Optimal Fiscal Policy over the Business Cycle Revisited

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Questions

▶ Current crisis financed by deficit, is that a good idea?

▶ What is the optimal size and composition of a stimulus package?

▶ What are the *short run* and the *long run* consequences?

▶ What is the optimal amount of debt?
American Recovery and Reinvestment Act 2009

- Increase in spending (3.5% of GDP)
- Tax cuts (2.0% of GDP)
- Financed by debt

Note: See Alesina and Ardagna (2009) for 90 other episodes
In the period of a negative productivity shock

▶ Labor income taxes: can decrease depending on preferences

▶ Capital income taxes: increase substantially

▶ Debt: decreases
Main Findings

In the period of a negative shock

- With state contingent debt
  1. Labor income taxes decrease
  2. Capital income taxes decrease
  3. State contingent debt *decreases!*

- Without state contingent debt
  1. Labor income taxes decrease
  2. Capital income taxes decrease
  3. Debt increases
Related Literature

- Complete markets
  - Chari, Christiano, and Kehoe, 1994

- Incomplete markets without capital income taxes
  - Aiyagari, Marcet, Sargent, and Seppälä, 2002
  - Scott, 2007
  - Marcet and Scott, 2009

- Incomplete markets with pre-announced capital income taxes
  - Farhi, 2009
Household Problem

- Preferences

\[
\sum_{t=0}^{\infty} \sum_{s^t} \beta^t \pi(s^t) U\left(c(s^t), l(s^t)\right)
\]

- Budget Constraint

\[
c(s^t) + k(s^t) + \sum_{s^t+1} q(s^t, s_{t+1}) b(s^t, s_{t+1})
\]

\[
= w(s^t) l(s^t) + r(s^t) k(s^t) + k(s^{t-1}) + b(s^t)
\]

Microfoundation
Technology and Feasibility

- Production

\[ y(s^t) = A(s^t)k(s^t)^{\alpha}l(s^t)^{1-\alpha} \]

where \( \alpha < 1 \)

- Feasibility

\[ c(s^t) + k(s^t) + g(s^t) = y(s^t) - \delta k(s^t) + k(s^{t-1}) \]
Ramsey Problem

- **Objective function**

\[
\max_{c,l,k_{(t,s^t)}} \sum_{t,s^t} \beta^t \pi(s^t) U(c(s^t), l(s^t))
\]

- **Subject to**
  - feasibility
  - implementability constraint

\[
\sum_{t,s^t} \beta^t \pi(s^t) [U_c(s^t)c(s^t) + U_l(s^t)l(s^t)] = A_0
\]

where \( A_0 = U_c(s_0)(k_{-1} + b_{-1}) \)

Note: GBC holds
Value of $\lambda$ deterministic case
Simulation Results

In the period of a 2% negative shock:

- Labor income tax revenue: -0.40% of GDP
- Capital income tax revenue: -0.04% of GDP
- Government debt: -4.32% of GDP

⇒ New debt issued goes down in bad times!
Ruling out State Contingent Debt

- Budget constraint with state contingent debt

\[ c(s^t) + k(s^t) + \sum_{s_{t+1}} q(s^t, s_{t+1}) b(s^t, s_{t+1}) \]

\[ = w(s^t)l(s^t) + r(s^t)k(s^t) + k(s^{t-1}) + b(s^t) \]

- Budget constraint without state contingent debt

\[ c(s^t) + k(s^t) + q(s^t)b(s^t) \]

\[ = w(s^t)l(s^t) + r(s^t)k(s^t) + k(s^{t-1}) + b(s^{t-1}) \]
Theoretical Results

If $U(c, l) = c + v(l)$ then

1. The capital income tax rate is zero

2. The Ramsey allocation converges to a first best allocation (negative bonds $\Rightarrow$ no distortions)
Simulation: $\lambda$ and Debt
Quantitative Results with IM ($\rho = 0.5$)

In the period of a 2% negative shock:

- Government spending: 0.0% of GDP
- Labor income tax revenue: -1.02% of GDP
  - change in labor tax rate -.004
- Capital income tax revenue: -0.21% of GDP
  - change in capital tax rate -1.26
- Increase in government debt: 1.31% of GDP
Debt over GDP USA

Source: IMF
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Debt over GDP France

Source: IMF

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Debt over GDP Italy

Source: IMF
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Debt over GDP Japan

Source: IMF
Alessandro Mennuni (Southampton and EUI)
Conclusion

- Business cycle model with elastic capital-supply
- Study complete and incomplete markets
- Provide a rationale for some kind of stimulus package within the neoclassical framework
- Plausible policy implications
- Found an ‘optimal’ amount of debt/gdp in the long run
Related questions for future work

- What is the optimal amount of debt in the long run?
  - EU put a number, 60%, on the basis of nothing.
  - Theory with complete markets cannot address this question
  - We can! (Ramsey taxation with incomplete markets)
Related questions for future work

- Gov. bonds interest rates react more to deficit than to debt

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<thead>
<tr>
<th>Table: Fiscal Variables</th>
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<td>5 yrs C.D.S.</td>
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<td>Debt / GDP</td>
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<td>Deficit / GDP</td>
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- See if this is predicted by these models, or how to amend them to account for it
Microfoundation

- Period $t$ composed of $n$ sub-periods

- First sub-period budget constraint

\[
c(s^t, 1) + k(s^t, 1) + \sum_{s_{t+1}} q(s^t, s_{t+1}) b(s^t, s_{t+1}) = w(s^t, 1) l(s^t, 1) + (1 + r(s^t, 1)) k(s^{t-1}) + b(s^t)
\]

- Sub-periods 2 to $n$

\[
c(s^t, i) + k(s^t, i) = w(s^t, i) l(s^t, i) + (1 + r(s^t, i)) k(s^t, i - 1), \ i = 2, ..., n
\]
Microfoundation

- Summing up the sub-periods budget constraints

\[
\sum_{i=1}^{n} c(s^t, i) + k(s^t, n) + \sum_{s_{t+1}} q(s^t, s_{t+1})b(s^t, s_{t+1})
\]

\[
= \sum_{i=1}^{n} \left[ w(s^t, i)l(s^t, i) + r(s^t, i)k(s^t, i - 1) \right] + k(s^{t-1}) + b(s^t)
\]

- Conventional assumption

\[
\sum_{i=1}^{n} \left[ (r(s^t, i))k(s^t, i - 1) \right] = r(s^t)k(s^{t-1})
\]

- Opposite extreme

\[
\sum_{i=1}^{n} \left[ (r(s^t, i))k(s^t, i - 1) \right] = r(s^t)k(s^t)
\]

Go to Household

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