

# State Tax Revenue Performance over the Business Cycle

Leslie McGranahan  
&  
Richard Mattoon

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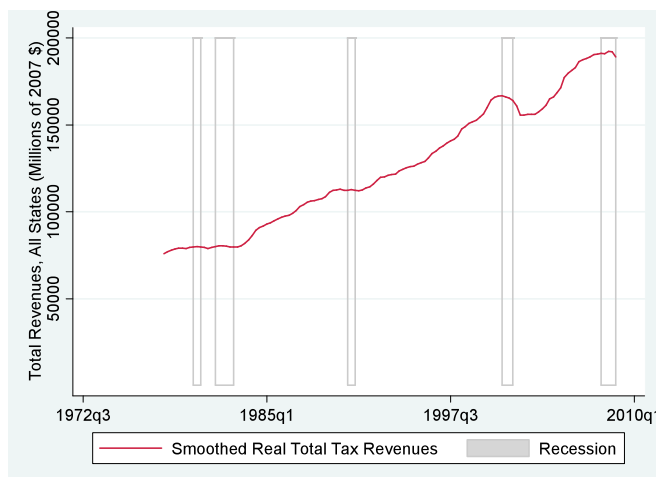
## What do We Find?

- State government revenue has grown far more sensitive to economic conditions during the past decade
- This change is concentrated in the state income tax
- Much of the change can be attributed to changes in underlying income trends

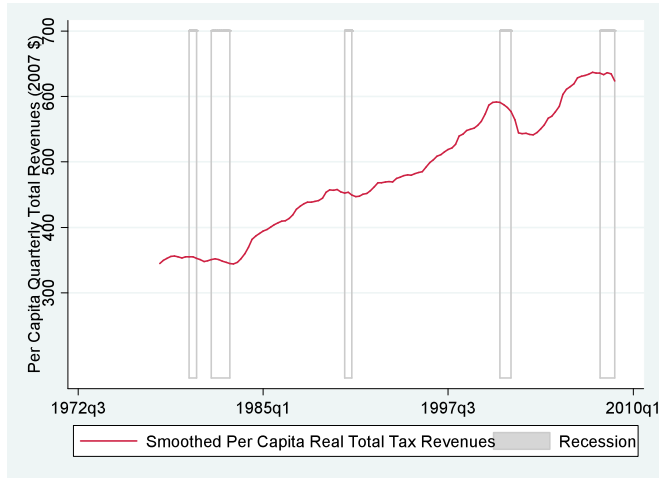
## What Does Tax Revenue Performance Look Like Over the Business Cycle – Has this Changed?

- Motivation
  - 2001 Recession as a watershed event – a mild business cycle contraction led to a major crisis in state government finances.
  - Why? What changed?
  - What does this imply for the more severe recession that we are experiencing.
- Data
  - Quarterly Summary of State and Local Government Tax Revenue
    - Collected (more or less) continuously since 1962
    - Released in a timely fashion (90 days after the quarter ends)
    - Quarterly frequency a big plus

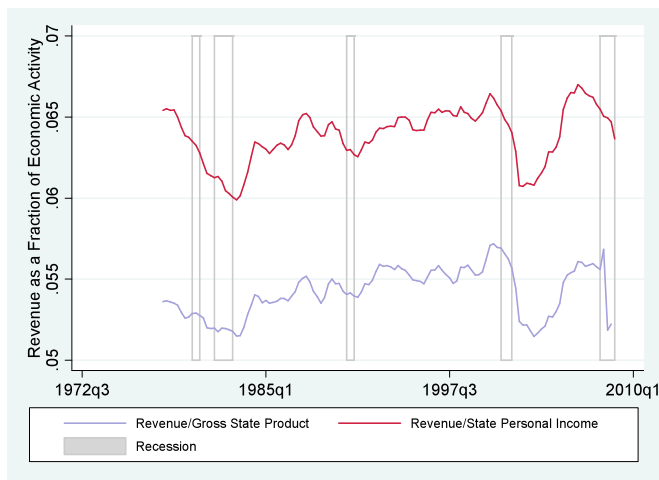
### Total Quarterly State Tax Revenues (Smoothed)



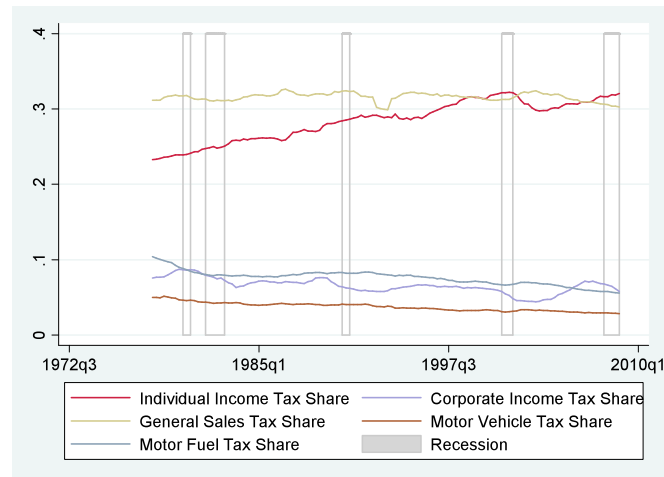
## Per Capita State Tax Revenues (Smoothed)



## Tax Revenue as a Fraction of Economic Activity



## Tax Revenue Shares



## Revenue Responsiveness to Economic Conditions

- We look at this question in two ways
- Begin by looking at aggregate revenues – revenues for the nation as a whole
  - One time series
- We then turn to analysis using data on each of the 50 states separately
  - Fifty time series

## Revenue Responsiveness to Economic Conditions: Aggregate Revenues

- Define the business cycle using the coincident index of released by the Federal Reserve Bank of Philadelphia
  - Nonfarm payroll employment
  - Average hours worked in manufacturing
  - Unemployment rate
  - Wage and salary disbursements
  - Trend for each state's index is set to the trend of its GDP.
- National Coincident Index
- Separate index for each of the fifty states

## Revenue Responsiveness to Economic Conditions: Aggregate Revenues

- Pre-1998
  - 1 pp Change in Coincident Indicator (i.e. jumps from 3% to 4%)
    - 0.756 pp growth in total state and local government revenues
    - 1.095 pp growth in total state government revenues
    - 0.276 pp growth in total local government revenues
    - 0.081 pp growth in state and local property tax revenues
    - 1.339 pp growth in state and local sales tax revenues
    - 0.834 pp growth in state and local individual income tax revenues
    - 3.340 pp growth in state and local corporate income tax revenues

## Revenue Responsiveness to Economic Conditions: Aggregate Revenues

- The Pre-1998 landscape
  - Revenues are procyclical on the state level although not so much so on the local level.
    - Property tax revenues pretty flat
      - This makes sense
  - Corporate income taxes have the strongest cyclical responsiveness (by a long shot)
  - Sales tax is slightly more responsive than the income tax to business cycle conditions (although using statistical tests, we cannot reject that they are the same)

## Revenue Responsiveness to Economic Conditions: Aggregate Revenues

- 1998 and after
  - 1 pp Change in Coincident Indicator (i.e. jumps from 3% to 4%)
    - 1.319 (~~0.756~~) pp growth in total state and local government revenues
    - 2.327 (~~1.095~~) pp growth in total state government revenues
    - -0.502 (~~0.276~~) pp growth in total local government revenues
    - -1.153 (~~0.081~~) pp growth in state and local property tax revenues
    - 1.727 (~~1.339~~) pp growth in state and local sales tax revenues
    - 4.361 (~~0.834~~) pp growth in state and local individual income tax revenues
    - 5.014 (~~3.340~~) pp growth in state and local corporate income tax revenues

## Revenue Responsiveness to Economic Conditions: Aggregate Revenues

- 1998 and After Landscape
  - Overall state government revenues have grown more cyclically sensitive
  - Due to massive increase in the sensitivity of the individual income tax
  - Local governments look modestly countercyclical
    - (Can't reject independent of the business cycle)
    - This can largely be attributed to the continuing housing boom during the 2001 recession

## Some thoughts

- If we want to understand the increasing sensitivity of the state and local sector to the business cycle
  - We want to look at states
  - We want to look at the personal income tax
- Not so much a long term switch from a stable source (sales) to a volatile source (income)
- Instead a change within the income tax where revenues have become more sensitive to economic conditions

## What about the Federal Government?

- Pre-1998
  - 1 pp Change in Coincident Indicator (i.e. jumps from 3% to 4%)
    - 1.387 pp increase in personal income tax receipts
- 1998 and after
  - 1 pp Change in Coincident Indicator (i.e. jumps from 3% to 4%)
    - 6.232 pp increase in personal income tax receipts

## Revenue Responsiveness to Economic Conditions: State Level Data

- Why do we want to look at state level data?
  - More variation to exploit
  - Differences in business cycle timing and intensity
  - We can look at different groups of states



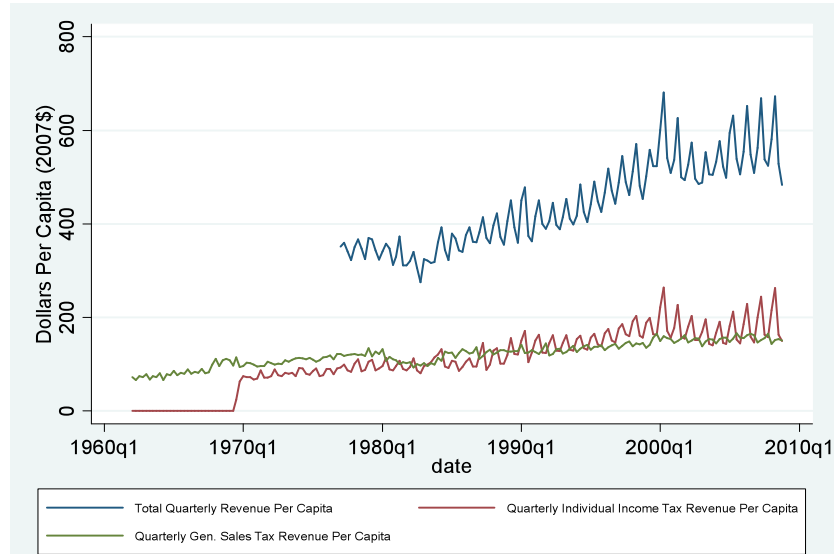
## Revenue Responsiveness to Economic Conditions: State Level Data

- Define state business cycle conditions using the state coincident index developed by the FRB Philadelphia
  - Average state down 2.2% over a year ago (2008:Q4 vs 2007:Q4)
    - Mean 1980-2008 2.9% St. Dev 3.7%
- Pre-1998
  - 1pp Change in Coincident Indicator
    - 0.707 pp Change in Total Per Capita Revenue
    - 0.810 pp Change in Per Capita Sales Tax Revenue
    - 0.568 pp Change in Per Capita Individual Income Tax Revenue
    - 1.449 pp Change in Per Capita Corporate Income Tax Revenue
- 1998 and After
  - 1% Change in Coincident Indicator
    - 1.074 pp Change in Total Per Capita Revenue
    - 0.568 pp Change in Per Capita Sales Tax Revenue
    - 2.004 pp Change in Per Capita Income Tax Revenue
    - 3.249 pp Change in Per Capita Corporate Income Tax Revenue

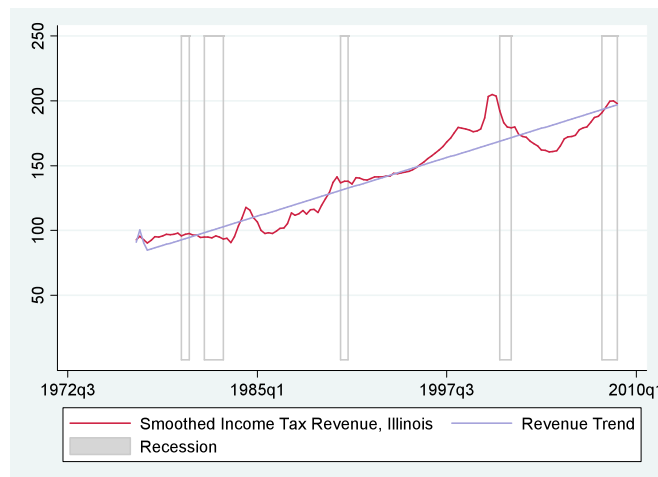
## Revenue Responsiveness to Economic Conditions: State Level Data

- Similar picture to the aggregate data
  - Increase in sensitivity lead by large change in the income tax
    - Prior to 1998, the sales and income taxes were not very different.
  - Difference because the aggregate data gives more weight to bigger states (larger impact on aggregates) while with state level data, each state is treated equally

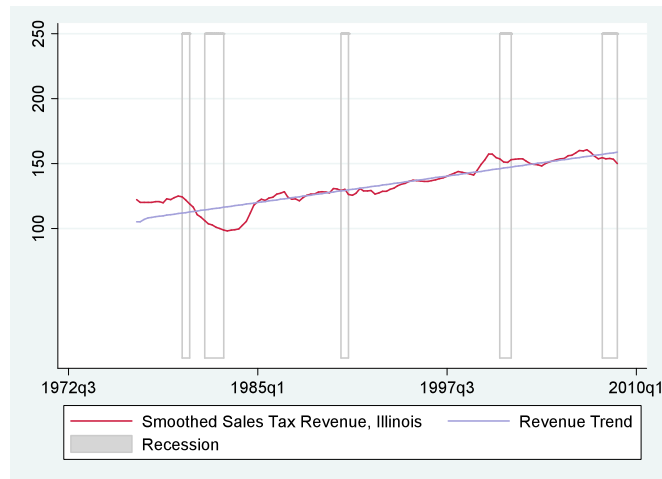
## Looking at Case of Illinois



## Revenue Variability – Illinois Income Tax



## Revenue Variability – Illinois Sales



## Explanations

- Who we're taxing
- When we're taxing
- How we're taxing
- What we're taxing

## Who We're Taxing

- Increasing income dispersion combined with tax progressivity may have made us more reliable on the more volatile top end of the income distribution.
- Test this by dividing states into groups
- More Progressive versus less progressive states
  - States with lowest marginal tax rates  $\leq 6\%$  in 2008
    - 0.623 pp pre 1998 to 2.005 pp 1998 and after
  - States with highest marginal tax rates  $>6\%$  in 2008
    - 0.511 pp pre 1998 to 2.004 pp 1998 and after
  - Increase is similar, we saw this for Illinois with low rates

## Who We're Taxing

- States with high income inequality versus states with low inequality
  - States with lower gini coefficients (lower inequality)
    - 0.761 pp pre 1998 to 1.744 pp 1998 and after
  - States with higher gini coefficients (higher inequality)
    - 0.375 pp pre 1998 to 2.249 pp 1998 and after
  - Growth has been more dramatic in states with greater income inequality
- Increase has also been larger in more populous states, states with higher median income, and states with more millionaires per capita

## When were taxing

- Look at income tax revenue growth during the four quarters of the calendar year
  - Jan-Mar 0.533 to 2.269
  - Apr-Jun 0.672 to 3.595
  - Jul-Sep 0.395 to 0.991
  - Oct-Dec 0.708 to 0.986
  - Biggest jump in April-June Quarter, followed by Jan-March Quarter, small increase in July-Sept Quarter, no increase in Oct-Dec quarter.
  - April surprises

## How We're Taxing

- Has there been a change in the way policy responds to economic conditions?
- Did we used to increase income tax rates when times were bad to stabilize revenues?
- I think of this as the Florio Effect (after James Florio the Gov. of NJ 1990-1994)

## Challenging to Implement

- We lack good data on the long term effects of state income tax changes from a consistent and comprehensive source
- Plan to look at revenue cyclicalities in the states where the income tax was largely unchanged

## Can We Learn Something from the Federal Experience?

- Federal tax sensitivity from 1.387 to 6.232
- We use the Congressional Budget Office's Estimates of the effects of the Bush tax cuts (EGTRA 2001 and JGTRA 2003) on personal income tax revenues.
  - Good estimates, 6 years out
- Adjusted revenues imply Federal tax sensitivity from 1.387 to 4.501
  - Not a perfect counterfactual

## What We're Taxing

- What we're taxing
  - Capital Gains became a more important share of Adjusted Gross Income
  - Timing is right
- Derive three measures of state income by year based on data from the IRS Statistics of Income
  - Total Adjusted Gross Income by State
  - Wage and Salary Income by State (already incorporated into the coincident indicators?)
  - Capital gains, interest and dividend income by State

## Controlling for Year over Year Changes in Income

- Without income controls
  - Pre-1998 0.568 pp Change
  - 1998 and after 2.004 pp
  - Increase of 1.436
- Controlling for income, constraining effects of income to be the same across the two periods
  - AGI
    - 0.396 to 1.586 (increase of 1.190)
  - Wages and Salary
    - 0.504 to 1.824 (increase of 1.320)
  - Capital Gains, Interest and Dividends (with 1 year lag)
    - 0.552 to 1.401 (increase of 0.849)
  - All income sources
    - 0.475 to 1.214 (increase of 0.739)
    - This is beyond the state's control

## Controlling for Income

- Without income controls
  - Pre-1998 0.568 pp Change
  - 1998 and after 2.004 pp
  - Increase of 1.436
- Controlling for income, allowing the effects of income on revenues to differ (could be due to changes in policy)
  - AGI
    - 0.453 to 1.603 (increase of 1.150)
  - Wages and Salaries
    - 0.659 to 1.744 (increase of 1.085)
  - Capital Gains, Interest and Dividends (with 1 year lag)
    - 0.554 to 1.195 (increase of 0.641)
  - Controlling for all three together
    - 0.598 to 0.867 (increase of 0.269)

## Controlling for Income

- About half of the increase in the sensitivity of income tax revenue to the business cycle can be explained by the dynamics of income, particularly investment income.
- We also find that states have grown more sensitive to income dynamics this explains about 2/3 of the remaining gap in sensitivity.
  - May be due to policy, changes in income among specific groups etc...



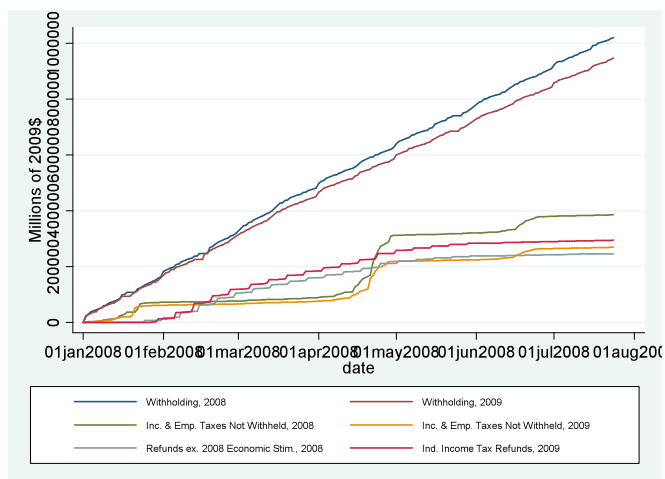
## Groups of States

- Smallest
  - MS MD NH IN OK ND HI IA KY MN DE MT WV ID
- Middle
  - MO NC OR IL VT ME SC NM PA AR MI GA AL MA
- Biggest
  - NY CO KS NE LA OH UT VA CA RI WI TN AZ CT NJ

## 2009 and Beyond

- Obviously not shaping up well.
  - U.S. coincident index -3.2% in Q2 (Year over Year)
  - Putting it through aggregate model predicts income tax revenues for 2009: Q2 down 22.5% over a year ago
- Federal Income Tax Revenues are falling
  - Federal Tax revenues relative to 2008
    - Withholding -7.1% (YTD July 24)
    - Refunds -12.0% (YTD July 24 )
      - Excluding 2008 Stimulus payments +20.1%
    - Final Payments -30.2% (YTD July 24)
    - Combined (ex stimulus) -20.5%

## Cumulative Federal Individual Income Tax Revenues and Refunds, 2008 vs. 2009



## Policy Options: A Menu

- Work to smooth revenues more aggressively
  - Raise tax rates during bad times (historic strategy)
    - The Federal Government gives and the states take away?
  - Sell off assets when times are bad (and perhaps buy assets when times are good?)
    - Buy high and sell low?
    - Need buyers to get financing when things are bad (Midway airport)
  - Change revenue structure towards something more stable either within income tax or to different taxes
    - Decreasing reliance on corporate income tax may partly be due to volatility
    - Corporate income tax is substantially more volatile than individual (about 2.5x)
- Work to smooth expenditures more aggressively (taking revenue cyclicity as given)
  - Rainy day funds. These may need to be larger than is politically feasible. Huge swings. (Appeals to neither side of political spectrum)
    - Is there a more creative way to do this? Capital gains / Business income driven fund?

## Policy Options a Menu

- Run Deficits
  - Maybe the states should be more like the federal government rather than visa versa
- Accept that expenditures will need to be procyclical
  - Runs counter to the automatic stabilizing roll of government
  - Make hay while the sun shines
    - Buying things when they are most expensive. Helping people when they least need it.
- Ask the Federal Government for help when times are bad
  - 2001 recession and now.
  - Take money / push expenses on to localities
    - More of an option in 2001 than now