Discussion of "Financing Corporate Growth" by Frank and Sanati

Nicolas Crouzet

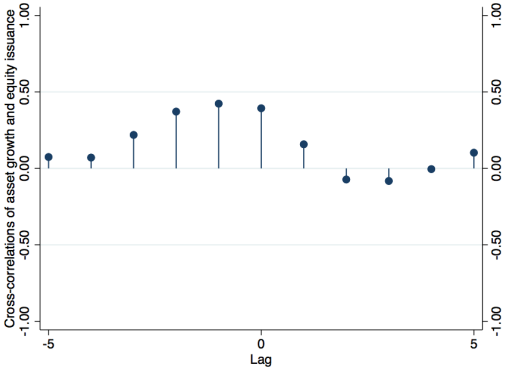
Northwestern and Chicago Fed

How do firms finance investment?

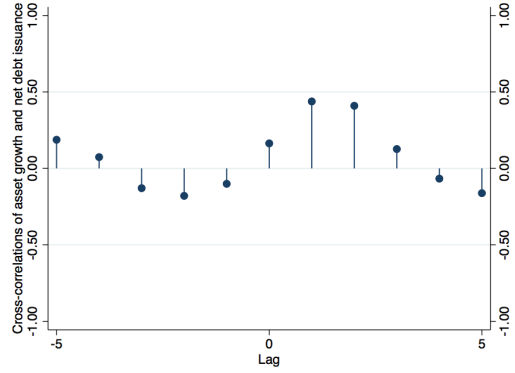
Aggregate data suggests firms follow a "financial cycle":

1. issue equity from years $t-2$ to t
2. grow assets at t
3. pay out to shareholders and increase debt from years $t+1$ to $t+2$

(a) Corr. btw $\frac{\Delta A_{t+1}}{A_t}$ (t=0) and $\frac{\Delta E_{t+1}}{A_t}$ (t=-5,...,+5)



(b) Corr. btw $\frac{\Delta A_{t+1}}{A_t}$ (t=0) and $\frac{\Delta B_{t+1}}{A_t}$ (t=-5,...,+5)



How do firms finance investment?

Aggregate data suggests firms follow a "financial cycle":

1. issue equity from years $t-2$ to t
2. grow assets at t
3. pay out to shareholders and increase debt from years $t+1$ to $t+2$

\$1 equity issuance $\rightarrow$ \$0.93 asset growth

\$1 debt issuance $\rightarrow$ \$0.14 asset growth

Also true in firm-level data

Model with debt limit à la Jermann and Quadrini (2012) can rationalize this

1. Facts

How is investment financed?

Paper: FoF or mix of Compustat cash flow (CF) and balance sheet (BS)

Exact identity in CF statements:

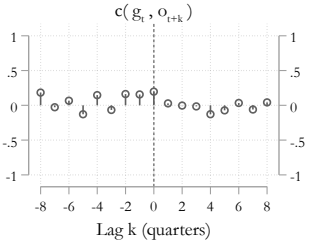
$$\underbrace{\Delta A_{t+1} + \delta A_t}_{\text{Gross investment}} = \underbrace{Y_t - r_t B_t - T_t}_{\text{Operating cash flow}} + \underbrace{\Delta E_{t+1} - D_t}_{\text{Equity issuance}} + \underbrace{\Delta B_{t+1}}_{\text{Debt issuance}}$$

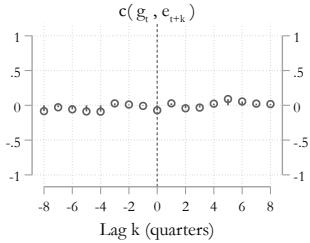
In ratios:

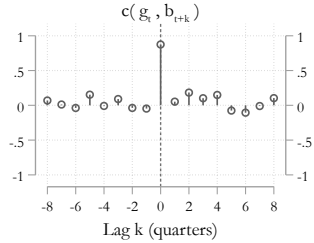
$$\frac{\Delta A_{t+1} + \delta A_t}{A_t} = \frac{Y_t - r_t B_t - T_t}{A_t} + \frac{\Delta E_{t+1} - D_t}{A_t} + \frac{\Delta B_{t+1}}{A_t}$$

$$g_t = o_t + e_t + b_t$$

Boeing





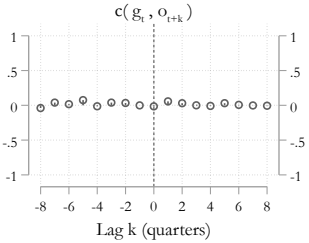


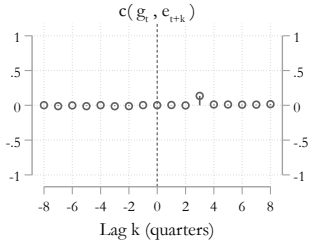
$$c(g_t, x_{t+k}) \equiv \frac{cov(g_t, x_{t+k})}{var(g_t)}$$

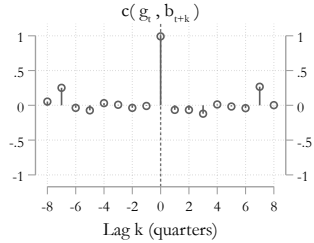
$$\text{Lag } 0: \quad 1 = c(g_t, o_t) + c(g_t, e_t) + c(g_t, b_t)$$

$$\text{Lag } k: \quad corr(g_t, g_{t+k}) = c(g_t, o_{t+k}) + c(g_t, e_{t+k}) + c(g_t, b_{t+k})$$

Valspar





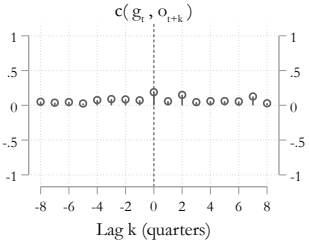


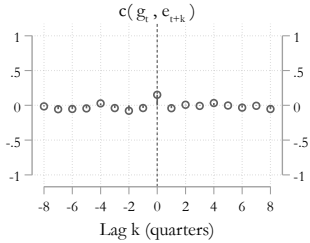
$$c(g_t, x_{t+k}) \equiv \frac{cov(g_t, x_{t+k})}{var(g_t)}$$

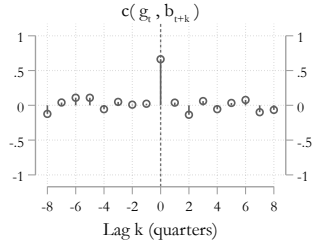
$$\text{Lag } 0: \quad 1 = c(g_t, o_t) + c(g_t, e_t) + c(g_t, b_t)$$

$$\text{Lag } k: \quad corr(g_t, g_{t+k}) = c(g_t, o_{t+k}) + c(g_t, e_{t+k}) + c(g_t, b_{t+k})$$

Pfizer





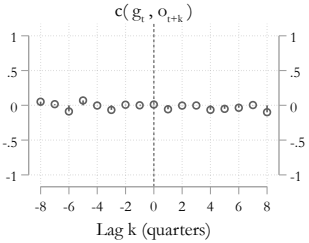


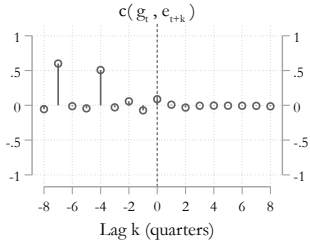
$$c(g_t, x_{t+k}) \equiv \frac{cov(g_t, x_{t+k})}{var(g_t)}$$

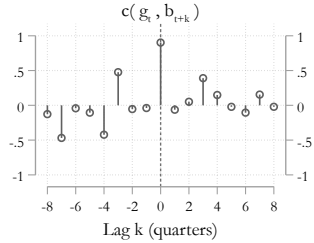
$$\text{Lag } 0: \quad 1 = c(g_t, o_t) + c(g_t, e_t) + c(g_t, b_t)$$

$$\text{Lag } k: \quad corr(g_t, g_{t+k}) = c(g_t, o_{t+k}) + c(g_t, e_{t+k}) + c(g_t, b_{t+k})$$

Amazon





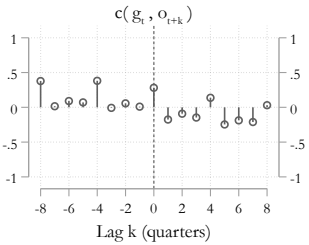


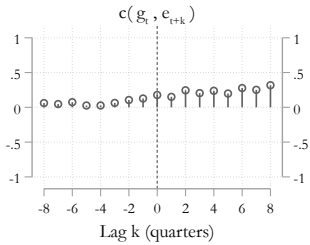
$$c(g_t, x_{t+k}) \equiv \frac{cov(g_t, x_{t+k})}{var(g_t)}$$

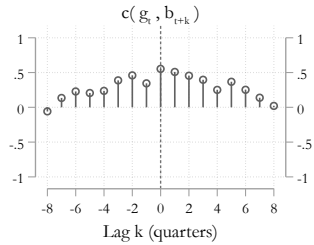
$$\text{Lag } 0: \quad 1 = c(g_t, o_t) + c(g_t, e_t) + c(g_t, b_t)$$

$$\text{Lag } k: \quad corr(g_t, g_{t+k}) = c(g_t, o_{t+k}) + c(g_t, e_{t+k}) + c(g_t, b_{t+k})$$

Aggregated data







$$c(g_t, x_{t+k}) \equiv \frac{cov(g_t, x_{t+k})}{var(g_t)}$$

$$\text{Lag } 0: \quad 1 = c(g_t, o_t) + c(g_t, e_t) + c(g_t, b_t)$$

$$\text{Lag } k: \quad corr(g_t, g_{t+k}) = c(g_t, o_{t+k}) + c(g_t, e_{t+k}) + c(g_t, b_{t+k})$$

How is investment financed?

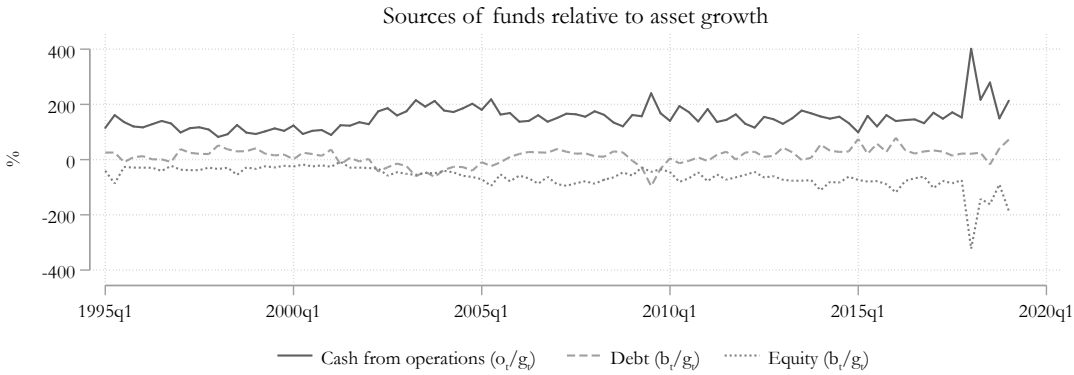
Aggregated Compustat CF $\neq$ firm-level examples

- entry/exit?
- heterogeneous life-cycle profiles + skewed size distribution?

Aggregated Compustat CF $\neq$ FoF or Compustat balance sheet

- debt issuance, not equity, strongly correlated with investment
- sample (private/public)?
- do financing components "add up" in FoF/Compustat balance sheet?

Suggestion : Use Compustat CF statements for both aggregate and firm-level patterns?



Sample means: operating cash = 151%, debt = 11%, equity = −62% — makes sense!

But no clear period of aggregate equity issuance

Suggestion : Does the model predict periods of aggregate equity issuance?

How is investment financed? Equity offerings

This paper:

In order to fund asset growth, firms (even mature ones) rely heavily on equity issuance

DeAngelo, DeAngelo and Stulz (2010) on seasoned equity offerings (SEO):

- ✓ mature firms account for 50% of # and proceeds of SEOs
- ✗ 40% would run out of cash ***even if*** capex did not change rel. to pre-issue levels
- ✗ SEO frequency: 3.4% p.a.; 2.8% among mature firms
- ✗ $12.6bn total average proceeds p.a. for 1973-2001 (in 2001 $)

Suggestion : Frequency and size (rel. to asset growth) of SEOs in data vs. model?

How is investment financed? Corporate finance cycle vs. Business cycle

Jermann and Quadrini (2006, 2012), also using Flow of Funds:

equity issuance is **counter**cyclical

debt issuance is **pro**cyclical

This paper, if aggregate asset growth were a proxy for the business cycle:

equity issuance is **pro**cyclical

debt issuance is **a**cyclical

How do the findings square together?

asset growth leads the cycle?

Suggestion : replicate Jermann-Quadrini w/ asset growth instead of GDP growth?

2. Model

Borrowing limit (Jermann and Quadrini, 2012)

$$\begin{aligned} \frac{b_{t+1}}{1+r_t} + \frac{1}{\xi} l_t &\leq k_{t+1} \qquad (\star) \\ l_t &= F(z_t, k_t, n_t) \end{aligned}$$

Microfoundation for $(\star)$ requires frictionless equity markets ...

need liquidity to pay out $\frac{b_{t+1}}{1+r_t} - k_{t+1}$ between periods ...

but $(\star) \implies l_t < \frac{b_{t+1}}{1+r_t} - k_{t+1}$, so need frictionless outside equity funding ...

... but equity markets in the model are not frictionless

Why are two types of debt needed? Does l_t behave consistently with the data?

Higher operating profits ***tighten*** borrowing limit, for fixed k_{t+1}

Suggestion : Start with a simple collateral constraint: $\frac{b_{t+1}}{1+r_t} \leq \xi k_{t+1}$

Conclusion

Conclusion

First-order question — the answer to which we're still suprisingly uncertain about

Suggestions:

Document aggregate and firm-level facts ***within the same dataset***

so that we understand better what drives aggregate patterns!

If equity issuance is important, probably want a model with entry

Jermann-Quadrini constraint is complicated: start from something simpler