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Effects of Shifts in the Local Tax Base on Economic Outlook

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In Kentucky, local governments can impose taxes on property and income. Tax options and maximum rates are limited by the classification of the city, which is loosely based on population size. In the summer of 2017, the City of Henderson, Kentucky's City Council passed an ordinance that lowered real estate tax rates and raised the occupational payroll tax rates. This shift is forecasted to be net neutral for city revenue, which raised the question of how changes in the local tax burden affect a Kentucky city's long run economic outlook.

In a theoretical model, the businesses and population would move outside of the area where the rate increase took place. For example, increases in the real estate tax would cause people to move outside of city limits, and increased payroll tax rates would cause businesses to move outside the city as well. However, as these movements would incur relocation costs, we hypothesize changes in local tax rates will have a minimal effect on a city's economic growth.

To measure the economic growth of a city, we used the CoWage model. This model is used to forecast net city inflows and is defined as:

\[
\text{CoWage} = b_0 + b_1 \text{ReCity}_t + b_2 \text{ReCo}_t + b_3 \text{PayrollCity}_t + b_4 \text{PayrollCo}_t + b_5 \text{Schools}_t + b_6 \text{CoWage}_{t-1} + b_7 \text{Class}_t + b_8 \text{Border}_t + b_9 \text{Demographics}_t + \epsilon_t
\]

For this project we focused on Kentucky cities that so we could control for state policies that affect local government options. Because this question arose from changes in Henderson, Kentucky, we further limited our observations to cities that were similar in class, population size, and geographic location. With these specifications, we used the following 15 cities as our observation groups:

Ashland, Beaver Dam, Central City, Covington, Elizabethtown, Frankfort, Henderson, Hopkinsville, Jeffersontown, Madisonville, Nicholasville, Owensboro, Paducah, Radcliff, Richmond.

To control for individual city differences, such as location and resources, we strived to obtain data on the cities from 1970 to 2016. With this, we could control for differences across time so that our estimates of the tax rate effects were not biased. Due to low retention rates and lack of digitized records, we were not able to collect data from every year for each city, but overall it is fairly balanced.

To measure the economic growth of a city, we used the city population, the net city employment inflow, annual average county wage, and average assessed property values as indicators. These data were provided by the Bureau of Economic Analysis, and the Census Bureau.

Models

Below are the models we estimated using OLS Regressions with two way fixed effects.

\[
\begin{align*}
\text{CityPop}_{it} &= b_0 + b_1 \text{ReCity}_{it} + b_2 \text{ReCo}_{it} + b_3 \text{PayrollCity}_{it} + b_4 \text{PayrollCo}_{it} + b_5 \text{Schools}_{it} + b_6 \text{CoPop}_{it} + b_7 \text{CoEmpl}_{it} + b_8 \text{IndustryEmp}_{it} + b_9 \text{LF}_{it} + b_{10} \text{Class}_{it} + b_{11} \text{Border}_{it} + b_{12} \text{Demographics}_{it} + \epsilon_{it} \\
\text{NetCityInflow}_{it} &= b_0 + b_1 \text{ReCity}_{it} + b_2 \text{ReCo}_{it} + b_3 \text{PayrollCity}_{it} + b_4 \text{PayrollCo}_{it} + b_5 \text{Schools}_{it} + b_6 \text{RatioPop}_{it} + b_7 \text{Schools}_{it} + b_8 \text{CoEmpl}_{it} + b_9 \text{IndustryEmp}_{it} + b_{10} \text{LF}_{it} + b_{11} \text{CoWage}_{it} + b_{12} \text{Class}_{it} + b_{13} \text{Border}_{it} + b_{14} \text{Demographics}_{it} + \epsilon_{it} \\
\text{CoWage}_{it} &= b_0 + b_1 \text{ReCity}_{it} + b_2 \text{ReCo}_{it} + b_3 \text{PayrollCity}_{it} + b_4 \text{PayrollCo}_{it} + b_5 \text{Schools}_{it} + b_6 \text{RatioPop}_{it} + b_7 \text{Schools}_{it} + b_8 \text{CoEmpl}_{it} + b_9 \text{IndustryEmp}_{it} + b_{10} \text{LF}_{it} + b_{11} \text{Class}_{it} + b_{12} \text{Border}_{it} + b_{13} \text{Demographics}_{it} + \epsilon_{it} \\
\text{CityProperty}_{it} &= b_0 + b_1 \text{ReCity}_{it} + b_2 \text{ReCo}_{it} + b_3 \text{PayrollCity}_{it} + b_4 \text{PayrollCo}_{it} + b_5 \text{Schools}_{it} + b_6 \text{RatioPop}_{it} + b_7 \text{Schools}_{it} + b_8 \text{CoEmpl}_{it} + b_9 \text{IndustryEmp}_{it} + b_{10} \text{LF}_{it} + b_{11} \text{Class}_{it} + b_{12} \text{Border}_{it} + b_{13} \text{Demographics}_{it} + \epsilon_{it}
\end{align*}
\]

*Note that when possible, variables were transformed using natural log.

We intentionally used log-log models, so that coefficient estimates from our regression represent the elasticity of the dependent variable with respect to the explanatory variable. This in turn makes the interpretation simpler because the coefficient is the percentage change in the dependent variable with respect to a 1% change in the explanatory variable.

**Net City Employment Inflow:** We found marginally significant evidence of a correlation with the previous year’s city real estate tax rate. On average, a 10% increase in the real estate tax rate will lead to a 1.72% decrease in the net employment inflow. This supports our hypothesis that when the city real estate tax rate is raised, people will move outside of the city, but remain employed there.

**City Population:** We found significant evidence of a correlation with the previous year’s city real estate tax rate. On average, a 10% increase in the real estate tax rate will lead to a 0.99% decrease in the average annual wage. This supports the idea that people with higher paying jobs are better able to bear relocation costs and are therefore more elastic to shifts in the tax burden.

**Annual Average County Wage:** We found significant evidence of a correlation with the previous year’s country real estate tax and the school tax. On average, a 10% increase in the county real estate tax rate will lead to a 0.92% decrease in the average annual wage rate. This shift is surprising since higher tax rates generally cause people to leave an area.

**Median City Property Values:** We found significant evidence of a correlation with previous year’s country real estate tax and the school tax. On average, a 10% increase in the county real estate tax rate will lead to a 0.56% increase in city property values. This is intuitive because houses in areas with well funded schools are offered in higher demand.

Conclusion

While our models serve as a basis on how shifts in local taxes can affect Kentucky cities, more work will have to be done in the future to definitively prove causation. This could be done by expanding the data set to include more Kentucky cities, and obtaining tax data for the years we were missing. Overall, it appears that while local taxes have a statistically significant effect on a city's economic growth, they do not have a large enough impact to be considered economically significant.

References