FINANCIAL PROGRESS AND ECONOMIC PROGRESS IN INDIAN A REVIEW

C Mannemanna
Research Scholar
Department of Economics
NIILM University, Kaithal.
cmannemanna09@gmail.com

Dr. Pawan Kumar
Research Guide
Department of Economics
NIILM University, Kaithal.

Abstract
The purpose of this essay is to look at the connection between FE (financial development) and economic growth in the Indian states. In order to achieve this goal, three panel data sets are used: (i) data on BIMAARU states, which consists of five states; (ii) data on nine other Indian States; and (iii) data on a full sample of fourteen states, which includes both the BIMAARU states and the nine other Indian states. The yearly statistics on Net State Domestic Product and Total Commercial Bank Credit Outstanding in different sectors from 1981 to 2002 were utilized in this research. The data were gathered from various publications of the Reserve Bank of India and the Central Statistical Organization. The panel cointegration findings support the existence of a long-term link between growth and financial development across Indian states.

Keywords: Financial development, economic growth, cointegration.

Introduction

Financial development and economic growth have been extensively tested for causality. The literature documents causation in both directions. Using several econometric methods, scholars have examined this nexus with varied findings. The empirical literature examines the financial development and economic growth nexus using cross-sectional, time-series, and cross-sectional time series methods. Cross-sectional analysis assumes a certain economic structure and its steady influence on all variables. In this hypothesis, variables with bigger cross-sectional differences contribute more to economic growth. Thus, cross-sectional differences across factors and their impact on economic development are investigated. Financial development boosts economic growth, according to Gelb (1989), King and Levine (1993), Fry (1995), Levine (1997), Levine (1998), Levine and Zervos (1998), and Rajan and Zingales (1998).

The second time-series analysis method examines growth across time. The idea that changing factors throughout time affects financial development and economic growth may be true. Sims (1972), Gupta (1984), Jung (1986), Demetriades and Hussein (1996), Luintel (1996), Arestis and Demetriades (1997), and Shan et al. (2001) study the financial development-economic growth nexus (FE) and find varied results.

Though (i) and (ii) seem compelling, cross-sectional and time series changes may affect economic growth jointly. Thus, cross-section and time series analyses together describe FE nexus better than separately. Panel Data Analysis is such empirical analysis. It controls omitted variable bias by examining variables in both cross-sectional and time series dimensions, which accounts for all economic changes. Roger Kelly and George Mavrotas

(2003), Valpy FitzGerald (2006), Okan Veli Safakli and Behiye Tuzel (2007), and Jordan Shan (2005) use panel data analysis to study financial development and economic growth.
This research does not examine the applicability of these models. This work uses panel data analysis with a theoretical underpinning to account for cross-sectional and time-series requirements in empirical testing. This model may help explain the FE nexus in India by taking into account the economic structure and state's role in cross-sectional and time-series dimensions. The paper continues as follows. Section-2 analyzes FE Nexus literature on panel data analysis, and section-3 gives technique and data. Section-4 addresses empirical evidence and section-5 concludes.

Previous Studies

By using panel data analysis, researchers have carried out numerous forms of research to evaluate any potential connections between financial development and economic growth. The panel data analysis test in FE literature may be run using either (i) a Fixed Effects Regression Model or (ii) a Random Effects Regression Model. In the instance of model (i), it takes into account the time series changes in independent variables and predicts how they will affect the dependent variable. To investigate the effect on dependent variables, the model (ii) takes into account cross-sectional changes in independent variables. Three explanations are possible for the FE nexus, according to a review of the literature: (i) finance is viewed as a relatively unimportant factor in growth (Robinson, 1952; Lucas, 1988; Stern, 1989); (ii) there is a potential negative impact of finance on growth (Van Wijnbergen, 1983; Buffie, 1984); and (iii) there is no relationship between finance and growth at all. Empirical research on the FE nexus has also shown conflicting findings, showing no function or beneficial link in contrast to these viewpoints (Xu, 2000). Furthermore, Neusser and Kugler (1996), Berthelemy and Varoudakis (1998), Ram (1999), Sinha and Macri (2001), and others have noted that the effect of independent third factors on these variables makes it difficult to determine the causal relationship between financial development and economic growth.
Using data from 25 Indian states from 1981 to 2000, Misra (2003) examined the credit-output connection in the context of India. This research used causality in a vector error correction framework and came to the conclusion that the credit-output nexus in Indian States had strong support. It also indicated that there was a greater degree of causality from credit to output than from production to credit. The report also claimed that growth weariness is to blame for the lack of credit off-take in India, which calls for significant attention to the country's credit-output nexus. Misra (2003a) examined the allocation effectiveness of the Indian banking system in the pre- and post-financial sector reform periods (1981–1992 and 1993–2001), respectively. The study came to the following conclusions: (i) Allocative efficiency had doubled in the post-reform period, ensuring that financial sector reforms had improved allocative efficiency; and (ii) A higher allocative efficiency was evident in the service sector than in the agricultural and industrial sectors. To evaluate the relationship between credit and production, these two studies, however, used just 20 yearly data points to test Vector Error Correction and Panel Cointegration. Therefore, a bigger data set may give adequate degrees of freedom to evaluate the credit and output relationship. In other words, a limited data set may provide an empirical challenge, particularly when the model has to be estimated in lags. Both developed and underdeveloped Indian states need to handle this problem. In contrast to underdeveloped and less developed states, the credit-output nexus

may be more apparent in developed states. The prior research also examined the credit output nexus using the Granger framework. Testing the same in a Panel Cointegration framework may thus be able to overcome the limitations of the limited sample size and provide some insight on the relationship between credit production and Indian States. In order to close the gap, the current investigation is conducted in this manner. In light of this, the purpose of this article is to identify the FE nexus using panel cointegration and data on production and credit from fourteen Indian states.

Methodology

Pedroni Panel Cointegration Test

In order to evaluate the link between financial development and economic growth, this research makes use of the Pedroni Panel cointegration test. The test for Pedroni's (1999) panel cointegration may be provided as follows, leaving additional details to Annexure-1 granted that each variable is integrated of order one.

$Y_{i,t} = \alpha_i + \rho_{i,t} + \beta 1i,t X 1i,t + \ldots\ldots \beta Mi X Mi,t + \varepsilon_{i,t}$ (1)

Here t =1,…T; i = 1,…N; m=1,…M, where T stands for the quantity of temporal observations, N for the number of distinct provinces in the panel, and M for the quantity of regression variables. Similar to a standard bi-variate co-integration test, the existence of cointegration is evaluated using the testing error estimation from equation (1), and the test statistics are then used to confirm the existence of any potential relationship between financial development and economic growth. For further information, see Annexure-1.

The equation (1) serves as a generic description of Pedroni Panel cointegration, hence it must be rewritten as follows:

$LPCNSDP_{it} = \alpha + \beta\ LPCC_{it} + \varepsilon_{it}$ (2)

where, i denotes Indian states (ie., i = 1, 2, …., 5 for BIMAARU states; i = 1, 2,…., 9 for the rest of nine states; and i = 1, 2,…., 14 for all states)and t refers to time. LPCNSDP refers to Natural Log of per-capita Net State Domestic Product and LPCC refers Natural Log of per-capita Credit.

Equation (2) tests the association between financial development and economic growth by taking into account two variables: (i) Net State Domestic Product and (ii) Per Capita Credit. A close approximation of both financial development and economic growth is required. For example, monetary aggregates like M2/GDP or M3/GDP are often employed as indicators of financial progress. Due to the deposit mobilization and subsequent investment of these financial resources in productive sectors via the availability of credit, credit is also seen as a useful indicator of financial growth. It controls the economy's savings and investment flow to promote capital formation and productivity. Per-capita Net State Domestic Product is a measure of economic growth or production.

FMOLS Panel Estimates

We generate FMOLS panel estimates for real per-capita credit since the model is cointegrated. In work by Phillips and Hansen (1990), the fully modified least squares (FMOLS) regression was first developed to provide the best estimates of cointegrating regressions. Using vector autoregressions (VAR'S) as if they were only reduced forms does not prevent endogeneities in the regressors caused by cointegrating relationships between nonstationary series. In order to take into consideration serial correlation effects and the endogeneity in the regressors brought on by the presence of a cointegrating connection, the

approach modifies least squares. Take into account the following cointegrated panel system of i=1,2,…, N states over time t = 1,2,…,M:

$Y_{it} = \alpha_{it} + \beta X_{it} + \varepsilon_{it}$ (3)

Where $X_{it} = X_{it-1} + \varepsilon_{it}$.; the estimates α_{it} and β is done through FMOLS methodology (For technical details, see Annexure-II). To prove that financial development leads to economic growth, the elasticity of real per-capita Net State Domestic Product with respect to real per-capita credit must exceed unity.

Data and its Sources

Data on per capita Net State Domestic Product (PCNSDP) and per capita Credit for the States (PCC) for a panel of 14 Indian states for the period 1981-2002 were collected on an annual basis in order to assess the potential relationship between financial development and economic development through panel co-integration. The Central Statistical Organization has provided the Net State Domestic Product (NSDP) statistics (base year = 1993-94). The data for credit, or the total amount of outstanding credit from all scheduled commercial banks in a state to various industries, was derived from the RBI's database on the Indian Economy, which is accessible on the RBI website. A crucial factor in deciding whether to include concerned states in the study is the availability of data across the relevant time period. This research took into account fourteen states, including Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Utter Pradesh, and West Bengal, based on reliable data availability for the years 1981 to 2002. This study divides the total sample into two sub-samples: (i) backward states, also known as BIMAARU states, which include Bihar, Madhya Pradesh, Assam, Rajasthan, and Uttar Pradesh; and (ii) developed states, which include Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, and West Bengal. Since Assam meets the criteria for inclusion in this group in terms of economic data, we include it in our BIMAARU categorization. This is distinct from the standard BIMARU categorization used in all discussions about the Indian economy.

Credit Allocation and Output Growth in Indian States: Summary Statistics

Table 1 and Graph 1 provide the summary data of the average credit growth and output growth throughout the period of 1981 to 2002 to help the reader grasp the credit-output connection in a basic manner. Table 1 shows that (i) developed states' average credit growth and output growth (in total) are higher than BIMAARU states' (4.98 and 1.58); (ii) all Indian states, both developed and BIMAARU states, except Bihar, show growth in credit and output separately during this period; (iii) similarly, all states, except Bihar, show a significant correlation between credit and output growth; and (iv) despite Bihar's positive growth in credit and output, the overall1. Table 2 lists the states in order of how credit and production growth correlate in BIMAARU and other developed countries. Table 2 shows that (i) among developed states, Tamil Nadu comes in first (i.e., 0.9695), while Haryana comes in last (i.e., 0.7595); (ii) among BIMAARU states, Madhya Pradesh comes in first (i.e., 0.9219); and (iii) the credit and output growth relationship (i.e., 0.9219) in Madhya Pradesh is higher than that of some developed states, including Gujarat (0. It can be concluded from Tables 1 and 2 that (i) BIMAARU states, on average, have a lower credit-output growth relationship than other developed Indian states, and (ii) Madhya Pradesh, a state that is part of BIMAARU, has a unique status in that it exhibits a higher credit-output growth relationship than four other

developed states, including Gujarat, West Bengal, Andhra Pradesh, and Haryana.

Table 1: Growth of Credit and Output in Indian States (1981-2002): Summary Statistics

State	Credit (%)	Output (%)	Correlation
India: BIMAARU States			
1) Bihar	3.2	-0.79	-0.16907
2) Madhya Pradesh	9.1	2.4	0.921942
3) Assam	2.7	0.9	0.700649
4) Rajasthan	6.7	3.8	0.863359
5) Utter Pradesh	3.2	1.6	0.845637
Average Growth Rates	4.98	1.58	-
India: Other States			
1) Andhra Pradesh	6.5	3.9	0.813654
2) Gujarat	6.7	3.9	0.885999
3) Haryana	2.03	2.6	0.759475
4) Karnataka	6.4	4.4	0.888786
5) Kerala	5.01	3.8	0.926757
6) Maharashtra	7.1	4.3	0.930803
7) Punjab	5.5	2.8	0.942402
8) Tamil Nadu	7.4	4.7	0.969588
9) West Bengal	3.9	3.7	0.841269
Average Growth Rates	5.62	3.79	-
All India Average Growth Rate	5.39	3.00	-

Credit-output nexus may be partly explained by the information on credit-output correlation. For instance, each state is viewed as an autonomous entity, with credit-output growth taken into account as the result of each state's independent and self-driven efforts. In fact, the credit-output connection between two states is impacted by both the credit-output relationships of other states (cross-sectional impacts) as well as the state's own effort over time (time series influence). Simple correlation may not show cross-sectional relationships across states, which limits the potential for any policy recommendations. The 'direction' of associations may also be shown, but the 'extent' of the link between two variables is not suggested. Therefore, an empirical investigation using both cross sectional and time series variables may help to better understand the relationship between credit and production. In order to quantify the credit-output linkage across Indian states, this article uses a panel of fourteen Indian states, each of which has an impact on the others across different cross-sections and time periods. Pedroni's panel co-integration is used to analyze the credit production connection across Indian states in order to achieve this goal.

Credit Allocation and Indian State Output Growth: Panel Cointegration Framework Evidence

In other words, even when each member of the panel acts arbitrarily in the short run (i.e., in short-term dis- equilibrium or non-stationary series), the whole panel tends to move in unison

over the long run. Although there is a short-term disequilibrium2, the mutual reinforcement of all panel members will deliver an equilibrium state in the long-run (i.e., stationary series). A panel member's participation in such a situation is formally referred to as "Panel cointegration." The panel members must collectively be anticipated to be non-stationary series of the same order, i.e., I(d), where d denotes the order of differencing necessary to transform a series into a stationary series, in order to pass Pedroni's panel co-integration test. Typically, the panel unit root approach is used to determine if panel member series are stationary or not. The existence or absence of a unit root in the panel data analysis is confirmed by the test statistics from panel unit roots.

This study used Im, Pesaran, and Shin's (IPS) (2003) panel unit root methodology on three different panel data samples: (i) BIMAARU states panel data; (ii) Nine developed Indian states panel data; and (iii) Full sample panel data, consisting of BIMAARU and developed Indian states, to see if states' credit and output growth rates are following the same order of integration. Table 3 displays the IPS panel unit roots' findings. The result of Table 3 indicates: In all three panel data sets, with a few exceptions, the non-stationary null hypothesis is not rejected in the level itself if there is no trend; but, in one of the three, the null hypothesis is rejected in the first difference, demonstrating that the panel member series are non-stationary series of order 1, I(I). This study regards the credit and output variables in three panel data sets as non-stationary of order I, i.e. I(1), despite the fact that there are some mixed findings in the presence of trend and leaves the same for future research.

Pedroni's panel cointegration may be used when the panel data shows non-stationarity of I(1) order. For each of the three panel data samples in this study, Pedroni's panel cointegration with and without a trend was tested individually. Table 4 displays the outcomes of this exam. This table offers seven test statistics, including (i) v- statistics, (ii) panel rho-statistics, (iii) panel adf-statistics, and (iv) panel pp-statistics, with more information in Annexure-III. Group rho-statistics, group adf-statistics, and group pp-statistics are the next three categories.3. The evidence in Table 4 shows that: (i) for BIMAARU states, other developed Indian States, and the whole panel data sample, the null hypothesis of no-cointegration (in a model with trend) is rejected. A long-run panel co-integration between credit and output throughout BIMAARU and other developed Indian states is ensured by cointegration with trend, which also verifies the rejection of the null hypothesis of no-cointegration in all three panel data sets, with the exception of a small number of instances. In other words, although seeming to show a short-term disequilibrium in the link between credit and production among Indian states, there is really a long-term relationship between the two.

Table: Results of Pedroni panel cointegration (Without Trend)

Test Statistic	(Without Trend)			(With Trend)		
	BIMAARU	Other States	All States	BIMAARU	Other States	All States
Panel v-statistics	1.28665	2.25267	2.55990	0.45331	2.25267	0.87331
Panel rho-statistics	-2.33426	-5.12984	-5.45044	-0.24850	-5.12984	-2.49856
Panel pp-	-3.74505	-5.98493	-7.00747	-1.39362	-5.98493	-5.85110

statistics						
Panel adf-statistics	-4.01750	-5.04253	-6.38550	-2.20567	-5.04253	-5.16046
Group rho-statistics	-1.90107	-3.01386	-3.55258	-0.39090	-3.01386	-0.61175
Group pp-statistics	-4.27284	-5.78793	-7.19418	-1.37686	-5.78793	-5.00934
Group adf-statistics	-4.64098	-3.38449	-5.48714	-2.25112	-3.38449	-4.92982

FMOLS Results

The co-integration between credit and production across Indian states is confirmed in the prior section. FMOLS is computed using equation (3) and the results are shown in Table 5. The evidence in Table 5 indicates that the responsive co-efficient of credit, which is 0.42 in BIMAARU states, 0.70 in other developed Indian states, and 0.54 in the whole panel data sample of Indian states, is extremely significant. In addition, compared to BIMAARU states, the responsive co-efficient is more noticeable in developed Indian states. Therefore, credit plays a critical role in driving economic development in developed Indian states because there is an active link between credit and production in the near term. The combination of BIMAARU and other developed Indian states shows a responsive co-efficient between BIMAARU states and other developed States, despite the fact that comparable conclusions are also shown in BIMAARU states. Because the credit-output connection is less active in BIMAARU states, the average credit-output relationship is decreased from 0.70 to 0.54. Any attempt to strengthen the connection between credit and output in BIMAARU states would likewise guarantee a greater and stronger connection between credit and production in all Indian states.

Table: The FMOLS Estimates

($LPCNSDP_{it} = \alpha + \beta\ LPCC_{it} + \varepsilon_{it}$)			
	BIMAARU	**Other States**	**All States**
Coefficient	0.42	0.70	0.54
t-statistics	(8.01*)	(22.68*)	(24.28*)

Concluding Remarks and Recommendations

This essay makes an effort to reconsider the connection between Indian economic growth and loan expansion. Previous research on the relationship between credit and production either used a small data set or failed to clearly emphasize panel data analysis. This paper collected annual data on Net State Domestic Product and Total Commercial Bank Credit Outstanding for the period 1981–2002 from various publications of the Reserve Bank of India (RBI) and Central Statistical Organization (CSO) in order to have larger data sets to assess the relationship between credit and output. This study divided the full panel data sample into three sets: (i) BIMAARU states, which are comprised of backward states; (ii) nine developed Indian states; and (iii) full sample panel data sets, covering both BIMAARU and developed

states, in order to determine whether the credit-output relationship differs across developed and backward states.

The results of the preliminary investigation into the relationship between credit growth and output growth showed that: (i) BIMAARU states and nine developed states both showed evidence of independent credit growth/output growth; and (ii) the correlation coefficient indicated that there was a significantly stronger correlation between credit growth and output growth in developed Indian states than in BIMAARU states. Because the co-efficient of correlation shows the direction of the relationship (either a positive or negative relationship), it is important to use models like Panel Cointegration and Fully Modified Ordinary Least Squares (FMOLS) to quantify the relationship between credit growth and output growth. Furthermore, it is preferred to take into account the impact of both time series and cross-sectional dimensions when empirically estimating the credit and output relationship because, in the opinion of the authors, this can better explain the relationship between credit and output than either a time-series focus or a cross-sectional focus. This research used Pedroni's Panel co-integration framework to evaluate if any long-run link between credit and output existed across Indian states as it was discovered that both credit growth and output growth had panel unit roots according to the IPS panel unit root. The findings supported a long-run association of co-integration between loan expansion and production development throughout Indian states, including both developed and underdeveloped Indian states. It suggests that although the credit-output connection across Indian states may have a tendency to diverge greatly in the near term, they have now returned to a shared long-term trend. As a result, it is believed that financial development is a key factor in economic growth in Indian States.

According to the FMOLS findings, BIMAARU states have a lesser sensitivity to the link between credit and output, and a clear government or regulatory action is required to encourage credit output development. Furthermore, there may be ineffective structural or regulatory issues with real sector operations contributing to the inadequate credit-output link. In BIMAARU states, a strong relationship between credit and output may be created by addressing (i) structural issues in real sectors and (ii) incorrect credit mechanism support.

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