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Introduction and Objective

The number of agricultural banks fell by nearly a thousand during the past decade¹. This decline occurred in a climate of financial institution deregulation, financial market innovation, and a severe downturn in the farm economy. The farm economy was in recovery by decade's end but the fortunes of farm banks had gone through a similar cycle and few emerged unscathed. There were 324 farm bank failures during the decade. An additional 54 banks were classified as weak at decade's end². Annual farm bank failures peaked at 75 in 1987, about 2 years after the bottoming of farm incomes, (having risen from zero failures in 1980) before falling to 24 in 1989. Annual profitability measures for farm banks lagged but mirrored the conditions in the farm economy. Rate of return on assets fell from over 1 percent in 1980 to 0.4 percent in 1986 before rising to over 1 percent again at decade's end. Rate of return on equity followed the same pattern, falling from over 14 percent to slightly over 5 percent before rebounding to over 11 percent.

Throughout this period there were a group of commercial banks which, while continuing its commitment to agriculture, was able to maintain a high level of profitability, even in the years of lowest farm income. These high performance agricultural banks (HPB's) had a mean rate of return on average assets (ROAA) of 1.8 percent over the decade. The ability of these HPB's to maintain consistent profitability is of interest not only to bank regulators but to agricultural credit policymakers. Bank regulators seek to protect the deposit insurance fund and the economy's payments system and thus are concerned with bank safety and soundness. Agricultural credit policymakers are concerned with the viability of banks because of their importance as a source of credit to farmers in their areas. The objective of this paper is to determine what factors lead to sustained high profitability among agricultural banks over an economic cycle including sectoral decline and recovery. We investigate characteristics of HPB's in comparison to their lower performing counterparts (NHPB's) over the entire 1980's decade. Further, we investigate whether location in a particular USDA crop reporting region is related to bank performance. In the remainder of the paper we will discuss previous research, our data and methodology, our results on both a national and regional basis, and draw some conclusions from these results.

* The ideas and opinions in this paper are those of the authors and do not necessarily reflect those of the Economic Research Service or the U.S. Department of Agriculture. USDA-Economic Research Service, Washington, D.C.

¹ The Federal Reserve System defines an agricultural bank as one which has an agricultural loan to total loan ratio greater than the unweighted average of that ratio for all banks at a particular point in time. These banks will be called agricultural, ag or farm banks herein.

² A bank is classified as weak if the total of its loans past due 90 or more days plus its nonaccrual loans exceed its capital.

Previous Research

Several studies have been conducted to ascertain reasons for superior performance among various bank groups. Ford and Olson evaluated bank performance in the 1970's and identified three characteristics of high performance banks. Their study identified a) maximization of revenues, b) expense control, and c) consistently good management as distinguishing superior performers.

Maximization of revenues included effective pricing strategies, maximization of tax-exempt income and liquidity management. Expense control included minimization of fixed expenses excluding employees compensation, and efficient employment of personnel. Good management implied effective planning, organization and control. Unfortunately this study was carried out in the 1970's, prior to major events in bank structure and deregulation.

Goldman Sachs evaluated a group of 46 large banking organizations over 1984-1986 and identified 12 banks, including 1 multinational and 11 regional multibank holding companies, which earned over 1 percent ROA during that period. However, one year later, after accounting for large additions to loss reserves for Less Developed Country nonperforming loans, only four of these banks still earned over 1 percent ROA.

Whalen investigated the possibility of market concentration as an explanation for high and sustained profitability. The study was done over the period 1982-84 in a two state area. While he did not concentrate on a specific "high performance" group, he isolated market concentration in rural areas using the Herfindahl index and estimated the relationship of ROA and market concentration. Whalen found no explanatory power in this relationship.

Gup and Walter studied high performing banks of less than \$100 million in total assets over the 1982-87 period. They restricted their high performers to those earning ROA over 1.5 percent each year of the study. They suggested collusion (market concentration), greater risk-taking, random events and unique qualities as potential explanations for "persistent profits". Their results were consistent with Whalen regarding the contribution of market concentration and Ford and Olson regarding the contribution of unique qualities and management abilities. They argued that the 1982-87 time-frame was sufficiently long to rule out random chance as an explanation and their results identified greater risk-taking as contributing to lower, not higher, performance.

While each of these studies made important contributions to the understanding of conditions leading to high performance by banks, each also has shortcomings. Ford and Olson's results were derived in the 1970's and prior to major deregulation and innovation events in financial markets. The Goldman Sachs study concentrated on only large banks over a very limited time-frame. Whalen focussed mainly on the issue of market concentration and didn't elaborate on other contributory factors. Gup and Walter overcame many of the drawbacks of the other studies but left three issues to be dealt with. First, in looking at all small banks (assets less than \$100 million) they overlooked the potential of bank commitment to a particular economic sector for sorting out superior management when that sector is in decline. Second, their time-frame doesn't allow for a concurrent divergence in sectoral and economy-wide performance (such as occurred in the mid-1980's when agriculture

declined while the economy as a whole was growing) to sort out management skill. Third, they allow exit and entry among banks in the non-high performance group so that a comparison cannot be made between two constant groups of banks over time. This limits their ability to say that one group had consistently better management than the other.

Data

Data from the quarterly Report of Income and Condition (call reports) of the Board of Governors of the Federal Reserve System were utilized. We used the December 31 reports for 1980-89. Changed data reporting requirements were tracked using the Federal Financial Institutions Examination Council Sample Report Forms so as to maintain comparability within ratios across time. In several cases we were unable to calculate desired ratios due to missing variables or changed reporting requirements. Agricultural banks are defined herein as banks which maintained an agricultural-loan-to-total-loan ratio (MELRATIO), which was higher than the unweighted average of that ratio for all banks within each year (Melichar). The magnitude of MELRATIO ranged from a high of 18.45 percent (1980) to a low of 15.60 percent (1987).

Methodology

To be in this study, an agricultural bank had to meet the MELRATIO requirement each of the 10 years of the study period. This requirement was imposed to ensure that the banks had maintained a high level of commitment to agriculture even when sector performance was at its lowest. A second requirement the banks in this study met was that they maintained the same bank organizational form during the entire decade. This meant that banks which failed, merged, were purchased, were turned into branches or were originated between January 1, 1980 and December 31, 1989 were eliminated from the study. This was an attempt to control for continuity of management over the study period. Finally, to be classified as an HPB, a bank had to achieve an ROAA of at least 1.1 percent each year of the decade. There were two reasons for this restrictive requirement. First, within the banking industry an ROAA of 1 percent is considered a desirable goal for long run profitability. Second, agricultural banks entered the decade earning an average ROAA of 1.1 percent. Thus, it was felt that the ability to maintain this level of performance even as the agricultural economy stagnated demonstrated superior performance.

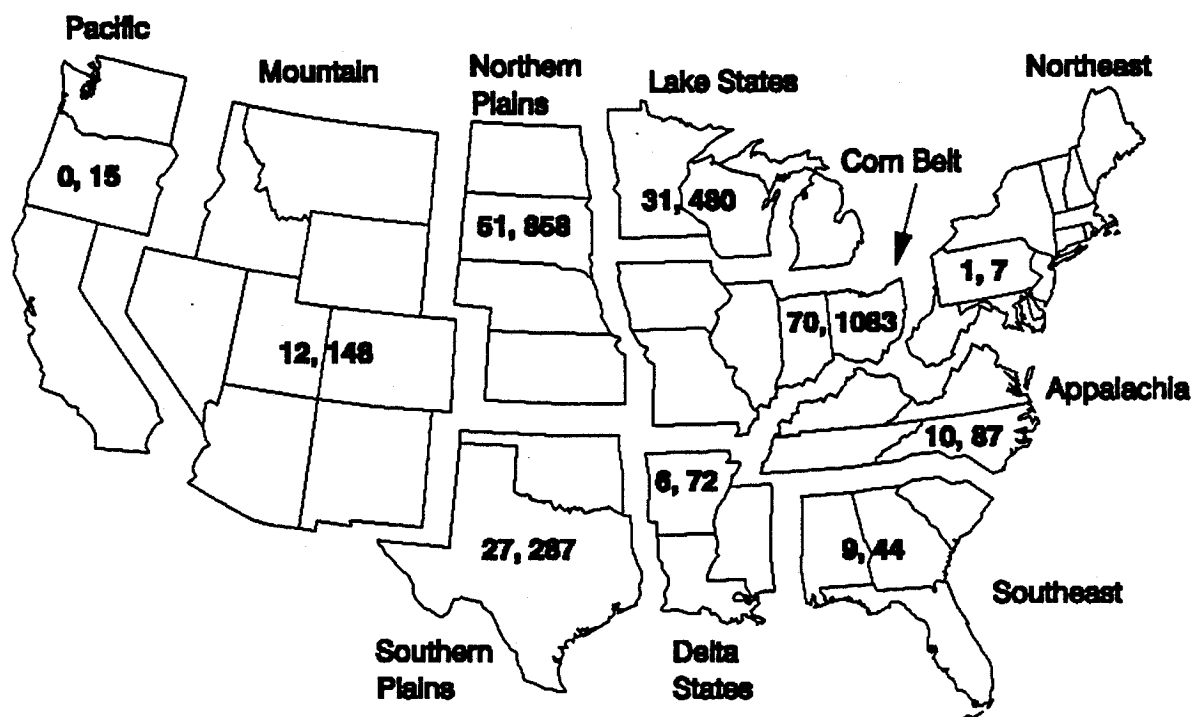
These criteria identified 3,298 total agricultural banks over the decade including 217 HPB's and 3,081 NHPB's. Thus, HPB's comprise 6.6 percent of all agricultural banks included in the study. The HPB's identified in this study are listed in Appendix A by name, city, state, 1989 average assets, and USDA crop reporting region. The HPB's achieved a decade average ROAA of 1.8 percent with a high of 1.97 percent in 1983 and low of 1.64 percent in 1989. The NHPB's averaged ROAA of 0.93 percent over the decade with a high of 1.39 percent in 1983 and a low of 0.4 percent in 1986. After identifying the banks to be evaluated, a series of 45 variable values, mostly ratios, were derived for each bank for each year. The mean and standard deviation of each of these variables were computed for the two bank groups each year in aggregate and at the crop reporting region level. The nonratio variables were indicative of bank characteristics such as average annual assets, equity and loans as well as their growth rates. The ratios calculated allowed the evaluation of standard bank performance criteria for significant differences

between bank groups. Standard t-tests were performed to identify statistically significant differences between HPB's and NHPB's.

Results

The regional disaggregation of the 217 HPB's and 3081 NHPB's is illustrated in figure 1. The Corn Belt, Lake States and Northern Plains Regions contain 70 percent of the HPB's and 79 percent of the NHPB's in the nation. The Northeast

Figure 1. Number of HPB's, Non-HPB's by USDA Crop Reporting Region



* Cropping Regions: Northeast - Region 1; Lake States - Region 2; Corn Belt - Region 3; Northern Plains - Region 4; Appalachia - Region 5; Southeast - Region 6; Delta States - Region 7; Southern Plains - Region 8; Mountain - Region 9; Pacific - Region 10

and Pacific regions contain only 1 HPB and 22 NHPB's and thus are not included in the regional level analysis. The paucity of qualifying banks in these regions reflect the less credit intensive type of agricultural production in the Northeast region and the bank branching and size of the Pacific region among other factors. Regional comparisons will be reported for the other eight regions following the presentation of national results.

Much discussion has been made regarding the contribution of size to bank performance but our results do not support this hypothesis among this limited set of agricultural banks. Figure 2 illustrates the average asset size of the two bank

groups over the decade and demonstrates that performance among the larger banks lagged that of the smaller banks across the decade. In fact, from 1985 through 1989 no statistically significant difference in average assets existed between the two groups.³ As noted previously, the variable used to identify HPB's was ROAA and, as shown by figure 3, NHPB performance declined dramatically in the mid-1980's before beginning recovery. Interestingly, the ROAA for HPB's was basically constant the last three years and lower than at the outset of the decade. One striking difference is the portfolios of the two bank groups and their relative proportions of loans and securities held over the decade. Figures 4 and

Figure 2. Average Total Assets

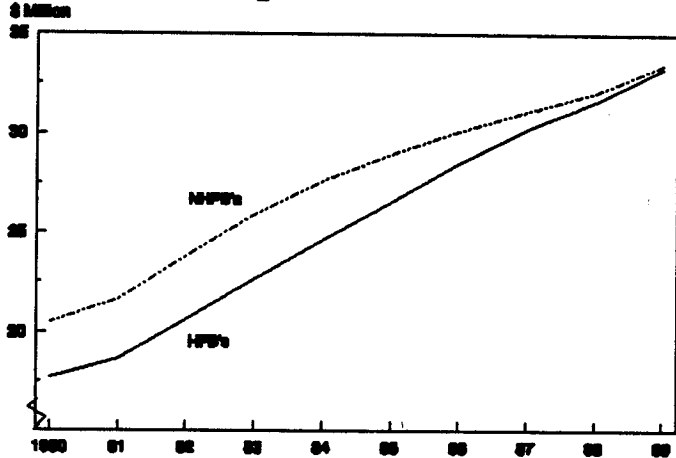
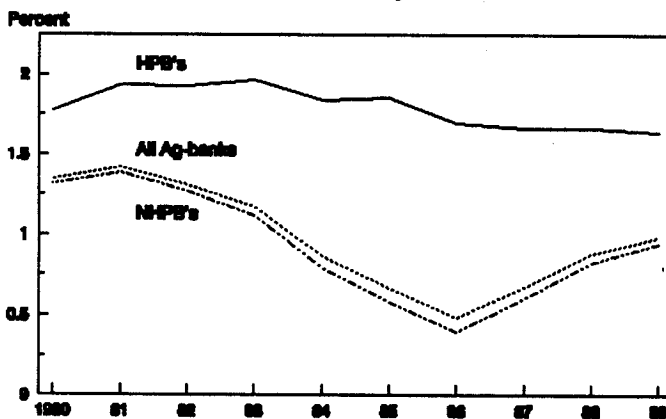


Figure 3. Rate of Return on Average Total Assets



5 display the consistently higher commitment to loans and lower commitment to securities of NHPB's. Interestingly, the two groups' proportional allotments to loans and securities moved in a roughly parallel manner over the decade. However, as the agricultural sector downturn approached, the HPB's were somewhat swifter to shift their portfolios to a higher proportion of security holdings. Concurrently, HPB's were swifter to increase capital-to-asset ratios (figure 6), driving their decade-long advantage up from about 2 percent in 1980 to almost 4 percent by decade's end. The higher capital-to-asset ratios, as well as relatively higher proportions of securities to loans, indicate a lower risk-taking profile for the HPB's over this time period.

³ All t-tests in the study are performed at the 95% level.

Criteria Used In Evaluation

Standard criteria used in evaluating performance of a business firm are profitability, efficiency, liquidity and solvency. Since the banks evaluated in this study are by definition solvent the entire decade, measures of solvency will not be focussed upon.

Liquidity in a commercial bank is heavily dependent upon its portfolio of government securities. This aspect of liquidity on the part of both bank groups is demonstrated in figure 5 above. Therefore, the analysis which follows will concentrate on profitability and efficiency. Ratios used in the

Figure 4. Loans-to-Assets Ratio

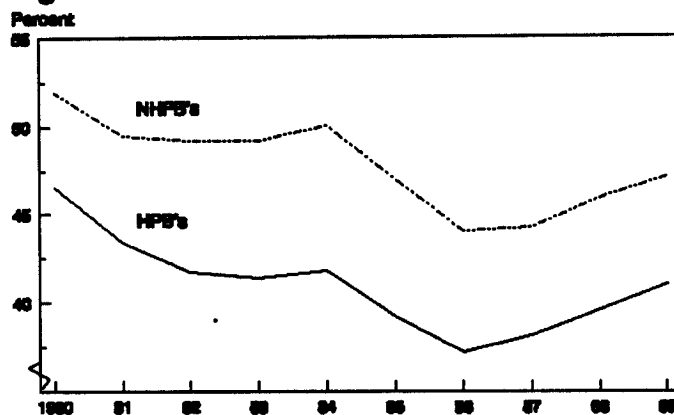
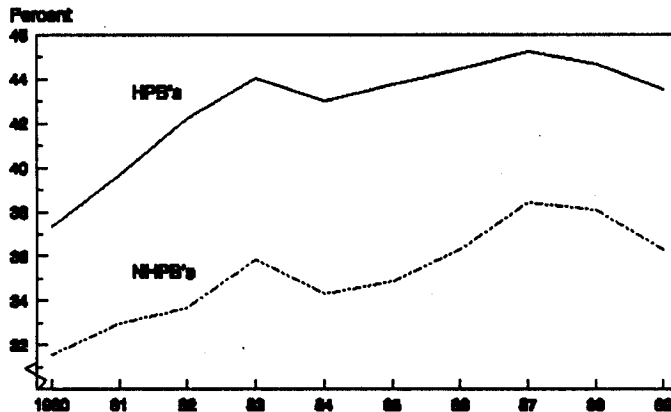


Figure 5. Securities-to-Assets Ratio



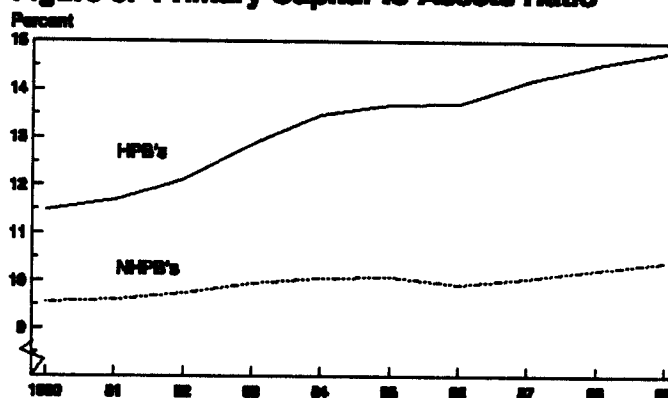
analysis involving each of these criteria are defined in table 1. In each case results reported are based upon the unweighted mean of the ratio for each bank group.

Profitability

The less risky management approach of holding smaller loan portfolios, followed by the HPB's was reflected in bank profitability as demonstrated in the national comparison of the two bank groups in table 2. The loss rate surged for both bank groups, peaking in 1986 as the agricultural economy began its rebound. Nonetheless the loss rate for NHPB's was between two and three times as great as that

of HPB's over the entire decade reaching about 2.4 percent whereas HBP loss rates never topped 1 percent annually.

The impact of the loss rate was dramatically reflected in the profit margins of the two groups. The profit margin for HPB's stayed relatively constant over the decade. However, the NHPB profit margin plummeted before a partial recovery. At the decade's outset HPB profit margin was 140 percent that of NHPB's. The advantage increased to nearly 450 percent in 1986 before falling to 180 percent at the decade's end.

Figure 6. Primary Capital-to-Assets Ratio**Table 1. Ratio Definitions**

Criteria	Ratio	Components
Profitability	Loss Rate	$(\text{Net Charge-offs} / \text{Average Loans}) * 100.0$
	Profit Margin	$(\text{Net Income} / \text{Total Operating Income}) * 100.0$
	Net Interest Margin	$(\text{Net Income} / \text{Average Assets}) * 100.0$
	Debt Service	$(\text{Total Interest Income} / \text{Total Interest Expense}) * 100.0$
Efficiency	Times Interest Earned	$((\text{Total Operating Income} - \text{Provision for Loan Losses}) / \text{Total Interest Expense}) * 100.0$
	Earning Assets -to- Total Assets	$(\text{Average Interest Earning Assets} / \text{Average Total Assets}) * 100.0$
	Net Noninterest Margin	$(\text{Net Noninterest Income} / \text{Average Assets}) * 100.0$
	Average Deposit Interest Rate	$(\text{Deposit Interest Expense} / \text{Total Deposits}) * 100.0$

Table 2. Bank Profitability Measures, All Banks

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Loss Rate (LOSSR %)										
HPB	0.13	0.21	0.34	0.34	0.59	0.82	0.92	0.49	0.29	0.27
NHPB	0.34	0.46	0.66	0.80	1.27	2.15	2.39	1.31	0.74	0.54
Profit Margin (PM %)										
HPB	19.26	16.79	15.95	17.69	16.36	17.27	17.49	18.43	18.43	17.08
NHPB	13.73	11.39	10.03	9.73	6.85	5.27	3.93	6.69	8.95	9.58
Net Interest Margin (NIM %)										
HPB	4.55	4.91	4.85	4.74	4.56	4.69	4.43	4.31	4.24	4.25
NHPB	4.18	4.49	4.36	4.18	4.02	4.10	3.82	3.75	3.80	3.87
Debt Service (DS %)										
HPB	241.7	309.4	288.4	280.0	247.6	282.5	267.9	267.7	224.3	200.4
NHPB	204.1	183.2	163.1	168.9	162.9	170.6	175.9	182.6	182.2	175.8

The net interest margin points to the superior ability of the HPB's to maintain their spreads. The HPB margin was as much as 0.61 percent above that of NHPB's (in 1986) and was greater the entire decade. These results are supported by the debt service ratio. Throughout the decade, HPB interest income was over twice as great as interest expense and tripled it in 1981. Only in 1980 did NHPB interest income more than double interest expense. These reflections of the effect of interest expense and interest income on bank profitability nationally point to more efficient management by HPB's.

Efficiency

Table 3 displays values for 4 ratios indicative of the relative efficiency of HPB's and NHPB's at the national level. The times-interest-earned-net ratio measures the relationship of total operating income less chargeoffs to total interest expense. (This ratio is alternatively calculated without subtracting chargeoffs.) Interest expense is paid by banks to maintain the liabilities which fund the assets necessary to earn income. Throughout the decade HPB's held a statistically significant advantage over NHPB's in this measure of efficiency. However, this advantage declined substantially in 1988 and 1989, due to a moderate improvement by NHPB's and a marked decline on the part of HPB's, to their lowest level of the decade.

The efficient use of interest-bearing liabilities in the acquisition of earning assets can be highlighted by calculating the proportion of assets held which are earning either interest or noninterest income. The earning-asset ratio illustrates that, on average, HPB's were better at employing assets in an interest earning capacity. In 1980 and 1981 this difference was not statistically significant but for the remainder of the decade HPB's held a statistically significant advantage.

In addition to employing assets effectively in an earning capacity, it is important to hold down expenses associated with interest-bearing liabilities. As interest rate ceilings were lifted on deposit rates and financial markets offered a wider array of products, agricultural banks experienced competition for deposits. Therefore, deposit interest cost control became more important. HPB's were more effective than NHPB's in this area of management. They paid between 24 and 88 basis points less for deposits on average. Again, as in the case of the times-interest-earned ratio, this advantage declined to its lowest level of the decade in 1989.

While interest income and expense fluctuated over the decade, the noninterest income and expense relationship was fairly stable both among and within bank groups. Net-noninterest-margin (always negative since fixed occupancy and personnel costs outweigh fee and service income) ranged from -1.92 percent to -2.07 percent for HPB's over the decade, ending at -1.97 percent in 1989. This compares to the NHPB margin which ranged from -2.14 to -2.38 and ended the decade at -2.35 percent.

The eight ratios presented in tables 1-3 illustrate measures of profitability and efficiency in which, nationwide, the HPB's outperformed NHPB's over the decade. Figures 1-6 and accompanying discussion highlighted differences in the bank groups in the areas of liquidity and solvency.

Table 3. Bank Efficiency Measures, All Banks

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Times Interest Earned Net (TINTRNN)										
HPB	2.99	3.17	2.95	2.86	2.53	2.84	2.69	2.81	2.33	2.08
NHPB	2.08	1.88	1.64	1.69	1.59	1.59	1.63	1.79	1.85	1.82
Earning Assets-to-Total Assets (EAR%)										
HPB	90.84	90.79	91.19	91.28	90.92	90.56	89.54	89.08	89.50	90.05
NHPB	90.34	90.27	90.26	90.11	89.55	88.82	87.63	87.00	87.65	88.44
Net NonInterest Margin (NNIM%)										
HPB	-1.92	-2.02	-2.07	-2.02	-1.97	-1.98	-2.00	-1.95	-1.96	-1.97
NHPB	-2.14	-2.27	-2.34	-2.31	-2.29	-2.35	-2.38	-2.36	-2.38	-2.35
Average Deposit Interest Rate (AVDR%)										
HPB	4.88	6.69	7.53	6.59	7.00	6.27	5.47	4.92	5.06	5.67
NHPB	5.52	7.52	8.28	7.47	7.66	6.89	5.95	5.22	5.34	5.91

Regional Considerations

The potential for regional variation in agricultural bank performance exists due to 1) the differences between state and regional banking laws and regulation, 2) differences in the nature of regional agricultural production, and 3) the differing impacts of the decline of the agricultural economy in addition to regional effects of macroeconomic events. Agricultural banks in this study were sorted by the ten USDA crop reporting regions and by HPB/NHPB classification within each region. T-tests were performed between bank groups within each region within each year of the ratio's availability to discover significant differences in performance indicators. Table 4 encapsulates the results of those tests. As there was only 1 HPB in the Northeast and no HPB's in the Pacific region, only 8 regions are represented.

No results statistically significant at both the regional and national level were conceptually inconsistent. However, this only compares HPB's and NHPB's within each region and not across regions. Therefore, results here do not indicate whether performance varies within a bank group across regions.

Four variables had no statistically significant difference between HPB's and NHPB's either regionally or nationally, and one differed at the national level but not the regional level. Three of the statistically insignificant variables were intended to elicit information on differences in agricultural lending practices between bank groups. Variables tested were the proportion of ag loans to total loans in the portfolio (AGTOTTL), the growth rate of the ag production loan portfolio (AGPGTH) and the return on ag production loans (GROAPL). Two other ag loan related variables help explain the 3 insignificant ones. Net chargeoffs (CHPL) and nonperforming ag production loans (NPFPL) were both significantly smaller for HPB's at the national level and in 4 of the regions. Recalling that HPB's had lower loan-to-asset ratios, and therefore a smaller quantity of ag production loans (even though their ag loan to total loan ratios were similar), it appears that HPB's merely made fewer high risk loans.

The lack of significance of the ratio of deposit interest expense to total interest expense (DIETIE) merely reflects the fact that HPB's incurred proportionally lower levels of both. In other words, HPB's were more efficient at controlling all interest expenses than NHPB's. HPB's earned a higher return on loans (LER) in their portfolios nationally but this failed to be statistically significant in any of the regions.

Appalachia, Southeast, and Delta regions held few HPB's thus resulting in lower strength statistical results. Standing out in the Southeast was the ability of HPB's to control interest expenses while the Appalachian and Delta regions exhibited strong capital bases and superior control over noninterest expenses. HPB's in the Southern Plains region defied the disasters surrounding them in energy and agricultural bank failures. High capitalization, good quality control on lending activities and control over interest expenses appear to be the keys to their success. The HPB's in the remaining regions appear to track national results very strongly which is unsurprising since they comprise the majority of HPB's.

Table 4. Selected Ratios Comparing Bank Group Performance

	-----Region-----								
	All	Lake States	Corn Belt	Northern Plains	Appalachia	South east	Delta States	Southern Plains	Mountain
Ratio ↓ Number of HPB's →	217	21	70	51	10	9	6	27	12
Agricultural Prod Loan Growth Rate (AGPGTH)									
Agricultural Loans to Total Loans (ACTOTTL)									
Average Deposit Interest Rate (AVDR)	-		-	-		-		-	-
Net Agricultural Loan Chargeoff Rate (CHPL)	-		-	-				-	-
Deposit Interest Expense to Total Interest Expense (DIETIE)									
Loan Delinquency Rate (DR)	-		-	-				-	-
Debt Service (DS)	+	+	+			+			+
Earning Assets to Total Assets (EAR)	+	+	+	+					+
Equity Multiplier (EM)	-		-	-	-		-	-	-
Gross Return on Ag-production Loans (GROAPL)									
Interest Expense to Average Assets (IETTA)	-	-	-	-				-	-

Conclusions and Implications

In spite of the decline in the agricultural sector during the mid-1980's, 217 banks simultaneously maintained a high level of commitment to agricultural lending and earned an above average return on average assets. When compared to the 3,081 banks which earned significantly lower returns on average assets, adherence to traditional banking practices appeared to explain most of the difference in performance.

HPB's were more concerned with loan quality and thus made less risky loans and less loans overall. They maintained high levels of liquidity and safety by holding higher securities-to-assets ratios and kept a higher proportion of their total assets in earning status. HPB's controlled interest expense better by paying a lower average interest rate on deposits. They also were more efficient at controlling noninterest expenses and had a better balance between noninterest income and noninterest expense. There were no significant deviations between national results and results at the USDA crop reporting regional level.

The conclusions of the study imply that there is an advantage on the part of local agricultural banks in evaluating credit risk which will hold them in good stead as the impacts of deregulation and increased competition continue to spread. However, these banks need to be vigilant in maintaining credit standards and controlling costs. It appears that commercial banks will continue to be very important providers of agricultural credit even through cyclical downturns if they adhere to traditional bank lending maxims.

Having made these observations based upon annual data for the decade of the 1980's, several comments must be made regarding data weaknesses and areas for further research. First, it could be useful to extend the analysis back to the decade of the 1970's to evaluate the performance of these same banks under the economic conditions in play during that time period. Second, the results of the comparisons within regions were weak since, in some instances, the ratios between HPB's and NHPB's were statistically different only 6 out of 10 years. Third, there was no inter-regional comparison of results within bank groups. Each of these represents a potentially fruitful extension of the study.

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