrastructure to support existing companies seeking to engage older technologies as well as to generate new ones. . . . The Ben Franklin program's creators planned on establishing three centers, one in Philadelphia, another in Pittsburgh, and a third covering the rest of the state to be located . . . near Penn State. The local group in Allentown . . . succeeded in advocating for a fourth, located near Lehigh University" (p. 74).

According to Safford (2009), "The Ben Franklin Partnership has played a pivotal role in developing the region's entrepreneurial infrastructure" (p. 119). This includes funding to set up a business incubator and support for a local venture capital fund, as well as various programs at Lehigh University attempting to assist local businesses.

The Lehigh Valley's lead economic development organization, the Lehigh Valley Economic Development Corporation, continues to focus on various clusters of related industries. Its website and strategic plan specifically identify a focus on four areas: 1) high-performance manufacturing, 2) life sciences research and manufacturing, 3) high-value business services, and 4) food and beverage processing.

4. *Both areas strategically emphasized overcoming industry barriers to growth by supplying additional land and labor resources.*

The Brookings report on Grand Rapids particularly highlights the area's focus on developing life sciences–related jobs. "The cornerstone of this [life sciences] expansion was the development of the Medical Mile, an approximate mile of medical-related development [in Grand Rapids]. . . . The complex was jump started . . . with the . . . Van Andel Research Institute, a biomedical research center that opened in 2000. . . . A second major development was the [2008–2010] relocation of Michigan State University's [medical school] to Grand Rapids."

These land and research and educational investments were combined with the creation of a cluster effort, the West Michigan Medical Device Consortium. "[This] Consortium was formed to give medical device companies throughout the region the opportunity to collaborate, and to promote their specialized expertise in the medical device industry. An automotive parts firm . . . moved into the medical devices market, making [orthopedic] parts. A bakery and wrappings supplier established a medical packaging subsidiary, manufacturing packaging for medical test kits. . . ."

Safford's (2009) case study of the Lehigh Valley mentions the region's foresight in 1959 in creating an industrial park: "The action [in the 1950s] with a more lasting impact was the creation of the Lehigh Valley Industrial Park, then a new concept in economic development" (p. 72). According to a recent economic development strategy report for the Lehigh Valley (Garner Economics 2014), "The seven parks within the LVIP system are home to more than 470 businesses employing more than 22,000 people" (p. 3).

The annual report of the Lehigh Valley Economic Development Corporation (LVEDC 2016) highlights the area's efforts to deal with a variety of specific barriers to growth. These include the following:

- The Lehigh Valley Lending Network, a consortium of 17 area banks and the LVEDC, under which a business can make a single application for available public and private financing options;

- The LVEDC Education and Talent Supply Council, which is trying to better connect area schools and colleges with the skill needs of area firms;
- The Lehigh Valley Land Recycling Initiative, which is engaged in 21 projects to redevelop brownfields.

5. *Both Grand Rapids and the Lehigh Valley's economic development efforts rested on the well-coordinated political and financial support provided by a local business community that was interested in promoting local economic development.*

One of the main points of Safford's fascinating book is that such unified local business investment in local economic development, on a sustained basis, is not always available. It was not available in Youngstown. And, with many banks and other corporations consolidating into national or international operations, local business leadership and investment often can be hard to find for midsized communities.

According to Safford (2009), in the Allentown/Lehigh Valley area, compared to Youngstown, "the personal involvement of top leaders of key businesses . . . [has] proved vital to regional success" (p. 8). He points to area business leaders helping fund the Lehigh Valley Industrial Park in the 1950s. Local business and political leaders in the area successfully lobbied the state of Pennsylvania to attract an extra and unplanned fourth Ben Franklin Technology Center to be located in the Lehigh Valley. This extra center also involved a private venture capital fund, which "drew investments from several of the community's companies and several wealthy individuals" (p. 75). The Lehigh Valley Economic Development Corporation is in part funded through an area hotel tax.

The Brookings study highlights the involvement in the development of Grand Rapids of several influential persons or entities: the founders of Amway, the descendants of the founders of the Steelcase office furniture company, the founder of Universal Forest Products, and the Meijer Foundation (endowed by the founders of a grocery store chain). Both the Brookings study and a study by Miller-Adams et al. (2017) highlight that these community investments were coordinated in a variety of ways—frequently through the Grand Action Committee, whose ostensible main purpose was supporting the development of downtown Grand Rapids. Private individuals and firms funded the Right Place Program in the 1980s within the local Chamber of Commerce, before it was made independent of the Chamber in 1997. The development of the downtown Grand Rapids campus of Grand Valley State University in the 1990s was largely funded through major private donors. The Van Andel Research Institute was funded by one of the cofounders of the Amway Corporation. The MSU medical school relocation was largely achieved through large-scale Grand Rapids–area donations: "It's called money, it's how we got the school here," one observer said (Atkins et al., p. 16).

Do these case studies show that the manufacturing success of Grand Rapids and the Lehigh Valley is due to investments in creating clusters, and in overcoming key barriers to these clusters' growth? No. Almost any local community today talking about economic development will talk about clusters. Almost any local economic development organization will have some efforts to deal with issues of labor skills, suitable land for development, and financing availability. Grand Rapids and the Lehigh Valley cannot be called unique for having such programs.

However, from perusing these case studies, one gets the sense that the Grand Rapids and Lehigh Valley areas' efforts to grow their economy, by strategies focused on overcoming key barriers to cluster growth, have been funded on a larger scale, have been more sustained over time, and have been of higher quality. This may in part be because of the interest in local economic development of these two areas' local leaders, and in particular these areas' local business leaders.

CONCLUSION

Let's return to the main question addressed in this report: What works to help manufacturing-intensive local economies?

If national policy arranges things so that overall U.S. manufacturing performance is as bad as it was from 2000 to 2007, the answer is: Nothing works, except for the local area doing whatever it can to rapidly abandon manufacturing and move into other industries. And even that will not work very well for most manufacturing-intensive local communities. No local policy for manufacturing-intensive communities can totally escape the headwinds of disastrous national manufacturing performance.

But if national policy allows for overall U.S. manufacturing performance to be at least mediocre, then state and local public policy can do a lot to improve the performance of manufacturing-intensive communities. State and local policymakers can do so by investing in services that help local manufacturing.

The easy fix of handing out cash to manufacturers via tax incentives is not the strategy to emphasize. What is more cost-effective in revitalizing manufacturing-intensive local economies is investing in customized business services, human capital development, infrastructure development, brownfield development, and neighborhood development.

Specifically, the following state and local public policy approaches are recommended:

- Cut back on business tax incentives by providing business tax incentives only to manufacturing companies with high multipliers. This could involve cutting the economic development budget for tax incentives by over half in many states.
- Invest economic development budgets more in manufacturing extension services, customized job training, and other customized business services to small and medium-sized businesses, with an emphasis on locally owned businesses. Because there is a natural limit to the need for such services, an efficient scale of such customized services probably would still involve a lower overall budget for economic development than is currently the case. But the resulting job creation effects for local manufacturing would be greater than for current economic development, which wastes a great deal of resources on relatively inefficient long-term business tax incentives with low multipliers.
- Invest more funds in human-capital development programs: high-quality child care; high-quality preschool; increased K–12 funding, particularly for lower-income children; and high-quality job training that is demand oriented toward the actual skills needed by growing employers, in places or times where unemployment is high, in programs that provide job training combined with wage subsidies for hiring the long-term unemployed for newly created jobs.
- Invest in developing more high-quality land for job creation through infrastructure investments in transportation, brownfield cleanup and redevelopment, neighborhood development that improves infrastructure and services in distressed neighborhoods, and

changes in zoning and building codes that allow more business development and housing development.

Cutting back on business tax incentives, and instead investing in an array of public services to promote economic development, may be more cost-effective, but it is a harder strategy to sell politically. Providing expensive business tax incentives for a large new facility of a large corporation has a huge short-term political payoff for governors and mayors. The favorable media coverage from attracting a Foxconn manufacturing plant to your state is immediately attractive to political leaders. In contrast, providing public services tends to have longer-term and less obvious benefits for local economic development.

In addition, handing out cash to businesses is easy, and it wins influential friends. Providing public services to promote business development, job skills development, or land development is a more complex strategy that is more challenging to consistently carry out in a high-quality manner. The immediate direct beneficiaries of such services are more diffuse and less politically influential.

What local areas need are local news media and local interest groups and leaders—especially locally interested business leaders—that are consistently committed to what will best work to promote long-term local economic development. These local groups can push to invest local dollars in long-term development strategies, and to consistently push to evaluate and improve the quality and cost-effectiveness of what the local area does to promote development.

The national interest is served by local economic development strategies that invest in business productivity, not in tax incentives to relocate businesses. What can national policymakers do to help promote local economic development strategies which will invest in the productivity of manufacturing-intensive communities? Some ideas include the following:

- Aggregate national economic development policies should regard promoting an overall competitive U.S. manufacturing sector as a goal. This requires attention to how macroeconomic policies and other policies affect exchange rates, and how trade policies affect manufacturing.
- The federal government should be willing to be a partner in helping provide matching funds for some of these public services that help promote local economic development. These include federal support for manufacturing extension services, customized job training, human capital programs from birth to adulthood, infrastructure, brownfield development, and neighborhood development.
- Federal support is particularly needed for evaluation of local economic development programs, and in particular customized business services. Local communities around the nation can benefit from learning which particular program designs lead to the best results.
- U.S. antitrust policy may have hidden effects on local economic development by the effect it has on the vitality of local business leadership. National policies that discourage corporate consolidation and encourage more business competition may indirectly help local economic development by making sure there is a more extensive presence in local communities of banks and other local companies that are locally owned.

What perhaps most discourages creative public policy toward manufacturing-intensive communities is the belief that nothing can be done. A common belief is that U.S. manufacturing is going down the tubes because of world competition and robots. According to this belief, nothing that manufacturing-intensive communities do to respond will much matter.

This need not be the case. It seems unlikely that with even minimally wise national policies, U.S. manufacturing long-term will do as poorly as it did from 2000 to 2007. Some researchers even believe that rising demand for customized products, and other economic forces, will lead to a growing interest of manufacturers in locating their production closer to major markets such as the United States (Livesey 2017).

But part of a brighter future for manufacturing-intensive communities also lies in these communities' own hands. Can these local communities find the local leadership and resources to invest in the public services needed to promote local economic development? With the right leadership and investments, manufacturing-intensive communities can promote more and better-quality jobs, both for their communities and for the overall U.S. economy.

DATA APPENDIX FOR REGRESSION ESTIMATES (Tables 16 and 17)

The college proportion, price, and real-wage variables used in the regression with the 105 manufacturing-intensive commuting zones (see Tables 16 and 17) are derived from the American Community Survey. Each individual observation in ACS is probabilistically assigned to a commuting zone by using the proportion of each Public Use Microdata Area (PUMA) population that is in that commuting zone. That population weight and the individual observation's housing weight or individual weight are used in weighting all data.

Local prices are derived from relative prices for one- and two-bedroom apartments in each commuting zone. This is similar to procedures used in previous studies by McHenry and McInerney (2014) and Moretti (2013). Relative overall local prices are assumed to be 50 percent of local housing prices; this is based on regression evidence of a relationship between overall local prices and local housing prices in Aten (2006).

For wage rate calculations, all observations are dropped that are allocated in ACS on any relevant variable (e.g., age, sex, education, weeks worked, self-employment income, wage and salary income, or usual hours worked). Observations are also dropped if self-employment income is nonzero, as respondent reports of weeks worked and work hours could include self-employment.

Wage rates are calculated as wage and salary earnings divided by annual hours worked. Annual hours worked are derived by multiplying usual hours worked per week by weeks worked. Weeks worked are derived as the midpoint of the weeks-worked interval reported in ACS. Individual observations are dropped if the number of weeks worked is less than 14 or the usual hours worked are fewer than 11. The dropping of usual hours worked if they are fewer than 11 is based on measurement error due to respondents misinterpreting the question as being asked about usual hours worked in a day rather than a week, as documented by Baum-Snow and Neal (2009). The midpoint assignment of weeks worked is similar to procedures used by Perry, Thomason, and Bernhardt (2016), who also provide evidence that this method yields similar results to using continuous weeks worked, except for the first interval, weeks worked less than 14, which is dropped in this analysis.

We then calculate mean ln real wage for each commuting zone for groups differentiated by gender/age/education. The age groups used are ages 25 to 34, 34 to 44, 45 to 54, and 55 to 64; older and younger individuals are dropped—the older because they are less likely to be in the labor force, the younger because of issues with education classification. The initial education categories attempted were fivefold: 1) high school dropout, 2) high school graduate, 3) associate degree, 4) bachelor's degree, and 5) some higher degree. Because of missing observations in some categories in some commuting zones, some of the gender/age/education categories were combined. To reduce the influence of outliers, real-wage-rate observations were bottom coded at the first percentile of the overall wage distribution.

The average ln(real wage) for each age/gender/education category is then calculated using the person weights from the ACS, combined with a weight reflecting the probability that this PUMA is in that commuting zone. The real-wage variable is then calculated as average ln real wages across these categories, with the proportion of U.S. population in 2007 in each category used as weights.

Three measures—1) the business tax/value added, 2) tax incentives/value added, and 3) customized job training/value added—are averages from 2007 to 2015 from the Upjohn Institute's Panel Data on Incentives and Taxes (Bartik 2017a). The calculated numbers are for the city if available, for the state if that city is not available, and is set to 0 if missing. An indicator for "missing" is included in the regression.

The share-effect prediction is derived from the Upjohn Institute's WholeData version of County Business Patterns and is based on data aggregated to three-digit NAICS codes. Share-effect-predicted additional jobs from 2007 to 2015 are calculated and added to 2007 jobs and are used to generate predicted growth in logarithm of private jobs.

MEP jobs created are based on data provided by MEP based on client surveys. These are what the client claims to be jobs created or retained due to MEP services. The claimed job creation/retention is aggregated to commuting-zone level for all years from 2007 to 2015. The predicted job growth is the predicted change in ln(private jobs) from adding this job growth to the 2007 job level.

REFERENCES

Aten, Bettina H. 2006. "Interarea Price Levels: An Experimental Methodology." *Monthly Labor Review* 129: 47–61.

Atkins, Patria, Pamela Blumenthal, Adrienne Edisis, Alec Fridhoff, Leah Curran, Lisa Lowry, Travis St. Clair, Howard Wial, and Harold Wolman. 2011. *Responding to Manufacturing Job Loss: What Can Economic Development Policy Do?* Metro Economy Series for the Metropolitan Policy Program at the Brookings Institution. Washington, DC: Brookings Institution.

Bartik, Timothy J. 1988. "Tennessee." In *The New Economic Role of American States: Strategies in a Competitive World Economy*, Scott Fosler, ed. New York and Oxford: Oxford University Press, pp. 141–202.

———. 1990. "The Market Failure Approach to Regional Economic Development Policy." *Economic Development Quarterly* 4(4): 361–370.

———. 1991. *Who Benefits from State and Local Economic Development Policies?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

———. 1992. "The Effects of State and Local Taxes on Economic Development: A Review of Recent Research." *Economic Development Quarterly* 6(1): 102–110.

———. 1994. "The Effects of Metropolitan Job Growth on the Size Distribution of Family Income." *Journal of Regional Science* 34(4): 483–501.

———. 2001. *Jobs for the Poor: Can Labor Demand Policies Help?* New York: Russell Sage Foundation.

———. 2005. "Solving the Problems of Economic Development Incentives." *Growth and Change* 36(2): 139–166.

———. 2009. "What Proportion of Children Stay in the Same Location as Adults, and How Does This Vary across Location and Groups?" Upjohn Institute Working Paper No. 09-145. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/wp09-145 (accessed March 19, 2018).

———. 2010. "Bringing Jobs to People: How Federal Policy Can Target Job Creation for Economically Distressed Areas." The Hamilton Project, discussion paper. Washington, DC: Brookings Institution.

———. 2011. *Investing in Kids: Early Childhood Programs and Local Economic Development.* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. http://doi.org/10.17848/9780880994002 (accessed March 19, 2018).

———. 2012. "Including Jobs in Benefit-Cost Analysis." *Annual Review of Resource Economics* 4(1): 55–73.

———. 2014. *From Preschool to Prosperity: The Economic Payoff to Early Childhood Education*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

———. 2015. "How Effects of Local Labor Demand Shocks Vary with the Initial Local Unemployment Rate." *Growth and Change* 46(4): 529–557.

———. 2016. "Labor-Demand-Side Economic Development Incentives and Urban Opportunity." In *Shared Prosperity in America's Communities*, Susan M. Wachter and Lei Ding, eds. Philadelphia: University of Pennsylvania Press, pp. 129–150.

———. 2017a. *A New Panel Database on Business Incentives for Economic Development Offered by State and Local Governments in the United States.* Report prepared for the

Pew Charitable Trusts. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

———. 2017b. "New Evidence on State Fiscal Multipliers: Implications for State Policies." Upjohn Institute Working Paper No. 17-275. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

———. 2018. *Who Benefits from Economic Development Incentives? How Incentive Effects on Local Incomes and the Income Distribution Vary with Different Assumptions about Incentive Policy and the Local Economy*. Report. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Bartik, Timothy J., Brad Hershbein, and Marta Lachowska. 2016. "The Merits of Universal Scholarships: Benefit-Cost Evidence from the Kalamazoo Promise." *Journal of Benefit-Cost Analysis* 7(3): 400–433. https://doi.org/10.1017/bca.2016.22 (accessed March 19, 2018).

———. 2017. "The Effects of the Kalamazoo Promise Scholarship on College Enrollment, Persistence, and Completion." Upjohn Institute Working Paper No. 15-229. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/wp15-229 (accessed March 19, 2018).

Baum-Snow, Nathaniel, and Derek Neal. 2009. "Mismeasurement of Usual Hours Worked in the Census and ACS." *Economics Letters* 102(1): 39–41.

Beaudry, Paul, David A. Green, and Benjamin Sand. 2014. "In Search of Labor Demand." Working paper. Vancouver, CA: University of British Columbia.

Borgschulte, Mark, and Paco Martorell. 2016. "Paying to Avoid Recession: Using Reenlistment to Estimate the Cost of Unemployment." IZA Discussion Paper No. 9680. Bonn, Germany: Institute of Labor Economics.

Bureau of Economic Analysis (BEA). 1997. *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II).* Washington, DC: U.S. Department of Commerce.

Burtless, Gary. 1985. "Are Targeted Wage Subsidies Harmful? Evidence from a Wage Voucher Experiment." *Industrial and Labor Relations Review* 39(1): 105–114.

Busso, Matias, Jesse Gregory, and Patrick Kline. 2013. "Assessing the Incidence and Efficiency of a Prominent Place Based Policy." *American Economic Review* 103 (2): 897–947. http://dx.doi.org/10.1257/aer.103.2.897 (accessed March 19, 2018).

Byrne, Paul. 2010. "Does Tax Increment Financing Deliver on Its Promise of Jobs? The Impact of Tax Increment Financing on Municipal Employment Growth." *Economic Development Quarterly* 24(1): 13–22.

Campbell, Douglas L. 2016. "Relative Prices, Hysteresis, and the Decline of American Manufacturing." Working Paper No. w0212. Moscow, Russia: Center for Economic and Financial Research (CEFIR).https://ideas.repec.org/p/cfr/cefirw/w0212.html (accessed March 19, 2018).

Card, David, Jochen Kluve, and Andrea Weber. 2017. "What Works? A Meta Analysis of Recent Active Labor Market Program Evaluations." *Journal of the European Economic Association* 0(0): 1–38. https://doi.org/10.1093/jeea/jvx028 (accessed March 20, 2018).

Civic Economics. 2007. *The San Francisco Retail Diversity Study*. Chicago: Civic Economics. ilsr.org/wp-content/uploads/2011/12/SFRDS-May07-2.pdf (accessed July 31, 2017).

———. 2013. *Independent BC: Small Business and the British Columbia Economy*. Report prepared for the Canadian Union of Public Employees–British Columbia. Chicago: Civic Economics.

De Sousa, Christopher A. 2013. “Publicly Subsidized Brownfields Redevelopment.” In *Financing Economic Development in the 21st Century*,. Sammis B. White and Zenia Z. Kotval, eds. 2nd ed. New York: M.E. Sharpe, pp. 150–167.

Dye, Richard, and David Merriman. 2003. “The Effect of Tax Increment Financing on Land Use.” In *The Property Tax, Land Use, and Land Use Regulation*, Richard Netzer, ed. Northampton, MA: Edward Elgar, pp. 37–61.

Ehlen, Mark. 2001. “The Economic Impact of Manufacturing Extension Centers.” *Economic Development Quarterly* 15(1): 36–44.

Elliott, Mark, and Anne Roder. 2017. “Escalating Gains: Project QUEST’s Sectoral Strategy Pays Off.” New York: Economic Mobility Corporation.

Elvery, Joel A. 2009. “The Impact of Enterprise Zones on Resident Employment: An Evaluation of the Enterprise Zone Programs of California and Florida.” *Economic Development Quarterly* 23(1): 44–59.

Garner Economics. 2014. *A Blueprint for Success: An Economic Development Strategy for Sustainable Growth in the Lehigh Valley*. Report to Lehigh Valley Economic Development Corporation. Atlanta, GA: Garner Economics.

Glaeser, Edward, and Joseph Gyourko. 2017. “The Economic Implications of Housing Supply.” Working Paper No. 23833. Cambridge, MA: National Bureau of Economic Research, Cambridge, MA.

Glaeser, Edward L., and Albert Saiz. 2004. "The Rise of the Skilled City." *Brookings-Wharton Papers on Urban Affairs* 5(2004): 47–94.

Greenbaum, Robert T., and Jim Landers. 2009. "Why Are State Policy Makers Still Proponents of Enterprise Zones? What Explains Their Action in the Face of a Preponderance of the Research?" *International Regional Science Review* 32(4): 466–479.

Hamermesh, Daniel. 1993. *Labor Demand*. Princeton, NJ: Princeton University Press.

Harden, J. William, and William H. Hoyt. 2003. "Do States Choose Their Mix of Taxes to Minimize Employment Losses?" *National Tax Journal* 56(1, Part 1): 7–26.

Hebert, Scott, Avid Vidal, Gregy Mills, Franklin James, and Debbie Gruenstein. 2001. *Interim Assessment of the Empowerment Zones and Enterprise Communities (EZ/EC) Program: A Progress Report*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Helms, L. Jay. 1985. "The Effect of State and Local Taxes on Economic Growth: A Time Series–Cross Sectional Approach." *Review of Economics and Statistics* 67(4): 574–582.

Hollenbeck, Kevin. 2008. "Is There a Role for Public Support of Incumbent Worker On-the-Job Training?" Upjohn Institute Working Paper No. 08-138. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. http://dx.doi.org/10.17848/wp08-138 (accessed March 20, 2018).

———. 2013. "Public Support of Workforce Training for Incumbent Workers?" Paper, School of Public Policy, University of Maryland.

Hollenbeck, Kevin M., and Wei-Jang Huang. 2014. *Net Impact and Benefit-Cost Estimates of the Workforce Development System in Washington State*. Upjohn Institute Technical Report

No. 13-029. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/tr13-029 (accessed March 20, 2018).

Holzer, Harry J., Richard N. Block, Marcus Cheatham, and Jack H. Knott. 1993. "Are Training Subsidies for Firms Effective? The Michigan Experience." *Industrial and Labor Relations Review* 46(4): 625–636.

Houseman, Susan. 2018. "Understanding the Decline in Manufacturing Employment." Report presented at the Manufacturing Forum, held at the Economic Policy Institute in Washington, DC, January 12.

Howard, Greg. 2017. "The Migration Accelerator: Labor Mobility, Housing, and Aggregate Demand." Job market paper, Department of Economics, Massachusetts Institute of Technology.

Hoyt, William H., Christopher Jepsen, and Kenneth R. Troske. 2008. "Business Incentives and Employment: What Incentives Work and Where?" Working Paper No. 2009-02. Lexington, KY: University of Kentucky, Institute for Federalism and Intergovernmental Relations.

Hsieh, Chang-Tai, and Enrico Moretti. 2017. "Housing Constraints and Spatial Misallocation." Working paper. University of Chicago and University of California, Berkeley.

Hungerford, Thomas L., and Robert W. Wassmer. 2004. "K–12 Education in the U.S. Economy: Its Impact on Economic Development, Earnings, and Housing Values." NEA Research Working Paper. Washington, DC: National Education Association. www.nea.org/assets/docs/HE/economy.pdf (accessed March 20, 2018).

Institute on Taxation and Economic Policy (ITEP). 2015. *Who Pays? A Distributional Analysis of the Tax System in All Fifty States.* Washington, DC: Institute on Taxation and Economic Policy.

Isserman, Andrew M., and James Westervelt. 2006. "1.5 Million Missing Numbers: Overcoming Employment Suppression in County Business Patterns Data." *International Regional Science Review* 29(3): 311–335.

Jackson, C. Kirabo, Rucker C. Johnson, and Claudia Persico. 2016. "The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms." *Quarterly Journal of Economics* 131(1): 157–218. doi.org/10.1093/qje/qjv036 (accessed March 20, 2018).

Jarmin, Ronald S. 1998. "Manufacturing Extension and Productivity Dynamics." Discussion Paper No. 98-8. Washington, DC: U.S. Census Bureau.

———. 1999. "Evaluating the Impact of Manufacturing Extension on Productivity Growth." *Journal of Policy Analysis and Management* 18(1): 99–119.

Kline, Patrick, and Enrico Moretti. 2014a. "People, Places, and Public Policy: Some Simple Welfare Economics of Local Economic Development Programs." *Annual Review of Economics* 6(2014): 629–662.

———. 2014b. "Local Economic Development, Agglomeration Economies, and the Big Push: 100 Years of Evidence from the Tennessee Valley Authority." *Quarterly Journal of Economics* 129(1): 275–331.

Lehigh Valley Economic Development Corporation (LVEDC). 2016. *Annual Report.* Bethlehem, PA: Lehigh Valley Economic Development Corporation.

Livesey, Finbarr. 2017. *From Global to Local: The Making of Things and the End of Globalization.* New York: Pantheon Books.

Lynch, Devon, and Jeffrey S. Zax. 2011. "Incidence and Substitution in Enterprise Zone Programs: The Case of Colorado." *Public Finance Review* 39(2): 226–255.

Mas, Alexandre, and Amanda Pallais. 2017. "Valuing Alternative Work Arrangements." *American Economic Review* 107(12): 3722–3759.

McHenry, Peter, and Melissa McInerney. 2014. "The Importance of Cost of Living and Education in Estimates of the Conditional Wage Gap between Black and White Women." *Journal of Human Resources* 49(3): 695–722.

Miller-Adams, Michelle, Grace Denny, Teresa Behrens, and Michael Moody. 2017. *Understanding the Philanthropic Character of Communities: Insights from Two West Michigan Communities.* Report. Grand Rapids, MI: Grand Valley State University, Johnson Center for Philanthropy.

Moore, Mark A., Anthony E. Boardman, Aidan R. Vining, David L. Weimer, and David H. Greenberg. 2004. "Just Give Me a Number! Practical Values for the Social Discount Rate." *Journal of Policy Analysis and Management* 23(4): 789–812. doi: 10.1002/pam.20047 (accessed March 20, 2018).

Moretti, Enrico. 2004. "Estimating the Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-Sectional Data." *Journal of Econometrics* 121(2004): 175–212. doi: 10.1016/j.jeconom.203.10.015 (accessed March 20, 2018).

———. 2010. "Local Multipliers." *American Economic Review* 100(2): 373–377. doi: 10.1257/aer.100.2.373

———. 2013. "Real Wage Inequality." *American Economic Journal: Applied Economics* 5(1): 65–103.

Neumark, David, and Jed Kolko. 2010. "Do Enterprise Zones Create Jobs? Evidence from California's Enterprise Zone Program." *Journal of Urban Economics* 68(1):1–19.

Neumark, David, and Helen Simpson. 2015. "Place-Based Policies." In *Handbook of Regional and Urban Economics,* Vol. 5, Gilles Duranton, J. Vernon Henderson, and William C. Strange, eds. Amsterdam: Elsevier, pp. 1197–1287.

Paull, Evans. 2008. *The Environmental and Economic Impacts of Brownfields Redevelopment*. Working Draft Report, Northeast-Midwest Institute.

Perry, Ian, Sarah Thomason, and Annette Bernhardt. 2016. "Data and Methods for Estimating the Impact of Proposed Local Minimum Wage Laws." Institute for Research on Labor and Employment, University of California, Berkeley.

Peters, Alan H., and Peter S. Fisher. 2002. *State Enterprise Zone Programs: Have They Worked?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Phillips, Joseph M., and Ernest P. Goss. 1995. "The Effect of State and Local Taxes on Economic Development: A Meta-Analysis." *Southern Economic Journal* 62(2): 320–333.

Phillips, Andrew, Caroline Sallee, and Charlotte Peak. 2016. *Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2015.* Ernst and Young report for the Council on State Taxation. Washington, DC: Council of State Taxation.

Poterba, James M., and Lawrence H. Summers. 1995. "A CEO Survey of U.S. Companies' Time Horizons and Hurdle Rates." *Sloan Management Review* 37(1): 43–53.

Robey, Jim, Randall W. Eberts, Kathleen Bolter, Marie Holler, Nicholas Marsh, Brian Pittelko, and Claudette Robey. 2017. "The National-Level Economic Impact of the

Manufacturing Extension Partnership (MEP)." Prepared for National Institute of Standards and Technology (NIST) and Manufacturing Extension Partnership (MEP). Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Rode, Peter. 1988. *MEED Means More Business: Job Growth through Minnesota's Wage Subsidy Program.* Minneapolis, MN: Jobs Now Coalition.

Roder, Anne, and Mark Elliott. 2013. *Stimulating Opportunity: An Evaluation of ARRA-Funded Subsidized Employment Programs.* New York: Economic Mobility Corporation.

Safford, Sean. 2009. *Why the Garden Club Couldn't Save Youngstown: The Transformation of the Rust Belt.* Cambridge, MA: Harvard University Press.

Saiz, Albert. 2010. "The Geographic Determinants of Housing Supply." *Quarterly Journal of Economics* 125(3): 1253–1296.

Saks, Raven E. 2008. "Job Creation and Housing Construction: Constraints on Metropolitan Area Employment Growth." *Journal of Urban Economics* 64(1): 178–195.

Suárez Serrato, Juan Carlos, and Philippe Wingender. 2016. "Estimating Local Fiscal Multipliers." NBER Working Paper No. 22425. Cambridge, MA: National Bureau of Economic Research.

Suárez Serrato, Juan Carlos, and Owen Zidar. 2016. "Who Benefits from State Corporate Tax Cuts? A Local Labor Market Approach with Heterogeneous Firms." *American Economic Review* 106(9): 2582–2624.

The Right Place. 2018. *Manufacturing in West Michigan.* Grand Rapids: The Right Place.

Turner, Matthew A., Andrew Haughwout, and Wilbert van der Klaauw. 2014. "Land Use Regulation and Welfare." *Econometrica* 82(4): 1341–1403.

Weber, Rachel. 2013. "Tax Increment Financing in Theory and Practice." In *Financing Economic Development in the 21st Century*, 2nd ed., Sammis B. White and Zenia Z. Kotval, eds. New York: M. E. Sharpe, pp. 150–167.

Wolman, Harold, Howard Wial, Travis St. Clair, and Edward Hill. 2017. *Coping with Adversity: Regional Economic Resilience and Public Policy*. Ithaca, NY: Cornell University Press.

Zidar, Owen. 2017. "Tax Cuts for Whom? Heterogeneous Effects of Income Tax Changes on Growth and Employment." Working paper. Chicago: University of Chicago, Booth School of Business; and Cambridge, MA: National Bureau of Economic Research.