DEUTSCHE BUNDESBANK
EUROSYSTEM

Workshop on

"The Costs and Benefits of International Banking"

Eltville, 18 October 2010

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Discussion of

"A gravity equation of bank loans"

Discussion of "A Gravity Equation for Bank Loans" by Brueggemann, Kleinert, Prieto

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Bundesbank Workshop

18.10.2011

Summary

- Gravity equation for bank loan
- The borrowing costs of a firm g in country i that borrows from a bank k from country j consist of four different components:

$$c_{igjk} = r_j + \tau_{ij} + a_j + \epsilon_{igjk} \tag{1}$$

- r_j: interest rate prevailing in country j
- τ_{ij}: transaction cost related to distance
- a_j: average bank characteristics in country j (largely unobserved)
- ϵ_{igjk}: unobservable component
- Can be written as:

$$c_{igjk} = \bar{c}_{ij} + \epsilon_{igjk} \tag{2}$$

Summary

- Probability that bank k from country i is chosen by a firm g from country k:

$$P_{igjk} = Pr(c_{igjk} = \min\{c_{l1}...c_{ln_l}; l = 1,...N\}) \quad (3)$$

$$= \prod_{l=1}^{N} \prod_{h=1}^{n_l} [1 - F(\bar{c}_{ij} - \bar{c}_{il} + x)] \quad (4)$$

- Summing over all banks within one country and assuming pdf $f(x)$:

$$P_{ijk} = \int_{-\infty}^{\infty} f(x) \prod_{l=1}^{N} [1 - F(\bar{c}_{ij} - \bar{c}_{il} + x)]^{n_l} dx \quad (5)$$

Summary

- Assuming that ϵ_{igjk} is normally distributed, minima are Gumbel distributed:

$$P_{ijk} = \frac{\exp(-\frac{\bar{c}_{ij}}{\sigma})}{\sum_{l=1}^{N} n_l \exp(-\frac{\bar{c}_{il}}{\sigma})}, \quad (6)$$

- Summing over all banks and assuming an exogenous demand for bank loans denoted BL_i, the authors obtain bank loans from country j to country i as:

$$BA_{ji} = \frac{n_j \exp(-\frac{r_j+\tau_{ij}+a_j}{\sigma})}{\sum_{l=1}^{N} n_l \exp(-\frac{r_l+\tau_{il}+a_l}{\sigma})} BL_i \quad (7)$$

- Authors go on and estimate this equation using data on foreign assets

Praise

- Authors think about the demand side of cross-border banking:
  - Banks extend loans abroad because firms demand their services
  - Services are demanded because of lower costs
  - Decomposition of costs into interest rate and other costs (transaction, monitoring costs)
- "Multilateral resistance": the loans between two countries depend on other third-country characteristics
- Great job in going from the theory to the empirics
- Nicely written, easy to understand

Major Comments

Why only consider cross-border loans, but not loans of foreign affiliates in the host market?

- Assumption: Firm searches for a bank loan in a foreign country
- Locational Banking Statistics: loans by foreign owned banks resident in country *i* not considered as a foreign bank loan
- Rise in foreign bank assets to a large extent due to activities of foreign affiliates (see BIS)
- Motivate more why LBS is better than CBS and why your model explains only cross-border loans

Major Comments

Bank loans between i and j depend directly on the number of firms in country j

- Different mechanism for why number of firms matters: competition effect
- n_j proxied by market share of largest three banks, effectively a measure of concentration of the banking sector in country j
- Relate results to the finding that the more concentrated a banking sector, the less it goes international (e.g. Focarelli and Pozzolo (2005))

Major Comments

Reduced-form model

- Gravity equation only partly derived
- Demand for bank loans is exogenous
- Result of a gravity relationship relies on a distributional assumption
- Provide more evidence for the assumption of a Gumbel distribution

Minor Comments

- Stress more what is new theoretically and empirically
- Interpretation of results: hard to separate effects because of confounded measures; e.g. market structure and concentration also affect interest income
- Interesting that source-country $\times$ year and recipient country $\times$ year fixed effects give more significant results than source-country, recipient country and year fixed effects. What about results for cross-section?

Minor Comments

- Elaborate on why gravity relationship is not found
- Compare results to Aviat & Coeurdacier (2007), who report similar distance coefficients showing that the effect of distance is much smaller on bank assets than on trade flows
- A bit more details on how the different variables are constructed, especially those in the Financial Structure Database

Final Remarks

- Gravity equations very successful in economics
- Great to think about the demand aspects of cross-border banking
- Other approach: Niepmann (2011)
  - Microfounded interest rate
  - General equilibrium
  - Gravity equation does not hold in general

Many thanks.