Expansion of Spanish Banks: Distance Costs and Proximity Gains

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- Capital misallocation
- Migration
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How do individuals gain access to credit who did not have it before?

1. New lenders enter the local market
2. Existing lenders expand to the local market

We focus on expansion.
Expansion and Distance Costs

Prior approach: Use natural/randomized experiments to analyze effect of microfinance entry on HH consumption and business investment.

- Examples: Banerjee, Duflo, Glennerster, Kinnan (2011); Kaboski, Townsend (2010).
- Takes firm activity as given–focus on household.
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- Central question: Why don’t banks expand geographically faster?
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- Central question: Why don’t banks expand geographically faster?
- One potential reason: Entry into markets far from established branches has high costs
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Distance costs

Why underlies distance costs in banking?

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- Local governments more amenable to entry by neighboring firms
  - Also potentially more customer demand for familiar, nearby banks—we ignore this.
Empirical Approach

Idea: Forward simulate bank’s future profits, expansion path following true/counterfactual market entry strategies; select parameters that maximize likelihood of true entry strategy. Three steps:

1. First stage estimates:
   1. Static demand for loans/deposits
   2. Flexible, reduced form estimation of bank’s market entry policies

2. Forward simulation. For any given starting state use estimated expansion policies and demand functions to simulate banks’ future actions:
   1. For the province entry strategy actually followed
   2. If counterfactual strategy was followed up to a vector of parameters on unobserved entry costs, incl. distance cost.

3. Find value of market entry cost and distance cost to maximize probability of true expansion strategy.
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Variables: For each bank we know:

- Province (=market) entry dates, and number of branches per province (50 provinces)
  - Unfortunately nothing on smaller market sizes...yet.
- Total loans made, deposits collected, interest rates
  - Potentially also default rates.
- Province level population characteristics.
- Some data on recurring cost of business operation.
Expansion: Branches

43% expansion in branch numbers across Spain:

Branch Growth: 1984-2007

Total Bank Branches: 1985-2005
Expansion: Banks within province

No trend in within province bank numbers:

Mean number of banks operating in province: 1984-2007

Year

Banks

Expansion: Banks across provinces

But banks have expanded to cover more of Spain:

Mean number of provinces in which bank operates: 1984-2007

Year

Mean number of provinces in which bank operates: 1984-2007

Provinces


Keniston et al. ()

Spanish Bank Expansion

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Market Concentration

Measure market share by bank’s fraction of total branches. Concentration increasing at national level, highly variable within province.

Across province HHI

Within province HHI
Industry-wide stylized facts:

- Large expansion of branches
- Large banks have expanded to new provinces
- Small banks have been purchased/merged.
Expansion data patterns

Industry-wide stylized facts:
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Within bank stylized facts:
- Banks tend to spread across Spain concentrically from their home provinces
- But substantial heterogeneity–some jumpers too.
3 levels of analysis:

1. **Demand for loans/deposits**
   - Static estimation of revenues as a function of exogenous province characteristics, # of branches, interest rates.

2. **Within-province branch opening/closing game**
   - Dynamic estimation of fixed costs to open/close branches

3. **National province entry game by banks**
   - Dynamic estimation of fixed cost to enter province, as function of distance
Individual $j$’s demand for loans from bank $i$ is

$$l_{ijmt} = x_{jm}^{ex} \beta^{ex} + \xi_{jm} + \alpha_{im} p_j + x_{jm}^{en} \beta^{en} + \epsilon_{ijt}$$

- Exogenous variables: Province chars, bank type.
- Endogenous variables: Number of branches, interest rate (decided at national level)
- Could also introduce random coefficients, as in BLP

Main challenge: instruments for branches, interest rates.
Banks make two dynamic decisions:

1. Whether to enter a province.
2. Whether (and how many) branches to open or close.

We estimate these policy functions as a non-parametric function of the state variables.
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Main challenge: With cross-province spillovers via distance costs, state variables may include all provinces’ characteristics.

- Assumption 1: Banks only consider a province’s own characteristics and those of bordering provinces when deciding entry.
- Assumption 2: Branch opening choice not a function of neighboring provinces at all.
Once we know:

1. Demand for loans/deposits (assume i.r. set through static Nash interest rate game)
2. Bank’s policy functions for province entry and branch opening
3. Evolution of exogenous state variables

we can predict future expansion paths for the bank and estimate profits up to dynamic parameters on cost of province entry and bank opening/closing.
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Main challenge: stationarity. Forward simulations last until discounting reduces future value to almost $0 \sim 60$ years. Do banks expect same range of state variables and strategies now as in 2040?
Bank $i$ changes number of branches by $\eta_{ipt}$ to maximize discounted sum of province-level profits $\pi \left( n_{ipt}, n_{-ipt}, p_{it}, x_{ipt}^e \right) = \pi \left( n_{ipt}, s_{ipt} \right)$:

$$W \left( n_{ipt}, s_{ipt} \right) = \max_{\eta_{ipt}} \left\{ \pi \left( n_{ipt}, s_{ipt} \right) + \beta \mathbb{E}_{s_{ipt}(t+1)} \left[ W \left( n_{ipt} + \eta_{ipt}, s_{ipt}(t+1) \right) \right] \right\}$$

Key simplifying assumption: conditional on entry, within province profits unaffected by other provinces. Restrictive: geographical spillovers, national i.r. setting.
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Estimation: Still in progress. Challenges:

1. Continuous choice variable $\eta_{it}$.
2. Large number of heterogenous competitors in each province makes solving branch opening equilibrium hard.
For bank $i$ in time $t$, let $\theta$ be the vector of province entry and distance costs, and

- $V_i(s_{it}|\sigma_{it}; \theta)$ be the expected current and future profits of following the actual strategy, $\sigma_{it}$
- $V_i(s_{it}|\sigma'_{it}; \theta)$ be the expected value of following a counterfactual strategy, $\sigma'_{it}$.

Given the true shocks that the firm received and at the true parameter vector $\theta^0$, it must be the case that

$$V_i(s_{it}|\sigma_{it}; \theta^0) \geq V_i(s_{it}|\sigma'_{it}; \theta^0)$$

for all $\sigma'_{it} \neq \sigma_{it}$.
Our approach:

- Use forward simulation to generate empirical analogue to $V_i(s_{it} | \sigma_{it}; \theta), V_i(s_{it} | \sigma'_{it}; \theta)$
- Solve for $\theta$ vector that maximizes probability of observing province entry when it actually occurs.

Main challenge: With spillovers the set of counterfactual strategies is huge—all possible combinations of entry into new provinces.
Counterfactual choice set problem

Even if current entry costs for province $p$ do not depend on other contemporaneous entry, future decisions are affected by whole set of provinces entered at time $t$. Example:

Don’t enter province in the future if enter only one neighbor now:

Enter province in the future if many neighbors entered now:
Estimation: Province entry/distance cost parameters

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  \( V_i(s_{it} | \sigma_{it}; \theta), V_{i'}(s_{it} | \sigma'_{it}; \theta) \)
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- Possible solution 1: Use moment inequalities to generate set of parameters satisfying inequalities—set decreases with more counterfactual strategies.
- Possible solution 2: Assume banks only get spillovers from bordering provinces. Limits relevant counterfactuals to single entry/not entry deviations.
Conclusion

Study examines entry decisions of banks into new markets. Broad question: Why is the spread of financial access slow?

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- How do those costs depend on the existing market penetration of the bank?
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Estimate parameters using BBL/Hotz-Miller approach of initial policy function estimation, secondary parameter estimation.

- Multiple factors in firm object function
  - Loans/deposit demand
  - Interest rate equilibrium
  - Branch opening/closing
  - Province entry

make estimation procedure complex.

- Much work to be done, but potentially interesting application of new techniques.