Discussion of

Debt or Demand: Which Holds Investment Back?
Evidence from an Investment Tax Credit

Presented at the Banque de France conference
“Investment in the new monetary and financial environment”
Paris, July 5th 2018

Antonio De Socio
Bank of Italy
Financial Stability Directorate
Objective:
Study the role of debt and demand on investment using a temporary tax incentive (for exporters) and IV methodology

Main results:
1. Debt burden has non linear negative effect on the use of the incentive...
2. ... and reduces the positive effect of demand
3. The effect on investment (of receivers) is somehow less clear
Outline of the discussion

Relevant topic, clearly structured paper, nice methodology
Some clarifications could be useful - also to assess/interpret the results

Remarks (questions) and suggestions
1. \(Y\): Investment tax credit and data
2. \(X\): Debt burden and product demand
3. \(Y\&X\): Regressions and results
4. Robustness/extensions
1 - Investment Tax Credit (2013)

Announced in May 2013; large, universal, automatic, deferrable (5Y)
There is evidence that effects are unrelated to other supporting measures.

Data refer to 2013-14 (due to availability issue?)

Mostly medium-large firms (24%); negligible for micro (1%)
1. Why so low (is it?): how many medium-large firms invested (Capex)?
2. Possibly due to higher proportion of unprofitable smaller firms
   -> is their share higher in 2014?
1 - Data

1. Size classes
EU definition (4 classes) VS Survey (200 employees)
Why mostly the second is used (<200 are nearly all firms)?

2. Statistics/number of firms refer to different time periods
Useful for general considerations BUT
Descriptive statistics for firms included in the regressions should be showed (e.g. exporters OR related to the Survey AND with balance sheet data between 2011-12 AND tax info in 2013 or 2014)

3. Why only firms with Credit Register information are included?
2 – (Non-linear) Debt burden...

Combine quartiles of 3 measures: Debt/EBITDA, Cash Fl/Debt, Int paid/EBITDA

1. Are highly correlated?  
   Alternative: principal component analysis?

2. I VS II qtile: more firms & less users (Tab. 3)

3. Role of non financial debt (trade/public): are there differences across size and industry (a reason not to use leverage measures)?

4. What about firms with zero debt or interest expenses (if any)?
2 - ... or unprofitable firms?

5. Does “high debt burden” proxies for negative EBITDA? Around 1/3 of the sample, by construction included in higher single quartile

• In which final quartile are mostly included?
• How many obtained tax incentives?

Indeed a lot of non users are really unprofitable/risky firms (24% have negative capital!)
Such firms have zero/negligible investment opportunities =expected effect of tax incentives

Table 2: Firm Characteristics by Use of Tax Credit

<table>
<thead>
<tr>
<th>Credit Risk</th>
<th>No Tax Credit</th>
<th>Tax Credit</th>
<th>All</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>0.05</td>
<td>0.02</td>
<td>0.05</td>
<td>128.74***</td>
</tr>
<tr>
<td>Bankruptcy indicator</td>
<td>0.05</td>
<td>0.00</td>
<td>0.04</td>
<td>103.13***</td>
</tr>
<tr>
<td>Default indicator</td>
<td>0.06</td>
<td>0.05</td>
<td>0.06</td>
<td>116.48***</td>
</tr>
<tr>
<td>Negative Capital indicator</td>
<td>0.24</td>
<td>0.06</td>
<td>0.24</td>
<td>186.26***</td>
</tr>
<tr>
<td>Cash Flow / Assets</td>
<td>-0.05</td>
<td>0.10</td>
<td>-0.04</td>
<td>-161.96***</td>
</tr>
<tr>
<td>Capital / Assets</td>
<td>0.03</td>
<td>0.38</td>
<td>0.04</td>
<td>-159.25***</td>
</tr>
</tbody>
</table>
2 - Product demand

a) IV for exporting firms (around 20,000; 3,000 of 8,000 receivers)
Combines time invariant firm product(s) AND time varying country imports
Firms weights based on share of product(s) & destination
• Averages over 2005-2011
Are stable during these years = is representative of 2013-14?
• Baseline = only core product (highest average export value)
-> some information on its share over exports would be useful
-> robustness could be shown
• Value = price * quantity (could be separated?)
Investment should be stimulated by increase in quantity, not in price

b) Survey on the causes of low investment (threshold: 200 employees)
Which year(s) are used (2013-14)?
3. Regressions - model

\[ \Pr(\text{take up})_i = \beta^{\text{demand}} \log \hat{S}_i + \sum_{j=1}^{3} \beta_j^{\text{debt} \text{ quartile}_i} + \]
\[ \sum_{j=1}^{3} \beta_j^{\text{interact quartile}_i} \times \log \hat{S}_i + \gamma X_i + u_i \]

\[ \log \hat{S}_i = \hat{\alpha}^Z Z_i + \sum_{j=1}^{3} \hat{\alpha}_j^{\text{debt} \text{ quartile}_i} + \hat{\theta} X_i \]

Controls, \(X_i\), include 2012 levels and growth rates so that \(X_{ijdb} = \{X_{ijdb,t-1}, \Delta X_{ijdb,t-1}\}\). We control for credit default risk, computed following the methodology in Antunes et al. (2016), indicators for insolvency, past default, and negative equity. We also control for past investment trends by including fixed assets growth, TFP, and cash levels. Finally, we include a dummy variable indicating whether a firm paid income tax in 2012 and the level of other investment tax benefits received. Where possible we include firm size category, industry, district, and banking group fixed effects. The banking group fixed effects are defined as the banking group of the main lender of each firm (the bank with

Why level and changes are included?

Why negative EBITDA is not included (it is related to 4th quartile?)
3. Regressions – First stage

R square/F-test are similar independently of instrument used: what is influencing the explained variance?

Is there a non linear relation? Maybe instrument could be improved (derive different debt burden?)

Table 6: First Stage Results

<table>
<thead>
<tr>
<th></th>
<th>Foreign Demand</th>
<th>Domestic Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.335***</td>
<td>6.429***</td>
</tr>
<tr>
<td></td>
<td>(0.904)</td>
<td>(0.673)</td>
</tr>
<tr>
<td></td>
<td>8.712***</td>
<td>9.283***</td>
</tr>
<tr>
<td></td>
<td>(0.547)</td>
<td>(0.574)</td>
</tr>
<tr>
<td>% Firms Citing Poor Sales</td>
<td>1.971***</td>
<td>1.985***</td>
</tr>
<tr>
<td></td>
<td>(0.650)</td>
<td>(0.660)</td>
</tr>
<tr>
<td>2nd Debt Quartile</td>
<td>-4.181***</td>
<td>-4.347***</td>
</tr>
<tr>
<td></td>
<td>[-1.611]</td>
<td>[-1.843]</td>
</tr>
<tr>
<td>3rd Debt Quartile</td>
<td>-8.394***</td>
<td>-9.075***</td>
</tr>
<tr>
<td></td>
<td>[-1.774]</td>
<td>[-1.286]</td>
</tr>
<tr>
<td>4th Debt Quartile</td>
<td>-28.123***</td>
<td>-29.473***</td>
</tr>
<tr>
<td></td>
<td>[-2.700]</td>
<td>[-2.774]</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.621</td>
<td>0.611</td>
</tr>
<tr>
<td>Observations</td>
<td>15,152</td>
<td>14,738</td>
</tr>
<tr>
<td>Sample</td>
<td>All Firms &lt;200 employees</td>
<td>All Firms &lt;200 employees</td>
</tr>
</tbody>
</table>
3. Regressions – Main results

The effect of HIGH debt burden is not significant if firms with positive EBITDA (only?) are included (huge standard errors)

“Results on investment suffer from weak instrument”

Alternative definition of demand/debt burden (aim: avoid to combine III&IV)?

Table 2: Regression Results: Amount Invested

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLS</td>
<td>Trade Measure</td>
<td>Ln(Revenue) instrumented using</td>
<td>Trade Measure</td>
<td>Ln(Revenue) instrumented using</td>
<td>Trade Measure</td>
<td>Ln(Revenue) instrumented using</td>
</tr>
<tr>
<td>Sample Ln(sales)</td>
<td>0.891***</td>
<td>[0.037]</td>
<td>1.376**</td>
<td>[0.068]</td>
<td>1.179*</td>
<td>[0.642]</td>
</tr>
<tr>
<td>2nd Debt Quartile</td>
<td>0.033</td>
<td>0.043</td>
<td>0.065</td>
<td>0.063</td>
<td>-0.029</td>
<td>0.034</td>
</tr>
<tr>
<td>3rd Debt Quartile</td>
<td>-0.077</td>
<td>-0.227&quot;</td>
<td>-0.176</td>
<td>0.591</td>
<td>0.595</td>
<td>-0.070</td>
</tr>
<tr>
<td>4th Debt Quartile</td>
<td>-0.073</td>
<td>[0.016]</td>
<td>[0.120]</td>
<td>[0.881]</td>
<td>[0.915]</td>
<td>[0.161]</td>
</tr>
<tr>
<td>First stage F-statistic</td>
<td>10.94</td>
<td>11.53</td>
<td>3.42</td>
<td>3.72</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>0.537</td>
<td>2.492</td>
<td>2.325</td>
<td>4.850</td>
<td>4.641</td>
<td>2.439</td>
</tr>
</tbody>
</table>
4. Robustness/Extensions

1. Regressions by size classes (VS <200employee)?

2. Debt burden:
   • Principal component analysis (and deciles, instead of quartiles)?
   • Assess role of negative EBITDA

3. Product demand:
   • show robustness tests on different definitions (first and second stage)
   • rely on “export measure” and use the Survey as a robustness check?

4. Show also the results of other variables (firm characteristics)

5. Role of banks on top of demand&debt (supply side): not only «fixed effect»