

The Estimated Local and Statewide Economic and Fiscal Impacts of the AK Steel Middletown Works Plant, Butler County, Ohio

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October 18, 2017

EXECUTIVE SUMMARY

The AK Steel Middletown facility, which is located just west of Interstate 75 about halfway between Cincinnati and Dayton in Butler County, Ohio, is the nation's most productive integrated steel operation. Its carbon steel melting, casting, hot and cold rolling, and finishing operations produce hot and cold rolled, enameling, electrogalvanized, hot tip galvanized, aluminized, and stainless steels used in a wide variety of products. AK Steel is interested in learning about and documenting the regional and statewide economic importance of its Middletown Works plant. The purpose of this report is to document and communicate the regional and statewide economic and fiscal importance of the AK Steel Middletown plant to Butler County and the state of Ohio.

The analysis in this report is based on data provided by AK Steel detailing its spending on various production inputs and the volume and value of production output from the beginning of 2016 through the second quarter of 2017. The AK Steel Middletown Works plant employed about 2,160 people during this time period, with an annual payroll of about \$144 million, plus \$67 million in fringe benefits. AK Steel sold nearly \$2 billion worth of steel in the final four quarters of the data provided. Based upon AK Steel's own estimates supplemented by information on steel and ferroalloy manufacturing plants already operating within Ohio, about 77 percent of the value of the steel manufactured at the plant will be accounted for by the value of intermediate goods. From this information, we also estimate that AK Steel purchases from Ohio vendors will be about 30 percent of the value of their sales, approximately \$590 million. Based on this and other regional economic data, and using a customized industry input-output model to estimate the economic impacts of the AK Steel Middletown Works plant, it is my opinion to a reasonable degree of economic certainty that the AK Steel's total net annual economic impact in Ohio was approximately 8,075 jobs and \$529 million in labor income. Of that, about 5,840 jobs and \$403 million in labor income was in Butler

County. Further, it is my opinion to a reasonable degree of economic certainty that state and local governments in Ohio received at least \$43.6 million in tax revenues annually in 2016 and 2017 related to operations at the Middletown Works plant, of which about \$5.8 million were in the form of local income and sales tax receipts in Butler County.

The above estimates are for the economic and fiscal categories most easily quantified. Although difficult to quantify, it is also my opinion that there are other, positive economic impacts related to the operation of the Middletown Works plant. For example, the area real estate market is linked to the payrolls at such facilities, but it is very difficult to sort out all the factors that contribute to housing values and commercial properties. Real estate markets are impacted over decades by complex interactions among many factors, including retirements, migration, mortgages, second incomes, second careers, children, as well as any industrial changes in the marketplace. Social indicators, like unemployment and crime, are also likely related to the Middletown Works plant's employment levels, as are public costs for unemployment benefits, retraining, and social services. And the finances of local school districts are linked to the Middletown Works plant's operations. AK Steel pays property taxes annually, and employees pay property taxes on their homes as well.

In the remainder of the report, I describe the methods used in this study, provide the detailed economic and fiscal estimates, and also highlight the relative importance of manufacturing industries to Butler County.

METHODOLOGY

Because the steel produced by the AK Steel Middletown Works plant will be sold in national and international markets, it will bring new dollars into the regional and state economy – as opposed to simply absorbing local dollars, as is the case for most retail and service operations. In this sense, the operation of the Middletown Works plant has large and predictable economic and fiscal impacts in Ohio. I now turn to a discussion of the methods used to measure the regional economic and fiscal impacts. First, I explain how I defined the regional economic footprint for purposes of this impact study. Then, I discuss in some detail the input-output model used to measure the statewide impacts.

Location and Economic Footprint

The Middletown Works plant is located in Butler County, Ohio, in the small city of Middletown, midway between Cincinnati and Dayton, just a few miles from heavily travelled Interstate 75. The residence county to workplace county commuting flow file from the U.S. Census Bureau's 5-Year American Community Survey of 2009-2013 estimates that 65% of Butler County workers also live in the county and that 95% live in Ohio. An alternative measure of commuting, from the Census Bureau's Longitudinal Employer-Household Dynamics program, which is derived directly from state unemployment insurance reports, estimates that 43% of Butler County workers in goods producing industries also live in the county, and 93% live in Ohio. It is, therefore, very likely that much of the spin-off activity resulting from the household spending of Middletown Works employees stays within Butler County and most of it within Ohio. As will be seen below, the software model of the Ohio state economy I utilize agrees with this assessment. The employment and spending patterns of the Middletown Works plant indicate that it has both significant local economic impact and impact that reaches statewide. Therefore, I utilize both an economic model of Butler County and one of the State of Ohio to derive the overall impacts.

Input-Output Model of Ohio

To evaluate the economic and fiscal impacts of the AK Steel Middletown Works plant, I used standard regional economic impact methods. I obtained detailed economic data for Butler County and the State of Ohio, and used them to build IMPLAN input-output models of the region.¹ The model is able to simulate the effects of changes in economic activity for any of 536 regional industries. It also can predict detailed inter-industry purchases and household spending related to industrial changes. Such region-specific

¹ As best I can tell, IMPLAN is one of the most widely used regional input-output modeling systems in the world. It has been used for thousands of impact studies. It was developed by economists at the University of Minnesota, and is sold by IMPLAN, Inc. See implan.com for documentation.

models have the advantage that they take into account those industrial supplies and retail items likely available in the region, and thus provide more precise economic impact estimates than one that assumes everything is available in the region. The more that local industries can support the plant operation and the employees' household demands, the greater the regional economic multipliers, and hence the greater the predicted regional economic impact.

The IMPLAN sector of interest used for this study is number 217, Iron and Steel Mills and Ferroalloy Manufacturing. This industry is defined according to the North American Industrial Classification System (NAICS) code 331110. The official definition is as follows:

This industry comprises establishments primarily engaged in one or more of the following: (1) direct reduction of iron ore; (2) manufacturing pig iron in molten or solid form; (3) converting pig iron into steel; (4) making steel; (5) making steel and manufacturing shapes (e.g., bar, plate, rod, sheet, strip, wire); (6) making steel and forming pipe and tube; and (7) manufacturing electrometallurgical ferroalloys. Ferroalloys add critical elements, such as silicon and manganese for carbon steel and chromium, vanadium, tungsten, titanium, and molybdenum for low- and high-alloy metals. Ferroalloys include iron-rich alloys and more pure forms of elements added during the steel manufacturing process that alter or improve the characteristics of the metal being made.

<http://www.census.gov/eos/www/naics/>

At the heart of regional input-output models are the estimates of how much of the supply needs of an industry can be provided by other regional industries. The models use federal data on the presence of industries in the local economy to predict how much of an industry's inputs can be supplied locally versus that which must be imported from other regional economies.

However, for the AK Steel Middletown Works plant, the default industry production function for Iron and Steel Mills and Ferroalloy Manufacturing differed from AK Steel management's estimates of their own production needs in significant ways. This is largely due to the fact that the Middletown Works plant is an integrated mill producing a wide variety of products, rather than mini-mill. The industry wide statistics which IMPLAN's production recipes are based on include both integrated and mini mills, but mini-mills do not need to purchase coal, coke or iron ore, and may only purchase a limited range of chemical additives. We therefore customized the industry production function based on AK Steel management's estimates of their direct production needs. For other inputs, such as wholesale, transportation, maintenance, and other business

services we assumed they would be needed in the same relative proportions as in the default model. We used IMPLAN's defaults for the percentage of each input that would be purchased either in Butler County or elsewhere in Ohio.

In Table 1, I show the top 21 commodities used as inputs at the Middletown Works plant, as predicted by the customized IMPLAN model. I show both the predicted supply from everywhere, as well as the predicted supplies from Butler County and other Ohio companies, stated per million dollars of inputs bought. One can see that the model anticipates that almost none of the iron ore can be sourced in Ohio, but that about 31% of the value of coke can come from Ohio suppliers (though from beyond Butler County). Other important commodities, like wholesale distribution, rail and truck transportation, electricity, and natural gas, are modeled as being supplied largely by Ohio companies, many local to Butler County. Altogether, the models predict that about 21% of the value of all inputs will come from local Butler County businesses and 39% from businesses in Ohio.

The AK Steel Middletown Works plant produced nearly \$2 billion worth of steel products in the four quarters ending in June of 2017. When we apply this production function to the making of that much steel, the estimated value of inputs purchased in Butler County is about \$322 million and the value of inputs purchased from all Ohio vendors is estimated to be around \$587 million. The economic richness and industrial detail of the IMPLAN modeling system, as well as the sound, peer-reviewed, methodology gives us confidence in the ultimate predictions of regional economic impact based on the custom model.

Table 1. Top Commodities Purchased per \$1 million of AK Steel Middletown Works Inputs in Butler County & Ohio

	from everywhere	from Butler County suppliers	from Other Ohio suppliers
Iron ore	\$232,158	\$0	\$7,692
All other petroleum and coal products	\$154,085	\$1,381	\$47,883
Scrap	\$134,484	\$20,137	\$27,095
Nonferrous metal (exc aluminum) smelting and refining	\$65,564	\$145	\$1,993
Wholesale trade distribution services	\$64,351	\$64,351	\$0
Natural gas distribution	\$60,012	\$4,157	\$49,282
Electricity transmission and distribution	\$38,667	\$27,111	\$3,304
Rail transportation services	\$31,061	\$6,120	\$13,900
Industrial gases	\$23,496	\$8,241	\$8,492
Maintained and repaired nonresidential structures	\$23,232	\$21,497	\$352
Coal	\$19,640	\$0	\$1,281
Truck transportation services	\$17,010	\$17,010	\$0
Services to buildings	\$11,616	\$10,553	\$0
Commercial and industrial machinery and equipment repair and maintenance	\$11,616	\$10,008	\$620
Aluminum products	\$9,195	\$6	\$681
Other basic inorganic chemicals	\$8,904	\$89	\$1,645
Bricks, tiles, and other structural clay products	\$4,904	\$9	\$3,182
Management of companies and enterprises	\$4,780	\$1,298	\$3,311
Architectural, engineering, and related services	\$4,457	\$2,310	\$1,178
Other miscellaneous chemical products	\$4,386	\$83	\$1,492
Petroleum lubricating oil and grease	\$4,290	\$2,605	\$0
Other commodities not shown	\$72,093	\$17,675	\$3,356
Total, all commodities	\$1,000,000	\$214,787	\$176,738

Source: IMPLAN version 3 input-output models of Butler County, Ohio and the State of Ohio, using 2015 economic data.

ECONOMIC IMPACTS

Based on that method, the IMPLAN model uses annual economic data to provide reasonable estimates of statewide effects on sales, jobs, and payrolls for export-based expansions or contractions of any of 536 industries in Ohio. In Table 2, I summarize the results of the IMPLAN simulations I ran on the customized Butler County and State of Ohio models based on production estimates for final two quarters of 2016 and first two quarters of 2017. The table is divided into sections covering the estimated impacts within Butler County, the spread to the rest of Ohio, and the Ohio totals. The Other Counties in Ohio impact is actually inferred from the difference between the two models run, but is useful for illustrative purposes. A discussion of the relevant economic terms follows the table.

Table 2. Estimated Local and Statewide Impact of AK Steel Middletown Works Plant, FY2017

Impact Type	Employment	Labor Income	Value Added	Output
Butler County, Ohio				
Direct Effect	2,157	\$210,756,191	\$443,651,903	\$1,942,379,005
Indirect Effect	1,942	\$121,280,714	\$204,426,548	\$370,473,971
Induced Effect	1,740	\$70,946,021	\$132,676,728	\$226,024,346
Total Effect	5,839	\$402,982,927	\$780,755,180	\$2,538,877,323
<i>Implied Multiplier</i>	<i>2.71</i>	<i>1.91</i>	<i>1.76</i>	<i>1.31</i>
Other Counties in Ohio				
Direct Effect	0	\$0	\$0	\$0
Indirect Effect	1,058	\$71,143,889	\$186,609,699	\$373,780,518
Induced Effect	1,179	\$54,810,867	\$97,815,964	\$175,661,232
Total Effect	2,237	\$125,995,219	\$284,510,840	\$549,814,674
State of Ohio Total				
Direct Effect	2,157	\$210,796,655	\$443,737,081	\$1,942,751,929
Indirect Effect	3,000	\$192,424,603	\$391,036,247	\$744,254,489
Induced Effect	2,919	\$125,756,888	\$230,492,692	\$401,685,578
Total Effect	8,076	\$528,978,146	\$1,065,266,020	\$3,088,691,997
<i>Implied Multiplier</i>	<i>3.74</i>	<i>2.51</i>	<i>2.40</i>	<i>1.59</i>

Source: IMPLAN version 3 input-output models of Butler County, Ohio and the State of Ohio, using 2015 economic data. Dollar figures are measured in 2017 dollars.

For each of several impact types (Employment, Labor Income, Value Added and Output), the IMPLAN model begins with a direct effect – here, a change of 2,157 jobs. The direct effect would be a change at the plant, from nonoperating to 2,517 employees earning \$211 million in compensation producing \$1.94 billion worth of steel. Labor income includes fringe benefits (both privately provided, such as health insurance or retirement fund matches, and government provided, such as Social Security and Medicare payments) as well as proprietor income (e.g. self-employment and unincorporated small businesses). Value added refers to the value of the product that is not tied to the prices of the purchased inputs. It is the difference between the sales value of the steel products and the value of all the purchased inputs, so it is the additional value gained during the production process. Since an input of one industry is the output of an industry upstream in the production process, focusing on value added avoids double counting. State level GDP, for example, is just the sum of the value added at all businesses in the state (not the sum of their output/sales). Given a Direct Effect, the

IMPLAN model calculates an Indirect Effect, Induced Effect, Total Effect, and an economic Multiplier.

The Indirect Effect in Table 2 refers to the linkages between the exporting industry (steel) and its industrial vendors (raw materials, transportation, electricity, tools, computers, insurance, etc.). When the exporting industry expands or contracts, it raises or lowers its purchases from its vendors, thus changing their employment and payrolls. Of course, the vendors also purchase goods and services from each other, so that the total indirect effect includes all the inter-industry linkages.

The Induced Effect refers to the impact of the new sales in the exporting industry (steel) on the local economy through the rounds of re-spending of the additional household income caused by the operation of the plant. Regional sales of cars, groceries, building supplies, banking services, and so on are all sensitive to growth in disposable income, as are donations to nonprofit groups, churches, and charities. The induced effect includes the household spending of all households affected directly and by the indirect linkages. The Total Effect is the sum of the Direct, Indirect and Induced Effects.

The table clearly shows that the Middletown Works plant has considerable impact both locally and statewide. Within Butler County alone we estimate that as many as 5,840 total jobs are supported by the operation of the plant (including the jobs at the plant). Those jobs infuse the local economy with an additional \$403 million in labor income. Those figures represent roughly 3 and 3.8 percent of current jobs and labor income in Butler County, so the impacts are noticeable. Those jobs would be associated with approximately \$781 million in value added, about 4.2% of current value added in Butler County. Roughly a third of the jobs and income would be due to business-to-business spending, both between AK Steel and its suppliers and between those suppliers themselves. About 30 percent of the jobs and \$71 million of income would be due to the household spending of Middletown Works employees and those households affected by the added business-to-business spending (induced effects tend to result in lower average income per job because much of the employment is in lower paying retail and personal service industries).

Beyond Butler County, all that activity generated by the Middletown Works plant could be expected to benefit the rest of Ohio by supporting about 2,240 jobs with annual labor income of \$126 million. A little less than half of those jobs and 56 percent of the labor income would come from the indirect effect of business-to-business spending.

In sum, the AK Steel Middletown Works plant operations likely benefit the state of Ohio by supporting an additional 5,920 jobs in addition to the 2,160 jobs at the plant itself.

Those jobs add about \$318 million in labor income to state households. With the affected businesses adding around \$622 million to the state GDP. Including the plant, AK Steel Middletown Works supports about \$1 billion of Ohio's GDP.

A few things about the multiplier lines in the table are worth mentioning. The IMPLAN Multipliers allow a reasonable prediction of the total statewide economic impact of a change such as the Direct Effect. For example, looking at the last entry in the Employment column of Table 2, the estimated job multiplier for the Middletown Works plant in Ohio is 3.74, meaning that for every job at Middletown Works, another 2.74 jobs are created elsewhere in Ohio. Similarly, the multiplier for Labor Income for Ohio in Table 2 is 2.51, meaning that for every dollar of income created at Middletown Works another \$1.51 in income is created in other Ohio industries. The Output Multiplier for Ohio, 1.59 as shown in Table 2, measures the total statewide revenues of companies divided by the direct Middletown Works revenues of \$1.94 billion. The Output Multiplier of 1.59 means that companies in Ohio see an additional \$0.59 in sales when Middletown Works sales rise by one dollar. Finally, the Value Added Multiplier estimates the sales dollars that 'stick' to Ohio. Value added refers to the portion of total sales that is accounted for by regional companies and which stimulate the regional economy.² The Value Added Multiplier of 2.40 means that companies in Ohio add \$1.40 in value to the Ohio economy for every \$1 added by the Middletown Works plant operations. The distinction between Output and Value Added is important in regional economic studies since much of what goes into the total value of a product is intermediate goods and services purchased from vendors outside the region, and thus local economic activity can affect many regions.

TAXES AND FISCAL IMPACTS

In this section, I provide estimates of the total regional tax and fiscal impacts. The estimated tax and fiscal impacts flow directly from the IMPLAN modeling system just discussed, supplemented with company records and an analysis of state and local tax rates, and thus require a more extensive discussion. First, here is a short summary of the economic impacts with just those details relevant to fiscal analysis (Table 3).

² For an insightful example of value added, consider the purchase of a new car at a Middletown area dealership. If a resident spent \$25,000 on a new Ford Escape, most of the dollars would flow immediately to the manufacturer of the car, built in Louisville with top management in Detroit. Only a few thousand dollars in dealer prep work and commissions would be captured in the Middletown economy. So, in economic parlance, the value of output (sales) would be \$25,000, and value added might be only \$3,000.

Table 3. Estimated Local and Statewide Economic Impact of AK Steel Middletown Works Plant

Direct Impacts	
Employment, FY2017	2,157
Wages and salaries paid in FY2017	\$143,864,595
Fringe benefits paid in FY2017*	\$66,939,052
Total employee compensation	\$210,803,647
Total Economic Impacts **	
Jobs, Butler County	5,839
Jobs, Statewide	8,076
Labor Income, Butler County	\$402,982,927
Labor Income, Statewide	\$528,978,146

* Includes company payments for payroll taxes, retirement plans, health and life insurance. Following methods used by the US Bureau of Economic Analysis, employee compensation also includes company payments for unemployment insurance and workers' compensation plans.

** Total economic impacts estimated using IMPLAN version 3 input-output models of Butler County and State of Ohio, constructed using economic data for 2015.

Taxes and Fiscal Impacts

To reasonably estimate the fiscal impacts of an industrial expansion or contraction in a region, analysts must rely on company records and local sources of data. I turn now to a discussion of the types of taxes and how I link fiscal impacts to economic impacts. My estimates are summarized in Table 4. The entries in the first three lines of the table, referring to company direct tax payments made to local and state governments for property taxes, sales taxes, commercial activity taxes, and energy taxes, are based on information provided by AK Steel.

The impacts on governments are much greater than these direct payments, since employees end up paying an array of state and local income and sales taxes. These estimated tax revenues are related both to the direct AK Steel Middletown Works wages and salaries and to the indirect and induced labor income statewide, as predicted by our IMPLAN models. I estimate that the total annual fiscal impact in Ohio will be \$43.6 million, as summarized in Table 4, with the methods of estimating lines 4 through 7 discussed below.

Table 4. Estimated Fiscal Impacts of AK Steel Middletown Works Plant

Line	Total Fiscal Impacts	
1	Local property taxes paid directly by company	\$836,291
2	State of Ohio electricity taxes paid directly by company	\$2,907,236
3	State of Ohio sales and commercial activity taxes paid directly by company	\$5,372,361
4	State of Ohio individual income taxes linked to payrolls	\$11,284,070
5	State of Ohio sales taxes linked to payrolls	\$15,035,241
6	City and Village income taxes linked to payrolls	\$5,924,407
7	Local sales taxes linked to payrolls	\$2,243,538
Total State and Local Taxes		\$43,603,144

Note: Of the tax in line 6, \$4,214,738 is collected by Butler County, the remainder is collected by jurisdictions throughout Ohio. Of the tax in line 7, \$1,556,375 is collected in Butler County, the remainder is collected by counties throughout Ohio.

Because I used both Butler and Ohio IMPLAN models, I can estimate the sales and income tax revenues linked to the Middletown Works plant at both the state and local levels. Employees pay state and local sales taxes when they spend their wages in the local economy, and are also liable for state and local income taxes in Ohio.

In addition, all of the fiscal impacts in lines 4 through 7 in Table 4 are calculated based on three categories of impact. There is a fiscal impact due to the direct, indirect and induced effect that occurs in Butler County, and there is a combined indirect and induced effect that occurs in businesses and households spread throughout Ohio.

Ohio State Sales and Income Tax

Based on data from 2011 to 2015, all workers in Butler County have earned on average about \$9.4 billion annually in labor income. We also know that, over the same time in the county, average annual state sales tax receipts were about \$266 million and average annual state income tax receipts were about \$250 million. By comparing the ratio of tax receipts to regional labor income, I calculate 'effective' tax rates and use those to estimate the amount of Ohio income and sales taxes linked to Middletown Works' payroll. The calculations are shown in Table 5. Although Table 5 shows the five-year average rates, Table 4 is based on the effective rates for 2015 because the effective rates have been trending over time as the state and some local sales tax rates have been adjusted upwards and the state income tax rates have been adjusted downwards in recent years.

For example, residents of Butler County paid about \$233.4 million in Ohio state income taxes in 2015. This is 2.24 percent of the labor income earned by workers in the county

that year. Similarly, the effective state sales tax rate is 3.05 percent of labor income, and the effective rate for the Butler County local sales tax is 0.40 percent. Not shown in the table, but used to calculate statewide fiscal effects resulting from activity beyond Butler County, are the corresponding statewide effective rates of 1.99 percent for state income taxes, 2.46 percent for state sales taxes, and 0.55 percent for county sales taxes.

We apply the Butler County effective rates to the labor income effect in the county and the statewide effective rates to the labor income effect that is spread out over the rest of the state. Calculated this way, in lines 4 and 5 I estimate that state government revenues attributable to the Middletown Works plant will be \$11.28 million in income taxes and \$15.04 million in sales taxes.

Table 5. Effective Tax Rates, Butler County, Ohio

	2011	2012	2013	2014	2015	average, last five years
Economic and Tax Receipt Data						
Labor income, by place of work	\$8,735,473,000	\$8,922,032,000	\$9,234,290,000	\$9,778,223,000	\$10,403,477,000	\$9,414,699,000
Ohio state individual income tax liability	\$254,627,267	\$274,517,206	\$242,229,131	\$246,949,237	\$233,444,128	\$250,353,394
Ohio state sales tax receipts	\$225,464,909	\$238,971,736	\$262,434,855	\$287,152,503	\$317,357,605	\$266,276,322
Butler County local sales tax receipts	\$30,745,215	\$32,587,055	\$35,147,525	\$37,454,674	\$41,394,470	\$35,465,788
Effective Tax Rates, using Labor Income						
Ohio state income tax	2.91%	3.08%	2.62%	2.53%	2.24%	2.68%
Ohio state sales tax	2.58%	2.68%	2.84%	2.94%	3.05%	2.82%
Butler County local sales taxes	0.35%	0.37%	0.38%	0.38%	0.40%	0.38%

Sources: compensation data from US Bureau of Economic Analysis; tax data from Ohio State Department of Revenue.

Local Income and Sales Taxes

Note that employees of the AK Steel Middletown Works plant not only pay state income and sales taxes, they also pay local income and sales taxes. The annual impact of these payments can be reasonably estimated, too, and are significant.

Seven municipalities in Butler County levy a local income tax, with total tax revenues of \$91.9 million in 2015. This tax applies to the wages, salaries and most other income of city and village workers. I assume that Middletown Works workers pay the 1.75 percent city of Middletown tax rate. I do not know the distribution of the other jobs in Butler County impacted by Middletown Works, nor how much of the associated incomes are subject to local income taxes, but it is reasonable to assume they mirror the overall geographic distribution of jobs in the county and we can divide the \$91.9 million in local income tax revenues by the labor income in the county to arrive at an effective tax rate of 0.88 percent. Similarly, for the payroll associated with the indirect and induced effects beyond Butler County, we use the statewide average effective rate for municipal

income taxes of 1.36 percent. Thus, I estimate that Middletown Works employees and those of other impacted companies in the county and beyond are responsible for about \$5.92 million of local income tax revenue (line 6 in Table 4). Of that, about \$4.2 million would be collected in Butler County.

Beyond the state government receipts from the 5.75 percent state sales tax, local governments in Ohio collected \$2 billion in sales taxes in 2015. Butler County levies a 0.75 percent sales tax, resulting in \$41.4 million in collections during 2015. We apply the effective rate of 0.40 percent discussed above and in Table 5 to the direct and spinoff effects within Butler County, and the effective rate of 0.55 percent to the spinoff effects occurring outside of the county. Applying these rates to the appropriate total labor income effect, I estimate that \$2.24 million in local sales taxes are generated as a result of the Middletown Works plant (line 7 of Table 4). Of that, about \$1.5 million would be collected in Butler County.

Although harder to measure, additional tax impacts are also likely. For example, corporations around the region are liable for state commercial activity taxes, and there are many such businesses linked to the AK Steel Middletown Works operations. Unemployment insurance taxes, insurance premiums taxes, building permit fees, motor vehicle sales taxes, and many other business tax categories are all affected by the operations of the plant. Employees also pay gasoline taxes and property taxes, and there are positive effects on the regional real estate market.

NOTE ON MANUFACTURING'S IMPORTANCE IN THE BUTLER COUNTY AREA

While not the primary focus of this report, it is useful to highlight the relative concentration of manufacturing in the Butler County area economy. Butler County supported 20,850 manufacturing jobs in 2002, was down to just 19,460 by 2009, but rebounded to have 22,470 manufacturing jobs in 2015. That was 12.7 percent of all jobs in all industries in the county in 2002, and about 22 percent of total labor compensation (due to the high average annual pay of manufacturing jobs) in the county. Now manufacturing jobs account for 11.6 percent of all jobs and 20.2 percent of labor compensation in Butler County. I organized data on jobs and compensation by industry over the past ten years, and summarized it in Table 6. Compared to the state of Ohio and the nation as a whole, manufacturing employment and compensation in Butler County has done very well. While manufacturing employment has dropped statewide and nationwide it has actually increased in Butler County. Butler County is now actually a bit more dependent on manufacturing than is Ohio as a whole, and much more so than the U.S. in terms of both employment and labor compensation.

Table 6. Manufacturing's Economic Importance in Butler County

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Manufacturing's Share of All Jobs										
Butler County, OH	11.0%	11.0%	11.1%	10.6%	11.0%	10.8%	10.8%	10.5%	11.0%	11.6%
State of Ohio	12.1%	11.7%	11.3%	10.1%	10.0%	10.2%	10.3%	10.3%	10.4%	10.4%
United States	8.3%	8.0%	7.8%	7.2%	7.0%	7.0%	7.0%	7.0%	6.9%	6.9%
Manufacturing's Share of Total Labor Compensation										
Butler County, OH	18.2%	18.8%	19.6%	18.5%	20.1%	19.5%	18.0%	18.8%	19.6%	20.2%
State of Ohio	18.8%	18.3%	17.5%	15.6%	15.6%	15.9%	15.8%	15.7%	15.8%	15.7%
United States	12.3%	12.0%	11.6%	10.8%	10.7%	10.7%	10.7%	10.5%	10.5%	10.4%

Source: US Bureau of Economic Analysis

Butler County's manufacturing base suffered losses in the 1980s, but has remained fairly steady since that time in contrast to much of the nation. At a time when much of the rest of the country was doing quite well, Butler County's unemployment rate was well below the state and national rates for much of the 1990s and into the early 2000s. The Great Recession of 2008-09 triggered a drop in manufacturing employment, but the county has rebounded with its manufacturing base and the area's unemployment rate has generally been below the state and national rates during the recovery (Figure 1).

**Figure 1. Unemployment Rates
Butler County, State of Ohio, United States**

