Deposit Interest Ceiling and the Cost of Bank Borrowing*

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1. Introduction

The stated objective of Congress in assigning the Federal Reserve Board and the Federal Deposit Insurance Corporation the joint authority to impose a ceiling on interest rates paid on commercial bank deposits was narrow indeed. Created under the power of the Banking Act of 1933, Regulation Q was designed to control the cost of bank borrowing by curbing competition for deposit liabilities, thought to induce investment in high-yield risky assets. Such alleged practices were widely perceived at the time as having led to the unprecedented wave of bank failures of 1929-30 (see Friedman and Schwartz [1963, pp. 443-44], Benston [1964], and Cox [1966]). Although the action of Congress in providing for the establishment of the interest ceiling was aimed solely at reducing bank costs, the implementation of the law in the past two decades implies a broader set of regulatory objectives. Recent episodes indicating substantial effects of the ceiling on the allocation of funds among various deposit categories and, more generally, among financial intermediaries and other financial markets led contemporary observers, including Federal Reserve officials, to characterize the ceiling as an important tool of monetary policy [e.g., Tobin (1970)]. This characterization represents an implicit yet important shift in regulatory focus, from bank cost of interest paid to depositor benefit from interest received. In principle, it is possible that the ceiling is effective when viewed in terms of the regulator’s newly defined objectives, yet ineffective in terms of the legislator’s intent. Specifically, the purpose of the law would be defeated if competition by non-cash means eliminates the economic rent created by the constraint on cash interest payment, even though the value of interest received is diminished due to the use of inferior payment methods.

The purpose of this study is to determine empirically the effect of the Banking Act on the cost of bank borrowing, thus assessing its impact in terms of the legislative intent behind the interest ceiling. Section 2 deals with the determination of deposit interest rates in the absence of legal restrictions. It also contains a brief review of methods of payment in kind available to a bank seeking to circumvent a binding ceiling. Empirical implications of the analysis are considered in Section 3, followed by a description of the data in Section 4. Test results reported in Section 5 deal with the effect of the Banking Act on the payment of interest through vari-
ous methods and the contribution of the ceiling to this effect. Empirical results presented in this paper indicate that the Banking Act has been virtually ineffective in constraining bank costs. In particular, a) the law has effected only a 13 percent reduction in the cost of soliciting deposits. This finding is explained by results showing that b) cash payments represented only 15 percent of the total interest paid before 1933 and 11 percent since, while c) preferential credit terms amounted for as much as 80 percent of the interest paid before 1933 and 72 percent since. In view of the composition of interest paid before 1933, it is argued that the ineffectiveness of a regulatory constraint focusing on cash payment of interest could have been predicted prior to enactment. Results further indicate that d) the interest ceilings has contributed to the overall effect of the Banking Act on the cost of bank borrowing, especially during periods of high interest rates. Although these results do not extend the extent of its contribution, they suggest that estimates of the “average” effect of the Banking Act tend to underestimate the potential impact of a removal of the ceiling if it is timed to coincide with high market interest rates.

2. Theory

A. Deposit Interest under Competitive Behavior

Consider the following simplified balance sheet of a commercial bank with zero net worth. The bank’s assets are comprised of loans and investments $I$ providing rate of return $r$, deposits held in other banks $D'$ yielding $r'$, and non-interest bearing reserves $R$. The liabilities of the bank are represented by demand and time deposits $D$ held by the non-bank private sector, the federal government, and other banks (for a listing of notations see the Glossary). The bank’s marginal cost of producing the flow of monetary services associated with a dollar deposit is approximated by the income foregone by virtue of the bank’s use of that dollar, that is,

$$MC = \frac{R}{D'} \times (1 - r) \frac{1}{D} + (1 - r') \frac{D'}{D}$$

where $i$ is the yield of a hypothetical asset whose return is entirely pecuniary. This marginal cost of is weighted average of three rates of marginal opportunity costs: $(1 - r)$, and $(1 - r')$. The first rate, $i$, is the cost of holding reserves assumed to earn no pecuniary return; the second, $(1 - r)$, the cost associated with loans and investments, and the third, $(1 - r')$, the cost entailed by holding deposit assets. As indicated by equation (1), the marginal cost of producing monetary services is assumed to exclude costs not marginal to the deposit balance but which may be incurred in servicing accounts in which the balance is carried. Such service costs are assumed to be directly charged to the depositor.

In the absence of legal restrictions upon the payment of interest on deposits, competitive forces induce the bank to pass on to its depositors the entire marginal profit on deposit accounts. As a result, customers’ marginal pecuniary cost of holding a dollar of deposits equals the bank’s marginal cost of producing the monetary services yielded by that dollar. This equilibrium condition is given by

$$i - r' = MC$$

where $r'$ is the average rate paid on bank deposit liabilities. Substitution of (2) into (1) yields

$$(i - r') = \frac{R}{D'} \times (1 - r) \frac{1}{D} + (1 - r') \frac{D'}{D}$$

In order to obtain a solution for $r'$ it is assumed that the same ratio of demand to time deposits is maintained on both sides of the bank’s balance sheet. Since under competitive conditions only one rate is paid on each type of deposits, it follows that $r'' = r'' = r'$, where $r''$ is the average rate paid on deposits in the absence of legal restrictions. Substitution of $r'$ for $r''$ and $r''$ in (3) yields

$$r' - r' \left( 1 - \frac{R}{D'} \right) + (r' - r') \frac{D'}{D}$$

where the control-free deposit rate is expressed in terms of observable variables. The rate given by (4) is adjusted in a minor fashion when applied to the situation of a bank which is a member of the Federal Reserve System in order to account for the subsidy received by such a bank in the form of special privileges [cf. Klein (1974)]. If $F$ is the amount borrowed at the preferred rate $r'$ rather than at the market borrowing rate $r$, the subsidy per dollar deposit is $(r' - r') \frac{F}{D'}$ and the adjusted control-free rate is

$$r' = r' \left( 1 - \frac{R}{D'} \right) + (r' - r') \frac{F}{D}$$

B. Interest Payment in Cash and in Kind

Deposit interest rate limits have been interpreted by regulatory authorities as applying primarily to the payment of interest in cash. If, however, a bank is induced to pay a percentage point of interest in kind for each percentage point which it may not pay in cash, it again is led into a position of earning zero marginal profit on deposit accounts.

3 Following Hodgman (1961), Klein (1970, 1973, 1974) uses the simplified formulation $r'' = (1 - R)/(1 - D')$. The difference between the two expressions is not eliminated by aggregation. This is the case even in a closed system in which banks maintain deposits only with each other.

4 Considering the insolvency nature of this subtraction, the change in the form of payment is likely to imply a decrease in the value of interest received even if competition assures no change in the gross rate paid. This effect has no bearing upon the present discussion, except for the requirement that the marginal value of interest received be at least positive.

5 For an analysis of the increased regulatory intervention following the depression see Friedman and Schwartz (1963), pp. 420-462.

6 For an analysis of the increased regulatory intervention following the depression see Friedman and Schwartz (1963), pp. 420-462.

7 "Innovations for the improvement of this practice is found in Federal Reserve Bank of Boston (1919-1960), Page and Wood (1966), Bell and Murphy (1967), Heilbronn (1968), Weitz (1969), and Berns and Santomero (1972)."
est payment can be attributed to its apparent limited effectiveness reflected in these features. Demand services do not maintain a fixed proportion to account balances, and thus, the cost of reselling these services is prohibitive. Service costs are typically small when translated to a rate of interest. 10

Compensating balance and preferential credit terms. Commercial lending arrangements commonly include a compensating balance provision specifying an average deposit balance to be maintained by the borrower for the duration of the loan. 10 Hodgman (1961) and Davis and Guttenag (1962, 1963) show that deposit balance requirements are consistent with profit maximization only if the bank reciprocates by cutting the rate charged on the loan while the terms of the agreement are freely negotiated between the parties. Friedman (1970) and Klein (1970, 1974) argue that this arrangement results in the payment of implicit interest whether or not it is designed to do so. Compensating balance provisions were known long before the ceiling went into effect (see Mayer and Scott (1963), and Gibson (1965)) and have remained in use under somewhat restrictive conditions since. The introduction of the ceiling marks the inception of the uniform prime lending rate [see Hodgman (1961)], a convention which, at least in principle, limits bank freedom in lowering individual loan rates to attract deposits. If alternative ways of adjusting the rate of implicit interest paid via this method (by increasing loan size and relaxing collateral requirements) are less economical, it can be argued that involuntary adherence to the prime convention may impede payment of implicit interest.

Other methods: Waiver of checking services and preferential credit terms are closely associated with demand as opposed to time deposits. Use of these methods prior to the late 1960's—the period during which the ceiling on time interest became binding for the first time—tends to support this conjecture. Since the use of avoidance methods aimed at time as well as demand deposits seems to have varied directly with market interest rates. Initially ranging from gimmicks directed at small deposits, such as frequent compounding of legal interest, to elaborate schemes attracting large deposits, such as transfer of deposits to foreign branches exempt from the ceiling, [cf. Friedman (1960)], these practices evoked little resistance by the Fed. With further increases in market interest rates in the late 1970's and the associated competitive pressure on banks, this resistance has all but disappeared, most recently inviting avoidance through open and effective devices such as writing checks on savings accounts. 11

3. Empirical Implications

Effective enforcement of the interest rate ceiling is expected to result in a situation in which changes in market interest rates are fully reflected in variations in bank operating earnings. The observed limited sensitivity of bank earnings to changes in market interest rates is interpreted by Friedman (1970) as evidence that banks successfully avoid the deposit interest rate ceiling. Banks are induced by competitive forces to substitute payment of interest in kind for payment in cash. As a result, changes in market rates of interest generate little change in bank earnings.

Overall payment of interest. Successful avoidance can be detected by comparing changes in potential operating earnings with changes in actual earnings, both measured before the deduction of cash interest payment. Changes in potential operating earnings, although not directly observable, are by definition equal to changes in potential investment revenue ∆(r). Thus any change in the amount of interest paid in kind is given by the difference between these changes and those of actual earnings ∆e, 11

\[
∆(r')D = ∆(r)I - ∆E
\]

where the change in the rate paid in kind is

\[
∆r = \Delta \left( \frac{r' - E}{D} \right)
\]

Since \( r' + r^e + r^e \), equation (6) is rewritten as

\[
\Delta \left( r' + \frac{r - E}{D} \right) + q \Delta \left( 1 - \frac{R}{D - D'} \right) + (r - r^e) \left( \frac{F}{D} \right)
\]

in which a change in the total rate paid ∆r is expressed as a fraction of the contemporaneous change in the hypothetical competitive interest rate ∆r'. The pre- and post-regulation value of q is estimated on the basis of this relationship. Since linearity in first differences implies linearity in original values, a test is conducted utilizing the following relationship in original values

\[
r' = \frac{r - E}{D} - \text{constant} + q \left( 1 - \frac{R}{D - D'} \right) + (r - r^e) \left( \frac{F}{D} \right)
\]

4. Data

Tests are conducted on annual time series of aggregate member bank data for the period 1919-1977, using the following empirical definitions.

Independent variable, equations (9) and (10)

\( R = \text{average dollar reserves held against demand and time deposits,} \)

bank opportunity cost includes revenue foregone, for example, due to reductions in loan rates in conjunction with compensating balance arrangements.
including vault cash
and reserves held with reserve banks;

\[ D = \text{average adjusted deposit liabilities,}
\]
including demand and time balances
held by the public,

\[ \text{and the federal government (including}
\]
time deposits of the postal systems,

\[ \text{and other banks.}
\]

\[ D' = \text{average deposit assets held by}
\]
member banks with member and other banks;

\[ r = \text{average market yield on 4-6 month prime commercial paper; this}
\]
choice of a "market" rate is
unavoidably arbitrary;

\[ F = \text{average Federal Reserve Bank}
\]
credit to members, extended by
discount through the Fed win-
dow.

\[ {\text{References:}} 1919-1942, \text{Friedman and Schwartz, Monetary Statistics, pp. 358-303, Table 25; the January-June 1939 average monthly for Nomoring Reporting Members is extrapolated on the basis of Weekly Reporting to Nomoring Report figures during the second half of 1919-1940, Federal Reserve Bulletin, tables entitled "Reserves and Liabilities of Banks in Lowering Cities," and "Reserves and Liabilities of Commercial Banks by Class"; the unannual average cash in vault of other banks is estimated by extrapolating the average cash balance calculated from the first table using the ratio of the cash figure of all Members to Weekly Reporting Members on the same date (twice a year); slightly different average would have been implied by Member Banks Call Data figures published in the Supplement, Section 2, Table 1(A), pp. 18-11, 1941-1977, see fev. 19.
\]

\[ {\text{Sources: 1919-1940, Supplement, Section 3, Table 1(A), p. 14, 1946-1951, Bulletin, tables entitled "Member Bank Reserves, FRB Credit, and Related Rates" and "Reserves and Borrowings, Member Banks", figures since 1961 include vault cash.}}
\]

\[ {\text{Sources: January-June 1919, Banking and Monetary Statistics, Table 18, p. 75; July 1919-December 1945, Friedman and Schwartz, Monetary Statistics, Table 35, columns 1, 2, 4, 506-515; 1946-1977, Bulletin, tables entitled "Principal Assets and Liabilities and Number of All Banks, by Class" and "Commercial Bank Assets and Liabilities." Deposits due from banks (DP); 1919-1938, Statistics, Table 18, pp. 72, 74; the 1919-1926 figures are adjusted upward to compensate for the missing data on foreign deposits, by extrapolating the average ratio between foreign and domestic deposits held by all Members during July-December 1926, Bulletin, Section 2, Table 1(A), pp. 10-11; 1967-1977, Bulletin, table entitled "Reserves and Liabilities of Large Commercial Banks"; the figures for June 1969 figures are increased by adding estimated all Member balances with foreign banks, calculated from the foreign balances held by Weekly Reporting Members during the same period, reported in the Bulletin, tables entitled "Assets and Liabilities of Large Commercial Banks and Assets and Liabilities of Banks in All Lowering Cities"; the calculations calls for estimating the ratio of foreign to domestic balances held by all Members to that held by Weekly Reporting Members in 1965-1986 (see above); July 1969-December 1977 figures are also increased by adding estimated balances held with foreign banks, which is done by extrapolating the average ratio to foreign to domestic balances held by all Members during January-December 1968, based on the above estimates of Foreign balances and available data on domestic balances. In the second step, the above estimated sums of deposit liabilities and assets for the period June 30, 1940-December 31, 1977, were adjusted upward to reflect the fact that beginning in the middle of 1942 banks reported interbank deposits on a net basis. It is assumed that the ratio of gross to net interbank deposits has not changed over time, and this ratio can be calculated (see Supplement, Section 2, p. 6).}
\]

\[ {\text{For data source, see fn. 17.}}
\]

\[ {\text{Sources: 1919-1951, New York City rates, Statisti-
\]

\[ {\text{Sources: 1919-1929, Statistics, Table 20, pp. 357-
\text{371); 1929-1960, Supplement, Section 1, pp. 50-60 (because of a discrepancy between June 30, 1942, figures are adjusted in the calculation of the first differences; when possible, a similar procedure was followed in the calculation of the variables); 1961-1977, Bulletin, table entitled "Reserves and Borrowings of Member Banks.}}
\]

\[ {\text{r'} = \text{average Federal Reserve Bank}
\]
discount rate on eligible paper;

\[ {\text{Dependent variable, equations (9) and (10)\}}
\]

\[ {\text{r' = average rate of cash interest paid on time and demand deposits held}
\]
by the public, the federal government, and banks; calculated by dividing the annual sum of interest paid by the average deposit liabil-
ity balance;}

\[ {\text{r'} = \text{average loans and other interest-
\text{bearing investments, excluding depo-
\text{sits held in banks (DP),}}\]

\[ {\text{E = operating earnings before cash interest payment on deposit liabil-
\text{ities;}}\]

\[ {\text{E' = service charges on deposit ac-
\text{counts; reported separately only
\text{since 1983;}}\]

\[ {\text{E = interest and discount on loans; due
\text{to official changes in variable defini-
\text{tion, data is available in first differences only.}}\]

\[ {\text{5. Tests}}
\]

\[ {\text{The statistical analysis employs the follow-
\text{ing dummy variables in conjunction with vari-
\text{ables appearing in equations (9) and (10);}}\]

\[ {\text{D = intercept dummy, assuming the value
\text{0 in pre-regulation years}}\]

\[ {\text{Sources: 1919-1941, Statistics, Table 115, pp. 439-
\]

\[ {\text{For data source: 1919-1941, Statistics, Table 85,
\]

\[ {\text{Sources: 1919-1941, Statistics, Table 16, pp. 72, 74; 1942-1962, Supplement, Section 2, pp. 10-11; 1963-
\text{1977, Bulletin, tables entitled "Reserves and Liabilities and Number of All Banks, by Class" and "Commercial Bank Assets and Liabilities."}}\]

\[ {\text{Data sources of this and the following two variables are the same as those of r' (see fn. 12).}}
\]

\[ {\text{The average rate of two successive years is used in}
\text{comparison with first differences.}}
\]

\[ {\text{The statistic D}D = \left( D_H - D_L \right) \text{is used with first}
\text{differences. Similar notation is used for the next two}
\text{variables in the difference form.}}\]
TABLE 1 Overall Payment of Interest, 1919–1977

<table>
<thead>
<tr>
<th>Date</th>
<th>Borrower Summary Number</th>
<th>Current or Interest Bear.</th>
<th>Average Interest</th>
<th>Variance in</th>
<th>Stage Deviations</th>
<th>$^2$</th>
<th>Source of</th>
<th>Change of</th>
<th>Var.</th>
<th>$\chi^2$</th>
<th>$\chi^2$</th>
<th>$\chi^2$</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>2.194</td>
<td>2.631</td>
<td>2.937</td>
<td>3.387</td>
<td>4.178</td>
<td>5.132</td>
<td>4.984</td>
<td>4.983</td>
<td>4.986</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\beta$</td>
<td>2.194</td>
<td>2.631</td>
<td>2.937</td>
<td>3.387</td>
<td>4.178</td>
<td>5.132</td>
<td>4.984</td>
<td>4.983</td>
<td>4.986</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2.194</td>
<td>2.631</td>
<td>2.937</td>
<td>3.387</td>
<td>4.178</td>
<td>5.132</td>
<td>4.984</td>
<td>4.983</td>
<td>4.986</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Variables are expressed in percentage points. Numbers in parentheses are $\lambda$-values.

perhaps as a result of the simplicity of the underlying model and the use of annual data. This estimated coefficient, rather than unity, is used as a benchmark for assessing the effect of the Banking Act upon the overall payment of interest. This effect is ascertained by examination of the estimated coefficient of $\gamma$ in the same regression. With a value of $-0.160$, which is significant at the 0.1 level, this coefficient indicates that the cost of soliciting deposits has been 13 percent lower since 1933 than it would have been in the absence of the body of regulations produced by the Act.

Regressions (i) and (ii) are designed to detect the effect of the interest ceiling, as opposed to the entire regulatory package, upon the decline of $q$. This is done in an indirect manner based on the following arguments. To the extent that the ceiling has contributed to the decline of $q$, that decline is likely to be greater in years typified by a more binding interest constraint. Hence the "tightness" of the constraint by the difference $\gamma - $, a dummy variable $D_2$ is set at zero for years in which the difference is the median difference, and at one for years in which it is above the median difference. Regression (iii) additionally contains the interaction dummy $DD$ and is interpreted in the following way. The coefficient of $\gamma$ and the summed coefficients of $\gamma$ and $\gamma DD$ give the pre-control $q$ under loose and tight interest constraints, respectively. Similarly, the summed coefficients of $\gamma$ and $\gamma DD$ give the post-control $q$ under loose interest constraint, while the summed coefficients of $\gamma$, $\gamma$, and $\gamma DD$ give the post-control $q$ under tight interest constraint.

The contribution of the ceiling to the decline in $q$ is confirmed by the greater decline observed in post-control years characterized by a tight interest constraint, as indicated by the significant coefficient of $\gamma DD$ valued at $-1.932$. Although this result is tentative from a statistical viewpoint due to strong collinearity among the slope variables (suggested by similarity of the sum of their coefficients in the three regressions), it is supported by the evidence of disintermediation and other market phenomena indicating a decline in the fraction of interest received during periods of high interest rates since the late 1960's (e.g., Bulletin, September 1978).

Equations (i), (iv), and (v) are estimated utilizing variables in first-differences form as in equation (9). These regressions show a pattern of results similar to that of the first set of regressions. The pre-control $q$ indicated by regression (iv) is $1.205$ which is virtually identical to that given by regression (i). Similarly, the post-control change in $q$ is $-0.142$, a 12 percent decrease as compared with the 13 percent decrease indicated by regression (i).

B. Specific Payment Methods

Test results based on equation (9) pertaining to specific payment methods are reported in Table 2. The first-differences form is selected to avoid inconsistencies in the data, produced by official changes in the definition of a number of variables. Interpretation of the results assumes an additive relationship among rates of interest paid via various methods, including those tested for here. This assumption is reflected in the use of disjoint components of the operating earnings figure in calculating the three dependent variables. Representing only three out of an unknown number of potential methods, slope coefficients estimated for these methods may not sum to the total value of $q$ estimated for the overall interest payment.

Cash interest. The coefficient of $\gamma$ in regression (i), showing the contribution of cash interest to the overall pre-regulation interest payment, is positive and significant at the 0.05 level. Its value of $1.179$ represents only 15 percent of the overall $q$ estimated by regressions (i) and (iv) in Table 1. This surprisingly low figure suggests that the limited effect of a cash interest ceiling on the total interest paid, as reflected in Table 1, could have been predicted as early as 1933. The effect of the Banking Act on this form of payment is given by the coefficient of $\Delta D$, which is negative but insignificant. Its insignificance is consistent with an interest ceiling that is insensitive to fluctuations in market and reserve rates. Its value of $-0.065$ implies a post-control coefficient of $-1.144$, representing only 11 percent of the overall $q$ estimated for the same period. This represents a slight decrease as compared with the pre-control figure of 15 percent.

Remitted account charges. Data limitations do not allow testing for the use of this method in the pre-regulation era. Low and insignificant coefficients of $\alpha$ and $\beta$, in regressions (ii) and (iii) support theoretical arguments (Section 2) suggesting that remittance of account charges is an unaesthetic way of paying interest on deposits.

Preferential credit terms. The coefficients of $\Delta D$ and $\Delta \alpha D$, in regression (iv) are highly significant and have the expected signs. In view of results of regression (iv) in Table 1,

TABLE 2 Payment Method Parameters

<table>
<thead>
<tr>
<th>Regression and Period</th>
<th>Dependent Variable</th>
<th>Equation Summarized</th>
<th>Constant Term</th>
<th>Intercept Coefficient</th>
<th>Variable</th>
<th>Stage Deviations</th>
<th>$^2$</th>
<th>Source of</th>
<th>Change of</th>
<th>Var.</th>
<th>$\chi^2$</th>
<th>$\chi^2$</th>
<th>$\chi^2$</th>
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</thead>
<tbody>
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<td>Cash interest</td>
<td>1919–1937</td>
<td>$\gamma$</td>
<td>0.117</td>
<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
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<tr>
<td></td>
<td>1938–1947</td>
<td>$\beta$</td>
<td>0.117</td>
<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
<td>1.078</td>
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<tr>
<td></td>
<td>1948–1954</td>
<td>$\gamma$</td>
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<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
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<tr>
<td></td>
<td>1955–1960</td>
<td>$\gamma$</td>
<td>0.117</td>
<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
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<tr>
<td></td>
<td>1961–1967</td>
<td>$\gamma$</td>
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<td>0.017</td>
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<td></td>
<td>1968–1977</td>
<td>$\gamma$</td>
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<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
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<td></td>
<td>1919–1937</td>
<td>$\Delta D$</td>
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<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
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<td>1948–1954</td>
<td>$\Delta D$</td>
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<td>$\Delta D$</td>
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<td>1961–1967</td>
<td>$\Delta D$</td>
<td>0.117</td>
<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
<td>0.003</td>
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<td>1968–1977</td>
<td>$\Delta D$</td>
<td>0.117</td>
<td>0.002</td>
<td>0.017</td>
<td>0.003</td>
<td>1.078</td>
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Note: Variables are expressed in percentage points. Numbers in parentheses are $\lambda$-values.
these coefficients show that preferential credit terms have been the most important method of payment, contributing 80 percent of the interest paid prior to 1933 and 73 percent thereafter. The decline in the relative importance of this method is surprising in view of the regulators’ focus on overt payment of interest. It may be attributable to the use of the prime rate convention to limit covert payment by tying preferential credit terms to the maintenance of compensating balances, a method widely used prior to the regulation. Regression (iv) provides evidence concerning the effect of this limitation on the extent of interest payments through this method.

The foregoing interpretation of the prime rate convention suggests that the combination of a deposit rate ceiling and a lending rate floor should limit interest payment through preferential credit terms more effectively during periods of high interest rates. In principle, the prime rate could be set sufficiently low to accommodate rate concession to all customers, including those characterized by low non-preferential rates. Yet, consistent with the above interpretation, casual observation showing a stable rate differential between the prime and various market rates indicates that the proportion of allowable concession limited by the prime floor is inversely related to the level of those rates.

Based on this interpretation of the role played by the prime rate, results reported in regression (vi) offer a meaningful explanation for the results of regression (iv). For low-rate years, the post-control coefficient of interest paid through preferential credit terms ($0.726 + 0.368 \cdot 1.094$) is significantly higher than the pre-control coefficient ($0.726$). For high-rate years, however, the post-control coefficient ($0.726 + 0.368 \cdot 2.47 - 0.599 \cdot 0.742$) is lower than that of the pre-control period ($0.726 + 0.247 - 0.973$). Thus, the selective impact of the Banking Act upon interest implicitly paid through preferential credit terms is apparent only in high-rate years. This result indicates two reasons for the apparently lower fraction of interest received during periods of higher interest rates: a lower fraction of the total interest paid and a switch to less economical methods of payment.

6. Summary and Conclusions

The establishment of a deposit interest ceiling provided by the Banking Act was intended to increase commercial bank profits by decreasing the cost associated with competition for deposits. Although a number of studies in recent years have sought to assess effects of the ceiling on the value of interest received by depositors, no similar attempt has been made to determine its impact upon bank costs. Estimates offered by this study show that the Banking Act in general and the ceiling in particular have been quite ineffective in decreasing bank costs. This finding is explained by evidence that direct payment of interest, the subject of regulatory attention, has represented only a small fraction of depositors’ overall compensation. Since according to this evidence indirect payment played a major role prior to enactment, it can be argued that the limited effectiveness of a ceiling excluding such payments was virtually assured. Notwithstanding long-term effects, there is some indication that the ceiling has been more effective during periods of high market interest rates.

Glossary

- $I$: loans and investments;
- $R$: reserves;
- $D$: deposit liabilities;
- $D^*$: deposit assets;
- Federal Reserve credit to member banks;
- pure pecuniary yield of a hypothetical non-liquid asset;
- average yield on loans and investments;
- $r^*$: average rate of interest paid on deposit liabilities;
- $r^*_{dep}$: average rate of interest earned on deposit assets;
- $r^*_{hyp}$: hypothetical cost-free competitive average rate of interest paid on deposits;
- $r^*_{pref}$: preferred discount rate offered by the Fed to member banks;
- $r^*_{cash}$: average rate of cash interest paid on deposits;
- $r^*_{imp}$: average rate of implicit interest paid on deposits;
- $r^*_{total}$: average rate of total interest paid on deposits, where $r^* = r^*_{dep} + r^*_{cash} + r^*_{imp} + r^*_{total}$;
- $q$: index of effective competition for bank deposits, where $q = 1 - r^*_{dep} / r^*_{cash}$;
- $r^*_{rem}$: average rate of implicit interest paid on deposits through remittance of charges on checking accounts;
- $r^*_{term}$: average rate of implicit interest paid on deposits through preferential credit terms;
- $E^*$: operating earnings gross of cash interest payment on deposits;
- $E_{int}$: service charges on deposit accounts;
- $E_{int}$: interest earned on loans.

REFERENCES

Barro, Robert J., and Santomero, Anthony M. “Household Money Holdings and the Demand Deposit Rate,” Journal of Money, Credit and Banking, 4 (May 1972), 397-413.


REFERENCES

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Excess Demand, Queueing and Macroeconomic Models with Quantity Rationing

JAGDISH HANNA

In recent years, macroeconomic models with quantity rationing have assumed that product and labour markets do not clear when the economy is in disequilibrium. Specifically, in conditions of (positive) excess demand for commodities, workers determine the labour they wish to supply subject to the constraint specifying the amount of commodities with which they are being supplied and are able to purchase. These models assume—or imply—that the existence of excess demand for commodities induces a reduction in the labour supplied, making the effective labour supply less than the notional one at any given wage rate.

These models do not generally specify the process by which the quantity supplied is to be distributed among the potential buyers under conditions of excess demand for commodities. It seems quite reasonable to assume that the impact of excess demand for commodities upon labour supply will depend upon the procedure which is adopted or otherwise comes into being for allocating the limited amount of commodities among the potential buyers. In general, these models do not assume that any specific procedure is adopted, say by the government or the suppliers, so that the allocation would tend to evolve into a first-come-first-served basis which is likely to degenerate into queues. It is, therefore, relevant to examine if allocation by queueing justifies the assumption of these models that the excess demand for commodities will, in fact, lead to a reduction in labour supply. This paper conducts this examination, using the assumption that consumers/workers maximize their utility in making decisions about the purchase of commodities for current consumption, savings and leisure. The purchase of commodities requires payment of their (monetary) price to the seller, as well as standing in a queue to make the purchase. Standing in queues requires the allocation of time, so that the cost to the purchase of commodities includes a monetary component and a time component. The latter is evaluated at the queue’s wage rate.

It is a well-known phenomenon in countries which suffer significant amounts of excess demand and queueing for commodities, that the higher-income groups tend to employ lower-income workers, designated as servants in this paper, to stand in queues for the former. Our analysis, therefore, distinguishes workers by income groups and examines the

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We have primarily in mind models of the type specified by Barro and Grossman (1971, 1976) and Mudd-

hauer and Potters (1978). Barro and Grossman will be designated B-G and Muddhauer and Potters will be designated M-P.

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