DISCUSSION OF CARDIA’S PAPER

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Agenda

- What is Ricardian Equivalence?
- What did Cardia do?
- Is the simulation credible?
- Are the reported results reasonable?
What is Ricardian Equivalence?

Are Government Bonds Net Wealth?

Barro says:

- under some circumstances, private agents do not take public debt as net wealth (intergeneration connections like bequest)

- the options among *lump-sum* taxes and public debt to finance government expenditure do not affect either private consumption nor capital accumulation
What does Ricardian Equivalence imply?

Budget Deficits Vs Current Account Deficits

יך Traditional View (small open economy)

- Budget deficits $\rightarrow$ Expansion in AD $\rightarrow$ Desired National Saving Decreases $\rightarrow$ Constant Interest Rate $\rightarrow$
- Borrowing From Abroad $\rightarrow$ Current Account Deficits

יך Ricardian View

As long as the present value of current tax cut and future tax increase are the same, the consumption won’t change, that is to say, the current budget deficits won’t lead to current account deficits
Is Ricardian Equivalence True?

Barro says:

- As long as the solution of inheritance is interior, RE holds even with finite life and inheritance taxes.

- However, under some circumstances, RE may not hold: heterogeneous agents, transaction costs of government bonds, imperfect (private) capital market, monopoly power of liquidity service.
Objections to Ricardian Equivalence

- People do not live forever
- Private capital market are imperfect
- Future taxes and income are uncertain
- Taxes are not lump-sum in general
- The Ricardian results hinges on full employment
Support—Kormendi (1983)

Kormendi’s Test (1930-1976 US)

\[ \Delta P_{Ct} = a_0 + a_{11} \Delta Y + a_{12} \Delta Y_t + a_2 \Delta G_{St} + a_3 \Delta W_t + a_4 \Delta T_{Rt} + a_5 \Delta T_{Xt} + a_6 \Delta R_{Et} + a_7 \Delta G_{INTt} + u_t \]

Results:
- Coefficient of TX, RE and GINT are insignificantly differently from zero
- F-test cannot reject the null hypothesis that the coefficient of TX, RE and GINT are zero
Reject: Modigliani & Sterling (1986)

Modigliani & Sterling Test (1949-1984 US)
\[ C_t = a + b_0 A_t + b_1 G_t + \sum c_i (Y_{t-i} - T_{t-i}) + \sum d_i D_{t-1} \]

Results:
- consumption should be affected both by taxes and by government expenditure
- as long as the representative planning horizon does not extend significantly beyond life, the role of taxes could be expected to be substantially larger than that of expenditure
Cardia’s Work

Construct a Usual Macroeconomic Model

Calibrate the Parameters and Specify the shocks

Simulate the Model

Regress the Consumption Equation

Test Ricardian Equivalence
Main Assumptions

- Small open economy, One homogeneous tradable good
- Perfectly integrated international financial capital market
- All shocks are domestic
- Perpetual youth assumption in the households
Main Result——No result

- Estimated Equation
  \[ C_t = a_0 + a_1 Y_t + a_2 Y_{t-1} + a_3 w_t + a_4 G_t + a_5 TR_t + a_6 b_t + u_t \]

- These tests produce estimates of the effects of taxation and government debt on consumption that are not robust, which suggests that standard tests might not be capable of providing conclusive evidence about Ricardian Equivalence whether it is true or wrong.
What the economic theories try to establish are not well predictable outcomes.

Rather, economists investigate the significant factors and their influences that make "ideal" theories fail (empirically).

Benchmark---Empirically inconsistent results--Feedback

Example: Economic Equilibrium Theory, MM Theorem, Perfect Market Hypothesis, Ricardian Equivalence

Innovations of simulation: doing statistical analysis by deducing equations of economic variables from theoretical models but not directly using reduced-form functions.
Some Limitations that Might Arise

- The imperfectness of financial market, heterogeneity of agents, uncertainty of future income are not tested in this simulations (which are significant factors influencing consumption functions!)
- Thus we cannot say more about the R-E beyond the theoretical models of this simulation.
- Empirical data adopted may be inappropriate or incomplete
  1. real economy -- outcomes of very complex system
  2. measure endogeneity -- how to measure wealth?
Potential Extensions

- More complex or realistic process other than AR(1) to describe the government policy
- Model consumers' Financial Constraint
- Heterogeneous Agents--Two types, poor and wealthy. Poor are more liquid constrained and have more own substitute effects of public projects, such as education, health insurance etc.
- Model agents' utility as function of government expenditure, i.e., $u(c, g)$
  (it makes sense since research on R-E is mainly about the relationship of $g$ and $c$)

Why not have a try as your memoire?!
Is the Reported Results Reasonable?

- Results Analysis
- Endogeneity Problem
Impact of Simulation on the Results

- Productivity shock plays the most important part which is randomly generated by simulation.
- The correlation parameters carry the whole influence of the all three shocks (productivity shock, TR shock, government spending shock).
### Table 5—OLS Estimates of Consumption Equation* (Case 2, Distortionary Taxation)

<table>
<thead>
<tr>
<th>Equation</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<td>$c_t$</td>
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<td>Const</td>
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<td>(49.60)</td>
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<td>0.200</td>
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<td>-0.051</td>
<td>-0.052</td>
<td>-0.039</td>
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<td>$w_t'$</td>
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<td>(28.81)</td>
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<td>$TR_t$</td>
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<td>-0.005</td>
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<td></td>
<td>(-0.09)</td>
<td>(-0.73)</td>
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<td>$b_t$</td>
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<td>0.005</td>
<td>0.005</td>
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<td>(1.57)</td>
<td>(1.44)</td>
<td>(1.44)</td>
<td>(0.69)</td>
<td>(0.69)</td>
<td>(0.51)</td>
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</table>

Consistent with Ricardian
equiv. 73.1% 33.8% 42.2% 95.1% 57.6% 64.0%
Consistent with non-Ricardian
view 14.7% 49.9% 43.8% 3.8% 30.9% 23.9%

*See notes to Table 4. The mean value of the estimated first-order serial correlation coefficient is 0.439 for the first equation, 0.411 for the second, and 0.439 for the third.
Parameter-Dependence

Table 6—OLS Estimates of Consumption Equation* (Case 3, finite horizon)

<table>
<thead>
<tr>
<th>Equation</th>
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<td></td>
<td>C-O</td>
<td>C-O</td>
<td>C-O</td>
<td>FD</td>
<td>FD</td>
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<td>(25.35)</td>
<td>(27.24)</td>
<td>(13.57)</td>
<td>(0.04)</td>
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<td>$Y_t$</td>
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<td>(51.18)</td>
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<td>$Y_{t-1}$</td>
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<td>-0.038</td>
<td>-0.036</td>
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<td>(-9.29)</td>
<td>(-9.29)</td>
<td>(-4.90)</td>
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<td>$w_t^p$</td>
<td>0.038</td>
<td>0.043</td>
<td>0.044</td>
<td>0.029</td>
<td>0.036</td>
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<td>(26.94)</td>
<td>(30.65)</td>
<td>(16.70)</td>
<td>(7.20)</td>
<td>(8.33)</td>
<td>(3.35)</td>
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<td>$G_t$</td>
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<td>-0.409</td>
<td>-0.407</td>
<td>-0.409</td>
<td>-0.406</td>
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<td>(-23.43)</td>
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<td>$TR_t$</td>
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<td>$b_t$</td>
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<td>(8.15)</td>
<td>(2.40)</td>
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Consistent with Ricardian equiv. view

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<th></th>
<th>4.2%</th>
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<th>43.0%</th>
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<th>0.0%</th>
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<td>Consistent with non-Ricardian view</td>
<td>95.8%</td>
<td>99.6%</td>
<td>52.1%</td>
<td>100%</td>
<td>100%</td>
<td>4.6%</td>
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</table>

$* See notes to Table 4. The mean value of the estimated first-order serial correlation coefficient is 0.653 for the first equation, 0.453 for the second, and 0.546 for the third.

**with a relative large value of $\eta$, the test could not reject the Ricardian equivalence**
Endogeneity Problem

- Uni-equation consumption function easily causes endogeneity problems
- The inference about the value of the correlation parameter is not clear
- Other methodology is needed
Merci!
Bon Week-end!