A New Theory of Credit Lines (with Evidence)

by Donaldson, Koont, Piacentino and Vanasco

Discussion by Nicolas Crouzet (Kellogg)

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A new theory about a thing

Door 1: How does this new theory work?

Door 2: Why is it better than old theories at explaining the thing?

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Yes.

$$\left(\mathbf{p}\left(\underbrace{Q^{(e)}}_{\text{given}} + dQ\right) - mc\right) dQ \geq 0 \quad \text{if} \quad Q^{(e)} + dQ \leq Q^{(ne)}.$$

Coase (1972)

<u>Coase's conjecture:</u> The firm will never be able to charge more than the competitive price.

"Consumers [...] fear an increase in supply if they buy at the monopoly price.""

Coase's (1972) solutions

How could the firm charge the monopoly price?

- Commit not to sell more!
- Lease the good for short periods of time, or make it less durable

What if you can't do any of these things?

- Producer surplus is 0 — despite being a monopolist

Coase (1972) in finance

Durable good = debt : DeMarzo and He (2021)

- Borrower is monopoly supplier
- Debt has flow benefits to borrower e.g. because of taxes
- Yet, without commitment, borrower NPV of issuing debt $= 0$

This paper: a new solution to Coase's conjecture — a "put option", interpreted as a credit line

Environment

Durable good, quantity Q_t [Q_t = debt]

Firm/Seller:

Flow profits $(y - c(Q_t))dt$ [$c(.)'' > 0$]

Can sell extra dQ_t at price p_t

Bank/Buyer:

Participation constraint: $p_t \leq \int_0^{+\infty} e^{-\rho s} \gamma(Q_{t+s}) ds$ [$\gamma(.)' < 0$]

Full commitment

$$\begin{aligned} V^e &= \max_{\{dQ_t, p_t\}_{t\geq 0}} \int_0^{+\infty} e^{-\rho t}\left(y - c(Q_t)\right) dt + \int_0^{+\infty} p_t dQ_t \\ \text{s.t.} \quad & p_t \leq \int_0^{+\infty} e^{-\rho s}\gamma(Q_{t+s}) ds \end{aligned}$$

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V^e = \frac{y}{\rho} + \underbrace{\frac{\gamma(Q_e)Q_e - c(Q_e)}{\rho}}_{\text{Gains from trade}}
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No commitment

[DeMarzo and He, 2021]

Assume that borrowing is smooth: $dQ_t = q_t dt$.

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p(Q_t) &= \frac{c'(Q_t)}{\rho} && \text{[Price = marginal cost]} \\
q(Q_t) &= \frac{\gamma(Q_t) - c'(Q_t)}{-p'(Q_t)} && \text{[} \approx \text{Ratchet effect]}
\end{aligned}$$

Credit lines

A credit line is two fixed numbers: $(\tilde{p}, d\tilde{Q})$.

Offered time at $t = 0$ by banks, in ”bundles” with ”normal” debt

Can be drawn at any time $t \geq 0$; adds to stock of debt outstanding

Once drawn, is not renewed, so back to no-commitment solution

The size of the credit line, $d\tilde{Q}$, does not need to be of order dt

If drawn, Q_t will ”jump”

Ruled out for ”normal” debt, for which $dQ_t = q_t dt$

Credit lines as deterrents

For any debt level Q_0, consider credit lines $(\tilde{p}, d\tilde{Q})$ such that:

$$\underbrace{(y - c(Q_0))dt + e^{-\rho dt} V(Q_0)}_{\text{do not draw, never issue again}} \quad = \quad \underbrace{(y - c(Q_0))dt + \tilde{p} d\tilde{Q} + e^{-\rho dt} V(Q_0 + d\tilde{Q})}_{\text{draw}} \tag{$\star$}$$

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<u>**Intuition:**</u> If $d\tilde{Q}$ is really large:

$$\underbrace{\frac{c'(Q_0 + d\tilde{Q})}{\rho}}_{\text{min price for borrowing}} \quad > \quad \underbrace{\Gamma\left(Q_0 + \overbrace{dQ}^{O(dt)} + d\tilde{Q}\right)}_{\text{NPV to lenders}}$$

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A really big $d\tilde{Q}$ drives down the willingness to pay of banks below marginal cost.

Why do credit lines work? (Heuristically)

For any debt level Q_0, can build a credit line such that:

if $Q_t = Q_0$, the firm is indiff. between staying at Q_0 and drawing the line + not borrowing anymore;

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$\implies$ Efficient outcome.

Some potential clarifications

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Here, lots of ”lumpiness” $[> O(dt)]$: initial borrowing is lumpy; credit line

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Would banks want to honor credit lines if they were triggered?

No

So, do banks have "a lot of" commitment here? (Revocation is random.)

Connecting to the data

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Can the model help us think about why firms draw on credit lines, and what happens afterwards?

Off-equilibrium in the model

$\neq$ liquidity insurance theories [Holmstrom and Tirole, 1998]

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In the data, when leverage ”jumps”, is it primarily because of drawdowns?

Empirically, how lumpy is ”normal” debt issuance compared to drawndowns?

[Leary and Roberts, 2005; Choi, Hackbarth, Zechner, 2018]

Conclusion

New resolution of Coases’ conjecture

- ”big” put option — could apply to other contexts than long-term debt

Is lack of commitment in debt issuance the main reason why credit lines exist?

- Door 2; harder!

Looking forward to future drafts!