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The Housing Crisis and State and Local Government Tax Revenue: Five Channels

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State and local government tax revenues dropped steeply following the most severe housing market contraction since the Great Depression. We identify five main channels through which the housing market affects state and local tax revenues: property tax revenues, transfer tax revenues, personal income tax revenues, direct sales tax revenues (through construction materials) and indirect sales tax revenues (through the link between housing wealth and consumption). We find that historically property tax revenues do not tend to decrease following house price declines. Similarly, property tax collections have yet to fall on average during the current housing market contraction. On the basis of state-level case studies we conclude that the current resilience of property tax receipts is due to significant lags between market and assessed values and the tendency of policy makers offset declines in the tax base with higher tax rates. The other four channels have had a relatively modest effect on state tax revenues. We calculate that the combined channels reduced tax revenues by \$14 billion from 2005 to 2009, which is less than 2 percent of total state own-source revenues in 2005. We conclude that the recent contraction in state and local tax revenues has been driven primarily by the general economic recession, rather than the housing market per-se.

*The views in this paper do not necessarily reflect those of the Federal Reserve Board or its staff.

I. Introduction

The housing market contraction of the past four years was the largest since the Great Depression, and it arguably played an important role in the ensuing downturn in economic activity. State and local tax revenues have suffered considerably during this episode. In this paper we seek to disentangle the direct impact of the housing market downturn on state and local tax revenues from the broader impact of the recession.

The housing market influences state and local tax revenues in many ways. We focus our attention on five channels that we argue are the most important. The first two channels, the property tax and the real estate transfer tax, are a direct function of the value of real estate and the volume of real estate transactions. The third and fourth channels involve the sales tax. A direct effect relates to the sales tax revenues generated by the materials used in new construction and the renovation of existing structures. We also consider an indirect effect on sales tax revenues related to general household expenditures: if changes in housing wealth affect homeowners' consumption, then the large drop in real estate values may have reduced the sales tax revenues from all types of goods and services. Finally, personal income tax revenues will be affected by the reduction in employment related to construction and real estate activity. A few of these channels incorporate commercial as well as residential real estate, but in most cases data limitations prevent us from examining the commercial real estate market directly.

We first provide national estimates of the impact of each channel by aggregating across all states and localities. State and local governments exhibit significant heterogeneity in their tax systems, so the impact of each channel will clearly vary across locations (e.g. for a given fall in home sales, a state with a greater reliance on real estate transfer tax revenues will see a larger fall in total tax revenue than a less reliant state). Nevertheless, it is informative to estimate the

overall national impact of each of the five channels because it reveals the effect on the average state or local government. Moreover, aggregate data on tax revenues are available on a much more timely basis than detailed tax data for individual state and local governments, allowing for a better assessment of the current condition of tax revenues. The national estimates also provide a baseline from which to view the experiences of individual states and localities. This baseline is particularly useful in preventing the natural tendency to extrapolate from the most visible – typically the most negative – experiences to the nation as a whole. After presenting our national estimates, we examine the heterogeneity across governments by performing simulations for each state, based on the national estimates and the individual parameters of each state’s tax system.

Our analysis can be broken into two primary components. The first component focuses on the property tax channel. Perhaps surprisingly, property tax receipts continued to grow at a robust pace through the end of 2009. We ask why the property tax has been so resilient over a period in which property values have decreased significantly, and examine whether this resilience is likely to continue. We conclude that the resilience to date is a function of significant lags in the effect of changes in the market value of property on changes in taxable assessments, as well as of the propensity of local policy makers to offset declines in property values by increasing the property tax rate. Analysis of historical data, as well as several case studies of individual states suggests that, on average, it is unlikely that property tax revenues will fall sharply in the near future.

The second component of the analysis seeks to assess the extent to which the housing market downturn has contributed to the plunge in state revenues through the four other channels. We estimate that revenues from some of these sources have contracted sharply in the past several years, but the contributions to the decline in total state tax revenues are relatively modest. We

estimate that the four channels reduced total state tax revenues by only \$14 billion from 2005 to 2009, a relatively small fraction of the \$650 billion in state tax revenues in (fiscal year) 2005. Although a net decline of this magnitude is by no means trivial, it is only $\frac{3}{4}$ of the standard deviation of changes in annual total state tax revenues from 1990 to 2005, and it is spread out over four years. However, the drop in revenue was more severe in some states. For example, we estimate that total state tax revenues in Florida were reduced by \$5 billion, or 13 percent of its 2005 tax revenues. By contrast, housing-related revenues in a number of states did not fall much between 2005 and 2009. Much of the drop in housing related revenues from 2005 to 2009 is due to the transfer tax and direct sales tax channels.

We also compare state tax revenues in 2009 to their predicted level had housing market variables continued to increase at their 1995-2002 trends, instead of first booming and then slumping. We estimate that state tax revenues in 2009 were \$27 billion lower than predicted. In this case, all four channels make notable contributions to the deficit between actual and predicted revenues.

It is important to point out that our methods do not allow us to identify the causal effect of exogenous house price declines on state and local tax revenues. Our intent is to quantify the main channels through which the housing market affects state and local tax revenues relative to other economic factors. We acknowledge that our methods will not capture the effects that occur through the housing market's impact on other sectors, such as on employment in non-housing industries (e.g. retail sales workers at Home Depot). Also, we attribute all fluctuations in housing-related sectors to the housing market, even though the recession likely intensified the depth of the housing market downturn. Despite these issues, this is the first paper to provide a

rough sense of the overall magnitude and importance of the housing-related components of state and local tax revenues.

II. Background Information

Housing Market

According to many different measures, the housing market expansion and contraction of the past eight years has been the most severe in the post-War period. House prices rose by 64 percent in the four years prior to their peak in 2006:Q1 and then plunged by nearly 30 percent in the subsequent four years. Existing home sales rose by 34 percent in the four years prior to their peak (in 2005:Q3) and then fell by 36 percent. The supply of housing also exhibited large swings: the number of new housing starts rose 24 percent in the four years prior to their peak before falling by 75 percent since then.

Although the severity of the housing market cycle varied across locations, most states experienced a noticeable swing. The top panel of Figure 1 shows the 10th, 25th, 50th, 75th and 90th percentiles of distribution of annual changes in house prices across states (the source of the data will be discussed later). House price appreciation increased from 2002 to 2005 even at the 10th percentile, and house prices fell in all but a few states in 2008 and 2009. The bottom panel shows a similar chart for the distribution of changes in existing home sales across states.

State and Local Tax Revenue

Total state and local tax revenues have been hit hard during the recession.¹ As shown in Figure 2, state and local tax revenues fell by almost 5½ percent in 2009 after slowing markedly in 2008. 2009 marked the first year that state and local tax revenues had fallen in nominal terms since the Great Depression, and only the third year since then that revenues did not increase by at least 2 percent (the other two years were 2002 and 2008). The decline in 2009 is attributable to two primary state taxes – the personal income tax and the sales tax. Income tax revenue plunged 17 percent in 2009, reflecting falling wage and salary income as well as a decline in capital gains realizations. Sales tax revenue fell by 7½ percent due to a decline in retail sales.

In contrast, property tax receipts—the primary source of local revenues—have held up remarkably well. Property tax revenues grew about 5 percent in both 2008 and 2009. Property tax receipts were the sole source of strength in state and local tax revenue in 2008 and 2009 and have served to significantly buffer the decline in other tax sources: Had property taxes been flat in 2009, the decline in overall tax revenue would have been 7 ½ percent instead of 5 ½ – a 30 percent more severe tax revenue slump.

As is clearly visible in Figure 2, property tax revenues generally tend to be less volatile than other forms of tax revenue. This stability has long been seen as one of the primary virtues of the property tax (Brunori 2003; Giertz 2006). The magnitude of the collapse in the housing market, however, raises the possibility that property tax revenues might fall. In the analysis below we explain why revenues had not yet fallen through the end of 2009 and we assess the likelihood that they will fall in the near future.

¹ Analyzing the sum of state and local tax revenue, rather than each level of government separately, reflects the extensive fiscal links between the two levels of government: In fiscal year 2007 almost 40 percent of general local government revenue was provided by state governments in the form of intergovernmental grants. These linkages imply that a change in state government revenue will likely impact local government revenue, and vice versa. For instance, during the state fiscal crisis of 2002 – 2004, localities responded to cuts in education aid from the states by increasing property tax revenues in order to prevent cuts in education budgets (Dye and Reschovsky 2008).

III. Results: Property Tax

This section examines the resilience of the property tax in the face of the steep home price declines of the last several years. First, drawing on Lutz (2008) we discuss the relationship between house price changes and property tax revenues. Second, we assess the impact of house price declines on property tax collections using state-level panel data. Finally, because the historical data may have limited relevance for the current extraordinary situation in the housing market, we conduct case studies of recent changes in property tax revenues in six states, including “bubble” states such as Florida and Nevada that experienced among the largest drops in house prices.

The Relationship between Real Estate Prices and Property Tax Collections

Property taxes are by far the most important tax at the local level, accounting for around three-fourths of local government tax revenue. The tax is assessed on the value of residential real property (i.e. personal real estate), commercial, business and farm real property, and personal property (e.g. automobiles). Residential real property accounts for approximately 60 percent of taxable assessments and is the largest component of the tax base by a significant margin; commercial, industrial and farm property account for around 30 percent and personal property accounts for less than 10 percent.²

Perhaps surprisingly, property tax revenues did not become a larger share of total revenues in the course of the housing market boom. Figure 3 plots the local government

² Authors’ calculations based on the 1987 and 1991 *Census of Governments*’ accounting of the assessed value of taxable property. These are the most recent available data from which these calculations can be made. Residential real property includes vacant platted land.

property tax share—the percent of total local taxes accounted for by the property tax—in 2000 against the share in 2007 (the last available year) by state. These data are from the *Annual Survey of Government Finances*. The points are clustered along the 45-degree line, illustrating that despite the historic increase in house prices, the property tax share held essentially constant in all states. Even though property tax receipts rose significantly during this period (Figure 2), other tax receipts increased as well.

Abstracting from the significant heterogeneity across jurisdictions, property tax revenue can be defined as being equal to the effective tax rate times the market value of property

$$R = \tau * V \tag{1}$$

where R is property tax revenue; τ is the effective tax rate (which should be distinguished from the statutory rate), and V is the market value of taxable property. When the market value of property increases, tax revenue will mechanically increase. However, policy makers may choose to offset some or all of the mechanical change by adjusting the effective tax rate.³ The change in tax revenue is therefore equal to the sum of the mechanical and policy offset components:

$$\Delta R = \underbrace{\tau * \Delta V}_{\text{mechanical}} + \underbrace{\Delta \tau * V}_{\text{policy offset}} \tag{2}$$

Lutz (2008) explores two aspects of this relationship. First, he assesses the magnitude of an increase in property tax revenues in response to an increase in house prices. This analysis sheds light on the average magnitude of the policy offset. If there is no policy offset, then the elasticity of property tax revenue with respect to house prices will equal 1 and if there is

³ The effective tax rate can be adjusted by altering the statutory tax rate or by altering the way in which taxable property is assessed for tax purposes.

complete policy offset, the elasticity will equal 0. Second, he examines the timing of the relationship between house price appreciation and property tax revenue.

Using both time-series data and micro-level panel data from individual governments, Lutz (2008) concludes that the elasticity of property tax revenue with respect to home prices equals 0.4, indicating that policy makers tend to offset 60 percent of house price changes by moving the effective tax rate in the opposite direction of the house price change. The effect of house prices changes on property taxes does not occur until three years following the change in house prices. This extensive lag likely reflects three institutional features of the property tax. First, the property tax is assessed in a backward looking manner, as the current year's taxes are based on the assessed value of property in the previous year. Second, assessed values often lag market values. In some cases this lag is by design or legal mandate and in others it is due to "poor" administration. The poor administration may sometimes be intentional, particularly in jurisdictions which elect their tax assessor.⁴ Third, most states have some form of cap and/or limit on increases in property tax rates, tax revenues or taxable assessments. During periods of rapid house price growth, these limits will prevent assessments or revenues from growing at the same pace as market values. Thus, a 'stock' of untaxed appreciation will develop. Assessments will catch-up to market values only when house price growth slows below the limit and the 'stock' of untaxed appreciation is incorporated into taxable assessments.

Both aspects of the relationship – the elasticity and the lag – are visible in Figure 4, which displays the annual growth rate of property tax revenue and house values from 1989 to

⁴ Sharp changes in house prices may intensify the propensity of officials to delay incorporating changes in market values into taxable assessments. When house prices are rising rapidly, officials may view it as politically prudent to incorporate the gains into the tax base with a lag. When house prices decline sharply, there may be a strong incentive to delay incorporating the new market values in order to avoid a decline in tax revenues (Bennett and Perry 2009).

2009. The growth rate of both series declined in the early 1990s. Although house price appreciation reached a trough in 1991, property tax revenue growth did not bottom out until 1995, implying that property taxes track real estate prices with a considerable lag. Similarly, in the more recent period house price appreciation collapsed from 2006 to 2008, but the growth in property taxes barely slowed. In addition, the growth rate of property tax revenues increased at a much slower rate than that of house price appreciation from the mid-1990s to 2005. These facts are both consistent with the notion that policy makers tend to offset changes in house prices by lowering tax rates.

Most relevant for this paper, Lutz (2008) estimates the relationship between house price declines (as opposed to changes in house prices which include both declines and increases) and property taxes. These estimates have limitations in regards to assessing the current situation because the typical house price decline in the sample used in Lutz (2008) is quite small relative to the declines which have occurred over the last several years. As a result, the generalizability of the estimates to the current situation is unclear. Nevertheless, the results strongly suggest that policy makers buffer negative house price shocks by raising property tax rates. Although the magnitude of the response varies greatly from specification to specification, in most cases it is not possible to reject the hypothesis that house price declines have no effect on property tax revenues. Updated results from Lutz (2008) (unreported) that add several more years of data to the sample produce no substantive change in the conclusions.

State-level Panel Data Evidence

To analyze the effect of large house price declines on property tax revenues, we use annual state-level panel data on total property tax collections from 1976 to 2007 (including both

state and local government collections).⁵ Figure 5 displays the distribution of the annual percent change in property tax receipts over this period. Declines in property tax collections are rare – only 7% of the distribution falls below 0. Furthermore, large declines are extremely rare. Only half of one percent of the annual changes in property tax collections since 1976 exceed 15%. Many of these extremely large declines are associated with policy changes, such as Proposition 13 in California, that are not directly related to fluctuations in home values. Less than one percent of the declines exceed 10 percent and less than two percent exceed 5 percent.

Using an event study framework, Figure 6 plots the distribution of changes in property tax revenues in the year of a decrease in home prices and the four subsequent years. We restrict the sample to the state-year combinations for which property tax data are available for all five years displayed. This restriction ensures that the evolution of the distribution of price changes does not reflect changes in the sample composition. In some cases, the sample sizes become quite small and we make no effort to compute standard errors around the moments of the distribution. Moreover, most episodes of house price declines are associated with events that would tend to depress demand for public goods, and hence for tax collections, independently of the change in home prices. For instance, an adverse shock to an industry with a major presence in a state would reduce incomes and cause out-migration, simultaneously reducing the demand for public spending and house prices. We do not account for this omitted variable bias, which should cause us to overstate the positive correlation between house prices and tax revenues. Our approach is a response to the failure of more standard econometric approaches (Lutz 2008) to find an effect of house price declines on property taxes. We view the analysis as heavily tilted toward finding an effect of house price declines on property tax revenues.

⁵ 2001 through 2004 are missing from the sample because the property tax data are not available for 2001 and 2003 and the use of first-differences prevents use of 2002 and 2004.

We measure house prices using repeat-sales indexes computed by LoanPerformance, a division of First American CoreLogic. These indexes are similar to those published by the Federal Housing Finance Agency (FHFA), but unlike the FHFA they include homes financed with non-conforming loans and cash. The indexes are based on transactions of single-family homes, condos, coops, foreclosed properties and short sales. We take annual averages of the monthly index for each state.

Panel A of Figure 6 displays the results using all episodes of house price declines in the sample (of which there are 153). The horizontal axis indexes the year relative to the house price decline. For example, year 0 denotes the year of the decline and year 1 denotes the year following the decline.⁶ The vertical axis displays the average, 25th percentile and 75th percentile of the percent change in property tax revenues in that year. In the year of a house decline, property taxes rose by an average of 6½ percent – quite close the mean change for the sample as a whole (i.e. including years in which houses prices both increase and decrease).⁷ The pace of growth slows only slightly in the two years following the house price decrease and then stabilizes by the third year at around 5 percent. States at the 25th percentile experienced an increase in property taxes of around 2½ percent, and even the 10th percentile (not shown) is greater than zero. House price decreases may slow the pace of property tax growth a bit, but the magnitude of the impact is small and there is absolutely no evidence that house price declines produce a fall in property tax receipts. These results are especially striking given the positive correlation between house prices and tax revenues that should exist for other reasons (discussed above).

⁶ Property taxes are based on assessments and tax rates set in the prior year. Therefore, tax collections in year 0 are very unlikely to reflect the impact of the house price decline and can be considered as establishing a baseline *prior* to the negative house price shock.

⁷ The mean house price decline in this subsample is around 3 percent.

Panel B performs the same exercise, but limits the sample to episodes where house prices fell by more than 5 percent. The sample becomes somewhat thin, as there are only 26 cases when house prices declined by this amount (the mean decline in this subsample is 7.2 percent). In the year of the housing “bust”, property tax collections rose by a robust 10%. This strong increase may reflect rapid house price appreciation in the years preceding the large decline in prices. In the year following the house-price decline property tax growth fell by roughly 3 percentage points, but tax collections continued to expand at the healthy pace of 6 percent.

Panel C shows another cut of the sample shown in Panel A, limiting to episodes involving a housing “bust.” Carlson (2010) defines a housing bust as a period in which the change in house prices falls significantly below what would be predicted by fundamentals such as personal income, the unemployment rate, and mortgage rates for five consecutive quarters.⁸ The sample contains 62 such “busts” that also involved a decline in house prices (a bust may occur when prices continue to rise, but at a slower pace than predicted by fundamentals). These bust episodes are arguably more relevant to current housing market conditions than typical general house price declines. The pace at which property tax receipts grow tails off somewhat following house price busts, but magnitude is not large and receipts continue to rise at a reasonably-rapid pace. Since some “busts” occur even when house prices rise or only fall modestly, Panel D restricts the sample to busts in which house prices fell in excess of 10%. The

⁸ Specifically, Carlson (2010) regresses the growth rate of houses price on: the contemporaneous and lagged growth rate of real income per capita, the contemporaneous and lagged change in the unemployment rate, the contemporaneous and lagged change in the real mortgage rate, the growth rate of residential construction costs, and the population growth rate. House prices are considered to grow abnormally slowly if the regression residual falls below the mean by more than 0.9 of a standard deviation. A housing “bust” occurs when house price growth is abnormally slow for at least five consecutive quarters. The regressions are estimated using the same state-level Loan Performance house price data used here. However, the sample starts in 1982 and the estimation occurs at the quarterly frequency, as opposed to the annual frequency employed here. We define a house price bust as any year with at least one quarter indentified by Carlson (2010) as a bust.

bust is associated with a drop in the growth of tax collections of around 4 percentage points, but growth remains relatively strong.

Figure 7 is similar to Figure 6 but attempts to control for a few things that are correlated with house prices and property tax revenues. First we regress growth in property tax rates on a state-specific constant and contemporaneous and lagged population growth. The state-specific constant controls for long-term differences in the rate at which tax revenues increase across states, while population growth is a very rough control for the demand for public goods. The regression is estimated over the entire sample (i.e. not just the portion of the sample with house price decreases). Then we plot the residuals in the years following house price declines and/or busts. In this case, the sample mean of the residual is 0 by construction.

The residuals provide even less evidence than the unadjusted data that house price declines significantly reduce property tax collections. House price declines are associated with an eventual slowing in the growth rate of tax collections relative to trend, but the magnitudes are quite small, typically 1 percentage point or less. Although residual declines of 2 to 3 percent are not uncommon, these magnitudes are still smaller than average growth in property tax collections. Calculating the residuals based on a larger set of covariates tends to further reduce the magnitude of the effect (unreported).

Contemporaneous Case Studies

Case studies of individual states in recent years provide direct evidence on why property tax collections have held-up so well through the end of 2009. This analysis is also useful because the historical data used in the prior two sections may be of limited relevance to current situation. Furthermore, it provides insight into the possibility that property taxes may start

falling in the near future in a very delayed response to the drop in house prices. The case studies use data collected from individual state sources such as departments of taxation.⁹ The data are not directly comparable across states, but the trends over time *within* each state are quite informative.

Figure 8 presents the cases studies graphically. For each state, there are four time-series indexed to equal 100 in 2000. The first series is the market value of residential real estate based on the Loan Performance house price indexes and, to account for changes in the stock of housing, on the Census Bureau's housing unit estimates. The second series is the assessed value of all real estate, collected from individual state sources. To the extent possible, this value captures the aggregate taxable value of real estate (e.g. the value of exemptions is removed from the total). The third series is total property tax collections, also from state sources. The final series is the property tax rate, defined as total collections divided by aggregate assessed value (right vertical axis). We term this tax rate the "average assessed tax rate" to avoid confusion with the "effective tax rate," which we define as based on market values rather than assessed values. All series are shown for fiscal years.

Nevada, one the primary housing "bubble" states, is the subject of the first case study. The market value of real estate soared from 2000 to 2006 and fell sharply in 2008 and 2009.¹⁰ Assessed values appear to lag market values by at least two years and only began to turn down in 2010. The assessed tax rate held roughly steady until 2006 when it began to fall with the introduction of a tax abatement program. The tax rate then reversed course in 2009 as the

⁹ Many of the state data sources were located using the Lincoln Institute of Land Policy and George Washington Institute of Public Policy's Significant Features of the Property Tax website (<http://www.lincolnst.edu/subcenters/significant-features-property-tax/>).

¹⁰ The Loan Performance house price index is not yet available for fiscal 2010. The monthly data, however, reveal that prices have generally continued to fall in the first 9 months of fiscal year. The displayed 2010 fiscal year data are estimates produced by the Nevada Department of Taxation.

growth in assessed values slowed and then turned sharply upward in 2010 as assessed values began to plunge. Combining the evolution of assessed values and tax rates, property tax revenues rose by almost 20 percent from 2008 to 2010 even though the market value of real estate collapsed by more than 40 percent during this period. Thus, the lags in assessed values and offsetting movements in the tax rate substantially muted the impact of the housing downturn on tax revenues in Nevada. Although tax revenues did fall by 4½ percent in 2010, it seems that the willingness of policy makers to adjust tax rates will make the ultimate effect of the housing downturn on tax revenues much smaller than suggested by a straight read of the decline in the market price of housing.

Our next case study is Florida, another housing “bubble” states where house prices more than doubled from 2000 to 2006. Assessed values did not increase as fast as house prices and the assessed tax rate declined during this period, which led property tax revenues to rise at a much slower pace than house prices. Interestingly, the assessed tax rate showed signs of increasing in 2008 as house prices dropped significantly and assessed values flattened out.

The next case study is California. Although California was also a housing “bubble” state, local governments in California face a different challenge because of the limitations imposed by Proposition 13. Approved by voters in the 1970s, Proposition 13 dictates that assessed values cannot grow by more than 2 percent per year or the inflation rate, whichever is greater, unless the house is sold and the assessed value is reset to the market value. Proposition 13 also limits property taxes not to exceed 1 percent of the assessed value. As expected, Figure 8 shows that the assessed tax rate held constant at about 1 percent. Due to the constant rate, growth in property tax collections mirrors that of assessed values, which continued to climb even after house prices fell sharply after 2006. Because Proposition 13 has created a large wedge between

market values and assessed values, it will take a very long time for assessed values to catch up with market values. If that does occur, the legislated cap on the tax rate would cause property tax revenues to fall as well.

Our next case study, New York, is a more-typical state than the previous case studies because it experienced a housing cycle typical to the national average and it does not have as stringent property tax limitations as California. Figure 8 shows that assessed values lagged house prices, continuing to rise in 2007 and 2008. Property tax revenues rose more slowly than the assessed values during this period because the assessed tax rate trended down.

Our next case study, Michigan, is atypical because its economy and housing market were largely driven by the declining auto industry. Michigan did not experience the housing boom that most other states did, but similar to other states, house prices in Michigan fell after 2006. Figure 8 shows that assessed values kept increasing after 2006, even though house prices were falling and the assessed tax rate remained little changed. Like the other states we have discussed, assessed values did not fall due to the lag between assessed values and market values. Because assessed values rose, property tax revenues in Michigan also increased through 2007 and only flattened out in 2008.

Lastly, we discuss Texas. Because of the soaring energy prices in 2008, Texas faces better fiscal conditions than most other states despite the national housing downturn and economic recession. Figure 8 shows that house prices increased at a relatively modest rate from 2000 to 2008 and dropped only moderately in 2009. Unlike in the other states that we have discussed, assessed values in Texas grew faster than the market value of residential real estate (possibly due to an increase in commercial real estate). Property tax collections flattened out in

2007 as the assessed tax rate declined, but then turned up again as the tax rate stopped falling and assessed values continued to increase.

Taken together, the cases studies shown in Figure 8 reveal a number of facts about the impact of the current housing downturn on state and local property tax revenues. First, there is a significant amount of heterogeneity across states in their experience of the housing cycle, the institutional features of their property tax assessment and collection practice, and their responses to the housing downturn. Second, assessed values lag market values in many states, which helps to support property tax revenues when house prices fall. This support is particularly useful because state and local governments usually face sharp declines in other tax revenues when house prices fall (due to deteriorating economic conditions). Third, when assessed values do catch up with market values, local officials appear to be willing to offset the decreases in assessed values with increases in tax rates. However, continuing to offset price declines by raising tax rates may eventually become politically impossible (Bennett and Perry 2009 and Wiseman 2010). It seems inevitable that the political economy of the situation will cause the growth of property tax collections to slow significantly. Looking forward, the likelihood of a decline in property tax collections depends on many factors including the speed of the economic recovery in the state and future housing market conditions. Overall, however, we read the evidence from the historical data and the case studies as suggesting it is quite unlikely that property tax collections will fall *steeply* in the next few years due to the propensity of policy makers to raise tax rates in the face of house price declines. Finally, even if property taxes do decline by a large amount, the significant lag between this event and the housing market downturn will have provided the state and local government sector time to at least partially recover from the plunge in sales and income tax receipts (Figure 2).

IV. Results: Four Non-Property Tax Channels

Simulation Approach for Remaining Four Channels

Our discussion of the property tax indicates that the housing market has had little effect on property tax collections to date. In the remainder of the paper, we assess the impact of the housing market downturn on other forms of tax revenue—transfer taxes, sales taxes on construction materials, sales taxes on other consumption and personal income taxes. For each channel we quantify the effect in two ways. First, we calculate the drop in tax revenue from 2005—the peak of the housing market—to 2009. To this end, we calculate the change in the relevant housing-related tax base from 2005 to 2009 for each state (e.g. for the transfer tax effect the tax base is real estate transactions). We then calculate the implied change in tax revenue arising from the change in the base. We call this effect the “peak year” method because it uses revenues at the (aggregate) housing market peak as a starting point. It could be argued that in 2005 the housing market was out of equilibrium and that quantifying revenue losses relative to such unsustainable levels is problematic. Therefore, we also quantify the effect of the housing market on state revenues relative to state-specific trends, which we term the “trend growth” method. This method involves extrapolating each housing-related tax base based on its average growth rate from 1995 to 2002. By comparing the implied counterfactual level of taxes in 2009 to actual tax collections in 2009, we gauge the level of revenue in 2009 relative to a world in which the housing market grew at trend instead of first booming and then collapsing.

Transfer Taxes

The real estate transfer tax, sometimes referred to as a deed recordation tax or a realty conveyance tax, is collected when real estate changes hands and is typically based on the value of the real property being transferred (Behrens and Gravelle 2004). The tax rate is generally the same for all transfers, although in some instances it is progressive in the sense that the tax rate rises with the value of the transfer (e.g. in DC the tax rate is 1.1% for properties valued less than \$400,000 and is 1.45% otherwise). Thirty-seven states and the District of Columbia currently assess the tax. In 24 states the tax is collected only by the state; in 11 states it is collected by both state and local governments and in 2 states it is purely a local tax. In 2007, roughly two-thirds of total collections occurred at the state level. See Appendix Table A1 for a listing of state transfer tax rates in 1999 and 2009.

Transfer taxes have typically comprised a negligible share of total state tax revenues. As can be seen in Panel A of Figure 9, transfer taxes were less than 1 percent of total state revenues from 1994 through 2000.¹¹ As the housing market boom got underway, however, the transfer tax share began to grow sharply, reaching a peak of nearly 1.8 percent in 2005 before falling back to around 0.7% by 2009. Panel B displays the run-up in the transfer tax share from 2000 to 2005 on a state-by-state basis. The horizontal axis displays the transfer tax as a share of state and local government taxes in fiscal year 2000 and the vertical axis displays the share as in fiscal year 2005 (near the peak point for transfer tax collections). Almost all of the states are above the 45 degree line indicating that the transfer tax grew in importance over this period. The growth was particularly notable in New York, Delaware, Washington state, Washington DC and Florida

¹¹ The data used in this figure are from the Census Bureau's Quarterly Survey of State and Local Government Tax Revenue and include all forms of documentary taxes. Although collections on real estate transactions are by far the most significant component of documentary tax, collections from other sources, such as stock and bond transfers, are also included. The empirical focus on state transfer taxes in this section (as opposed to local) reflects the fact that the state data is available through 2009, but the local figures have only been released through fiscal year 2007 (which ends in mid-2006) – too early to assess the impact of the housing market downturn.

Transfer tax revenues can be separated into two components: the tax rate, $\tau_{\text{trans},t}$, times the value of real estate transactions, $V_{\text{trans},t}$ (which is itself equal to the number of real estate transactions, $N_{\text{trans},t}$, times the average sales price, $\bar{P}_{\text{real estate},t}$):

$$T_{\text{trans},t} = \tau_{\text{trans},t} * V_{\text{trans},t} = \tau_{\text{trans},t} * (N_{\text{trans},t} * \bar{P}_{\text{real estate},t}) \quad (3)$$

Taking logs and first-differencing the data yields:

$$\Delta \log T_{\text{trans},t} = \Delta \log \tau_{\text{trans},t} + \Delta \log V_{\text{trans},t} \quad (4)$$

$$\Delta \log T_{\text{trans},t} = \Delta \log \tau_{\text{trans},t} + \Delta \log N_{\text{trans},t} + \Delta \log \bar{P}_{\text{real estate},t} \quad (5)$$

Equation (4) makes clear that the elasticity of transfer tax revenues with respect to the value of real estate transactions equals 1: $\frac{\Delta \log T_{\text{trans},t}}{\Delta \log V_{\text{trans},t}} = 1$. Similarly, equation (5) shows that the elasticity of transfer tax revenues with respect to the number of real estate transaction and the average value of real estate transactions both equal 1:

$$\frac{\Delta \log T_{\text{trans},t}}{\Delta \log N_{\text{trans},t}} = \frac{\Delta \log T_{\text{trans},t}}{\Delta \log \bar{P}_{\text{real estate},t}} = 1$$

The relationship between transfer tax receipts and the housing market is visible in the aggregate time-series data displayed on Figure 10. In order to display transfer tax collections, house prices and the volume of real estate transactions simultaneously, the series are converted to indices equaling 100 in 2000. As both the volume of real estate transaction and home prices surged in the first half of the decade, transfer taxes rose 200 percent. Tax receipts then turned downward in 2006 as the volume of real estate transactions began falling. The decrease in collections intensified in 2008 as housing prices began to slide.

We estimate the elasticities of transfer tax revenues to real estate transactions and house prices using state-level panel data on annual state government tax collections from 1999 to 2009 and the empirical analogue to equation (4) and (5)

$$\Delta \log T_{\text{trans},t,s} = \alpha + \beta_{V_{\text{trans}}} \Delta \log V_{\text{trans},t,s} + \Delta \varepsilon_{t,s} \quad (6)$$

$$\Delta \log T_{\text{trans},t,s} = \alpha + \beta_{N_{\text{trans}}} \Delta \log N_{\text{trans},t,s} + \beta_{\bar{P}_{\text{real}}} \Delta \log \bar{P}_{\text{real estate},t,s} + \Delta \varepsilon_{t,s} \quad (7)$$

where s indexes states. We measure home sales by taking annual averages of quarterly data published by the National Association of Realtors. These sales include sales of existing single-family homes and condos, but exclude sales of new homes.¹² The house price data are the LoanPerformance indexes described above. The transfer tax data are from the Census Bureau's Quarterly Summary of State and Local Government Tax Revenue.

Empirical estimates of each β may fail to equal 1 for a number of reasons. In some states the tax is progressive, leading to estimates of $\hat{\beta}_{\bar{P}_{\text{real}}}$ greater than 1: as the average value of real estate transactions grows, more transactions will fall into higher tax brackets leading to a higher average tax rate. The error term in equation (3), $\Delta \varepsilon_{t,s}$, incorporates any changes in transfer tax rates, $\Delta \log \tau_{\text{trans},t,s}$. If the propensity to change tax rates is correlated with real estate transaction volumes or prices, the $\hat{\beta}$ s will be biased. The sign of the bias will depend upon whether such tax changes work to intensify or dampen the influence of changes in the real estate market on transfer tax receipts (e.g. if policy makers reduce rates when receipts are growing strongly, there will be a downward bias). In addition, although the transfer tax typically applies to both

¹² Nationally, new homes sales were 17 percent of total home sales from 2000 to 2005. They contracted more steeply than existing home sales during the housing market contraction and were only 7 percent of total home sales by the end of 2009. Consequently, we are understating home sales. New home sales data at the state level do not exist.

residential and commercial real estate transactions, the housing market measures used here pertain only to the residential side of the market (commercial measures at the state-level are unavailable). If movements in the commercial market are positively correlated with movements in the residential market, there will be an upward bias. Finally, the state-level real estate variables are almost certainly measured with error leading to downward attenuation bias.

The estimation results are presented on Table 1. Column (1) reports estimates from equation (6) and column (2) presents the results of equation (7). Equation (6) essentially constrains the coefficients on real estate volumes and prices to be equal, whereas equation (7) relaxes this constraint. The coefficient on the value of real estate transactions is close to the expected value of 1 (and the 95% confidence interval easily encompasses 1). The house price coefficient is equal to 0.7, while the home sales volume coefficient is equal to 1.6. These estimates are both significantly different from one. It is possible that the house price measure is greater than one because it is correlated with movements in the commercial real estate market.¹³ It is also possible that measurement error in the home sales measure arising from the inability to measure new home sales causes the effect of movements in the real estate market on transfer taxes to load onto the price variable. Column (3) drops from the sample the 8 states with progressive transfer tax schedules. As expected, the house price coefficient falls somewhat (although the home sales coefficient falls as well). Finally, column (4) also drops the 12 states that increased their tax rates between 1999 and 2009 (no state reduced its tax rate over this

¹³ Reliable information on the commercial real estate market is not available at the state level. As a result, the only avenue for empirically assessing the impact of commercial real estate on transfer taxes is a time series approach at the national level. Attempts to estimate these regressions, including both residential and commercial real estate transactions and prices, yielded imprecise coefficients on the commercial real estate variables. This imprecision may reflect the fact that commercial real estate is a much smaller share of transfer tax revenues than residential real estate. It may also be a product of more pronounced measurement error in the commercial variables relative to the residential variables (the commercial side of the market is more difficult to quantify than is the residential side).

period – see Appendix Table A1). The restriction has little impact on the results, suggesting that tax rate changes are not significantly biasing the results.

Using the “peak year” approach, the elasticity estimates combined with the state-level home price and sales volume data suggest that total state government transfer tax revenue should have declined by \$6 billion from 2005 to 2009, equal to 49 percent of the 2005 peak in this form of revenue. The estimate is close to the actual decline of around 60 percent. Using the trend growth approach, we estimate that transfer tax receipts in 2009 were \$5 billion lower than they would have been if house prices and transactions volumes continued to expand at their 1995-2002 average growth rates.

Direct Sales Tax Channel

Builders typically pay sales tax on the materials used in construction or pay the equivalent use tax if the materials are purchased out of state. When the construction sector shrinks, states lose sales tax revenue from numerous input materials ranging from lumber and concrete to durable goods like washing machines. To estimate the sales tax revenue generated by the residential construction industry, we consider sales of materials that are used in new construction and renovation. We estimate the materials input cost of new construction by multiplying the number of new housing units built in each state by the cost of construction materials in that state. We create separate estimates for single-family and multifamily housing units. We use the number of building permits issued for new housing units to proxy for the number of newly-constructed housing units in each state. We estimate the cost of construction materials as the cost per square foot of construction materials multiplied by the average square footage of new housing units from the “Characteristics of New Housing” report of the Census

Bureau. We assume that the materials costs of are \$33 per square foot for single-family structures and \$40 per square foot for multifamily structures.¹⁴ The square footage data are reported annually for the four Census regions.

Data on residential renovation do not exist annually at the state level.¹⁵ Therefore, we estimate state-level renovation expenditures by multiplying the total number of building permits (for new housing units) issued in the state by the national ratio of spending on residential improvements relative to the aggregate number of building permits. The residential improvement data are nominal expenditures on owner-occupied and rental units based on a combination of estimates from the Census Bureau and the BEA.¹⁶ We assume that materials inputs are roughly 1/3 of improvement expenditures in each state.¹⁷ Finally, we multiply the state-level estimates of renovation materials costs by state-level sales tax rates to obtain sales tax revenues.

Figure 11 shows our estimates of sales tax revenues from the materials used in new single-family construction, new multifamily construction, and improvements. The largest component is single-family, which peaked at 7.3 billion in 2005 and had plunged 73 percent by 2009. Multifamily materials inputs show a similarly-large drop during this period, although they make up a much smaller share of total construction materials spending. Our estimates suggest

¹⁴ These assumptions are based on average square foot costs calculated by R.S. Means Company (a well-known construction cost estimator) and assuming that materials comprise 1/3 of the total cost.

¹⁵ Neither the American Housing Survey nor the Consumer Expenditure Survey (which are the only two microdata sources for residential renovation data) are large enough to provide state-level estimates for most states.

¹⁶ For years prior to 2003, we use the residential improvement data reported by the BEA, which includes expenditures by households and landlords. For 2003-onwards, we extrapolate the 2002 level of the BEA data based on the growth rate of residential improvements from the “Construction Spending” release of the Census Bureau. These data are based on the Consumer Expenditure Survey and do not include landlord expenditures. We prefer to use the Census Bureau estimates in the recent years because they do not include a judgmental trend that is embedded in the BEA data.

¹⁷ According to the BEA’s input-output tables, materials inputs were roughly 1/3 of gross construction output from 1997 to 2007.

that revenues related to materials used in residential renovation only declined by 11 percent from 2005 to 2009. Adding these three pieces together and using the peak year method, total state revenues from sales of construction materials fell by 57 percent (\$6.6 billion) from 2005 to 2009. Although this decrease is large in percentage terms, it is only 3 percent of the \$222 billion dollars in general sales tax revenues generated in 2005.

To smooth through the boom-bust cycle, we use the trend growth method. Specifically, we estimate trend expenditures on construction materials for each of the three components (single-family, multi-family and improvements) assuming that after 2002 the level of spending continued to increase at its 1995-2002 average growth rate. Then we apply the actual sales tax rate in each state and year to obtain trend sales tax revenues. Summing across all three categories, aggregate sales tax revenues were 64 percent lower (\$8.8 billion) in 2009 than they would have been had spending continued at its 1995-2002 trend. Even this seemingly-large gap is only 4 percent of total state sales tax revenues in 2009.

Indirect Sales Tax Channel

Housing is often the most important wealth component for many households. According to the 2007 Survey of Consumer Finances (SCF), housing value accounts for at least half of total assets for 47 percent of households. Booms and busts in the housing market can induce increases and decreases in the consumption of nondurable goods through two channels. The first channel is the conventional wealth effect. Similar to financial assets such as stocks and bonds, increases in house prices raise consumption by increasing the amount of resources available for households. The second channel is through providing collateral against which liquidity-constrained households can borrow. If the current housing downturn has reduced consumption

through either of these two channels, it will have reduced the sales tax revenues of state and local governments.

A large number of studies have examined the size of the housing wealth effect using macro and micro data, and the estimates vary significantly from study to study. For example, While Case, Quigley, and Shiller (2005) find a large effect of housing wealth on household consumption, Attanasio, Blow, Hamilton, and Leicester (2009) argue that changes in house prices do not directly influence the spending of homeowners. Cooper (2009) studies the 1996-2005 wave of the Panel Study of Income Dynamics (PSID) and finds a marginal propensity to consume (MPC) of 3.5 cents per dollar increase in housing wealth. Mian and Sufi (2009) use credit report data and estimate a MPC of 25 to 30 cents. Dynan (2010) examines data from the Consumer Expenditure Survey (CE) and finds no link between growth in house prices and growth in homeowners' consumption of nondurable goods. In this paper, we choose a middle ground and assume a MPC of 3 cents for every dollar increase in housing wealth. We allow the housing wealth effect to phase-in over three years: 60 percent in the first year, 90 percent in the second year, and 100 percent in the third year.

To estimate the housing wealth effect on state tax revenues, we collect data on house prices, housing units, state sales tax rates, state sales tax exemptions of grocery food and clothes, and expenditure fractions of grocery food and clothes. We obtain 1995-2009 state-level total housing wealth by inflating the 2000 Census data with the Loan Performance house price indexes and the change in the Census Bureau's estimates of the number of housing units in each state. The 1995-2009 state sales tax rate data are from the State Tax Handbook. In many states, grocery food and clothes are exempt from sales taxes. As a result, the changes in the consumption of grocery food and clothes will not affect sales tax revenues in these states. We

obtain data on whether each state exempts grocery food or clothes from the 2008 State Tax Handbook and we estimate that on average grocery food and clothes account for 7.4 and 3.6 percent of total consumption, respectively, using the 2008 CE data.

Figure 12 shows our estimates of the housing wealth effect on state sales tax revenues from 2000 to 2009. House prices and construction activity increased in the late 1990s and early 2000s, boosting state sales taxes through the housing wealth effect. As the housing boom accelerated from 2003 to 2005, our estimate of the indirect sales tax effect also surged (from about \$1.5 billion to \$3 billion). House prices began to decline in 2006. However, the number of housing units (and therefore aggregate housing wealth) continued to expand due to continued inflows from new construction. Housing wealth started to fall in 2007, but we estimate that housing-wealth-related sales tax revenues did not turn negative until 2008 because the housing wealth effect takes three years to phase-in.

Sales tax revenue generated by housing wealth declined by \$2.5 billion from 2005 to 2009. To carry out the “trend growth” simulation, we predict house prices and the number of housing units based on their average growth rates from 1995 to 2002. In this counterfactual, state sales tax revenues induced by housing wealth continue to grow steadily from 2003 to 2009. Actual housing-wealth-related sales tax revenues in 2009 were \$4.5 billion lower than revenues predicted by these trends.

Personal Income Tax Channel

The housing downturn has reduced labor income in housing-related industries. We assess the impact of these declines on personal income tax receipts at the state level by focusing on two housing-related industries: construction (naics 23000) and real estate (naics 53100). The

construction industry includes residential and nonresidential construction of buildings, heavy and civil engineering construction, and specialty trade contractors.¹⁸ The real estate industry includes real estate agents and brokers, lessors of real estate, property managers, and appraisers. It does not include mortgage brokers, who cannot be separated out from the other workers in the credit intermediation category in the state-level data.

For each sector, we calculate the average wage per job by state from the BEA's Regional Economic Accounts. Both full-time and part-time workers are included in these estimates. Wage and salary disbursements include commissions, tips, bonuses, and voluntary contributions to deferred compensation plans. They do not include the employers' contributions to pension and insurance funds or to social insurance. They are based primarily on state unemployment insurance records. The 2009 data are not yet available, so we assume that the growth rate of the average wage is the same as the growth rate of average weekly earnings in that industry from the BLS's Current Employment Statistics.¹⁹ Using the NBER's Taxsim module, we estimate the total state income tax payments that would be paid by an individual earning the average wage in that state. We assume that the individual has no non-wage income, is married, has two children, and that the spouse's labor income is 70 percent of construction workers' income and 80 percent of real estate workers' income.²⁰

¹⁸ Although it would be interesting to split this category into separate components for residential and nonresidential construction, the state-level data do not report this split. Moreover, distinguishing between residential and nonresidential construction employment can be difficult because some workers can do both types of construction.

¹⁹ When possible, we use state-level estimates of average weekly wages in the industry. Construction industry estimates are available for 44 states and real estate industry estimates are available for 16 states. For all other states, we use national average weekly earnings.

²⁰ These ratios are consistent with national statistics from the 2000 Census and 2006 and 2008 American Community Surveys. They were roughly the same in each sample, so we assume constant ratios over time. We do not estimate state-specific ratios due to small sample sizes.

Total personal income tax revenues attributable to labor income from each industry are equal to the income tax per worker times the total number of employees in each industry. The BEA data described above only reports the number of jobs, which is much greater than the number of employees for industries with a large number of part-time workers (like construction). Therefore, we multiply the number of jobs in each state by the national ratio of employees to jobs in that industry. The number of employees in each industry is from the BLS's Current Employment Statistics. Since the 2009 data on the number of jobs are not yet available, we assume that the growth rate in the number of jobs per state from 2008 to 2009 is the same as the growth rate in the number of employees from the BLS data.²¹

Figure 13 shows total income tax revenues attributable to labor income from the construction and real estate industries aggregated across all states. Income tax revenues from the construction industry peaked at \$17 billion in 2007 and 2008 and fell to \$14.7 billion in 2009. This time series is largely driven by changes in employment, which fell from 7.6 million in 2007 to 6 million in 2009. By contrast, average tax payments per employee continued to increase through 2009 as average (nominal) wages increased. One reason why the drop in housing-related income tax revenues was not more severe is that construction employment was supported in 2007 and 2008 by the nonresidential sector; the peak in residential construction employment occurred in 2006. In addition, the drop in residential construction employment has been larger than that in the nonresidential sector. Consequently, if we were able to disaggregate the state-level data into these two components, we would likely find that the contraction in income tax

²¹ As with the average weekly wage data, we use state-level estimates of employment in the industry when possible. Construction industry estimates are available for 44 states and real estate industry estimates are available for 16 states. For all other states, we use national employment.

revenues from residential construction began earlier and was more severe than that of the nonresidential sector.

In the much-smaller real estate industry, income tax revenues peaked at \$3.7 billion in 2008 and edged down to \$3.6 billion in 2009. The decline in employment was probably less pronounced in the real estate industry than in the construction industry because it includes categories like lessors of real estate and property managers, which are less-closely tied to owner-occupied real estate values.

Adding the two industries together and using the peak year method, income tax revenues from housing-related industries were 5 percent (\$0.9 billion) lower in 2009 than they had been in 2005 at the peak of the housing market boom. As mentioned above and illustrated in the figure, income tax revenues from these industries continued to increase even as the housing market contracted. They did not start to fall until 2009, when they dropped by 11 percent (\$2.3 billion).

Turning to the trend growth simulation, we assume that average wages and employment in each industry increased at their 1995-2002 trends and use Taxsim to calculate the implied counterfactual personal income tax revenue in 2009 attributable to each industry. The counterfactual level of collections is \$26.7 billion—37 percent (\$8.3 billion) higher than our estimates of actual 2009 tax revenues. This gap is so large because construction employment grew slower than trend throughout the 2003-2009 period. Although this gap seems large, aggregate state income tax revenues were \$236 billion in 2009. Thus, revenues from housing-related industries would have only boosted aggregate income tax revenues by 3.5 percent had they increased at trend through 2009.

V. Combining the Channels

In this section, we combine the estimated effects of each channel to obtain a total effect on all forms of revenue. Because property tax revenues appear to be unresponsive to declines in house prices (at least through the end of 2009), we focus on state revenues due to the other four channels.

Table 2 reports the change in housing-related revenues from 2005 to 2009 (the peak method). Focusing first on the national estimates (final row), the transfer tax and direct sales tax effects are of similar magnitudes, each reducing total revenue by about \$6 billion. The indirect sales tax effect is about half as large. The income tax effect is a net positive in this calculation, because in most states construction employment continued to increase from 2005 to 2008. The sum of these effects reduced state revenues by \$14 billion. Columns 6 through 10 of the table compare these estimates to total 2005 tax revenues from each source. The transfer tax fell by 49 percent during this period. The large magnitude of this percentage effect is not surprising because residential housing comprises a large portion of the transfer tax base. By contrast, the other effects are more modest. The direct sales tax channel reduced sales tax revenues by 3 percent from 2005 to 2009, and the indirect sales tax effect reduced sales tax revenue by 1 percent. Adding the components together, total tax revenues (including corporate income and other taxes not included in our analysis) were reduced by 2 percent from 2005 to 2009. Although a reduction in total revenue of this magnitude is not insignificant, the decline occurred over several years which likely reduced the impact on state governments. For comparison, total revenues fell by 5 percent in 2009, primarily as the result of the broader economic recession.

The table also reveals considerable heterogeneity across states. Not surprisingly, Florida, Nevada and Arizona suffered the largest losses in percentage terms. Tax revenues in California

also decreased substantially (the 2nd largest drop in billions of dollars), but this decrease was only the 8th largest as a percent of total tax revenues. Other states that experienced relatively large declines are Virginia, Michigan, and Minnesota. On the other hand, a large number of states have not experienced notable drops in tax revenue. We estimate that the housing channels either boosted total tax revenues or reduced them by less than 1 percent in 22 states.

Table 3 reports similar results for the “trend growth” simulation method. Total tax revenues in 2009 were \$27 billion lower than predicted by trend. All four channels contribute noticeably to this deficit, although the personal income tax and direct sales tax effects are larger than the other two channels. To estimate the percentage effect of this deficit, we predict what total tax revenues would have been had the housing components expanded at trend. We find that total state tax revenues in 2009 were 4 percent lower than they would have been had the housing market continued at its 1995-2002 trend.

V. Conclusions

The historic housing market of the past several years likely contributed to the broader economic recession. State and local tax revenues suffered a sharp downturn over the same period. In this paper we attempt to disentangle the direct impact of the housing market downturn on state and local tax receipts from the broader impact of the recession. We come to two primary conclusions. First, we find that property tax collections have been surprisingly resilient due to both the long lags between changes in the market value of property and changes in taxable assessments and the tendency of policy makers to insulate revenues from housing price declines by raising tax rates. This propensity makes it unlikely that property tax revenues will fall sharply

in coming years. Second, although the housing market downturn has reduced transfer tax, sales tax and personal income tax collections, the magnitude of this effect is relatively modest, particularly when viewed against the recent plunge in aggregate tax receipts.

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Figure 1
Percentiles of the Distribution of Housing Market Fluctuations Across States

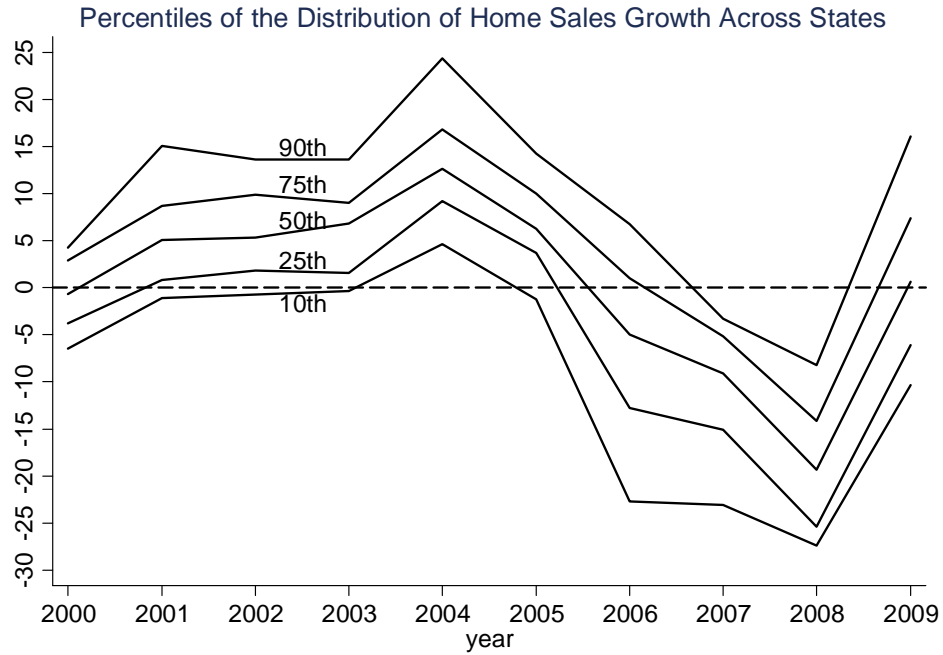
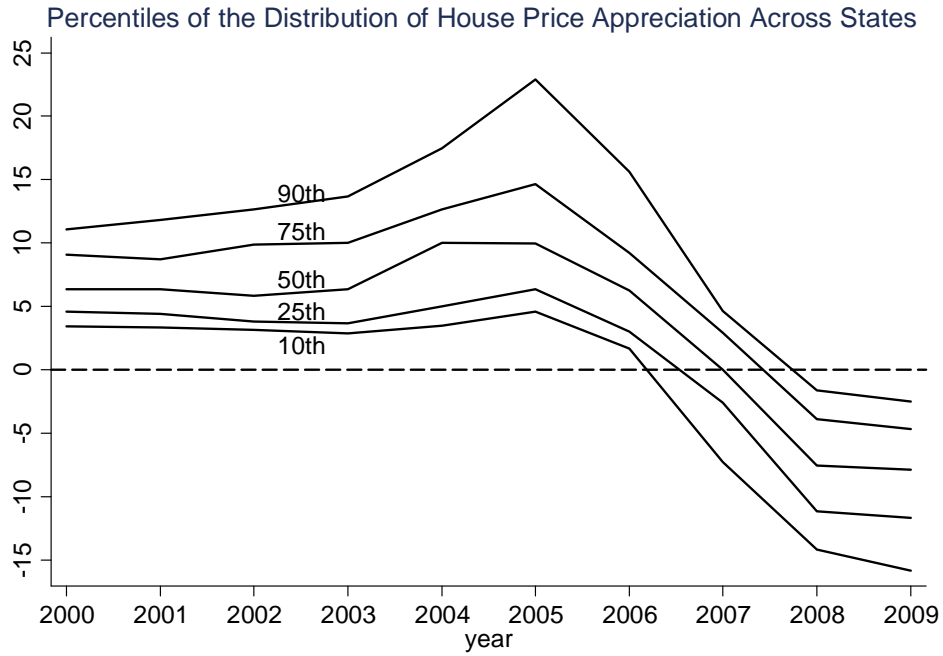
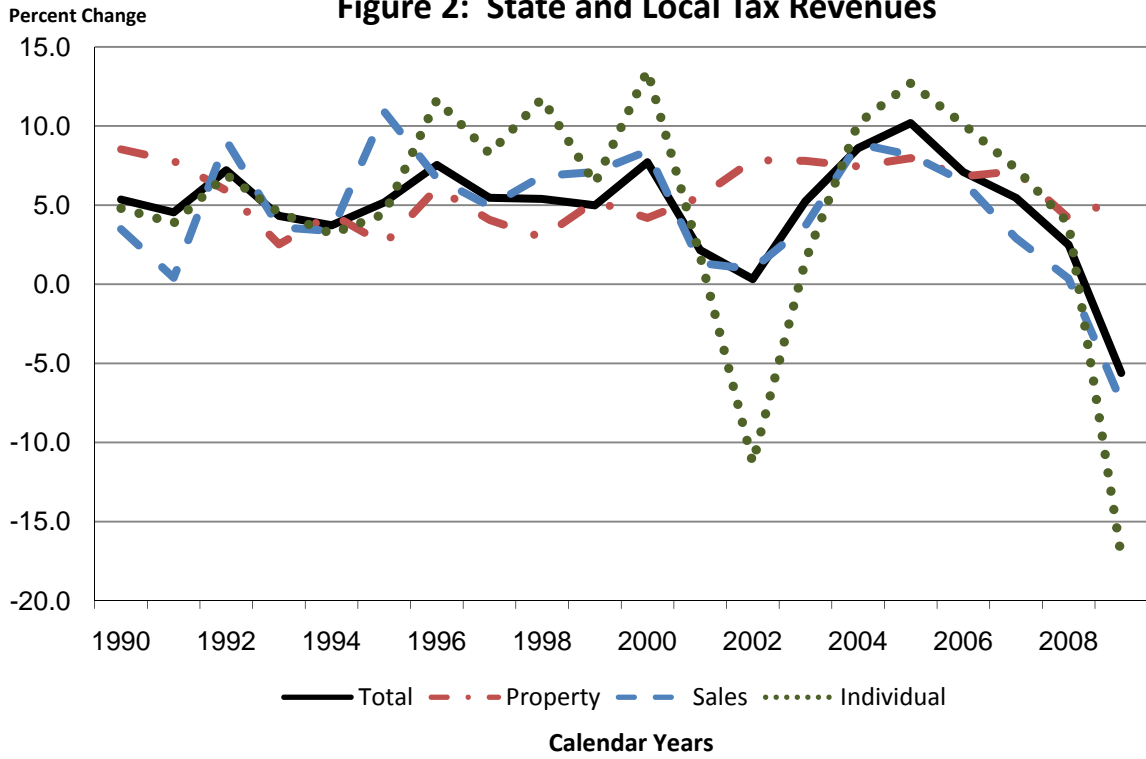


Figure 2: State and Local Tax Revenues



Source. Census Bureau, *Quarterly Summary of State and Local Tax Revenue*.

Figure 3: Local Property Taxes

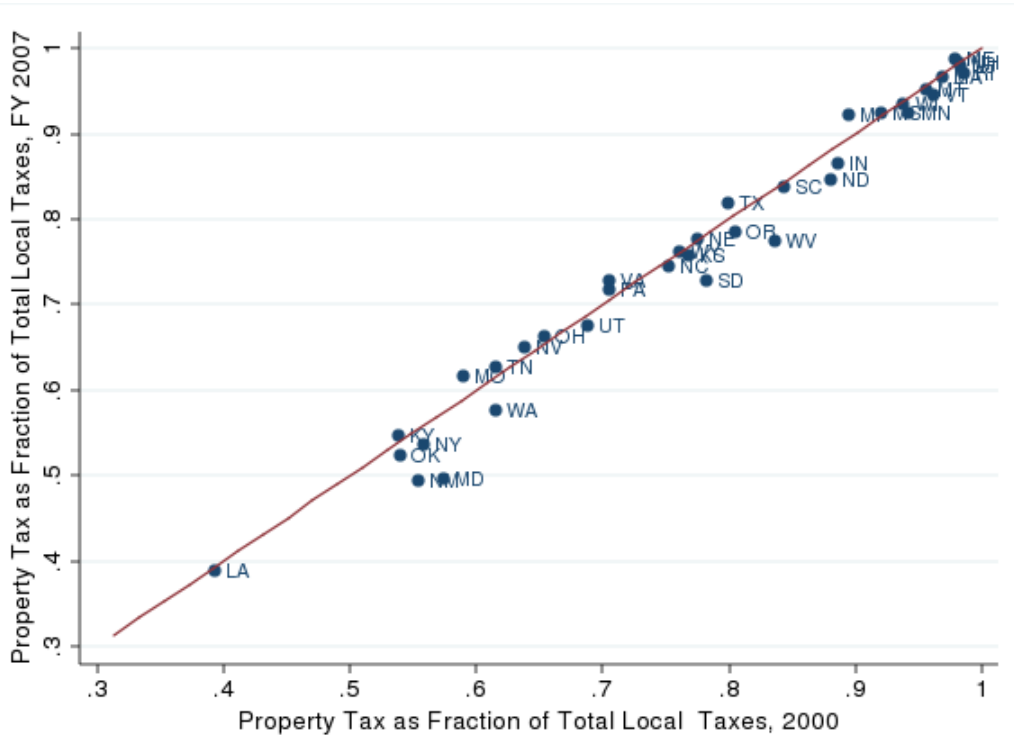
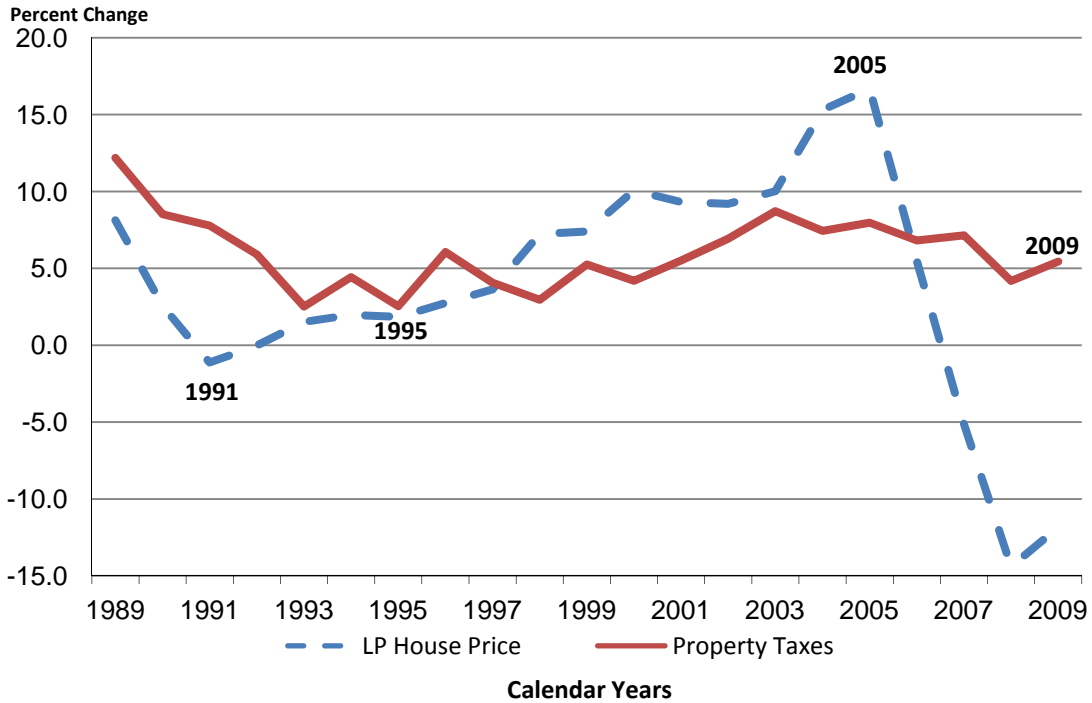


Figure 4: House Price Appreciation and Property Taxes



Note. 2002:Q2 property tax value is an estimate.
 Source. LoanPerformance; Census Bureau, *Quarterly Summary of State and Local Tax Revenue*.

Figure 5: Distribution of Change in Property Tax Collections

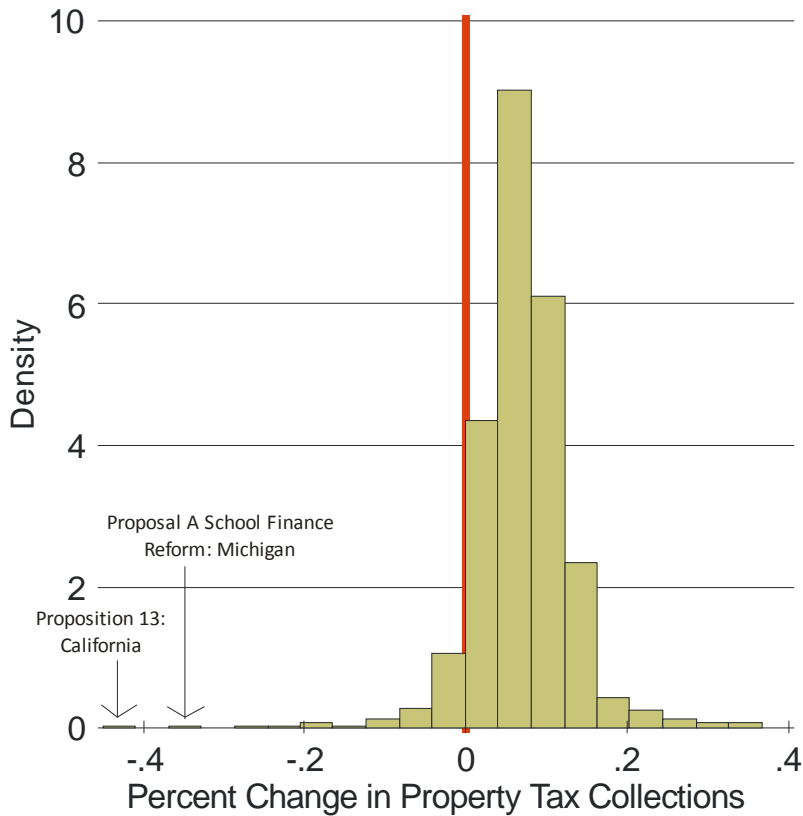


Figure 6: Percent Change in Property Tax Collection Following House Price Declines

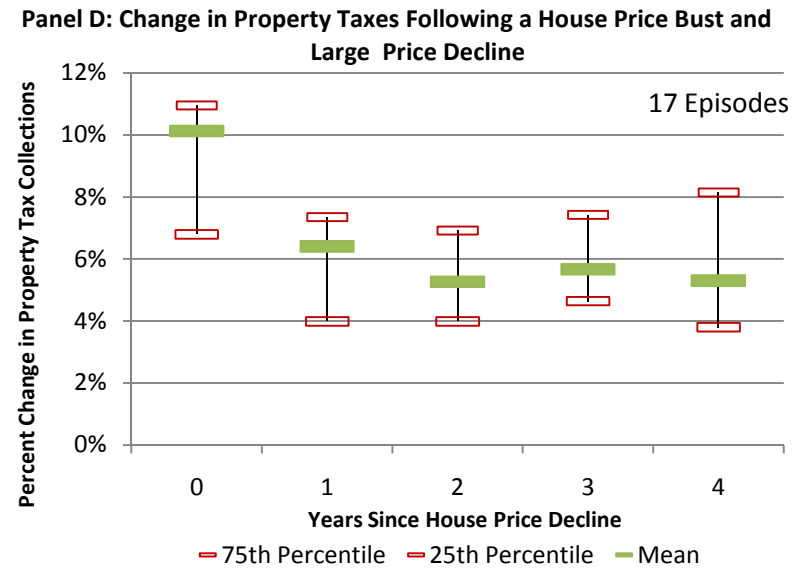
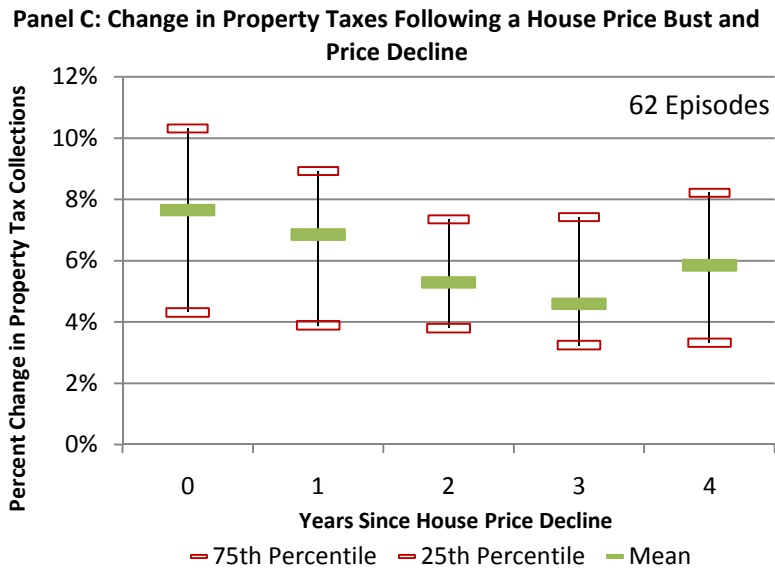
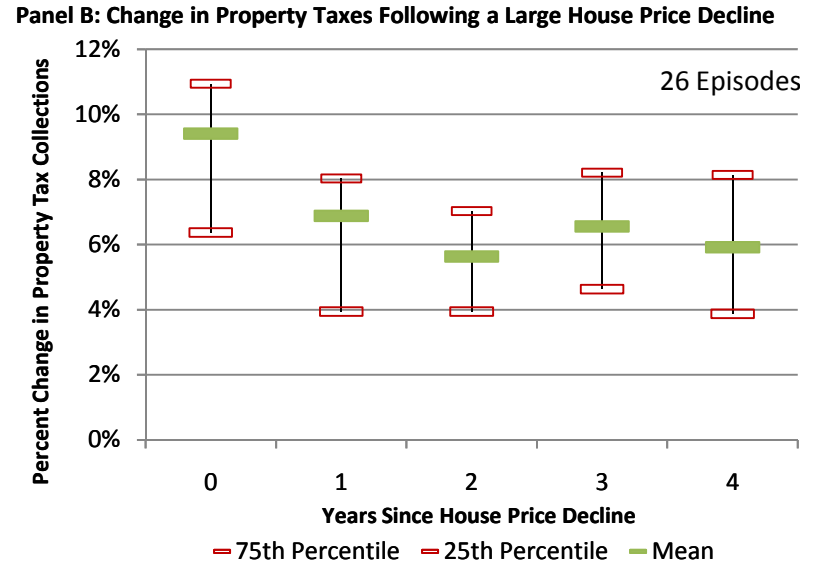
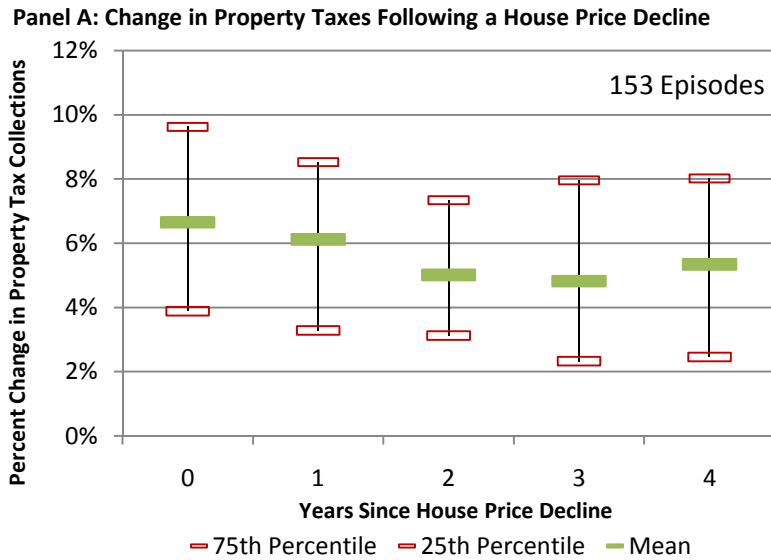


Figure 7: Residual Percent Change in Property Tax Collection Following House Price Declines

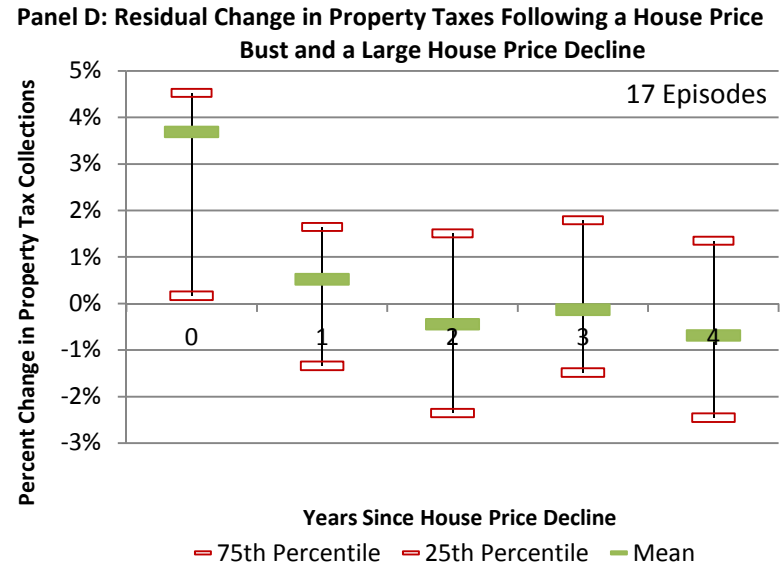
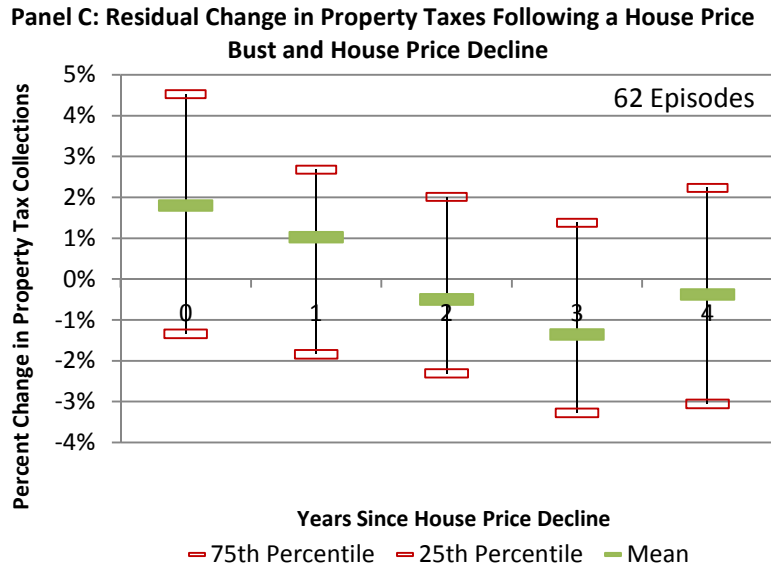
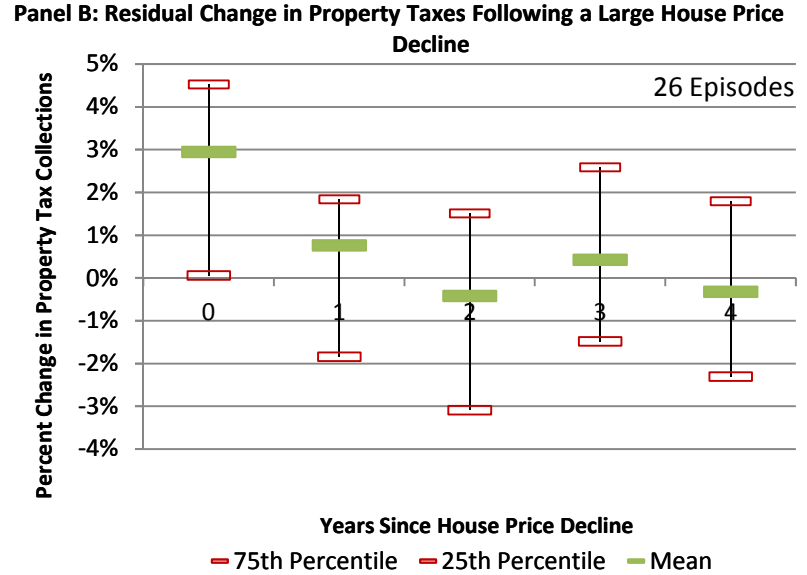
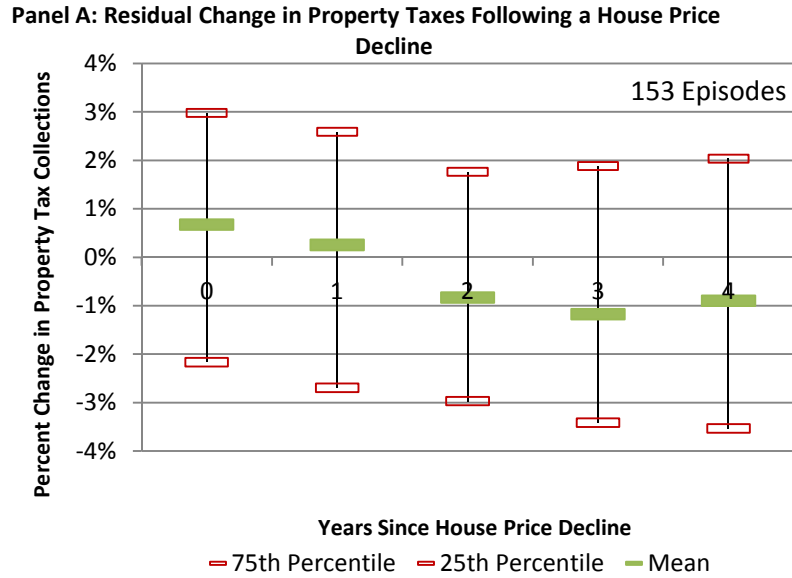


Figure 8: Property Tax Case Studies

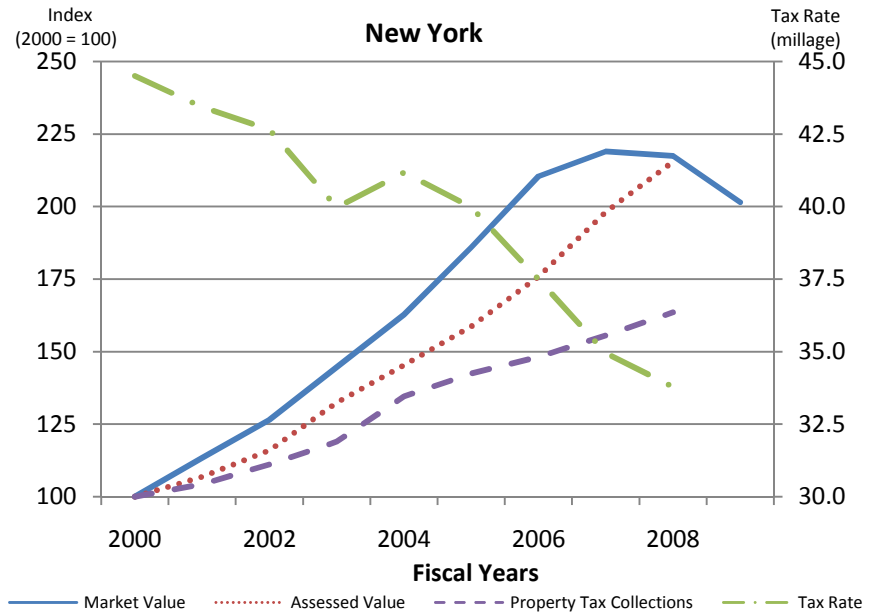
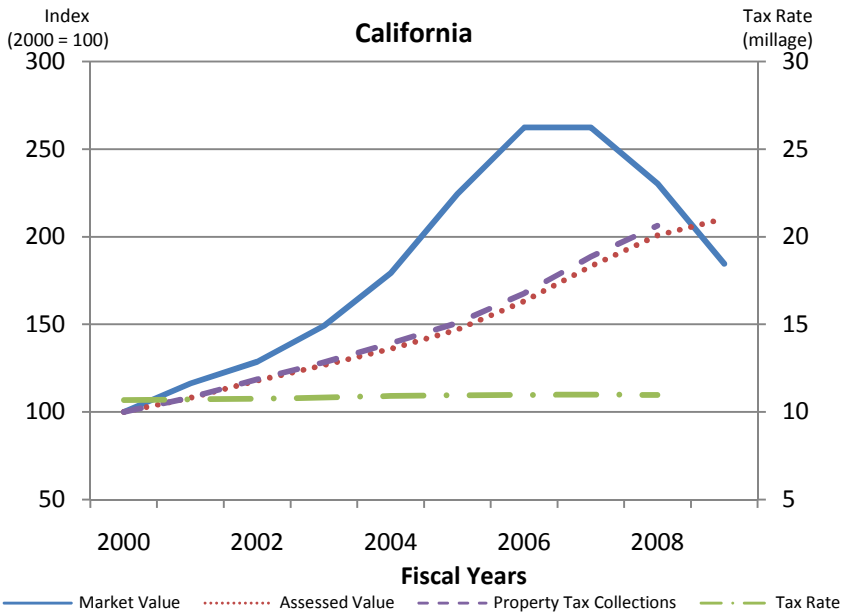
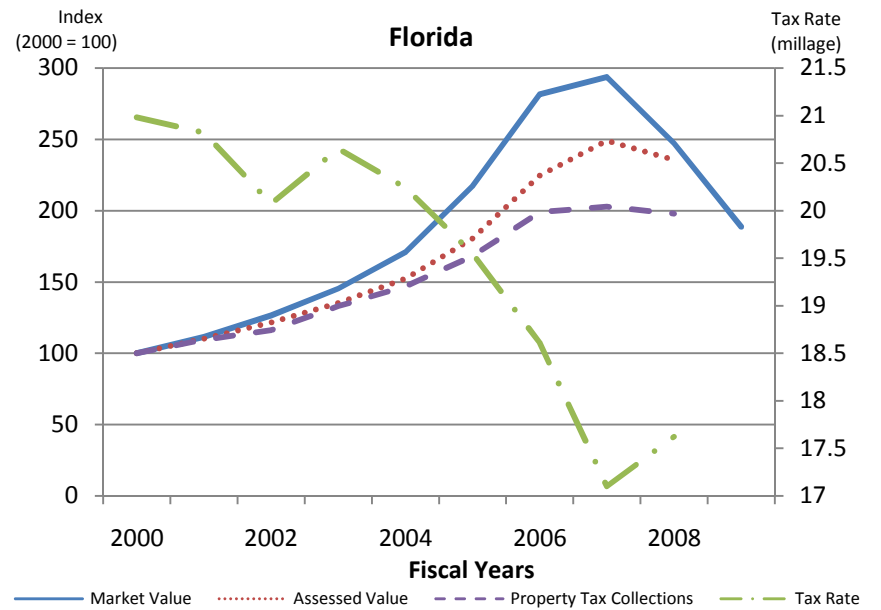
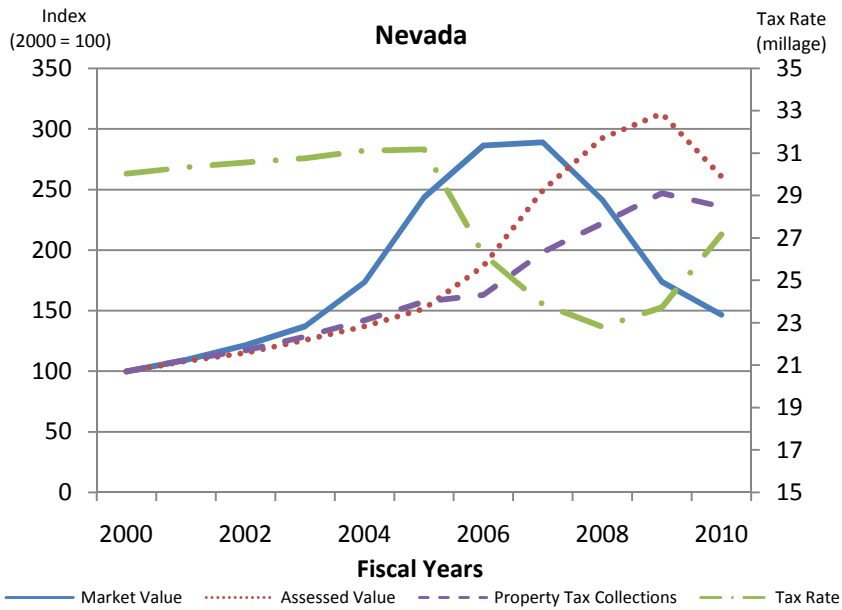


Figure 8: Property Tax Case Studies (continued)

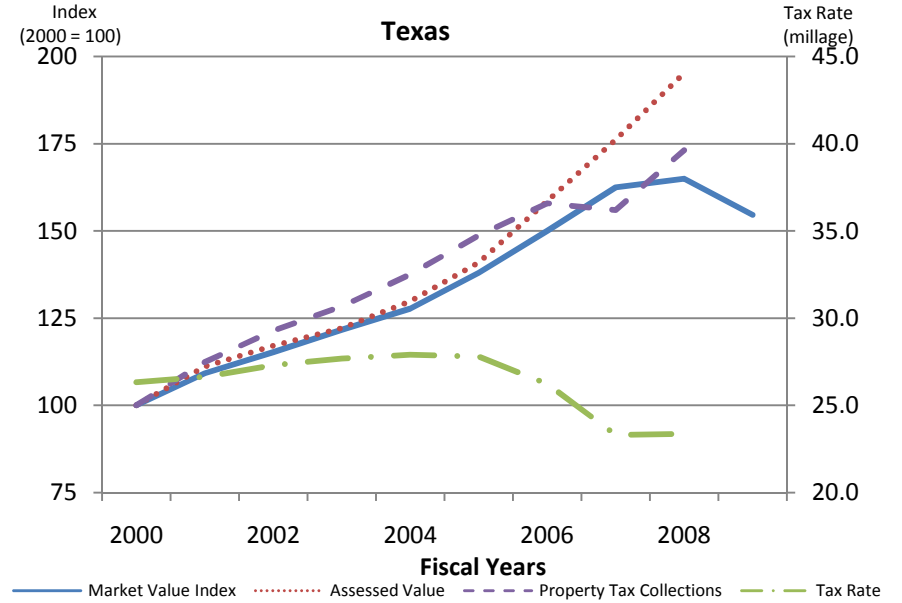
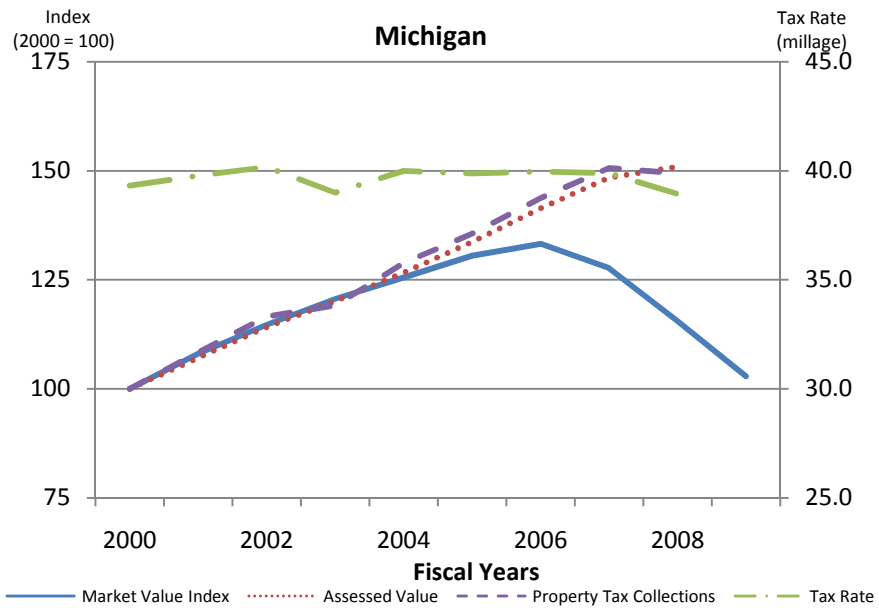
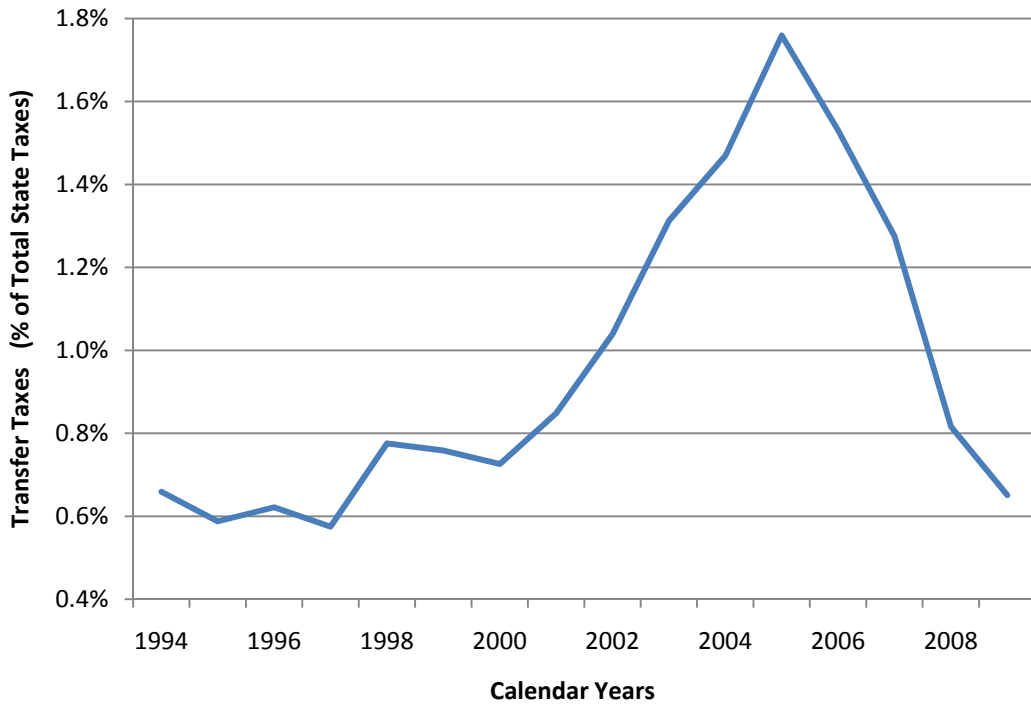


Figure 9: Transfer Taxes
Panel A: State Real Estate Transfer Taxes



Source. Census Bureau, *Quarterly Summary of State and Local Tax Revenue*.

Panel B: State & Local Real Estate Transfer Taxes

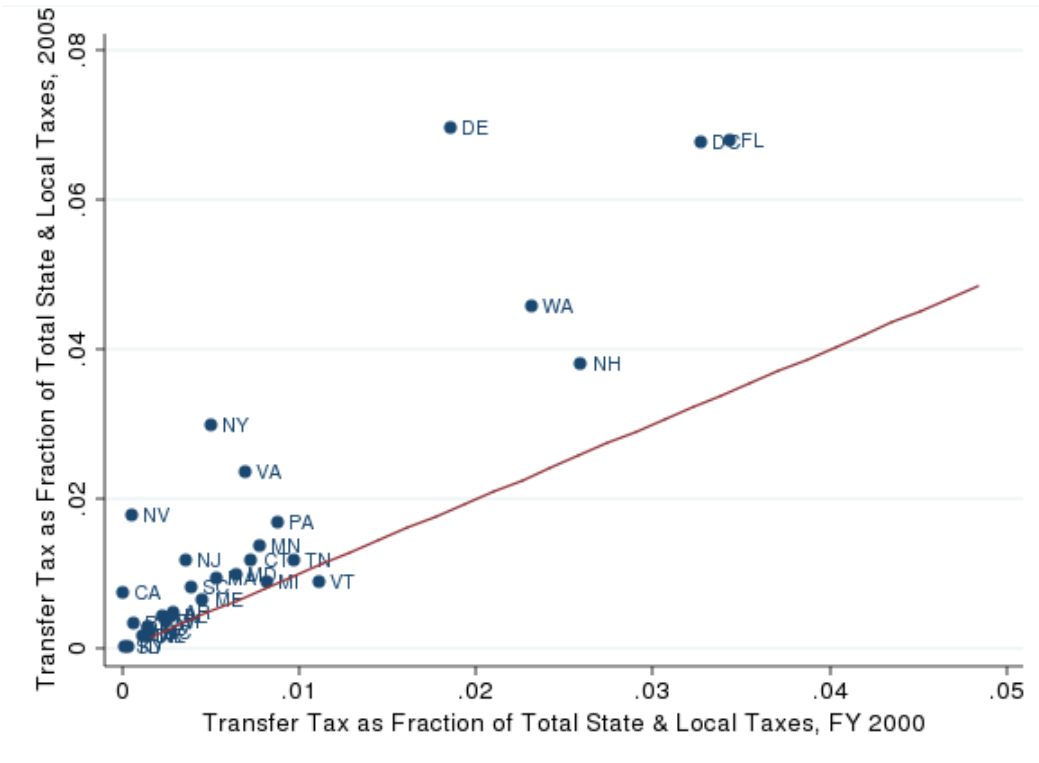
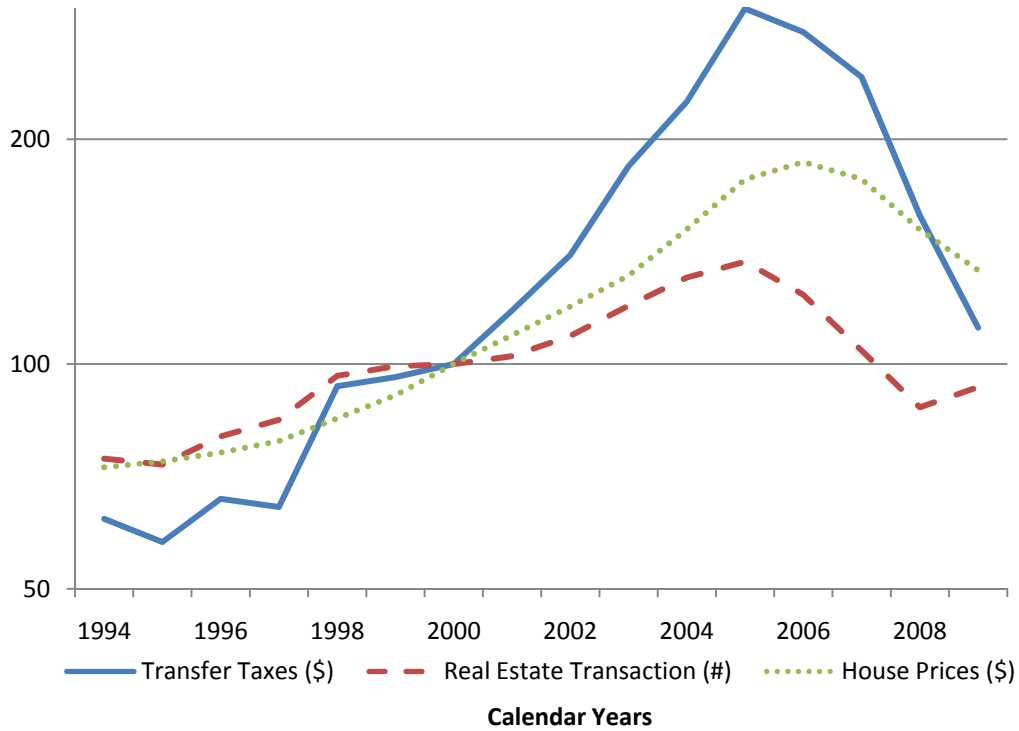


Figure 10: State Real Estate Transfer Taxes



Source. Census Bureau, *Quarterly Summary of State and Local Tax Revenue*, National Association of Realtors, LoanPerformance

Figure 11
State Sales Tax Revenues from Materials Inputs to Residential Construction

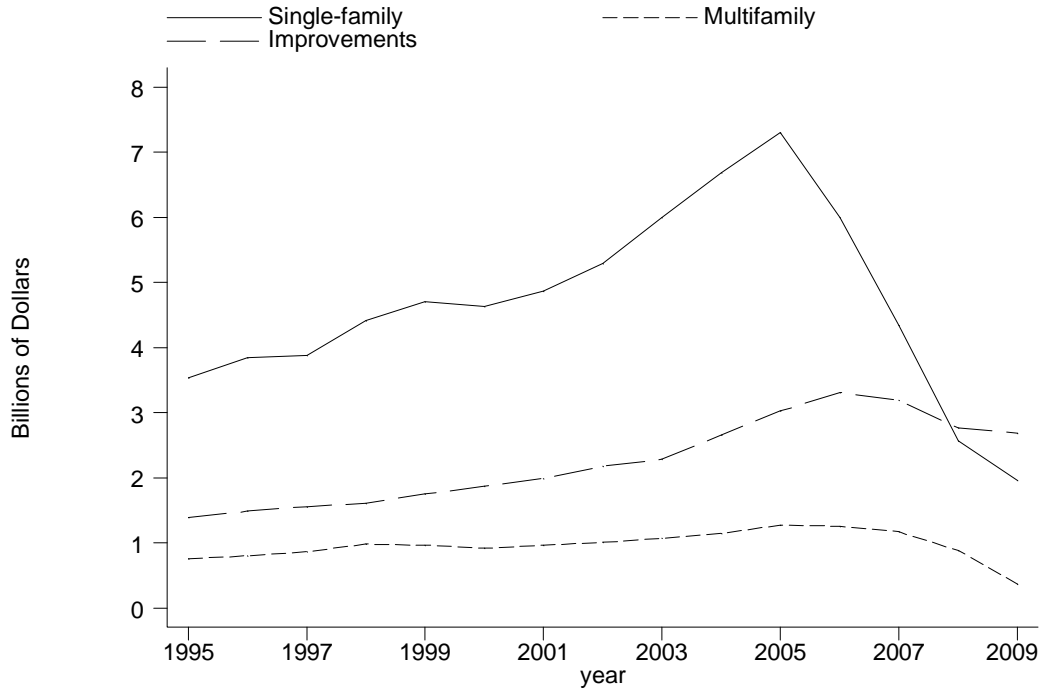
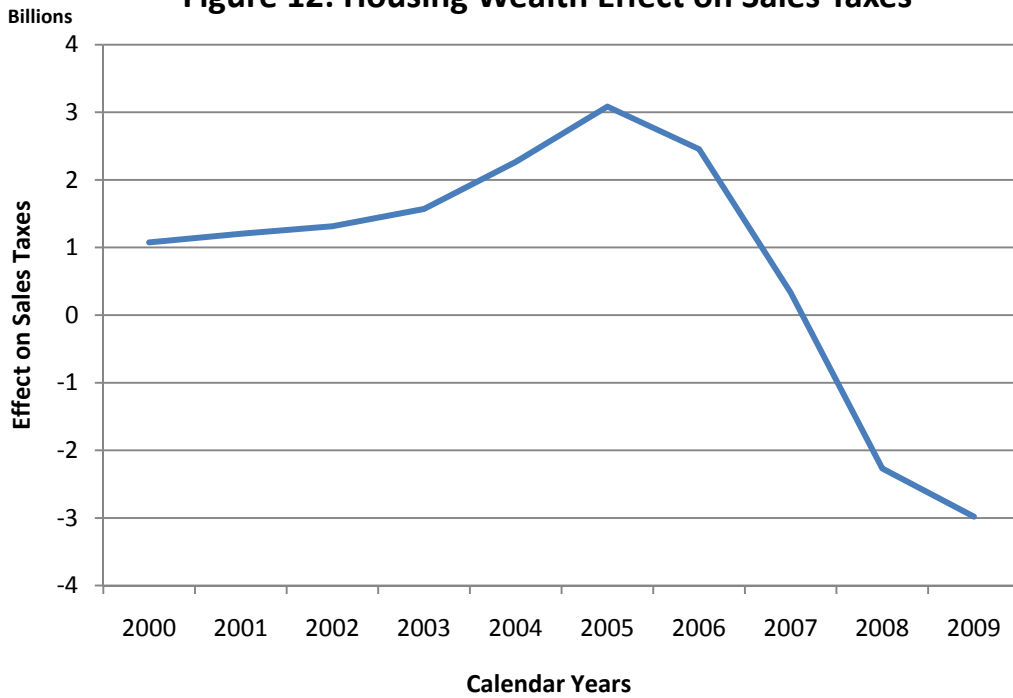


Figure 12: Housing Wealth Effect on Sales Taxes



**Figure 13
State Income Tax Revenues from the Construction and Real Estate Industries**

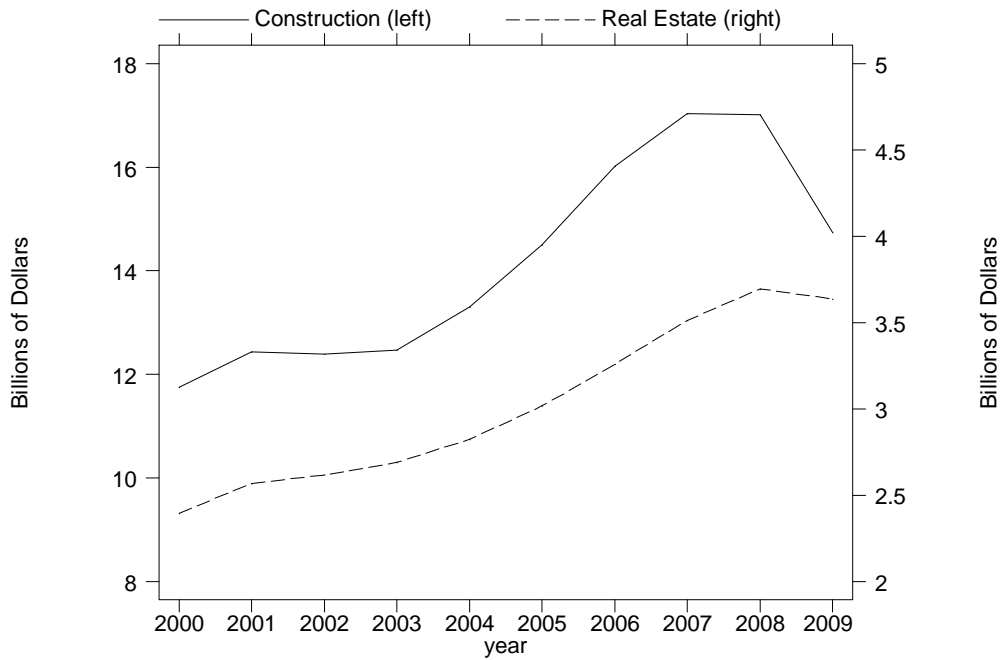


Table 1: Transfer Tax

	(1)	(2)	(3)	(4)
	<u>$\Delta\text{Log}(\text{Transfer Tax Collections})$</u>			
$\Delta\text{Log}(\text{Value of Residential Real Estate Transactions})$	0.86 (0.10)			
$\Delta\text{Log}(\text{Homesales})$		0.71 (0.09)	0.62 (0.09)	0.58 (0.64)
$\Delta\text{Log}(\text{House Price})$		1.59 (0.19)	1.49 (0.11)	1.44 (0.11)
Exclude States with "Progressive" Tax Structures			X	X
Exclude States with a Tax Rate Increase Between 1999 and 2009				X
Number of Observations	307	307	228	168

Note. The unit of observation is state-year. The sample period is 1999 to 2009. The sample is restricted to 1999 to 2009 in column (3). Standard errors clustered by state in parentheses. The transfer tax data contain only state collections (not local). Observations weighted by the state share of annual national transfer tax collections.

Table 2: Simulation with the Peak Year Method

State	2009 housing - 2005 housing (\$millions)					(2009 housing - 2005 housing) / (2005 total) (%)				
	transfer	direct	indirect	income	total	transfer	direct	indirect	income	total
		sales	sales				sales			
AL	-10	-46	18	24	-14	-19	-2	1	1	0
AK	0	0	0	0	0	.	.	.	.	0
AZ	0	-430	-88	-64	-583	.	-8	-2	-2	-5
AR	-4	-44	8	32	-7	-9	-2	0	2	0
CA	0	-916	-1,434	179	-2,170	.	-3	-4	0	-2
CO	0	-92	-8	-24	-124	.	-4	0	-1	-2
CT	-101	-40	-35	-21	-197	-47	-1	-1	0	-2
DE	-35	0	0	1	-34	-26	.	.	0	-1
DC	-91	-4	5	-13	-103	-25	0	1	-1	-2
FL	-3,438	-1,357	-375	0	-5,170	-70	-7	-2	.	-13
GA	0	-338	-29	45	-322	.	-6	-1	1	-2
HI	-12	-21	24	12	2	-31	-1	1	1	0
ID	0	-80	4	10	-66	.	-7	0	1	-2
IL	-51	-289	-86	41	-385	-46	-4	-1	1	-1
IN	0	-88	-30	14	-104	.	-2	-1	0	-1
IA	-2	-13	5	37	27	-12	-1	0	2	1
KS	0	-17	0	56	39	.	-1	0	3	1
KY	-1	-63	3	35	-26	-17	-2	0	1	0
LA	0	-11	18	163	170	.	0	1	7	2
ME	-7	-24	6	4	-20	-20	-2	1	0	-1
MD	-124	-43	-20	-15	-202	-47	-1	-1	0	-1
MA	-129	-61	-120	35	-275	-48	-2	-3	0	-1
MI	-206	-200	-277	-60	-742	-65	-2	-3	-1	-3
MN	-134	-136	-81	-110	-461	-43	-3	-2	-2	-3
MS	0	-21	6	46	31	.	-1	0	4	1
MO	-3	-80	-20	44	-59	-27	-3	-1	1	-1
MT	0	0	0	2	2	.	.	.	0	0
NE	-1	-8	1	0	-9	-12	-1	0	0	0
NV	-100	-238	-99	0	-437	-59	-8	-3	.	-7
NH	-57	0	0	0	-57	-34	.	.	0	-3
NJ	-252	-86	-65	51	-352	-42	-1	-1	1	-1
NM	0	-35	11	19	-6	.	-3	1	2	0
NY	-270	-114	56	351	24	-22	-1	1	1	0
NC	-10	-208	41	42	-135	-15	-4	1	0	-1
ND	0	5	4	7	17	.	1	1	3	1
OH	0	-163	-83	-97	-343	.	-2	-1	-1	-1
OK	0	-19	14	11	5	-1	-1	1	0	0
OR	-3	0	0	0	-3	-27	.	.	0	0
PA	-107	-92	82	8	-109	-18	-1	1	0	0
RI	-9	-8	-31	-6	-54	-59	-1	-4	-1	-2
SC	-22	-116	9	12	-116	-27	-4	0	0	-2
SD	0	0	3	0	3	2	0	0	.	0
TN	-40	-168	38	0	-170	-19	-3	1	0	-2
TX	0	-477	27	0	-450	.	-3	0	.	-1
UT	0	-56	25	53	21	.	-3	1	3	0
VT	-5	-6	1	1	-9	-25	-2	0	0	0
VA	-377	-112	-78	-90	-658	-54	-3	-2	-1	-4
WA	-271	-169	107	0	-332	-28	-2	1	.	-2
WV	-6	-19	-9	41	7	-43	-2	-1	3	0
WI	-25	-84	-9	-13	-131	-31	-2	0	0	-1
WY	0	-3	3	0	-1	.	-1	0	.	0
TOTAL	-5,902	-6,591	-2,458	863	-14,088	-49	-3	-1	0	-2

Table 3: Simulation with the Trend Growth Method

State	2009 housing - predicted 2009 housing (\$millions)					(2009 housing - predicted 2009 housing)/ (2009 total) (%)				
	transfer	direct sales	indirect sales	income	total	transfer	direct sales	indirect sales	income	total
AL	-14	-5	-2	-51	-72	-38	0	0	-2	-1
AK	0	0	0	0	0	.	.	.	.	0
AZ	0	-411	-66	-155	-632	.	-8	-1	-7	-6
AR	-8	-18	-5	-39	-71	-32	-1	0	-2	-1
CA	0	-1,688	-1,561	-1,057	-4,307	.	-5	-5	-3	-4
CO	0	-139	-109	-471	-719	.	-7	-5	-11	-9
CT	-82	-44	-78	-241	-444	-97	-1	-2	-4	-4
DE	2	0	0	-29	-27	3	.	.	-3	-1
DC	-310	-4	-5	-45	-363	-187	0	-1	-4	-7
FL	-1,966	-1,368	-248	0	-3,581	-161	-8	-1	.	-11
GA	0	-442	-129	-338	-910	.	-7	-2	-5	-6
HI	2	-9	68	60	121	7	0	3	5	3
ID	0	-61	8	-7	-60	.	-5	1	-1	-2
IL	-53	-373	-273	-369	-1,067	-158	-5	-4	-4	-4
IN	0	-172	-75	-116	-363	.	-3	-1	-3	-3
IA	-5	-48	-17	-31	-101	-41	-2	-1	-1	-2
KS	0	-22	-21	-32	-75	.	-1	-1	-1	-1
KY	-2	-79	-28	-100	-209	-51	-3	-1	-3	-2
LA	0	-16	-12	40	13	.	-1	0	1	0
ME	-17	-48	-12	-65	-142	-99	-5	-1	-5	-4
MD	-69	-97	47	-224	-343	-61	-3	1	-3	-2
MA	-261	-45	-363	-597	-1,266	-193	-1	-9	-6	-7
MI	-431	-259	-558	-582	-1,829	-343	-3	-6	-10	-8
MN	-391	-294	-247	-548	-1,480	-235	-7	-6	-8	-9
MS	0	-23	4	-20	-39	.	-1	0	-1	-1
MO	-7	-88	-64	-174	-333	-76	-3	-2	-4	-3
MT	0	0	0	-11	-11	.	.	.	-1	-1
NE	-4	-20	-16	-48	-88	-39	-1	-1	-3	-2
NV	-3	-217	-40	0	-261	-5	-9	-2	.	-4
NH	-122	0	0	0	-122	-158	.	.	0	-6
NJ	-103	-189	-143	-376	-810	-36	-2	-2	-4	-3
NM	0	-38	20	11	-7	.	-2	1	2	0
NY	-353	-229	-88	-726	-1,396	-62	-2	-1	-2	-3
NC	-21	-265	-21	-324	-630	-66	-5	0	-3	-3
ND	0	7	-2	4	10	.	1	0	1	0
OH	0	-218	-195	-305	-718	.	-3	-3	-3	-3
OK	-4	-22	-7	-17	-51	-36	-1	0	-1	-1
OR	-1	0	0	-182	-184	-14	.	.	-4	-3
PA	-13	-195	93	-274	-389	-4	-2	1	-3	-1
RI	-5	-16	-31	-70	-122	-82	-2	-4	-7	-5
SC	-29	-155	-37	-96	-317	-120	-6	-1	-4	-5
SD	0	-8	-1	0	-9	-31	-1	0	.	-1
TN	-95	-93	-40	0	-228	-74	-2	-1	0	-2
TX	0	-894	-244	0	-1,138	.	-4	-1	.	-3
UT	0	-19	15	-1	-5	.	-1	1	0	0
VT	-6	-16	-4	-11	-36	-71	-5	-1	-2	-2
VA	-177	-202	-42	-427	-849	-57	-6	-1	-5	-5
WA	-350	-130	32	0	-448	-94	-1	0	.	-3
WV	-2	-27	-5	20	-13	-25	-2	0	1	0
WI	-44	-140	-65	-308	-557	-128	-4	-2	-5	-4
WY	0	1	1	0	2	.	0	0	.	0
TOTAL	-4,943	-8,835	-4,566	-8,331	-26,676	-110	-4	-2	-4	-4