Predator-Prey Competition Among Cosmopolitan and Local Organizations*

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Abstract

We draw on the distinction between locals and cosmopolitans to describe the different geographic strategies used by 20th century retail banks in California. Local banks and branch bank systems are distinct strategies – one basing its identity on, and building social connections within, a particular locale, and the other drawing on expertise and networks that can be leveraged across a broader geography. We expected this difference to shape competition in the history of retail banking, and found evidence of competition within each of these strategies that is significantly stronger than competition between them. We also investigated the role of acquisitions of up-and-coming local banks by branch systems, finding evidence of a predator-prey relationship that reinforced resource partitioning.

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In many areas of life, organizations of vastly different sizes co-exist. Massive global corporations and small local firms often are classified formally as being within the same industry. This fact has long fueled scholarship, with various research traditions inquiring into why it is that organizational sizes can be so different within the same industry. Especially curious is the persistent appearance of small organizations alongside very large firms in contexts where size is widely believed to make organizations more competitive. In such contexts, one might expect organizations to converge on an optimal size. Yet organizational size distributions typically remain skewed even in industries marked by scale advantages and strong selection pressures (Ijiri and Simon, 1977).

Evolutionary theories include two general approaches to explaining the co-occurrence of large and small organizations. Developmental explanations understand growth as the outcome of superior fitness. Variations in size, then, result from variations in fitness as small, fit firms grow (Penrose, 1958; Nelson and Winter, 1982; Levinthal, 1991). Selection-based theories, most notably within organizational ecology, see the coexistence of small and large organizations as arising from environmental partitioning (Carroll, 1985). As distinct "niches" emerge for large generalists and small specialists, competition occurs mainly among organizations that are of a similar size (Carroll and Hannan, 1990). From this perspective, growth moves small organizations into a nether world, rendering them too large to make legitimate identity claims as a specialist, and yet too small to win in scale-based competition against the champions of industry.

Less discussed, from either of these perspectives, is the role played by large organizations acquiring up-and-coming rivals before they become too much of a threat. We sometimes observe small organizations succeeding and growing, as developmental theories predict. And although the process of growth is fraught with hazards, as noted by theories of niche partitioning, sometimes an organization does survive this transition. This possibility is well known to those who manage large, powerful organizations. In such organizations, it is not unusual for management to routinely monitor the most vital, small organizations in their industry and to acquire them before they can make the transition to large scale. While many specific tactics are available for large organizations to eliminate upstarts, among the most common is to acquire the organization before it becomes large enough to constitute a threat.

Seen at the population level, acquisitions of small organizations by large ones can be understood as predator-prey competition. Our idea in this paper is that predator-prey competition is especially likely to deplete the most successful of the population of small organizations – those that are showing signs of success but that have not yet become large enough to make acquisition difficult and costly. Environmental partitioning is fortified by the process we describe: Successful small organizations growing into the middling area between niches are eliminated by acquisition, and large organizations become even larger as a consequence.

Cosmopolitans and Locals – Distinct Niches in 20th Century Retail Banking

The empirical setting of our study is the retail banking industry of California over the 20th century. Large and small organizations co-existed in this industry throughout the century, especially in California since its banking regulators have consistently allowed bank branching.

So while the state has always had many small banks, each focusing on a single town, it also witnessed the growth of branch banks extending services to their customers over many different establishments in various locations throughout the state (see Figures 1 and 2).

Single-location and multi-location banks differed in several ways, corresponding strikingly to the distinction between cosmopolitans and locals developed by Merton in his study of influential people a community (Merton, 1957), and extended by Gouldner to the roles and identities of individuals within organizations (Gouldner, 1957, 1958). The distinction between locals and cosmopolitans refers to, in Merton's terms, a "basic orientation" – one toward its immediate locale and the other to the wider world. This same difference in orientation describes the local and branch banking systems that we studied.

One important difference between locals and cosmopolitans is their very different social relations. Locals tend to be connected to others in their community, across various walks of life (Merton, 1957). Consequently, locals typically are seen as loyal to the local community, and to maintain a reference group orientation toward others in the local community (Gouldner 1957). Cosmopolitans, by contrast, draw on social ties based on their profession or other basis of expertise, regardless of the geographic proximity of these ties. This difference describes the social ties of banks, too. Single-location banks typically depend on the banker's social ties to various aspects of the local community for access to information regarding creditworthiness, possible opportunities, and the like. The local banker has typically been a pillar of the local community, understood to be dependable even at those crucial times when "outside" bankers might have restricted credit. In one interview, a long-time local banker reported that he and others in his position would commonly refer to branch banks as "foreign banks," because they lacked intimacy with those in the community. For the top brass of branch bank systems,

connections with other "professional bankers," through organizations such as the ABA, were more important than ties to those in any particular locale.

Merton also describes locals and cosmopolitans differing in terms of the "basis of appeal," with locals trusted to share an empathetic understanding of those who reside in the locale. Cosmopolitans were valued instead for their expertise. This same contrast is seen among banks. Local bankers typically are turned to by business and agricultural customers who seek someone worthy of trust. Officers in branch bank systems, by contrast, can be turned to for professional financial advice, and so these organizations typically invest in the training of their customer-contact personnel for this purpose. The organization BAI, for instance, grew during the last years of the 20th century to provide professional training courses to lending and operations officers in branch bank systems. The nature of such training is especially well suited to branch systems, since these organizations can aggregate credit decisions over different sectors of the economy and thereby rationalize their portfolios. This expertise has given branch systems capabilities of a very different sort than those available to the local banker.

Locals and cosmopolitans differ as well in the historical paths they follow over time, notes Merton. Locals "grew up" in a given location, while cosmopolitans enter a location "fully equipped" and "worldly." Much of learning depends on the path one follows, of course, and so these different historical routes imply very different knowledge and perspective. Exactly this difference can be seen between local banks and branch bank systems. A bank "born and raised" in a single community draws on a history limited to that location – a rich and complex history perhaps, but one that knows only what was experienced in that place. As Thompson (1967) notes, branch bank systems specialize in standardizing activities across diverse locations, thereby buffering the larger organization from the idiosyncrasies of any one place. As a consequence of

their different historical paths, local banks and bank branch systems evolved in very different ways – one embodying the experience of the local community and the other removing itself from such localized forces.

These differences led both Merton and Gouldner to conclude that locals and cosmopolitans should be understood as distinct identities that implied very different roles for each. Similarly, we treat local and cosmopolitan banks as distinct strategies, for which there were distinct organizational alignments and different logics of competition. Our understanding is that local and cosmopolitan banks sought customers in very different segments. Locals competed over those customers best served and understood by those with contextualized knowledge. Branch bank systems, by contrast, competed over those who could be best served with banking products and services offered uniformly over various geographies. These customers would value access to financial services beyond the boundaries of a given locale, while the local bank customer valued "knowing" the bank – even if this meant limiting his access to banking services geographically. But it is important to keep in mind that the distinction we describe here is more than just two different market segments. These are two different niches in the banking industry, each maintaining a population of organizations that are very different with respect to fundamental organizational processes and characteristics.

Predation by Branch Banks

Different as the local and cosmopolitan niches are, for them to remain distinct over time depends on the segregating and blending processes that are at work (Hannan and Freeman, 1989). Considerable research has looked at processes of niche segmentation – the leading theory describing this evolution as "resource partitioning" (Carroll, 1985). In this process, as the

generalist niche becomes more concentrated, more environmental space is opened up for specialists. This dynamic leads the generalist and specialist niches to become increasingly distinct as an industry evolves, since it eliminates organizations in the "near center" that are somewhere between the specialist and generalist extremes (Hannan et al., 2007).

In the context of retail banking, we found a broad pattern consistent with the prediction of resource partitioning theory. Figures 1 and 2 show that as the number and geographic extent of branch systems (generalists) increased, so did the number of single-location (specialist) banks. On further investigation, however, the specific processes at work appear to be different than those typically described in resource partitioning theory. Two differences are especially noteworthy. First, local and cosmopolitan banks operate at different levels of analysis. The local niche is at the level of a particular geographic place, and so for a local bank the relevant competitors are other banks and branches in the local community. By contrast, branch banks operate across multiple locations and consequently face competitors across a variety of geographic locations. Second, it was very common for successful local banks to begin branching – at first within their community and then into neighboring geographic places. So the most successful local banks would effectively expand their fundamental niche, increasing their overlap with branch systems. How would such encroachment be resolved?

We suspected that when such encroachment occurred, the branch systems would react by acquiring the expanding local bank. Large branch banks have long been known to target other banks for acquisition. Although such moves typically are accompanied by a rhetoric of efficiency, many have suspected that such moves are motivated as much (or more) by the quest for market power. But for either reason, banks pursuing a strategy of growth by acquisition would be especially likely to prey on up-and-coming local banks. As the successful local bank

begins to branch, it must develop routinized functions and organizational structures compatible with multi-location operation. These characteristics make such banks a good target for acquisition, because they allow the up-and-coming bank to be integrated into the branch system.. Second, an expanding local bank is a potential competitive threat to the established branch systems, and one way to eliminate this threat is to acquire it before it becomes too much of a problem competitively.

Acquisitions of expanding local banks by branch systems can be understood, at the population level, as a predator-prey relationship between the two strategies. Looking again at Figure 1, note the cyclical movement of the local bank population over time. Such cyclicality is typically associated with predator prey competition (May, 1973). As local banks are acquired, they would fall in number as they fuel the expansion of branch banks. This decrease in the density of local banks, then, would allow for new bank creation in the local niche, triggering an increase in the local bank population. As some of these banks become successful, and so are acquired by branch systems, the dynamic repeats. In this way, we think the process of resource partitioning among local and cosmopolitan banks was reinforced by predator-prey competition, as the branch systems strategically targeted the most threatening, successful local banks.

It is worth noting that our theory assumes a transformation after acquisition, with local banks at that point becoming part of their cosmopolitan acquirer. Some evidence of a similar transition was found by Ingram and Baum (1997), who found that local organizations became less responsive to local conditions when they became part of a chain organization. If this assumption holds for acquired local banks, then we should find evidence that the local and cosmopolitan niches remained distinct competitive arenas. If it did not hold, then the process of

acquisition would have blended the niches, and so we would not find evidence that the two niches remained competitively segmented.

Modeling Competition Among Cosmopolitans and Locals

Our arguments imply that we should find evidence of competition within, more strongly than between, these two strategies among the banks we study. And, when local banks do begin to grow, we expect to see them become targets for acquisition by the branch systems. To investigate these ideas empirically we use ecological models, where evidence of competition appears when an organization's viability is reduced by increases in the density of organizations of a given kind (Hannan and Freeman, 1989). This approach to modeling the segregation of the banking market into distinct niches was effective in Hannan and Carroll's (1992) study of competition in the New York banking market. They found that regulatory barriers effectively segmented the market, so that competition appeared among commercial banks, and among savings banks, but not between these forms. Note that we also test for non-monotonic density effects, to allow for increases in legitimacy with initial increases in numbers of organizations (Carroll and Hannan, 2000). Such a non-monotonic pattern was found by Greve (2002) in his study of Tokyo banks.

Notably, we distinguish in these models between material and social density, the former being the number of physical establishments and the latter being the number of distinct organizations (regardless of the number of branches) faced by a given organization. This approach allows us to investigate the extent to which competition is driven by organizations as social actors, or merely by the supply of alternative banking services regardless of how many different organizations operated that supply. We expect that social density will be the primary

driver of competition, because organizational diversity increases with the number of distinct social units.

"Viability," in the context of this study, is operationalized in two ways. First, we model rates of local market exit. If a given bank withdraws from a given market, we treat this is as evidence that the bank was not viable in that market. For local banks, this approach means that we are modeling the failure rate of the bank – since its withdrawal from the only market in which it operates implies the end of the organization. (Being acquired was not counted as market exit; see below. In some cases, banks failed and then regulators sold their remaining assets and liabilities to other banks. These events were coded as failures rather than non-failure acquisitions.) For branch banks, we modeled the exit of any bank from any particular local market in which it operated. Yet the competition affecting such a bank could be strictly within the locality, or it could be statewide. If we are correct that branch banks faced a different (geographically broad) niche, then they would feel competition mainly from the number of other branch bank systems that they faced statewide. To allow for this, we modeled the exit rate of these banks from each locale, but allowed these rates to vary as a function of both local density and the density of competitors faced more broadly throughout the state.

A second way that we operationalize viability is in terms of the market entry rate. In this case, we look at branching activity, where an event occurs whenever a bank opens a branch (either in the same local market or in another locality). Competition is evidenced in these models when the density of a given kind of organization reduces the likelihood that an organization will enter a given market. We know that geographic clustering tends to encourage organizational foundings, since social ties to other organizations enables the mobilization of resources (Sorenson and Audia, 2000; Stuart and Sorenson, 2003). In some cases, geographic

clustering reflects the importance of social networks (Sorenson, 2003), but in other cases particular geographies come to be reified, further reinforcing geographic agglomeration (Sorenson and Stuart, 2001). For these reasons, our market entry models allow for a baseline entry rate that varies from place to place in terms of the frequency of observed cases (historically) where organizations existed across any given combination of geographic areas. For instance, if banks have tended to operate in Walnut Creek if they operate in Oakland, then the rate of entry into Walnut Creek for an Oakland bank would be allowed to be higher.[1]

To model predator-prey competition, we estimate the rate at which any given bank acquired any other bank, so that the units under analysis are bank dyads. This approach allows us to investigate whether, as we suspect, growing small banks are especially likely to be the acquisition targets of the branch systems that they potentially threaten. The baseline model includes various control variables, including geographic distance measures to capture different acquisition pairings as they varied according to the distance of these banks from one another. If banks pursued regional strategies, possibly to take advantage of agglomeration effects, then these distance measures will be important control variables.

Data and Model Estimation

The data were collected by manually coding the life histories of every domestic California bank ever recorded in the Rand-McNally bankers directory (and its successor publications) from 1900-1993. The existence of each bank was documented in each year, and its size in assets and the localities in which it operated were recorded for each year. The directories

[1] Sometimes an organization will branch into new territory, opening an office in a town that as yet has no bank. Sorenson (2005) finds that such "de alio" entrants are more likely to 'trailblaze" into new geographies than are de novo start ups. In our data, slightly more than half of the 594 first-bank entries into a locale (318) were branching by existing banks rather than the start up of a new bank.

document the reason for disappearance of each bank using textual descriptions. Over the century, many dozens of specific reasons for disappearance were noted, but we were able to group them as failures or non-failure merger and acquisitions. For individual branches, it was also noted when a bank entered or exited a particular locality. These various events are summarized in Figures 3 and 4.

From these data, several different datasets were created in order to test different models. (See Table 1.) To analyze the exit rates of these banks from the local markets, the data were structured into bank-location dyads, and then these dyads were split into annual segments for the duration of time that a given bank spent in a given locality. The hazard of exit was then estimated at the bank-locality level. Because multi-locality banks often simultaneously exited multiple localities in the same year, these events were weighted by 1/k, where k is the number of simultaneous exits that occurred for that bank in that year. This adjustment made it so that simultaneous exits by a given bank from multiple locations were counted as just one event.

To model entry by branching into a locality, bank-location dyads were constructed for all banks in each year for all locations within which a bank did not yet have a branch. As with the market exit models, competition is investigated using various density effects. The social density vs. material density distinction becomes especially useful for these models. A bank can branch into a location that contains many banks, but if these are all rivals that the bank faces already in its other markets, then the social density faced by the bank – the number of distinct competitors it faces – does not increase with this entry even though material density does increase. Thus we can experiment with whether social density, and the increase in organizational variety that comes with it, are what drives competition in the entry process.

Acquisition models were estimated by constructing bank dyads for all banks that coexisted at any time over the study period. These dyads then were split into annual segments to allow for the updating of independent variables. This approach allowed us to include characteristics of the acquiring bank, the target bank, and of the geographic locations of these organizations. Specifically, it was possible to identify local banks that were growing and expanding into multiple branches to see whether they were more likely to become acquisition targets by branch systems.

All rates were analyzed using partial likelihood estimates of the proportional hazards (Cox) model. Location-specific nuisances were specified, to help control for unobserved heterogeneity at the local market level. Along with the variables of theoretical interest, we included various control variables and period effects for each decade over the century. Geographic heterogeneity was specified by measuring the physical distance between the organizations under study, and between the organizations and particular markets, depending on the model.

Results

Table 2 lists various local market exit rate model estimates, and Tables 3 and 4 list estimates of various branching models. Table 5 includes estimates of the acquisition models. We experimented with a wide variety of specifications to see whether non-monotonic density effects were operating – both within local areas and in mixed models that include local and non-local density. The only evidence we found of non-monotonic density effects using quadratics vanished once we included local monopoly effects, and these effects were important only in the market exit models of Table 2. Local banks who were monopolists were considerably more

likely to fail, possibly evidence of a dying-town effect. Once this effect was included, all density effects were strictly monotonic.

Looking first at the results pertaining to our theory, the patterns in Table 2 reveal competition within, but not between, the local and cosmopolitan strategies. The competitive local density effect in Model 1 turns out, in Model 2, to be competition only from local banks. And models 3 through 8 show that these local competitive effects are felt by other local banks, but we do not find evidence that this competition affected branch systems. Competition did affect branch systems, however, but at the higher level of analysis. Model 7 shows that branch systems were more likely to exit any local market when they were confronted *system-wide* with a larger number of distinct rival organizations. And Model 8 shows significant competition only from those rivals who were also branch systems. Overall, these patterns reveal competition only within each strategy: Locals competed with locals and cosmopolitans with cosmopolitans, and each competed at a different level of analysis consistent with its strategic orientation.

The entry-by-branching models reveal very important differences between cosmopolitans and locals. Table 3 lists models estimated on all banks, and shows that banks were reluctant to enter into markets that would lead them to encounter a rival whom they had not yet encountered elsewhere. Entry was not deterred, apparently, by the number of already-met rivals there. Table 4, however, reveals that the true patterns hinged on strategy. Already-met rivals in a given location made entry more likely for local banks that were "becoming" branch systems by geographic expansion, while already-met rivals made entry less likely for branch systems. These patterns are consistent with theories of mutual forbearance, predicting that multi-market organizations refrain from competing with each other in return for similar restraint by their multi-market rivals.

Another branching result is noteworthy with respect to competition. The density of local organizations deterred the entry of branch systems, but only when that entry did not involve an acquisition. Local banks would be the fuel for acquisitions, so acquisition-based entry was not reduced by the presence of such banks. The fact that local banks deterred the entry of branch systems, holding aside predatory entry, suggests that the niches were not entirely segmented. So while the overall pattern of results across the various analyses supports our claim that these niches were distinct, there is some evidence of between-niche competition where locals prevented the expansion of branch systems.

Turning to the acquisition models in Table 5, the results bear out our suspicion that more successful local banks were targeted by branch systems for acquisition. The results are nuanced, however, in that they hold only for acquisitions made in the process of entering a new locality. This calls into question our rationale that branch systems were dealing with these rivals as threats. After all, successful local banks in your existing markets would be especially threatening, yet they did not appear to be more likely to be acquired. Another nuance is that larger local banks were less likely to be acquired, while local banks with a great branch share in the locality were more likely. So while we theorized about "successful" local banks, the specific form of this success mattered. Size per se (in terms of assets) made acquisition less likely, while growth in terms of the share of branches in a locality did lead banks to be targeted for acquisition as we predicted. And Figure 5 shows that this branch share effect was strong enough to offset the deterring effect of size over much of the observed range. Finally, note that local monopolists were considerably less likely to be targeted – again a finding consistent with a possible "dying town" effect.

Conclusion

We found patterns of competition among local and cosmopolitan banks consistent with the idea that these strategies operated in segmented niches. With the exception of local banks deterring the entry of branch systems by branching into a locality, all other competitive effects that we found were within, rather than between, these strategies. Yet there was considerable interplay between these strategies in the form of predator-prey competition. Branch systems fueled their growth into new markets, in part, by acquiring the most successful local banks. But with sufficient size, local banks could deter such acquisition attempts.

It is theoretically noteworthy that these acquisition effects did not hold within localities already served by the acquiring bank. Our failure to find effects there casts doubt on our view that branch systems feared the up-and-coming local banks. Furthermore, the success measure that attracted acquisition was branch share, meaning that the local banks most attractive as targets were those that had successfully elaborated a branch system themselves – albeit only within a given locality. This pattern suggests that the compatibility of such systems with the branching form was what made them especially attractive targets, serving as convenient vehicles for rapid expansion into new locations.

More generally, our findings show that predator-prey competition can play an important role in the resource partitioning process. We did experiment with concentration effects more in line with the "classic" approach to resource partitioning theory, but found nothing statistically significant in such models. Only when we allowed for segregating processes based on predator prey interactions did we find evidence that can help to explain how these two strategies came to be partitioned over the history of this industry. We think that predator prey interactions probably have been neglected by researchers in our field, since we typically treat acquisitions as coding

problems or as financial outcomes. While acquisitions clearly are both of these, they also are the mechanism through which organizations play out competition based on predation – a competition with a distinct logic and meaning worthy of theory in its own right.

References

Barnett, William P. 2008. *The Red Queen Among Organizations: How Competitiveness Evolves.* Princeton: Princeton University Press.

Carroll, Glenn R. 1985. “Concentration and Specialization: Dynamics of Niche Width in Populations of Organizations.” *American Journal of Sociology,* 90: 1262-1283.

Carroll, Glenn R., Stanislav Dobrev, and Anand Swaminathan. 2002. "Organizational processes of resource partitioning," *Research in Organizational Behavior*, 24: 1-40.

Carroll, Glenn R. and Michael T. Hannan. 2000. *The Demography of Corporations and Industries.* Princeton: Princeton University Press.

Gouldner, Alvin W. 1957. “Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles.I” *Administrative Science Quarterly*, 2: 281-306.

Gouldner, Alvin W. 1958. “Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles. II” *Administrative Science Quarterly*, 2: 444-480.

Greve, Henrich R. 2002. “An Ecological Theory of Spatial Evolution: Local Density Dependence in Tokyo Banking, 1894-1936.” *Social Forces*, 80: 847-879.

Hannan, Michael T. and Glenn R. Carroll. 1992. *Dynamics of Organizational Populations: Density, Legitimacy, and Competition.* New York: Oxford University Press.

Hannan, Michael T. and John Freeman. 1977. “The Population Ecology of Organizations.” *American Journal of Sociology,* 82: 929-964.

Hannan, Michael T. and John Freeman. 1989. *Organizational Ecology*. Cambridge, MA: Harvard University Press.

Hannan, Michael T., László Pólos, and Glenn R. Carroll. 2007. *Logics of Organization Theory: Audiences, Codes, and Ecologies.* Princeton: Princeton University Press.

Ingram, Paul and Joel A. C. Baum. 1997. “Chain Affiliation and the Failure of Manhattan Hotels, 1898-1980.” *Administrative Science Quarterly*, 42: 68-102.

May, Robert M. 1973. *Stability and Complexity in Model Ecosystems.* Princeton: Princeton University Press.

Merton, Robert K. 1957. “Patterns of Influence: Local and Cosmopolitan Influentials.” Chapter XII in *Social Theory and Social Structure*. New York:Free Press.

Rand McNally International Bankers Directory. (Annual directories from 1900-1990). Rand McNally, Chicago, IL.

Sorenson, Olav. 2003. “Social networks and industrial geography.” *Journal of Evolutionary Economics*, 13: 513–527

Sorenson, Olav. 2005. “Social Networks and the Persistence of Clusters: Evidence from the Computer Workstation Industry.” Pp. 297-316 in Stefano Breschi and Franco Malerba (eds.) *Clusters, Networks and Innovation.* New York: Oxford University Press.

Sorenson, Olav and Audia, Pino G. 2000. “The social structure of entrepreneurial activity: Geographic production of footwear in the United States, 1940–1989.” *American Journal of Sociology*, 106: 424–462.

Sorenson, Olav and Toby E. Stuart. 2001. “Syndication networks and the spatial distribution of venture capital investments.” *American Journal of Sociology*, 106: 1546–1588.

Stuart, Toby E. and Olav Sorenson. 2003. “The geography of opportunity: Spatial heterogeneity in founding rates and the performance of biotechnology firms’. *Research Policy*, 32: 229–253.

Thomson Bank Directory. (Annual directories from 1991-1993). Thomson Financial Publishing, Skokie, IL.

U.S. Department of Commerce. 1988. *County and City Data Book.* U.S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census, Washington, DC.

U.S. Department of Commerce. 1992. *USA County Statistics* [CD-ROM database]. U.S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census, Washington, DC.

Table 1. Summary statistics of variables by level of analysis

Variables	# of Obs	Mean	Std Dev	Min	Max
STATE LEVEL					
Bank Density	91	358.868	203.291	122	743
Number of Foundings	91	18.176	18.444	0	76
Number of Exits	91	16.681	20.115	1	149
BANK LEVEL					
Total Establishments	32657	4.894	39.879	1	1103
Number of Locations	32657	3.216	21.163	1	513
Bank Assets (Exponential)	32657	16.127	1.974	5.851	25.588
Number of Distinct Competitors	32657	9.740	23.393	0	437
Number of Distinct Single-Location Competitors	32657	4.748	12.733	0	256
Number of Distinct Multi-Location Competitors	32657	4.992	12.621	0	253
LOCALITY LEVEL					
Local Population (Exponential)	41664	8.024	2.204	1.609	15.009
Number of Market Exits	41664	0.039	0.216	0	7
BANK-LOCALITY DYAD LEVEL					
Number of Establishments	105022	1.522	3.226	1	84
Relative Local Market Presence	105022	0.397	0.326	0.003	1
Number of Competitor's Establishments	105022	13.969	42.034	0	338
Number of Competitors (Local)	105022	5.055	8.571	0	76
Number of Single-Location Competitors (Local)	105022	1.552	4.460	0	40
Number of Multi-Location Competitors (Local)	105022	3.502	5.682	0	58

Table 2. Estimate of the Local Market Exit Rate Models

	All Banks		Single Location Banks		Multi Location Banks			
DV = Bank-Location Exit	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
KEY VARIABLES								
# of Local Comp Orgs	.0221**		.0421***		-.0139			
	(.0087)		(.0122)		(.0193)			
# of Local Single-Loc Comp Orgs		.0560***		.0686***		-.0062	.0069	.0071
		(.0132)		(.0160)		(.0334)	(.0330)	(.0331)
# of Local Multi-Loc Comp Orgs		-.0217		-.0138		-.0202	-.0146	-.0136
		(.0161)		(.0255)		(.0296)	(.0300)	(.0299)
# of Distinct Competitors							.0039*	
							(.0022)	
# of Distinct Single-Loc Competitors								.0016
								(.0036)
# of Distinct Multi-Loc Competitors								.0062*
								(.0036)
BANK LEVEL								
Bank Age	.0048**	.0047**	-.0159	-.0172	.0041	.0041	.0027	.0023
	(.0021)	(.0021)	(.0137)	(.0134)	(.0026)	(.0026)	(.0026)	(.0026)
Log Bank Assets	-.1762***	-.1787***	-.3062***	-.3178***	-.0686**	-.0685**	-.1159***	-.1154***
	(.0215)	(.0216)	(.0372)	(.0379)	(.0338)	(.0338)	(.0354)	(.0354)
# of Locations	-.0063***	-.0064***	-	-	-.0083***	-.0083***	-.0126***	-.0123***
	(.0009)	(.0009)	-	-	(.0012)	(.0012)	(.0018)	(.0019)
Multi-Location Dummy	.2026	.1745	-	-	-	-	-	-
	(.1319)	(.1323)	-	-	-	-	-	-
BANK-LOCALITY DYAD LEVEL								
Dummy for Local Monopoly	.8266**	.8051**	1.9005***	1.6505**	.8976	.9096	.8032	.7534
	(.4016)	(.3988)	(.7071)	(.7049)	(.7103)	(.7113)	(.7139)	(.7173)
Relative Local Market Presence	-2.6173***	-2.4374***	-4.7538***	-4.1013***	-2.5123**	-2.5225**	-2.2852**	-2.1971*
	(.6299)	(.6272)	(1.0871)	(1.0955)	(1.1582)	(1.1584)	(1.1603)	(1.1647)
LOCALITY LEVEL								
Log Local Population	.1128	.1117	.2908**	.2952**	.1672	.1682	.1679	.1675
	(.0893)	(.0895)	(.1420)	(.1416)	(.1987)	(.1986)	(.1989)	(.1988)
# of Competitor Establishments	-.0057***	-.0011	-.0061***	-.0015	.0038	.0044	.0029	.0030
	(.0014)	(.0019)	(.0017)	(.0024)	(.0058)	(.0061)	(.0062)	(.0062)
STATE LEVEL								

State-wide Density	.0029***	.0026***	.0032***	.0029***	-.0020	-.0020	-	-
(Excluding Loc Org)	(.0006)	(.0006)	(.0008)	(.0008)	(.0014)	(.0014)	-	-
State-wide Density	-	-	-	-	-	-	-.0024*	-.0026*
(Excluding Distinct Competitors)	-	-	-	-	-	-	(.0014)	(.0014)
No. of Events	1625	1625	664	664	961	961	961	961
No. of Unit-Years	84019	84019	25478	25478	58540	58540	58540	58540
Log Likelihood	-1434.640	-1428.618	-790.470	-786.836	-287.231	-287.191	-281.089	-280.775

* p<0.1 ** p<0.05 *** p<0.01

† Models include calendar period effects for each decade.

Table 3. Estimate of the hazard rate of branching at bank-Locality dyad level

DV = Branching	Model 9	Model 10	Model 11	Model 12	Model 13
KEY VARIABLES IN TARGET LOCALITY					
# of Loc Org	-.0265***				
	(.0085)				
# of Single-Loc Org		-.0016	-.0015	.0010	.0029
		(.0138)	(.0139)	(.0139)	(.0138)
# of Multi-Loc Org		-.0466***			
		(.0124)			
# of New Multi-Loc Org			-.0582***	-.0560***	-.0587***
			(.0127)	(.0128)	(.0128)
# of Already-Met Multi-Loc Org			.0159	.0184	-.0015
			(.0169)	(.0169)	(.0173)
KEY VARIABLES BANKWIDE					
# of Distinct Competitors				-.0012**	
				(.0006)	
# of Distinct Single-Loc Competitors					.0068***
					(.0009)
# of Distinct Multi-Loc Competitors					-.0121***
					(.0011)
HETEROGENEITY & DISTANCE					
Co-occurrence Likelihood (Mean)	.3213*	.3963**	.4035**	.4125**	.3953**
	(.1644)	(.1675)	(.1661)	(.1661)	(.1648)
Overall Distance to Target Location	-.0098***	-.0098***	-.0098***	-.0100***	-.0094***
	(.0008)	(.0008)	(.0008)	(.0008)	(.0008)
Closest Distance to Target Location	-.0128***	-.0128***	-.0126***	-.0125***	-.0128***
	(.0006)	(.0006)	(.0006)	(.0006)	(.0006)
BANK LEVEL					
Log Bank Assets	.5592***	.5589***	.5598***	.5531***	.5649***
	(.0119)	(.0119)	(.0119)	(.0132)	(.0135)
Bank Age	-.0015	-.0015	-.0014	-.0013	-.0005
	(.0010)	(.0010)	(.0010)	(.0010)	(.0010)
# of Locations	.0005*	.0005*	.0006**	.0004	.0002
	(.0003)	(.0003)	(.0003)	(.0003)	(.0003)
Multi-Location Dummy	1.1372***	1.1421***	1.2335***	1.2335***	1.0905***
	(.0597)	(.0598)	(.0619)	(.0620)	(.0634)
TARGET LOCALITY LEVEL					
Log local population	.5226***	.5328***	.5222***	.5201***	.5280***

	(.0437)	(.0439)	(.0440)	(.0440)	(.0443)
# of Local Branches	.0137***	.0165***	.0164***	.0165***	.0155***
	(.0025)	(.0028)	(.0028)	(.0028)	(.0028)
STATE LEVEL					
State-wide Density	-.0016***	-.0017***	-.0017***	-	-
(Excluding Loc Org)	(.0004)	(.0004)	(.0004)	-	-
State-wide Density	-	-	-	-.0017***	-.0016***
(Excluding Distinct Competitors)	-	-	-	(.0004)	(.0004)
No. of Events	3692	3692	3692	3692	3692
No. of Unit-Years	1.59e+07	1.59e+07	1.59e+07	1.59e+07	1.59e+07
Log Likelihood	-12526.62	-12523.97	-12510.52	-12509.82	-12436.85

* p<0.1 ** p<0.05 *** p<0.01

† Models include calendar period effects for each decade.

Table 4. Estimate of the hazard rate of single-location and multi-location banks' branching at bank-Locality dyad level

	DV = All Branching				DV = Non-M&A Branching			
	Single-Location Banks		Multi-Location Banks		Single-Location Banks		Multi-Location Banks	
	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21
KEY VARIABLES IN TARGET LOCALITY								
# of Single-Loc Org	.0157	.0136	-.0030	-.0032	.0127	.0090	-.0500**	-.0500**
	(.0228)	(.0227)	(.0189)	(.0188)	(.0229)	(.0229)	(.0220)	(.0218)
# of Multi-Loc Org	-.0247		-.0767***		-.0283		-.1032***	
	(.0202)		(.0173)		(.0210)		(.0193)	
# of New Multi-Loc Org		-.0805***		-.0701***		-.0811***		-.0902***
		(.0242)		(.0173)		(.0250)		(.0192)
# of Already-Met Multi-Loc Org		.1676***		-.1434***		.1596***		-.2293***
		(.0315)		(.0265)		(.0327)		(.0290)
KEY VARIABLES BANKWIDE								
# of Distinct Single-Loc Competitors	.0615***	.0697***	.0038***	.0040***	.0511***	.0592***	.0038***	.0042***
	(.0088)	(.0089)	(.0010)	(.0010)	(.0094)	(.0095)	(.0011)	(.0011)
# of Distinct Multi-Loc Competitors	-.0238***	-.0652***	-.0100***	-.0101***	-.0188**	-.0591***	-.0131***	-.0131***
	(.0082)	(.0105)	(.0012)	(.0012)	(.0086)	(.0109)	(.0014)	(.0014)
HETEROGENEITY & DISTANCE								
Co-occurrence Likelihood (Mean)	1.5181***	.7539**	.1446	.1779	1.6330***	.8867**	-.0374	.0775
	(.3037)	(.3314)	(.2218)	(.2231)	(.3170)	(.3453)	(.2284)	(.2305)
Overall Distance to Target Location	-.0267***	-.0256***	-.0088***	-.0085***	-.0273***	-.0263***	-.0077***	-.0070***
	(.0015)	(.0015)	(.0009)	(.0009)	(.0016)	(.0016)	(.0010)	(.0010)
Closest Distance to Target Location	-	-	-.0128***	-.0130***	-	-	-.0135***	-.0139***
	-	-	(.0007)	(.0007)	-	-	(.0008)	(.0008)
BANK LEVEL								
Log Bank Assets	.5295***	.5117***	.5459***	.5404***	.5148***	.4973***	.6437***	.6329***
	(.0335)	(.0337)	(.0158)	(.0159)	(.0368)	(.0370)	(.0177)	(.0178)
Bank Age	-.0338***	-.0340***	.0013	.0012	-.0451***	-.0449***	-.0091***	-.0089***
	(.0065)	(.0066)	(.0010)	(.0010)	(.0082)	(.0083)	(.0011)	(.0011)
# of Locations	-	-	.0004	.0004	-	-	.0015***	.0014***
	-	-	(.0003)	(.0003)	-	-	(.0004)	(.0004)
TARGET LOCALITY LEVEL								
Log local population	.5725***	.5552***	.5265***	.5311***	.5829***	.5658***	.5858***	.5980***
	(.0963)	(.0972)	(.0524)	(.0524)	(.1030)	(.1039)	(.0592)	(.0592)
# of Local Branches	.0141***	.0123**	.0187***	.0186***	.0130***	.0114**	.0265***	.0259***
	(.0048)	(.0049)	(.0038)	(.0038)	(.0049)	(.0050)	(.0043)	(.0043)
STATE LEVEL								

State-wide Density (Excluding Distinct Competitors)	.0003 (.0008)	.0006 (.0008)	-.0025*** (.0005)	-.0024*** (.0005)	-.0009 (.0009)	-.0005 (.0009)	-.0015*** (.0005)	-.0012** (.0005)
No. of Events	576	576	3116	3116	508	508	2529	2529
No. of Unit-Years	1.21e+07	1.21e+07	3.78e+06	3.78e+06	1.21e+07	1.21e+07	3.78e+06	3.78e+06
Log Likelihood	-2820.74	-2785.66	-8194.52	-8188.61	-2505.624	-2474.878	-7412.058	-7393.135

* p<0.1 ** p<0.05 *** p<0.01

† Models include calendar period effects for each decade.

Table 5: Single-Location Bank's Hazard of Being Acquired by a Multi-location Bank

	Full Sample		Acquirer from Same Loc		Acquirer from Different Loc	
	Model 22	**Model 23**	**Model 24**	**Model 25**	**Model 26**	**Model 27**
KEY VARIABLES						
Dummy for Local Monopoly	-1.3111*	-3.0987**	-	-	-1.3771*	-3.6934**
	(.7189)	(1.2534)	-	-	(.8006)	(1.4461)
Relative Local Market Presence		2.8150*		-3.8110		3.6985**
		(1.5448)		(7.5260)		(1.8262)
STATE LEVEL						
State-wide Density	-.0016	-.0016	.0028	.0023	.0005	.0001
	(.0016)	(.0016)	(.0032)	(.0033)	(.0022)	(.0023)
BANK LEVEL						
Bank Age	-.0042	-.0041	-.0659	-.0648	.0011	-.0031
	(.0243)	(.0246)	(.1981)	(.1997)	(.0273)	(.0276)
Log Bank Assets	-.1235**	-.1307**	-.0363	-.0280	-.1789**	-.1920**
	(.0561)	(.0557)	(.1020)	(.1044)	(.0870)	(.0860)
LOCALITY LEVEL						
Log Local Population	.1760	.3482	2.7189**	2.5302**	.2349	.4513
	(.2130)	(.2350)	(1.1898)	(1.2499)	(.2753)	(.2965)
# of Establishments	-.0042	-.0045	-.0062	-.0070	-.0008	-.0026
	(.0047)	(.0047)	(.0066)	(.0068)	(.0109)	(.0109)
# of Local Single-Loc Competitors	.0450	.0453	.0382	.0426	.0454	.0628
	(.0340)	(.0338)	(.0569)	(.0581)	(.0643)	(.0632)
# of Local Multi-Loc Competitors	-.0319	-.0383	-.0171	-.0051	-.1251	-.1018
	(.0375)	(.0373)	(.0586)	(.0626)	(.0804)	(.0797)
No. of Events	394	394	105	105	289	289
No. of Observations	25478	25478	11574	11574	25478	25478
Log Likelihood	-240.187	-238.540	-97.097	-96.976	-135.683	-133.657

* p<0.1 ** p<0.05 *** p<0.01

† Calendar period effects are included for each decade.

Figure 1: Density of Cosmopolitans and Locals

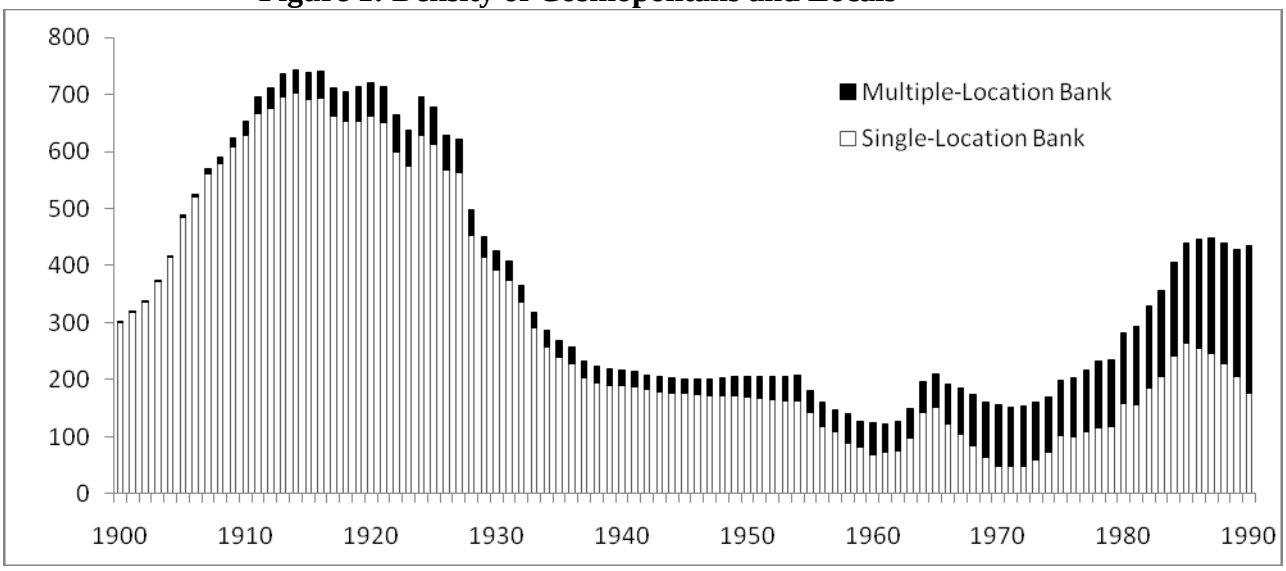


Figure 2: Distributions of Banks by Number of Locations

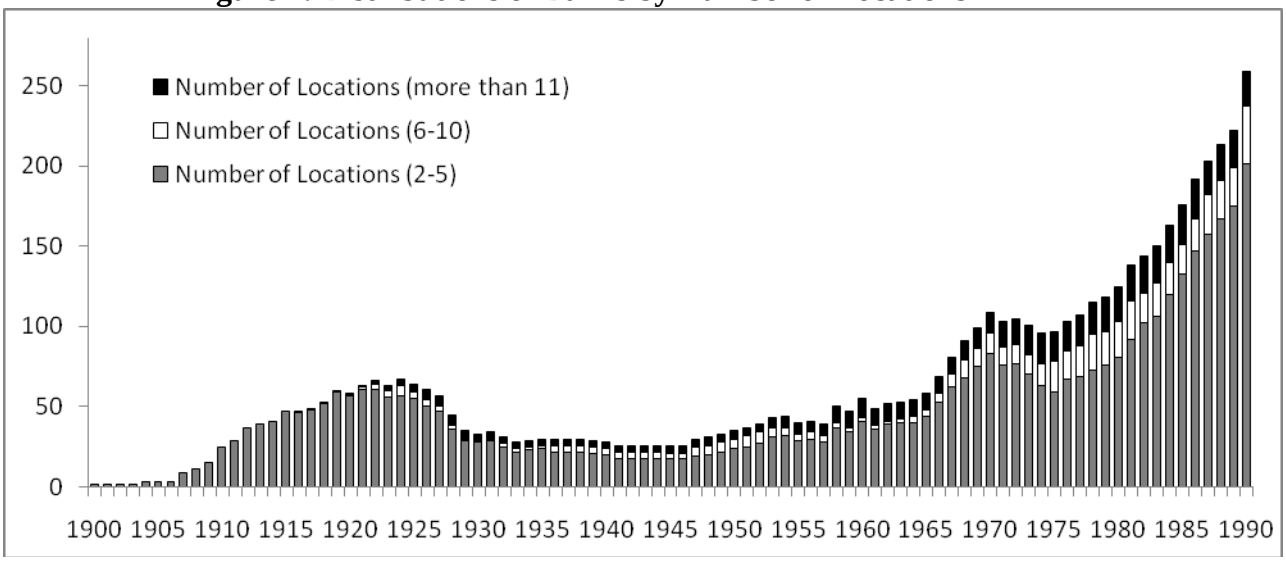


Figure 3: Number of Failures, Entries, and Merger and Acquisitions

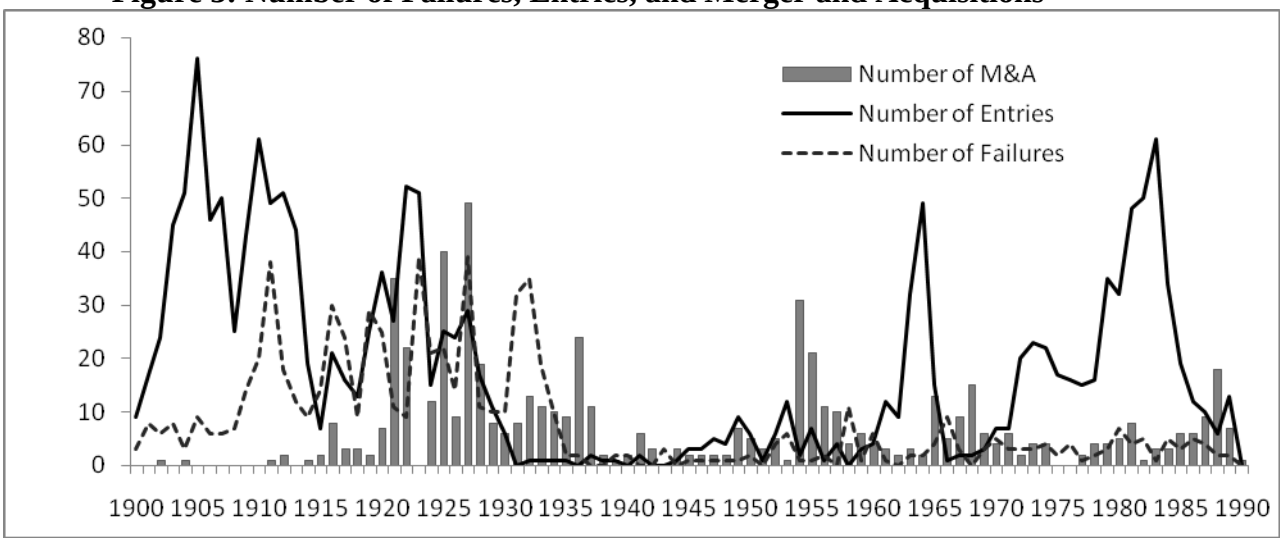


Figure 4: Number of Location Entries and Exits over Year

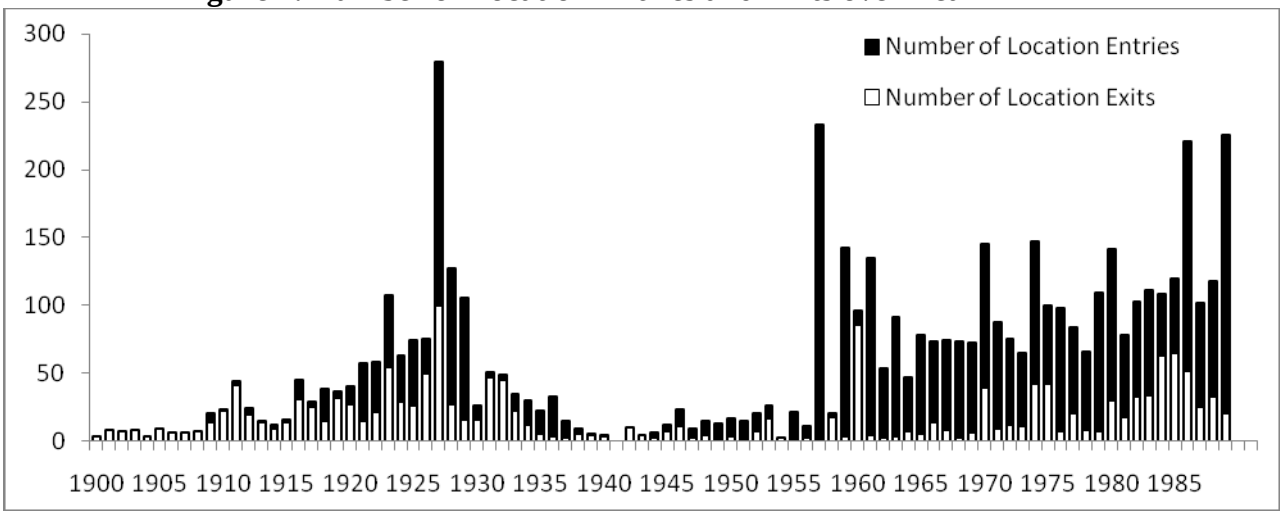
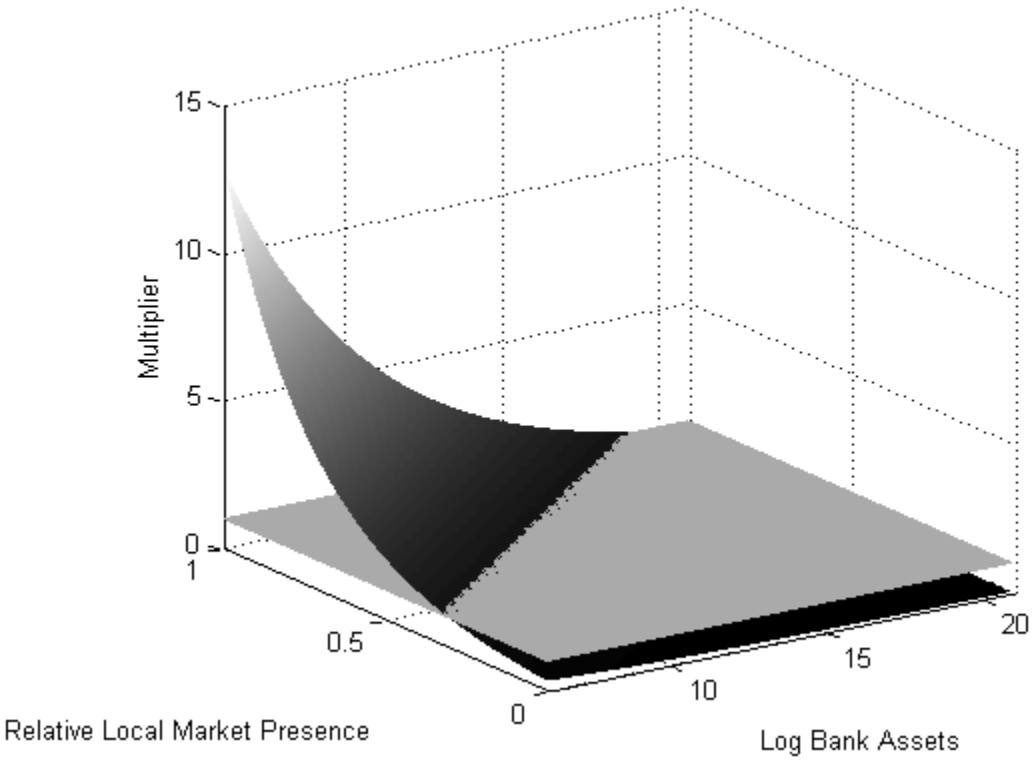


Figure 5
Multiplier of the Hazard of Being Acquired: Effects of Local Market Share and Size



Note: The grey-shaded plane indicates a multiplier equal to 1.