
Special Studies on Technology and Banking

Banking over the Internet

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Banking over the Internet is attracting a great deal of attention in the banking and regulatory communities, and developments in this new delivery channel are the subject of numerous articles in the banking press. Despite widespread interest in and concerns about this subject, there is little systematic information on how many banks offer personal computer (PC) banking over the Internet, and on the nature of the services offered. To address this deficiency, the Special Studies staff at the Office of the Comptroller of the Currency (OCC) has undertaken a comprehensive review of Web sites of banks offering transactional Internet banking. We define "transactional" Internet banking as providing customers the ability to access their accounts and, at a minimum, transfer funds between accounts. This report provides new and unique information on the dimensions of transactional Internet banking, both in the commercial banking industry in total and for national banks.

Our key findings are as follows:

- Very few banks offered customers the ability to access their accounts and perform at least simple money transactions. As of June 30, 1998, less than 5 percent of commercial banks and less than 7 percent of national banks had such transactional Web sites. While some Internet-based financial services, particularly discount brokerage, are having a dramatic impact on the market, Internet banking at this point is a relatively small factor in the banking industry.
- Because of the relatively high number of large banks offering Internet banking, Internet-accessible banks account for almost 40 percent of commercial bank and over 60 percent of national bank assets.
- Large banks are more likely to offer transactional Internet banking than smaller banks, but some small and mid-size banks also offer customers the ability to bank via the Internet. Currently, the fixed costs of offering Internet banking do not appear to be prohibitive for small institutions.
- Banks offering transactional banking over the Internet appear to be more likely to include a privacy statement on their Web sites as compared to banks with Web sites and no transactional capabilities. The

majority of large banks have adopted Web site privacy statements. While there has been growth in adoption, most small and mid-size banks with transactional Internet banking do not yet have on-line privacy statements. Our analysis does not assess the quality of the on-line privacy information offered.

- During 1998, we estimate that the number of commercial bank transactional Web sites more than tripled, although the growth rate slowed in the second half of the year. Announcements by third-party Internet software vendors of new contracts with banks suggest that strong growth is likely in the number of transactional Web sites in early 1999.
- While use of the Internet for banking transactions is relatively small, the projected growth in Web sites means that a very large share of all banking customers will have access to this service. The critical factor for future use will be the development of products that provide higher value relative to traditional channels, and that provide adequate security, privacy, and other consumer protections. The introduction this year of electronic bill presentation may generate a substantial boost to customer usage of Internet banking.

Key Characteristics of Banks Offering Transactional Internet Banking

Advancements in information technology have made it possible for banks to use the Internet as a delivery channel for banking services. By using the Internet, as compared to previously available "proprietary" or "dial-up" PC banking, banks have the potential to reach a large number of customers at a low incremental cost. Proprietary PC banking has been used by some banks for more than two decades, but despite claims about its potential to revolutionize the delivery of banking services, its use has never become extensive.²

² Both proprietary PC banking and Internet PC banking are two forms of "remote" banking. Telephone call centers and automated teller machines (ATMs) are two other widely used forms of remote banking. Though it is not yet standard procedure in the banking press, industry studies, and common usage to specify which form of PC banking one means, it is worthwhile making the distinction between the two. They are different from a technological point of view. For example, although not yet widespread, devices other than PCs could be used for Internet banking such as "palmtop" (or hand-held) personal computers, kiosks, and Web television. It is also likely that there are differences in the levels and types of risk exposures related to these forms of remote and PC banking.

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Table 1—Banks offering transactional banking via the Internet¹
(as of June 30, 1998)

	All banks	National banks
Transactional Web sites for commercial banks and banking companies	223	88
Banks offering transactional Internet banking ²	374	161
Banks offering both transactional Internet banking and proprietary PC banking	68	32
Banks with transactional Internet banking as a percent of all banks, by charter type	4.2	6.3
Assets in banks with transactional Internet banking as a percent of all bank assets, by charter type	39.6	61.0

Memorandum: There were 8,983 commercial banks and 2,546 national banks as of June 30, 1998.

Source: Office of the Comptroller of the Currency using information from banks' Web sites and from FFIEC *Reports of Condition and Income*.

Notes:

¹ "Transactional" Internet banking includes any of the following activities: access accounts for balance inquiry and account history; transfer funds between accounts; electronic bill payment; download data to software; open an account; apply for a loan; apply for a line of credit; purchase financial instruments (e.g., certificates of deposit, mutual funds); purchase insurance.

² The number of banks offering transactional Internet banking is greater than the number of transactional Web sites, because the bank subsidiaries of some banking companies are accessible from a single Web site.

There are a number of reasons to believe that there is great potential for Internet banking despite the lackluster experience of proprietary systems. In recent years, we have seen the development of an electronic and communications infrastructure that could facilitate the adoption of Internet banking. The most important factor is the astounding growth in the Internet. According to one survey, the number of Internet users over the age of 16 increased from 58 million at the third quarter of 1997 to 79 million at the end of the second quarter of 1998.³ Perhaps more importantly, a recent study indicates that 40 percent of Internet users are willing to conduct a financial transaction on-line.⁴ In addition, innovations in technology hold great promise for improving the quality and functionality of on-line services. Moreover, the openness of the Internet allows banks to avoid the problems associated with the distribution of software and updates that are found in proprietary PC banking.

Our Database

Our information on the nature and extent of transactional Internet banking comes from our review of Web sites for the entire banking and thrift industries. We found almost

1,800 banking and thrift Web sites as of June 30, 1998, of which 258 were transactional, the rest being information-only sites. Of the 258 transactional Web sites, 223 belonged to individual commercial banks or multi-bank holding companies, as Table 1 shows. The Web sites of some multi-bank holding companies are used by more than one bank in the holding company, and we ascertained that the 223 banking Web sites covered 374 commercial banks.⁵ We scrutinized each transactional Web site to determine the range of services each offered. On a bank-by-bank basis we matched our Internet banking data with the OCC's database of standard banking variables. The result is a unique set of information that allows us to describe the structure and performance of banks offering transactional Internet banking, and to compare these technological "early-adopter" banks with the remainder of the banking industry.

Few Banks Offer Transactional Internet Banking

Very few banks offer transactional Internet banking. Table 1 shows that 4.2 percent of the 8,983 commercial banks offered transactional Internet banking as of June 30, 1998. National banks were slightly more likely to offer transactional Internet banking than state banks; even so, only 6.3 percent of national banks did. Nevertheless, Table 1 also shows that the small group of banks offering transactional Internet banking accounted for almost 40 percent of all commercial bank assets. Transactional Internet banks with a national charter accounted for 61 percent of national banking system assets.

Producing a comprehensive "count" of proprietary PC banking is another story. Because banks are not required to report the fact that they offer proprietary PC banking and because there is no publicly available information on all proprietary PC banking, our count is based on data we could collect from Web sites. As Table 1 shows, we were able to ascertain that 68 of the 374 banks offering transactional Internet banking also offered proprietary banking; 32 of the banks offering both Internet and proprietary PC banking were national banks.

³ The CommerceNet/Nielsen Internet Demographic Survey of North American Internet users over the age of 16.

⁴ As reported by Piper Jaffray Research, *Online Brokerage*, October 1998, using data from GUV Internet surveys 1995–1998.

⁵ In so doing, we took a fairly conservative approach, including multiple subsidiary banks only if a given Web site contained a statement that it was applicable to multiple banks, or if it contained other information strongly indicating this. As a consequence, our bank "count" may somewhat understate the total number of banks covered by the 223 Web sites.

Table 2—Banks offering transactional PC banking via the Internet: size distribution
(as of June 30, 1998)

Asset size	Number of banks	Percent of all banks	Number of national banks	Percent of all national banks
Less than \$100 million	72	1.3	26	2.0
\$100 million to \$1 billion	210	7.1	74	7.2
\$1 billion to \$10 billion	65	21.0	40	27.2
Greater than \$10 billion	27	42.2	21	52.5

Memorandum:

National banks as a percent of all banks: 28.3

National banks offering transactional Internet banking as a percent of all banks offering transactional Internet banking: 43

Source: Office of the Comptroller of the Currency using information from banks' Web sites and FFIEC *Reports of Condition and Income*.

Table 3—Structure characteristics of banks offering transactional banking via the Internet
(as of June 30, 1998)

	Banks with transactional Internet banking	Banks without transactional Internet banking
Number of banks	374	8,609
Structure characteristics (averages)		
Assets (in millions)	\$5,481	\$364
Deposits (in millions)	\$3,711	\$246
Number of branches	61	5
Number of employees	1,676	112

Source: Office of the Comptroller of the Currency using information from banks' Web sites and from FFIEC *Reports of Condition and Income*.

Banks Offering Transactional Internet Banking Are Larger on Average than Other Banks

The different impressions one gets from considering the small number of transactional Internet banks on the one hand, and the large proportion of banking system assets for which these banks account on the other hand, is explained by the fact that a relatively high proportion of large banks offered this delivery channel, when compared with the proportion of large banks in the whole banking industry. Table 2 shows that 27 large banks, accounting for 42 percent of all commercial banks in the over-\$10-billion-in-assets size category, offered transactional Internet banking; 21 of these were national banks. By comparison, the 72 small banks offering transactional Internet banking accounted for only 1.3 percent of all banks in the under-\$100-million-in-assets size category.

Measured by assets or deposits, transactional Internet banks as a group were about 15 times larger on average than the 8,609 banks which did not offer transactional Internet banking, as Table 3 indicates. The size differential is apparent in the comparison of the average number of branches and employees per banks as well. However, 75 percent of the transactional Internet banks were under \$1 billion in assets, indicating that the cost of offering Internet banking is not prohibitive for small banks.

We also compared the performance of transactional Internet banks with other banks in order to ascertain if there are distinct characteristics of these early adopters. We did not find obvious differences between the groups in profitabil-

ity, efficiency, or credit quality.⁶ The relative similarity of the performance of the two groups held across size categories, leading us to the conclusion that transactional Internet banks differ from other banks primarily by size.

Key Internet Banking Characteristics

Virtually all banks with transactional Internet banking offered customers the ability to check their account balances and history, and transfer moneys between their accounts, as Table 4 shows.⁷ Three-fourths of banks with transactional Internet capabilities offered customers an electronic bill payment service; almost 80 percent of national banks with transactional Internet banking offered

⁶ Anecdotal evidence suggests that most bankers do not believe they are receiving a significant boost to net revenue from their customers' use of Internet banking capabilities. We did not conduct any formal statistical analysis to ascertain if offering Internet banking may be a factor in determining bank performance. Such analysis is likely to be more fruitful as the use of Internet banking spreads and matures.

⁷ A small number of Web sites did not contain information about one or more of the attributes displayed in Table 4. In building our data set we took a conservative approach, inserting "missing values" into these fields. Subsequently, we calculated the percentages in Table 4 using as the denominator 374, the total number of banks offering transactional Internet banking, rather than excluding the missing values (which varied across attributes) from the denominator, and then calculating percentages. This approach makes very little quantitative difference and no qualitative difference in the results displayed in Table 4, though it seems highly likely that in fact 100 percent of banks offering transactional Internet banking offer at least balance inquiry and funds transfer.

Table 4—Banks offering transactional banking via the Internet: key services
(as of June 30, 1998)

Type of service offered	Services offered (percent of transactional Internet banks) ¹	
	All banks	National banks
Balance inquiry and funds transfer	98.1	98.1
Electronic bill payment	75.4	80.7
Business Internet banking	24.1	39.1
Open an account	19.5	24.8
Apply for loan	12.8	17.4
Transactional Internet banking and proprietary PC banking	18.2	19.9

Source: Office of the Comptroller of the Currency using information from banks' Web sites.

Notes:

¹ For a small number of institutions it was not possible to ascertain the nature of the Internet banking services offered. For purposes of the calculations in this table, missing values were treated as if the service was not offered.

this service (Table 4). Electronic bill payment allows the bank's customers to instruct the bank to make payments electronically. The bank then either sends an automated clearing house (ACH) payment or a paper check. In either case, the customer's account is debited for the amount of the payment. Customer use of electronic bill payment is not yet widespread, but many observers believe there is likely to be a sudden, large increase in customer demand for this technology. Electronic bill presentment, due to be offered by a number of banks early in 1999, has the potential, in combination with electronic bill payment, to "electronify" the entire billing and payment process.⁸

Although transactional Internet banking is commonly viewed as a service offered to individuals, among banks offering transactional Internet banking, a sizeable minority offered an Internet-based service tailored to businesses. Table 4 shows that almost a quarter of commercial banks with transactional Internet Web sites, and almost 40 percent of national banks, offered transactional Internet services aimed at business customers. Some industry observers believe that access to Internet banking services is likely to become increasingly important to small and medium-size businesses. We know of no precise analysis measuring the demand for such a service by businesses, but some observers suggest that, in general, both small and large banks have stepped up efforts to gain more small- and medium-size-business customers.

Table 4 shows that fewer than 20 percent of banks' transactional Web sites allowed customers and potential

customers to open an account on-line. Even fewer had provisions for applying for a loan on-line. These lower percentages may in part be due to uncertainty about the validity of alternatives to handwritten signatures. It is unclear how the use and acceptance of electronic authentication will affect these activities, particularly the ability to open an account on-line, and a banks' ability to know a customer on-line without in-person identification.

Privacy Statements and Transactional Internet Banking

Technological developments have introduced tremendous changes in the ability of financial and nonfinancial firms to efficiently collect, store, use, and sell information about their customers. This has heightened concerns about the potential for violations of personal privacy. In a report to Congress this past summer, the Federal Trade Commission (FTC) stated that industry efforts to encourage voluntary adoption of the most basic privacy protection—notice⁹—have fallen short of what is needed to protect consumers. The FTC conducted an on-line survey in March of 1998 and found that only 14 percent of all Web sites and 17 percent of financial Web sites posted a notice describing the collection and use of information.¹⁰

Our analysis of transactional bank Internet Web sites provides additional information on the extent of on-line privacy statements. As displayed in Table 5a, in June 1998 slightly over 40 percent of all transactional banking Web sites included a privacy statement that at a minimum indicated what information is collected by the bank on-line, and how it is to be used. The corresponding percentage for national bank transactional Web sites was slightly higher at 41 percent. It is important to note that we have

⁸ This point is explored further in Furst, Karen, Daniel E. Nolle, and William W. Lang, "Technological Innovation in Banking and Payments: Industry Trends and Implications for Banks," *Quarterly Journal*, Vol. 17, No. 3, Office of the Comptroller of the Currency, September 1998; and in Radecki, Lawrence J., and John Wenninger, "Paying Electronic Bills Electronically," *Current Issues in Economics and Finance*, Vol. 5, No. 1, Federal Reserve Bank of New York, January 1999. For a recent description of the perspectives of current and possible future participants in the market for electronic bill presentment and payment, see O'Sullivan, Orla, "Banks Begin to Present Bills On Line," *USBanker*, Vol. 108, No. 12, December 1998, pp. 64–70.

⁹ Notice includes telling customers what information is to be collected about them, and the intended use of that information.

¹⁰ The FTC sample included 125 Web sites of banks, credit unions, mortgage companies, real estate firms, security and stock brokerage, and other financial services firms.

Table 5a—Privacy statements and transactional Internet banking¹

	June 30, 1998		November 30, 1998		Percent increase in privacy coverage	
	All banks	National banks	All banks	National banks	All banks	National banks
Percent of transactional Web sites with on-line privacy statement	40.4	40.9	51.6	54.5	27.8	33.3

Table 5b—Transactional Web sites with on-line privacy statement as a percent of all transactional Web sites, by asset size category

Asset size	June 30, 1998		November 30, 1998	
	All banks	National banks	All banks	National banks
Less than \$100 million	30.4	21.4	37.0	35.7
\$100 million to \$1 billion	37.4	32.6	48.9	41.3
\$1 billion to \$10 billion	36.4	37.5	52.6	62.5
Greater than \$10 billion	74.1	75.0	88.9	95.0

Source: Office of the Comptroller of the Currency using information from banks' Web sites.

Notes:

¹ To qualify as having a privacy statement, a Web site had to indicate what information is collected and how it is used.

made no qualitative assessment of these on-line privacy statements, which may vary widely in the nature of the information they provide to customers.

We examined these same sites for privacy statements as of November 30, 1998. Over that five-month period, the percentage of sites with on-line privacy statements grew to almost 52 percent, an increase of almost 28 percent. The growth at national bank Web sites was somewhat higher at 33 percent.

A distinct pattern emerges when we look at privacy statements for banks of different sizes. Table 5b reveals that large banks are much more likely to have an on-line privacy statement. In June 1998, three-fourths of banks with greater than \$10 billion in assets had on-line privacy statements, and by November 30 this had increased to almost 90 percent. The corresponding level was even higher for large national banks with transactional Internet banking: 95 percent of national banks with greater than \$10 billion in assets included privacy statements on their transactional Web sites.

Among the largest 10 banks, six offered transactional Internet banking in June 1998, but one of those banks did not have an on-line privacy statement, a situation that was remedied by the time we re-examined Web sites at the end of November. By that time, seven of the top 10 banks had transactional Internet banking Web sites, and all of these had on-line privacy statements. In addition, for the three without transactional Web sites, one had an on-line privacy statement on its non-transactional Web site.

Small banks, particularly those in the smallest size category with less than \$100 million in assets, were much less likely to have on-line privacy statements. In June 1998, only 30 percent of Web sites for this group of banks included a privacy statement. Coverage increased to 37 percent by November. These figures show that despite

progress in addressing on-line privacy, the majority of small banks still do not have an on-line privacy statement.

Growth of Transactional Internet Banking

Data of the same scope and quality as our data for transactional Internet banking as of midyear 1998 do not exist for other points in time, so it is not possible to describe with precision the growth of transactional Internet banking. However, based on information from the Federal Deposit Insurance Corporation (FDIC), from a widely used industry publication, and from recent press reports, it is possible to estimate roughly the recent growth trend in banks offering transactional Internet banking.

Some observers have said that the transactional Internet banking "era" is approximately three years old.¹¹ Figure 1 shows that by year-end 1997 (i.e., at the end of the second year of the Internet banking era) there were only 103 transactional banking and thrift Web sites.¹² However, the number of transactional banking Web sites increased to 258 over the first six months of 1998, an annual growth rate of over 300 percent. Our estimates of the number of transactional banking and thrift Web sites for the end of the third quarter and the end of November of 1998 indicate a slowdown in that pace, but still show steady growth.

There are indications that growth in the number of transactional Web sites will accelerate in early 1999. In late 1998 and early 1999, we reviewed numerous Web sites and press releases of major vendors announcing

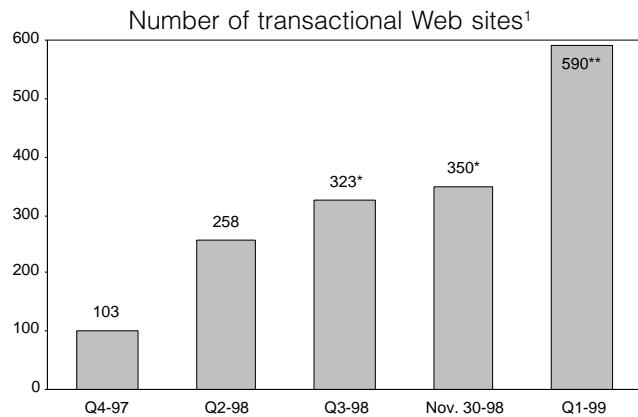
¹¹ For example, see the article in *The Charlotte Observer*, October 24, 1998.

¹² The few other "counts" of Internet banking that exist do not distinguish between banks and thrifts. Though most of this report deals with commercial bank Web sites, we compiled information on thrift Web sites as well, and so are able to put our figures for June 30, 1998 on the same basis as other data bases we have used.

new contracts with banks and thrifts to build and/or service Web sites.¹³ Based on this information, we calculate that at least 240 new bank and thrift transactional Web sites will come on-line within the next several months, bringing total transactional bank and thrift Web sites to 590 by the end of the first quarter of this year, as displayed in Figure 1. At a pace of 240 new Web sites per quarter, there would be about 1,300 transactional bank and thrift Web sites by the end of 1999, covering perhaps 10 to 15 percent of all commercial banks.¹⁴

It is more difficult to gauge the extent and growth of customer usage of transactional Internet banking. Industry estimates vary widely and generally lack precision, but most estimates suggest that usage is not widespread. Based on a recent estimate of "on-line" banking usage, roughly 4 percent of households currently bank on-line.¹⁵ However, the 374 commercial banks currently offering Internet banking account for 41 percent of all small deposits at commercial banks. Even without taking into account the likely growth in Internet banking Web

Figure 1—Transactional Internet banking Web sites: strong growth in 1998, possible surge in early 1999



¹ Bank and thrift Web sites

* estimated

** extrapolated

Source: Office of the Comptroller of Currency using data from the FDIC, bank and thrift Web sites, *On-line Banking Report*, and selected vendor Web sites and press releases.

¹³ Based on our conversations with several vendors, we estimate that over 90 percent of the new Web sites will be transactional.

¹⁴ Our intent is to determine what sort of "baseline" growth rate results from extrapolating from known information, rather than to attempt to forecast future growth in transactional Internet banking. We also caution that our baseline may be somewhat conservative. It is possible, for example, that as banks complete their Y2K readiness programs during 1999 they may be able to focus more resources on technology upgrades, including transactional Internet banking. In addition, it is worth mentioning that many of the 1,500 or so banks that had an Internet site without transactional capabilities at mid-year 1998 may have viewed establishing an Internet presence as a prerequisite to offering transactional banking in 1999. If so, past growth rates are likely to understate this sort of "evolutionary" move to transactional Internet banking.

¹⁵ PSI Global, as illustrated in "Delivering the Goods," special section of the *American Banker*, December 1, 1998.

sites, the infrastructure already in place provides considerable potential for expansion in Internet banking activity.

It is impossible to predict whether such expansion in usage will occur, but the possibility should not be discounted. Such dramatic shifts in market acceptance are not unusual in the world of electronic commerce. For example, starting from virtually zero three years ago, on-line brokerage activity now accounts for almost one quarter of all individual brokerage activity.¹⁶ Moreover, bill presentment is expected to become operational during 1999. Many industry experts believe that the introduction of bill presentment could greatly accelerate the already rapid growth in the use of bill payment through on-line banking.

Summary and Conclusions

Few banks offer transactional Internet banking, though the relatively high proportion of large banks in this group means that a significant share of industry assets and deposits are accounted for by these banks. The significant number of small and mid-size banks offering Internet banking suggests that the fixed costs of offering Internet banking do not appear to be prohibitive for small institutions. In terms of performance characteristics, we found no evidence of major differences in the performance of the group of banks offering transactional Internet banking compared to those that do not.¹⁷

The majority of large banks are adopting Web site privacy statements. While there has been growth in adoption, most small and mid-size banks with transactional Internet banking do not yet have on-line privacy statements. We did not assess the quality of the on-line privacy information offered.

Growth in the number of banks offering transactional Internet banking has been strong recently. However, even if recent growth trends accelerate somewhat, that would still result in a relatively small percentage of banks offering transactional Internet banking by the end of 1999. Nevertheless, it is likely that the majority of large banks will offer transactional Internet banking by the end of 1999.

Usage of Internet banking is still a relatively small factor in the banking industry. However, it is likely that over half of existing depositors will have deposit accounts at banks with Internet banking sites by the end of 1999. A change in consumer demand for Internet banking services could potentially generate a rapid expansion in the importance of Internet banking activity for the industry. Such shifts in customer preferences may become a hallmark in the world of electronic commerce.

¹⁶ Calculations based on Deutsche Bank Research and Piper Jaffray Equity Research.

¹⁷ Our external approach to the data does not allow us to make any judgments about transactional risk exposure, including security risk.