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Economic Goals for 1981: A Monetary Analysis

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LONG-RANGE economic planning in the United States began in calendar 1975 with the preparation of the fiscal 1976 Federal budget.¹ Since then, each budget document has included economic assumptions and budget projections for a five-year horizon.² For example, the fiscal 1978 budget, for which estimates were first prepared in January 1977 and then revised in July 1977, includes assumptions and projections through 1982. The assumptions for the current year and the next are called "forecasts," but beyond the next year the assumptions are labeled as "projections consistent with moving gradually toward relatively stable prices and maximum feasible employment."³ In other words, for the longer run, the assumptions for output growth, inflation, and unemployment can be viewed as macroeconomic goals.

The Carter Administration's national economic goals for 1981 include:⁴

1. a reduction of unemployment to 4.75 percent of the labor force from the current level of about 7 percent;
2. a reduction in the rate of inflation to a 4.3 percent annual rate;
3. a balance in the Federal budget at expenditure and revenue levels equal to 21 percent of GNP.

Although the Administration is explicit in its specification of fiscal policy assumptions for the period 1977 through 1981, it says nothing about its monetary

policy assumptions. Furthermore, details about the structure of its underlying economic model are not made explicit.

A unique feature of the goals of the current Administration is the self-imposed constraint on the growth of Federal spending and the goal of budget balance. Budget goals had been set forth in general terms in earlier budgets, but previous budgets did not specifically state a desire to achieve a balanced budget, nor did they impose the additional constraint of limiting the size of Federal spending to a stated percentage of GNP. The emergence of this goal might be related to the persistence of large Federal deficits in recent years, and, in particular, the concern expressed by the financial and business community about their magnitude.

EVALUATION PROCEDURE

Although the Administration does not provide information about its underlying model, it is essential to examine the long-range goals within the context of a particular analytical framework. The question asked here is whether the set of economic goals is consistent with a monetarist model of the U.S. economy.⁵ The model which is used is a modified form of the "St. Louis model."⁶ The chief modification is the use of a newly developed potential output series.⁷

Since the Administration does not make its assumptions about monetary policy explicit, its goals are first examined to determine their implications for monetary growth. In a monetarist framework, such assumptions are critical, and in the monetary model used here, changes in money are the primary driving force.

The St. Louis model includes direct determination of GNP, via a reduced form equation, relating the

¹Presentation of the Administration's long-run budget projections and economic assumptions is required under the provisions of the Congressional Budget and Impoundment Control Act of 1974.

²For a summary of the year-by-year economic assumptions that have been made thus far, see Table I.

³The short-term assumptions are presented as forecasts of probable economic conditions whereas the longer range assumptions are "mechanical projections." The difference is that "forecasts" are best guesses as to likely outcomes, taking into account all factors impinging on the economy (including external shocks, e.g., changes in oil prices). Long-run assumptions (or projections) are based on systematic and predictable influences on economic activity, and thus do not reflect an attempt to predict the occurrence of external shocks or changes in economic structure. See *The Budget of the United States Government, Fiscal Year 1976* (Washington, D.C.: U.S. Government Printing Office, 1975).

⁴Office of Management and Budget, *Mid Session Review of the Fiscal 1978 Budget* (July 1, 1977). Also see Remarks by Charles L. Schultze, Chairman, Council of Economic Advisers, to New York Financial Writers Association (May 18, 1977). Although projections are presented through 1982, the Administration focuses its discussion on 1981.

⁵For a similar analysis of the administration's 1981 goals using the Wharton model (University of Pennsylvania), see Thomas F. Dernburg and L. Douglas Lee, "The Macroeconomic Goals of the Administration for 1981: Targets and Realizations," *A Study Prepared for the Use of the Joint Economic Committee* (August 5, 1977). See insert.

⁶A detailed summary of these modifications is available upon request. For a discussion of the original model see Leonall C. Andersen and Keith M. Carlson, "A Monetarist Model for Economic Stabilization," this *Review* (April 1970), pp. 7-25.

⁷Robert H. Rasche and John A. Tatom, "Energy Resources and Potential GNP," this *Review* (June 1977), pp. 10-24.

Table I

SUMMARY OF ADMINISTRATION PROJECTIONS*

Time of Projection	1975	1976	1977	1978	1979	1980	1981	1982
GNP (Billions of Dollars)								
January 1975	1514.6	1705.5	1917.0	2147.0	2378.9	2635.8		
January 1976		1718.4	1928.0	2167.1	2425.0	2689.3	2934.0	
January 1977			1894.2	2108.3	2352.8	2599.9	2805.3	2984.8
July 1977			1899.3	2125.4	2365.5	2616.3	2872.7	3119.7
Actual	1528.8	1706.5						
Real GNP (Billions of 1972 Dollars)								
January 1975	1177.6	1234.1	1303.2	1388.0	1478.2	1574.3		
January 1976		1276.6	1349.4	1429.0	1521.9	1620.8	1700.2	
January 1977			1341.0	1409.4	1492.5	1574.6	1636.0	1693.3
July 1977			1339.7	1410.7	1481.3	1558.3	1634.6	1704.9
Actual	1202.1	1274.7						
Price Deflator (1972=100)								
January 1975	128.58	138.23	147.21	154.72	161.06	167.51		
January 1976		134.64	142.99	151.71	159.30	165.99	172.63	
January 1977			141.36	149.70	157.78	165.20	171.47	176.27
July 1977			141.76	150.69	159.88	168.03	175.26	182.62
Actual	127.18	133.88						
Unemployment Rate (Percent)								
January 1975	8.1	7.9	7.5	6.9	6.2	5.5		
January 1976		7.7	6.9	6.4	5.8	5.2	4.9	
January 1977			7.3	6.6	5.7	4.9	4.8	4.7
July 1977			7.0	6.3	5.7	5.2	4.8	4.5
Actual	8.5	7.7						
3-Month Treasury Bill Rate (Percent)								
January 1975	6.4	6.4	6.4	6.0	5.0	5.0		
January 1976		5.5	5.5	5.5	5.5	5.0	5.0	
January 1977			4.4	4.4	4.4	4.4	4.4	4.4
July 1977			4.9	5.0	5.0	5.0	5.0	5.0
Actual	5.8	5.0						

*All GNP data are adjusted to mid-1977 revisions of NIA accounts.

change in GNP to current and past changes in money and high-employment Federal expenditures. Estimates of the equation indicate that over a period of a year or more, steady growth in Federal spending in the absence of changes in the rate of monetary expansion has little net effect on the growth rate of GNP. The primary factor determining the growth of GNP over a period of a year or more is the trend of money and the trend of velocity as embodied in the estimated constant term.⁸

⁸These results regarding fiscal actions remain in dispute. See Benjamin M. Friedman, "Even the St. Louis Model Now Believes in Fiscal Policy," *Journal of Money, Credit and Banking* (May 1977), pp. 365-67. Friedman's results follow from an updated estimation of the GNP equation in first difference (arithmetic) form. The conclusion about the net effect of fiscal actions being near zero continues to hold when the equation is estimated in log first difference form. Analysis of the two specifications indicates that the log first difference form shows greater coefficient stability over time than does the arithmetic first difference form.

The change in GNP is divided between price and output change via a price equation. This price equation gives the change in prices as a function of current demand pressure and the recent history of price change. Over the long run, however, estimated price change is dominated by the trend of money growth, since the growth of total spending (driven by money) is the chief determinant of demand pressure. Given the change in GNP and prices, output change is found as a residual.

The final three equations of the model determine the unemployment rate and long- and short-term interest rates. Changes in output are used to estimate the unemployment rate via Okun's law.⁹

⁹Arthur M. Okun, "Potential GNP: Its Measurement and Significance," 1962 *Proceedings of the Business and Economic Statistics Section of the American Statistical Association*, pp. 98-104. Okun's Law relates the unemployment rate

THE DERNBURG-LEE STUDY: A COMMENT

In a recent study prepared for the Joint Economic Committee, Thomas Dernburg and L. Douglas Lee used the Wharton model to analyze the Administration's economic goals for 1981.¹ They concluded that attainment of all the goals simultaneously was not possible. The reasoning underlying this conclusion was as follows:

- (1) because winding down inflation would require restrictive monetary and fiscal policies, it is questionable whether the growth and employment targets are compatible with the inflation target;
- (2) since balancing the budget in 1981 would require relatively restrictive fiscal policy after fiscal 1978, the employment target may be incompatible with a balanced budget;
- (3) because monetary policy would have to be expansionary to reach the employment and balanced budget targets, the inflation rate might rise above the target level.

¹Thomas F. Dernburg and L. Douglas Lee, "The Macroeconomic Goals of the Administration for 1981: Targets and Realizations," *A Study Prepared for the Use of the Joint Economic Committee* (August 5, 1977).

These conclusions sound reasonable, and do not differ substantially from those reached via the St. Louis model. The policy implications of the Dernburg-Lee study, however, reflect more accurately the differences between the Wharton and St. Louis models. They conclude that *because of the budget target, full employment can be achieved only by aggressive resort to monetary policy*. According to simulations of the St. Louis model, the employment target is not achievable with any pattern of monetary growth within the range of historical experience.

The reason the implication for monetary policy is so different is that the Dernburg-Lee study *assumes* the inflation rate to be exogenous. And since the transmission mechanism of the Wharton model works through the growth of real money balances, an increase of nominal money growth expands output and employment because increased real money reduces interest rates and stimulates real spending. The Dernburg-Lee conclusions are seriously flawed because they overlook the causal relationship between money and prices.²

²Curiously, the authors note an association between money and prices in their conclusion, yet their simulations were conducted in such a way that the inflation rate was not allowed to vary freely as an endogenous variable.

ANALYSIS OF THE ADMINISTRATION'S 1981 GOALS

For purposes of evaluating the Administration's 1981 economic goals, the crucial assumption in the St. Louis model is the growth of money. By examining the relations between money and GNP, money and prices, and money and interest rates, the consistency of the Administration's goals can be checked. Furthermore, the budget constraints can be examined to see if they are simultaneously attainable. The reader is reminded that these simulations of the St. Louis model do not incorporate the effects of possible external shocks, and thus should not be considered as forecasts. Such an exercise is based on the assumption that average relationships of the past will hold in the future, and an evaluation of the consistency of future goals is conducted within that context.

Money and GNP

The Administration has set a goal for nominal GNP of \$2,873 billion for 1981 (see Table II). GNP would have to grow at a 10.9 percent average annual rate from 1977 to 1981. Given past relationships between money and GNP, the money stock (M1, that is, currency plus demand deposits) would have to grow at

to the gap between actual output and an estimate of potential output.

about a 7.1 percent annual rate from current levels (third quarter 1977) in order for such a GNP goal to be realized (see Table III).

It is also informative to examine the year-by-year path to this GNP goal in 1981. The Administration has laid out a path whereby the growth of GNP is faster in the earlier years then slows toward the end of the planning period. These growth rates are shown in Table IV. According to the St. Louis model, such a pattern of GNP growth would require the growth rate of money to be faster than 7.1 percent until late 1979 (see Table IV).

For purposes of analysis, two basic simulations are conducted in order to determine the consistency of the remaining variables. One is a steady growth of money from mid-1977 to 1981 (summarized in Table III), and the other is rapid growth of money in the early years, with a tapering in the growth rate to about 6 percent in 1981 (summarized in Table IV).

Money and Prices

The relationship between money and prices is a well-established one.¹⁰ However, this relationship is

¹⁰See Denis S. Karnosky, "The Link Between Money and Prices — 1971-76," this *Review* (June 1976), pp. 17-23 and Richard T. Selden, "Inflation: Are We Winning the Fight," *The Morgan Guaranty Survey* (October 1977), pp. 7-13.

Table II

GOALS FOR 1981
From Mid Session Review*
 (Rates of Change from Previous Year are in Parentheses)

	GNP (Billions of Dollars)	Real GNP (Billions of 1972 Dollars)	Prices 1972=100	Unemployment Rate	3-Month Treasury Bill Rate
1976 Actual	\$1706.5 (11.6)	\$1274.7 (6.0)	133.88 (5.3)	7.7%	5.0%
1977	1899.3 (11.3)	1339.7 (5.1)	141.76 (5.9)	7.0	4.9
1978	2125.4 (11.9)	1410.7 (5.3)	150.69 (6.3)	6.3	5.0
1979	2365.5 (11.3)	1481.3 (5.0)	159.88 (6.1)	5.7	5.0
1980	2616.3 (10.6)	1558.3 (5.2)	168.03 (5.1)	5.2	5.0
1981	2872.7 (9.8)	1634.6 (4.9)	175.26 (4.3)	4.8	5.0
1982	3119.7 (8.6)	1704.9 (4.3)	182.62 (4.2)	4.5	5.0

*All GNP data are adjusted to mid-1977 revisions of NIA accounts.

not given explicit treatment by the Administration in its discussion of long-range goals. For the period 1977 to 1981, the Administration sees an average annual rate of increase in prices of 5.4 percent, with the increase more rapid from 1976 to 1978, but slowing to a 4.3 percent rate by 1981. Examination of alternative simulations of the St. Louis model indicates that a 5.4 percent average rate of increase of prices from 1976 to 1981 is consistent with about a 5 percent trend growth of money. This points out a discrepancy between money growth implied by the GNP projection (7.1 percent) and that implied by the price projection (5 percent).

Consider now the inflation implications of the growth in money that would yield the Administration's 1981 GNP goal. Simulation with a steady 7.1 percent growth of money shows that prices will increase at a 7 percent average rate from 1977 to 1981 (see Table III). But more significantly, the dynamics of the model suggest that the rate of inflation would be accelerating in 1981, as opposed to the Administration's contention that inflation would be decelerating.

Consider, on the other hand, the effects of an early acceleration of money followed by a slowing, a pattern apparently more consistent with the Administration's time path of GNP to 1981. Based on this assumed

pattern of money growth, the inflation rate would be even greater than in the simulation using steady money growth, averaging 7.3 percent per year for 1977 to 1981 (see Table IV). The dynamics of the model suggest that the effect of the rapid growth in money from 1977 to 1979 on the inflation rate is still very much present in 1981, with the rate exceeding 9 percent.

Output and Unemployment

According to the St. Louis model, output over the longer run is determined by real factors in the economy — growth of the labor force, work-leisure preferences, capital growth, and technology. What happens to money growth on average over the next four years is of minor consequence for the growth of output in 1981. However, the internal dynamics of the St. Louis model suggest output would still be in the process of adjusting to its long-run equilibrium rate five years after a current change in the growth rate of money. As a result, the growth of output in 1981 does differ somewhat for alternative growth rates of money.

The Administration's real GNP goal for 1981 is \$1,635 billion (1972 dollars). This is an average annual rate of increase from 1977 of 5.1 percent. Simulation

Table III

ST. LOUIS MODEL SIMULATION OF ADMINISTRATION'S 1981 GNP GOAL
Assuming Steady Growth of Money of 7.1 Percent
 (Rates of Change from Previous Year are in Parentheses)

	GNP (Billions of Dollars)	Real GNP (Billions of 1972 Dollars)	Prices (1972=100)	Unemployment Rate	Short- Term Interest Rates ¹	Money (Billions of Dollars) ²
1976 Actual	\$1706.5 (11.6)	\$1274.7 (6.0)	133.9 (5.3)	7.7%	5.4%	\$304.2 (5.1)
1977	1896.9 (11.2)	1340.4 (5.2)	141.5 (5.7)	7.1	5.7	324.5 (6.7)
1978	2120.2 (11.8)	1412.8 (5.4)	150.2 (6.1)	6.2	7.2	348.8 (7.5)
1979	2342.1 (10.5)	1469.8 (4.0)	159.5 (6.2)	5.9	7.8	373.5 (7.1)
1980	2593.7 (10.7)	1519.3 (3.4)	171.0 (7.2)	5.8	8.3	400.1 (7.1)
1981	2872.2 (10.7)	1552.1 (2.2)	185.4 (8.4)	6.2	8.8	428.5 (7.1)
1982	3180.6 (10.7)	1573.3 (1.4)	202.6 (9.3)	7.0	8.6	458.9 (7.1)

¹Four- to six-month commercial paper rate.²M1 definition.

of the St. Louis model with a steady 7.1 percent growth of money indicates an average growth of output of 3.7 percent, which falls \$83 billion (1972 dol-

lars) short of the Administration's goal (see Table III). With alternative simulations of steady growth rates of money of 2 through 9 percent, it was impos-

Table IV

ST. LOUIS MODEL SIMULATION OF ADMINISTRATION'S 1981 GNP GOAL
Assuming Declining Growth Rate of Money from 9.5 Percent Rate in III/77
 (Rates of Change from Previous Year are in Parentheses)

	GNP (Billions of Dollars)	Real GNP (Billions of 1972 Dollars)	Prices (1972=100)	Unemployment Rate	Short- Term Interest Rates ¹	Money (Billions of Dollars) ²
1976 Actual	\$1706.5 (11.6)	\$1274.7 (6.0)	133.9 (5.3)	7.7%	5.4%	\$304.2 (5.1)
1977	1897.8 (11.2)	1341.0 (5.2)	141.5 (5.7)	7.1	5.6	324.9 (6.8)
1978	2127.2 (12.1)	1417.1 (5.7)	150.2 (6.1)	6.1	7.3	350.0 (7.7)
1979	2363.8 (11.1)	1480.8 (4.5)	159.9 (6.5)	5.7	8.1	377.2 (7.8)
1980	2617.7 (10.7)	1524.4 (2.9)	172.0 (7.6)	5.6	9.1	403.0 (6.8)
1981	2870.5 (9.7)	1532.7 (0.5)	187.6 (9.1)	6.5	9.2	427.0 (6.0)
1982	3119.7 (8.7)	1520.7 (-0.8)	205.5 (9.5)	8.2	7.8	448.6 (5.1)

¹Four- to six-month commercial paper rate.²M1 definition.

sible to simulate results yielding both the Administration's 1981 GNP and output goals. The alternative simulation with early acceleration of money followed by later slowing shows an average rate of output growth of 3.4 percent (slower than for the steady 7.1 percent case) because inflation intensifies earlier (see Table IV). Consequently, according to the St. Louis model, achievement of the Administration's goals for nominal GNP will probably result in more inflation and less output growth than the Administration desires.

Given that output growth falls substantially short of the Administration's goal in this model, the unemployment rate also falls short of the 4.75 percent target. The 7.1 percent money growth simulation indicates an unemployment rate of 6.2 percent in 1981 (Table III). The alternative simulation (variable growth pattern of money) indicates an even higher rate of unemployment of 6.5 percent (Table IV). If the Administration should attempt to achieve its unemployment goal (or, say, a more ambitious goal as suggested by the Humphrey-Hawkins bill) with only aggregate demand policies, more inflation will probably result.

Money, Prices, and Interest Rates

Although not so fundamental as a part of the Administration's goals, it is worth noting that the interest rate pattern of the St. Louis model indicates another area of inconsistency in the Administration's set of goals for 1981. The Administration indicates an assumption of a steady 5.0 percent yield on 3-month Treasury bills throughout the planning period. If money growth is held at 7.1 percent to achieve the 1981 GNP target, the inflation implications are such that short-term interest rates can be expected to approach 9.0 percent by 1981. A similar result is associated with the alternative simulation using a variable growth pattern of money.

Implications for the Federal Budget

The Federal budget projections are, of course, an input to this process of long-run planning. The only aspect that is checked here is the effect of the long-range plan on real Federal outlays. According to the mid-session review of the budget, 1981 outlays are targeted at 20.2 percent of GNP. The goal for GNP implies a level of receipts such that a surplus of \$50 billion is implied with current tax laws.¹¹ Even if the

expenditure level were equal to 21 percent of GNP, a \$30 billion surplus would still be implied. The reasons for such a surplus are twofold: One, the inflationary experience has boosted the relative importance of the individual income tax (a tax which is very responsive to changes in nominal income) in the U.S. tax structure, and, two, receipts estimates include tax increases for social security and those incorporated in the proposed energy program.

Furthermore, if the GNP target is achieved and expenditures reach their projected level, an implication of the St. Louis model is that *real* Federal outlays would increase at a 0.4 percent average annual rate, instead of the 1.0 percent rate that the Administration projects. By comparison, real Federal outlays rose at a 4.5 percent average rate in the previous five-year period from 1971 to 1976.

SUMMARY AND CONCLUSIONS

The Administration has presented a set of national economic goals for 1981, continuing a process of long-range planning begun over two years ago. Exactly how these assumptions are used in the policymaking process is not clear, but presumably departures from plan suggest that the Administration believes that policy actions should then be taken. Consequently, it is important that such goals be subjected to scrutiny.

Using as a starting point a growth of money that would achieve the Administration's GNP goal for 1981, it was found that based on past relationships, the goals for prices, output, unemployment, and interest rates probably are not achievable simultaneously. Furthermore, the discrepancies are substantial. No fundamental inconsistency was found relating to the budget goals of restrained expenditure growth and at least a balanced budget, but the implication is that the implied growth of real Federal expenditures is somewhat less than indicated in the long-range plan and much below the growth in the recent past.

Presentation by the Federal Government of its long-range goals is laudable. The St. Louis model does, however, indicate unequivocally that the Administration's goals are not achievable given the current structure of the economy. Furthermore, an attempt to use aggregate demand management to attain the stated goals regarding output growth and unemployment will impart substantial damage to the economy by causing inflation to accelerate. Eventually such policies will cause an increase in unemployment.

insurance tax base and the social security tax rate and base. The effect of proposed tax reform is not included.

¹¹Receipts estimates assume enactment of the Administration's proposals as of July 1, 1977, and include energy proposals and the effect of scheduled increases in the unemployment

Effects of Interest on Demand Deposits: Implications of Compensating Balances

R. ALTON GILBERT

LEGISLATION is being considered which would allow depository financial institutions throughout the nation to offer to households interest-paying checking accounts, more popularly known as NOW (Negotiable Order of Withdrawal) accounts. Bankers, in general, are concerned about the effects on earnings of such a regulatory change. Several studies of NOW accounts, however, suggest that this concern may be unjustified, as only small earnings effects have been detected in areas where NOW accounts are currently permitted.¹

One of the reasons for the expectation of small effects on bank earnings due to nationwide NOW accounts can be traced to the ways by which banks are currently circumventing the prohibition of interest on demand deposits by offering services to depositors at no charge or at low rates. The primary service offered to households is the processing of checks written and deposited by these customers. In effect, this amounts to *implicit* interest payments.² Thus, permission for nationwide NOW accounts would have the most pronounced effect on the *form* in which banks pay demand deposit interest, with direct interest payments replacing indirect, or implicit, interest payments.

¹Those studies also suggest that future earnings effects of NOW accounts are likely to be reduced as more banks require minimum balances and/or charge for previously free services. See Ralph C. Kimball, "Recent Developments in The NOW Account Experiment in New England," *New England Economic Review*, Federal Reserve Bank of Boston (November/December 1976), pp. 3-19; Kimball, "Impacts of NOW Accounts and Thrift Institution Competition on Selected Small Commercial Banks in Massachusetts and New Hampshire, 1974-75," *New England Economic Review* (January/February 1977), pp. 22-38; and John D. Paulus, "Effects of 'NOW' Accounts on Costs and Earnings of Commercial Banks in 1974-75," Staff Economic Studies, Board of Governors of the Federal Reserve System, 1976.

²David C. Cates and Samuel B. Chase, Jr., *The Payment of Interest on Checking Accounts*, a report to the South Carolina Bankers Association, February 1976; Charles F. Haywood, "Possible Effects of Payment of Interest on Demand Deposits," in *Studies on the Payment of Interest on Checking Accounts* (Washington, D.C.: American Bankers Association, 1976), pp. 1-11; Charles Hoffman and Earlene Herman,

This article is concerned with the same sort of analysis of interest-bearing demand deposits, only as it applies to *business accounts*.³ Although business accounts have not been given serious consideration in the discussion of permitting interest-bearing demand deposits, it seems likely that a favorable experience with interest-bearing household accounts could lead to the lifting of the interest-paying prohibition on all demand deposits.⁴ The analysis involves an examination of compensating balances, or the demand deposit balances banks require from firms in compensation for preferential loan terms or low-priced services.

THE ROLE OF COMPENSATING BALANCE REQUIREMENTS IN THE COMPETITION AMONG BANKS FOR THE DEPOSITS OF BUSINESS FIRMS

Bank policies of requiring compensating balances from business firms are considered since, as revealed

"NOW Accounts in New England," *Studies on the Payment of Interest on Checking Accounts*, pp. 23-38; William A. Longbrake, "Commercial Bank Capacity to Pay Interest on Demand Deposits, Part II: Earnings and Cost Analysis," *Journal of Bank Research* (Summer 1976), pp. 134-49; Carl C. Nielsen, *Bottom Line Study for Kansas Banks*, prepared for the Kansas Bankers Association, May 1977; Staff Study, Board of Governors of the Federal Reserve System, *The Impact of the Payment of Interest on Demand Deposits*, January 31, 1977.

³A recent regulatory change has made the prohibition of interest payments on the demand deposits of business firms less effective. Banks are now permitted to offer savings accounts to business firms up to \$150,000 per firm. The firms that take advantage of another regulatory change which allows banks to transfer funds between their checking and savings accounts based upon telephone instruction are able to keep part of their working balances in interest earning accounts. However, these changes in regulations significantly affect the cash management of only relatively small firms.

⁴Two recent studies consider very briefly the effects on banks of interest on demand deposits of business firms. Both studies conclude that such interest payments would have minimal effects on bank earnings. See Cates and Chase, *The Payment of Interest on Checking Accounts*, p. viii, and Staff Study, Board of Governors, *The Impact of the Payment of Interest on Demand Deposits*, pp. 44-45.

in several studies cited below, most bank lending arrangements with business firms involve compensating balance requirements. Therefore, if banks are currently paying implicit interest on demand deposit balances of business firms, such bank policies would tend to be reflected in the nature of compensating balance requirements.

Differing views are held as to why banks require compensating balances. One view is that banks require compensating balances simply to increase the return on loans. Another view is that compensating balances serve as partial collateral for loans.

Of these two explanations, the argument that banks attempt to increase their returns on loans by requiring borrowers to hold demand balances is discussed more frequently in the banking literature.⁵ According to this view, a bank requires a borrower to leave some proportion of its loan with the bank as an idle demand deposit balance. Under this arrangement the effective yield on lending to the customer is higher than the stated rate on its loan, since the customer has use of only a portion of the total loan on which it is paying interest. While only a few economists explicitly state this view of compensating balances, many apparently support it when they claim that the true costs of borrowing at commercial banks must be adjusted upward from stated loan rates to reflect the additional cost of holding idle compensating balances.

The accuracy of this explanation of compensating balances can be tested, since it has several implications for behavior. For example, the stated interest rates on loans to borrowers that hold compensating balances would tend to be lower than the interest rates on loans to borrowers that do not hold compensating balances. Also, banks would set compensating balance requirements in terms of *minimum balances*, since compensating balances would represent simply the borrowed funds which customers are not allowed to use, and not their working balances. Consequently, demand deposit balances of borrowers holding compensating balances would tend to be at least some minimum fraction of their outstanding loans at all points in time. These inferences would also follow from the explanation that compensating balances serve as a form of partial collateral for loans.

⁵For a discussion of this explanation of compensating balances, see the following articles by Paul S. Nadler: "Compensating Balances and the Prime at Twilight," *Harvard Business Review* (January-February 1972), pp. 112-20; and "A Doubtful Device Even Before Lance," *New York Times*, September 25, 1977, p. F16.

A third view of compensating balances is that banks require them as part of agreements that involve payment of implicit interest on the demand deposits that business firms use as their working balances. Business firms hold working balances to finance their transactions, but banks are not allowed to compete for those deposits with offers of direct interest payments. Operating under this constraint on bank competition, firms shop to find banks which, in return for deposit of their working balances, will offer loans at lowest interest rates and lowest fees for services. To insure that they are compensated for preferential loan terms and low fees on services, banks require that firms keep certain average demand deposit balances. Thus, firms can use their deposits that serve as compensating balances for their working balances, drawing them down when making expenditures and letting them accumulate when receiving payments.

If this third interpretation of compensating balance requirements is correct, banks would tend to offer better loan terms and lower fees on services to their depositors than to nondepositors, but also, banks would set compensating balance requirements in terms of *average balances*, rather than *minimum*. Therefore, at any point in time, demand deposit balances of customers holding compensating balances would *not necessarily* be some minimum proportion of their loans outstanding.

Several reasons can be given for accepting the view that compensating balance requirements reflect payment of implicit interest on the working balances of business firms, and thus, for rejecting the view that banks require compensating balances just to raise the effective interest rates on loans. If banks require firms to hold idle compensating balances to increase their effective yields on loans, both banks and their customers could benefit from eliminating such compensating balance requirements, except when usury ceilings are effective. The same reasoning can be used to indicate why requiring minimum compensating balances would be an unprofitable way of charging for use of bank services or of requiring borrowers to provide collateral for loans. However, as indicated in the Appendix, both banks and their borrowers can benefit from average compensating balance requirements satisfied by the customers' working balances.

Also, evidence on banking practices presented in the following section indicates that most banks allow their business customers to meet compensating balance requirements with average balances, instead of setting minimum balance requirements. This result

supports the view that banks are paying implicit interest on the working balances of business firms.

Finally, compensating balances are most frequently imposed upon relatively large firms by large banks, as noted in several surveys of banking practices. The market for loans to the relatively large firms is generally believed to be the most competitive market for bank loans. Therefore, these observations are consistent only if compensating balance requirements reflect competition by banks for demand deposits.

A SURVEY OF EVIDENCE

Two conditions are necessary if compensating balance requirements are to be interpreted as part of arrangements by which banks pay implicit interest on the demand deposits that their business borrowers use as working balances:

- (a) Depositors receive better loan terms than non-depositors with similar risk characteristics or receive services at lower fees than nondepositors.
- (b) Banks allow firms to meet compensating balance requirements with their average balances.

Loan Terms and Fees on Services for Depositors

Several studies present evidence that business firms do receive preferential loan terms when they borrow where they hold demand deposit accounts.⁶ A recent study of reports by corporations to the Securities and Exchange Commission provides additional evidence of preferential loan terms for depositors. In reports from a sample of corporations, about half of the firms borrowing at banks under compensating balance requirements reported that banks offered options of borrowing at higher interest rates without compensating balance requirements, even though such information was not requested in the reports.⁷

⁶Donald P. Jacobs, *Business Loan Costs and Bank Market Structure: An Empirical Estimate of Their Relations*, National Bureau of Economic Research, Occasional Paper 115 (New York: Columbia University Press, 1971); Neil Murphy, *A Study of Wholesale Banking Behavior* (Federal Reserve Bank of Boston, 1969), pp. 60-67; James Cooper, "The Demand for Bank Outputs and the Bank-Customer Relationship," Ph.D. dissertation, University of Illinois, 1967, pp. 105-22; and Donald Hester, "An Empirical Examination of a Commercial Bank Loan Offer Function," *Studies in Portfolio Behavior* (New York: John Wiley and Sons, Inc., 1967), p. 165.

⁷The study is based upon financial statements of 100 corporations for 1975. About 60 percent of these firms reported borrowing under compensating balance requirements. Of the other firms, about half had no short-term domestic bank borrowings. See Richard Kolodny and Peter Seeley, "The

Evidence that firms receive implicit interest on their demand deposit balances in the form of services is available from studies of account analysis by banks. A bank conducting account analysis keeps records on services used by a business customer, calculates the average level of demand deposits in the customer's account that are necessary to compensate the bank for services used, and analyzes the customer's demand deposit balance to determine whether it is generally large enough to compensate the bank for the services used without charging explicit fees. A study of account analysis at 130 major U.S. banks conducted by the Kansas City Federal Reserve Bank in July 1976 lists balance requirements for 31 separate corporate services.⁸

Indirect evidence that banks have been paying implicit interest on demand deposits is found in a study by Klein.⁹ He estimated an implicit rate of return that banks would have been paying on demand deposits under the assumption that banks are competitive. Equations which estimate the aggregate demand for money were improved significantly by including this estimated rate of return on demand deposits as an explanatory variable. Klein's study indicates that, in adjusting cash holdings to changes in interest rates, the public behaves as though banks are paying interest on demand deposits. His evidence does not apply specifically to the demand for money by business firms, but since a large proportion of money holdings are by business firms, conclusions concerning determinants of the total demand for money would tend to hold for the money holdings of business firms.¹⁰

Compensating Balances as Working Balances

Surveys of Banking Practices — Several studies of how banks calculate and enforce compensating balance requirements were conducted in the 1950s and 1960s, based on interviews with bankers or questionnaires filled out by bankers. Those studies indicated that compensating balance requirements were com-

Integration of Compensating Balance Theory and Monetary Theory," State University of New York at Binghamton, mimeographed, May 1976.

⁸For a discussion of methodology in the account analysis study, see Robert E. Knight, "Account Analysis in Correspondent Banking," *Monthly Review*, Federal Reserve Bank of Kansas City (March 1976), pp. 11-20.

⁹Benjamin Klein, "Competitive Interest Payments on Bank Deposits and the Long-Run Demand for Money," *American Economic Review* (December 1974), pp. 931-49.

¹⁰In 1976, business firms were estimated to hold about 60 percent of the demand deposits of individuals, partnerships, and corporations.

mon in bank lending agreements with business firms, especially among large banks lending to large firms.¹¹ The bases on which compensating balance requirements are determined vary among banks, as proportions of actual borrowings, credit lines, or both. Whatever the amount of compensating balances, the surveys revealed that banks generally allowed firms to meet these requirements with *average* annual balances. The primary exception was arrangements with finance companies, which were often required to hold minimum compensating balances.¹²

A survey of compensating balance practices conducted by Burns in 1971 yields results which are very similar to those of the older studies cited above.¹³ His survey included 109 banks in the Eleventh Federal Reserve District. All banks in the survey with total deposits over \$500 million required compensating balances of borrowers, whereas less than half of the banks with total deposits under \$50 million did so. All of the banks with total deposits over \$100 million allowed firms to meet compensating balance require-

ments by using average deposit balances, whereas about 20 percent of the smaller banks that use compensating balance requirements required minimum balances.

Studies of the Demand for Money by Firms — Two recent studies examine the nature of compensating balance requirements by estimating the influence of the level of bank loans by individual firms on their demand for money balances.¹⁴ Both studies use data from quarterly reports made by firms to the Securities and Exchange Commission. The money balances reported by firms (as of four days each year at quarterly intervals) are estimated as a function of sales or production, short-term interest rates (as measures of the opportunity cost of holding money), holdings of liquid assets, and the level of bank loans outstanding. The quarterly observations are for individual firms.

Bank debt is included as an independent variable to test the influence of compensating balance requirements on money holdings of firms. If banks impose minimum compensating balance requirements on firms, there would tend to be a positive relation among firms between their loans from banks and their demand deposits at any point in time. However, if compensating balance requirements were not enforced, or if they were enforced as average balance requirements, there would be no basis for expecting a positive relation between the deposit balances and bank loans outstanding. Instead, demand deposit balances would fluctuate from day to day, and bank loans outstanding would also be variable for many of the firms in the study.

The influence of bank loans on the money holdings of firms was found to be either negative or insignificant, while other variables were found to have the expected influences. These results are inconsistent with the view that banks impose minimum compensating balance requirements on firms.

Additional Evidence on Compensating Balances —

A survey of business loans at banks in the St. Louis area was conducted by the Federal Reserve Bank of St. Louis in the spring of 1968.¹⁵ That survey includes information on total loans outstanding by individual

¹¹Nevins D. Baxter and Harold T. Shapiro, "Compensating-Balance Requirements: The Results of a Survey," *Journal of Finance* (September 1964), pp. 483-96; Caroline H. Cagle, "Credit Lines and Minimum Balance Requirements," *Federal Reserve Bulletin* (June 1956), pp. 573-79; F. P. Gallot, "Why Compensating Balances? Part II," *Bulletin of the Robert Morris Associates* (August 1958), pp. 309-19; William E. Gibson, "Compensating Balance Requirements," *National Banking Review* (March 1965), pp. 387-95; Douglas A. Hayes, *Bank Lending Policies: Issues and Practices* (Ann Arbor, Michigan: Bureau of Business Research, University of Michigan, 1964); Donald Hodgman, *Commercial Bank Loan and Investment Policy* (Champaign, Illinois: Bureau of Economic and Business Research, University of Illinois, 1963), pp. 24-26; Thomas Mayer and Ira O. Scott, Jr., "Compensating Balances: A Suggested Interpretation," *National Banking Review* (December 1963), pp. 157-66.

¹²By experience, banks can anticipate that, given the demand by firms in most industries for short-term credit and transactions balances, their average demand deposit balances will be large enough, in relation to their average borrowings, to make the combined business with those firms profitable, even when lending to them at preferential rates. The demand for short-term credit relative to transactions balances for money is higher for finance companies than for firms in many other industries. If banks allowed firms in financial industries to use their demand deposits as working balances with no minimum deposits required, they could not anticipate profitable business with such firms if their loans were at the preferential rates given other depositors. Therefore, financial firms that prefer the prestige of being prime borrowers hold demand deposit balances at the lending banks and accept minimum deposit balance restrictions. See Jack M. Guttentag and Richard G. Davis, "Compensating Balances," *Monthly Review*, Federal Reserve Bank of New York (December 1961), pp. 205-10; Davis and Guttentag, "Are Compensating Balance Requirements Irrational?," *Journal of Finance* (March 1962), pp. 121-26.

¹³Joseph E. Burns, "Compensating Balance Requirements Integral to Bank Lending," *Business Review*, Federal Reserve Bank of Dallas (February 1972), pp. 1-8.

¹⁴Tim Campbell and Leland Brondsel, "The Impact of Compensating Balance Requirements on the Cash Balances of Manufacturing Corporations: An Empirical Study," *Journal of Finance* (March 1977), pp. 31-40; C. Robert Coates, *The Demand for Money by Firms* (New York: Marcel Dekker, Inc., 1976), pp. 148-54.

¹⁵Detailed results from this study are available from the author upon request.

borrowers, their average demand deposit balance during the month of the survey if they had a demand deposit account where they borrowed, activity in those demand deposit accounts, and the industrial classification of borrowers.

Data from this survey can be used to analyze the nature of compensating balance requirements. One approach is to examine the distribution of the ratios of demand deposit balances to loans outstanding among individual borrowers that have demand deposit accounts where they borrow. Data from the survey provide approximations to the demand deposit balances and loans outstanding of borrowers as of a point in time, since the measure of demand deposit balances is average balances over a month, and loans outstanding are reported as of the end of that month.

If banks impose minimum compensating balance requirements, the observed deposit-to-loan ratios of individual customers at any point in time would be at or above the required compensating balance ratios. Firms observed to have ratios of demand deposits to loans outstanding higher than the required compensating balance ratios would be those that had just received large cash inflows at the time of the survey and those that generally hold higher deposit balances in relation to their loans outstanding than banks require. However, if compensating balance requirements are enforced in terms of average balances, the deposit-to-loan ratios of individual borrowers at a point in time would be distributed widely above and below the average compensating balance ratios that are required.

In this study deposit-to-loan ratios were found to be distributed widely above and below the ratios mentioned in the banking literature as required compensating balance ratios. For instance, at most banks in the survey, over half of the customers with demand deposit accounts where they borrowed held demand deposit balances which were less than ten percent of their loans outstanding. One exception to this involves firms in financial industries. Their deposit-to-loan ratios tended to be more concentrated in the range from 10 percent to 30 percent than for other borrowers, supporting the view expressed above that minimum compensating balance requirements are enforced more frequently on financial firms than on firms in other industries.

Another approach to investigating the nature of compensating balances involves analyzing the "idle" demand deposit balances held by business firms. If

compensating balances just represent part of bank loans that borrowers are required to hold as demand deposit balances in some fixed proportion to the amount of their loans, borrowers would not have incentives to hold their working deposit accounts where they borrow. Under such conditions demand deposit accounts of business firms that borrow at banks where they do not keep their working balances would be "idle," that is, have no debits or credits. On the other hand, the demand deposit accounts of business borrowers would tend to be active accounts, that is, have frequent debits and credits, if compensating balances are generally the working balances of firms.

Survey results indicate that for banks of various sizes, idle demand deposit balances of their business borrowers are one percent or less of their total demand deposit liabilities. Also, of the idle demand deposit balances held by firms, a substantial proportion was held by firms in financial industries. Thus, almost all of the demand deposit balances held by business firms at banks where they borrow appear to be working balances.

IMPLICATIONS OF INTEREST PAYMENTS ON DEMAND DEPOSITS FOR BANKS AND THEIR BUSINESS CUSTOMERS

Would Banks Pay Explicit Interest on Demand Deposits?

The evidence presented above indicates that banks are paying implicit interest on the working balances of business firms. Given that banks and their business customers have found means of circumventing the prohibition of interest on demand deposits, would banks be induced to pay explicit interest on demand deposits if given permission to do so, or would banks and their customers be satisfied with current arrangements for compensating depositors? Implications of interest on demand deposits for banks and their business customers developed in the following sections are based upon the assumption that banks would pay explicit interest on demand deposits of business firms if given permission to do so.

One set of circumstances under which banks would tend to offer explicit interest would be if, under the prohibition on interest payments, banks had been offering their depositors different implicit interest rates. Banks could do so if they could take advantage of varying degrees of information that customers have

about banking services that are available in return for their deposit accounts. The prohibition of interest payments is conducive to such discrimination. Banks may be able to offer business customers different combinations of credit terms and services without variation in implicit returns becoming common knowledge among bank customers, because of the individualized nature of such packages of credit terms and services.

However, if banks began offering explicit interest on demand deposits and pricing services separately, customers could more easily make comparisons among banks, and therefore, opportunities for discrimination among customers would be reduced. Banks especially interested in expanding the scope of their operations might begin offering explicit interest on deposits to attract customers that had been receiving relatively small implicit returns on their deposit balances at other banks. Those banks attempting to attract more deposits would be able to communicate information to potential customers concerning explicit interest to be paid on demand deposits more easily than information on the availability of various combinations of loan terms and bank services. Under such conditions there would be competitive pressures on other banks to offer explicit interest on demand deposits.

The case for assuming that banks would pay explicit interest on demand deposits does not depend, however, upon bank discrimination among customers. Even if banks are currently paying competitive implicit rates of interest on the demand deposit balances of all firms, there would also be reasons to expect that banks would begin paying explicit interest if given permission to do so.

If banks set no floor on loan rates to depositors, firms could receive all of their implicit interest on demand deposits in the form of bank loans at relatively low interest rates. Firms with small loan demand relative to their average demand deposit balances would be allowed to borrow at relatively low interest rates in order to provide the same implicit return as that to depositors with relatively larger loan demands.

However, banks generally set the prime rate as the minimum loan rate for all borrowers, including depositors, and surveys indicate that required compensating balance ratios generally vary between 10 percent and 20 percent. Therefore, the benefit a firm receives from its bank in terms of preferential loan terms is limited by its demand for bank loans at the prime rate. Customers which have low loan demands relative to their average demand deposit balances would receive any

additional implicit interest in the form of services at no cost or at fees lower than costs to banks of providing the services. Given this pricing structure, the marginal units of bank services would be of little value to many firms, and thus they would not receive the full value of their implicit interest. Such firms would benefit from receiving their interest on deposits directly as cash payments and purchasing bank services at fees high enough to cover costs (including normal returns). With explicit fees a firm would demand bank services only up to the point at which the value to the firm from an additional unit of service equals the cost to the bank of providing the service.

The history of bank competition for demand deposits prior to the 1930s can perhaps provide some guidance on whether banks would pay explicit interest on demand deposits. Major money center banks frequently agreed to limit rates of interest on demand deposits, but often those agreements were undermined quickly by competitive behavior.¹⁶ If banks failed at limiting rate competition on demand deposits prior to the 1930s, when anti-trust prosecution of such collusive agreements was more lax, they probably would not be able to limit interest rate competition for demand deposits now, unless government sets the rate.

Effects on Bank Profits

The effects that explicit interest payments on demand deposits of business firms would have on earnings depends upon the implicit interest rates they have been paying. With limited information publicly available on individual bank-customer relationships, it is difficult to estimate the implicit interest rates banks are now paying. For banks now paying a competitive implicit interest rate, interest on deposits would have minimal effects on earnings. The staff of the Board of Governors made a rough estimate that explicit interest payments on demand deposits would increase the net costs of business demand deposits to banks by no more than one-half of one percent.¹⁷

Effects on Bank Loan Interest Rates

The analysis above has implications for another issue involved in the payment of interest on demand deposits: would banks raise their interest rates on

¹⁶Albert H. Cox, Jr., *Regulation of Interest on Bank Deposits* (Ann Arbor, Michigan: Bureau of Business Research, University of Michigan, 1966), pp. 1-11.

¹⁷"The Impact of the Payment of Interest on Demand Deposits," pp. 44-45.

loans to offset part of their increase in interest costs, if the prohibition of interest payments on demand deposits was lifted, and if they did so, what would be the reason? One condition under which banks might raise their loan rates in response to interest on demand deposits would be if banks have some monopoly power in the market for credit. If interest on demand deposits would raise the marginal costs of lending for banks, they would tend to raise their interest rates on loans, although not necessarily by enough to fully cover the increased cost of attracting funds.

A second possibility is that banks would invest more of their assets in higher risk, higher rate loans in order to cover the increased costs of interest payments on demand deposits. Concern that interest on demand deposits would induce banks to make high risk loans has been one of the reasons for prohibiting such interest payments since the early 1930s.¹⁸

However, there is a third condition under which banks would raise interest rates on some of their loans which would reflect neither monopoly power nor increased risk. If banks are currently paying implicit interest to business firms on their demand deposit balances in the form of lower loan rates than those offered other borrowers, banks would tend to raise the loan rates offered to their business depositors relative to the loan rates offered to other borrowers when they

began paying explicit interest on demand deposits. Such a reaction by banks would indicate that they had been competing indirectly for demand deposits under the prohibition on explicit interest payments, and not necessarily that banks have monopoly power in the market for credit or that banks would be making riskier loans.

CONCLUSIONS

Studies of banking practices indicate that firms receive loans at preferential rates and bank services at low fees when they borrow or use services at banks where they keep demand deposit balances. Those studies also report that the demand deposit balances which firms hold as compensation for preferential loan rates or low-priced services are, in general, their working balances. These observations support the view that banks have been circumventing the prohibition of interest payments in competing for the demand deposit balances of business firms.

If banks were permitted to pay interest on the demand deposit balances of business firms directly, there would be some incentives for banks to do so. If banks did begin paying explicit interest, they would tend to offer depositors and nondepositors the same loan terms, and end the practice of requiring compensating balances of business borrowers. Banks that would substitute explicit for implicit interest payments would raise the interest rates they charge business depositors for loans and increase their fees on services. For banks currently paying competitive interest rates on the demand deposits of business firms through indirect means, payment of explicit interest would have small net effect on earnings.

¹⁸Studies by Benston and Cox found that evidence from the 1920s and 1930s does not support the hypothesis that banks which paid higher interest rates on deposits had more risky assets or that banks which paid higher interest rates on deposits had greater tendency to fail. See George J. Benston, "Interest Payments on Demand Deposits and Bank Investment Behavior," *Journal of Political Economy* (October 1964), pp. 431-49, and Cox, *Regulation of Interest on Bank Deposits*.

APPENDIX

Are Minimum Compensating Balance Requirements Rational?

This appendix demonstrates that both a bank and borrower could benefit from eliminating minimum compensating balance requirements and, alternatively, that both banks and their customers can benefit from compensating balance requirements set in terms of average balances.

Suppose a bank has excess reserves of \$840 which it plans to lend to its customers. One customer wishes to

borrow \$800. If the bank imposes a compensating balance requirement of 20 percent, it would lend the customer \$1,000 and require that \$200 be held in demand balances. If the bank's marginal reserve requirement on demand deposits was 20 percent, its required reserves would go up by \$40 due to creating the \$200 of net demand deposits, thus reducing the bank's excess reserves to zero. Thus, the bank would use the \$840 in excess reserves by making \$800 available to the customer to use

as it wishes and by creating \$200 in compensating balances, which would increase its required reserves by \$40.

If the bank imposed minimum balance requirements, the customer would not be allowed to draw its demand balance below \$200. Those balances would not be useful to the customer for conducting transactions, and therefore, the customer would receive no benefit from holding them. Suppose the bank charges the customer 8 percent interest on the \$1,000. To the borrower this is an effective interest rate of 10 percent since he pays \$80 in interest annually, on the \$1,000 loan, but has use of only \$800.

Under these conditions, both the bank and the customer could benefit from eliminating the compensating balance requirement. If the bank lent \$800 to the customer without requiring a demand balance, the bank would still have \$40 in excess reserves to invest, and the bank and the customer could share interest on the \$40. The customer would benefit from any reduction in its interest rate on the \$800 loan below 10 percent.

On the other hand, suppose the customer holds a \$200 average demand deposit balance and is willing to move that working balance account to the bank with \$840 in excess reserves if that bank will offer a favorable interest rate on a loan of \$800. Under such an arrangement the bank would lend \$800 to the customer, \$40 in reserves would be required on the \$200 addition to the bank's demand deposit liabilities, and the bank would, on average, have \$200 in additional excess reserves to invest.

Suppose the market rate of interest on loans to non-depositors is 10 percent. What rate of interest would the bank charge the customer with the \$200 average demand deposit balance on its loan of \$800? The answer depends upon the degree of competition among banks. As one case, suppose banks are perfectly competitive. Under that assumption, all benefits from compensating balance agreements are passed on to depositors. The bank in this example could increase its earning assets by \$160 under the compensating balance agreement; the customer deposits \$200, and as an offsetting effect, required reserves go up by \$40. At a market rate of 10 percent, the bank can earn an additional \$16 per year. Under perfect competition, the bank would charge the depositor \$64 per year on the \$800 loan, or 8 percent, which is \$16 below what the customer would be charged on the \$800 loan as a nondepositor. With an annual savings of \$16 in interest costs and a \$200 average demand deposit balance, the implicit interest rate on demand deposits is 8 percent.

In this example all benefits from the compensating balance agreement go to the depositor. However, if the bank offers the customer a smaller reduction in its loan interest rate below the market rate, both the bank and the customer can benefit from a compensating balance agreement compared to the situation with no compensating balance agreement. For instance, suppose the bank is willing to lend \$800 to the customer with the \$200

average demand deposit balance at \$70 interest per year, instead of \$64 as in the example above. The customer would have paid \$80 interest per year as a nondepositor, and therefore, is better off under this compensating balance agreement than it would be as a nondepositor. If the bank did not enter into this compensating balance agreement, it could earn \$84 from lending its \$840 of excess reserves to nondepositors. However, under this compensating balance agreement, the bank would earn \$70 from lending \$800 to the depositor and an additional \$20 per year from investing the depositor's average demand deposit balance.

This example illustrates how compensating balance agreements involve implicit interest payments on demand deposits under the following conditions:

- (a) a depositor gets a lower loan rate than it would as a nondepositor,
- (b) the bank allows the customer to satisfy the compensating balance requirement with its average balances, and
- (c) the bank attracts additional reserves through the compensating balance agreement.

However, compensating balance agreements can involve implicit interest payments on demand deposits even if a bank loans a customer the compensating balance, as illustrated below.

Assume that all conditions are the same as in the example above except that the bank lends the customer \$200 which is to be held at the bank as a working balance. The customer also borrows \$800 for other purposes, thus borrowing \$1,000 in total. This transaction can be analyzed like that in the example above by treating the \$1,000 loan as being in two parts: first, the competitive bank lends the customer \$200 for a working demand deposit balance at the market interest rate of 10 percent, and then lends \$800 at 8 percent, taking into consideration the \$200 average compensating balance. The average interest rate on the two loans would be 8.4 percent, with interest payments of \$84 per year. Since the customer would save \$16 per year by holding its average demand deposit balance of \$200 at the bank at which it borrows, its implicit interest return on demand deposits would be 8 percent.

Thus minimum compensating balance requirements are unprofitable for banks since by creating demand deposit balances, which borrowers would hold as idle balances, banks increase their required reserves. Compensating balance requirements based upon the average balances of borrowers can be profitable for banks and their customers since the firms may use their demand deposits as compensating balances or as working balances, and banks retain the demand deposit liabilities they create from the excess reserve they lend to their customers. Through use of such compensating balance agreements banks and their customers are able to circumvent the prohibition of interest payments on demand deposits.