How Large is the Government Spending Multiplier? Evidence from World Bank Lending

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Motivation

- Empirically identifying government spending multiplier: many endogeneity problems.

- Literature provides a wide array of estimates, from -0.2 to more than 1.

- Theoretical models do not give a clear answer: neoclassical and new-keynesian models provide different mechanisms and different numbers.
Research question

Three solutions are usually proposed in the literature:

1. **SVARs**;
   Usual identification assumption: government spending cannot react to GDP in the same quarter. (Blanchard and Perotti, 2002)

2. Narrative approach: find a series of spending innovations uncorrelated with GDP;
   Typical solution: military buildups in the US (Ramey and Shapiro, 1998)

3. Find a good instrument for spending innovations;
   Example: changes in congressional committee chairmanship (Cohen, Covall, Malloy 2010)

Kraay: use **World Bank Lending** to poor countries as an instrument for innovations in government spending!
Why use world bank lending?

1. For poor countries who depend very much on external financing, world bank lending is a large proportion of government spending;

2. World Bank lending is not completely exogenous with respect to GDP cycle: but predicted lending is.

3. Timing of disbursement may not be completely exogenous: but the typical spending profile is.

Results

- The estimated spending multiplier is relatively small (0.48), and reasonably precisely estimated.

- Estimates vary through different robustness checks (from 0.1 to 0.8).

- Possible explanations:
  1. Neoclassical mechanism at work (future taxes to repay debt = more working today) plus high dependency from foreign aid;
  2. New Keynesian rigidities are less important in poor countries (rule-of-thumb consumers?);
Empirical Framework

- Minimal empirical framework:
  \[
  \frac{y_t - y_{t-1}}{y_{t-1}} = \alpha + \beta \frac{g_t - g_{t-1}}{g_{t-1}} + \epsilon_t \tag{1}
  \]

- Define $\Delta x_t$ as the deviation of $\frac{x_t - x_{t-1}}{x_{t-1}}$ from the country’s year average. Then the equation becomes
  \[
  \Delta y_t = \alpha + \beta \Delta g_t + \epsilon_t \tag{2}
  \]

Endogeneity

- Standard difficulty in identifying $\beta_t$: $E[\Delta g_t \epsilon_t] \neq 0$
- If automatic stabilizers are important, $E[\Delta g_t \epsilon_t] < 0$
- If government spending is procyclical, $E[\Delta g_t \epsilon_t] > 0$
World Bank projects are financed by loans provided by the bank; Projects are approved in one year, then financed for many years to come. Approval in one year may be correlated to economic condition (attempt to use as stabilizer)... → but spending for subsequent years is unlikely to be correlated with future macroeconomic conditions. Problem: actual disbursements often change due to implementation problems, delays, countries not meeting requirements... → but predicted disbursements do not take this into account!
The Instrument

- **Instrument**: synthetic measure of *predicted disbursements* based on typical disbursement profiles, taking out the year of project approval.
- Typical profiles construction: averaging between projects in same country/sector.

![Image: Average Disbursement Profile for 7443 World Bank projects between 1985 and 2009.](image.png)

**Figura**: Average Disbursement Profile for 7443 World Bank projects between 1985 and 2009.
The Instrument

- 1989: Stopped financing due to country not paying debt services (coup d’état).

Figura: Measures of WB disbursements to Zambia.
## The Instrument

<table>
<thead>
<tr>
<th>Code</th>
<th>Country</th>
<th>Number of Observations</th>
<th>Average Disbursements on World Bank Projects (Share of GDP) (%)</th>
<th>Total Government Spending (Share of GDP) (%)</th>
<th>World Bank Disbursements (Share of Total Government Spending) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH</td>
<td>Ethiopia</td>
<td>24</td>
<td>1.9</td>
<td>21.5</td>
<td>9.4</td>
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<tr>
<td>GHA</td>
<td>Ghana</td>
<td>24</td>
<td>3.0</td>
<td>27.1</td>
<td>12.5</td>
</tr>
<tr>
<td>GIN</td>
<td>Guinea</td>
<td>24</td>
<td>1.7</td>
<td>18.6</td>
<td>9.4</td>
</tr>
<tr>
<td>GMB</td>
<td>Gambia</td>
<td>24</td>
<td>3.1</td>
<td>26.6</td>
<td>11.0</td>
</tr>
<tr>
<td>JOR</td>
<td>Jordan</td>
<td>24</td>
<td>1.2</td>
<td>36.4</td>
<td>2.9</td>
</tr>
<tr>
<td>KEN</td>
<td>Kenya</td>
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<td>1.3</td>
<td>22.9</td>
<td>5.7</td>
</tr>
<tr>
<td>LSO</td>
<td>Lesotho</td>
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<td>2.0</td>
<td>54.9</td>
<td>3.7</td>
</tr>
<tr>
<td>MAR</td>
<td>Morocco</td>
<td>24</td>
<td>1.0</td>
<td>24.8</td>
<td>2.8</td>
</tr>
<tr>
<td>MDG</td>
<td>Madagascar</td>
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<td>2.9</td>
<td>18.5</td>
<td>16.1</td>
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<tr>
<td>MLI</td>
<td>Mali</td>
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<td>2.5</td>
<td>24.5</td>
<td>10.1</td>
</tr>
<tr>
<td>MWI</td>
<td>Malawi</td>
<td>24</td>
<td>4.6</td>
<td>29.5</td>
<td>15.8</td>
</tr>
<tr>
<td>NER</td>
<td>Niger</td>
<td>24</td>
<td>2.2</td>
<td>19.1</td>
<td>11.8</td>
</tr>
<tr>
<td>RWA</td>
<td>Rwanda</td>
<td>24</td>
<td>2.6</td>
<td>22.0</td>
<td>13.0</td>
</tr>
</tbody>
</table>

**Figura**: Subset of the 29 countries included in the analysis.
### Results: Baseline

**Panel A: Estimates of Spending Multiplier**  
*(Dependent variable is Change in Real GDP)*

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>2SLS</th>
<th>2SLS</th>
<th>2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Total</td>
<td>0.228*</td>
<td>0.475</td>
<td>0.665</td>
<td>0.627</td>
</tr>
<tr>
<td>Government Spending</td>
<td>(0.0547)</td>
<td>(0.287)</td>
<td>(0.434)</td>
<td>(0.450)</td>
</tr>
<tr>
<td>Weak Instrument Consistent 95% CI</td>
<td>[−0.064, 1.121]</td>
<td>[−0.037, 1.757]</td>
<td>[−0.054, 1.630]</td>
<td></td>
</tr>
</tbody>
</table>

**Panel B: First-Stage Regressions**  
*(Dependent variable is Change in Total Government Spending)*

<table>
<thead>
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<th></th>
<th>OLS</th>
<th>OLS</th>
<th>OLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Predicted Disbursements</td>
<td>1.029***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.266)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Actual Disbursements</td>
<td>0.281***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0936)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Actual Disbursements Excluding Projects Approved in Same Year</td>
<td>0.380***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.133)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-statistic on Excluded Instrument</td>
<td>14.97</td>
<td>9.03</td>
<td>8.15</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>610</td>
<td>610</td>
<td>610</td>
</tr>
</tbody>
</table>
Robustness Checks

1. Remove influential observations
   → Estimated multiplier ranges from 0.1 to 0.8 depending on the methodology.

2. Check for violation of exogeneity of WB disbursements;
   controlling for lagged growth, lagged spending, policy change (CPIA).
   → Results do not change significantly.
Explanation for results

1. **Anticipation effects**: if spending shocks are anticipated, multipliers are smaller (Ramey 2011)
   → mixed evidence.
   - Consumption falls and Investment increases in line with unanticipated shocks...
   - but approval of project itself (with no financing) has positive impact on GDP, in line with anticipated shocks.

2. **Cheap financing**: if financing public debt is cheap (the case for most heavily-aided countries), wealth effect is small;
   → neoclassical multiplier mechanism becomes weaker.

3. **Less frictions in poor countries**
   → very hard to find convincing empirical evidence for this.
Conclusions

- The author uses World Bank project financing data to instrument government expenditure in poor countries;

- Finds that the multiplier is around 0.48 (precision close to comparable papers);

- Estimate is at the low end of the literature; possible explanation relies on low burden of debt for poor countries + neoclassical mechanism at work.