

# **Precautionary Debt Capacity**

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# Introduction

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- **Question:** how do firms respond to a change in debt capacity?
- **Approach:** empirical analysis using **random experiment** in Turkey
- **Main results:** firms borrow substantially against credit limit increases
  - Firms first expand their revolving credit (~35 cents per dollar of capacity)
  - Later substitute to term credit (~55 cents per dollar of capacity)
  - Holds even for firms that had previously utilized little debt capacity
- **My evaluation:** **extremely convincing evidence** that firms value undrawn credit line capacity, can react to changes if not literally constrained
  - Looking ahead, less clear what this means for firm investment and real activity
  - Some potential challenges extrapolating from Turkish lending system

# Simple model of firm debt and investment

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- Consider a firm that solves

$$V(K_{t-1}, B_{t-1}) = \max_{i_t, B_t} D_t + E_t[\Lambda_{t+1} V(K_t, B_t)]$$

where  $K$  is capital,  $B$  is debt,  $D$  is dividends, and  $\Lambda$  is the SDF, subject to

- The budget constraint:  $D_t = F(K_t) - I_t + B_t - R_{t-1}B_{t-1}$
- The capital accumulation equation:  $K_t = (1 - \delta)K_{t-1} + \Phi(I_t)$
- The debt limit:  $B_t \leq \bar{B}_t(K_t)$

# Simple model of firm debt and investment

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- Optimality conditions:

$$1 = R_t E_t[\Lambda_{t+1}] + \mu_t$$

$$q_t = \frac{1}{\Phi'(I_t)} + \mu_t \bar{B}'_t(K_t)$$

$$q_t = E_t[\Lambda_{t+1}(F'(K_t) + (1 - \delta)q_{t+1})]$$

where  $q_t$  is the marginal value of capital, and  $\mu_t$  is the multiplier on the debt constraint (equal to zero if constraint does not bind).

- A change in the debt limit  $\bar{B}_t$  **only affects debt ( $B_t$ ) if the constraint is binding ( $B_t = \bar{B}_t$ )**, has no effect if slack

# Simple model of firm debt and investment

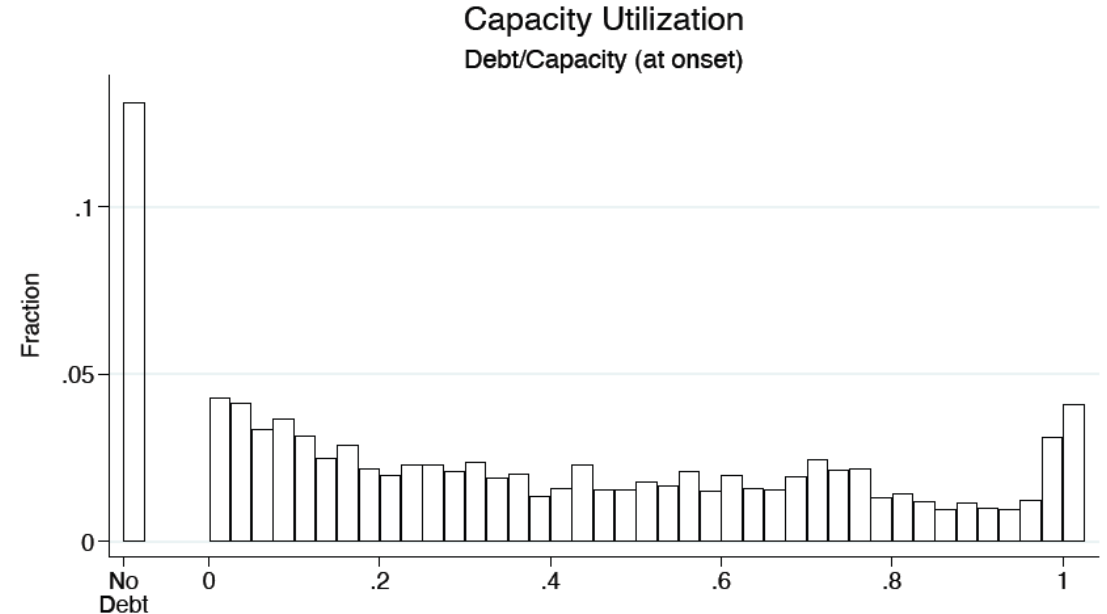
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- This paper shows convincingly that this model is not correct
  - Firms with excess credit line capacity cannot be literally constrained
  - Yet they react a lot when their credit limits are expanded
  - This is extremely convincing due to **random experiment** and careful empirics
- This paper's (intuitive) explanation: response is due to precautionary value of undrawn credit line capacity
  - Want credit and credit capacity
  - When credit capacity expands, you can have more of both
  - See also: Amberg, Jacobson, Quadrini, and Roganti Picco (2023)

# Utilization rate across firms

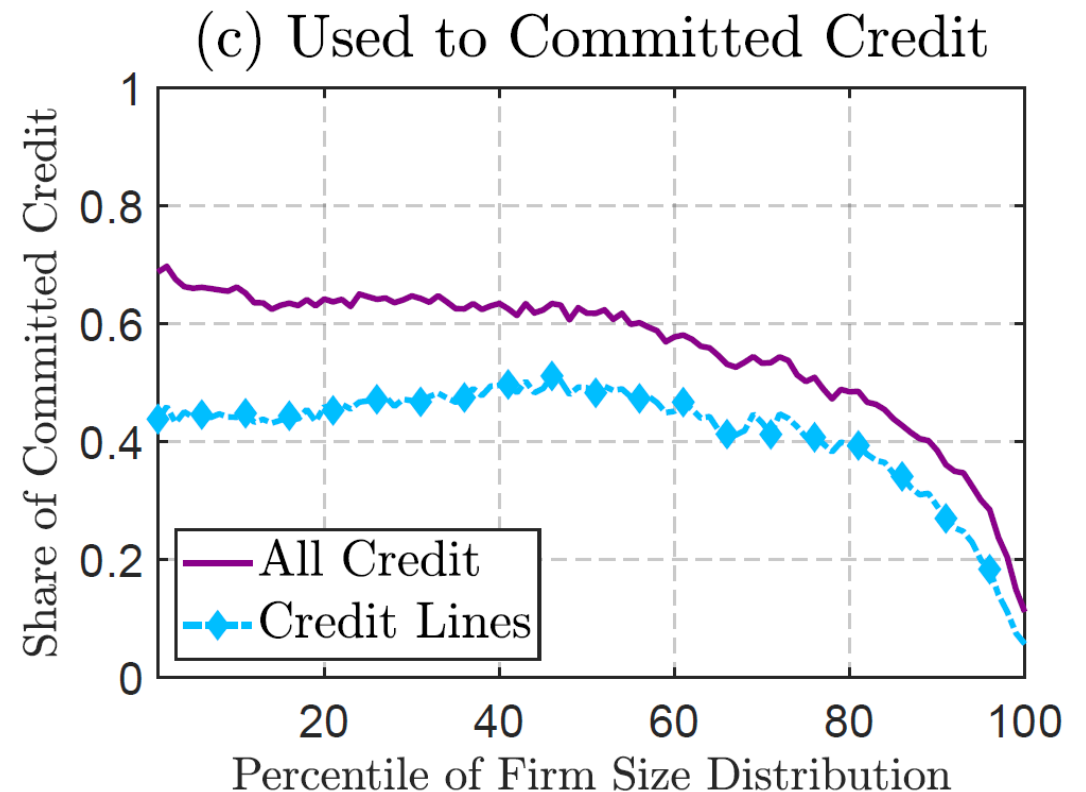
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- This question is critical to the transmission of credit supply shocks to firms
- Many firms have credit lines. Among these, most are not fully utilized.
- If only firms with full utilization react to changes in credit limits, then these shocks will have very small aggregate effects.



# Utilization rate across firms

- Pattern in which few firms are at full utilization likely holds across many countries + environments
- Right: average utilization for US borrowers from Y14 banks from Greenwald, Krainer, Paul (2023)



# Updating the model

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- Let's try another model that incorporates this precautionary motive

$$V(K_{t-1}, B_{t-1}) = \max_{i_t, B_t} D_t + v(\bar{B}_t - B_t) + E_t[\Lambda_{t+1} V(K_t, B_t)]$$

- Now the optimality conditions are:

$$1 = R_t E_t[\Lambda_{t+1}] + v'(\bar{B}_t - B_t)$$

- If  $v'(\bar{B}_t - B_t)$  is increasing and concave, we will see debt respond to  $\bar{B}_t$ 
  - In fact, will see full pass through to  $B_t$  in steady state
  - Sensitivity will be higher when  $v$  larger (higher uncertainty)
  - Highly consistent with authors' findings



# What about investment and real activity?

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- Bigger question in the background is what does this mean for investment and real activity?
- Investment optimality condition:

$$q_t = \frac{1}{\Phi'(I_t)} + v'(\bar{B}_t - B_t)\bar{B}_t'(K_t)$$

- Only affects investment when investment affects debt limit
  - In other words, we still need a financial friction for this to matter
  - Otherwise, the firm will just pay out the additional debt as dividends
- In typical SME context, many important frictions (e.g., equity issuance)

# External validity

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- Special feature of Turkish SME credit lines: in addition to standard revolving credit, can borrow in the form of a **term loan**
  - **Interest-free** loan with fixed repayment schedule, similar to trade credit when firms purchase durables
  - Because inflation in Turkey is ~10% over this period, real rate is around -10%, much cheaper than revolving borrowing rate of 24%
  - Account for virtually all long-term increase in credit at treated firms
- My concern: because term loan credit is so heavily subsidized, and can be used for standard purchases, it may be optimal for treated firms to shift spending to term loans, holding spending unchanged.
  - Would observe increase in debt, but no real effects
  - Likely specific to this setting where capacity → interest-free term loans

# Analogy: rewards credit card

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- Think of a credit card with spending rewards
  - Customers strictly prefer to buy items using card than cash
  - But may not max out credit card due to precautionary reasons
- What should we expect if credit limits on reward credit cards increase?
  - Cardholders will likely buy more items with credit rather than cash
  - But this may be purely transactional, with no change in total spending
  - Difficult to tell without seeing total household budget
- Is it possible to look closer at total firm budget here?
  - Some efforts in paper (e.g., cash transactions) but does not appear conclusive

# Conclusion

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- Extremely convincing evidence that firm borrowing reacts to debt capacity
  - Even when not fully utilizing credit lines
  - Fully randomized experiment is gold standard for this type of evidence
- Authors' interpretation that reaction comes from valuing undrawn debt capacity (financial flexibility) makes sense to me
- Looking ahead, would like to know more about the impact on real activity and how the results translate to non-Turkish context
  - Unusual feature that credit line capacity can be used for term lending
  - Because term loans are so cheap as to be dominant form of purchase, they should be used heavily even if total firm spending unaffected