To Ask or Not To Ask?
Collateral versus Screening in Lending Relationships

Hans Degryse, Artashes Karapetyan, & Sudipto Karmakar

Discussion by Matthias Efing

October 20, 2017
In a nutshell

Question:
- Effects of expected relationship duration on collateral requirements?

Data & Identification:
- Portuguese central credit register from 2005 to 2013.
- Secured vs. unsecured loans from 2009 to 2013.
- EBA capital exercise as quasi-natural experiment.

Findings:
- Longer expected relationship ⇒ initially more unsecured credit.
- Collateral requirements decline over the course of relationships.
Karapetyan & Stacescu (JFE R&R, 2016):

- How do banks choose between screening and collateral requirements when a firm borrows from a bank for the first time (at the initial stage)?
- More unsecured lending when the expected length of a relationship increases!

How do they get this prediction?
Cost of collateral requirements:
- Expected liquidation costs.
- Decreasing with the creditworthiness of the borrower.
- High collateral requirements deter risky borrowers (ceteris paribus).

Cost of screening:
- cost of acquiring information about potential borrowers
Theory

Relationship lending:
- Banks learn about borrower quality in repeated lending.
- Banks weed out the worst firms in their borrower pool.

Predictions:
1. Collateral requirements decline over the course of a relationship.
2. Hold-up problem: relationship lenders extract information rents at later stages.
3. Competition: forces relationship lenders to compensate borrowers at initial stage. ⇒ Initial interest rate decreases with longer expected relationship.
Theory

Effects of lower initial interest rate:

1. Secured lending:
   - More collateral required to deter risky borrowers.
   - Higher expected liquidation costs.

2. Unsecured lending:
   - Lower interest rate does not change screening cost per borrower.

More unsecured lending when the expected length of a relationship increases!
Sample selection

   - External validity outside this special period?
   - Extend to years after the sovereign debt crisis?
Sample selection

   - External validity outside this special period?
   - Extend to years after the sovereign debt crisis?

2. Focus on borrowers with at least two banks.
   - You lose the smallest firms with the strongest informational asymmetries and credit constraints.
   - H1: one spec. with full sample but without firm FE?
   - H2: one spec. replacing firm*time by industry*location*size*time FE?
Predicted Maximum relationship\(_{i,j}\)

Predicted maximum number of interactions between firm \(i\) and bank \(j\).

\[
\text{Max. relationship}_{i,j} = \hat{\alpha}_1 \text{size}_{i}^{\text{firm}} + \hat{\alpha}_2 \text{leverage}_{i}^{\text{firm}} + \hat{\alpha}_3 \text{profitability}_{i}^{\text{firm}} \\
+ \hat{\alpha}_4 \text{size}_{j}^{\text{bank}} + \hat{\alpha}_5 \text{leverage}_{j}^{\text{bank}} + \hat{\alpha}_6 \text{liquidity}_{j}^{\text{bank}} \ldots
\]
Predicted Maximum relationship\textsubscript{\textit{i,j}}

Predicted maximum number of interactions between firm \textit{i} and bank \textit{j}.

\[ \text{Max. relationship}_{i,j} = \hat{\alpha}_1 \text{size}_{i}^{\text{firm}} + \hat{\alpha}_2 \text{leverage}_{i}^{\text{firm}} + \hat{\alpha}_3 \text{profitability}_{i}^{\text{firm}} + \hat{\alpha}_4 \text{size}_{j}^{\text{bank}} + \hat{\alpha}_5 \text{leverage}_{j}^{\text{bank}} + \hat{\alpha}_6 \text{liquidity}_{j}^{\text{bank}} \ldots \]

Right-censoring

- Authors consider any relationship with at least 12 months of data.
- Don’t relationship lenders entertain longer relationships than that?
- Econometric solutions?

Model death of a relationship as a proportional Cox hazard model (replacing calendar time by number of interactions)?
Identification H1

\[
\begin{align*}
\text{Max.} \text{relationship}_{i,j} &= \hat{\alpha}_1 \, \text{size}^\text{firm}_i + \hat{\alpha}_2 \, \text{leverage}^\text{firm}_i + \hat{\alpha}_3 \, \text{profitability}^\text{firm}_i \\
&+ \hat{\alpha}_4 \, \text{size}^\text{bank}_j + \hat{\alpha}_5 \, \text{leverage}^\text{bank}_j + \hat{\alpha}_6 \, \text{liquidity}^\text{bank}_j \\
&\ldots
\end{align*}
\]

\[
\begin{align*}
y_{i,k,t} &= \beta_1 \, \text{Max.} \text{relationship}_{i,j} + \psi_i + \phi_j \\
&\ldots
\end{align*}
\]

Identifying assumption:

The predicted maximum relationship length is determined by the \textbf{specific combination} of \textit{firm i’s} and \textit{bank j’s} characteristics.

Wouldn’t it be consistent to include \textbf{interaction terms} between firm and bank-characteristics in the prediction model?
Identify $\hat{Max.\,relationship}_{i,j}$ is not specific to the individual firm $i$ or the bank $j$.

Again: It’s about the specific combination $(i,j)$.

$\hat{Max.\,relationship}_{i,j}$ supposedly captures the notion that some firms and banks a natural matches and expected to engage in a long relationship.
Max.\(\text{relationship}_{i,j}\) is not specific to the individual firm \(i\) or the bank \(j\).

Again: It’s about the specific combination \((i,j)\).

\(\text{Max.}\text{relationship}_{i,j}\) supposedly captures the notion that some firms and banks a natural matches and expected to engage in a long relationship.

**Endogeneity:**

Maybe those natural matches of specific bank-firm pairs are also characterized by lower asymmetric information...

... and thus by lower collateral requirements.
Once you take away the firm and bank FE explaining $y_{i,k,t}$, you have a serious endogeneity problem. For example:

$$y_{i,k,t} = \ldots + \beta_1 \text{Max. relationship}_{i,j} \ldots + \beta_2 \text{Credit Worthiness}_i \ldots$$

$$\text{Max. relationship}_{i,j} = \ldots + \alpha_1 \text{size}_i + \alpha_2 \text{leverage}_i + \alpha_3 \text{profitability}_i + \ldots$$

$$\text{Credit Worthiness}_i = \ldots + \gamma_1 \text{size}_i + \gamma_2 \text{leverage}_i + \gamma_3 \text{profitability}_i + \ldots$$

Absent firm FE, omission of $\text{Credit Worthiness}_i$ biases $\beta_1$. 
Identification H1

**Instrument** for $\text{Maximum relationship}_{i,j}$:

Avg. *max. relationship length* of a given firm across its other lenders.
**Identification H1**

**Instrument** for $\text{Maximum relationship}_{i,j}$:

Avg. *max. relationship length* of a given firm across its other lenders.

- Why is this a good instrument?
- What is the reasoning for the first stage? Why do other bank relations explain the specific combination of firm $i$ and bank $j$?
Instrument for $Maximum \ relationship_{i,j}$:

Avg. $max. \ relationship \ length$ of a given firm across its other lenders.

- Why is this a good instrument?
- What is the reasoning for the first stage? Why do other bank relations explain the specific combination of firm $i$ and bank $j$?
- Where is the first stage in the paper?
Identification H1

**Instrument** for \( \text{Maximum relationship}_{i,j} \):

Avg. max. *relationship length* of a given firm across its other lenders.

- Why is this a good instrument?

- What is the reasoning for the first stage? Why do other bank relations explain the specific combination of firm \( i \) and bank \( j \)?

- Where is the first stage in the paper?

- Where is the discussion of the exclusion restriction?

- Note that the instrument is certainly invalid in any specification without firm FE (because the instrument is a function of firm characteristics — as is the instrumented variable).
Identification H1

\[ y_{i,k,t} = \alpha_i + \beta \text{Max. relationship}_{i,j} + \theta x_{i,k,t} + \gamma f_{i,t} + \lambda_j + \epsilon_{i,k,t} \]

\[ \text{Max. relationship}_{i,j} = \alpha_0 + \alpha_1 F_{i,t} + \alpha_2 B_{j,t} + \beta \Gamma_{FE} + \nu_t \]

- \( y_{i,k,t} \) is indexed by \( t \) although H1 makes a cross-sectional prediction.
- Authors include the first five loans in each bank-firm relationship (= 1/3 of the median maximum relationship!).
- Get rid of \( t \) and conduct a (true) cross-sectional test for H1.
EBA capital exercise

What is treatment:
- Exogenous shock to the cost of unsecured lending to treated banks.
- Do treated banks ask for collateral (i) more often but (ii) less so for potential relationship borrowers?
What is treatment:
- Exogenous shock to the cost of unsecured lending to treated banks.
- Do treated banks ask for collateral (i) more often but (ii) less so for potential relationship borrowers?

Slicing the sample thin?
- How many banks are treated in total? Only 4?
- How many observations are treated, out of how many?
- How much variation does $Max.\ relationship_{i,j}$ have in this sample?
Is treatment random?

- Four treated banks are among the eight largest of the country (large banks were shown to be more collateral-oriented).
- Most definitely not random in terms of financial health.
Is treatment random?
- Four treated banks are among the eight largest of the country (large banks were shown to be more collateral-oriented).
- Most definitely not random in terms of financial health.

Parallel trend analysis:
- As authors concede, sample period is very volatile. This is the most likely explanation why the authors cannot reject a parallel-trend.
Is treatment random?
- Four treated banks are among the eight largest of the country (large banks were shown to be more collateral-oriented).
- Most definitely not random in terms of financial health.

Parallel trend analysis:
- As authors concede, sample period is very volatile. This is the most likely explanation why the authors cannot reject a parallel-trend.
- You test parallel trends in several sub-periods (post12, postmid9, post9, postmid10).
- Given that each sub-period is very short, it is not surprising that you do not detect diverging trends in any of them (power problem).
Is treatment random?
- Four treated banks are among the eight largest of the country (large banks were shown to be more collateral-oriented).
- Most definitely not random in terms of financial health.

Parallel trend analysis:
- As authors concede, sample period is very volatile. This is the most likely explanation why the authors cannot reject a parallel-trend.
- You test parallel trends in several sub-periods (post12, postmid9, post9, postmid10).
- Given that each sub-period is very short, it is not surprising that you do not detect diverging trends in any of them (power problem).
- Why do you include quarters after June 2012 in the event window?
Information on loan purposes? For identification?

“The EBA capital exercise had precisely this effect: a certain number of banks had to increase their capital ratios to meet the new regulatory minima and also hold additional capital against their sovereign holdings (sovereign buffers) by June 2012. After this period, collateralized lending ceases to have any advantage.”

In a static model, it only matters whether the regulatory constraint is binding or not (e.g., Glasserman & Kang, 2014). But in a dynamic model, the shadow price of unsecured lending will depend on the distance from the regulatory minimum requirement.

You could probably run a regression in which you interact your regressors with regulatory slack in the bank’s constraint. This slack variable would require exogenous variation. Yet, treatment in the EBA capital exercise is not a suitable instrument because it clearly does not satisfy the exclusion restriction!
Conclusion

- Interesting and relevant topic.
- Some econometric issues with H1.
- Looking forward to the next version.