Stasis and Punctuation in State Tax Policy

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Previous scholarship has found a relationship between the frictions operating within an issue domain and rates of policy change: where frictions are higher, policies tend to endure until they are so far out of step with environmental realities that updating them requires a major course correction. While this pattern is an endemic characteristic of the budgetary process and has been documented at the national and subnational level in many countries, extant research has looked exclusively at government spending, not revenues. We turn our attention to revenues. Revenue streams change on the basis of economic realities and shifts in tax rates, which are subject to significant stickiness. We look at revenues and associated tax policies across the fifty states from 1965 through 2008. We hypothesize that because updating the tax code is a politically complex process—that the frictions involved in this area of legislating are immense—we should therefore observe both greater stasis and more dramatic punctuations in revenue collections than is typically found in expenditures. Moreover, we expect that particular revenue streams will be more volatile than others and that states will have different mixes of stable and unstable sources of revenue. Therefore, we can predict stickiness in revenues by incorporating measures of the mix of revenue sources a state chooses to use. We test these ideas using a dataset on state tax revenues made publicly available by the Bureau of Economic Analysis (N = 62,500) and preliminary evidence offers support for our claims. This research makes multiple contributions: we document that revenues are also prone to the instabilities that have been so frequently noted in government expenditures, that important variation exists across revenue streams, and, conceptually, that the notion of friction has an enduring usefulness in explaining the policymaking process.

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In 2016, the Oklahoma Legislature passed House Bill 2763, which created a revenue stabilization fund designed to smooth over volatility in tax receipts.[1] Under the new plan, revenue generated in excess of annual projections would be set aside to even out deficits in other years. Oklahoma's issue is that it raises a substantial portion of annual state revenue through taxes on oil and gas production, but the prices of these commodities can fluctuate dramatically from year to year. For example, between 2009 and 2010 revenue raised through gas taxes fell by over 50%; a difference of $300 million (Zahradnik, Moody, and Bailey 2016).

Revenue volatility is nothing new to the American states, although concerns have grown in the wake of the 2008 recession, which emptied many states' rainy-day funds. Often volatility can be traced to instability in underlying economic markets, such as in the Oklahoma case when the price of gasoline fell. But tax receipts can also be volatile for political reasons. Kansas is currently facing historically large budget shortages after Governor Sam Brownback and the Republican-controlled legislature followed through on campaign promises to slash income tax rates in 2012. By 2016, Kansas was bringing in approximately $650 million less each year from income taxes than before the cuts (Abouhalkah 2016). Whatever the cause, revenue volatility can place severe fiscal pressure on state governments and very often leads to deteriorating state services. (In Kansas, most public schools are open only four days a week.) Not surprisingly, then, volatility has received considerable attention from the scholarly community, including organizations such as the Pew Charitable Trusts, The National Conference of State Legislatures, and the Federal Reserve Bank.

Often, measures of state revenue volatility are based on average annual changes in total revenues or changes in standard deviations. We measure volatility by looking at higher moments

[1] We thank Jon Moody for his help.

of the distribution; specifically, we focus on kurtosis. Kurtosis is a popular indicator of what is often termed "stick-slip" dynamics in policy scholarship. The idea, as laid out by Jones and Baumgartner (2005) in their punctuated equilibrium theory, is that legislatures operate under cognitive and institutional frictions that cause policies to stick in place for long periods until social and fiscal pressures accumulate to the point where dramatic changes become necessary. Thus, the prediction is that policy changes should be predominantly incremental, but occasionally very large in magnitude. Distributions with high kurtosis have pronounced central peaks and wide tails, so if distributions of policy changes are found to be high in kurtosis, then it can be taken as evidence consistent with the theory.[2]

Scholarship that investigates how stick-slip dynamics characterize the policy process focuses predominately on government outlays (or in some cases expenditures) (Jones et.al. 2009), with a few articles focusing on other policy outputs such as congressional hearings and bills introductions (Jones et al. 2003; Baumgartner et.al. 2009; Boydstun 2013; Martin and Streams 2015; Epp 2015). This is the first paper to look at government revenues in light of punctuated equilibrium theory. We argue that the theory offers a useful framework for understanding revenue volatility. Because state tax receipts are a function of tax policy, and policymaking is subject to various frictions, instabilities are to be expected. However, tax policy is an area of great political contention and (as Oklahoma legislators are well aware) economic turmoil can affect revenue streams, so we expect that levels of instability in government revenues will exceed what is typically observed in government outlays. Empirical analysis using state-level expenditure and revenue data available from the US Census Bureau from 1965 to

[2] The normal distribution has a kurtosis value of 3; higher values indicate leptokurtosis (excess kurtosis) and lower values platykurtosis. Policy scholarship typically focuses on L-kurtosis statistics, which are robust to extreme outlying values (Breunig and Koski 2006). The L-kurtosis of the normal distribution is 0.123, with higher values indicating leptokurtosis.

2008 supports this hypothesis. However, we also find that levels of instability are much lower in some states than others, which can be attributed to variability in the composition of tax portfolios. Because revenues must be matched with expenditures (in contrast to the federal government most American states must balance their annual budgets), we also find that the mix of revenue sources is a significant predictor of punctuations in expenditures, providing a link between the study of revenue stickiness and that of spending. We conclude by suggesting that kurtosis may offer an advantage over other approaches to measuring revenue volatility because it puts dual emphasis on both dramatic changes and excess stasis, both of which may be concerning to state legislators.

Stick-slip dynamics in policymaking

Punctuated equilibrium theory (as the term is used within policy studies) applies insights from cognitive psychology to policymaking. Specifically, Jones and Baumgartner (2005; see also Baumgartner and Jones 1993) considered the implications of bounded rationality for governmental agenda setting. They argued that while the hierarchical nature of government bureaucracies ensured that many routine functions could be accomplished simultaneously, updating policies in a meaningful way required the attention of a small subset of institutional gatekeepers, such as congressional leaders and the president. At this point, individual-level limitations on the amount of information that can be processed come into play, and the system hits a bottleneck of attention. Add to these cognitive frictions a host of institutional constraints, such as the dual-chambered nature of legislating, and it becomes clear that governmental attention will be allocated disproportionately across issues. Attention is a prerequisite for policy change, so the implication of punctuated equilibrium theory is that policies should alternate

between long periods of stagnation interrupted by brief periods of dramatic upheaval, corresponding to the rare moments when attention is focused on an issue.

Crucially, the degree to which policy changes alternate between these two extremes is conditioned by the degree to which governments process information disproportionately, which is itself variable. Some institutional structures and decision-making mechanisms allow for a smoother allocation of attention than others, and consequently the pattern of policy change may be more or less erratic, depending on institutional design. Moreover, some policy areas are simply less complicated than others (either due to their nature or the institutional design that surrounds them), and for these areas the attention-allocation problem may be more or less acute. Take, for example, the problem of snow removal, which is conceptually very simple and nonpartisan. We would not expect major disruptions in the policies governing snow removal, as the relevant information streams are uncontested and well understood. In contrast, policies relating to climate change are more likely to be in flux as the issue is scientifically complex (in the details) and politically contentious (Epp and Baumgartner 2017). Delivering clean water is also typically a consensual issue through as recent events in Flint Michigan show, even that can occasionally be the subject of upheaval. So while some areas may show smoother policy processes than others, Baumgartner and Jones' work, followed up by many other scholars, suggests that the possibility of punctuation is virtually omnipresent (see a review of this literature see Baumgartner et al. 2017).

Breunig and Koski (2006) showed that state expenditures are prone to stick-slip dynamics, but that levels of kurtosis varied widely across state spending distributions. Spending in some states is much more likely to undergo both stasis and punctuation, while spending in other states follows a smoother rate of change. Recent scholarship by Kwak (2017) suggests that

at least some of the variability uncovered by Breunig and Koski is related to revenue availability; specifically, that spending punctuations become more likely following a dramatic change in state revenue. Of course, it is not surprising that government revenue and spending are related, but Kwak was the first to demonstrate a relationship between punctuations in revenues and subsequent punctuations in expenditures, even controlling for possibly cofounding institutional variables. We look to build on Kwak's model by investigating patterns of change in state revenue with the overall goal of developing a better understanding of why some states see highly volatile tax revenue and others greater stability.

Hypotheses

We argue that tax policy is an area that should be particularly susceptible to the stick-slip dynamics predicted by punctuated equilibrium theory. Tax rates have always been politically contentious. Grover Norquist's famous "Taxpayer Protection Pledge," promising no new taxes, continues to be immensely popular on the political right. Of course, it is easy to see how such pledges might lead to stasis when it comes to tax policy; with changes coming only when tax rates are so far out of step with economic realities that political consensus becomes possible. Furthermore, revenues generated by taxes are affected by underlying economic instabilities, so, much like other complicated policy areas, we anticipate that changes in government revenues should be highly volatile, alternating between long periods of incrementalism and punctuation.

Hypothesis one: distributions of state tax revenue will display higher levels of kurtosis than the normal distribution or comparable state expenditure distributions.

However, in keeping with the results of Breunig, Koski, and Kwak, we also expect to observe that levels of instability in tax receipts will vary across states according to the makeup of state tax portfolios. States that rely disproportionately on excise taxes for their revenue should be more vulnerable to shifting market demand for these natural-resource commodities. On the other

hand, states that get a larger share of revenue from broad-based income and sales taxes should be less susceptible to shifts in underlying economic fundamentals.

Hypothesis two: distributions of state tax revenue from states with tax portfolios that place less emphasis on excise taxes will display lower levels of kurtosis than states that rely more heavily on excise taxes.

Data sources

Historical data on state tax revenue is available through the US Census Bureau, which sponsors an annual survey of state government finances.[3] Revenue data is reported under five broad tax categories (property, sales and gross receipts, license, income, and other) and these categories are subdivided into twenty-six specific taxes. For example, revenue from the sale of liquor licenses falls under the "license tax" category, while revenue from taxes on gasoline are a type of sales tax. Data on receipts from all twenty-six taxes are available for each of the fifty states from 1951 to 2015, and, using Consumer Price Index (CPI) inflation tables, we adjust the data so that receipts are in constant 2015 dollars. The US Census Bureau also surveys states about their expenditures. These data are available for 20 different expenditure categories (including such areas as prisons, public schools, and highways) from 1950 to 2008 for all fifty states. Once again, we use CPI inflation tables to adjust expenditure amounts to constant dollars, although in this instance we use constant 2008 dollars as this is the last year of data availability.[4]

Results

[3] This data is available online at: https://www.census.gov/govs/statetax/historical_data.html.
[4] Ideally, research on patterns of change in government budgeting would utilize outlays, which is the amount of money authorized to be spent, rather than expenditures, which is the amount of money that was actually spent in a given year. The distinction is important because outlays better reflect the underlying decision-making process that is of interest. However, outlay data is often unavailable, and expenditure data still reflects decision-making by policymakers, albeit indirectly. The Census dataset on state expenditures used here was also used by Breunig and Koski in their 2006 article that started the discussion on punctuations in state budgeting.

Our primary expectation drawn from the ideas underlying punctuated equilibrium theory is that government revenues will experience stick-slip instabilities similar to those documented in government expenditures, but even moreso. Levels of instability are expected to be higher for revenues than expenditures because of the political and economic difficulties associated with changing tax rates. Whereas expenditures can be adjusted and in fact must be adjusted each year, tax rates need not be changed. Further, revenues relate both to the stochastic changes in a state's economic climate and to the rates of various taxes, with changes in tax rates operating as a form of ratchet, amplifying whatever stochastic changes that might have occurred without them. In Figure 1, we plot the pooled, annual percentage changes of both state expenditures and state revenues from 1951 to 2015. The first panel (left) spans 24,309 percentage-change observations that occur across the 20 surveyed budget categories from all states. The pattern of changes within expenditures follows those documented by others (Jones et al. 2009, Jones and Baumgartner 2005, Breunig and Koski 2006), with a high concentration of small changes around zero, narrow shoulders, and long tails. Specifically, over 9,000 observations fall within a few percentage points of zero and indicate small, incremental adjustment from one year to the next.

The frequency of percent-change observations rapidly declines moving away from the center of the distribution. Note that the distribution has "weak shoulders," which is typical of leptokurtic distributions and suggests a relative absence of mid-range sized changes. But the positive tail of the distribution extends well beyond 250% (for presentation purposes, we have clustered outlying observations at 250% so that the center of the distribution is clearly visible). These extremely wide left- and right-hand tails correspond to punctuations—dramatic changes taking place from one year to the next—which are considered indicative of the cognitive and institutional constraints of budgetary decision-making. Turning to revenues in the following

panel (right), this histogram includes 68,600 percentage changes pooled across states and 26 tax categories. We see a similarly punctuated distribution of percentages changes, but with a higher peak and more narrow shoulders. The majority of changes occur within only a few percentage points of 0, but, on the positive tail, 572 percentage changes are greater than 250%—98 of which exceed 1000%. Thus, just as with expenditures, revenues exhibit the dual presence of stasis and punctuation.

[Figure 1 here]

The kurtosis of these distributions allow us to further compare the degree to which expenditures and revenues are subject to instabilities over time. Expenditure percentage changes have a L-k value of 0.823, indicating a high degree of punctuated change. Similarly, and as we expect, state revenues have a greater L-kurtosis value of 0.857. We can conclude that state revenues not only exhibit the same pattern of stability and dramatic change as expenditures, they are even more subject to these characteristics. This difference is only marginally larger, however, and so we now turn to examining revenue at the state level where substantial variation in how states collect revenues are likely to correspond to further differences between expenditures and revenue distributions.

In Figure 2, we first plot the percentage change distributions of revenues collected in two states: South Carolina (left panel) and Connecticut (right panel). While both distributions follow the same pattern of stasis and punctuation as pooled revenues from all states, Connecticut exhibits twice the L-kurtosis value of South Carolina. This is due in large part to differences in the positive tails of each distribution (not pictured because we cluster observations at 150%). South Carolina exhibits eight annual changes above 150%; specifically, changes between 53% through 398%. In stark contrast, revenues in Connecticut include 14 changes above 150%, three

of which exceed 1000%. One of these observations corresponds with a massive increase in revenue drawn from amusement taxes. Revenue increased from under $1,000 in 1969 to $4.15 million in 1970 (in constant 2015 dollars), representing a percentage change of over 300,000%. This observation is clearly extreme, but it is an illustrative example as it corresponds to a dramatic shift in underlying tax policy: a temporary measure that was made permanent in 1971 (Lohman 2001).

[Figure 2 here]

Next we plot (bottom panel), the L-kurtosis values drawn from each state's percentage changes in revenue. Given variation in the number of tax types and tax policy across states, the number of observations by state varies from 984 (Hawaii) to 1,537 (Wisconsin) and has a mean of 1,372. Across all states, clear differences in the level of revenue instability are apparent. With L-kurtosis values above 0.90, the revenues generated in Connecticut, Nevada, Pennsylvania, Maryland, and Mississippi exhibit the highest degree of instability. Subject to less punctuated revenues, South Carolina, Rhode Island, Maine, and Ohio have L-kurtosis values below 0.55. Mean L-kurtosis across the fifty states is 0.74, with a standard deviation of 0.14.

In Figure 3, we examine the paired differences between state expenditures and revenues to test our expectation that revenues are subject to increased instability. Sorted by the L-kurtosis value of each state's expenditure distribution (square markers), we plot the distance to the corresponding L-kurtosis value for the revenue distribution (lines to circular markers). While six states exhibit revenues that are less volatile than expenditures, the opposite holds for the remaining 44 states. For example, Nevada's expenditures are among the least punctuated of all states (0.37), but revenues are subject to extreme levels of both stasis and punctuation (0.98, a difference of .60). In keeping with our expectations, state revenue L-kurtosis values are, on

average, 0.17 higher than expenditures. Though we expect that aggregated patterns in state expenditures are directly linked to the dynamics of incoming revenues, we find that there is no strong relationship between the L-kurtosis scores of pooled percentage changes from each type (correlation=0.18). Kwak (2016), however, does find evidence that instability in revenue is statistically associated with instability in expenditures using a multivariate framework.

State Reliance on Revenue Streams

In a 2014 Pew Charitable Trusts Report, Bailey et al. describe the various sources of variation in state revenue volatility in the context of managing uncertainty over time. In addition to state economic performance, they discuss how the structure of state tax systems may contribute (either amplifying or mitigating) to the volatility of revenues. They suggest that,

> Different tax sources capture activity from distinct sectors within a state's economy, and are therefore tied to shifts in the business cycle. Both severance taxes, which are tied to the global price of energy commodities, and corporate income taxes, which are tied to unpredictable profits, have a reputation for being notoriously volatile. Other tax sources, such as sales and personal income taxes, are relatively more stable on average. But no tax is immune to sudden swings (Bailey et al. 2014, 9).

We map these tax-type differences in detail below, before exploring linkages between state reliance on particular sources of revenue and aggregate instability in revenues. In Tables 1 and 2, we report the aggregate sum and percentage of revenue generated from each of the 26 tax types. General sales taxes account for a quarter of state revenues (25.4%) and correspond to $175 billion (in 2015 dollars) between 1951-2015, on average. State income taxes account for another 23.1% of revenues ($171 billion), followed by select sales taxes at 16.2% ($102 billion), gas taxes at 6.8% ($39.9 billion), corporate income taxes at 5.1 ($37.3 billion), and severance receipts at 3.6% ($9.8 billion).

[Insert Tables 2 and 3]

While sales taxes account for the largest percentage of revenue across states, on average, individual states range from zero for those with no sales taxes (e.g. New Hampshire) to providing for more than 40% in revenue in others (e.g. Washington, Florida, Tennessee and Hawaii). Beyond sales taxes, reliance on additional major revenue streams varies substantially across states and is pictured in Figure 4. Though some states do not collect income tax (e.g. Texas, Nevada), others rely heavily on income tax revenue (e.g. Oregon, at 56.3%). Severance drawn from natural resources benefits only a few states, but for those with this stream it accounts for a large portion of overall revenue (e.g. Alaska, at 56.7%, Wyoming at 31.7%, and North Dakota at 20.9%). In comparison, gas taxes are more consistently collected across all states, ranging from 2.0% through 11.2% (with a standard deviation of 1.9). Figure 4 further illustrates this variation in reliance on state revenue streams, plotting the percentage of total revenues from 1951-2015. For presentation purposes, we include only those revenues sources that account for more than 30% of revenue in any one state: general sales, income, select sales, and severance.

[Insert Figure 4]

Explaining Variation in Revenue L-k

To examine underlying sources of instability—which may contribute to the variation in state-level patterns of stasis and punctuation we show above—we also calculate L-kurtosis values across all 26 taxes. Reported in Table 2, these values range from 0.27 (select sales taxes) to 0.96 (amusement taxes), with a mean L-k of 0.65 and a standard deviation of 0.24. We also plot the percentage change distributions of the six revenue streams that account for the largest share (over 80%) of average revenues across all states: general sales, income, select sales, gas, corporate income, and severance.

Among these, the revenue source with the highest degree of instability is severance taxes with a L-kurtosis value of 0.94. This value indicates that revenues generate by severance taxes are extremely volatile, alternating between long periods of incremental change and dramatic shifts. This volatility is clearly visible in the percent change distribution, displayed in the bottom-right panel of Figure 5. Though severance revenues do not exhibit an especially high central peak, 26 changes exceed 250% in the tail of the distribution (with eight over 1000%). Recent downward fluctuations in fossil fuel prices continue to affect changes in severance tax revenues (EIA 2016) and have prompted consideration of alternative revenue streams (Johnson 2015). In contrast, gas taxes are remarkably stable with an L-kurtosis value of 0.35. Nearly all shifts in gas tax revenues fall within a small range around zero, with very few large-scale punctuations. This is likely due to the taxing of the quantity of fuel sold (versus prices) and consistent consumption over time (Felix 2008). While changes in revenue from general sales and income taxes follow a comparable pattern of high peaks and narrow shoulders, those from corporate income tax and select sales tax are the least subject to stasis and punctuation. With low values of L-kurtosis (0.33 and 0.27), these two revenue streams are among the most consistently stable. Outside of these six streams, state property taxes (not pictured) exhibit a very high L-k value of 0.90 that comparable to severance taxes. These taxes account for only 2.2% of revenues on average, but they make up over 10% of revenues in Vermont (14.8%), Wyoming (10.8%), and Washington (10.7%).

[Insert Figure 5]

It follows from this variation both in the reliance of states on particular sources of revenue and in the instabilities found within different types of sources, that endogenous factors underlying these differences may affect instabilities in overall state revenues. More specifically,

we expect that increasing reliance on major streams of revenue that are not tied to the sale of specific commodities (e.g. non-excise taxes) will lead to more stable revenues across states. Second, we expect that a reliance on highly punctuated severance tax revenues will conversely contribute to increasing instability in revenues.

[Insert Table 4]

In Table 4, we report the results of an OLS estimation of our model of state revenue L-kurtosis values. These results indicate that as the combined proportion of major non-excise taxes (property, general sales, select sales, other sales, income, and corporate income taxes) increases, state L-kurtosis values decrease. This relationship is statistically significant at the .05 level. Though high instability in revenue streams suggests that reliance on severance taxes would yield increasing instability in overall revenue, we find the inverse—a negative and statistically significant—relationship. Overall average revenue does not, we show, have an independent effect on revenue instability. Of course, given the economic nature of revenues it is important to consider the effect of cyclical patterns in state economies on the dynamics of instability. In a recent report by the Pew Charitable Trusts (2017) focuses on the use of rainy day funds to counter cyclical changes in the economy, Bailey et al. develop a method to map underlying revenue cycles in states—one that could be adapted across our long period of study here.

Discussion and Conclusion

Our preliminary investigation into state tax policy emphasizes the difficulties of the budgetary process for state policymakers. Unlike the federal government, states have statutory requirements preventing them from going into debt, which means that sudden shifts revenue have potentially severe implications for government services. We have documented that, in fact, such shifts are relatively commonplace; exceeding levels of punctuation typically observed in government

spending. While previous scholarship has noted revenue volatility across the American states, this paper is the first to link that volatility to a broader theoretical framework explaining punctuations in policymaking. One implication of this framework for revenue generation is that although stability may be a good thing in the short-term, prolonged periods of incremental change can be seen as a prelude to dramatic punctuations. That is, stasis and punctuation typically go hand-in-hand. Measuring volatility with kurtosis, rather than mean differences or standard deviations, captures this nuance.

Given that policy scholarship has paid considerable attention to punctuations in government spending, it is surprising that revenue generation, which is an equally important part of the budgetary process, has receive comparatively little focus. Additional research in this area is merited, especially research that further investigates the connection between the composition of state tax portfolios and L-kurtosis in revenue. Moreover, a better understanding of the ways in which political and natural complexity interact to produce stick-slip dynamics in state revenue could offer important insights into both the punctuated equilibrium model and state budgeting.

Tables and Figures

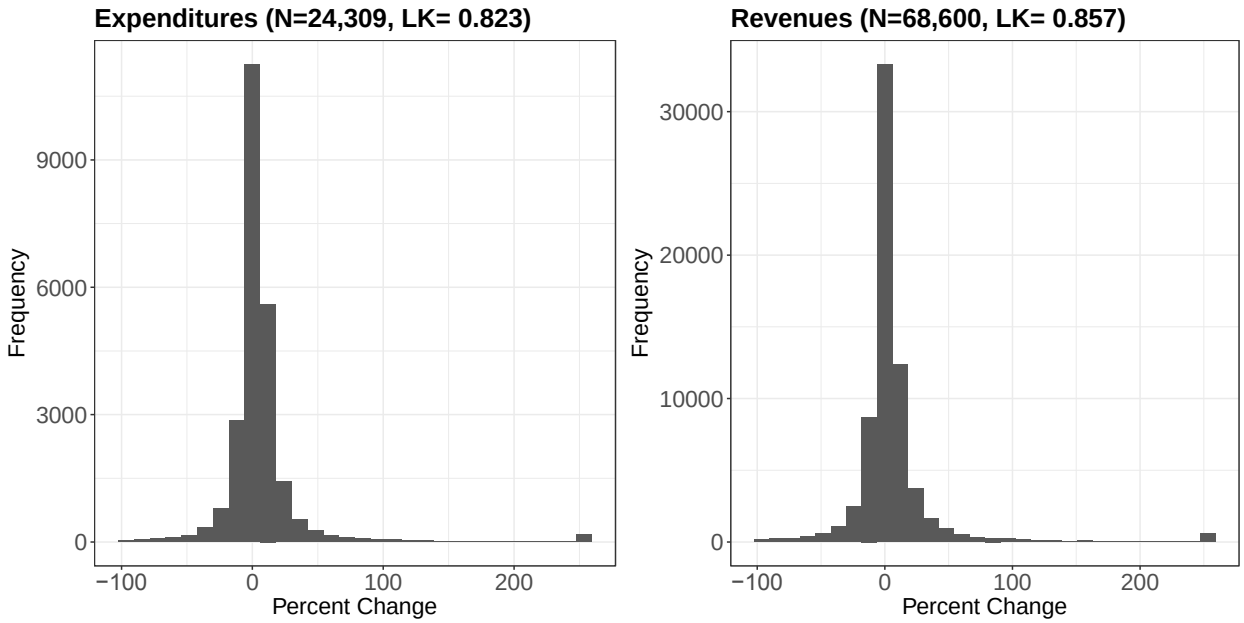

Figure 1. State Budget Expenditures vs. Revenues, Pooled Percent Changes (1951-2015)

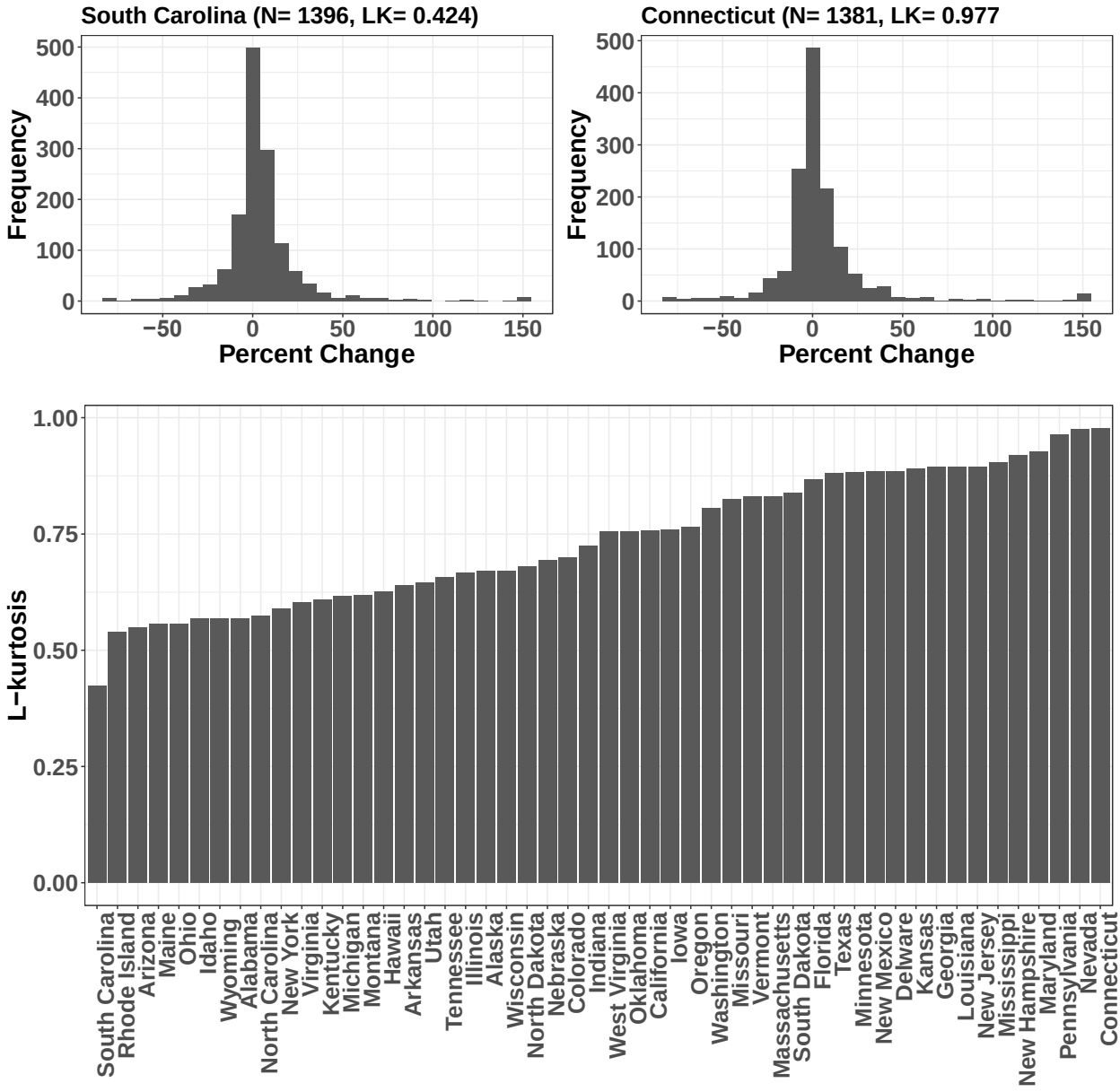

Figure 2. State Tax Revenue, L-k (1951-2015)

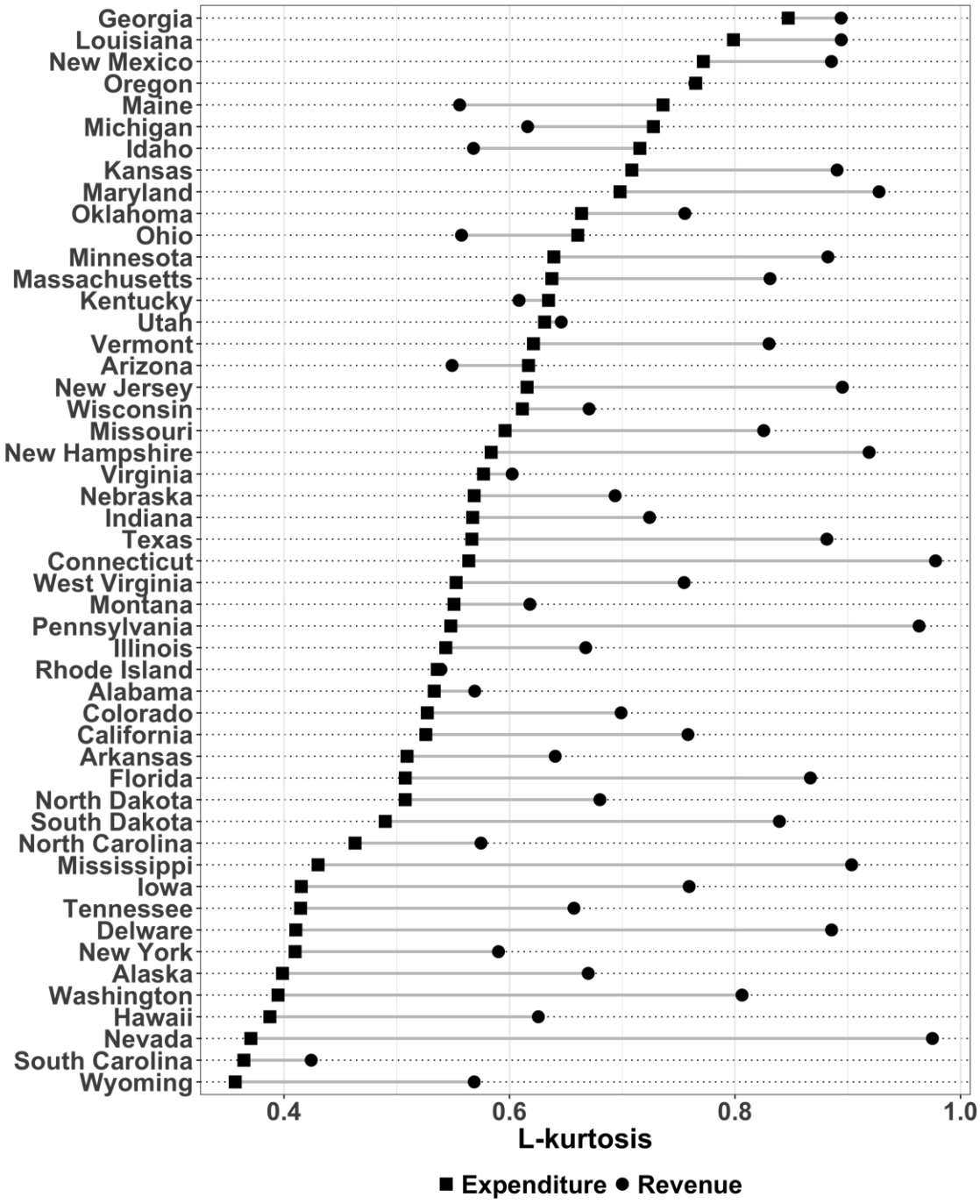

Figure 3. Comparing State Expenditure and Tax Revenue L-k Scores (1951-2015)

Note: Lines indicate the difference between Expenditure L-k and Revenue L-k

Table 1. State Reliance on Tax Revenues, in USD (1951-2015)

Tax Type	Revenue (USD, Mean)	Revenue (USD, s.d.)	Revenue (USD, min.)	Revenue (USD, max.)
General Sales	175.0	214.0	0.0	1210.0
Income Tax	171.0	279.0	0.0	1530.0
Select Sales	102.0	104.0	6.9	434.0
Gas	39.9	37.7	2.9	202.0
Corporate Income Tax	37.3	62.2	0.0	377.0
Drivers License	19.7	21.7	2.1	111.0
Tobacco	13.5	15.1	0.9	63.9
Insurance	12.5	14.7	1.0	86.6
Other Sales	12.5	22.0	0.0	130.0
Utility	11.4	19.6	0.0	76.9
Property	11.3	24.3	0.0	144.0
Severance	9.8	25.1	0.0	145.0
Business License	7.6	12.7	0.4	87.6
Alcohol	7.2	8.2	0.2	38.4
Death & Gift Tax	6.9	10.5	0.1	49.6
Corporation License	6.8	14.8	0.0	86.4
Stock Tax	4.5	12.3	0.0	70.1
Amusement	2.8	5.7	0.0	30.3
Operators License	1.8	1.9	0.0	8.2
Parimutuels	1.7	3.6	0.0	20.0
Hunting License	1.5	1.1	0.0	5.4
Liquor License	0.7	1.3	0.0	7.4
NEC Tax	0.6	1.7	0.0	9.3
Utility License	0.6	1.2	0.0	7.6
Other License	0.5	0.6	0.0	3.1
Amusement License	0.3	0.8	0.0	4.4

Note: Values are total revenue generated within each tax type, across all states in the period of study, and are in constant 2015 dollars (billions).

Table 2. State Reliance on Tax Revenues, in Percentages (1951-2015)

Tax Type	Revenue (%, mean)	Revenue (%, s.d.)	Revenue (%, min.)	Revenue (%, max.)	L-k
General Sales	25.4	11.6	0.0	50.0	0.43
Income Tax	23.1	13.2	0.0	56.3	0.48
Select Sales	16.2	4.1	6.4	30.8	0.27
Gas	6.8	1.9	2.0	11.2	0.35
Corporate Income Tax	5.1	3.0	0.0	17.4	0.33
Severance	3.6	9.7	0.0	56.7	0.94
Drivers License	3.2	1.3	1.4	7.5	0.54
Property	2.2	3.3	0.0	14.8	0.90
Tobacco	2.1	0.8	0.5	5.5	0.82
Other Sales	2.0	2.1	0.0	10.3	0.93
Insurance	2.0	0.5	1.0	3.4	0.35
Utility	1.3	1.5	0.0	5.6	0.79
Business License	1.3	1.0	0.4	7.0	0.36
Alcohol	1.1	0.6	0.3	2.8	0.46
Corporation License	1.1	2.7	0.0	18.2	0.47
Death&Gift Tax	0.9	0.6	0.0	2.5	0.66
Amusement	0.6	1.9	0.0	13.2	0.96
Stock Tax	0.5	0.9	0.0	4.8	0.83
Hunting License	0.4	0.4	0.0	2.2	0.61
Operators License	0.3	0.1	0.0	0.5	0.64
Parimutuels	0.2	0.3	0.0	1.3	0.55
Other License	0.1	0.1	0.0	0.8	0.80
NEC Tax	0.1	0.2	0.0	1.5	0.90
Liquor License	0.1	0.1	0.0	0.3	0.72
Amusement License	0.1	0.3	0.0	1.9	0.87
Utility License	0.1	0.1	0.0	0.8	0.88

Note: Values are the percentage revenue generated within each tax type, across all states in the period of study.

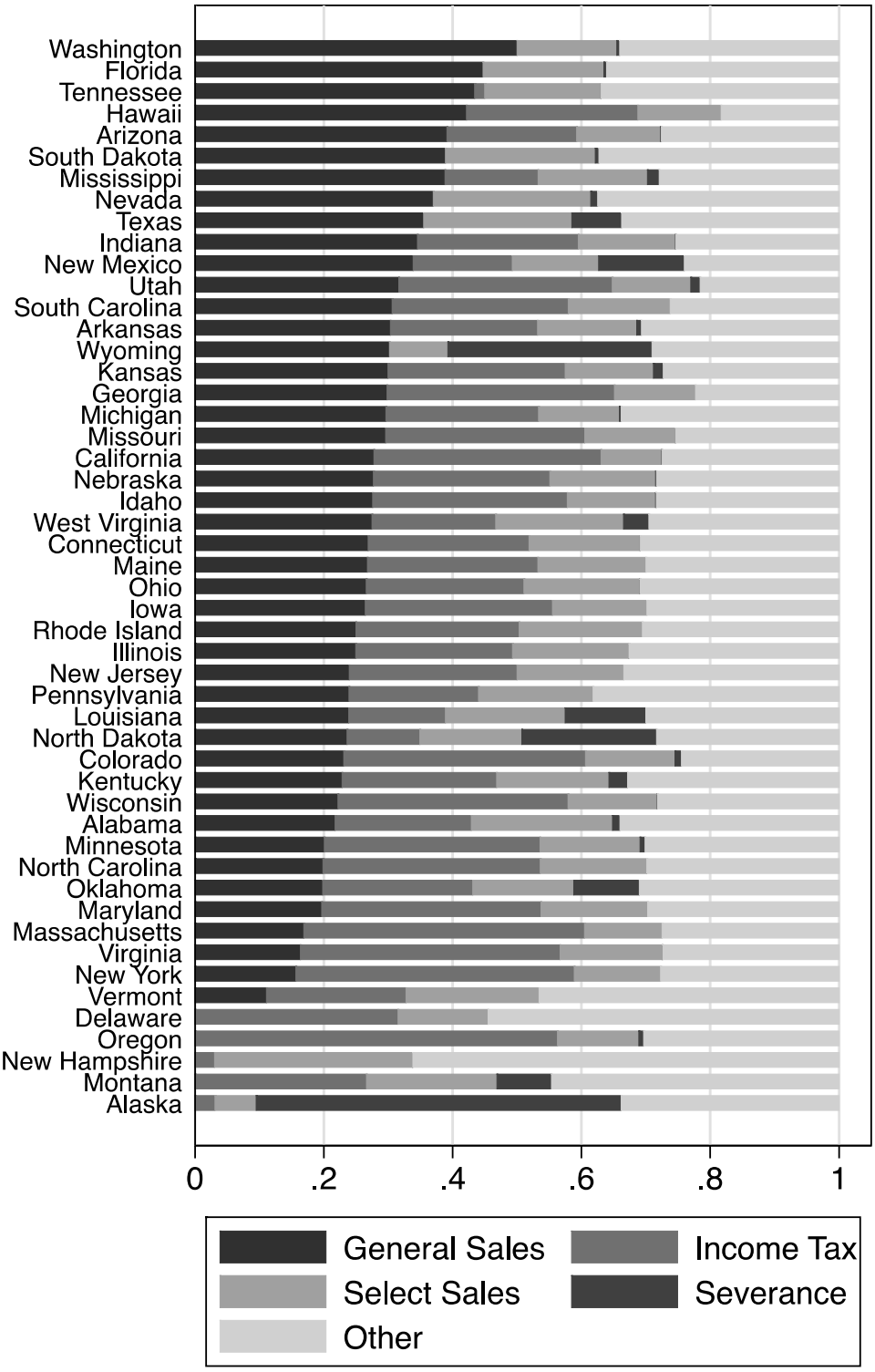

Figure 4. State Reliance on Tax Revenues, Selected Revenue Streams (1951-2015)

Table 3. Estimation of State Revenue L-kurtosis

	State L-k Score
Proportion of Major Non-Excise Tax Revenue	-0.765**
	(0.357)
Proportion of Severance Tax Revenue	-0.729**
	(0.353)
Overall State Revenue (in billions)	19.163
	(27.08)
Constant	1.318***
	(0.272)
N	50
R-squared	0.099

Standard errors in parentheses
*** p<0.01, ** p<0.05,
*** p<0.1; ** p<0.05

Note: *Proportion of Major Non-excise Tax Revenue* includes the sum of each state's proportion of tax revenue from: property, general sales, select sales, other sales, income, and corporate income. Proportions are calculated from the sum of revenue generated between 1962-2008, in constant 2015 dollars.

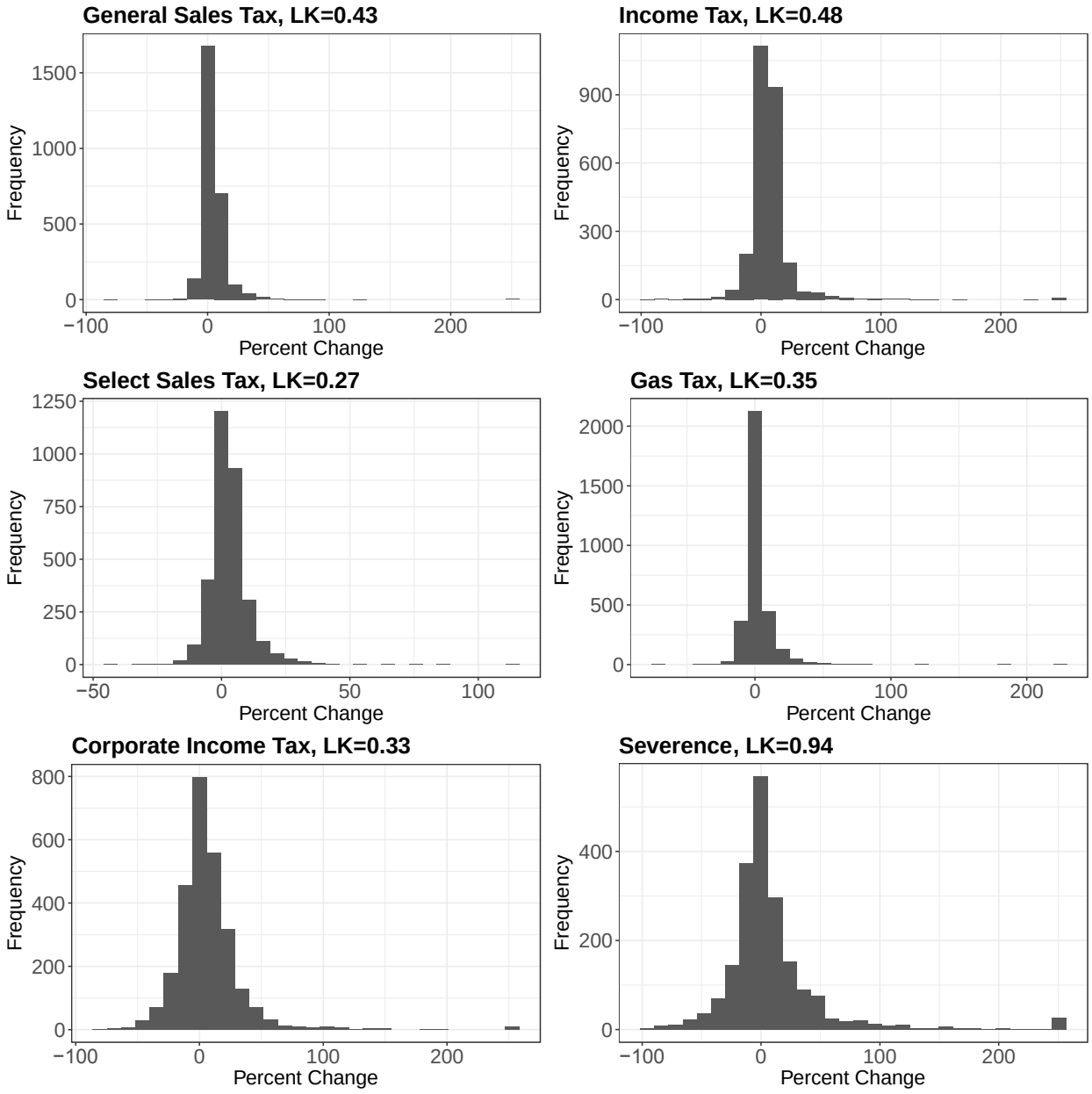

Figure 5. Pooled Percentage Changes by Major Tax Types, All States (1951-2015)

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