

Making Mountains of Debt out of Molehills:

The Pro-Cyclical Implications of Tax and Expenditure Limitations

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1. Introduction

In this paper we analyze the effect of state and local tax limits on revenues during cyclical downturns in the economy. Previous literature on efficacy of tax and expenditure limits suggests that these limits rarely have their intended effects (Kousser et al. 2008). Instead of cutting the size of government, scholars have shown that public officials almost always find ways to circumvent taxing and spending limits (Kiewiet and Szakaty 1996, Gerber et al. 2001, Kousser et al. 2008). For example, if a limit only restricts property taxes, a locality might switch to revenues derived from charges and fees, sales taxes, or income taxes. Likewise, if a revenue limit only restricts state revenues, a hike in property tax collections at the local level might ensue. These evasion techniques, while increasing government size, allow public officials to abide by the letter of the law.

Despite these known evasion tactics, the complaints of politicians regarding various voter proscribed revenue limitations are especially shrill during recessions. Given the dearth of evidence that tax limits have any long-term affect on total state or total state and local revenues, we will explore here an alternative hypothesis that tax caps

lead to greater short-term declines in revenue during recessions than would otherwise occur in the absence of these caps.

We posit that tax limits and the politics of circumvention that they engender have a secondary effect, aggravating the effects of public economic crises. Specifically, we argue that tax revolt legislation has led state and local governments to rely on sources of revenue that are increasingly elastic with respect to changes in personal income. These new revenue sources are less stable during recessions than the previous mainstay of state and local government revenue, the property tax. As a result, state and local revenues are more pro-cyclical, they boom during economic booms and crash during recessions.

This paper tests one part of the pro-cyclical hypothesis, the hypothesis that tax limits aggravate revenue declines during fiscal crises, by analyzing time-series, cross-sectional data for the fifty US States. During the time frame analyzed in this paper, all fifty states experienced multiple economic declines. For the purposes of our test it is especially useful that the states do not suffer downturns at the same time and are not subject to tax limits at the same time. A listing of states and the years in which a tax limit was in force can be found in Table 1.

[Table 1 About Here]

Using state-level recession indicators developed by Owyang et al. 2005, we test for the interaction effect between tax limits and fiscal downturns. Our results support the hypothesis that tax limits aggravate revenue declines in state and local governments during

recessions. This suggest that states would have fewer and more modest financial problems during economic downturns if they did not enact tax limitations.

This paper proceeds as follows. In the first section, we review the previous literature on the consequences of tax limits on government revenue streams. We then tie these consequences with what is known about revenue stability during fiscal downturns from the public finance literature. We show that many of the revenue sources that states are highly dependent on today have a relatively high income-elasticity. The section that follows presents a model of the affect of tax limits (TLs), recessions, and their interaction. We show that TLs aggravate revenue declines during recessions and that these declines are a result of reliance on income-elastic revenue sources. In the final section we summarize our conclusions.

2. The Consequences of Tax Limits on Government Revenues

In this section we review previous findings on the unexpected consequences of tax limits. The observation that tax limits dramatically change government revenue streams is an observation as old as the tax revolt itself. Before the tax revolt even ended, newspaper columnists and policy experts immediately identified an increase in charges and fees as a consequence of property tax limitations. Since then, empirical tests have confirmed this speculation (Danziger and Ring 1982; Joyce and Mullins 1991; Mullins and Joyce 1996, Gall and Sexton 1998; Kousser et al. 2008). Specifically, tax limits increase reliance on charges and fees, sales tax, income tax, and the use of off-budget activities (Bennet and DiLorenzo 1982, Schwartz 1997, Thomson and Green 2004).

There is strong evidence that tax limits increase assessments of charges and fees. Both property tax limits and some general revenue limits can have this consequence, as this form of revenue has been defined by the courts as a fee, not a “tax”, and is often not covered by the letter of the law. Charges and fees are assessed in a variety of forms: increases in college tuition, business licenses and fees, charges for school lunches, park fees, or costs associated with public parking. Many property tax bills today are now loaded with "special assessments" in lieu of ad valorem property taxes (Kogan and McCubbins 2009).

Charges and fees are a consequence of tax limits for a variety of reasons. In some circumstances, it is a simple case of substitution: water bills that were once subsidized by local government property taxes and now paid for in full directly by the user as fees. Alternatively, charges and fees can also be the tertiary affect of changes to the structure of government. Previous research suggests that tax limits splinter government revenue sources. Instead of classic budgetary procedures where the whole of government spending is allocated from general revenue sources, tax limits led to the creation of special funds and devolve finances to newly formed special districts or enterprises. Bennet and DiLorenzo's (1982) early work on this subject posited that tax limits led to a "massive amount of off-budget spending and borrowing". In particular, Bennet and DiLorenzo were concerned with the proliferation of "off-budget enterprises", the political entities referred to as authorities, districts, commissions, or agencies. Most recently, Bowler and Donovan (2004) found that tax limits were the cause of special districts, at least in states that heavily used the initiative process. Special districts and the like, given their purpose

of service delivery, are likely to rely on user-fees instead of traditional taxes.

Another finding in the previous literature is that property tax limits lead to increases in income and sales taxes. Specifically, Thomson and Green (2004) show that Oregon's property tax limit prompted the state to rely more heavily on income taxes. Skidmore (1999), using data from all fifty states, showed that local government restrictions led to growth in state aid. This was clearly the case in Massachusetts. Increases in state aid occurred immediately after the adoption of their property tax limit, Proposition 2 ½. Though this increase was initially sustained by a strong economy, the so-called "Massachusetts Miracle", the state was quickly forced to raise the flat rate of the personal income tax. By contrast, the increase in the use of the sales tax is evident in California. Several scholars have argued that localities have been turned into "sales-tax farms", affecting redevelopment, zoning, and eminent domain, favoring car dealerships and significant shopping malls over mom-and-pop businesses. This activity even garnered a name, the "fiscalization of land use." (Schwartz 1997; Lewis 2001)

In this section we have reviewed the unexpected consequences of tax and expenditure limits on government revenue streams. In the next section, we more thoroughly explain the implication of these consequences during fiscal downturns, turning financial molehills into mountains.

3. Estimating Short-Run Revenue Stability

We argue in this paper is that shifts in revenue sources can have a negative affect on state budgets during recessions. Our reasoning is drawn from a literature in public

finance that tells us that many of the new revenue sources that states rely on are income-elastic. Research in public finance has shown that income-elastic revenues lead to larger revenue growth in the long-run but are less stable in the short-run during a fiscal crisis.

The most comprehensive examination of short-term revenue instability during fiscal crises is by Holcombe and Sobel (1997). In their book, they present an error corrected model to test for tax elasticity. They find that corporate income taxes, personal income taxes, and non-food retail sales taxes are income-elastic whereas taxes on fuel usage and liquor sales are income-inelastic. Although they do not formally test the elasticity of property taxes (which is generally a local, not state revenue source), they characterize this revenue as "relatively stable over the business cycle." (Holcombe and Sobel 1997, p. 186). Looking at state-level data, Bruce et al. found that short-run income elasticity was greater for income taxes than for sales taxes (Bruce, Fox, Tuttle 2006).

An omission in the literature is the absence of analysis on the elasticity of charges and fees. Charges and fees are now the largest single revenue source for state and local governments in many states (McCubbins and Moule 2009). In this paper we replicate the just-mentioned results on the income-elasticity of tax revenue sources, and present new results on the elasticity of charges and fees.

We rely on the method described by Holcombe and Sobel (1997) to estimate the short-run elasticity of state and local revenue sources. For this analysis we use data from the Department of Commerce on aggregate state and local revenue components from 1963-2005. This dataset includes a breakdown of state and local revenues by sales taxes, personal income taxes, corporate income taxes, property taxes, and other revenue sources

nationwide. This latter category includes motor vehicle license taxes, other taxes, charges and fees, and miscellaneous revenues. All variables are transformed to constant dollars using the consumer price index.

Optimally, to estimate income elasticity it is best to have data on tax bases, not tax revenues. As explained by Holcombe and Sobel, elasticity estimates will be biased if policy decisions to raise or lower taxes are correlated with economic changes. Though this endogeneity remains a concern in our analysis, Holcombe and Sobel's own estimates show that there is a strong correlation between estimates derived from tax bases and tax revenues. Further, it would be difficult, if not impossible, to estimate the "tax base" from which revenues from charges and fees are drawn.

Holcombe and Sobel develop an error correction model to estimate short-run income elasticity:

$$\Delta \ln(R_t) = \alpha + \beta_1 \Delta \ln(I_t) + \beta_2 (E_t) + \varepsilon$$

Where R_t is the time-series of a revenue component, I_t is the time-series of state personal income, and E_t is a variable used for error-correction. As described by Holcombe and Sobel, error correction is necessary in the estimation of short-run elasticity because "Two non-stationary variables that have a long-run relationship with one another will tend to move back together whenever they get too far apart (a regression to their mean relationship). Thus one may observe one variable moving down in the same period another is moving up simply because the variables deviated from the levels implied by their long-run relationship" (Holcombe and Sobel 1997, p 83). Here, the error correction variable is the residual derived from an estimate of long-run elasticity.

Table 2 presents the short-run income-elasticity estimates of the major components of state and local revenue. These coefficients represent the percentage change in the revenue component associated with a one percent change in state personal income. The results largely confirm analysis by Holcombe and Sobel. Corporate income tax revenue has the highest-elasticity, varying by 2.83 percentage points for every one percent change in total state personal income. This result is graphed in Figure 1. Changes in corporate income tax revenues roughly match and magnify changes in personal income. The results for personal income taxes are very similar, with an income-elasticity of 2.17.

[Table 2 About Here]

Table 2 also shows that receipts from “other” sources, largely charges and fees, have an elasticity greater than one. Again, this level of elasticity means that this revenue source will fluctuate more than the general economy. The income-elasticity of charges and fees is not surprising given what we know about consumer behavior during recessions. As the most recent Census Data shows, recessions stop consumers from getting married, moving, immigrating, and a variety of other behaviors associated with government fees for services. If citizens are not paying for government services during recessions, revenues will go down even if costs are fixed. The elasticity of charges and fees is graphed against income in Figure 2. Again, as supported by the regression data, this revenue source matches and magnifies changes in the economy.

We also confirmed through this analysis that property tax revenues are highly

income-inelastic. Of the five revenue sources analyzed herein, property taxes are the only source of revenue that is not significantly predicted by changes in personal income. Figure 3 plots the change in log state and local property tax revenue with the change in log personal income. As evident from the figure, property tax revenues often appear to be counter-cyclical.

The important lesson from this analysis is that some revenues will be more stable than others during times of fiscal crisis. Although the most recent fiscal crisis made property values plummet, historically property taxes have been a highly stable revenue source. Moving away from property taxes to more elastic forms of revenue, such as the charges and fees or income tax, could make states more susceptible to cyclical volatility.

This danger was recognized by Holcombe and Sobel who noted that, "If the trend away from local reliance on property taxes continues, however, local governments may not be as insulated from recessionary fiscal crisis in the future." (Holcombe and Sobel 1997, p. 51)

4. Tax Limits and Recessions

We turn now to our central analysis, the affect of tax limits during recessions. In this section we test whether tax limits aggravate revenue declines during fiscal downturns. The key independent variables in this paper are indicators of state recessions and tax limits, as well as their interactions. We will start by describing the data used to measure state-level recessions. Our data from comes from analysis by Owyang, Piger, and Wall 2005. Owyang et al. produce data that measures the number of quarter per calendar year

that each of the fifty states can be classified as being in recession from fiscal years 1980-2001. We use this data to create an annual indicator of state recessions. Specifically, we classify a state as being in recession if at least three quarters of its fiscal year have a recession probability greater than 0.5.¹

Owyang et al. estimate state recession probabilities quarterly for each of the fifty states from 1980-2001 using the Markov-switching model developed by Hamilton (1989). Hamilton's method estimates endogenously the timing of shifts from expansion to contraction of the economy. This model estimates when the mean growth rate switches between high and low growth regimes.

This estimation procedure produces recession probabilities, ranging from zero to one that represent the probability that a state is in a recession in a given quarter. In this paper we rely on a simple cut-off method to identify whether or not a quarter can be classified as in a recession. If the recession probability is greater than 0.5 during any given quarter, a state is coded as being in recession for that quarter. This cut-off rule is non-controversial as Owyang et al. report that recession probabilities are regularly either close to zero or close to one.

The underlying data used to calculate recession probabilities is a state-level coincident index by Crone (2002). Crone's widely used index follows the methodology developed by Stock and Watson (1989) for the national economy. Crone uses three

¹ The cut-off of at least three quarters in recession was chosen through a non-parametric estimate of the affect of each additional quarter in recession. The results of this estimation showed that only three and four quarters of recession had significant affects on annual general revenues. The size of the coefficients for three and four quarters were statistically indistinguishable.

monthly and one quarterly economic indicator to estimate the underlying state of the economy. These indicators are nonagricultural payroll employment, unemployment rate, average hours worked in manufacturing, and real wage and salary disbursements. This data is preferable to other economic indicators because it displays substantial business cycle variability (unlike personal income) and is available on a quarterly basis (unlike gross state product) for each state.

The Owyang et al. data is a significant improvement to previous research that simply relied on national-level recession data. As shown by Owyang et al., there is tremendous variation between states regarding business cycles. This finding is not surprising given the diverse economies of the fifty states. Using this data we are able to take advantage in the rich variation in state business cycles to produce more accurate estimates of their effects.

The second key independent variable in this paper is an indicator of the existence of a statewide tax limit. Specifically, we include two types of tax limits: general revenue limits and property tax limits. The general revenue limits in this analysis come from Poterba and Rueben 1999 and the National Council of State Legislatures 2009. This set of cases is limited to those limits that are considered to be “binding,” meaning they cannot be overturned by normal legislative procedure. Only six US states have passed this type of limit (Colorado, Florida, Michigan, Missouri, and Washington).

The indicators for property tax limits come from Moule (2009). The following rules were used to determine the existence of a property tax limit. First, the limit must restrict property taxes for all geographic areas of the state (no local options). Second, if

the limit does not restrict all taxing entities, i.e. it only limits municipalities not special districts, the entities that are restricted must collect a majority of the state's property taxes. Third, the limit must be either a revenue limit (pegging increased property taxes to an explicit rule) or stipulate both a tax rate limit and cap assessment simultaneously. This last rule means that states that have assessment limits but not tax rate limits are excluded from consideration.

We combine general revenue and property tax limits into a single variable, henceforth referred to simply as a tax limit. The full list of tax limits appears in Table 1. Each tax limit indicator is coded as one in a fiscal year if a state has an active tax limit, and zero otherwise. It is important to note that there are a variety of states that have redacted their tax limit over their time series.

The dependent variable used in this paper is collected from the Census Bureau's statistics on State and Local Government Finances. Specifically, we are interested in state and local own-source, general revenues. The data was transformed to 2006 constant dollars using the consumer price index.

We collected a variety of covariates standard in the state and local finance literature to control for other factors that affect revenue collections. Specifically, we control for three measures of population fluctuation: total population, elderly population (as defined by the number of individuals over the age of 65), and school-age children population (this group was approximated using the age category 5-19). We also control for state political characteristics using a set of dummy variables that indicate the existence of unified republic government, unified democratic government, or divided government

(c.f. Alt and Lowry 1994, 2000). For modeling purposes, divided government is omitted and used as the reference group for the two other dummy variables.

Common covariates used to predict government revenues omitted in this analysis are state personal income and total employment. These indicators of fiscal health are, of course, highly correlated with whether or no a state is experiencing a recession. Indeed, these indexes were employed in creating the Owyang et al. recession probabilities.

We rely on differences-in-differences (cf Wooldridge 2006) to estimate the effect of tax limits and recessions on revenues. This model allows us to hold constant unobserved, time-invariant state-level characteristics that predict state and local revenue growth. Additionally, this model controls for variation of the dependent variable related only to the passage of time that is constant across all states. Our model is estimated using the following equation:

$$\Delta y_{it} = \alpha_{it} + T_{it} + \Psi_{it} + T * \Psi_{it} + \Delta \theta_{it} + \gamma_{it} + \lambda_i + \kappa_t + u_{it}$$

Where:

- y = fiscal outcome
- T = indicator a tax limit
- ψ = indicator of a recession
- θ = Population Covariates
- Y = Political Covariates
- κ = Year fixed effects
- λ = State fixed effects

All continuous variables are log-transformed and first-differenced. This specification is common with econometric data, particularly in the study of short-term effects of fiscal crisis. First-differencing is particularly helpful in eliminating

autocorrelation. This is actually important to our analysis because, as noted by Bertrand et al. (2003), serial correlation often inflates standard errors in differences-in-differences estimation leading to mistaken rejection of the null hypothesis. Indeed, from a series of simulations, those authors found effects “significant at the 5 percent level for up to 45 percent of the placebo interventions.” (Bertrand et al 2003, 1).

5. Results

The coefficients of our model are interpreted as effects on state and local general, own-source revenue growth rates. Our results are presented in Table 3. For example, while both elderly and school-age population variables are insignificant, we find that a one percentage point change in total population leads to a 1.8 percentage change in the growth of general, own-source revenues. Unified Republican and Democratic control of state governments have expected affects on revenue growth, increasing growth during unified Democratic control and decreasing growth during unified Republican Control at rates close to half a percentage point relative to divided government. These variables are not significant at the 5% confidence level, although they are close with p-values of 0.052 and 0.065, respectively. The restrictions on the duration of our time series, to make use of the Owyang et al. data to measure recession, has undoubtedly imposed some cost on us in terms of power, perhaps limiting our ability to find variables to be significant when they are in practice.

[Table 3 About Here]

The most important independent variables in this model are the affects of tax limits, recessions, and their interaction on revenue growth rates. The results suggest that tax limits, in absence of a recession, have no affect on general revenue growth. This finding replicates the findings in our previous research (Kousser et al. 2008). However, new to this paper is the finding that tax limits do in fact have significant affects on revenue during recessions. The interaction variable suggests that in the presence of a recession, a tax limit would decrease state and local own-source general revenue by an additional 1.3%. This result is significant at the 5% level. This decline should be interpreted cumulatively with the overall affect of recessions, which adds an additional 1.2% decline in revenue.

6. Discussion

The results just presented show that states with tax limits experience more sever drops in revenue during economic recessions than do states without limits. This empirical result is consistent with both our theory, that TLs cause states to change the mix of revenue streams to favor income-elastic sources. However, this result is also consistent with the possibility that TLs themselves are binding only during recessions. This alternative hypothesis has some anecdotal evidence to support it, and is a reasonable possibility given the fact that many tax limits are tied directly to an index of economic indicators, such as growth in personal income or the inflation rate (Poterba and Reuben 1996, National Council of State Legislatures 2009).

For example, a common stipulation in property tax revenue limits (rather than limits on individual property assessments and property tax rates, as in California's Proposition 13), so-called "new growth allowances", further tie their tax limits to the state of the economy. New growth allowances state that any construction, whether it is for a new structure or a home renovation, increases a taxing entity's property tax levy limit. For example, if a municipality is only allowed to increase its property tax revenues by 2.5% per year (as is the case in Massachusetts), the actual maximum levy limit would be an increase in 2.5% per year for all previous assessments, plus whatever taxes can be collected from new growth. As noted by a Massachusetts assessor, new growth "gave you that extra measure" to increase taxes beyond the 2.5% limit. When new growth stops or slows during a recession, that "extra measure" disappears, making the cap that was previously nonbinding to now bind the taxing authority.

While we do not reject the possibility that decreases in revenues during recessions are in-part the consequence of the limit themselves, there is also evidence that states that are subject to limits changed their revenue structure in such a way as to make them more sensitive to decreases in state personal income. We turn once again to the model presented in Sobel and Holcombe (1997) to show that states with tax limits have more income-elastic revenues than states without tax limits. This conclusion is confirmed through a simple interaction model. By interacting changes in personal income with the existence of a tax limit, we estimate two elasticities simultaneously: the income-elasticity of general revenues in the presence of a tax limit and the income-elasticity of general revenues in the absence of a tax limit. The estimates of short-run elasticity follow the

method used in Section 3, with state and local general-own source revenues serving as the dependent variable.

A key difference in this latter model to those presented earlier is that we are now relying on state-level data instead of aggregated data. To adjust for this difference, we estimate the model with state and year fixed effects (see Baltalgi et al. 2000 for a discussion of this modeling choice). The results appear in Table 4. As evident from the interaction affect, states with TLs have a higher income-elasticity than states without TLs. This increase is significant at the 5% level. Interesting as well, tax limits on average appear to have a negative and significant affect on changes in own-source state and local revenues. This result differs from Table 3 and our previous work (Kousser et al. 2008) and is likely the result of the simplicity of this reduced-form model.

Conclusion

We have demonstrated that taxation limits have negative effects on state and local revenues during fiscal crises. State and local general, own-source revenues may decrease during a recession for two reasons. First, revenue caps may be more restrictive during economic downturns. Slowdowns in inflation and personal income mean that limits tied to these economic indicators are going to be more stringent. Further, many property tax limits have new growth allowances that also tie limits to the state's economic outlook. Ironically, it seems, tax limits are most binding precisely when reducing revenues will have the most harmful consequences.

Second, as we have emphasized here, revenue limits cause states to rely on

income-elastic revenue sources, such as the income tax or charges and fees. For many years, property taxes were a highly inelastic form of revenue, a source of stability in the face of personal income declines. Greater reliance on an income-elastic revenue source will result in greater revenue declines during economic downturns. This was shown in the negative and significant interaction effect between the recession indicator and tax limits.

Our results suggest that states, in response to tax limits, are building a revenue system that puts them on a budgetary roller-coaster with huge swings between the apex of the caoster's climb and the nadir of its fall. As it seems unlikely that politicians will choose to limit spending during the good times, our results here also imply that state deficits will spike during recessions.

Table 1: Statewide Tax Limits in the US

State	Years Implemented
Arizona	1981-Present
Arkansas	1982-Present
California	1979-Present
Colorado	1993-2004
Florida	1995-Present
Idaho	1982-1991
Indiana	1980-Present
Kansas	1989-1998
Kentucky	1980-Present
Maine	2006
Massachusetts	1982-Present
Michigan	1979-Present
Missouri	1982-Present
Montana	1987-Present
Nevada	1990-Present
New Mexico	1982-Present
Oklahoma	1997-Present
Oregon	1992-Present
Rhode Island	1987-Present
South Dakota	1997-Present
Utah	1979-1985
Washington	1979-Present
West Virginia	1991-Present

Table 2: An Error Correction Model of Short-Run Income Elasticity, 1963-2005

Regression Coefficients of Short-Run Income Elasticity	
Corporate Income Tax	2.83 (0.52)***
Personal Income Tax	2.17 (0.31)***
Charges and Fees	1.06 (0.15)***
Sales Tax	0.93 (0.13)***
Property Tax	0.12 (0.16)

NOTE: Estimates from a regression of changes of logged personal income on changes of logged revenue sources. Error correction from long-run elasticity estimates are employed. Analysis uses Commerce Department data of state and local government revenues (constant dollars) and BEA annual estimates of national personal income (constant dollars) from 1963-2005. R-squareds range from 0.07 (property taxes) to 0.59 (personal income taxes).

Table 3: The Effect of Recession and Tax Limits on Changes in the Log of State and Local Own-Source General Revenues, 1980-2000

Dependent Variable: Δ LN General Own Source Revenues	
Tax Limit	0.004 (0.004)
Δ LN School-Age Population	-0.103 (0.146)
Δ LN Elderly Population	-0.302 (0.264)
Δ LN Total Population	1.820 (0.213)***
Unified Democratic Control	0.007 (0.004)*
Unified Republican Control	-0.005 (0.003)*
Recession X Limit	-0.013 (0.006)**
Recession	-0.012 (0.004)***
Fixed Effects	included
Year Effects	included
Constant	0.030 (0.006)***

NOTES: Overall R-Squared: 0.36. Number of Observations: 1029 (49 states, Alaska excluded). Years Covered: 1980-2000.

Table 4: The Effect of Changes in the Log of Personal Income and Tax limits on State and Local Own-Source General Revenues, 1972-2006

Dependent Variable: Δ LN General Own Source Revenues	
Δ LN Personal Income	0.210 (0.035)***
Δ LN Income X Tax Limit	0.130 (0.066)**
Tax Limit	-0.008 (0.003)***
Constant	0.037 (.007)***
State / Year Effects	included

NOTES:

Overall R-squared: 0.46. Number of Observations: 1764 (49 states, Alaska excluded).
 Years Covered: 1972-2006.

Figure 1: Income-Elasticity of Corporate Income Taxes



Figure 2: Income-Elasticity of Charges and Miscellaneous Revenues

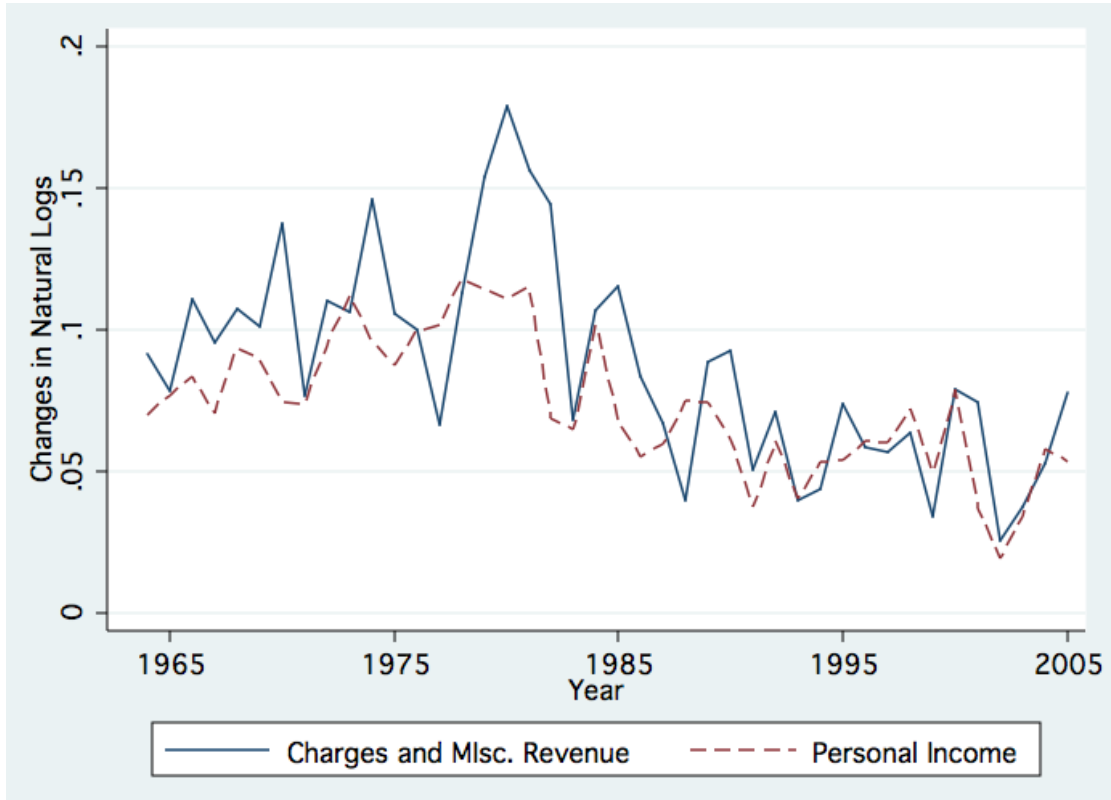


Figure 3: Income-Inelasticity of Property Taxes



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