

Discussion “Uncovering Collateral Constraints” by  
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# Summary of the paper

- ▶ Paper looks at a cross-country panel of firms that take a loan from the same bank
- ▶ Sometimes, bank requires collateral
- ▶ Firms may default because of an “agency risk” or because of uncorrelated shocks to output (“production risk”)
  - ▶ **I think** authors have in their minds something like “agency risk” can be mitigated by a contract ex ante, while “production risk” cannot
- ▶ This paper asks the following question: is cross sectional variation in the collateral-to-debt ratio explained by **ex ante** measures of “agency risk” or “production risk”, or both?

# Conceptually

- ▶ Collateral is costly
  - ▶ Privately on lenders and borrowers
  - ▶ Potentially socially via externalities
- ▶ Suppose borrowers and the lender have the same information, so there are no adverse selection or moral hazard concerns: why would collateral be used?
- ▶ If lender is worried that claims upon default/bankruptcy are not fully enforceable, or about seniority, etc, why not use rates?
  - ▶ Potentially if rates are capped? Is this relevant for this sample?
- ▶ Authors must make an effort to show why would collateral be used for anything else than to mitigate an agency problem

# Discussion

- ▶ Let me turn to what the authors do
- ▶ At the time they apply for a loan, firms are assigned a categorical risk rating  $R_i$  by the bank, higher rating means riskier borrower. Authors regress  $R_i$  on ex post default  $Z_i$ ,

$$R_i = \alpha + \beta Z_i + \epsilon_i$$

- ▶ Note that  $\hat{\beta} > 0$ : the bank's risk-rating model is not fully messed up
- ▶ Define  $\hat{R}_i = \hat{\alpha} + \hat{\beta} Z_i$  and  $R_i^{Z0} = \hat{\epsilon}_i = R_i - \hat{\alpha} - \hat{\beta} Z_i$ . Authors claim  $R_i^{Z0}$  is an **ex ante measure of “agency risk”** and  $\hat{R}_i$  is an **ex ante measure of “production risk”** unrelated to “agency concerns”

# Discussion

- Suppose there are two risk-ratings (1,2):

$(R_i^{Z_0}, \hat{R}_i)$	$Z_i = 0$	$Z_i = 1$
$R_i = 1$	$(1 - \hat{\alpha}, \hat{\alpha})$	$(1 - \hat{\alpha} - \hat{\beta}, \hat{\alpha} + \hat{\beta})$
$R_i = 2$	$(2 - \hat{\alpha}, \hat{\alpha})$	$(2 - \hat{\alpha} - \hat{\beta}, \hat{\alpha} + \hat{\beta})$

# Discussion

- ▶ Let  $Y_i^0$  be the collateral-to-loan ratio for each borrower. This is the paper's main regression:

$$Y_i^0 = \omega_0 + \beta_1 R_i^{Z0} + \beta_2 \hat{R}_i + \eta_i \quad (1)$$

- ▶ Authors document that  $\hat{\beta}_1 > 0$  and  $\hat{\beta}_2 = 0$ 
  - ▶ Thus, they claim, variation in collateral ratio is fully explained by variation in “agency risk” and not at all by “production risk”

## What does this mean?

- ▶ Lets take the definitions of  $R_i^{Z0} = R_i - \hat{\alpha} - \hat{\beta}Z_i$  and  $\hat{R}_i = \hat{\alpha} + \hat{\beta}Z_i$  and plug them in the regression:

$$Y_i^0 = \omega_0 + \beta_1 (R_i - \hat{\alpha} - \hat{\beta}Z_i) + \beta_2 (\hat{\alpha} + \hat{\beta}Z_i) + \eta_i$$

- ▶ Collecting terms and defining  $\tilde{\omega}_0$  as the new constant:

$$Y_i^0 = \tilde{\omega}_0 + \beta_1 R_i + \hat{\beta}(\beta_2 - \beta_1)Z_i + \eta_i$$

# What does this mean?

- ▶ Lets re-interpret the findings:
  - ▶  $\hat{\beta}_1 > 0$ : holding ex post default constant, firms with worst rating post a higher collateral ratio
  - ▶  $\hat{\beta}_2 = 0$ , then  $\hat{\beta}(\beta_2 - \beta_1) < 0$  (assume this is true for now): holding risk-rating constant, firms that go on to default post a lower collateral ratio
- ▶ Potentially, Berger, Fram, and Ioannidou (2011):
  - ▶ Observably riskier borrowers are more likely to be required to pledge collateral (moral hazard)
  - ▶ Unobservably riskier borrowers are less likely to pledge collateral (adverse selection)



# What does this really, really mean?

- ▶ Is there any reason to believe  $E[\eta_i | R_i, Z_i] = 0$  is a valid assumption?
  - ▶ This can be thought of as: is collateral randomly assigned within “rating-default” bins?
  - ▶ If not, true coefficients could be all over the place
- ▶ Doesn't seem like it: any unobserved determinant of collateral would have to be “randomly assigned” within bins

# Refinements

- ▶ OK, so perhaps  $E[\eta_i | R_i, Z_i] \neq 0$  only in the most basic specification. What if we add controls and fixed effects (Models 2 and 3)?
  - ▶ This just makes more “bins”; not useful for unobserved variation
- ▶ Models 3 and 4: authors estimate “agency” risk using variables such as “personal client”, “age”, “relationship length”, or using loan officer’s assessments of agency risk instead of the risk-rating
  - ▶ First, this is a different paper
  - ▶ Second, sure these variables could be correlated with agency risk, or rather, risk of fraud, but who knows with what else?

# Conclusion

- ▶ In its current incarnation, paper must overcome serious challenges
- ▶ What is “agency” or “production” risk? Fundamental problem is that we can’t know why a firm defaulted on its debt
  - ▶ In particular, we can’t distinguish from ex post defaults whether firms defaulted because managers were lazy or because the firm got hit by lower than expected demand
  - ▶ In fact, what is the difference between both?
- ▶ Need to motivate conceptually why would collateral be used in the absence of agency concerns
- ▶ Need to think carefully about identification

Thanks

Thank you!

## Other concerns

- ▶ Why is “... the debtor should be less likely to default if default is costly”? an argument for the “agency” role of collateral?
- ▶ Clarify what is to “instrument” production risk with “the component of risk grade unrelated to default”. As in IV estimation, e.g. 2SLS?
- ▶ Does specific functional form of risk rating affect estimation ( $A=1$ ,  $B=2$ , etc)?
- ▶ Standard errors should account for the fact that regressors ( $R_i^{Z0}$  and  $\hat{R}$ ) are estimated (probably need to run a GMM/2SLS system)

## Other concerns (2)

- ▶ Page 24: “*Although collateral spread is robust to controls...*”: I do not follow this discussion, seems like you were talking about collateral ratios
- ▶ Collateral pecking order: “*A valid concern is that collateral type is endogenous to borrower risk*”: very hard to argue that this can be controlled for based on observables
- ▶ Results on interest rate spread are troubling: if collateral contracts perfectly eliminate agency risk there is no need for variation in interest rates. This is counter-intuitive