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Institutional Credit as a Catalyst for Agricultural Sector Growth: Evidence from Nepal

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This paper estimates the impacts of institutional credit on the growth of the agricultural sector in the Nepalese economy and examines the direction of causation between institutional credit and agricultural sector growth.

Regression estimates obtained from data covering the period 1970-87 indicated that both the current and lagged real values of agricultural credit had positive impacts on the real gross domestic product of the agricultural sector. However, there was only a mild unidirectional causation from the real values of agricultural credit to real gross domestic product of the agricultural sector, providing no convincing evidence that institutional credit led to agricultural sector growth in Nepal.

I. Introduction

The growth of the agricultural sector plays a vital role in the economic growth of many less-developed countries. Development economists such as Lewis (1954), Ranis and Fei (1961), Schultz (1964), and Mellor (1966) have demonstrated the importance of the agricultural sector in the economic development process. Recognizing the potential benefits, many less-developed countries have implemented various agricultural development programs, including those designed specifically to generate or introduce modern technology. However, the application of modern technology to expand agricultural output was expected to increase the financing needs of farmers (Mellor (1966) pp. 312-313). As an alternative to traditional sources of financing, institutional credit was considered to function as a catalyst in the agricultural development process. Thus,

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financial institutions were established in many less-developed countries for the purpose of providing agricultural credits at favorable interest rates.

Cooperative societies, developed for the first time during the 1950s, were the early forms of agricultural credit institutions in Nepal. In 1963, a Cooperative Development Bank (CDB) was established to strengthen the cooperative societies. The Land Reform Savings Corporation (LRSC), established in 1966 under the provisions of the Lands Act of 1964, became another source of institutional credit for agriculture (Jha (1978)). In 1967, the CDB was converted into the Agricultural Development Bank of Nepal (ADBN). With the merging of the LRSC with the ADBN in 1973, the ADBN became the single agricultural credit agency in Nepal. Even though commercial banks were directed in 1974 to initiate lending in the agricultural sector, their shares in total agricultural credits have been only 15 percent or less (Asian Development Bank (1982)), leaving the ADBN as the main agricultural credit institution in Nepal.

Dantwala (1989) estimated the demand for and supply of institutional credit in India and discussed the role of such credit in poverty alleviation. He suggested that even though the supply of institutional credit was a necessary condition for poverty alleviation, it was not sufficient by itself. Noting that the Indian government had overemphasized the supply side of institutional credit, he stressed the need to increase technical assistance to rural poors in order to increase their productivity and to make them more creditworthy. Zuberi (1983, 1990) reported that the size of institutional credit in Pakistan grew over the years, reaching even small farmers, who are usually left out. He estimated the impact of such credit on agricultural output and found the impact to be significantly positive. He noted, however, that although Pakistan's economy grew at higher rates when the agricultural sector performed well, the government had ignored output and price signals while increasing the supply of institutional credit in the agricultural sector.

This paper provides yet another evidence of the role of institutional credit in the growth of agricultural sector in less-developed countries. In particular, the paper estimates the impacts of institutional credit on the growth of the agricultural sector in the Nepalese economy. In this context, this paper goes one step further and estimates the direction of causation between institutional credit and agricultural sector growth. Such a test appears to be useful in determining if the supply of institutional credit unidirectionally caused agricultural sector growth of the opposite also took place. Theoretically, growth in the agricultural sector would increase savings in that sector and make more capital available for investment. Thus, the economy as a whole would have more internally-generated capital

available for investment, including reinvestment in the agricultural sector, especially if the agricultural sector is relatively large. Thus, the supply of institutional credit would grow as the agricultural sector grew.

The paper is organized as follows. Estimation methods and data are described in Section II. Empirical results and their implications are analyzed in Section III. Concluding comments are presented in Section IV.

II. Estimation Methods and Data

To estimate the possible impacts of institutional credit on agricultural sector growth, a linear regression model was specified as follows:

$$RGDPAG_t = b_0 + b_1RICAG_t + b_2RICAG_{t-1} + b_3RICAG_{t-2}$$

where, $RGDPAG_t$ is the real value of gross domestic product of the agricultural sector in time period t; $RICAG_t$, $RICAG_{t-1}$, and $RICAG_{t-2}$ are the real values of institutional credit supplied to the agricultural sector in time periods, t, t–1, and t–2, respectively; and b_0, ..., b_3 are the regression coefficients. Since the ADBN has supplied 85 percent or more of institutional credit for agriculture, total loans disbursed by the ADBN were used as a measure of institutional credit in the agricultural sector (ICAG). All the real values were computed using 1974-75 as the base year.

The regression model, as specified above, was chosen over alternative models such as the Cobb-Douglas type model in which agricultural output is specified as a function of cultivated land, labor force employed in agriculture, and institutional credit (capital) used in agriculture (Zuberi, 1990) for two reasons. First, this regression model permits the test of causality between institutional credit and agricultural sector growth, specifically in accordance with the procedure suggested by White (1980). Second, data on the area of cultivated land and the labor force employed in the agricultural sector needed to specify a model similar to that used by Zuberi (1990) were unavailable for the period after 1981. With regard to the number of lags, the real values of institutional credit in the agricultural sector (RICAG) were lagged only two years because of the relatively short time-series data available for estimating the regression model.

The data used to estimate the model covered the period 1970-87. Data on gross domestic product of the agricultural sector were obtained frm United Nations (1981) for the period 1970-73 and from HMGN (1989) for the period 1974-87. Data on total loans disbursed by the ADBN were

obtained from HMGN (1983) for the period 1970-73 and from HMGN (1989) for the period 1974-87. The gross domestic product (GDP) deflator used to convert nominal values into real values were obtained from Das (1982) for the period 1970-73 and from HMGN (1989) for the period 1974-87.

The model was first estimated using the ordinary least squares (OLS) procedure, thereby making no corrections for possible serial correlation. Even though the Durbin-Watson statistic indicated no serial correlation, the model was reestimated using the maximum likelihood procedure (Beach and MacKinnon (1978)), especially given the relatively small sample size. The maximum likelihood estimates were more efficient and meaningful than the OLS estimates.

III. Empirical Results

The autocorrelation-corrected maximum likelihood estimates of the regression model are as follows:

$$\underset{}{RGDPAG_t} = \underset{}{8818.04} + \underset{(2.94)}{7.36}\ RICAG_t + \underset{(2.93)}{5.34}\ RICAG_{t-1}$$

$$+ \underset{(3.16)}{3.08}\ RICAG_{t-2}$$

where, the numbers in parentheses are the standard errors of the estimated regression coefficients. The F-statistic and R^2 for the model were 18.52 and 0.8316, respectively.

Both the current and lagged values of agricultural credit (RICAG) had positive impacts on the real gross domestic product of the agricultural sector (RGDPAG). The current value of RICAG (i.e., $RICAG_t$) had a larger impact on $RGDPAG_t$ than the lagged values (i.e., $RICAG_{t-1}$ and $RICAG_{t-2}$). Similarly, the lagged values of RICAG closer to the current time period (i.e., $RICAG_{t-1}$) had larger impacts on $RGDPAG_t$ than the lagged values further from the current time period (i.e., $RICAG_{t-2}$). An examination of the distribution of RICAG among various purposes during the period covered in the analysis revealed that an average of 30 percent of total agricultural loans was disbursed for cash and cereal crop production (HMGN (1983), (1989)). The only other purpose for which a higher percentage (32 percent) of total agricultural loans was disbursed was agro-industry, marketing, and warehousing. Other purposes such as farm mechanization and irrigation; livestock, poultry, and fisheries; horti-

culture; and tea and coffee cultivation had been allocated an average of 18, 15, 2, and 3 percent of total agricultural loans, respectively. Loans for cash and cereal crop production are almost entirely short-term whereas loans for other purposes are mostly medium-term to long-term. The largest coefficient of $RICAG_t$ in the estimated model suggests that loans disbursed for cash and cereal crop production had the greatest impact on $RGDPAG_t$.

The positive relationship between RICAG and RGDPAG as indicated by the coefficients of the estimated regression model does not necessarily mean, however, that the variables are causally related. In order to determine if the positive relationship was merely "spurious" or was based on causal linkage between the two variables, White's (1980) procedure was used to test two null hypotheses. The first was that variations in RICAG did not cause variations in RGDPAG. This hypothesis was not rejected at the 5 percent significance level but was rejected at the 10 percent significance level, suggesting that variations in RICAG had a mild, if any, causal effect on variations in RGDPAG. The second null hypothesis was that variations in RGDPAG did not cause variations in RICAG. This hypothesis was not rejected at both 5 percent and 10 percent significance levels, suggesting that variations in RGDPAG had no causal effect on RICAG.[1]

These results indicate that there was a mild unidirectional causation from RICAG to RGDPAG. Thus, there appears to be only marginal evidence that institutional credit led to agricultural sector growth in Nepal. On the other hand, there does not appear to be any evidence that growth in the agricultural sector led to increases in capital for reinvestment in the agricultural sector in the form of institutional credit.

With regard to institutional credit causing only a mild impact on agricultural sector growth, three issues underlying institutional credit programs in Nepal appear to be relevant. First, there was organizational instability in institutional credit delivery, especially until the establishment of the ADBN. For example, the CDB lasted less than five years. The LRSC survived for slightly more than nine years but largely ineffectively. Cooperative societies, which used to be under the administrative purview of the CDB before the ADBN was established, have been intermittendly brought under the control of the ADBN or allowed to operate autono-

[1] For both null hypotheses, the tabulated values of Chi-square were 12.59 and 10.64 at the 5-percent and 10-percent significance levels, respectively. On the other hand, the calculated values of Chi-square were 10.77 for the first null hypothesis and 7.69 for the second null hypothesis.

mously. As a result, institutional credit programs have lacked efficient management and overall effectiveness required to generate sustainable benefits. Second, about two-thirds of the loans supplied by the ADBN have gone to medium and large farmers even though majority of farmers are small and marginal. Third, the emphasis placed on increasing the number of branch and subbranch banks in order to increase the area covered and the volume of loans disbursed has led to inadequate loan supervisions and, possibly, to ineffective uses of loans.

The lack of any causation from RGDPAG to RICAG is also consistent with the reality that over 70 percent of farmers in Nepal are small and marginal. Even when these farmers derive some additional incomes through increased agricultural output, the incomes are generally used up in meeting their basic needs and possibly paying off debts. On the other hand, additional agricultural incomes of relatively large and well-off farmers are likely invested in the form of private lending, land and equipment purchases, and rental home construction in urban locations, among others, rather than in the form of capital for institutional credit.

IV. Concluding Comments

The empirical results obtained in this paper indicate that despite a strong correlation between the amount of institutional credit and the real gross domestic product of the agricultural sector in a given time period, institutional credit has been only a mild cause of agricultural sector growth in Nepal. One implication of this finding is that the impacts of substantial resources used in providing agricultural credit have been rather small. However, the results obtained from aggregate data, as used in this paper, should be viewed only in broad terms, because as Barry, Hopkin, and Baker (1979) have indicated, it is costly and difficult to accurately measure the impacts of credits even at the farm-household level. Nevertheless, the findings of this paper seem to underscore the criticisms of traditional agricultural credit programs as used in Nepal.[2]

[2] Some of the criticisms of traditional agricultural credit programs have been heavy emphasis on increasing the number of specialized agricultural or rural credit institutions; artificially low interest rates on both institutional credits and savings deposits, thereby increasing the quantity demanded of credits but discouraging local suppliers of loanable funds: serious loan repayment problems; high loan transaction costs, discouraging particularly small borrowers from seeking institutional credits; and ineffectiveness of policies designed to increase institutional credits for agriculture in general and for rural poors in particular. In addition, some of the assumption underlying traditional agricultural credit programs that rural

Institutional credit programs used in Nepal as well as in many other less-developed countries have excluded deposit services and consumption lending from their activities. However, deposit services are generally viewed to encourage rural savings and increase the supply of loanable funds. Since many farmers need consumption credits as much of or even more than production credits, institutional sources for consumption credits along with production credits, especially at low transaction costs and flexible repayment terms, would likely relieve farm households in less-developed countries from having to borrow from usually exploitative private money-lenders and would thereby reduce possible misuse of production credits. Thus, reforms in institutional credit programs along these lines by also incorporating appropriate elements of the "new views on rural financial market projects" appear to be already overdue in order for institutional credit to effectively perform as a catalyst for agricultural sector growth in less-developed countries.[3]

poors cannot save and, thus, do not respond to savings incentives; that cheap credit is a requirement for most farmers to adopt new technologies; that providing credits in kind assures their truthful use; that formal lenders are highly risk averse and, thus, avoid lending to rural poors; that cheap credit is an efficient way of off-setting production disincentives caused by unfavorable input or output prices; and that agricultural credits should be provided as a component of input packages have also been considered as questionable (Adams and Graham (1981)).

[3] The "new views on rural financial market projects" have advocated, among other things, more flexible nominal interest rates aimed at maintaining relatively stable and positive real rates of interest on both loans and savings deposits; reduced emphasis on building new credit institutions specialized to serve fragmented credit needs or narrow target groups and instead strengthening and expanding the services of existing credit institutions by introducing policies designed to identify and overcome their problems; using care or cautions by governments and aid agencies while providing additional subsidized loanable funds to credit institutions in order not to dampen interest rates on rural savings; viewing loans as claims on resources that expand borrowers' spending capacity rather than as a physical input like chemical fertilizers and seeds; and minimizing loan transaction costs in general and costs to small and new borrowers in particular (Adams and Graham (1981)).

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