A Decade in the Buckeye State
The Effect of Unemployment, Home Value, and Local Taxes on Population Change in the Counties of Ohio between 2000 and 2010

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Population in Ohio

With 11,536,504 people as of the 2010 Census, the State of Ohio remains the seventh most populous state in America. Ohio's population, historically indicative of its competitive manufacturing economy and desirability, has seemingly plateaued in the first decade of the new millennium. Ohio's growth rate is fourth lowest in the nation at 1.6% (US Census 2000-2010) and in the Midwest statistical region, it is trailed only by Michigan which had negative growth over 10 years. Population stagnation stands to affect local tax bases, economic opportunities, and the electoral importance of Ohio as a key swing state.

Economic Opportunity and Unemployment

Before 2000 Ohio's state economy centered around manufacturing, agriculture, and heavy industry sectors, similar to many states in the Great Lakes region. Wages were high for even the lowest quartile of unskilled labor, and homeownership rates were high across the state (US Census 2010, Ohio County Index 2000). The reduction of manufacturing across the country and setbacks of the economic recession of 2008 drove unemployment up and it peaked at over 11% statewide in 2011 (Bureau of Labor Statistics 2012). While no Ohio county was spared high unemployment and wage reductions, the effects of the economic downturn differed between counties dependent on concentration of heavy industry (Bureau of Labor Statistics 2012).

Home Values and Taxes

Home ownership rates across the state dropped after 2000 (Ohio County Index 2010) and median home values followed as many counties saw a collapse of local housing markets. Much of Ohio's tax structure is concentrated at the local and county level with property taxes accounting for the largest quotient of local public revenue (Ohio County Index 2010). The reduction in assessable home value and shrinking tax base proportionally reduced revenues an funding for public services like education, transportation, and emergency services. Many counties attempted to raise residential property tax rates in response to shrinking bases, with mixed implications.

Brueckner and Kim's Urban Tax Model

Brueckner and Kim's *Urban Sprawl and Property Tax* (2003) described their theory of how property tax increases, like the actions taken by Ohio counties to make up lost revenue, have a dual countervailing effect on growth. The Brueckner and Kim model suggests that urban areas with high density high millage properties are stifled by property taxes that reduces *density expansion.* Conversely, high taxes increase the marginal benefit of suburban growth as density expansion is limited in metropolitan areas. The application of the Brueckner and Kim model to Ohio's population growth structure over 2000-2010, may be explanatory for the distribution between counties.

Theory and Hypotheses

If the county unemployment rate increased between 2000 and 2010, then population decreased between 2000 and 2010.

If county net residential property tax rates rose between 2000 and 2010, then county population will rise.

If county median home values increased between 2000 and 2010, then the county population will increase.

Ohio's industrial specialty (manufacturing and heavy industry) has folded and poor economic prospects reversed the prior population growth in many areas. The value of property, tax revenues ,and improvements to the community, along with implications of long term unemployment are all factors in Ohio's county population movement between 2000 and 2010. The differential relation of taxation to urban density further affects the endogenous relationship of taxation and population growth.

Data

Population growth (upper left) was concentrated in central Ohio (state capital area) specifically Delaware County. Central Ohio also saw increases in property tax rates (lower left) and home value (lower right). While northeast Ohio and Cuyahoga County also had some tax increase, the region lead the state in decline and unemployment.

Correlations

		Change in County Population (2000-2010)	Absolute Unemployment Change (2000-2010)	Change in Home Value (2000-2010)	Change in Net Residential Property Tax Rate
Percent Change in County Population (2000-2010)	Pearson Correlation	1	-.216*	.223*	.304**
	Sig. (2-tailed)		.043	.037	.004
	N	88	88	88	88
Absolute Unemployment Change (2000-2010)	Pearson Correlation	-.216*	1	-.371**	-.124
	Sig. (2-tailed)	.043		.000	.249
	N	88	88	88	88
Percent Change in Home Value (2000-2010)	Pearson Correlation	.223*	-.371**	1	-.049
	Sig. (2-tailed)	.037	.000		.651
	N	88	88	88	88
Percent Change in Net Residential Property Tax Rate (2000-2010)	Pearson Correlation	.304**	-.124	-.049	1
	Sig. (2-tailed)	.004	.249	.651	
	N	88	88	88	88

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The bivariate statistical analysis yielded that all of the indicators had statistical significance in relation to population change. Unemployment and Population change had a strong negative correlation, that was exceeded by the positive relation of home value and population. Tax rates also had a significant positive relationship to population rates. The correlation of unemployment and home values was unexpected and supported the endogeneity of the indicators in the model.

Economic Relationship

Correlation data yielded support for the idea that economic conditions, like unemployment, were strongly indicative of population change in the Ohio counties. The negative relationship supported the first hypothesis that posited such. Similar support was found for median home value as indicator of economic growth, and its positive relationship to population also supported the third hypothesis. The side correlation between unemployment and home value was demonstrative of the interconnectedness of local economic indicators.

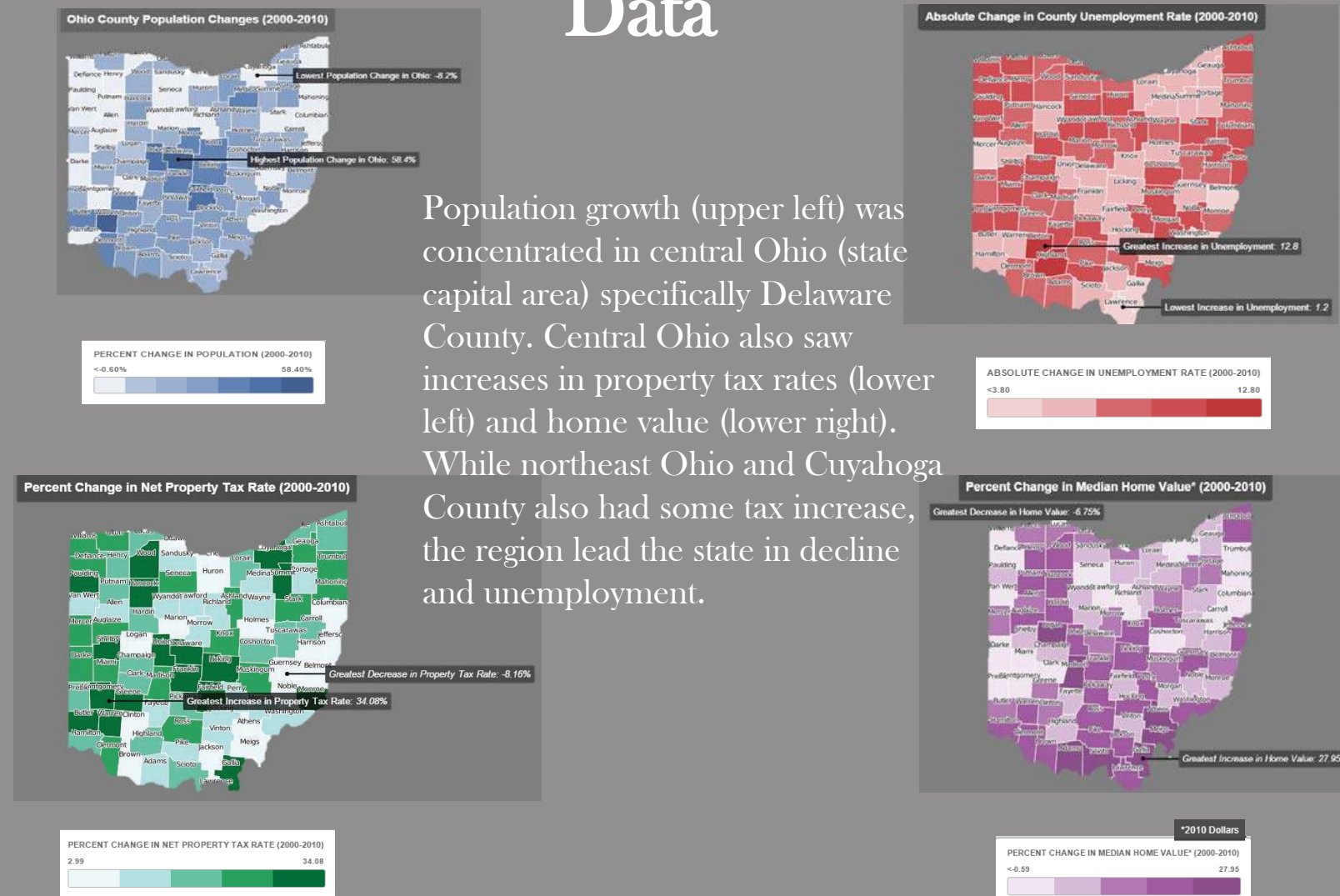## Urban Density and Taxation

Brueckner and Kim's tax density model was supported in the data, and also related to differences regarding tax effectiveness. Cuyahoga County had the highest decline in population (-8.2%) but also appeared in the highest quintile for tax increases. While this case refutes the hypothesis that tax rates and population are positively related, it supports tax density expansion reduction. The map at upper left shows Cuyahoga County with the dark yellow areas representing urbanized land (67% of total land area). Cuyahoga County's high density is thusly stifled by high property tax that serves to reduce urban growth. In addition, reduced economic opportunity has further contracted the size of high value property tracts and furthered what the Cleveland Federal Reserve calls "Reverse Gentrification."

By comparison the fastest growing county (Delaware) was also in the highest quintile of tax increases. The key difference being Delaware (shown lower left) is largely suburban with less than 14% of the county being urbanized land (shown in dark yellow). As per the Brueckner and Kim tax density model, Delaware County sees relative growth because its taxable property is low millage, high yield land that see high public expenditure benefits.

Public Policy Implications and Ohio as a Model

Understanding how matters of public policy like regulations and tax code affect population change begins with looking at policy as a catalyst for economic changes. In this study, taxation is a key determinant of some economic factors, along with others like industrial diversity and market saturation. The heterogeneity and localized nature of Ohio's counties make them a model laboratory for how differences in policy make for differtial impacts of economic and urban development. Ohio's economic condition as a state also closely mirrors neighboring states in the Great Lakes region. Regionally, many states are also seeing stagnating or declining growth for which Ohio's analysis is relevant. The endogenous nature of economy, population, and policy points to a need for critical comprehensive evaluation of policy and economic decisions at all levels.

Brueckner, Jan K. and Kim, Hyun-A. 2003. "Urban Sprawl and Property Tax." *International Tax and Public Finance*. Vol.10, 5-23.
Oates, Wallace E. 1969. "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis." *Journal of Political Economy*. Vol. 77, No. 6, 957-971.
Unemployment Status and Detailed Census demographics, Workers age 16 and over: Ohio Counties – US Census Bureau 2000 (summary file 5) and *Unemployment Status and Occupational demographics, Workers age 16 and over: Ohio Counties* – American Community Survey (1 year tract).