

COMPARATIVE ANALYSIS OF SOCIO-ECONOMIC INDICATORS IN SOUTHERN OHIO

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1. Introduction

The U.S. Department of Energy (DOE) former Portsmouth Gaseous Diffusion Plant (PORTS) near Piketon, Ohio has been an important economic player in the Pike, Scioto, Ross, and Jackson County area for many years and has thus impacted the region's socio-economic well-being. As the PORTS site undergoes decontamination and decommissioning (D&D), the site will present potential economic growth opportunities for the four-county area. PORTS provides numerous assets to leverage in repurposing efforts to attract industries to utilize the site to build businesses and create jobs. As the PORTS site progresses through D&D it is expected that the site's transition will lead to further changes in the region's socio-economic profile including both socio-economic stress as well as opportunities for the four-county area. The extent to which decision-makers can minimize transitional stress and maximize the economic prospects for the area hinges upon the diagnostics of the characteristics, bottlenecks and comparative advantages of the study area. For example, if the community wishes to reutilize the PORTS site as an industrial park, the definition of the target industries will invite a feasibility study based, among other things, on the skill set of the local labor force. Such a feasibility study will need to address the question whether the existing skill set of the local labor force is sufficient to support the desired industries or a targeted investment in training of the local workers is warranted. These fundamental questions cannot be answered without an understanding of the region's socio-economic fabric. Other factors influencing the current attractiveness of the region as well as the needs for investment to make it more attractive for future businesses are safety, current income levels, morbidity, mortality levels affecting local productivity, and the return on investments.

In order to better understand the variables that affect local labor productivity, we provide a quantitative description of local indicators for education, family structure, health and crime. Furthermore, the development of a given region as well as its future prospects hinge on the economic path it has travelled over the years. This is a phenomenon scholars call "path dependency". It stresses that present conditions as well as future prospects for a society are conditioned by its history. The characterization of this history from multiple perspectives, therefore, helps us to understand the region's current state and design a roadmap for feasible welfare improving socio-economic policies and actions. In order to shed light on the historical progression and current state of the local economy as well its dependence on local and external engines of economic growth, we also provide a description of the local population growth (reflecting the ability of the region to replenish and retain its labor force), of unemployment and income indicators (essential to and reflecting the development of the local economy), and of government transfers (reflecting the region's degree of external dependency, as well as public spending that might condition future growth).

In this report, we use historical and cross-sectional data to conduct a statistical characterization of the four-county region in the vicinity of the Portsmouth Gaseous Diffusion Plant located in Piketon, OH. The four-county region includes the Jackson, Pike, Ross and Scioto counties. We characterize this region from a socio-economic perspective by contrasting its information to data for two supra-regional sets of counties of which it is a member: the set of all Appalachian counties in Ohio, and the entire set of Ohio counties. In this process, we look for major differences and similarities between the four-county region and the comparison groups.

Our characterization of the socio-economic indicators for the region is supported by graphical analysis of the data. Throughout this report, in order to avoid cluttered graphs, we represent data for the four-county region in blue, Appalachian Ohio in green and aggregate Ohio data in black. This report is composed of three sections in addition to this introduction. Section 2 reports the historical data, whereas section 3 focuses on more contemporary cross-sectional comparisons, except for marriage and divorce data that are also available over time. Section 4 concludes this report.

2. Historical Information

2.1. Population

We start with the data describing the population in the four-county region (blue lines), Appalachian Ohio (green lines) and the State of Ohio (black lines) between 1969 and 2011. Figure 1 plots the time series for these variables. The first three graphs in figure 1 show similar overall trends for all three regions. Between 1969 and 2011, the population for the four-county region ranged between 180 thousand and 220 thousand and was 1.9% of the state population, on average. Similarly, the Appalachian counties were home to between 1.85 million people in the early 1970s and 2.05 million people in 2011 or 18% of the state population during the same period, on average. The state totals were between 10.6 million people in the early 1970s and 11.4 million people in 2011. Nevertheless, some differences in changes in population are worth noting. The widely different numbers of people living in each geography depicted in figures 1 (a) through (c) make it difficult to compare the changes in population across different geographies. To address this issue and make data more directly comparable, for each year we calculate the population for each sub-region minus its corresponding average divided by its standard deviation (a measure of how much the population varies for that sub-region over the years). This approach will allow a 1% change in population in one region to be more closely comparable to a 1% change in population in another region, even though the absolute numbers corresponding to 1% of the population might be very different from region to region. This is what is termed a standardized variable (standardized population in this context). Figure 1(d) depicts the same information as the first three, but now with standardized values to facilitate comparison of oscillation of population in the different regions. The four-county region (blue line) experienced faster growth from the mid-1970s to the mid 1990s relative to the State of Ohio (black line) and eventually all three geographies converged to a similar growth pattern.

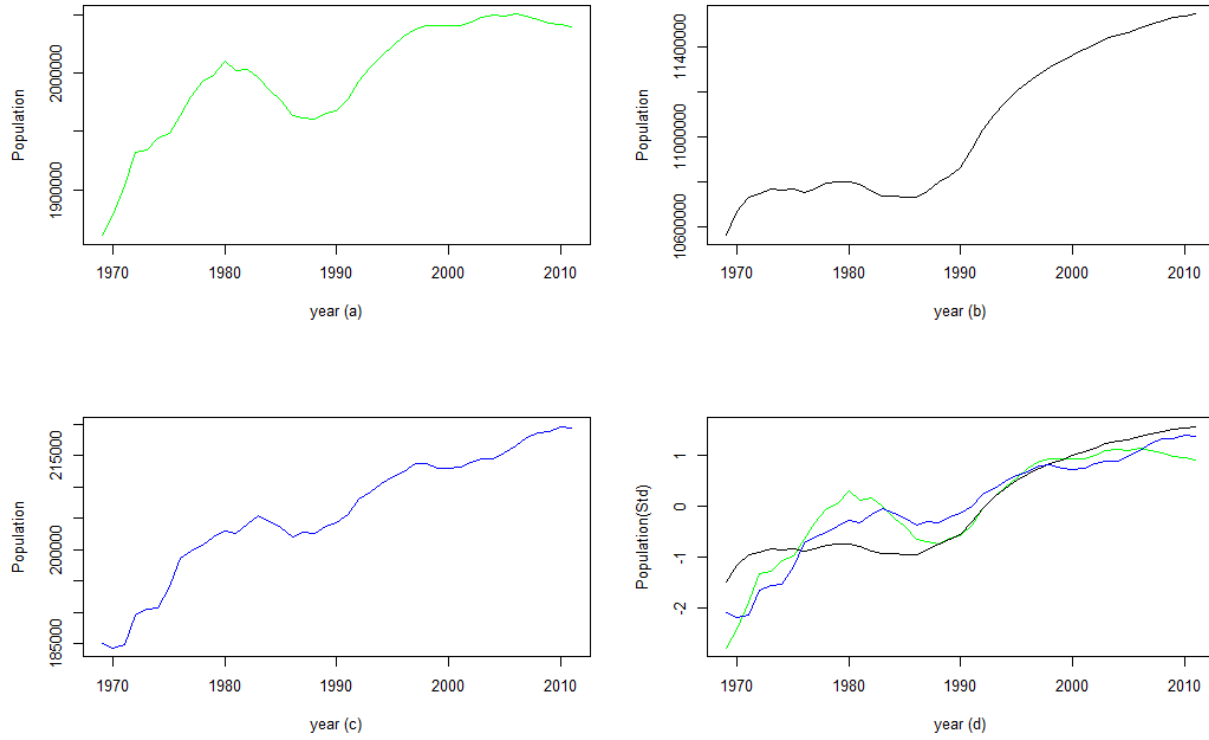


Figure 1: Population in Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).
Source: Bureau of Economic Analysis CA1-3 (1969-2009)

Figure 2 plots the rates of population growth in the different sets of counties. The four-county region went from population loss in the beginning of the 1970s to substantially larger growth than the rest of the state through the mid 1980s. This accelerated growth can be seen from the steep increase in population during the 1970s in figure 1. Population growth in the region then tracked the overall trend in the state since the late 1980s. Interestingly, although the Portsmouth Plant can be perceived as an important local economic engine, figure 2 does not suggest substantial population losses in the region relative to the state after the closing of the Portsmouth Plant in 2001 (compare black (state) and blue (4-county region) lines in the last decade in the graph).

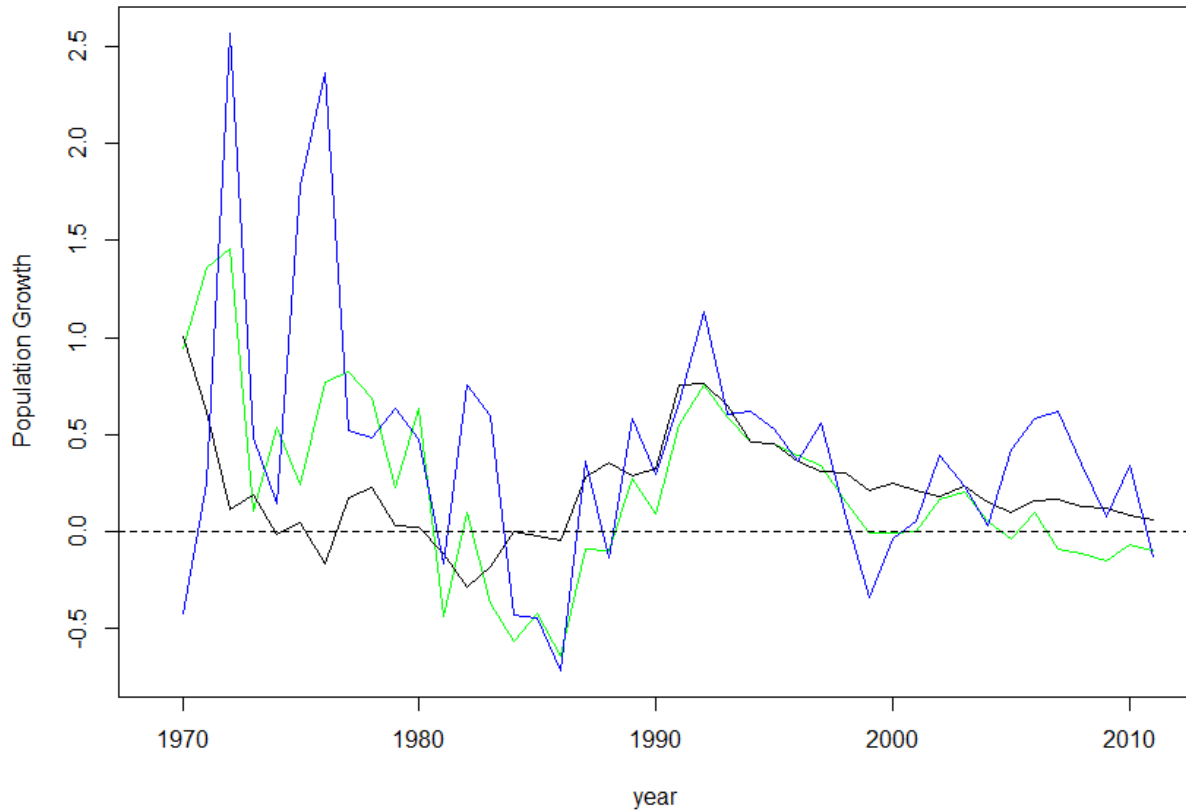


Figure 2: Rates of population growth in Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: Bureau of Economic Analysis CA1-3 (1969-2009)

2.2. Personal Income and Earnings

Personal income and earnings are indicators for the overall strength of the economy. They reflect the aggregate wealth of individuals in the region and at the same time condition the strength of present and future local markets. By looking at personal income and earnings over time, we can compare the four-county region to the rest of the state in terms of its potential for the development of local markets. This information, combined with additional field studies might help to identify bottlenecks and opportunities for the development of specific uses of the PORTS site. Also importantly, the strength of the local economy will directly influence variables that influence the productivity of the local labor force (such as education, family structure, health and crime to be discussed below) and will also greatly influence a strategy for the development of the region.

Figure 3 plots personal income per capita for the 1969-2011 period. The graph on the left (figure 3(a)) shows the time series for personal income and highlights the gap between average personal income for the region, the Appalachian counties' average and aggregate state average. Figure 3 (a) suggests a drop in personal incomes in the early 2000s, possibly as a consequence of the national

economic downturn at the time following the contraction of the so-called “dot com” markets. However, when we recalculate personal incomes as relative deviations from their long-term regional averages and make them more directly comparable across regions (standardized values described above), we notice a more pronounced drop in personal income in the four-county region (figure 3(b)). This might have been a consequence of the additional economic shock that affected the region: the closing of the PORTS facility. Interestingly, however, and in contrast to what happened in the state and Appalachian counties, personal income per capita continued to increase in the four-county region following the financial crises of 2007-2008.

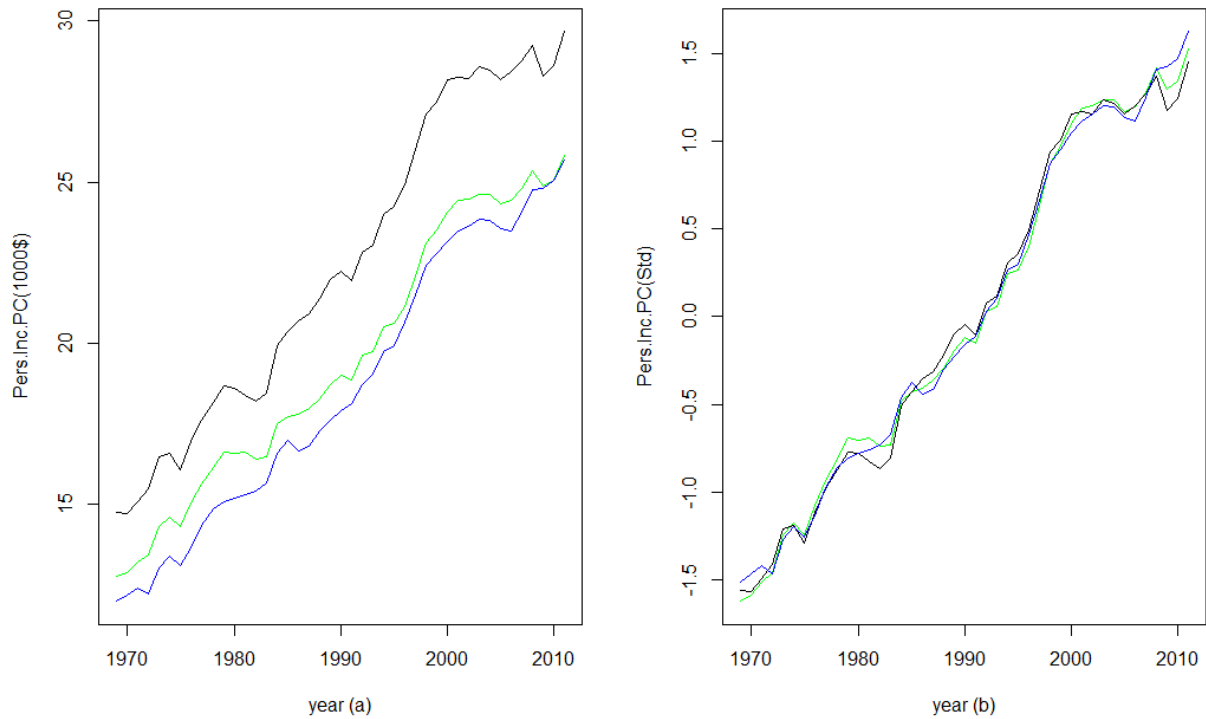


Figure 3: Personal Income per capita for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: Bureau of Economic Analysis CA1-3 (1969-2009)

Personal income is directly correlated with economic activity in the state and its regions, but it also includes sources of income that might be somewhat independent of the strength of the job market, production and employment opportunities that are available to the local population. Figures 4 and 5 take a closer look at the wealth generated by the economy by plotting average farm and non-farm per capita earnings for the state, Appalachian Ohio and the four-county region over time. Both figures show substantially lower farm and non-farm earnings for the region relative to the state, but the overall trends over time seem to be pretty similar in all three geographies. As before, graphs labeled as (b) in both figures reflect standardized values to make oscillations of the variables of interest more directly comparable across regions.

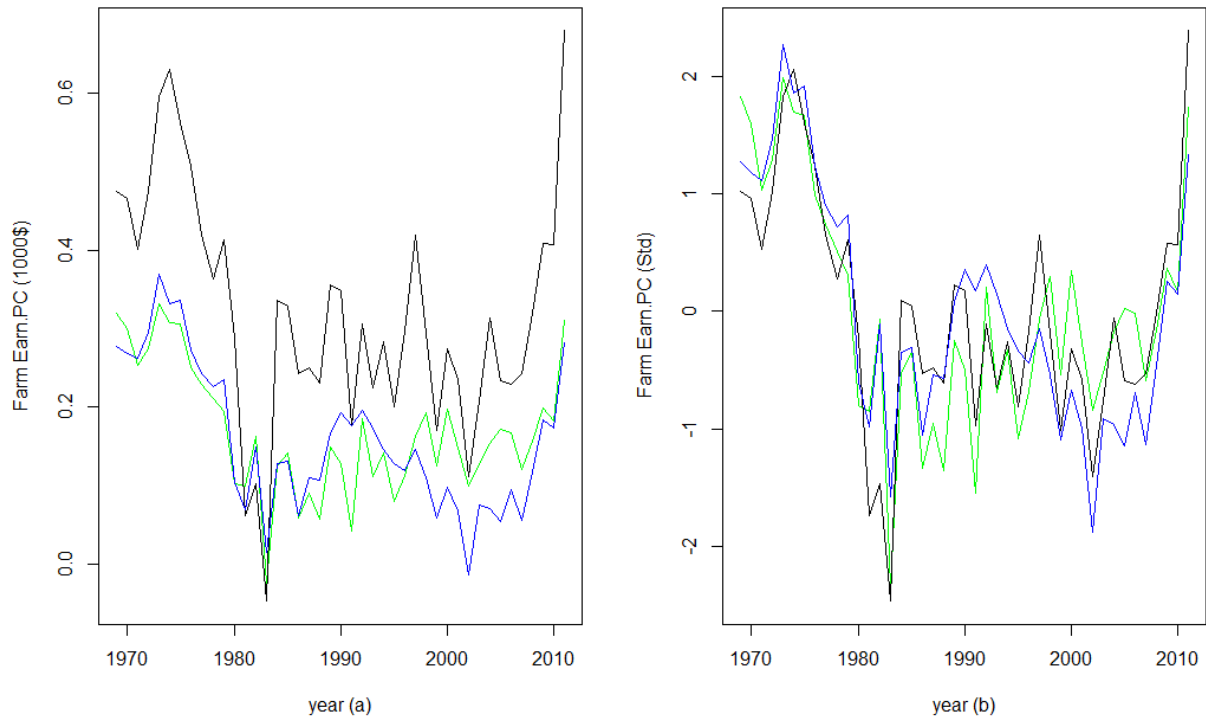


Figure 4: Farm Earnings per capita for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: Bureau of Economic Analysis CA05N (1969-2009)

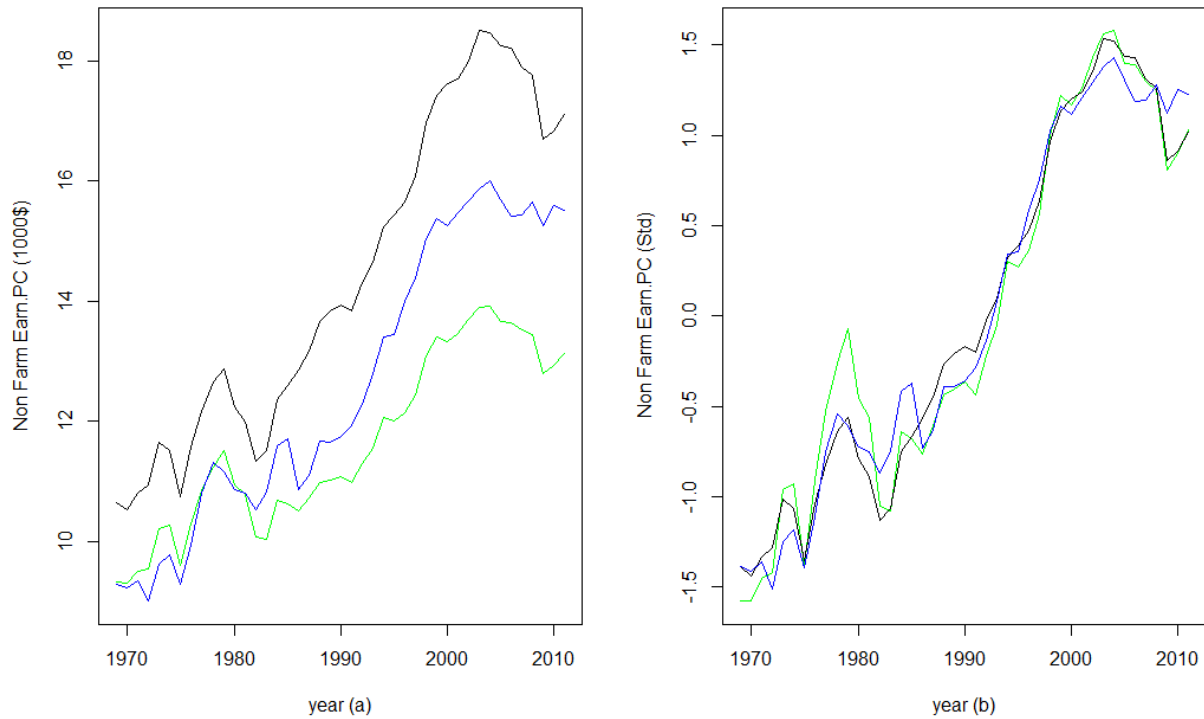


Figure 5: Non-Farm Earnings per capita for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: Bureau of Economic Analysis CA05N (1969-2009)

2.3. Unemployment

Figure 6 shows the unemployment rates for the three geographies over time. For the most part, unemployment was higher in the four-county region compared to both the state and Appalachian Ohio averages. The consistently higher rates of unemployment in the region might suggest important bottlenecks for the development of a strong labor market in the area. Access to major labor markets and transportation logistics do not seem to be a major impediment to growth of the region. Dependency on natural resources that can be subject to large price fluctuations and local labor market qualification can be important constraints to local development. We further explore the local labor market skills by concentrating on the state of education in the region in section 3.2.

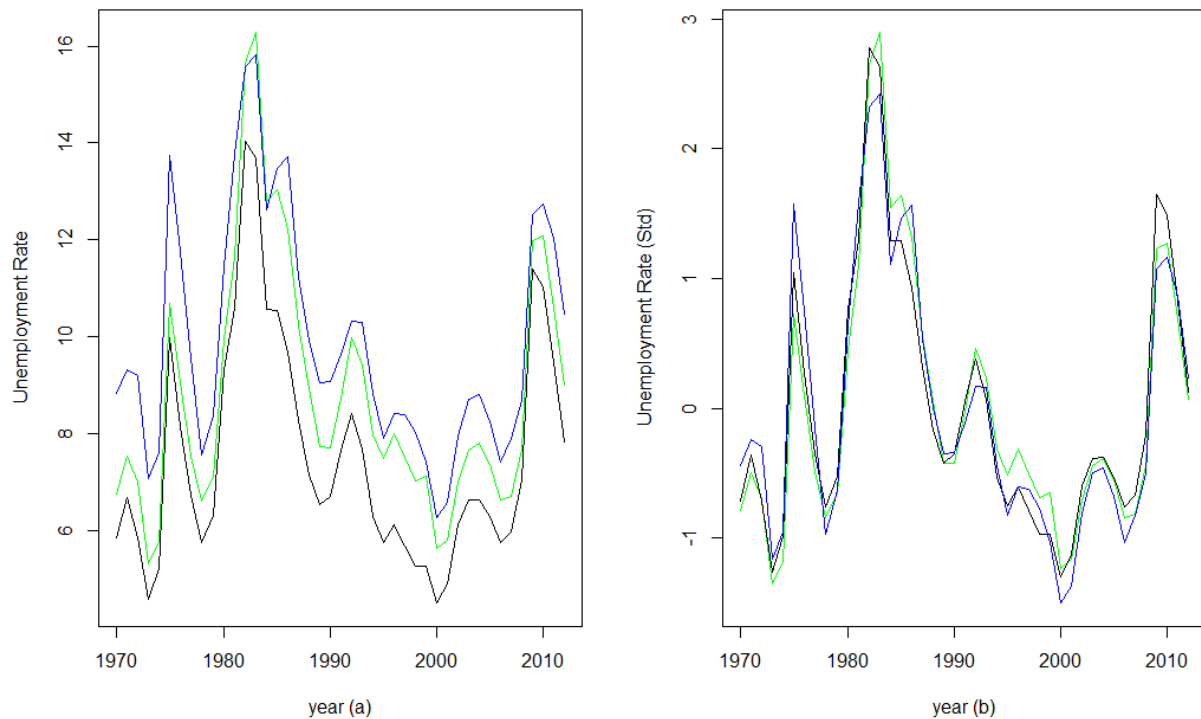


Figure 6: Unemployment Rates for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: Bureau of Economic Analysis LMI LAUS (1970-2011)

2.4. Government Transfers

Government transfers are a barometer for the degree of dependence of the four-county region on external drivers of the local economy. Large volumes of income maintenance and unemployment transfers per capita relative to transfers to other regions suggest the inability of the local economy to generate wealth to its citizens. Furthermore, government transfers to education and training programs reflect policies to make workers in the region more productive and improve the future economic prospects for the region. A more educated and better trained labor force is a fundamental precondition for the attraction and maintenance of businesses offering better paying jobs.

Figure 7 provides further insight into the income dynamics in the four-county region relative to the state and Appalachian Ohio. The graphs on the top portion of figure 7 depict average levels of government transfers per capita in thousands of US\$. More specifically, income maintenance transfers, unemployment insurance transfers, and education and training transfers. All values are in 2005 dollars. The bottom graphs are the corresponding series in standard deviations. Once again, the purpose of the graphs in standard deviations is to make it easier to compare the patterns of variability of the different data series. That is, these graphs help us to identify systematic differences in the pattern of transfers to the different portions of the state over time.

Figures 7 (a) and (b) show that the volume of average income maintenance and unemployment insurance transfers per capita is larger for the four-county region than for the other parts of the state. This fact highlights the relative dependency of the region on government programs. Although the volume of average transfers per capita is larger in the four-county region, figures 7 (d) and (e) do not suggest substantial differences in the dynamics of per capita government transfers to the different regions of the state. Table A1 in the appendix provides additional information on the determinants of per capita income maintenance transfers to Ohio counties. Lagged personal income per capita, manufacturing employment and construction sector employment are negatively related to these government transfers (lagged values refer to data for the year preceding the government transfers). That is, as personal income, the number of manufacturing jobs and the number of construction jobs increase, per capita income maintenance transfers decrease in the following year. This fact is especially important to the four-county region following the ceasing of operations of the Portsmouth gaseous diffusion plant. Also interesting is the positive relationship between per capita income maintenance transfers and lagged farm earnings (and farm employment). This might be an indication of migration of labor from higher paying manufacturing and transportation to lower paying farm jobs when the manufacturing sector contracts. The second column of table A1 also suggests that income maintenance transfers per capita are larger in the region than in the rest of the state.

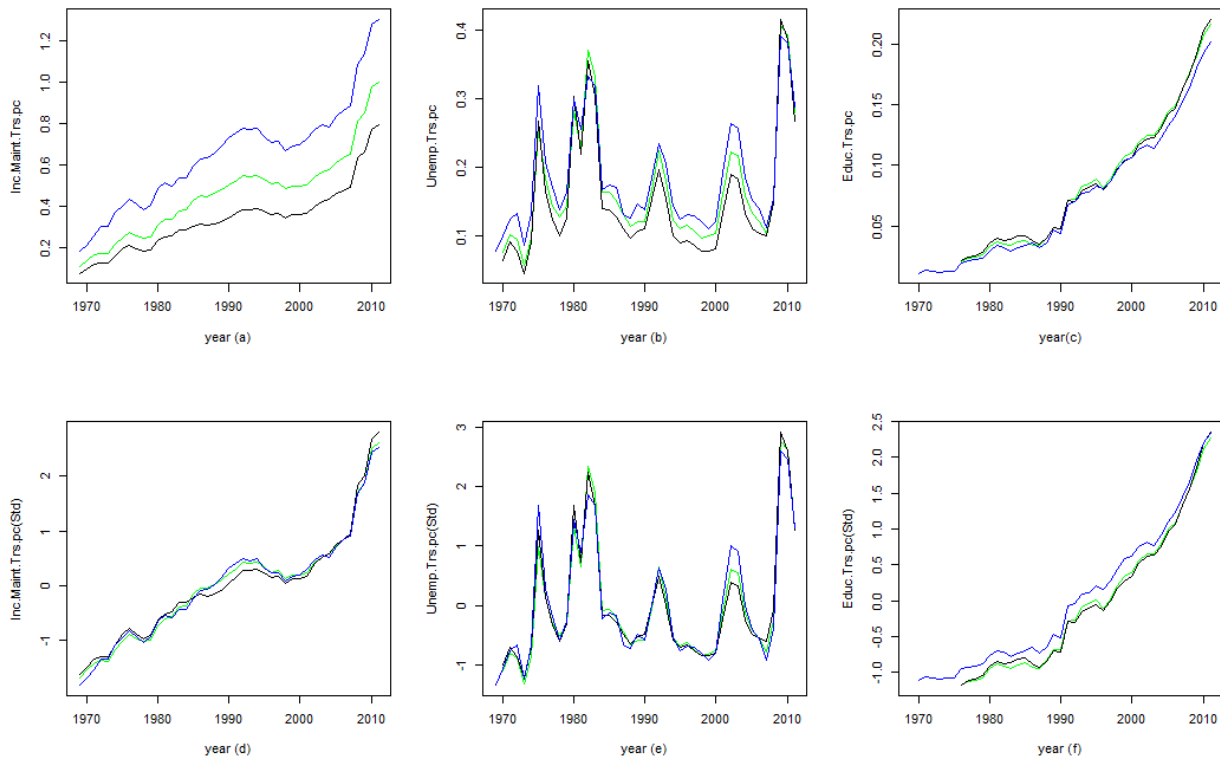


Figure 7: Government Transfers to Ohio (black), Appalachian Ohio (green), and Four-County Region (blue). Selected Categories: Income Maintenance, Unemployment Insurance and Education and Training.

Source: Bureau of Economic Analysis CA35 (1969-2009)

Finally, figure 7 (c) shows average education and training per capita transfers to the different portions of the state. Average per capita transfers are similar in all three regions, although they are generally lower in the case of the four-county region. When we contrast education and training transfers to personal income (figure 3), and income maintenance and unemployment insurance transfers a paradoxical result emerges: the region in most need for education and training programs receives similar if not less education and training transfers. Education and training are expected to raise labor productivity and positively impact income, and the region in most need does not seem to receive a flow of resources that is compatible with its needs. This fact, along with lower educational attainment levels in the four-county region (see section 3) can be a limiting factor for some uses of the Portsmouth plant site in the future. For example, improving education and labor productivity may make the region more attractive for future enterprises that pay higher wages to better skilled local workers. Alternatively, if these businesses decide that it is profitable for them to move to the region to take advantage of possible infrastructure improvements after D&D, they may need to import skilled labor from other regions.

3. Cross-Sectional Comparisons

In this section, we present data on family structure, fertility, education attainment, and health and crime for the four-county region, Appalachian Ohio and all Ohio counties. Family structure, health, education and security are thought to be intimately connected to labor productivity, economic growth and development. Education is perceived to be a key engine of long-run economic growth (Blankenau et al., 2007). At the regional level, the availability of skilled and productive labor is an important factor in the location decision for several businesses (Zucker et al., 1998, Moretti, 2004). As for family structure, economic conditions are thought to influence marriage and divorce rates, the number of single parents with dependent children and the prospects for marriage for young adults (Black et al., 2003). This, in turn, can impact government transfers such as aid to families with dependent children (Black et al., 2003) and disability insurance (Black et al., 2002), migratory flows and the ability for families to invest in their children. Economic swings such as those resulting from boom and bust cycles can also affect the incentives individuals have to invest in their own education (Black et al., 2005) and the long-run prospects for the region.

Since the information on family structure, fertility, education attainment, and health and crime for the four-county region, Appalachian Ohio and Ohio counties is not available over a long time period, our graphical exposition relies, for the most part, on cross sectional comparisons based on a 5-year estimate from the 2011 American Community Survey. Exceptions are time series data for marriage and divorce rates and shorter time series data for obesity, diabetes and homicide rates.

3.1. Family Structure

Several of the figures below plot density functions. Density functions are similar to histograms and indicated in figure 8. Figure 8 plots the histogram for the percentage of households with at least one child aged 18 or less among all Ohio counties. For example, suppose we randomly point at a county on the Ohio map and ask the following question: what is the probability that between 30% and 32% of the households in this county have at least one child aged 18 or less? To answer this question, we go to the tallest bar on the histogram (See Figure 8). The base of that bar goes

from 30 to 32. The height of that bar is approximately 0.14. Therefore, the area of that tall bar is approximately $(32-30) \times 0.14 = 0.28$. That is, the probability that the county we randomly picked has between 30 and 32 percent of its households containing at least one child is roughly 28%. The density provides the same information, but more precisely. The area below the density curve and between 30 and 32 is a better approximation for the probability that we are looking for than the rough approximation given by the histogram bar. As another example, the probability of picking a county with more than 40% of its households with at least one child is relatively small as depicted by the histogram bars to the right of 40 or the area below the density curve and to the right of 40. We focus on the densities and not histograms, because they provide a more precise visual depiction of the frequency or probabilities associated with different values of the variables we discuss below.

Histogram and Density

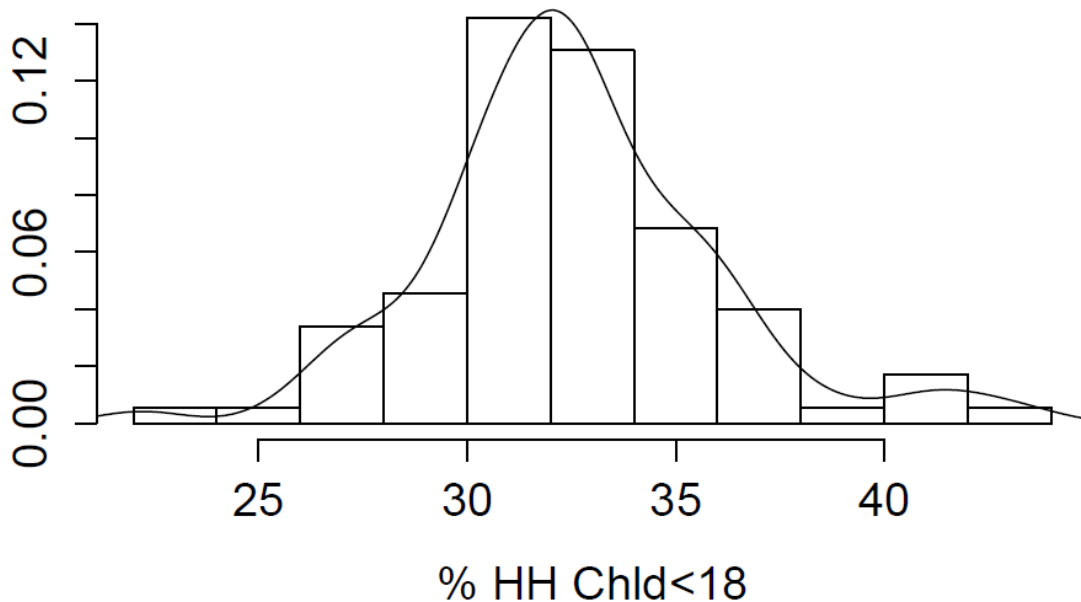


Figure 8: Histogram and Density Function

Source: 2011 American Community Survey, 5-year estimate

Figure 9 plots the distribution of household size; family size; percentage of male (female) householder, no wife (husband) present, with own children under 18 years; and percentage of households with one or more people under 18 (over 65) years. For each graph, the black vertical lines indicate the state averages, whereas the green and blue vertical lines indicate the Appalachian Ohio and four-county region averages, respectively.

Although the average household and family size are slightly larger, they are not much different from the average for the State of Ohio. Similarly, the average percentage of households with one

or more people over 65 years of age in the four-county region is similar to that of the state. The more marked differences appear in the percentage of single parent households with own children under 18 years. The average percentage for the region is larger than that for the state both in the case of households headed by males or females. This may be a reflection of a stagnant economy in the region (Black et al., 2003), but the data we have available at the county level do not allow us to further pursue the causal relationship between the state of the local economy and family structure.

One possible implication of a larger fraction of single parent households with children under 18 years of age in the region is that the opportunities for the division of labor within the households decreases (Becker, 1985). This, in turn, might lead to fewer resources dedicated to raising children, which might arguably have a negative impact on future local labor productivity (Andrabi et al, 2012). If this is the case, actions to improve education and training of the future local labor force might be justified.

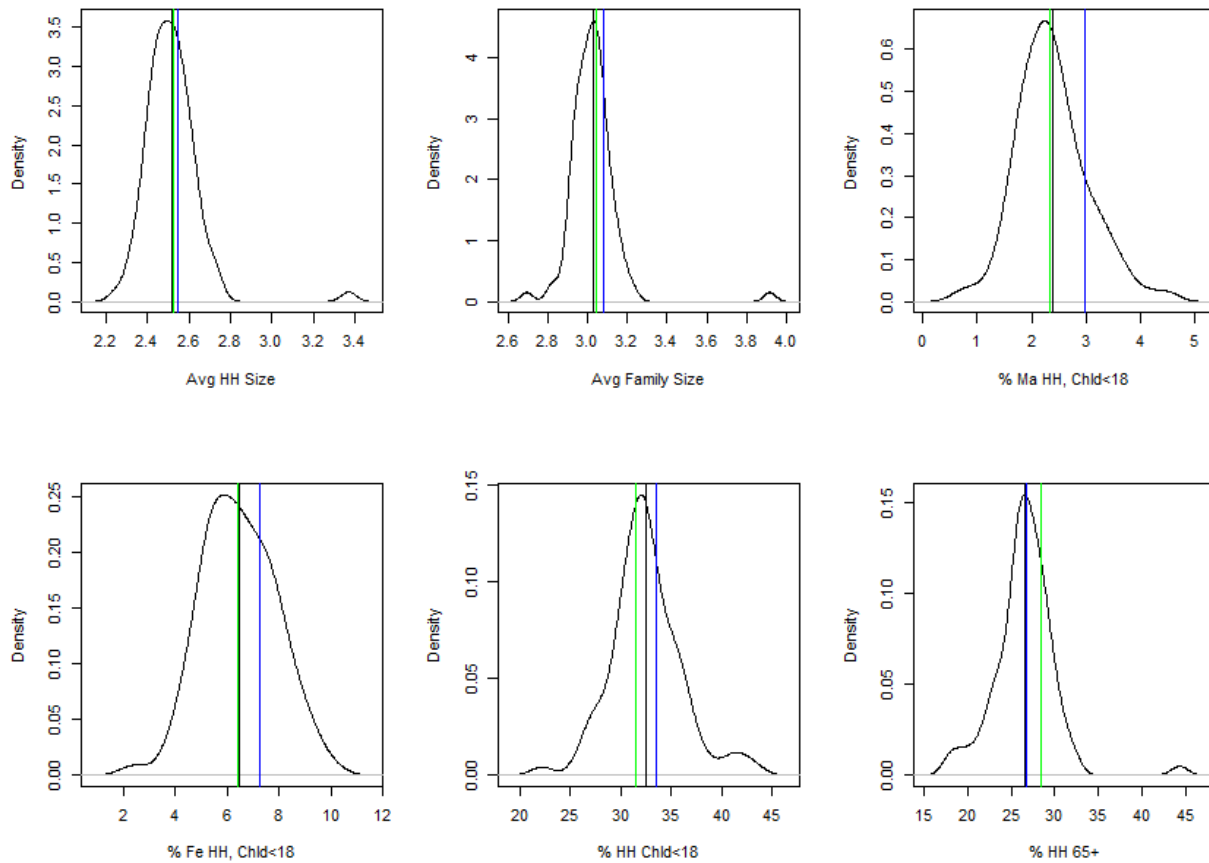


Figure 9: Probability Density Functions for Family Structure Indicators. Vertical lines are averages for: Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: 2011 American Community Survey, 5-year estimate

Figure 10 shows the distribution of the percentage of divorced males (graph on the right) and females (left) 15 years of age or older. There is a notable gap between the overall average for the

State of Ohio and the four-county region in both cases. The fact that the percentage of divorced males and females is larger in the region than in the rest of the state (and the more directly comparable Appalachian counties in Ohio) may be a consequence of a stagnant local economy, where unemployed males become less attractive partners (Lerman (1989), Olsen and Farkas (1990), Mare and Winship (1991), Fitzgerald (1991), and Brien (1997)).

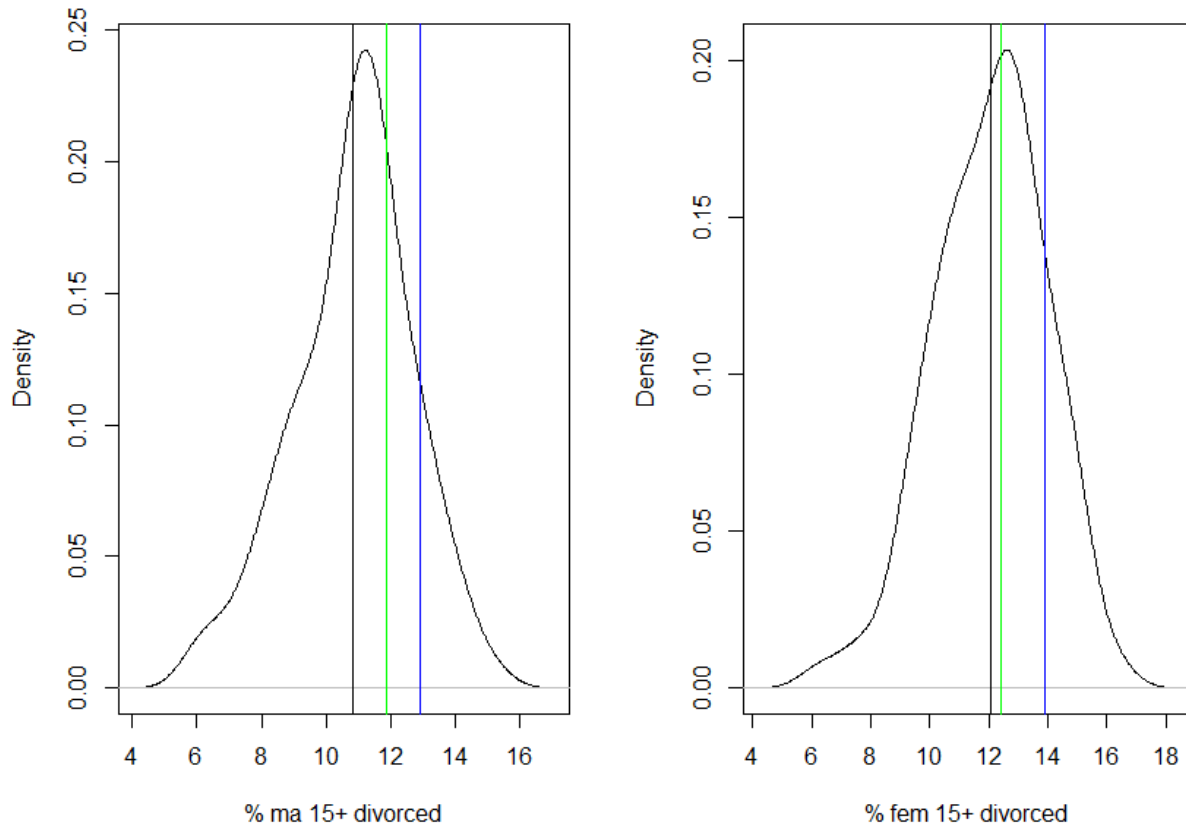


Figure 10: Probability Density Functions for Percentage of Divorced Males and Females 15 years of age or older. Vertical lines are averages for: Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: 2011 American Community Survey, 5-year estimate

The graphs in figure 11 show the changes in marriage and divorce figures over time. The graphs on the top row refer to information for 1970, 1975, 1980 and 1985, whereas the graphs on the bottom row are based on annual data from 1990 to 2010. Marriage rates (marriages per 1000 adults) for the four-county region were consistently above the state total from 1970 to the early 1990s. The local marriage rate then experienced a sharp drop in the 1990s and eventually converged to the state average. Both the divorce rate (divorces per 1000 adults) and the number of divorces per 100 marriages were below the state figure in 1970, but subsequently surpassed the state total, a fact that might have resulted from local economic conditions in recent decades. Table A2 in the appendix suggests marriage rates in Ohio counties are negatively related to the unemployment rate and positively related to personal income per capita. Unemployment seems to also negatively relate to divorce rates in the state.

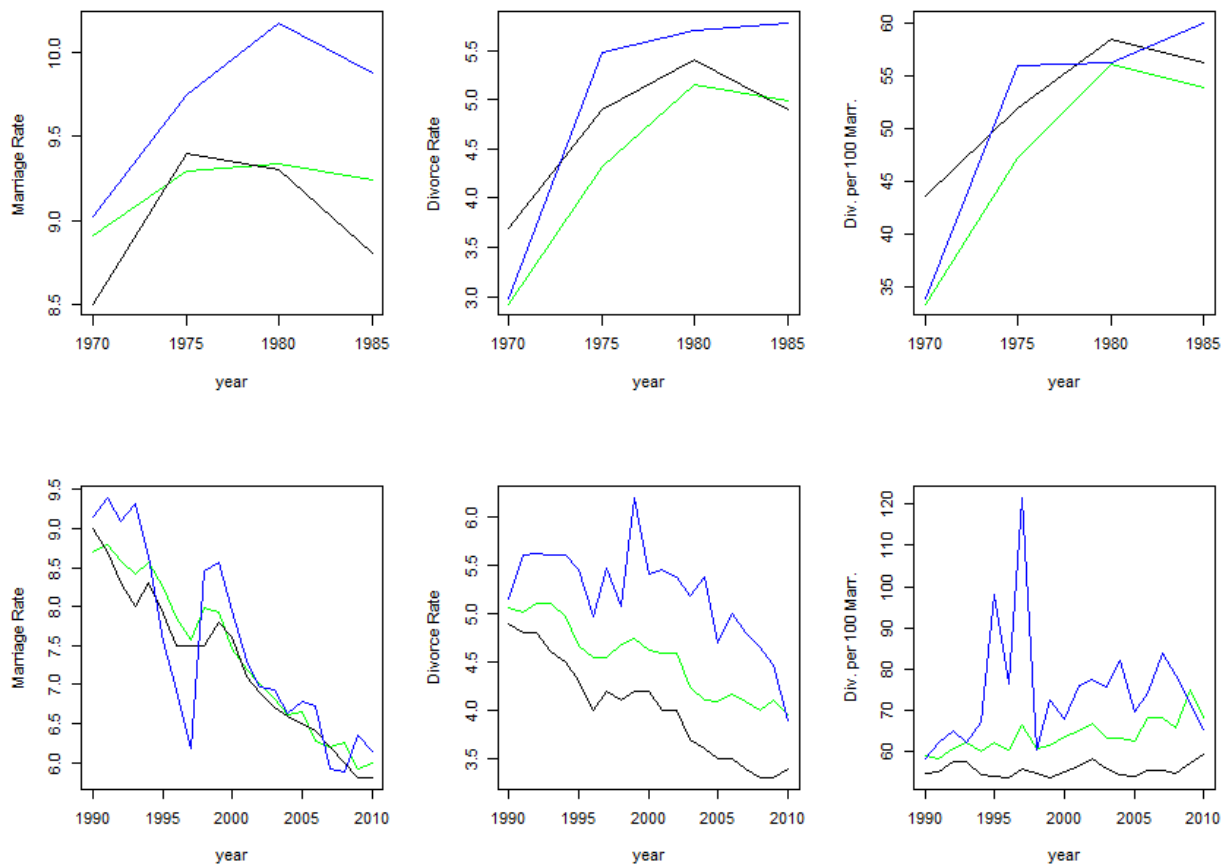


Figure 11: Average Marriage Rate, Divorce Rate and Divorce per 100 Marriages for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).
Source: 2011 American Community Survey, 5-year estimate

The information on figure 12 offers additional insight into the current state and future dynamics of local family structure. Figures 12 (a), (b) and (c) depict the distribution of fertility rates for women at different age groups (births per 1000 women in each age group). The average fertility rates for the region, Appalachian counties and all Ohio counties are quite similar for the 15-19 and 20-34 age groups. However, the average four-county region fertility rate for the 35-50 age group is substantially larger than the rates for Ohio and Appalachian Ohio.

Lastly, the average percentage of grandparents responsible for grandchildren is larger in the four-county region than the state or Appalachian Ohio. This might be a reflection of the significantly larger divorce rates combined with lower personal income per capita in the region (see figure 3).

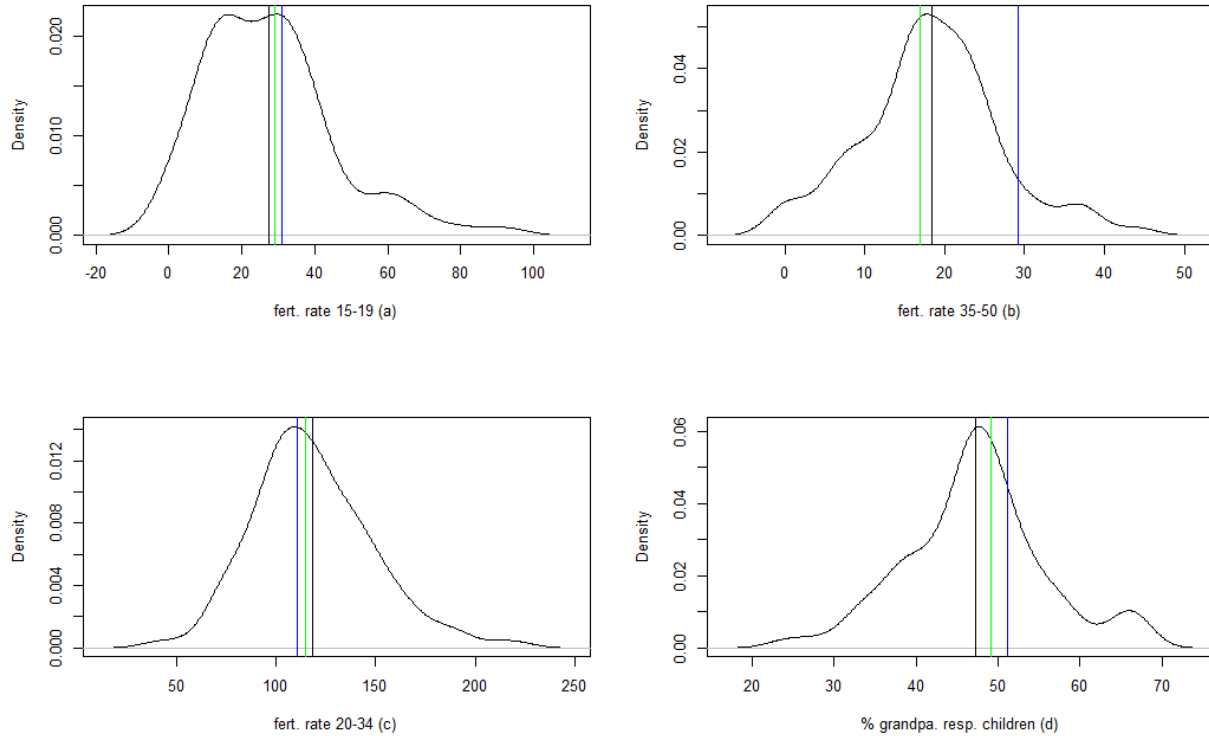


Figure 12: Probability Density Functions for Fertility Rate by Age Group and for Grandparents Responsible for Children. Vertical lines are averages for: Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: 2011 American Community Survey, 5-year estimate

3.2. Education

Figures 13a and 13b depict a disadvantageous educational scenario for the four-county region relative to the rest of the state. The percentage of the population whose educational attainment falls into the categories of “less than 9th grade” and “9-12th, no diploma” is substantially larger in the four-county region relative to the state average. In addition, the percentage of the population with higher education is substantially smaller in the region relative to the state average. The relatively low educational attainment levels in the region might put it in a disadvantaged position with respect to the attraction of better quality and higher paying jobs in the future. This, in turn, can significantly limit the prospects for future uses of the Portsmouth plant site as well as the ability of future enterprises to generate higher paying jobs for the local labor force. Since the site will be transitioning into alternative uses over the next twenty years, there is still time to invest in education and training of the future generation of the local labor force. A better prepared labor force can improve the prospects for the community when the site is finally decontaminated, decommissioned and ready to be put to different uses.

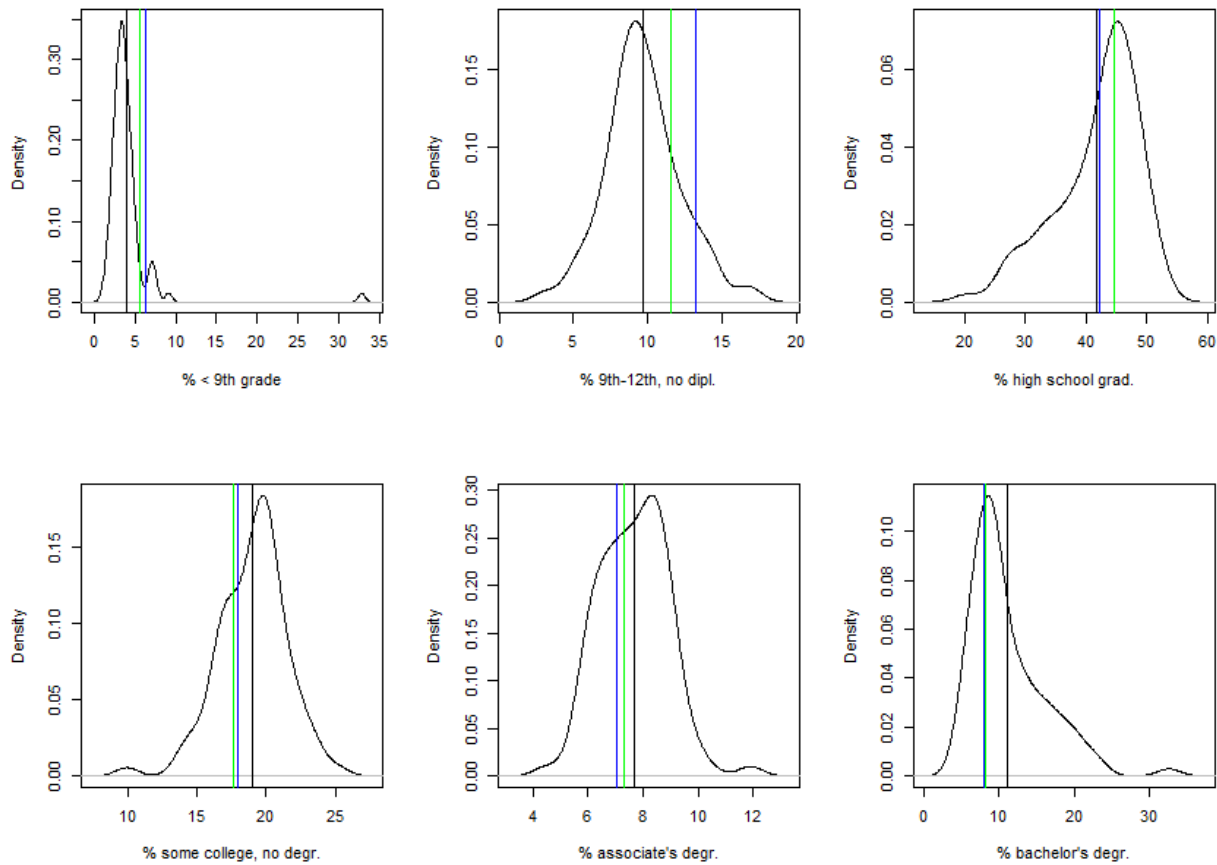


Figure 13a: Distribution of Educational Attainment. Vertical lines are averages for: Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).
Source: 2011 American Community Survey, 5-year estimate

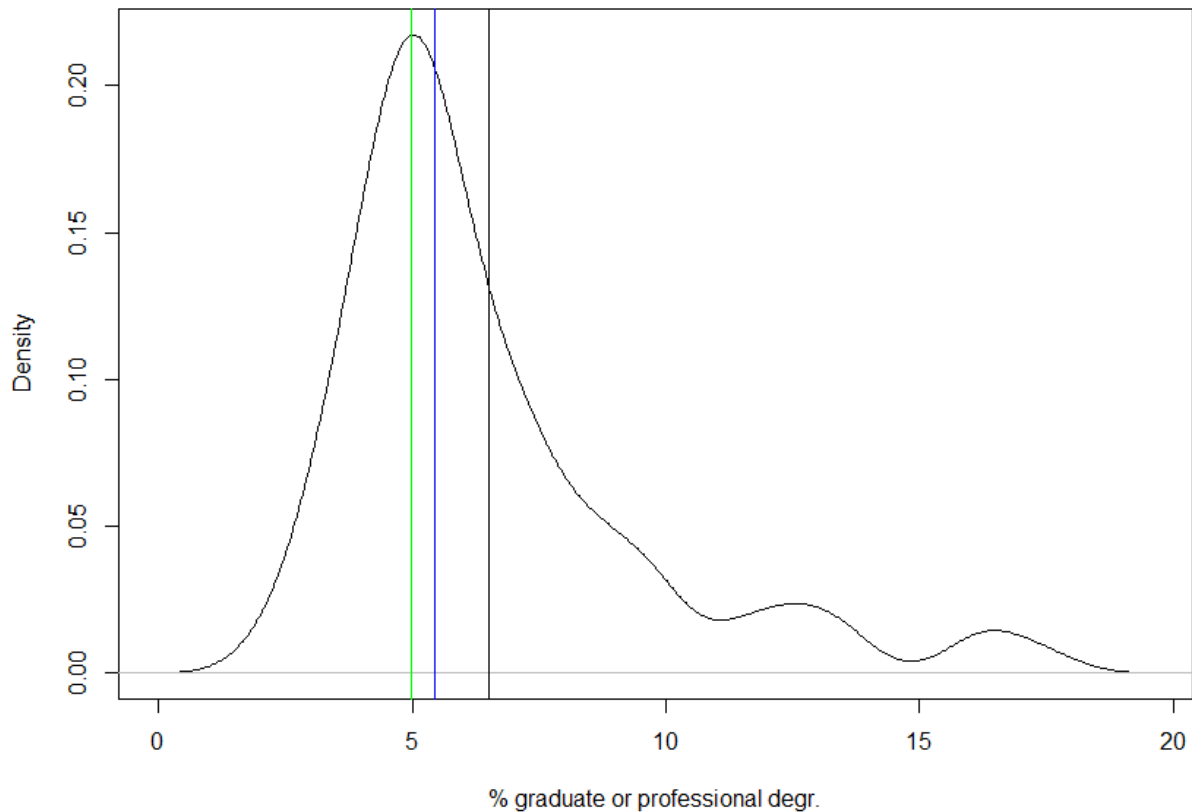


Figure 13b: Distribution of Educational Attainment (Continued). Vertical lines are averages for: Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).
Source: 2011 American Community Survey, 5-year estimate

3.3. Health and Crime

This section focuses on two topics of major importance to quality of life: health and crime. In particular, our health indicators are on data for obesity and diabetes, whereas our crime indicator is age-adjusted homicide rate. All of these indicators are often associated with economic development and to the extent that they influence morbidity, mortality and safety, they can impact the prospects for current and future economic growth.

Figure 14 plots the time series for obesity rates (number of obese individuals per 1000 people, based on self-reported weight and height) and the percentage of the local population with diabetes between 2004 and 2009. Both graphs show an upward trend for all regions, but the rate of growth differed for the three geographies. The obesity rate for the four-county region was similar to that of the state and Appalachian Ohio in 2004, but the figures for the region quickly and substantially surpassed the indicators for the other regions in the 5 year period. Similarly, the percentage of the population of the four-county region with diabetes was below the same figure for the state in 2004, but increased to levels above the state total in 2009.

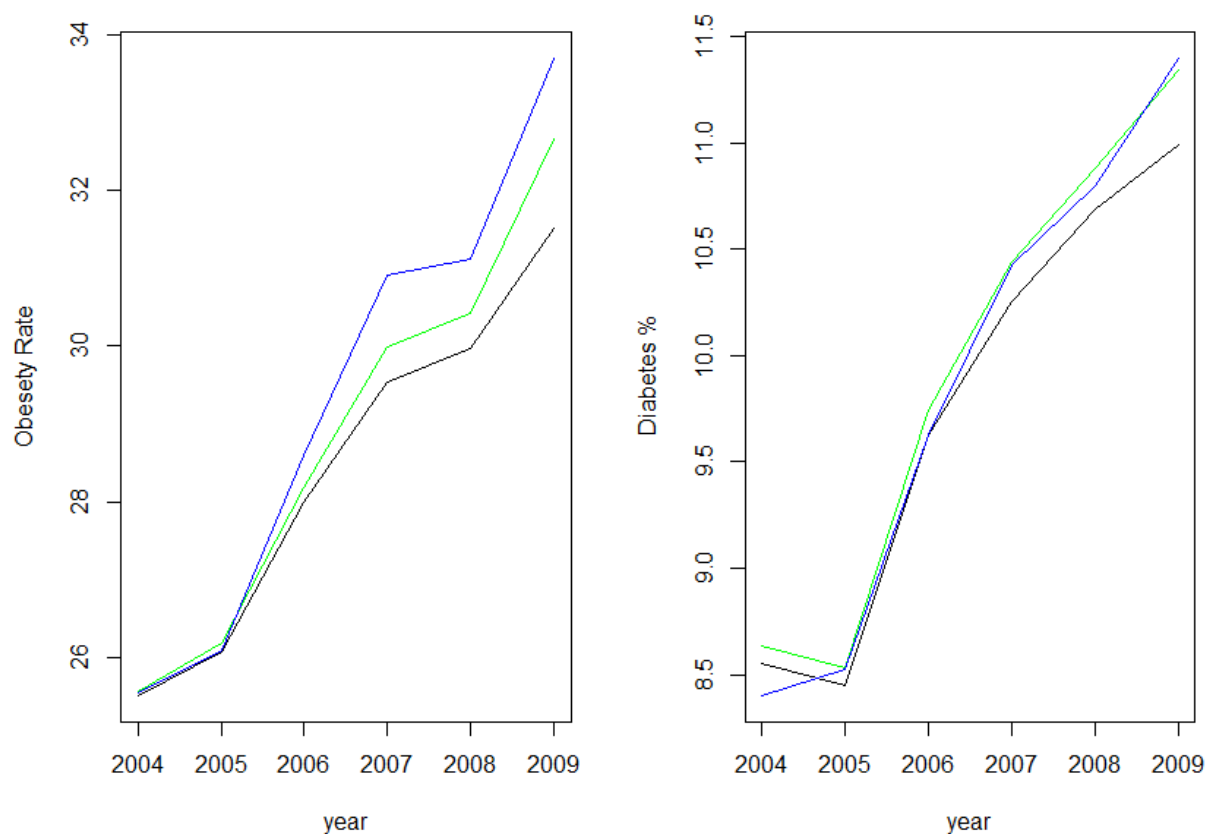


Figure 14: Obesity Rate and Diabetes Percentage for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

Source: Ohio Department of Health

Homicide data comprise of three data points covering the 2000-2002, 2003-2005 and 2006-2008 time periods. The age-adjusted homicide rate (number of homicides per 100 thousand people) steadily increased in Ohio, whereas it first decreased, then increased in Appalachian Ohio and the four-county region. A notable difference between the rates for the region, Appalachian Ohio and the state is clear from figure 15, with the four-county region experiencing much higher levels of violence. Relative to the state figures, the homicide rate in the region was 48% larger in 2000-2003, 35% larger in 2003-2005 and 79% higher in 2006-2008.

The alarmingly larger homicide rates combined with the larger rates of obesity and diabetes in the four-county region invite an analysis of the driving forces behind these indicators. The development of a strategy of economic development for the region and improvement of life quality for the local communities may depend on the addressing of these major causes of mortality and morbidity.

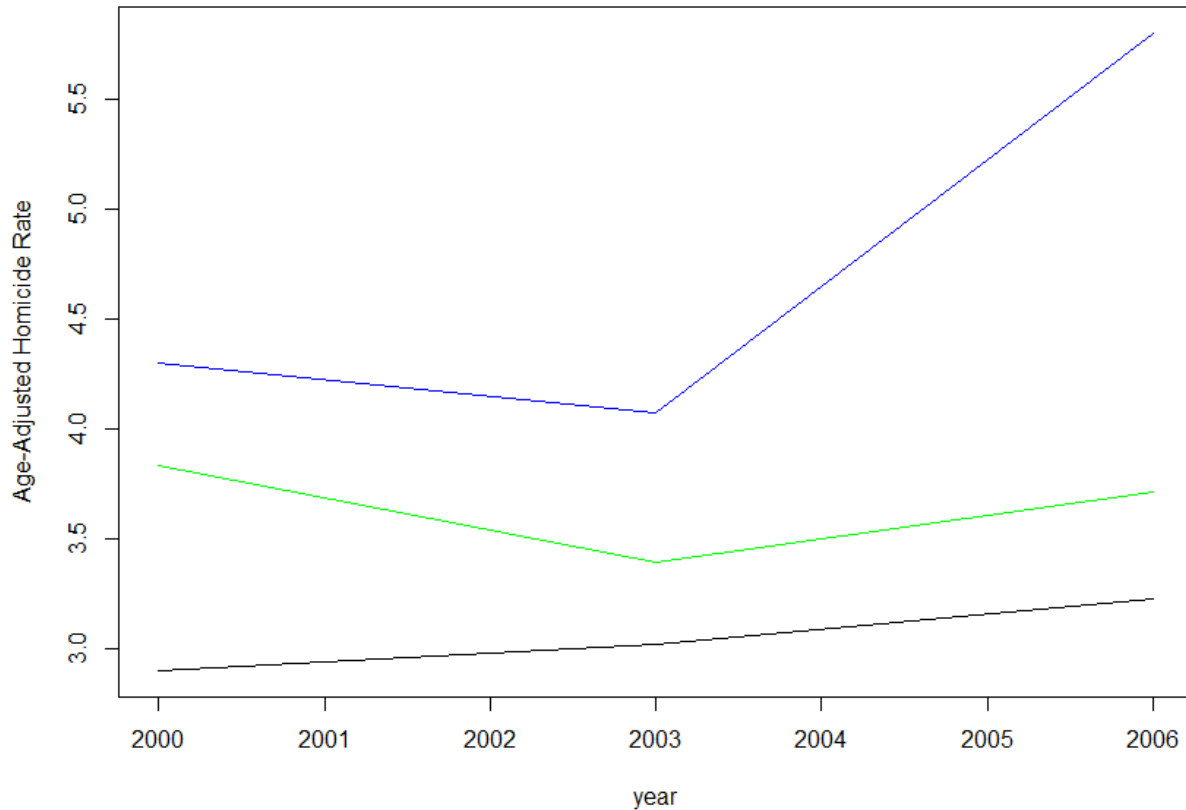


Figure 15: Age-Adjusted Homicide Rate for Ohio (black), Appalachian Ohio (green), and Four-County Region (blue).

4. Conclusion

Our findings can be summarized as follows. The four-county region went from population loss in the beginning of the 1970s to substantially larger growth than the rest of the state through the mid 1980s. Population growth in the region then tracked the overall trend in the state since the late 1980s.

Average personal income in the four-county region fell in the years following the closing of the Portsmouth plant in 2001, but quickly recovered afterwards. Although this pattern was also present in the state and Appalachian averages, the decrease in personal income following 2001 as well as the subsequent increases in the four-county region were more pronounced than in the rest of the state. When the focus is on income maintenance and employment insurance government transfers, a larger volume of average income maintenance and unemployment insurance transfers per capita go to the four-county region relative to the other parts of the state. This fact highlights the relative dependency of the region on government programs.

The following key indicators of family structure are substantially higher in the four county region than in the state: fertility rate for women between 35 and 50 years of age, percentage of single-parent households with own children under 18 years (headed by both males and females), percentage of divorced males and females 15 years of age and older, and percentage of grandparents responsible for grandchildren. The higher percentage of single parent households with dependent children, higher divorce rates and higher percentage of grandparents responsible for grandchildren might be a consequence of a relatively stagnant local economy. This in turn can have consequences for the investment in human capital, including education and a strong social fabric, which are critical for long run economic growth and development.

Education and training are expected to raise labor productivity and positively impact income. The percentage of the population whose educational attainment amounts to less than 9th grade and less than complete high school is substantially larger in the four-county region than the state average. In addition, the percentage of the population with higher education is substantially smaller in the region. Furthermore, historical data show that average per capita government transfers for education and training are similar in all three regions under consideration (four-county region, Appalachian Ohio and all of Ohio), although they are generally lower in the case of the four-county region. When we contrast education and training transfers to personal income, and income maintenance and unemployment insurance transfers a paradoxical result emerges: the region in most need for a differential treatment does not seem to receive a flow of resources that is compatible with its needs.

The relatively low educational attainment levels in the region might put it in a disadvantaged position with respect to the attraction of better quality and higher paying jobs in the future. When considering the two decade time period when the Portsmouth Plant site will be transitioning into alternative uses, improving education and labor productivity starting in the present may make the region more attractive for future enterprises that pay higher wages to better skilled local workers.

The homicide rate in the four-county region is surprisingly above the figures for the state and Appalachian Ohio. Furthermore, the obesity rate and the percentage of the population with diabetes are above the state indicators and the gap between the figures for the region and the state grew significantly between 2004 and 2009. The development of a strategy of economic development for the region and improvement of life quality for the local communities may depend on the addressing of these major causes of mortality and morbidity.

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Appendix

Table A1: Panel regression results for government income maintenance transfers per capita.

VARIABLES	Fixed Effects gincmaintcpc	Random Effects gincmaintcpc
L.eafarmcpc	-0.00197 [0.0133]	-0.00175 [0.0134]
L.eanfarmcpc	0.0445** [0.0191]	0.0531*** [0.0172]
L.eaminingcpc	0.0119 [0.0175]	0.0178 [0.0173]
L.eaconstcpc	0.0310** [0.0149]	0.0256* [0.0149]
L.eamanucpc	-0.0227 [0.0217]	-0.0216 [0.0204]
L.eatranspcpc	-0.0122 [0.0178]	-0.0106 [0.0170]
L.rate	6.096e+09 [1.594e+11]	3.484e+11** [1.547e+11]
L.farmemp	1.990e+11*** [2.379e+10]	8.807e+09 [1.186e+10]
L.nfarmemp	7.020e+08 [5.274e+08]	1.019e+09*** [3.669e+08]
L.minemp	-1.299e+10 [1.532e+10]	1.247e+10 [1.101e+10]
L.constemp	1.937e+10*** [6.543e+09]	-1.781e+10*** [5.309e+09]
L.manuemp	4.098e+09*** [1.109e+09]	-2.139e+09*** [7.420e+08]
L.transempp	9.654e+09* [5.589e+09]	1.622e+09 [4.337e+09]
L.pinconspc	-0.103* [0.0578]	-0.149*** [0.0577]
Pop	-5.468e+08 [4.185e+08]	9.683e+07 [2.014e+08]
Region		1.564e+14*** [3.157e+13]
Constant	2.595e+14*** [5.695e+13]	3.796e+14*** [3.615e+13]
Observations	2,626	2,626
R-squared	0.161	
Number of counties	87	87

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2: Panel regression results for marriage and divorce rates.

VARIABLES	Marriage Rate	Divorce Rate
Eafarmcpc	0 [0]	-0 [0]
Eanfarmcpc	0 [0]	0 [0]
Eaminingcpc	-8.23E-15**	4.06E-16
Eaconstcpc	0 [0]	0 [0]
Eamanucpc	0 [0]	0 [0]
Eatranspcpc	-0 [0]	0 [0]
Farmemp	0.00817 [0.0106]	-0.00839* [0.00502]
Rate	-0.0613* [0.0328]	-0.0307* [0.0179]
Minemp	-0.00479 [0.00637]	-0.00564 [0.00499]
Constemp	0.000454 [0.00149]	-0.000179 [0.000404]
Manuemp	5.17e-05 [0.000152]	0.000167 [0.000133]
Transemp	4.26e-05 [0.000650]	-0.000745* [0.000383]
Pinconspc	2.21e-14* [1.13e-14]	3.03E-16 [6.35e-15]
Pop	-2.25e-05 [3.74e-05]	-2.02e-05 [4.15e-05]
Constant	68.82*** [15.13]	64.38*** [9.125]
Observations	950	950
R-squared	0.124	0.137
Number of counties	85	85

Robust standard errors in
brackets

*** p<0.01, ** p<0.05, * p<0.1