

Discussion of: Akhavein, Frame, and White
and Courchane, Nickerson, and Sullivan.

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* The opinions expressed here are DeYoung's and do not necessarily reflect the views of the Federal Reserve Bank of Chicago or the Federal Reserve System.

Papers model adoption of new technology

- This is a repeating scenario in banking:
 - ATMs in 1970s.
 - Credit scoring in early 1990s (Akhavain, et al).
 - Internet banking in late 1990s (Courchane, et al).
- These papers do not model the implications of new technology for industry structure, bank business strategies, service quality, or competitive rivalry.
- Let's illustrate using a simple strategic framework.
 - DeYoung (*Chicago Fed Letter*, 1999).
 - DeYoung and Hunter (forthcoming in Future of Banking, ed: Benton Gup, 2002).
 - DeYoung, Hunter, and Udell (forthcoming, *JFSR*, 2003).

A Strategic Map for Banking



Banking before Deregulation



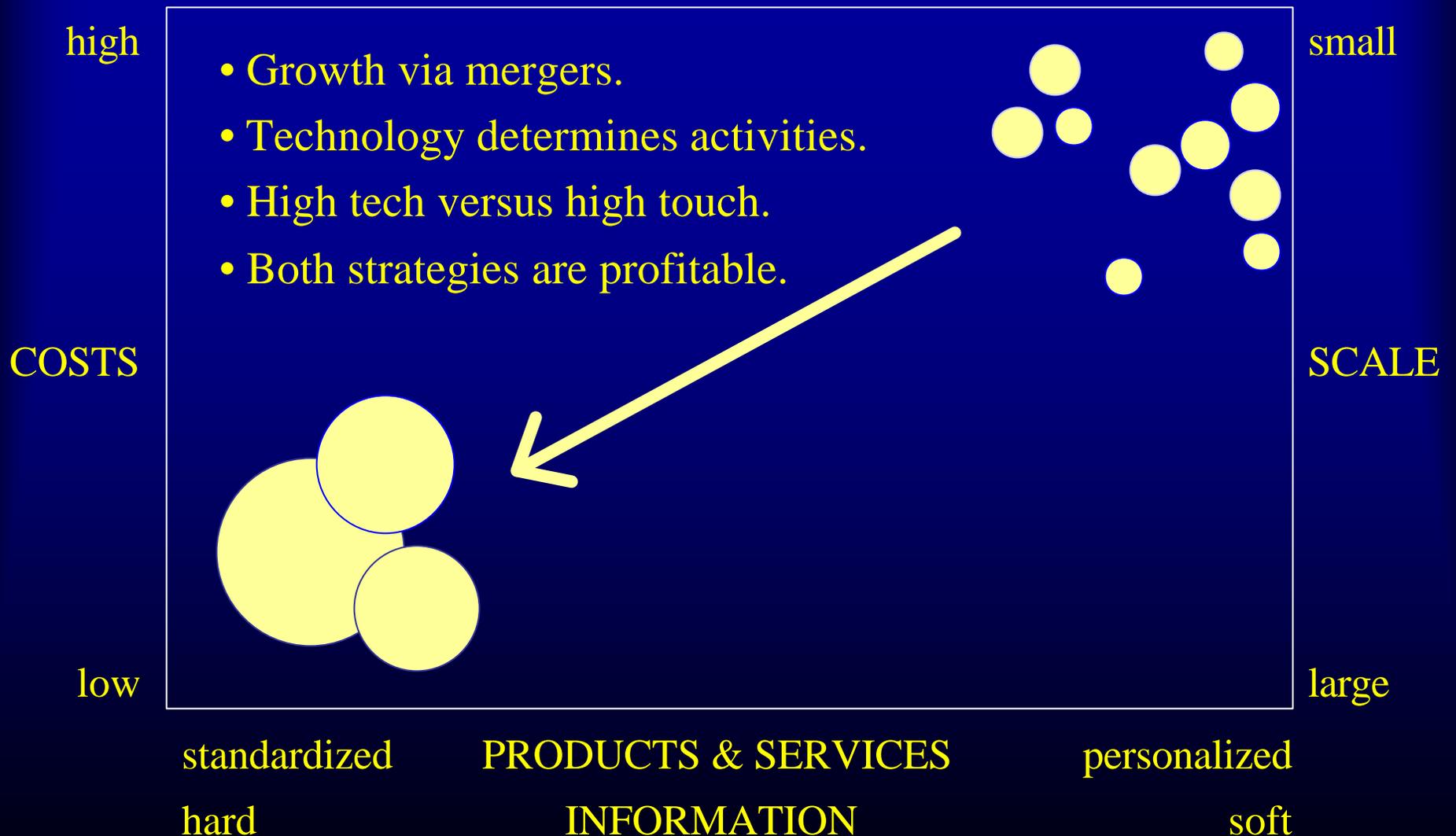
Deregulation and New Technology

- Geographic Deregulation:
 - Large banks: Increase their scale and scope via market extension mergers.
 - Small banks: Retain small size and local focus.
- New Technology:
 - ATM networks, credit scoring, securitization, Internet.
 - Reductions in person-to-person contact.
 - High fixed costs, low variable costs.
 - “Scaleable technologies.”
- New technology “drives a wedge” between large and small banks -- in terms of bank size and in terms of business mix.

Deregulation and New Technology

- Large bank activities:
 - High volume, low unit cost, standardized products.
 - “Transactions-based” business.
 - Credit cards, mortgage banking, discount brokerage.
 - Technology based on “hard” information: Internet, credit scoring, securitization.
- Small bank activities:
 - Low volume, high cost, personalized service.
 - “Relationship-based” business.
 - Small business lending, private banking.
 - Technology based on “soft” information: personal contact at bank office is important to retain high-value customers.

Deregulation & New Technology



Discussion of papers:

- Akhavein, Frame, and White
- Courchane, Nickerson, and Sullivan
- Format of discussions:
 - (1) Summary and main results.
 - (2) Does the paper contain evidence consistent with the DeYoung/Hunter/Udell Strategic Map?
 - (3) Comments and suggestions.

Akhavein, Frame, and White (1)

- Models the diffusion of credit scoring technology.
- Survey data from 95 banks:
 - Did banks adopt credit scoring for small business loan applications between 1992 and 1999? If yes, when?
- Hazard model:
 - Bank adopted earlier if (a) it was large or (b) it was in New York.
- Tobit model:
 - Bank adopted earlier if (a) it was large or (b) it had a high ratio of branches-to-affiliates.
- A conclusion:
 - As banking system continues to consolidate, rate of technology diffusion may increase.

Akhavein, Frame, and White (2)

Is the Akhavein, Frame, and White evidence consistent with our Strategic Map?

- Large banks were quicker to adopt.
 - Credit scoring is a scaleable technology.
- Banks with high branch-to-bank ratios were quicker to adopt.
 - Credit scoring is an impersonal, arms-length technology.
 - Prior to Internet banking and Riegle-Neal, having lots of branches (rather than lots of banks) was an impersonal, arms-length technology.

Akhavein, Frame, and White (3)

- How did banks use credit scoring?
 - Exclusively hard information underwriting?
 - Hard information primary, soft information secondary?
 - Soft information primary, hard information secondary?
- Authors use the Tobit model as a robustness test of the hazard model. In the same spirit, they might try alternative distributions in the hazard model.

Akhavein, Frame, and White (3)

- The regression specification is *ad hoc*:
 - It taxes the data. N=95, but 13 parameters need to be estimated. What did some sparser models produce?
- Banks and Branches results:
 - Adoption later for firms with lots of banks.
 - Adoption earlier for firms with lots of branches.
 - Banks and branches usually not significant.
 - More to the point: The ratio of branches/banks.
- Curious about other variables:
 - Presence of other scoreable loans in portfolio?
 - Had a close competitor also adopted?
 - Risk profile of bank?

Courchane, Nickerson, and Sullivan (1)

- Models the diffusion of Internet banking.
- Theoretical model predicts that a firm is more likely to exercise its real investment option when:
 - It is large relative to its market rivals.
 - Its expected return from investment is relatively certain.
- Logit model estimates probability that 10th District banks had adopted Internet as of 1999.
- Results are consistent with theory. Adoption is more likely when:
 - Bank is absolutely large.
 - Bank is large relative to its rivals.
 - Income and education high (demand uncertainty is low).

Courchane, Nickerson, and Sullivan (2)

Is the Courchane, Nickerson, and Sullivan evidence consistent with our Strategic Map?

- Large banks were more likely to have adopted.
 - Internet banking is a scaleable technology.
- Divergence in size between a bank and its rivals increases the likelihood of adoption.
 - Internet technology “drives a wedge between large and small banks.”

Courchane, Nickerson, and Sullivan (3)

There is a series of disconnects between the theory model and the empirical model.

- Empirical result: Adoption is positively related to absolute and relative bank size.
 - Theory casts bank size as a strategic determinant.
 - But bank size also indicates the potential return from a scaleable technology, which is a financial determinant.
 - I'd like to see more discussion of these two independent motivations for adoption.

Courchane, Nickerson, and Sullivan (3)

- Empirical result: Adoption is positively related to local income and education.
 - Demand for Internet banking will be more “certain” if education and income are either very high (i.e., strong demand) or very low (i.e., weak demand).
 - Hence, empirical result likely measures adoption response to “strong demand,” not “certain demand.”
- Theoretical results are relative to a “single referent bank, strategically large relative to its rivals.”
 - In equilibrium, this bank is the market leader.
 - This suggests estimating the logit model only for the largest bank in each 10th District market.