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Bank Performance and Regional Economic Growth: Evidence of a Regional Credit Channel

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Abstract

This paper examines the relationship between bank performance and economic growth at the state level. We develop a regional credit view to explain how, due to information costs, regional banking conditions can influence local economic activity by affecting a region's ability to fund local investments. The model suggests that local banking-sector problems may constrain economic activity in financially distressed regions, whereas no such link need be evident in financially sound regions. We test the empirical relevance of this credit view for the 1983-1990 period using state-level data and find evidence of a regional financial channel to output. Specifically, local banking-sector conditions explain more of real personal income growth in states whose share of nonperforming loans is above the national share.

I. Introduction

Although the 1980s ushered in the second-longest expansion in the United States since the Civil War, both regional real-sector and financial-sector performance was uneven during the decade. Not surprisingly, banking problems were primarily concentrated in areas experiencing economic distress, namely, the Farm Belt and oil-producing regions, and more recently, New England. This correlation between regional banking conditions and regional real-sector performance is not coincidental. The regulatory structure of the U.S. banking industry reflects a long tradition of geographic barriers in the form of interstate branching restrictions. These regulatory boundaries have resulted in a banking system that has been artificially segmented along state lines. Consequently, bank performance has been dependent on the health of local economies.

Evidence that the poor performance of a regional economy leads to a deterioration in the quality of local bank loan portfolios has important implications for the government as it regulates, supervises, and insures these institutions. However, from a policymaker's perspective, the reverse is equally significant: To what degree do problems in the local banking sector affect future regional economic activity? The importance of this question is emphasized by what has generally come to be known as the *credit view* of the relationship between financial-sector conditions and real economic activity.[1]

The credit view posits that because the financial sector produces the information needed to allocate resources, the performance of this sector, rather than merely mirroring conditions in the real sector, can affect economic activity. It also emphasizes the role of banks in funding information-intensive borrowers, particularly small local borrowers who do not have direct access to capital markets. An important implication of the credit view is that adverse shocks to the financial sector resulting from a decline in economic activity can feed back and magnify an economic downturn. However, empirical tests for a channel from the financial sector to the real sector using national-level data have yielded inconclusive evidence. Moreover, even the studies finding that financial variables help to predict economic activity are subject to the usual caveats in interpreting time-series results and thus do not allow one to conclude that these variables also *cause* economic activity.

This paper takes a regional perspective in testing for a financial channel to output. The tests are based on Samolyk (1989), which presents a model in which information costs cause banking markets to segment along regional lines. In this framework, the health of the local financial sector (in terms of the credit quality of local banks and nonbank borrowers) can influence investment activity and regional economic growth by affecting a region's ability to fund local projects. The analysis suggests that information costs may cause the relationship between local financial conditions and economic growth to be different in financially unhealthy versus healthy regions. In financially distressed regions, local bank credit problems may constrain economic activity, whereas no such link need be evident in regions with sounder bank balance sheets.

This study uses state-level data on banking conditions and takes a cross-sectional approach in examining the relevance of this regional credit view for the U.S. economy between 1983 and 1990. We exploit the disparities in both financial-sector and real-sector conditions across states to test whether regional financial health helps to predict the future performance of regional economies in a manner that is consistent with the existence of credit-market imperfections. Specifically, we test whether the link between local bank balance-sheet conditions and real personal income growth is different when past bank credit performance (as defined by the share of loans on nonperforming status) has been relatively poor versus relatively good.

The results are consistent with the regional credit view. Controlling for state-specific fixed effects that may explain differentials in personal income growth, we find that bank balance-sheet conditions explain more of income growth in states whose lagged nonperforming loan share is above the national share. Thus, local banking-sector conditions are more important when past realized credit performance has been poor. Moreover, we do not find a difference in the relationship between financial conditions and income growth when the sample is split by past income growth rather than by past credit performance. This suggests that the significance of past credit performance is not merely a proxy for the importance of past real-sector performance.

The remainder of the paper is organized as follows. Section II presents the results of Samolyk (1989) to motivate the empirical tests for a credit channel to regional output. Section III describes the data and methodology used to test for a link between regional credit conditions and regional economic performance. Section IV presents the empirical results, and section V concludes.

II. A Regional Credit View

One interpretation of the credit view emphasizes the importance of the financial sector when investors possessing financial capital lack complete information about borrowers with profitable investment opportunities. Because there are information costs associated with monitoring such projects, borrowers who are more costly to evaluate and to monitor are considered less creditworthy and are apt to face more-stringent credit provisions, such as higher loan rates or higher collateral requirements. This implies that the condition of a borrower's balance sheet can affect the credit terms he faces. Specifically, because expected monitoring costs are positively related to the risk of default, the amount of internal net worth a borrower can pledge to his project is inversely related to these costs, as his investment will reduce the required leverage and hence, ceteris paribus, the risk of default.

This interpretation of the credit view also emphasizes the importance of banks in identifying, evaluating, and funding information-intensive investment projects.[2] However, the ability of a bank to supply credit depends on its capacity to raise funds. When the costs associated with monitoring banks are related to the risk of bank failure, this capacity is affected by an institution's financial strength, as measured by its equity capital and the credit quality of its loan portfolio. In the absence of deposit insurance, depositors will impose more-stringent credit provisions on an institution in poor financial condition (for example, by requiring a higher risk-adjusted return on their deposits).[3]

Asset diversification helps banks to minimize the costs of raising funds by lessening their exposure to the risk of one loan or one type of loan, hence reducing their exposure to failure. Yet, to the extent that banks do not diversify risks that are costly to monitor, the health of bank balance sheets can affect the ability to finance risky ventures. Samolyk (1989) presents a model of regional credit markets based on the existence of information costs that limit unregulated banks' ability to geographically diversify their loan portfolios. Interstate branching restrictions, which have historically imposed boundaries on bank operations along state lines, segment banking markets and further reduce geographic diversification. Here, we present the implications of this model that underlie our empirical tests for a regional credit channel to output.

The Model

The model of regional credit markets presented here assumes that banks possess a specialized information technology that allows them to identify and to monitor risky investment projects more efficiently than other investors. However, unlike much theoretical literature that uses imperfect information to motivate financial structure, this analysis assumes the economy is made up of regional economies having independent and risky production technologies. The distribution of returns on local investment activity is assumed to exhibit diminishing marginal returns. Thus, the expected one-period return on risky local projects is a function of the level of local investment activity, where

(1) $R^L = f(L)/L$,

and $f'>0$, $f''<0$, $f(L)$ is the expected gross return on local projects, L.

Each productive sector has two types of individuals: bankers and depositors. Both receive an endowment that is invested to maximize expected future consumption. Bankers possess an information technology for locating and monitoring specific real investment projects; depositors do not. Bankers in any given region (local banks), however, can identify, monitor, and fund local projects more efficiently than nonlocal banks. Thus, the information produced by banks is local because monitoring costs are lower for local investments than for investments in other regions. To simplify the exposition, we assume that only local banks can monitor local projects.

Local bankers invest their own endowment as bank capital and obtain external finance (deposits) to fund their portfolio of projects. The portfolio balance constraint for local banks in a region is

(2) $D + NW = L(1+m) + S$,

where D and NW are deposits and bank net worth, respectively, S is bank holdings of default-free assets such as government securities, which yield a gross risk-free one-period rate of R^f, and m is the proportional cost of monitoring a local project (here, m will be set equal to zero).

As in Bernanke and Gertler (1987), we assume that the scale of risky local projects prevents banks from completely diversifying portfolio risk. Therefore, banks face a positive probability of earning a lower bound of $R^{min} < R^f$ on the share of their portfolios invested in risky projects. In each period, local banks maximize expected next-period profits of

(3) $E(p) = R^L L + R^f S - r^D D$,

where r^D is the gross one-period rate of return required by depositors. Because depositors do not possess a monitoring technology, they will not accept deposit contracts that are contingent on unobservable portfolio risks. In Samolyk (1989), depositors require that banks manage their investments so as to "self-insure" that they can pay depositors $r^D = R^f$ independent of realized risky project returns. Depositors can, however, assess the ex ante quality of bank portfolios, including R^{min}. Thus, assuming that local banks maximize expected profits by investing in local projects until their marginal return equals R^f, they face the following solvency constraint:

(4) $R^{min} L + R^f S - R^f D \geq 0$.

Using (2) to eliminate L from (4) and rearranging yields

(4') $R^{min} NW \geq (D - S)(R^f - R^{min})$.

Expression (4') shows that a region's banking sector is unconstrained when the minimum possible return to bank net worth on the profit-maximizing level of risky projects covers the maximum potential losses on deposits invested in these projects. Thus, in regions where banks are unconstrained, $f'(L) = R^f$ determines L, and all remaining funds are invested in risk-free projects.

In regions where (4) is not satisfied for L when $f'(L) = R^f$, local banks must invest a larger share of depositors' funds in default-free securities to ensure that depositors can be paid off should local projects yield R^{min}. In these regions, local bank investments must satisfy

(5) $R_c^{min} L_c + R^f S_c - R^f(L_c + S_c - NW_c) = 0$,

where c denotes that banks are constrained by balance-sheet conditions (specifically, by net worth relative to the minimum possible return on risky projects). In constrained banking sectors,

(6) $L_c = NW_c(R^f/[R^f-R_c^{min}])$ and

(7) $S_c = D_c - NW_c(R_c^{min}/[R^f-R_c^{min}])$.

In this framework, the ability of banks to fund local investments is related to their inherited financial health. Regional balance-sheet conditions affect a region's *financial capacity,* which is defined as the maximum level of local investments that can be funded.[4] Insufficient local bank net worth can prevent banks from funding profitable, albeit privately monitored, local projects that would be financed if information were costless. This model suggests that regional differences in inherited bank balance-sheet conditions can lead to differences in regional investment activity and, hence, in future output growth. This would not occur in the absence of information costs, since regional investment would be determined solely by the expected relative profitability of local investment opportunities.

To the extent that credit flows reflect expectations about investment opportunities, local lending may help to predict output without causing output. This framework, however, illustrates how the information costs that create a need for banks can also cause the health of bank and nonbank balance sheets to affect local credit availability. It yields the testable hypothesis that when credit markets are regional because local banks can produce information about local investments most efficiently, the relationship between financial conditions and economic activity should be different in regions where financial conditions are poor versus where they are sound. Specifically, the balance-sheet problems of banks and nonbank borrowers should be more significantly related to local investment activity and economic growth when the local financial sector is ailing.[5]

This model also illustrates that a link between credit conditions and economic activity at the regional level could be obscured in examining data aggregated at the national level. For example, Samolyk (1989) considers an economy made up of regions with independent but identical production possibilities, where half of the regions receive a negative shock to bank net worth resulting from a poor return on past local investments, and the other half receive a positive shock. Banks in capital-impaired regions may be unable to fund profitable local investment projects, even though banks in other regions are flush with funds. Moreover, capital-rich banks will invest in lower-yielding local projects as long as their return is greater than the cost-adjusted return associated with funding projects in capital-poor regions (interregional monitoring costs are assumed to be prohibitive). As a result, although bank net worth aggregated at the national level may not have changed, disparate regional bank balance-sheet conditions can cause local investment activity and thus future output growth in the aggregate economy to decline.

III. The Empirical Tests

Disparities in regional banking conditions were prominent during the 1980s. Figure 1 compares the share of nonperforming loans to total loans by region between 1982 and 1990. Although the national share was relatively flat, there were substantial regional differences in the quality of bank loan portfolios. During this same period, regional economic growth varied to the point where this disparate performance became an important factor in assessing the national economy.[6] Figure 2 illustrates the differences in the growth rate of personal income by region between 1982 and 1990.

The model presented in section II suggests that the financial conditions of local banks and nonbank borrowers can affect local investment activity and regional economic performance by influencing the ability of local entrepreneurs to fund local investments. Given the disparities in regional conditions during the past decade, this potential regional credit channel suggests that cross-sectional tests exploiting these differences may yield evidence of a credit channel to output that could be obscured in tests using data aggregated at the national level.

In the following two sections, we use state-level data and take a pooled cross-sectional, time-series approach to examine the empirical relevance of the regional credit view between 1983 and 1990. We test for a regional credit channel by including lagged proxies for local balance-sheet conditions in a reduced-form model.[7] Using real personal income growth as the proxy for local economic performance, we attempt to ascertain whether past local financial conditions are related to local economic performance in the manner predicted by the existence of credit-market imperfections.[8]

First, the model is estimated using the entire pooled sample. Then, to test whether inherited financial conditions are important in explaining personal income growth, the sample is split: first, by past bank credit performance, and second, by past real-sector performance. We examine whether financial conditions are more important in explaining personal income growth in economies whose past bank credit performance has been poor than in those inheriting healthier balance sheets. We then compare these results to those obtained using the sample split by past real-sector performance.

The Credit Variables

To construct proxies for balance-sheet conditions, we obtained data for local banking sectors from the Federal Financial Institutions Examination Council's Reports of Condition and Income (call reports). The data include the return on bank assets, loan loss reserves, nonperforming loans (defined as loans 90 days past due and still accruing, plus nonaccruing loans), and total domestic loans. Dun and Bradstreet figures on the volume of liabilities of failed firms are used to measure the financial problems of the broader local business sectors. The variables used as credit proxies are defined in table 1.

We use the data on bank profitability and on bank and nonbank credit quality to construct balance-sheet proxies that reflect realized credit performance. Bank return on assets (ROA) is the return on past investments, which affects internal bank cash flows. The share of nonperforming loans measures the realized rate of default on bank loans, since loans are placed on nonperforming status after they fail to pay stipulated cash flows. The change in bank reserves set aside for loan losses equals new provisions plus recoveries from past loan markdowns less net charge-offs for realized loan losses. To the extent that banks lag in accounting for expected default losses, changes in loan loss reserves reflect realized credit performance. Alternatively, to the extent that banks use loan loss provisions to set aside funds for expected future losses, this series may reflect expectations about future economic conditions. Nevertheless, because changes in loan loss reserves are a proxy for changes in the perceived credit quality of existing bank loan portfolios, they are included as a measure of balance-sheet conditions. Finally, failed business liabilities measure the volume of business credit in default due to firm deaths. This series captures adverse changes in the balance-sheet conditions of the broader local business sector.

The real growth rate of domestic bank loans is also included as a credit proxy, because while bank lending reflects expectations about future economic conditions (since loans are forward-looking contracts), it may also be affected by the health of bank balance sheets. Bank lending is therefore used as a proxy for local credit availability, as well as for expectations about the profitability of local investment opportunities.

The Empirical Specifications

To examine whether credit conditions are more significantly related to real-sector performance in state economies that have experienced bank credit problems than in those where bank credit performance has been good, three types of reduced-form models are estimated. In each, relative state personal income growth (y_t), which is the difference between the growth rate of state real personal income and that of national real personal income, is regressed on two of its own lagged values and on the credit variables lagged one period. This allows us to test whether inherited local balance-sheet conditions help to explain relative state income growth.[9]

The first type of model estimated specifies a log-linear relationship between credit conditions and income growth of the general form

$$(8) \quad y_t = \sum_{i=1}^{2} B_i y_{t-i} + \sum_{j=1}^{2} B_j \, CREDIT_{j,t-1} + e_t,$$

where CREDIT is the set of proxies for state credit conditions included in the regression.

The second type of model includes interactive dummy variables for all explanatory variables to test whether there is a significantly different relationship between these variables and y_t in states whose share of nonperforming loans is above versus below the national share. As illustrated in figure 1, while the national share was relatively flat between 1982 and 1990, there were substantial differences in both the levels and the trends across regions. Regressions of this type are of the general form

$$(9) \quad y_t = G_{t-1}\left[\sum_{i=1}^{2} C_i y_{t-i} + \sum_{j=1}^{2} C_j CREDIT_{j,t-1}\right] + P_{t-1}\left[\sum_{i=1}^{2} D_i y_{t-i} + \sum_{j=1}^{2} D_j CREDIT_{j,t-1}\right] + e_t,$$

where G_{t-1} is a dummy variable that equals one when the lagged nonperforming loan share is below the national share (good credit performance), and P_{t-1} is a dummy variable that equals one when it is above (poor credit performance). This specification effectively splits the pooled sample into two groups: one in which the past credit performance of the state banking sector is better than the national average, and one in which it is worse.

Finally, the third type of model uses interactive dummy variables to test whether there is a different relationship between credit conditions and output in states that have experienced low versus high relative income growth. Regressions of this type are of the general form

$$(10)\ y_t = H_{t-1}[\sum_{i=1}^{2} C_i y_{t-i} + \sum_{j=1}^{2} C_j CREDIT_{j,t-1}] + L_{t-1}[\sum_{i=1}^{2} D_i y_{t-i} + \sum_{j=1}^{2} D_j CREDIT_{j,t-1}] + e_t,$$

where H_{t-1} is a dummy variable that equals one when y_{t-1} is positive, and L_{t-1} is a dummy variable that equals one when y_{t-1} is strictly negative. This specification effectively splits the pooled sample into low and high lagged-income-growth groups.

We then test the hypothesis that there is no difference between the regression results for the sample split by past bank balance-sheet conditions and those for the pooled sample (equation [8]). Rejecting this hypothesis will be interpreted as evidence that the relationships between inherited credit conditions and output are different in states with healthy versus unhealthy bank balance sheets. Next, we test the hypothesis that there is no difference between the regression results for the sample split by lagged income growth and those for the pooled sample. If past relative income growth does not explain an asymmetry in the relationship between credit conditions and output, but past bank credit performance does, then the asymmetry associated with bank credit conditions can be interpreted as evidence of a financial channel that is not merely mirroring past real economic performance.

IV. Empirical Results

Results were derived from pooled regressions using cross-sectional state data over the sample period of 1983 to 1990.[10] In addition to the variables defined in table 1, all specifications included dummy variables to control for economywide fixed effects by year, as well as for state-specific fixed effects that may explain state personal income growth differentials over the sample period. Estimates of several specifications of the three models are presented in tables 2, 3, and 4.

Estimates of equation (8) are presented in columns (1.A), (1.B), and (1.C). These regressions restrict the coefficients on the explanatory variables to be the same for the entire sample. The pooled sample results are broadly consistent with the credit view hypothesis that, conditioning on lagged relative state-income growth, past local credit conditions are significantly related to current economic performance. The real growth rate of loan loss reserves, the nonperforming loan share, and the per capita volume of failed business liabilities are all negatively related to y_t. Furthermore, both the real growth rate of domestic loans and bank ROA are positively related to y_t.

More persuasive evidence of the type of credit channel implied by our model of regional credit markets is yielded by a comparison of the pooled sample results with those for the sample split by the nonperforming loan share. Columns (2.A), (2.B), and (2.C) present the estimation results for equation (9). In these regressions, the coefficients on the credit proxies, including loan loss reserves, the nonperforming loan share, and failed business liabilities, are significantly greater in magnitude in economies whose lagged nonperforming loan share is above the national share.

Using a log-likelihood ratio test, we can reject the hypothesis that the regression results for the sample split by the nonperforming loan share are not significantly different from those for the pooled sample regressions. This indicates that there is a different responsiveness of income growth to lagged balance-sheet conditions when past bank credit performance has been relatively poor versus when it has been relatively good. Moreover, the differences are associated with the credit proxies that measure inherited credit problems.

To examine whether these asymmetries can be interpreted as a financial channel to output, we also tested for reverse causality from lagged income growth to the nonperforming loan share. These tests revealed no significant difference in the relationship between past personal income growth and credit problems in states with a high versus low nonperforming loan share. Thus, the result that past credit problems have a greater negative effect on income growth in states with unhealthy banking sectors can be interpreted as follows: Although past economic performance appears to have a similar impact on current bank credit performance in states with healthy and unhealthy banking sectors, credit problems, once realized, can be a drag on future real income growth.

Finally, comparing the estimation results for equation (10) with those obtained for equation (9) yields further evidence that the results for the sample split by the nonperforming loan share may reflect a financial channel to output. Columns (3.A), (3.B), and (3.C) present the findings for the sample split by relative income growth. Using a log-likelihood ratio test, we find no significant difference between the results for equation (10) and those for the pooled sample regressions. Thus, there is no asymmetry in the relationship of lagged credit conditions to current output in the sample that is split into low- and high-growth observations. A comparison of these results with those for the sample split by bank credit quality indicates that inherited credit performance is not merely proxying for the importance of past real-sector conditions. [11]

V. Conclusion

This study presents empirical evidence that regional economic performance was related to regional banking conditions during the 1980s. The tests do not represent an attempt to identify either the exact nature or the magnitude of a credit channel at the state level.[12] Nonetheless, our finding of a different relationship between inherited credit conditions and output in financially healthy versus unhealthy states -- a result predicted by the regional credit view -- does represent evidence that financial factors may affect output, not merely predict it. Moreover, the fact that past relative real-sector performance does not explain this relationship can be interpreted as evidence that inherited credit conditions are not merely a proxy for past real-sector conditions. Finally, the results also indicate that restricting the relationship between financial factors and economic activity to be the same across states independent of relative conditions -- a restriction implicitly imposed in tests using macroeconomic data -- may obscure the link between credit conditions and output that is predicted by asymmetric information models of financial structure.

The credit view emphasizes that one reason banks are important is because they produce information when funding specialized investments (Fama [1985]). The model of regional credit markets underlying the tests presented here is based on the notion that there is a geographic dimension to the information costs. When information is local, entrepreneurs must rely on local credit markets to fund their ventures. Hence, the health of these borrowers and of the local banking sector that provides intermediation services can affect local investment activity and regional economic growth. To the extent that information costs make banking markets inherently regional, financial conditions may be an unavoidable propagation mechanism to relative regional economic performance.

Finally, this study examines whether there is evidence of a regional credit channel to output, not why banking markets are regional. Evidence of such a channel has implications for policies affecting the structure of banking markets. To the extent that regulatory policies have localized the nation's banking markets, the benefits of these policies should be weighed against the costs in terms of reduced financial capacity. When it is costly to monitor banks, their ability to diversify and to raise internal capital is related to their ability to fund investment projects. Restrictions on the scale and scope of banking activities may exacerbate regional output fluctuations, since poor bank performance may constrain lending when local real economic conditions improve. Given this potential regional credit channel, the merits of policies that limit bank size and restrict geographic diversification should be weighed against the costs of potential output losses.

FOOTNOTES

1 See Gertler (1988) for a survey of the theoretical literature and empirical studies examining this view.

2 See Diamond (1984) for a model in which banks exist to minimize monitoring costs.

3 In a regulated banking system, regulators attempt to impose more-stringent credit provisions on ailing institutions by directly limiting the risks taken on by banks, and by enforcing capital requirements.

4 In a less-restrictive setting, it could be assumed that nonlocal banks or depositors could monitor the return on local projects for a cost. In this setting, the cost of credit to local banks would depend on their relative creditworthiness, as well as on the profitability of their investment projects.

5 See Bernanke and Gertler (1989) for a theoretical model in which credit effects are the strongest in distressed economies.

6 See Hoskins (1991) for one perspective on this issue.

7 Bernanke's (1983) study of the Great Depression using national-level data employs a similar methodology.

8 Personal income data were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis.

9 Two lags of the dependent variable were included to control for the possibility that the credit variables are merely capturing the significance of past real-sector conditions.

10 The pooled cross-sectional time-series regressions were estimated using the Shazam statistical package, with the autocorrelation coefficient, rho, constrained to be zero for all states. Pooled regressions that did not restrict the autocorrelation coefficient to be zero (but that also did not adjust estimates for the inclusion of lagged dependent variables) yielded near-zero estimates of rho and no significant difference in the results. Washington D.C., New Mexico, and South Carolina were omitted from all regressions because of missing data.

11 The significant differences in the coefficients on the explanatory variables are not concentrated in the proxies measuring past credit problems in the sample split by lagged income growth.

12 As with all tests of whether financial variables cause real variables, the fact that lagged financial variables "Granger cause" economic activity does not mean that inherently forward-looking financial decisions do not reflect expectations about future economic conditions.

Table 1: Notes on the Statistical Tables

DIFPIN(-i): The growth rate of real state personal income minus the growth rate of real U.S. personal income.

GLOAN(-i): The real growth rate of commercial bank loans to domestic addresses.

FLIAB(-i): The log of the ratio of real failed business liabilities to state population.

GLOANLOSS(-i): The real growth rate of loan loss reserves.

ROA(-i): The ratio of net income to beginning-of-period assets of commercial banks.

SNONPERF(-i): The log of the ratio of nonperforming loans to total loans for commercial banks.

Poor Credit Health: Identifies the results for the sample with poor past credit performance, defined as SNONPERF(-1) > USSNONPERF(-1).

Good Credit Health: Identifies the results for the sample with good past credit performance, defined as either SNONPERF(-1) < USSNONPERF(-1) or SNONPERF(-1) = USSNONPERF(-1).

Low Growth: Identifies the results for the sample with low past relative personal income growth, defined as DIFPIN(-1) < 0.

High Growth: Identifies the results for the sample with high past relative personal income growth, defined as either DIFPIN(-1) > 0 or DIFPIN(-1) = 0.

Note: (-i) indicates an i-year lag. All real variables were constructed by deflating the nominal stocks by the GNP deflator.

Table 2: Regressions Explaining Relative State Personal Income Growth
Dependent Variable: DIFPIN

	(1.A)	(2.A)	(3.A)
No. of observations	384	384	384
R^2	0.6546	0.6826	0.6508
Log of likelihood function	1193.82	1209.61	1196.76
	Pooled Sample	**Good Credit Health**	**High Growth**
DIFPIN(-1)	0.1990	0.2091	0.3808
	(3.8954)[a]	(3.3950)[a]	(3.6522)[a]
DIFPIN(-2)	-0.1847	-0.2141	-0.1070
	(-4.1559)[a]	(-3.8442)[a]	(-1.5094)
GLOAN(-1)	0.0478	0.0312	0.0303
	(4.9074)[a]	(2.7521)[a]	(3.0256)[a]
GLOANLOSS(-1)	-0.0168	0.0017	-0.0172
	(-4.5707)[a]	(0.3280)	(-3.5910)[a]
FLIAB(-1)	-0.0041	-0.0038	-0.0037
	(-5.0365)[a]	(-4.8526)[a]	(-4.2843)[a]
		Poor Credit Health	**Low Growth**
DIFPIN(-1)		0.1593	0.0895
		(2.0909)[b]	(1.0938)[c]
DIFPIN(-2)		-0.1105	-0.2553
		(-1.6291)	(-4.4077)[a]
GLOAN(-1)		0.0165	0.0539
		(0.8171)	(3.8562)[a]
GLOANLOSS(-1)		-0.0266	-0.0136
		(-5.1067)[ad]	(-2.5156)[a]
FLIAB(-1)		-0.0040	-0.0039
		(-5.0684)[a]	(-4.6695)[a]
Year dummies	a	a	a
State dummies	a	a	a

a. Coefficient (or sum of coefficients) is significant at the 1% level.
b. Coefficient (or sum of coefficients) is significant at the 5% level.
c. Coefficients are significantly different at the 5% significance level.
d. Coefficients are significantly different at the 1% significance level.
Source: Author's calculations.

Table 3: Regressions Explaining Relative State Personal Income Growth Including SNONPERF as an Explanatory Variable Dependent Variable: DIFPIN

	(1.B)	(2.B)	(3.B)
No. of observations	384	384	384
R^2	0.6895	0.7026	0.6785
Log of likelihood function	1207.62	1217.35	1210.22
	Pooled Sample	**Good Credit Health**	**High Growth**
DIFPIN(-1)	0.1467	0.1377	0.2738
	(2.9069)[a]	(2.2120)[b]	(2.7117)[a]
DIFPIN(-2)	-0.2177	-0.2405	-0.1518
	(-4.9442)[a]	(-4.3031)[a]	(-2.1976)[b]
GLOAN(-1)	0.0128	0.0157	-0.0038
	(1.1566)	(1.2981)	(-0.3214)
GLOANLOSS(-1)	-0.0103	0.0027	-0.0116
	(-2.8458)[a]	(0.5384)	(-2.4154)[a]
SNONPERF(-1)	-0.0148	-0.0115	-0.0114
	(-5.5339)[a]	(-3.7755)[a]	(-3.6824)[a]
FLIAB(-1)	-0.0030	-0.0026	-0.0023
	(-3.8475)[a]	(-3.1657)[a]	(-2.6805)[a]
		Poor Credit Health	**Low Growth**
DIFPIN(-1)		0.1261	0.0374
		(1.6684)	(0.4560)[c]
DIFPIN(-2)		-0.1321	-0.2888
		(-1.9729)[b]	(-5.0055)[a]
GLOAN(-1)		-0.0258	0.0127
		(-1.1492)[c]	(0.8211)
GLOANLOSS(-1)		-0.0198	-0.0104
		(-3.9413)[ad]	(-1.9759)
SNONPERF(-1)		-0.0183	-0.0151
		(-4.1873)[ac]	(-5.2890)[a]
FLIAB(-1)		-0.0045	-0.0037
		(-3.9756)[ac]	(-3.8988)[ac]
Year dummies	a		b
State dummies	a	a	a

a. Coefficient (or sum of coefficients) is significant at the 1% level.
b. Coefficient (or sum of coefficients) is significant at the 5% level.
c. Coefficients are significantly different at the 5% significance level.
d. Coefficients are significantly different at the 1% significance level.
Source: Author's calculations.

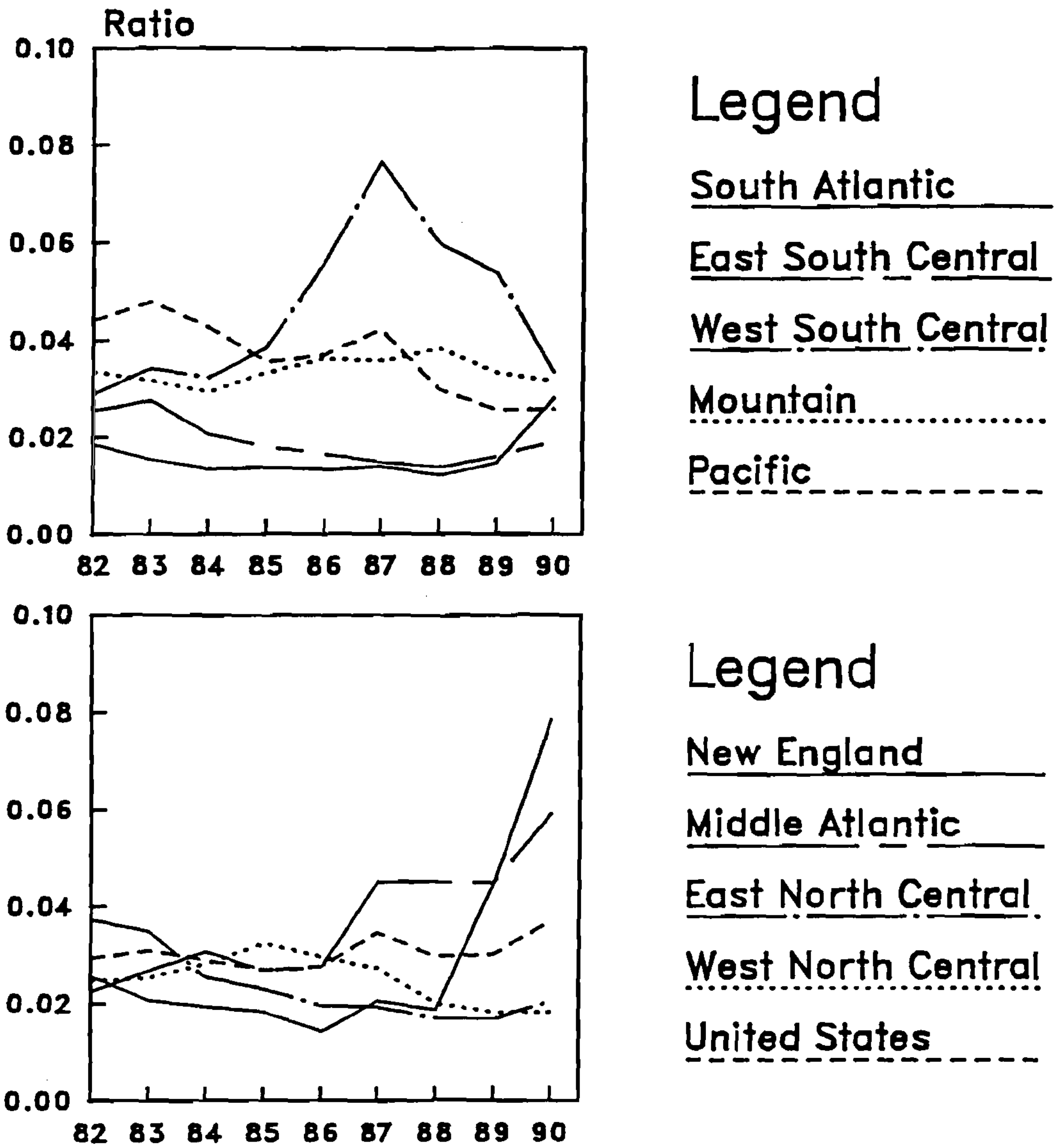
Table 4: Regressions Explaining Relative State Personal Income Growth Including SNONPERF and ROA as Explanatory Variables
Dependent Variable: DIFPIN

	(1.C)	(2.C)	(3.C)
No. of observations	384	384	384
R^2	0.6918	0.6981	0.6878
Log of likelihood function	1208.36	1215.53	1211.99
	Pooled Sample	**Good Credit Health**	**High Growth**
DIFPIN(-1)	0.1412	0.1310	0.2548
	(2.7507)[a]	(2.0640)[b]	(2.5071)[a]
DIFPIN(-2)	-0.2291	-0.2332	-0.1558
	(-4.9498)[a]	(-4.0634)[a]	(-2.2736)[b]
GLOAN(-1)	0.0091	0.0129	-0.0027
	(0.7695)	(1.0638)	(-0.2167)
ROA(-1)	0.1902	-0.0044	0.4534
	(0.7467)	(-0.0102)	(1.3485)
GLOANLOSS(-1)	-0.0080	0.0022	-0.0059
	(-1.7105)	(0.3812)	(-0.9264)
SNONPERF(-1)	-0.0147	-0.0125	-0.0102
	(-5.1059)[a]	(-3.8777)[a]	(-3.1507)[a]
FLIAB(-1)	-0.0028	-0.0022	-0.0021
	(-3.5515)[a]	(-2.6427)[a]	(-2.4887)[b]
		Poor Credit Health	**Low Growth**
DIFPIN(-1)		0.1455	0.0322
		(1.8692)	(0.3900)[c]
DIFPIN(-2)		-0.1239	-0.2680
		(-1.6991)	(-4.3943)[a]
GLOAN(-1)		-0.0223	0.0240
		(-0.8385)	(1.3753)
ROA(-1)		-0.2237	-0.4273
		(-0.5887)	(-1.1513)[c]
GLOANLOSS(-1)		-0.0233	-0.0152
		(-3.1587)[ad]	(-2.3584)[b]
SNONPERF(-1)		-0.0210	-0.0170
		(-4.0137)[ac]	(-5.3594)[ad]
FLIAB(-1)		-0.0045	-0.0039
		(-3.5619)[ac]	(-4.0515)[ac]
Year dummies	b	b	b
State dummies	a	a	a

a. Coefficient (or sum of coefficients) is significant at the 1% level.
b. Coefficient (or sum of coefficients) is significant at the 5% level.
c. Coefficients are significantly different at the 5% significance level.
d. Coefficients are significantly different at the 1% significance level.
Source: Author's calculations.

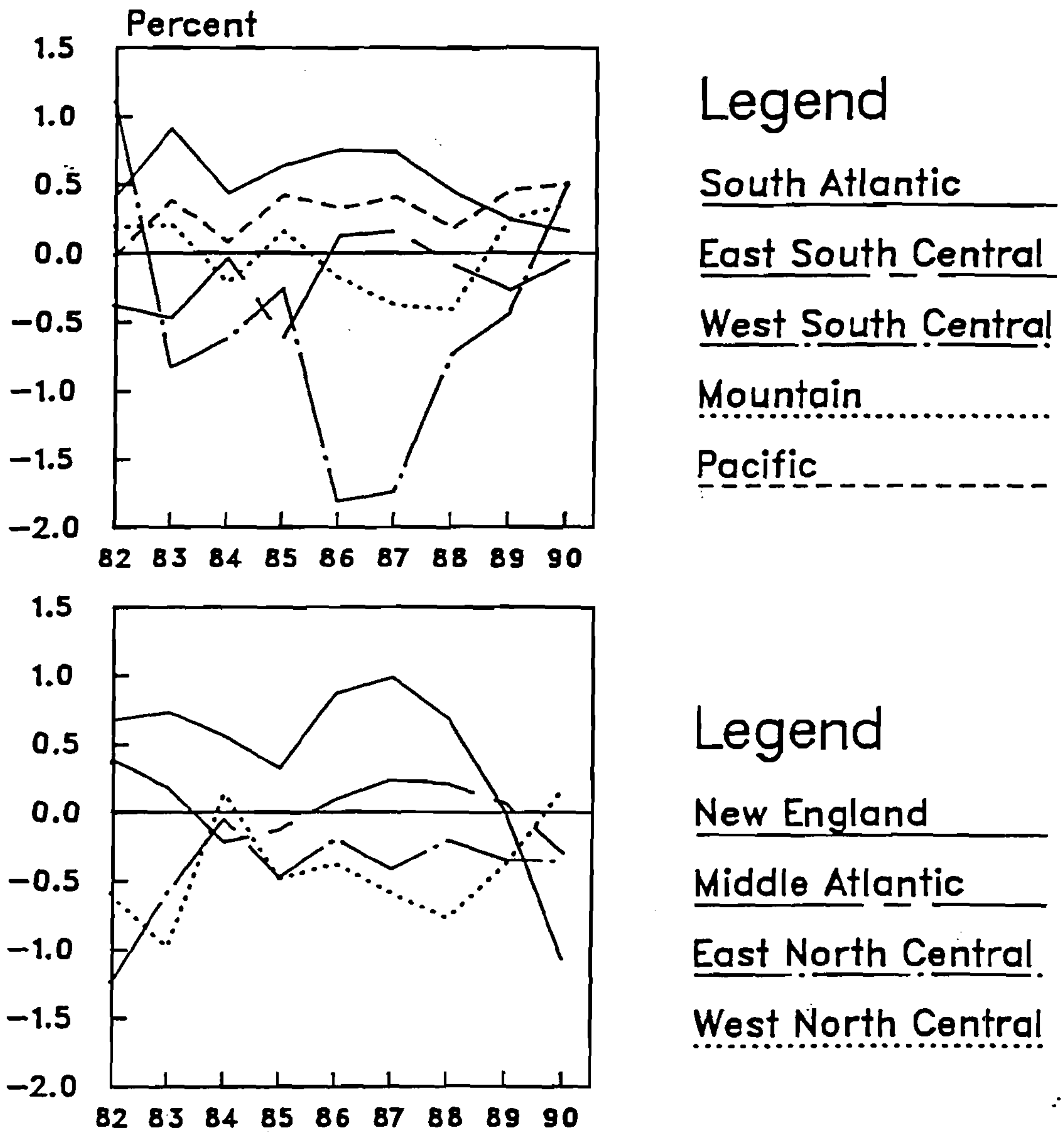
FIGURE 1

NONPERFORMING LOANS/TOTAL LOANS



Source: Board of Governors of the Federal Reserve System.

FIGURE 2
REGIONAL REAL PERSONAL INCOME GROWTH MINUS U.S. REAL PERSONAL INCOME GROWTH



Source: U.S. Department of Commerce, Bureau of Economic Analys

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