Demand for Bank Lending by the Private Business Sector in Pakistan

Abdul Qayyum

Pakistan Institute of Development Economics

2002

Demand for Bank Lending by the Private Business Sector in Pakistan

ABDUL QAYYUM

This study estimates the demand for bank lending by the private business sector in Pakistan. For the purpose of analysis a three-step methodology is applied, that is, univariate analysis, multivariate cointegration analysis, and error correction mechanism. It is found that the individual series are difference stationary, and there is a long-run stable relationship between the variables. The preferred model, obtained by the application of the general-to-specific methodology is also found to be stable throughout the study period. The study shows that the output of business sector is an important determinant of the demand for bank credit in Pakistan, implying that to achieve the objective of monetary policy the behaviour of the output of business sector must not be ignored. Furthermore, the study shows that the rate of interest on bank advances is an important determinant of the demand of credit by the business sector. It implies that monetary authorities can move the flow of bank credit to the private sector while changing the interest rate charged on bank lending. The analysis has important implications: a tight monetary policy implies a high rate of real interest; a high rate of interest on bank lending negatively affects the demand for bank credit by the business sector (and the investment), which in turn leads to low aggregate demand and lower output. That is what has happened in Pakistan in the last decade.

I. INTRODUCTION

Monetary policy is the predominant tool operated by independent central banks[1] to achieve macroeconomic objectives, such as controlling the price level or inflation, promoting stability of output, and long-term growth of living standard and welfare.[2] Effectiveness of monetary policy, however, depends on the appropriateness of instruments, for example the money supply rule as policy. The choice of instrument depends on the nature of the estimated money demand function and its stability.

[1]Wren-Lewis (2000).
[2]Allsopp and Vines (2000).

In Pakistan, the State Bank of Pakistan (central bank) uses two aggregates, M2 and credit, as instruments of monetary policy to contain the rate of inflation within the target. Money supply growth target is fixed considering the estimated money demand function and the target rate of growth of income.[3] To control money supply, the credit aggregate is used as an intermediate target instrument. Bank lending (credit) is often assumed to be demand-determined at the going interest rates, set either in the market or by the banks.[4] Hence the determinants of the demand for money in equilibrium consist of the determinants of the equilibrium demand for government debt, currency demand, and demand for bank advances.

Theories state that if the authorities want to use credit as an instrument of monetary policy, then the estimated demand for credit function must be stable and the interest rate elasticity of credit demand must be known to the authorities.

In the developed countries the demand for bank credit/advances to the business sector is investigated, for example, by Hewitson (1997); Moore (1988); Moore and Threadgold (1985) Cuthbertson (1985a), etc. However, no attention has been paid to this important field in Pakistan. Under the circumstances, it is highly desirable to investigate the business sector's behaviour of bank lending which could provide an insight for understanding the behaviour of money demand in Pakistan, an understanding that is not possible only studying money demand literature.

The theoretical background, model specification, and methodology for estimation are discussed in the next section. Section III presents the results of the estimated model, and the last section concludes the study with a discussion of policy.

II. MODEL SPECIFICATION

It is assumed that the credit aggregates contain information additional to that contained in monetary aggregates and interest rate in the determination of output and prices. Friedman (1983) suggests the use of credit market in addition to income and money market for macroeconomic analysis. Therefore, in macroeconomic analysis, some representation of the credit market is clearly better than none. The credit market consists of supply of credit and demand for credit. The former represents the lender's behaviour and the latter indicates the borrower's behaviour. It is assumed that the banks set interest rates and meet all the requirements of the borrowers. Therefore, theory states that bank lending is demand-determined at the going interest rates, no matter how the interest rate is determined, set either by the market forces or fixed by the banks [Cuthbertson (1985)].

Theories of monetary transmission mechanism indicate the following channels of transmission mechanism through which monetary policy can affect output. These include the interest rate channel, exchange rate channel, other assets

[3]State Bank of Pakistan (2001).
[4]Cuthbertson (1985).

channel, and credit channel. It implies that credit is one of the important variables in the transmission mechanism from financial variables to real variables and the price level [Cuthbertson (1985); Mishkin (1995); Bernanke and Gertler (1995)].

Portfolio approach is one of the important approaches for the determination of money supply. It takes into consideration both the assets and the liability side of the economy. The flow of Fund (FOF) approach describes the supply side counterparts of the money supply. This approach advocates that the variations in money supply are largely due to bank lending to different behavioural groups that include the government, public sector enterprises, private business sector, and personal sector. Hence, looking from 'supply side', the determinants of the demand for money consist of the determinants of the demand for government debt, currency demand, and the demand for bank advances to the private business sector and the personal sector.

Finances play an important role in any business organisation. Finances are required to establish a new enterprise. Successfully running of a business corporation requires adequate financial resources. One reason may be that the firm's production process takes time and time is money. There is a gap between the production and sales. The production costs are incurred and paid before the receipt of sales proceeds. These production costs represent the firm's demand for working capital, for which it must obtain finance.

The business sector can meet their financial needs from internal sources and external sources. Internal sources include personal savings, friends and relatives, revenue from sales, retained earnings, and running-down liquid assets, while external sources include bank lending, equity market, and bond market. Bank lending is a cheaper source of funds among the external sources. The business sector uses this money to cover running costs (for example, wages and salaries, rent, material and tax payment), for stock building and for fixed investment.

The theories of demand for assets such as the transaction, precautionary, and portfolio model may be applied to model the demand for bank lending to the private business sector (PBS). On *a priori* grounds, the demand for credit by PBS may depend on the number of variables.

The business sector considers that bank advances are a close substitute for money transactions balances. The theories of transaction demand for money, which can be applied to the credit demand, state that the credit demand by the business sector depends upon the income/output or sales of the sector, which in turn varies with the economic climate. Therefore, in a period of general prosperity, with business keen to expand and consumers keen to spend in anticipation of rising incomes, this situation is likely to mean a high demand for bank loans. We may expect a higher demand for bank advances (BL) by the business sector as a result of a higher expected level of turnover/output (LY) of the business sector.

Abdul Qayyum

Another important determinant of bank lending to the business sector is the real cost of loans. If the business sector considers that the stocks and financial assets are substitutes, then it expects the real cost of loans to have a negative relationship with bank lending. Therefore, the demand for credit is inversely related to the rate of interest charged on bank credit.

Inflation expectations of the borrowers is another important variable that affects the demand for bank credit. If it is expected that if the increase in the rate of inflation is greater than the increase in the rate of interest, then the demand for credit would increase by offsetting the effect of increase in nominal interest rate. It implies that the demand for bank credit is directly related to the rate of inflation. Another source may be important to determine the impact of inflation on demand for credit by the private business sector. If high inflation is associated with the highly variable rate of inflation, it may increase the risk associated with the return to investment. This leads to the negative impact of the rate of inflation on the demand for bank lending.

On *a priori* grounds, the demand for credit by PBS may depend on the number of variables given in the following model (all variables are in the log form)

$$LBL_t^d = f(LY_t, RADR_t, \pi_t^e, \varepsilon_t) \quad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad (1)$$

where

$$
\begin{aligned}
LBL_t^d &= \text{Demand for bank lending by the private business sector.} \\
LY_t &= \text{Industrial output as proxy of output of business sector.} \\
RADR_t &= \text{Real rate of interest on bank advances.} \\
\pi_t^e &= \text{Rate of inflation.} \\
\varepsilon_t &= \text{Error term assumed to be independent and identically} \\
&\quad\ \ \text{distributed.}
\end{aligned}
$$

The study intends to estimate the dynamic model by applying the error correction mechanism (ECM) on the assumptions which are testable: that the time series data are generated by the random walk, non-stationary, process; and the series have the long-run linear relationship between them. It is already proved in the Granger representation theorem that under these assumptions the dynamic model can be represented by the error correction mechanism [Engle and Granger (1987)]. The error correction mechanism has important properties: first, the ECM nests all types of popular model specifications, for example linear, adaptive expectation and partial adjustment mechanism, etc. [Hendry, *et al*. (1984)]; and second, it helps to estimate the short-run dynamics without losing the long-run information of the data. Thus following Johansen and Juselius (1990) the ECM is achieved through the vector autoregressive (VAR) form and can be written as:

$$X_t = \Sigma\, \Pi_i X_{t-1} + u_t + \varepsilon_t \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad (2)$$

where X_t is vector of variables included in the function of demand for credit, u_t is constant and ε_t is IID $(0, \Lambda)$. If the univariate series are random walk and they have a long-run linear relationship, then the model can be represented by the following error correction mechanism

$$\Delta X_t = \Gamma_i \Delta X_{t-i} + \ldots + \Gamma_{k-1}\Delta X_{t-k+1} + \Pi X_{t-k} + u_t + \varepsilon_t \qquad \ldots \qquad \ldots \qquad (3)$$

where Δ is first difference operator and the term 'ΠX_{t-k}' has information about the long-run credit demand function.

In this study we use a three-step methodology; univariate time series analysis, multivariate cointegration analysis and estimation of long-run credit demand function; and estimation of dynamic error correction model. Univariate analysis is concerned with investigating the data-generating properties (DGP) of individual series. For this purpose, the study considers plot of the data at preliminary stage and then application of the Augmented Dickey-Fuller (ADF) test[5] [Dickey and Fuller (1981)]. The process of ADF is well-known and needs no explanation.

Another important step is to investigate existence of cointegrating relationship between the demand for bank lending and its determinants, and to estimate the long-run demand function of bank lending by PBS. In the former case, the likelihood ratio test, drawn from the Maximal Eigenvalue and Trace of stochastic matrix, is applied. This method has edge over the Engle-Granger two-step method because the LR method allows testing the existence of more than one cointegrating relationships between the variables whereas the other implicitly assumes that there is only one cointegration relationship between the variables. Then the Johansen (1988) maximum likelihood method is applied to estimate the long-run demand function, because it is the best available method to deal with non-stationary data.

Finally, the error correction model of the demand for bank lending would be estimated by employing the general-to-specific methodology. The preferred model is expected to pass a battery of diagnostic tests.

The annual data for the period from 1960 to 2000 are taken from the *Annual Report and Bulletin* of State Bank of Pakistan (various issues) and the *International Financial Statistics* of IMF (various issues).

III. ESTIMATED MODEL

1. Test of Integration

The ADF test results, calculated by Hall's (1994) sequential rule presented in Table 1, indicate that all the series are non-stationary at their level. They, except prices, are integrated of order one I(1). The prices, however, are I(2), implying

---

[5]There are a number of other tests available to test the hypothesis of unit root in the data. For detail, see Maddala and Kim (1998).

Table 1

Augmented Dickey-Fuller Test for a Unit Root

	Variables	Lag	*t*-statistics	Variables	Lag	*t*-statistics
1	LBL	0	–2.426	Δ LBL	1	–4.189
2	LY	1	–2.181	Δ LY	0	–4.39
3	LADR	0	–1.475	Δ LADR	0	–5.848
8	LCPI	1	–3.355	Δ LCPI	0	–2.72
9	π	0	–2.72	Δ π	0	–5.399

Note: The 5 percent critical value for the ADF test is: ADF $\tau < –3.53$.

inflation is I(1). It implies that the series under consideration are random walk. They become stationary after employing difference operator of degree one.

2. Testing for Cointegration

The hypothesis of no cointegration is tested by employing the Likelihood Ratio test that is proposed by Johanson (1988), based on maximal eigenvalue (λmax) and trace statistics. In the analysis the VAR of length two is used which is selected on the basis of white noise property of cointegration vector. The results are presented in Table 2. It is found that there are four cointegrating relationships between the demand for loans (LBL), LY, RADR, and π^e.[6]

Table 2

Johanson Maximum Likelihood Method: L R Test Based on the Stochastic Matrix

Maximal Eigenvalue			Trace		
Null	Alternative		Null	Alternative	
r = 0	r = 1	26.37*	R = 0	r $\geq$ 1	61.71*
r $\leq$ 1	r = 2	20.07*	R $\leq$ 1	r $\geq$ 2	35.33*
r $\leq$ 2	r = 3	9.29	R $\leq$ 2	r $\geq$ 3	15.26*
r $\leq$ 3	r = 4	5.97	R $\leq$ 3	r $\geq$ 4	5.97*

*Indicates significance at 5 percent level.

3. Long-run Credit Demand Model

In the case of multiplicity of cointegrating vectors, the explanation becomes difficult. However, the practitioners take first vector as the estimated long-run

---

[6]We used a number of combinations with the alternative interest rate variable, that is, call money rate, rate of interest on total deposits, and rate of interest on saving deposits. The final selection gave theoretically plausible results.

function. So following the tradition, we take first vector as the long-run demand for bank loan model by the Pakistan business sector, which is presented below (*t*- values are in the parentheses):

$$LB = 1.09LY - 0.06ADR - 0.09\,\pi \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (4)$$
$$(3633.3) \quad (1.17) \quad (2.73)$$

Estimated parameters of output and the rate of inflation are significant at the five percent level whereas the parameter of real interest rate is significant at ten percent level. The coefficient of *LY* is close to one. We formally tested the proposition of proportionality between the demand for bank lending and output. The $\chi^2_{(1)} = 2.74$ from *LR* test leads us not to reject this hypothesis at the ten percent level. The results imply that the greater the turnover of the business sector, the higher its demand for loans from the banking sector.

The rate of inflation is significant in determining the long-run demand for bank credit in Pakistan. The negative inflation impact implies the importance of the risk factor in the behaviour of the business sectors demand for credit. The other important determinant of the demand for bank loans is the real cost of bank borrowing indicated by the real rate of interest on bank advances. The results indicate that advance rate has negative impact on the demand for bank loans by the business sector in Pakistan. It implies that in Pakistan firms consider real assets such as stocks as a substitute of financial assets. The lending interest rate sensitivity of the demand for bank advances by the business sector has an important implication for the conduct of monetary policy. It implies that the rate of interest can be used as an instrument of monetary policy to control the flow of credit in the desired direction. This indicates the importance of indirect instruments of monetary policy in the long-run management of credit flow.

4. Dynamic Model of Credit Demand

The short-run dynamic error correction model of the demand for bank credit by the business sector is estimated by employing the general-to-specific methodology. The unrestricted model started with the lag length of two, and sequentially tested down to the parsimonious model. The preferred model presented below contains the error correction term, which is the estimated long-run relationship between bank lending, income of industrial sector, and rate of interest charged on bank advances (*t*-ratios are in parenthesis).

$$\Delta LB = 1.17\,\Delta LY - 1.11\,\Delta LY_{(-1)} - 0.02\,\Delta RADR - 0.07\,\Delta RADR_{(-1)}$$
$$(3.7) \qquad (-3.1) \qquad (-3.5) \qquad (-4.3)$$

$$+0.08\,\Delta\pi_{(-1)} - 0.197\,ECM_{(-1)} \qquad \ldots \qquad \ldots \qquad \ldots \qquad (5)$$
$$(3.9) \qquad (-6.5)$$

$R^2 = 0.83$ $F(5, 12) = 11.66$ Auto $\chi^2_{(1)} = 3.14$ RESET$\chi^2_{(1)} = 0.17$

J-B test $\chi^2_{(2)} = 1.42$ Het $\chi^2_{(1)} = 1.21$ ARCH $\chi^2_{(1)} = 0.08$

The preferred model passed a battery of diagnostic tests, including the test of serial correlation, homoscedasticity, ARCH, normality, and functional form misspecification at the 95 percent confidence level. The estimated coefficients accord with *a priori* expectations.

The estimated models are also tested for any structural break. The CUSM and CUSMQ tests, presented in Figures 1 and 2, of Brown, *et al*. (1975), indicate that the preferred models remain remarkably stable throughout the study period.[7] Further, when tested for forecasting ability of the model, the results are encouraging. The models do not systematically overpredict or underpredict the demand for bank lending by the business sector in Pakistan.

The results indicate that in the short run the business sector gives importance to the variation in the output/sale of the private business sector. The estimated coefficients of error correction term indicate that the business sector corrects its 20 percent of error in one year, which is an indicator of slow speed of adjustment towards the equilibrium state. There are a number of competing explanations for the slow speed of adjustment. However, in the absence of explicit modelling of bank and borrower behaviour, these explanations are speculation at best. The slow adjustment may be due to the aggregation of short-term and long-term loans. The movements of credit are subject to the decision of the lenders (banking sector) and the borrowers (enterprises). Another factor of slow adjustment is that the business sector is sensitive to the inconsistency in the policies. This is due to political instability in the country; change of every government implies a change in policies. This uncertainty about the implementation of policies may prevent the business sector to adjust quickly.

The significance of the error correction term also implies that the greater is the excess of income/outcome over the credit for the last years, the higher is the demand for credit now. Therefore, it is necessary to raise the demand for credit in the future. Further, it implies that the higher rate of inflation one year ago corresponds to the lower demand for credit now. On the other hand, the results indicate that if in the previous year the rate of interest was high, it implies a low rate of credit demand now. Therefore, the economic agent may have more (less) demand for credit at some point in time, but will then tend to demand less (more) at some point in the future.

---

[7]Stability of the estimated parameters is also found by using the recursive least squares method. However, the results are not presented in the paper.

Figure 1 & 2

IV. CONCLUSIONS AND POLICY IMPLICATIONS

This study estimates the demand for bank credit by the Private Business Sector in Pakistan. For this purpose we applied a three-step methodology, that is, univariate analysis, multivariate cointegration analysis, and error correction mechanism.

Univariate analysis confirms that individual series are non-stationary at their level; they are integrated of order one. It also reveals that there is a long-run cointegrating relationship between the demand for bank lending, output, real rate of interest on advances, and the rate of inflation. Moreover, the preferred model, estimated by the general-to-specific method, is found to be stable throughout the study period. It is seen that output, real rate of interest on advances, and the rate of inflation play an important role in the determination of the demand for credit behaviour of the private business sector in Pakistan.

It is supposed that the change in money supply is a result of the change in bank credit. The results show that the demand for bank credit is sensitive to the rate of interest. This implies that the monetary authorities can control money stock through the credit channel by varying the interest rate particularly in the short run.

In the light of our findings, the significant impact of output on bank lending in Pakistan is clear. In the word of Moore (1985), "if bank credit causes money and if the prices and output cause bank credit, then this is one more endogenous element that monetary authorities must forecast to control the money supply".

The significance of the rate of inflation in the demand for credit function implies that the policies that are successful in reducing the inflation will also lead to a decrease in the demand for credit/advances by the business sector. This may have adverse consequences for the financing of investment and the possibility of automatic recovery in the economy. This situation can drag the economy into deep recession [Mishkin (1995)]. The investment behaviour of the business sector in Pakistan is the result of low inflation and high real rate of interest on bank advances—the tight monetary policy. Low inflation pushed the economy into recession because a low rate of inflation means a high rate of real interest and high cost of borrowing from the banking sector. A high real rate of interest affects the demand for credit.

REFERENCES

Allsopp, C., and D. Vines (2000) The Assessment: Macroeconomic Policy. *Oxford Review of Economic Policy* 16:4, 1–32.

Bernanke, B. S., and M. Gertler (1995) Inside the Black Box: The Credit Channel of Monetary Policy. *Journal of Economic Perspectives* 9:4, 27–48.

Brown, R. L., J. Durbin, and J. M. Evans (1975) Techniques for Testing the Constancy of Regression Relation Over Time (with discussion). *Journal of Royal Statistical Society* B 37, 149–192.

Cuthbertson, K. (1985) Bank Lending to UK Industrial and Commercial Companies. *Oxford Bulletin of Economics and Statistics* 42:2, 91–118.

Cuthbertson, K. (1985a) *The Supply and Demand for Money*. Basil Blackwell.

Dickey, D. A., and W. A. Fuller (1981) Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica* 49:4, 1057–72.

Eangle, R. F., and C. W. J. Granger (1987) Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica* 55, 251–276

Friedman, B. M. (1983) *The Roles of Money and Credit in Macroeconomic Analysis, in Tobin (1983), Macroeconomics, Prices and Quantities*. Oxford: Basil Blackwell.

Hall, A. (1994) Testing for a Unit Root in Time Series with Pretest Data Based Model Selection. *Journal of Business and Economic Statistics* 12, 461–470.

Hendry, D. F., A. R. Pagan, and J. D. Sargan (1984) Dynamic Specification. In Z. Girliches and M. D. Interligator *Handbook of Econometrics* 2.

Hewitson, G. (1997) The Post-Keynesian Demand for Credit Model. *Australian Economic Papers* 36:68, 127–143.

Johansen, S. (1988) Statistical Analysis of Cointegrating Vectors. *Journal of Economic Dynamics and Control* 12:2/3, 231–254.

Johansen, S., and K. Juselius (1990) Maximum Likelihood Estimation and Inference on Cointegration—With Application to the Demand for Money. *Oxford Bulletin of Economics and Statistics* 52:2, 169–210.

Maddala, G. S., and I. Kim (1998) *Unit Roots, Cointegration, and Structural Change*. London: Cambridge University Press.

Mishkin, F. G. (1995) A Symposium on Monetary Transmission Mechanism. *Journal of Economic Perspectives* 9:4, 3–10.

Moore, B. J. (1988) *Horizontalists and Verticalists: The Macroeconomics of Credit Money*. London: Cambridge University Press.

Moore, B. J., and A. Threadgold (1985) Corporate Borrowing in the UK, 1965–1981. *Economica* 52.

State Bank of Pakistan (2001) *Quarterly Report*. State Bank of Pakistan.

Wren-Lewis, S. (2000) The Limits of Discretionary Fiscal Stabilisation Policy. *Oxford Review of Economic Policy* 16:4, 72–91.