Some Unpleasant Stabilization Arithmetic

Joe Peek, VP and Economist
Eric S. Rosengren, President & CEO
Geoffrey M.B. Tootell, EVP and Director of Research
Federal Reserve Bank of Boston

September 8, 2018

Federal Reserve Bank of Boston’s 62nd Economic Conference
“What Are the Consequences of Long Spells of Low Interest Rates”
Boston, Massachusetts

bostonfed.org
Stabilization Policy

- Before the Great Recession – primary countercyclical tool was monetary policy
  - The greater likelihood the effective lower bound (ELB) is reached in the future is a challenge for monetary policy
  - Limitations on future monetary policy actions make other countercyclical tools potentially more important
- For any countercyclical tool, policymakers must be willing and able to use them
Role of Buffers

- Monetary policy buffers – limited
  - Low productivity, slow population growth, low inflation rate – buffer relative to ELB limited
  - Nontraditional monetary policies remain controversial and could be politically difficult to deploy in the future

- Fiscal policy buffers – limited
  - Debt/GDP likely to rise over next 10 years
  - Many states have less financial capacity after the Great Recession

- Regulatory buffers – have been raised
Recent Work in this Area

- Romer and Romer (2017, 2018) – International evidence that a lack of fiscal and monetary policy buffers impedes economic recovery
- This paper similar in spirit
  - Focus on states – similar institutional characteristics
  - Can examine state and regulatory responses
Paper Outline

- Highlight variation across states
- Risks to hitting ELB – implications for monetary policy buffer
- Role of other buffers – state, federal, bank regulatory
- Impact of changing buffers
- Simulate potential state impact on personal income of depleted buffers
Figure 1: States with the Largest and Smallest Increases in the Unemployment Rate, 2005 - 2010

Source: BLS, Haver Analytics
Table 1: Sensitivity of State to National Real Per Capita Personal Income One-Quarter Growth
1983:Q1 - 2015:Q4

<table>
<thead>
<tr>
<th>State</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA</td>
<td>1.176</td>
</tr>
<tr>
<td>CA</td>
<td>1.158</td>
</tr>
<tr>
<td>ND</td>
<td>1.150</td>
</tr>
<tr>
<td>NY</td>
<td>1.099</td>
</tr>
<tr>
<td>NC</td>
<td>1.096</td>
</tr>
</tbody>
</table>

Highest

<table>
<thead>
<tr>
<th>State</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA</td>
<td>0.713</td>
</tr>
<tr>
<td>WV</td>
<td>0.701</td>
</tr>
<tr>
<td>MS</td>
<td>0.697</td>
</tr>
<tr>
<td>AK</td>
<td>0.556</td>
</tr>
<tr>
<td>HI</td>
<td>0.495</td>
</tr>
</tbody>
</table>

Source: BEA, Haver Analytics
Significant Variation Across States

- Characteristics across states vary substantially
  - State impact of limited policy buffers can vary substantially
- Example – if monetary policy is limited – states that are interest sensitive may not recover as quickly
- Example – exposure to fiscal austerity quite different if dependent on federal expenditures or transfers
Figure 2: The Actual and Equilibrium Real Federal Funds Rates
1961:Q1 - 2018:Q1

Source: Federal Reserve Board, Laubach and Williams, BEA, NBER, Haver Analytics
ELB is Quite Likely to be Binding in the Future

- Equilibrium real rate has declined and inflation rate is only 2 percent
- Monetary policy cushion is much smaller than during most of postwar period
- If downturn were to occur soon – little ability to lower the 5-6 percentage points that occurs in many recessions
Figure 3: Bank Failures in the U.S.
1960:Q1 - 2018:Q1

Note: Includes both failures and assistance transactions. Banks include commercial banks, savings banks, and savings and loan associations (beginning in 1980).

Source: FDIC, NBER, Haver Analytics
Figure 4: Tier 1 Risk-Based Capital Ratios at Banks by Asset Size
1990:Q4 - 2018:Q1

Note: Includes OTS-regulated savings institutions as soon as they file the call report. Some began in 2011, all filed by 2012:Q1
Source: Quarterly Bank Call Reports, NBER, Haver Analytics.

Note: Large banks are banks with $50 billion or more in assets.

Recession

Percent
Bank Buffers Have Improved

- Improvement in capital ratios is greatest for large banks
  - Concern is with banks shrinking if capital is constrained
  - Countercyclical capital buffer could help reduce this risk
- Small banks have seen less improvement in capital
- Small banks appear to be taking more risks in some areas – commercial real estate
- Significant roll back in regulations would increase this risk
Federal Fiscal Policy Buffers

- Focus on two episodes of fiscal restraint associated with persistent declines in the cyclically adjusted deficit as a percent of potential GDP
  - 1990-2000: Reflecting the Budget Enforcement Act of 1990; spending caps for discretionary spending items and pay-as-you-go requirements
  - 2009-2014: Heightened interest in controlling spending to prevent further increases in the budget deficit
- These two periods reflect political constraints (willingness), not financial constraints (ability), given the dollar’s dominant role in foreign currency reserves, foreign trade invoicing, and currency denomination for cross-border lending
Figure 5: Federal Surplus/Deficit as a Percent of Potential GDP
Federal Fiscal Year, 1980 - 2027

Source: CBO, Haver Analytics
State and Local Fiscal Austerity

- Must remove federal intergovernmental transfers that pass through state and local budgets in order to isolate state and local fiscal policies.
- Both the need for stabilization policy and the ability of a state to provide countercyclical policy vary across states.
  - Balanced budget amendments
  - State pension funding ratios (assets/liabilities)
  - Rainy day funds
  - Correlation between a state’s revenues and expenditures
Figure 6: State and Local Expenditure Decreases
State Fiscal Year, 1983 - 2015

Note: Missing Data for AL, MI and TX in Fiscal Year 2015.
Source: Census Bureau’s Annual Survey of State and Local Government Finances, DOL, Haver Analytics
Real Per Capita State Personal Income and the Role of Policy Buffers

- Panel regression using individual state annual data
- Real per capita personal income growth rate
- Change in state’s unemployment rate
- CAMELS_345: deposit-weighted share of 3-, 4- or 5-rated banks operating in a state
  - CAMELS ratings: supervisory ratings from 1 to 5, with 1 strongest health and 5 weakest health
Monetary Policy Buffer

- Change in FFRgap using Laubach-Williams real equilibrium rate
  - Also interact FFRgap measure with HIGH and LOW interest sensitivity dummy variables based on auxiliary regressions using national employment data for 14 industries
  - Interest sensitive industries: mining; construction; manufacturing; retail and wholesale trade
  - HIGH and LOW indicators are (1,0) dummy variables based on a state’s average share of employment in these interest sensitive industries (15 states each)
Fiscal Policy Buffer Indicators

- Federal austerity measure: (1,0) dummy variable for 1990-2000 and 2009-2014
- State and local austerity measure: state-specific (1,0) variable with value of one for periods when nominal state and local expenditures decline until again attain prior peak value
- Equations based on federal fiscal year data and include state fixed effects
Table 2: Real Per Capita State Personal Income Growth Rate
Federal Fiscal Year, 1983 - 2015

<table>
<thead>
<tr>
<th></th>
<th>Unweighted</th>
<th>Weighted</th>
<th>Unweighted</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 Change in State UR (%)</td>
<td>-0.644***</td>
<td>-0.735***</td>
<td>-0.661***</td>
<td>-0.750***</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td>(0.012)</td>
<td>(0.059)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>L1 CAMELS: State 3-4-5 Share (%)</td>
<td>-0.014***</td>
<td>-0.011***</td>
<td>-0.016***</td>
<td>-0.013***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.001)</td>
<td>(0.003)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>L1 Change in Real Eff. - Equil. FFR</td>
<td>0.171***</td>
<td>0.075***</td>
<td>0.154**</td>
<td>0.067***</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.015)</td>
<td>(0.066)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>L2 Change in Real Eff. - Equil. FFR</td>
<td>-0.249***</td>
<td>-0.207***</td>
<td>-0.255***</td>
<td>-0.212***</td>
</tr>
<tr>
<td></td>
<td>(0.055)</td>
<td>(0.012)</td>
<td>(0.055)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>L1 High Interest Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR</td>
<td>-0.369***</td>
<td>-0.352***</td>
<td>-0.369***</td>
<td>-0.350***</td>
</tr>
<tr>
<td></td>
<td>(0.093)</td>
<td>(0.021)</td>
<td>(0.093)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>L2 High Interest Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR</td>
<td>-0.033</td>
<td>-0.079***</td>
<td>-0.030</td>
<td>-0.077***</td>
</tr>
<tr>
<td></td>
<td>(0.083)</td>
<td>(0.019)</td>
<td>(0.083)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>L1 Low Interest Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR</td>
<td>-0.137</td>
<td>-0.137***</td>
<td>-0.138</td>
<td>-0.142***</td>
</tr>
<tr>
<td></td>
<td>(0.092)</td>
<td>(0.018)</td>
<td>(0.092)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>L2 Low Interest Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR</td>
<td>0.041</td>
<td>-0.148***</td>
<td>0.043</td>
<td>-0.150***</td>
</tr>
<tr>
<td></td>
<td>(0.083)</td>
<td>(0.016)</td>
<td>(0.083)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Federal Austerity Dummy (1990-2000, 2009-2014)</td>
<td>-0.361***</td>
<td>-0.321***</td>
<td>-0.361***</td>
<td>-0.321***</td>
</tr>
<tr>
<td></td>
<td>(0.104)</td>
<td>(0.022)</td>
<td>(0.104)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Nominal Broad Federal Expenditure Decrease Dummy</td>
<td>0.005</td>
<td>0.180***</td>
<td>0.005</td>
<td>0.180***</td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(0.031)</td>
<td>(0.137)</td>
<td>(0.031)</td>
</tr>
<tr>
<td>Nominal State &amp; Local Expenditure Decrease Dummy</td>
<td>-0.282*</td>
<td>-0.444***</td>
<td>-0.365**</td>
<td>-0.503***</td>
</tr>
<tr>
<td></td>
<td>(0.163)</td>
<td>(0.038)</td>
<td>(0.165)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.307***</td>
<td>2.241***</td>
<td>2.151***</td>
<td>2.093***</td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.017)</td>
<td>(0.068)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Total Obs.</td>
<td>1647</td>
<td>1647</td>
<td>1647</td>
<td>1647</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>0.146</td>
<td>0.216</td>
<td>0.146</td>
<td>0.212</td>
</tr>
<tr>
<td>Change in Real Eff. - Equil. FFR: Sum</td>
<td>-0.078</td>
<td>-0.132</td>
<td>-0.101</td>
<td>-0.154</td>
</tr>
<tr>
<td>Change in Real Eff. - Equil. FFR: P-Value</td>
<td>0.363</td>
<td>0.000</td>
<td>0.239</td>
<td>0.000</td>
</tr>
<tr>
<td>High Int. Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR: Sum</td>
<td>-0.402</td>
<td>-0.432</td>
<td>-0.399</td>
<td>-0.427</td>
</tr>
<tr>
<td>High Int. Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR: P-Value</td>
<td>0.001</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td>Low Int. Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR: Sum</td>
<td>-0.096</td>
<td>-0.285</td>
<td>-0.065</td>
<td>-0.292</td>
</tr>
<tr>
<td>Low Int. Rate Ind. Emp. Share Dummy*Ch. Real Eff.-Equil. FFR: P-Value</td>
<td>0.437</td>
<td>0.000</td>
<td>0.445</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Simulated Effects of a Moderate Recession with and without Policy Responses

- Based on column 1 estimates
- 3% increase in national UR; use estimated state “betas” to calculate increases in state URs
- FFR decline: 600 bp; equil. FFR decline: 100 bp
  - FFRgap declines by 500 bp
  - HIGH and LOW interactions produce state-specific responses to countercyclical monetary policy
- Note that typical policy responses are able to more than offset adverse shock in 16 states
Figure 7: Estimated Recession Effects

Source: Authors’ calculations using Federal Reserve System, Federal Reserve Board, Laubach and Williams, Census Bureau’s Annual Survey of State and Local Government Finances, CBO, DOL, BEA, BLS, Haver Analytics
Simulation with Monetary Policy Limited due to Hitting ELB

- Assume FFR at 2 percent
- Falls only to zero
- With monetary policy countercyclical response limited
  - All states now experience decline in real per capita personal income
  - Particularly large switch for many Southern states
  - Smallest declines primarily in agricultural states in Midwest
Figure 8: Typical Recession Effects with Limited Monetary Policy Response

Source: Authors’ calculations using Federal Reserve System, Federal Reserve Board, Laubach and Williams, Census Bureau’s Annual Survey of State and Local Government Finances, CBO, DOL, BEA, BLS, Haver Analytics
Simulation with All Policy Buffers Depleted at the Same Time

- Federal funds rate hits ELB
- National CAMELS_345 increases by 20 percentage points; use estimated “betas” to obtain state-specific changes
- Activate the federal and the state and local fiscal austerity dummy variables
- Unsurprisingly, outcomes for all states worsen; but not to the same degree
Figure 9: Typical Recession Effects with Limited Monetary Policy Response and All Other Buffers Depleted

Source: Authors’ calculations using Federal Reserve System, Federal Reserve Board, Laubach and Williams, Census Bureau’s Annual Survey of State and Local Government Finances, CBO, DOL, BEA, BLS, Haver Analytics
Isolate Effects of Depleted Policy Buffers

- Consider differences in outcomes between situation with the usual policy responses and with all policy buffers being depleted
- Differences are large and vary substantially across states
  - Southern states now among those most severely impacted by policy buffer depletion
  - Midwestern agricultural states account for most of the states with the smallest negative deviation
Figure 10: Difference in Outcomes between No Depleted Policy Buffers and All Buffers Limited

Source: Authors’ calculations using Federal Reserve System, Federal Reserve Board, Laubach and Williams, Census Bureau’s Annual Survey of State and Local Government Finances, CBO, DOL, BEA, BLS, Haver Analytics
Message from the Simulations

- Not only are states differentially affected by recessions, they are also differentially affected by the extent to which policy buffers are insufficient to provide adequate countercyclical policy responses.
- Differences can be quite large.
- Still, effects are understated because they ignore feedback effects on UR from weak policy response.
  - Feedback will magnify both size of decline in personal income growth rates and extent of divergence in economic performance across states.
Concluding Comments

- In current environment, more likely that FFR will hit ELB, short-circuiting countercyclical MP
- Effects will not fall evenly on states
- Limitations on what has been the first, and often the last, resort for countercyclical policy heightens importance of establishing adequate buffers for nonmonetary policy tools
- Concerns about rising federal debt, limited state and local fiscal policy buffers, and any weakening of bank capital regulations