

Is the Geography of Banking Services Converging toward Markets? The Case of Illinois

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ABSTRACT

In this paper, we explore whether the geography of bank services has been converging toward the market since banking geographic deregulation. We use Illinois as a study area and examine changes in various market segments such as metro and non-metro markets, and regional markets. We adopt the Spatial Concentration Index (SCI) and the related supply and demand SCI deviations to measure changing supply-demand mismatch. We find that supply distribution was more dispersed than demand distribution in most market segments in the early 1980s when geographic restrictions on banking were in place. However, discrepancies in supply-demand distribution declined during the geographic deregulation and banking consolidations of the last two decades, especially in the 1990s. In the Chicago market, bank offices were more dispersed, but deposit distribution more concentrated, than demand distribution before deregulation. Since deregulation, both office and deposit distributions have become more aligned with the demand distribution. In Northern Illinois metro markets, and to a certain extent in the Central and Southern Illinois non-metro markets, supply-demand distribution discrepancies have declined only in the period of 1992 to 2002. In Central Illinois metro markets, while bank office distribution has become more in line with that of demand, deposit distribution has become more dispersed than demand distribution during the 1990s. We also find a reduction of the average bank office size, particularly in larger markets, which provides further support to the hypothesis of bank market convergence.

Key words: bank market, geographic deregulation, spatial concentration index.

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Amid changing macroeconomic conditions and financial realities in the late 20th century, the U.S. banking industry has undergone unprecedented restructuring in the past twenty years (Rhoades 2000), leading to fundamental changes in the geography of banking. This paper investigates one aspect of the changing banking geography since the early 1980s, the change in the geography of banking services. Specifically, using

Illinois as an example, we explore whether banking services have become more aligned with the demand for banking amid banking geographic deregulation. In other words, we study whether there has been any convergence of the geography of bank services toward the market.

GEOGRAPHIC RESTRICTIONS AND BANK GEOGRAPHIC MARKETS

The traditional Arrow-Debreu model of resource allocation places a seamless

market as the focal point in household and firm interactions, and gives no role to financial intermediaries (banks included), and by extension to their locations (Allen and Santomero, 1998). However, financial intermediation theory suggests otherwise. Transaction costs involving customer credit information, monitoring loan performance and knowledge of specific activities financed by bank lending carries real risks and thus help break down bank markets into disjointed segments (Gurley and Shaw, 1960). These transaction costs in many ways are associated with distance and locations, and thus contribute to geographic fragmentation of local retail banking. Regulatory restrictions may also erect barriers to market entry, adding to and altering the pattern of market fragmentation. Even the cost of overcoming distance helps delineate space into self-contained sub-markets, as illustrated in central place theory (Berry and Parr, 1988). Indeed, as Cooperman *et al* (1991) observe, the U.S. banking system operates as a collection of segmented markets involving retail customers, and some integrated banking systems involving regional and national (even international) corporate clients.

Although transaction costs and the cost of overcoming distance are real expenses and thus reduce efficiency, they arise mostly due to unavoidable factors. For example, transaction costs are closely associated with asymmetric information in which the borrower asks for credit but attempts to conceal as much information on him as possible for self-protection (Leland and Pyle, 1977). Such a desire is deeply rooted in the human psyche and constitutes an integral part of human nature. Costs associated with distance arise since physical distance is an inherent element of every reality in human life.

Historical geographic restrictions on banking, however, occurred largely due to political reasons and under specific historical circumstances (Calomiris 2000). They came as a result of policy choices to redirect economic benefits. Local special interest groups such as small banks, local businesses, and governments in the 19th century persuaded state legislatures to erect geographic restrictions on banking out of self-interest against financial instability associated with outside financial power. The costs of overcoming such local protectionism led to a system of semi-independently operating local retail banking markets (Kroszner 2000), adding to the fragmentation and inefficiency of the whole banking system (Calomiris 2000). In the last two decades when the survival of the banking industry came under threat due to competition from overseas and domestic non-bank financial institutions, the purpose of banking regulation (including geographic deregulation) and efficiency gain have converged (Calomiris 2000).

Traditional geographic restrictions may generate inefficiency by limiting the locations and numbers of bank offices from the level desirable for a market (Evanoff 1988). Although there have been numerous studies comparing bank service availability under different branch restrictions (Kaufman *et al* 1983; Savage and Soloman 1980; Berger *et al.* 1999), very little has been said about how, under the same geographic restrictions, places of different sizes and socioeconomic characteristics (rural vs. metropolitan) may develop different bank service availability. However, in an early study on Alabama banking, Guttentag and Thomas (1979) present data revealing interesting characteristics. Their data reveal that within the pool of unit banking counties,

metro counties have a per capita income 27% higher than, and a population density nearly 4 times higher than, in non-metro counties. However, the number of metro bank offices per 1000 people is 30% lower than that in non-metro counties. Counties with limited branching demonstrate similar metro-rural disparity, though at a lower level than observed in unit banking counties. In other words, there seems to be under-served markets in metro counties compared with non-metro counties.

Traditional branch limitations reduce efficiency by prohibiting banks' desire for expansion through branching. Banking institutions desiring growth in a large market may be forced to choose a multi-bank holding company structure as a substitute. A bank requires a full corporate governance structure, which is much more expensive than a branch office. Such an expensive structure may discourage bank holding companies from establishing adequate banks, leading to inadequate services by bank offices. In comparison, small markets were traditionally served by small banks. Their simple corporate structure, and in many cases state charters, may have given them a cost advantage in setting up operation in small places. Legislation allowing limited branching may have given them just enough space to expand business locally, while curtailing the invasion by powerful outside institutions. The result would have been that larger markets had fewer bank service locations than banks would like to have, leading to under-banking compared with smaller markets. This may be particularly true in states with many small, and often agricultural, communities, which would encourage bank legislation designed to protect these small communities. In larger markets, costly banking locations associated with

corporate structure may result in larger office sizes substituting for fewer locations. Bank customers received basic banking services at the cost of waiting longer, traveling further, enduring traffic jams, etc. though they may also have enjoyed the benefits of cross-selling and the diverse lines of products available at larger offices. However, providing a whole spectrum of services in every office may not be the ideal business strategy. This means that office size may not be a perfect substitute for office locations in order to accommodate large markets. With geographic deregulation, along with bank consolidation, increasingly larger banks may consolidate offices in small markets, establish more branches in larger bank markets, alter office size distribution and re-bundle the service mix among offices of various sizes. The results are that banking services increasingly come in line with the distribution of bank markets, and the geography of banking services converges toward the market. We investigate whether this has occurred over the last twenty years amid fundamental geographic deregulation.

We choose Illinois as our study area largely because Illinois is a state known until recently for its unit banking system. Given such a unit banking structure, the dispersion and concentration mechanism described above may particularly apply. In addition, Chicago, one of the largest banking centers in the United States, is located in Illinois. The confluence of these two characteristics, a unit banking tradition and the dominance of Chicago banks, raises the question of whether changes in the geography of banking services in Illinois go along different paths with the Chicago market, dominated by the Chicago banks, going one way, and other market segments in the state going

another. The changing geography of banking services occurs within a specific historical-geographical configuration. Illinois offers a unique case study to observe such a contextual based change.

A BRIEF HISTORY OF ILLINOIS BANKING

During most of the 18th century, in the area of present day Illinois, European settlers established communities along wooded riverbanks in southern Illinois, while northern and central Illinois was still occupied by Native Americans (Foster, 1968). Since the early 19th century, steamboats facilitated trade and commerce, leading to several thriving towns near and along the rivers. In 1813, the first bank in present day Illinois was established in Shawneetown, the leading city in southern Illinois and perceived gateway from the East, near the confluence of the Ohio and the Wabash rivers. In 1816, the bank received a charter from the territorial legislature. The following year, three additional banks were incorporated at Edwardsville, Cairo, and Kaskaskia. In 1818 Illinois gained statehood and within a few years, a new State Bank of Illinois was established with the main office at the state capital Vandalia and branches in a few other southern cities.

The "Internal Improvements" movement opened vast lands in central and northern Illinois to settlers by building canals and railroads. The completion of the Erie Canal in 1825, and the final removal of the Native Americans allowed white settlers to arrive in Chicago via the Great Lakes (Foster, 1968). Chicago, a small village of 150 inhabitants in 1833 when incorporated (Huston, 1926), grew rapidly in the next three decades, reaching 100,000 by 1860. Chicago became the

nation's railroad hub and a major market center amid the westward movement (Nelson, 1978). In the process, the economic center of gravity in Illinois shifted from southern Illinois to northerly locations, especially the Chicago area. In 1835, a new State Bank of Illinois opened for business with the main office in Springfield and branches in many central and northern Illinois' cities. A great many more banks were opened during "banking inflation" in the subsequent two years (Knox 1903), only to collapse during the business panic in 1837. The state was left without chartered banks. Private banks (unchartered and privately held) and illegal banks (non-bank institutions such as insurance companies) filled the void. Many of these private and illegal banks were Chicago institutions.

In 1851, Illinois adopted "free banking". Any individual could issue bank notes as long as the notes were backed by federal or state bonds. Some private and/or illegal banks took advantage of this law and reorganized into legal banks. Examples include the Chicago Marine and Fire Insurance Company reorganized into the Chicago Marine Bank, and George Smith and Company reorganized into the Bank of America, also a Chicago bank. By this time, Chicago had become a leading banking center for Illinois and the Northwest (Huston, 1926). At the turn of the century, it was one of the few reserve centers in the nation, along with New York City and San Francisco.

The national banking movement since 1864 adopted many provisions for "free banking" by lowering the barrier to entry into banking. Banks were chartered through regulatory agencies instead of legislative process. Lower barriers to entry into banking made it possible for small

communities to start their own banks. This, along with dispersed population, the agriculturally based economy, relatively lower income and limited banking needs, and transportation conditions at the time, contributed to a unit banking system (Fischer, 1968). Banking was viewed as a local concern and banking institutions were to draw deposits from local depositors and were mainly dedicated to local funding needs (Gatton, 1991). In 1870, the Illinois Constitution prohibited branch banking. For the next one hundred years, Illinois remained a unit bank state. The 1970 state Constitution reaffirmed the prohibition on branching. In 1966, while over a quarter of the banks in the United States were branch banks, less than 0.4% of Illinois banks had branches.

With the emergence of an urban-based economy, changing population distribution, improvement in transportation and communication, and increasing income, the legislative obstacles to modern banking were incrementally overcome by the need to meet demand in a new world of banking. From 1967 to 1976, Illinois loosened branch restrictions allowing limited intra-city branching. The banking crisis of the 1980s that swept the country and brought down the Continental Illinois Bank helped stir the state legislature to allow more freedom in banking such as inter-city branching within the same county, and limited out-of-county branching. In 1986, the state allowed out of state bank holding companies to acquire banks in Illinois. In 1993 unrestricted statewide branching was allowed. Illinois also opted into the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act, which allows nationwide interstate banking and branching. These legislative changes have come in conjunction with significant bank

consolidations in Illinois. From 1980 to 1998, there were over 750 mergers and consolidations between different banking institutions in Illinois. The number of commercial banks declined from 1253 in 1980 to 692 in 2001. During the same period, the number of branch offices increased from 534 to 2899. In 2001, 66% of the commercial banks in the state were branch banks. The number of branch offices per bank increased from 0.4 per bank in 1980 to 4.2 in 2001. While the number of banks declined by 45% between 1980 and 2001, the average size of banks measured in assets more than doubled from \$135.9 million to \$355.7 million, adjusting for inflation. Following the national trend, Illinois banking has become more concentrated, and multi-locational in nature.

METHODS AND DATA

Operationally, exploring whether banking services are converging toward the market requires the comparison of two sets of variables that represent locations of bank service supply and demand. Although banking services are reflected through avenues such as bank offices, the Internet, telephones, and even informal personal contacts and exchange, difficulties in obtaining relevant information force us to confine ourselves to bank office data, supplemented by bank deposit data. Bank office locations are where many retail bank services (loan origination, safe deposit, teller banking, and retail insurance selling and investment advising, etc.) are delivered. There are still over 80% of bank customers who use an office once a month, and 30% use an office 4 to 5 times each month (Wall Street Journal, 2003a). Building branches has been one of the most effective ways for banks to compete for retail customers (Wall Street Journal, 2003b).

To the extent that deposits are the consequence of bank deposit taking, locations of deposits reflect the geography of bank services and their magnitudes. However, deposits at the offices of large banks may come from retail as well as corporate customers, the latter of which may be locally, regionally, nationally, or even internationally based. In most deposit statistics, deposits from local and non-local markets are lumped together. The deposit figures from published data may not mirror the magnitude of services rendered locally. To the extent that local-market based deposits dominate outside deposits, deposit information may still be useful in addressing location-specific issues. However, the unknown amount of non-local deposits calls for caution in interpreting the results.

On the demand side, many proxies can arguably represent demand for banking. We use population and personal income because of the ease in obtaining historical data. Sizes of population are related to the potential numbers of customers for bank office visits. However, banks do not make branch decisions by merely following the size of population. They also consider the earning potential of a given population. This consideration favors using personal income as a proxy for banking demand. Personal income (the total income received by all persons in a market from work related earnings, rental income, dividend income, personal interest income, and transfer payments) is conceivably related to personal wealth. We use both population and income measures since each has its own merit.

As discussed above, our interest in banking service geography is derived from a particular context of U.S. banking: the geographic restrictions on banking.

Historical limitations on branching and cost differential inherent in bank vs. branch operation may have led to under-banking in large markets and over-banking in smaller markets. Hence, elimination of geographic restrictions may cause a shifting of banking services to previously under-served, larger markets. Thus, our focus here is on changing banking service availability in markets of different sizes. That is, whether concentration (or dispersion) of bank services among markets of different sizes has become increasingly aligned with the sizes of bank markets. To this end, we use indices of spatial concentration for bank supply and demand, constructed with supply variables and demand variables respectively. These indices in turn are used to measure the market mismatch between bank supply and demand.

The index we adopt is a spatial version of the Herfindahl-Herschman Index (HHI).¹ The HHI is used in antitrust enforcement as a measure of market concentration. In that context, it quantifies the degree of concentration resulting from the operation of all firms in a market. The HHI belongs to a family of indices that also includes the Rosenbluth Index and the Entropy Index (Jacquemin, 1987). All these indices utilize shares of individual firms in a market. The difference resides in how such percentages are weighted (Shephard, 1979). Different indices also vary in terms of their emphasis on different aspects of market structure. While the HHI gives weight to the influence of large firms, the Entropy Index tends to emphasize small firms in shaping the overall index. The Rosenbluth Index incorporates both firm market shares and firm ranks. Studies have found strong correlations between different concentration indices (Nelson, 1963).

The spatial version of the HHI quantifies the degree of spatial concentration of an economic activity across all spatial units involved in a market segment. It replaces the firm shares in the HHI with shares of spatial units. For this reason, it can be called the Spatial Concentration Index (SCI). The SCI is the sum of squared market share of all spatial units. Specifically,

$$SCI = \sum_{i=1}^n S_i^2 = S_1^2 + S_2^2 + S_3^2 + \dots + S_n^2$$

In the above, S is the share of a market in a market segment, and n the number of markets within the market segment. Because we will be calculating SCI for various market segments such as the entire state, metro markets, and non-metro markets, n takes on different values depending on the number of markets in these segments. We also consider regional market segments. To this end, we use a modified Illinois regional delineation developed within Illinois Strategic Planning, a state initiative to promote statewide economic development in the new millennium. It divides Illinois into four strategic regions (Figure 1). We combine the Northeastern and Northwestern regions due to geographical proximity to form a Northern region, and retain the original Central and Southern regions.

The market shares of the spatial units involved ultimately determine the magnitude of the SCI. A higher (lower) SCI indicates a higher (lower) degree of spatial concentration, as a result of more (less) uneven distribution among markets. Changes in spatial distribution will necessarily alter the shares of different markets, which will cause the SCIs to

change. The maximum value of the SCI is 10,000.

Since the focus of the study is whether bank supply converged toward the demand, we calculate both the demand SCIs using bank demand variables (population and income) and the supply SCIs using supply variables (offices and deposit). The differences between a demand SCI and a supply SCI indicate bank service mismatch. Specifically, we subtract a demand SCI from a supply SCI to find a deviation. A negative deviation is defined as a dispersion deviation where supply distribution is more dispersed than demand distribution. On the other hand, a positive deviation can be called a concentration deviation in which supply distribution is more concentrated than demand distribution. Since the traditional geographic restrictions are believed to contribute to under-banked larger markets and over-banked smaller markets in relation to their demand, the basic premise of banking deregulation is to loosen shackles on banks and allow them greater freedom to chase the market for profits. If this were the case, we would expect the supply-demand mismatch to be manifested in larger dispersion deviations, when geographic restrictions were in place. Over time, when geographic restrictions were eroded and eventually eliminated, we would expect diminishing supply-demand mismatch, manifested in declining magnitudes of dispersion deviations. Essentially, we use demand SCIs as benchmarks for comparison to see whether supply SCIs have been catching up to demand SCIs.

We construct the SCIs and the related supply and demand SCI deviations for three landmark years, 1982, 1992, and 2002. The early 1980s marked the

beginning of U.S. banking deregulation, manifested in the Depository Institutions Deregulation and Monetary Control Act of 1980 and the Gain-St. Germain Depository Institutions Act of 1982. These laws unleashed significant portfolio changes for depository institutions and helped trigger the bank merger wave in the 1980s. Throughout the course of the 1980s to the early 1990s, Illinois increasingly lifted branch limitations. In 1992, the U.S. economy came out of a recession. The number of bank mergers were on the rise again, which led to the bank consolidation of the 1990s. In 1993, Illinois abolished limitations on in-state branching altogether. By 2002, amid bursting stock market bubbles and slow economic growth, bank mergers all but died out. With the merger announcements of the Bank of America with FleetBoston Financial in late 2003, and J.P. Morgan with Bank One in early 2004, U.S. banking seems to have entered a new round of consolidation. Therefore, the SCIs for 1982 take stock of prior-deregulation banking concentration or dispersion patterns; SCIs for 1992 measure the result of the 1980s bank consolidation, and SCIs for 2002 measure the result of 1990s bank consolidation.

Following Federal Reserves Banks, we use metropolitan statistical areas as metropolitan bank markets, and counties as non-metropolitan bank markets.² Bank office and deposit data are obtained from Bank Data Books for various years published by the Federal Deposit Insurance Corporation (FDIC). Since commercial banks are increasingly competing with many other financial institutions in the same market, we incorporate office and deposit information for both commercial banks and saving

institutions. Population and personal income data are obtained from the Commerce Department's Bureau of Economic Analysis.

RESULTS

Increasing Market Accessibility

Table 1 shows rates of growth in demand and supply measures (the left side) and the shares of bank demand supply measures (the right side) for various market segments with and without the Chicago market. In all cases, bank supply variables grew faster than did demand variables, and growth was more rapid in the second sub-period from 1992 to 2002 than in the first sub-period from 1982 to 1992. The Chicago market experienced faster growth in all four variables than all other market segments; metro markets, excluding the Chicago market, experienced faster growth than non-metro markets. Some exceptions occurred to patterns in the two sub-periods. In the first sub-period, the Chicago market suffered negative growth in deposits. This may largely be attributed to problems in major Chicago banks in the 1980s associated with the agricultural recession in the Midwest, the Third World debt crisis, and resultant troubles experienced by large Chicago banks such as the First Chicago and Northern Trust and manifested in the collapse of the Continental Illinois Bank and Trust Corporation in 1984, then the largest Chicago bank and the 7th largest bank in the U.S. The fortunes of the Chicago banks have reversed since the mid 1990s with a series of consolidations involving large banking institutions, which revitalized the Chicago market as a dominant banking center in the United States.³

Figure 1. Illinois Strategic Planning Regions

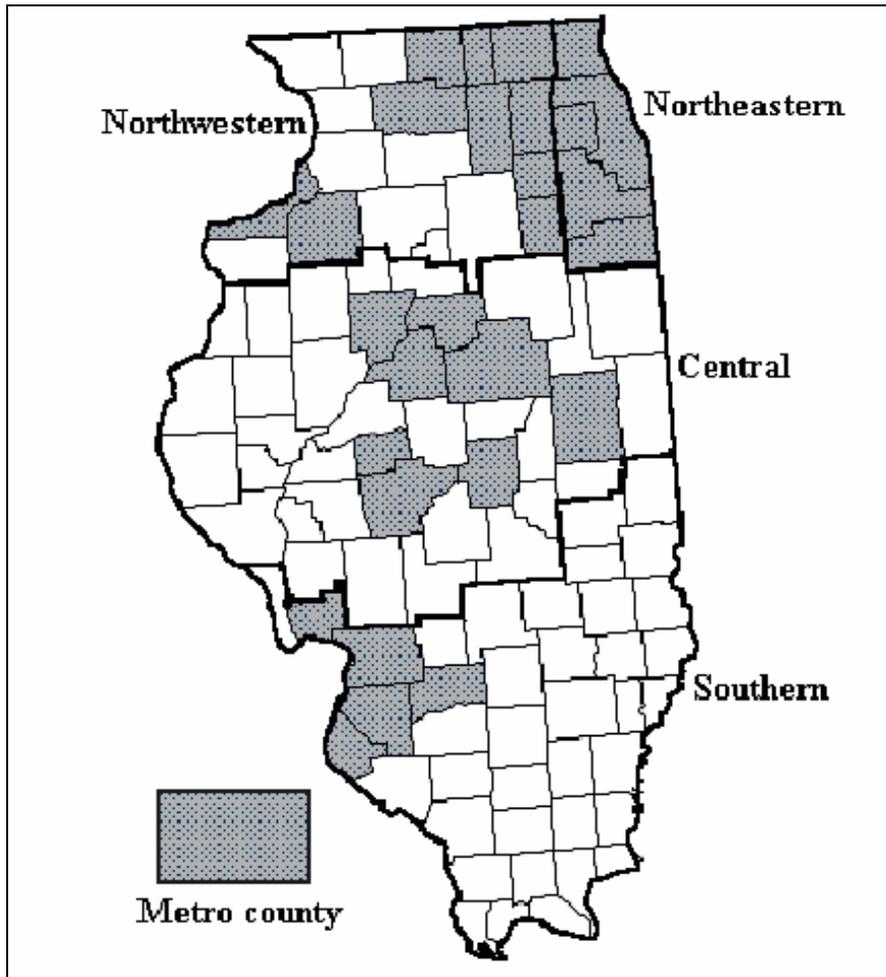


Table 1 Changes in Supply and Demand Variables: Illinois

Market segment	Variable	Change (%)			Share as State Totals (%)		
		1982-1992	1992-2002	1982-2002	1982	1992	2002
All markets	Population	2.4	7.1	9.6	100.0	100.0	100.0
	Income	21.2	24.9	51.4	100.0	100.0	100.0
	Office	28.2	74.2	123.2	100.0	100.0	100.0
	Deposit	1.7	54.5	57.1	100.0	100.0	100.0
All markets excluding the Chicago market	Population	-2.4	1.8	-0.6	36.5	34.8	33.1
	Income	8.7	14.8	24.8	31.2	28	25.7
	Office	17.8	45.4	71.3	61.5	56.5	47.2
	Deposit	6.8	30.4	39.2	27.7	29.1	25.6
Non-metro markets	Population	-5.1	0.2	-5.0	17.2	15.9	14.9
	Income	3.5	10.7	14.6	13.9	11.8	10.5
	Office	13.7	38.3	57.3	37.3	33.1	26.3
	Deposit	0.9	19.5	20.6	14.8	14.7	11.4
All metro markets	Population	3.9	8.4	12.6	82.8	84.1	85.1
	Income	24.1	26.8	57.3	86.1	88.2	89.5
	Office	36.8	91.9	162.5	62.7	66.9	73.7
	Deposit	1.8	60.6	63.5	85.2	85.3	88.6
Metro markets excluding the Chicago market	Population	0.1	3.2	3.3	19.3	18.9	18.2
	Income	12.9	17.7	32.8	17.3	16.2	15.2
	Office	24	55.4	92.8	24.2	23.4	20.9
	Deposit	13.5	41.5	60.6	12.9	14.4	13.2
The Chicago market	Population	5.1	9.9	15.5	63.5	65.2	66.9
	Income	26.9	28.8	63.4	68.8	72.0	74.3
	Office	44.8	111.5	206.4	38.5	43.5	52.8
	Deposit	-0.3	64.4	64.0	72.3	70.9	75.4

Sources: FDIC, Dept of Commerce. Calculated by author

The first sub-period also saw slow population growth in metro markets, negative population growth in non-metro markets, and slow deposit growth in non-metro markets. This slow non-metro deposit growth may reflect the impact of the Midwestern agricultural crisis at the time. The dynamics of growth in various market segments have caused changing distributions of demand and supply variables. For the entire period of 1982 to 2002, the Chicago market gained shares in supply and demand variables at the expense of non-Chicago markets, except for a loss of deposit share to other metro markets in 1992. Outside the Chicago

market, metro markets gained shares at the expense of non-metropolitan markets.

At the regional level (Table 2), we find the growth pattern in all Illinois regions and in most market segments within each region to be largely comparable to those found at the state level. That is, faster growth in supply variables than in demand variables, faster growth in metro markets than in non-metro markets, and in most cases, faster growth in the second sub-period than in the first sub-period for most variables.⁴ Among the three regions, Northern Illinois gained at the expense of the other two regions. Within each region, metro markets gained at the expense of

non-metro markets. One feature from the above analyses stands out. In most market segments, and at both the state and regional levels, supply variables grew faster than demand variables. This means that at all levels and within most market segments, bank services have become more accessible. To determine whether improvement in market accessibility is more significant in larger markets than in smaller ones, we now turn to the analysis using the SCIs and the related supply and demand SCI deviations.

Declining Supply-Demand SCI Deviations

As discussed previously, changing SCIs indicate shifting distribution among markets of different sizes. Changing deviations between a supply SCI and a demand SCI indicate changes in market mismatch over time. Table 3 contains dispersion/concentration deviations measured as the percent of demand SCIs. For all cases including the Chicago market, office-population and office-income deviations have negative values, while most deposit-population and deposit-income deviations have positive values. This suggests that the spatial distribution of bank offices was more dispersed than population and income, while the distribution of deposits was more concentrated than population and income. However, when the Chicago metro market is excluded, offices and deposits show a greater level of spatial dispersion than population and income. Apparently, it is in the Chicago market where office distribution was more dispersed than, and deposit distribution more concentrated than, the demand distribution. In all other markets segments, there is a consistent pattern of supply distribution being more dispersed than demand distribution. More

importantly, the general trend is that the magnitudes of deviation decrease over time. This is especially true for deviations involving bank offices. In deviations involving deposits, non-metro markets conform to such a pattern.

In all cases including the Chicago market and in the case of metro markets excluding the Chicago market, deposit-demand deviations reduced in the first sub-period but rose again in the second. The reversal in the second sub-period for all cases including the Chicago market occurred because the deposit decline in the Chicago market between 1982 and 1992 was so significant that any recovery would give an appearance of rising dominance. However, even here, the magnitudes of concentration deviations have not reversed to the level reached in 1982. Within metro market deposit deviations, excluding the Chicago market, there seems to be a real case of deposit dispersion during the second sub-period.

This occurred largely due to the diminishing significance in the Metro East and to a certain extent, the Peoria metro market. The Metro East is the Illinois portion of the St. Louis metro market. Its share of demand variables in the state's metro markets, excluding the Chicago market, declined in the 1990s when banking activities in the St. Louis metro market increasingly shifted to the Missouri portion of the market (Zhou 1997), leading to declining deposit concentration or deposit dispersion. The Peoria metro market is a traditional manufacturing center that has suffered from economic restructuring and loss of population in the 1980s. In the 1990s, the region struggled to recover economically but today it still has over a third of its civilian labor force in manufacturing,

Table 2 Changes in Supply and Demand Variables: Regional

	Variable	Change (%)			Share in state totals		
		1982-1992	1992-2002	1982-2002	1982	1992	2002
All Northern markets	Population	4.2	9.2	13.8	72.4	73.7	75.1
	Income	25	27.5	59.3	76.7	79.1	80.7
	Office	38.3	95.7	170.7	52.2	56.1	63.3
	Deposit	0.9	61.1	62.6	78.9	78.2	81.7
All Northern metro markets	Population	4.6	9.5	14.6	69.2	70.7	72.3
	Income	25.8	28	61	73.9	76.7	78.6
	Office	41.7	103	187.5	45.4	50	58.6
	Deposit	0.5	62.7	63.5	76.1	75.1	79.2
All Northern non-metro markets	Population	-4.5	1.2	-3.3	3.2	3.0	2.8
	Income	3.6	11.6	15.6	2.8	2.4	2.2
	Office	16	36.6	58.4	6.8	6.1	4.8
	Deposit	12.1	23.2	38.1	2.8	3.1	2.5
All Northern markets excluding the Chicago market	Population	-2.3	4.1	1.8	8.9	8.5	8.3
	Income	8.4	13.9	23.4	7.9	7.1	6.5
	Office	18.6	44.7	71.1	13.8	12.7	10.6
	Deposit	12.6	30.7	47.2	6.7	7.4	6.2
All Northern metro markets excluding the Chicago market	Population	-1	5.7	4.6	5.7	5.5	5.4
	Income	11	15	27.7	5.1	4.7	4.3
	Office	21.1	51.6	83.6	7	6.5	5.8
	Deposit	5.2	36.3	54	3.8	4.2	4.1
All Central markets	Population	-2.8	1	-1.8	15.8	15	14.2
	Income	7.8	16.2	25.2	13.9	12.3	11.5
	Office	14.9	47.8	69.8	28.8	25.7	21.9
	Deposit	1.9	40.2	42.9	12.3	12.4	11.2
All Central metro markets	Population	-0.01	2.7	2.7	8.5	8.3	7.9
	Income	13.3	20.4	36.4	7.8	7.3	7.1
	Office	19	60	90.5	11.4	10.6	9.7
	Deposit	5.2	56.8	64.9	6.1	6.3	6.4
All Central non-metro markets	Population	-6.0	-1.0	-7.0	7.3	6.7	6.2
	Income	0.7	9.9	10.7	6.1	5.0	4.4
	Office	12.2	39.3	56.3	17.4	15.2	12.2
	Deposit	-1.2	23.0	21.5	6.3	6.1	4.8
All Southern markets	Population	-1.9	1.2	-0.8	11.8	11.3	10.7
	Income	10.4	13.5	25.2	9.4	8.6	7.8
	Office	23.6	40.5	73.6	18.8	18.2	14.7
	Deposit	10.7	15.5	27.8	8.7	9.5	7.1
All Southern metro markets	Population	1.5	1.5	3.0	5.1	5.1	4.8
	Income	14.5	15.9	32.7	4.4	4.1	3.8
	Office	39.3	49.7	108.4	5.8	6.3	5.4
	Deposit	32.5	21.1	60.4	3.0	3.9	3.0
All Southern non-metro markets	Population	-4.6	0.9	-3.6	6.7	6.2	5.9
	Income	6.8	11.2	18.7	5.0	4.4	3.9
	Office	16.6	35.6	58.1	13.1	11.9	9.3
	Deposit	-0.6	11.6	10.9	5.7	5.6	4.0

Sources: FDIC, Dept of Commerce. Calculated by author

Table 3 Dispersion and Concentration Deviations as the Percent of Demand SCIs (%)

Market segment	<i>Office vs. Population</i>			<i>Deposit vs. Population</i>			<i>Office vs. Income</i>			<i>Deposit vs. Income</i>		
	1982	1992	2002	1982	1992	2002	1982	1992	2002	1982	1992	2002
All markets	-61.2	-53.8	-27.0	28.3	17.4	26.2	-66.8	-61.9	-48.5	9.9	-3.1	3.0
All markets excluding the Chicago market	-39.4	-35.0	-29.7	-21.9	-15.0	-11.4	-43.5	-40.3	-36.5	-27.2	-22.0	-19.9
All non-metro markets	-11.7	-10.1	-6.5	-7.5	-6.9	2.3	-16.1	-13.3	-10.6	-12.1	-10.2	-2.2
All metro markets	-29.8	-27.7	-16.0	27.7	14.1	16.4	-38.3	-34.5	-24.2	12.4	3.5	5.1
All metro markets excluding the Chicago market	-7.9	-2.7	-2.8	-8.1	-1.1	-8.9	-6.5	-1.0	0.2	-6.8	1.1	-6.5
Northern markets	-28.6	-22.8	-12.1	8.7	4.7	7.0	-31.5	-27.0	-17.5	4.2	-1.0	1.0
Northern markets excluding the Chicago market	-26.8	-28.2	-25.4	-10.3	-16.2	-11.6	-29.0	-31.2	-27.4	-15.6	-19.8	-14.0
Northern non-metro markets	-9.2	-8.7	-5.6	-8.5	-8.1	1.0	-11.1	-8.1	4.6	-10.4	-7.6	2.0
Northern metro markets	-14.1	-10.7	-4.7	6.9	4.5	5.9	-16.4	-13.7	-8.6	4.1	1.0	1.6
Northern metro markets excluding Chicago market	-4.4	-7.2	-6.4	0.8	-2.2	-1.0	-6.0	-9.2	-7.0	-0.9	-4.4	-1.6
Central markets	-36.8	-34.4	-27.9	-16.3	-13.8	-4.0	-42.4	-41.2	-37.7	-23.8	-22.8	-17.0
Central metro markets	-6.1	-3.9	0.1	-5.7	-1.8	-6.0	-8.0	3.0	0.1	-7.6	-1.8	-6.2
Central non-metro markets	-17.0	-14.1	-11.8	-8.0	-12.1	-6.6	-18.4	-16.1	-13.4	-9.6	-14.1	-8.3
Southern markets	-44.3	-36.5	-29.4	-33.9	-15.8	-8.6	-51.1	-44.5	-40.3	-41.9	-26.4	-22.8
Southern non-metro markets	-10.0	-19.5	-3.9	-7.6	-8.8	-3.7	-11.5	-10.8	-7.8	-9.1	-10.1	-7.6

Sources: FDIC, Dept of Commerce. Calculated by author

which contributed to its diminished position in banking. The declining importance of the Peoria market is also largely responsible for the similar deposit deviation reversal in the second sub-period for Central Illinois metro markets.

There is one other exception to the general trend of declining supply and demand SCI deviations at the regional level. This can be called delayed convergence where the supply-demand SCI deviations rose in the first sub-period but fell in the second. The delayed convergence occurred in the Central and Southern non-metro markets deposit-demand deviations, and in Northern metro market supply-demand deviations, excluding the Chicago market. In the case of Central and Southern non-metro deposit-demand deviations this may be explained by the banking problems in large non-metro markets attributable to the agricultural crisis during the 1980s.⁵ In the Northern metro market, excluding the Chicago market, the delayed convergence may have occurred as a result of the close relationship between the Chicago banks and banks in other Northern metro markets, through loan participations and correspondent banking. It is important to note that while the delayed convergence occurred only in deposit deviations in Central and Southern Illinois markets, it occurred to both office deviations and deposit deviations in Northern metro markets, excluding the Chicago market.

This is mainly due to a rare case in Northern metro markets where the population and income SCIs rose more rapidly than the office SCI. This means that during that sub-period, the pace of demand concentration in larger markets was faster than that for offices, leading to

the delayed convergence in office deviations.

Changing Bank Office Sizes

As suggested earlier, under geographic restrictions, banks in the metropolitan environment may substitute office sizes for fewer locations in order to accommodate large markets. If bank sizes and locations are perfect substitutes, increasing bank demand in the marketplace can be equally met by increasing either the bank office size or the number of bank offices. When market participants randomly choose between the two strategies to accommodate changing markets, office sizes would not demonstrate clear pattern of changes along markets of different sizes.

However, as explored earlier, if the location and office size are not perfect substitutes, the erosion of branch restriction would cause banking institutions to rationalize the distribution of office sizes and the related services. Specifically, banks may consolidate specialized services in a small number of larger offices on the one hand and saturate the market with branch offices to provide basic services and compete for low cost deposits on the other. The result would be that while a few offices with special functions become larger, the overall office size would on average decline, especially for large markets. Although a lack of bank portfolio information at the office level prevents a complete empirical investigation of this issue, some evidence seems to support the above statement concerning changing bank office sizes. Table 4 lists the average bank office sizes (adjusted for inflation) for various market segments and rates of change. A common pattern is the declining average office sizes

throughout the study period, especially the second sub-period. In nearly all cases, the standard deviations also reduce over time, indicating a stable process of declining office sizes. More significantly, metro markets tend to experience higher rates of size reduction than non-metro markets, and the Chicago market, the largest market of all, experienced the largest rate of reduction of office size. Although all metro markets excluding the Chicago market seemed to experience a smaller rate of size reduction than in all non-metro markets, a breakdown at the regional level shows a pattern generally consistent with the overall pattern of office size change. For example, in Northern Illinois, metro markets excluding the Chicago showed higher rates of size reduction than non-metro markets in the north. Metro markets in Central Illinois also demonstrated higher rates of size reduction than in non-metro markets. The only exception is in Southern Illinois where only the Metro East portion of the St. Louis metro market is accounted for and showed a higher rate of size reduction only during the second sub-period. Changing office sizes demonstrate a clear pattern with larger markets experiencing the larger office size reductions.

The Pearson correlation coefficients between relevant variables seem to point in the same direction. In 1982, the correlation between the average office size and the size of markets (using either population or deposit as market size) is 0.82, suggesting that larger markets tend to have larger bank offices. The correlation between changes in the average office size from 1982 to 1992 and the market size in 1982 is -0.51. The correlation between changes in the average office size from 1982 to 1992 and the average office size in 1982 is -0.60.

This suggests that larger markets tended to experience negative office size change (size reduction) or smaller size increase than smaller markets, and that markets with larger sized offices tend to experience size reduction or smaller size increase. Changes in the average size of bank offices in the 1980s seemed to alter the relationship between the market size and the office size. In 1992, the correlation between the average office size and the size of markets reduced to 0.69. However, the tendency for office size change continued. The correlation between changes in the average office size from 1992 to 2002 and the market size in 1992 is -0.32, and the correlation between changes in the average office size from 1992 to 2002 and the average office size in 1992 is -0.63. Apparently, larger markets in the 1990s were still somewhat associated with large bank offices, and these larger offices were still associated with office size reduction or smaller increase as a result of bank restructuring in the 1990s.

Our earlier analysis suggests the existence of widespread market mismatch in the form of more dispersed supply than demand. Although the actual mismatch may be less than the supply and demand SCI deviations would suggest due to larger office sizes, especially in larger markets, declining average office sizes in larger markets amid geographic deregulation seems to indicate that when banking firms are given more freedom, they choose more locations over the larger office sizes. In other words, larger office sizes are indeed not a perfect substitution for fewer locations. It is likely that changes in the average office sizes in markets of various sizes may not be independent of the overall rationalization of bank services, and may be indeed an

Table 4 Average Office Size* and Changes in the Average Office Size: Illinois and Regional

Market segment		1982 (\$)	1992 (\$)	2002 (\$)	1982- 1992	1992- 2002	1982- 2002
All markets	Mean	31468	30389	26718	-3.4%	-12.1%	-15.1%
	St.d**	14516	11730	9305	-19.2%	-20.7%	-35.9%
All markets excluding the Chicago market	Mean	30189	29525	25987	-2.2	-12.0	-13.9
	St.d	8768	8800	7037	0.4	-20.0	-19.7
All metro markets	Mean	48680	44403	39290	-8.8	-11.5	-19.3
	St.d	31720	20611	15537	-35.0	-24.6	-51.0
Metro markets excluding Chicago mkt	Mean	38801	37988	34574	-2.1	-9.0	-10.9
	St.d	5836	3882	4620	-33.5	19.0	-20.8
All non-metro markets	Mean	29143	28496	24943	-2.2	-12.5	-14.4
	St.d	8507	8685	6564	2.1	-24.4	-22.8
All Northern markets	Mean	31931	33421	30251	4.7	-9.5	-5.3
	St.d	7009	10549	5417	50.5	-48.6	-22.7
Northern metro markets excluding Chicago mkt	Mean	38531	39239	35219	1.8	-10.2	-8.6
	St.d	6027	5289	4023	-12.2	-23.9	-33.3
All Northern non-metro markets	Mean	29730	31482	28595	5.9	-9.17	-3.8
	St.d	6056	11361	4895	87.6	-56.9	-19.2
The Chicago market	Mean	137589	102130	81737	-25.8	-20.0	-40.6
	St.d	-	-	-	-	-	-

*In the 1996 dollar

**St.d stands for standard deviation

integral part of emerging bank market convergence, though more studies are needed to confirm this.

SUMMARY AND CONCLUDING REMARKS

In this study, we explore whether the geography of bank services has been converging toward the market since banking geographic deregulation. Our findings can be summarized as follows.

1. There has been a process of general rise in bank service accessibility in all market segments, and larger markets benefit particularly from such improvement. The general trend has been one of increasing bank service concentration in the Chicago market over non-Chicago markets, metro over non-metro markets, larger metro over

smaller metro markets, and larger non-metro over smaller non-metro markets. Similar biases concerning changes in bank service accessibility favorable for larger markets have also occurred at the regional level. In addition, in most market segments, the sub-period of 1992 to 2002 saw greater rates of concentration than the sub-period of 1982 to 1992.

2. Evidence suggests that there was bank supply-demand mismatch, manifested in more dispersed bank services than demand in larger markets at least during the earlier points of observation. This finding underscores the notion of under-banked larger markets. Under-served larger markets are such a pervasive phenomenon that they existed to different extents in all market segments, such as the state as a whole, metro, non-metro, cases

including or excluding the Chicago markets, and market segments at the regional level. However, in the last two decades, amid fundamental bank restructuring and geographic deregulation, the supply-demand mismatch seemed to continue to diminish in most market segments.

3. Declining supply-demand mismatch has occurred in several ways. For most market segments, it is via a diminishing dispersion deviation process. In the Chicago market, offices have been in a process of diminishing dispersion deviation while deposits have generally been in a process of diminishing concentration deviation. In Northern metro markets, and to a certain extent the Central and Southern non-metro markets, there has been delayed convergence in which dispersion deviations declined only in the sub-period of 1992 and 2002. In Central Illinois metro markets, while bank office distribution has experienced diminishing dispersion deviation, deposit dispersion deviation has expanded from 1992.

4. Evidence also indicates the reduction of the average office size in all market segments in the last twenty years, especially during the second sub-period from 1992 to 2002. The office size reduction is particularly significant in larger markets compared to smaller markets, especially in the Chicago metro market and metro markets in Northern and Central Illinois. As a result, the larger markets' hold on larger bank offices has declined. Assuming office sizes and locations are not perfect substitutions, reduction of the average office size in larger markets provides additional support to the notion of the bank market convergence.

Although our findings lend support to a convergence hypothesis, they by no means provide undisputable proof due to several shortcomings in the study. First, we use only three points in time to anchor our empirical observations. Although strategically selected at the historical turning points of U.S. banking, more observation points would be helpful to confirm the changing pattern, as suggested by this study. Furthermore, the bank supply and demand measures we use may not be the most suitable, especially given the possible problem associated with substituting income for the measure of wealth. In addition, the outcome of a study may be sensitive to the methodology utilized. The Spatial Concentration Index and the related supply and demand SCI deviations we use may have the potential for exaggerating the effect of larger markets. Comparative studies involving alternative approaches are desirable. Finally, changes in the average office size only reflect one aspect of strategies in rationalizing size distribution and bank service mix. More insights can be gained by observing service portfolios provided at offices of various sizes. Despite these shortcomings, our study does provide a starting point to explore the issue of banking spatial supply-demand convergence. Its findings may help lay a stage for more sophisticated future studies.

ENDNOTES

1. The HHI was first used by Hirschman in the 1940s, followed by Herfindahl (1959) in the 1950s. The index came to be known as the Herfindahl Index after studies by Rosenbluth (1955, 1957). After Hirschman (1964) claimed original ownership of the index, it has been known by its current name.

2. The precise boundaries of a metropolitan bank market may not follow exactly those of a metropolitan area. For the purpose of this study, such discrepancies are not a major distortion factor.

3. Over 70% of the bank assets involved in consolidations between 1980 and 1998 in Illinois belonged to institutions that merged since 1994. Major consolidations that involved Chicago banks included mergers between First Chicago Corporation and Lake Shore National Bank, between the First National Bank of Chicago and NBD Bancorp, Inc., between ABN Amro North America, Inc. and Comerica Bank-Illinois, and between First Chicago NBD Corporation and Bank One Corporation.

4. However, in Southern Illinois, non-metro deposit growth was slower than income growth from 1982 and 2002, and deposit growth for the metro market in the first sub-period was faster than in the second. Deposit growths were slower than demand variables in all cases involving the Chicago market in Northern Illinois, possibly due to problems in major Chicago banks in the 1980s. Northern metro markets, excluding the Chicago market, also experienced slower deposit growth than income growth for the first sub-period. Deposits in Central and Southern non-metro markets experienced negative growth for the first sub-period, reflecting the impact of the agricultural crisis.

5. Within the largest 12 non-metro markets measured by 1982 deposits, eight (or two thirds) experienced a size decline greater than the average for non-metro markets at 22.1%. Reduction of supply in

larger non-metro markets led to higher dispersion deviations.

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