The Effects of Removing Regulation Q— A Theoretical Analysis

By Scott Winningham

For many years, the maximum interest rates that financial institutions could pay on deposits have been limited by ceilings set by various regulatory agencies. These ceilings—known collectively as Regulation Q regardless of the type of financial institution or applicable regulatory agency—will be phased out over the next six years under the terms of the Depository Institutions Deregulation and Monetary Control Act of 1980. This article investigates theoretically the implications for monetary policy and the economy of removing Regulation Q and related deposit rate ceilings. The first section provides a framework within which the analysis is conducted, and the following two sections present the theoretical analysis.[1]

A FRAMEWORK OF ANALYSIS

The important macroeconomic implications for monetary policy and the economy of removing Regulation Q can be analyzed by reference to a simple model that describes the relationship between interest rates, Gross National Product (GNP), and various monetary assets. This section develops such a model.

The Demand for Monetary Assets

Traditional theories postulate that the public's demand for monetary assets depends on GNP and interest rates.[2] As GNP rises, the demand for demand deposits and other monetary assets generally increases because the public requires more money to finance the additional expenditures. Rising market interest rates, on the other hand, generally result in a decline in the demand for monetary assets, as the public shifts into alternative financial assets in order to increase interest income. However, increases in the interest rates on time and savings deposits are associated with increases in the demand for these deposits and with declines in the demand for demand deposits and other monetary assets.

The Demand for Reserves

Like the public, banks and other depository institutions also demand various financial assets. Of particular interest is their demand for reserves, defined here as deposits of

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[1] For a review of the history and purposes of deposit interest rate ceilings, see Scott Winningham and Donald G. Hagan, "Regulation Q: An Historical Perspective," *Economic Review,* Federal Reserve Bank of Kansas City, April 1980, pp. 3-17.

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[2] See, for example, Stephen M. Goldfeld, "The Demand for Money Revisited," *Brookings Papers on Economic Activity* (No. 3, 1973), pp. 577-638. Changes in prices may also affect the public's demand for money. For simplicity, however, the effects of these changes are not considered except insofar as they affect GNP and interest rates.

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depository institutions at Federal Reserve Banks plus currency held as vault cash. The demand for reserves is mainly a derived demand, as it depends on the public's holdings of deposits and on reserve requirements imposed by the Federal Reserve. Thus, for example, an increase in market interest rates leads to a decrease in the demand for reserves because it leads the public to hold fewer deposits and, therefore, reduces the required reserves of depository institutions. Similarly, an increase in interest rates on time and savings deposits may reduce the demand for reserves because it induces the public to shift out of demand deposits, which have relatively high reserve requirements, and into time and savings deposits, which have lower requirements.[3]

However, it is conceivable that an increase in interest rates on time and savings deposits could increase the demand for reserves. This would occur if a decline in reserves behind demand deposits were more than offset by an increase in reserves behind time and savings deposits. Such a positive effect on the demand for reserves would have been more likely under the structure of reserve requirements that has existed prior to the phase in of new requirements under the Depository Institutions Deregulation and Monetary Control Act of 1980. After the phase in, reserve requirements on most time and savings deposits will be eliminated. Still, a positive effect after phase in could result because some savings deposits—in particular, NOW accounts, credit union share drafts, and savings deposits subject to automatic transfer—will have the same reserve

requirements as demand deposits. If the public shifts enough funds into these interest-bearing transactions balances from other assets with lower or no reserve requirements, the reserves behind these savings deposits could increase enough to offset the decline in required reserves that will occur as the public shifts funds from demand deposits to time and other savings deposits.

Although this positive effect is possible, an increase in time and savings deposit interest rates is assumed to decrease the demand for reserves in the analysis that follows. This assumption is quite important for the results that follow. While the analysis is unaltered, assuming a positive effect on the demand for reserves would reverse the direction of many of the impacts described.

The Supply of Reserves

The supply of reserves depends mainly on actions of the Federal Reserve System. There are two alternative ways of viewing the role of the Federal Reserve. The System may be viewed as allowing the supply of reserves to vary in order to achieve predetermined levels of market interest rates, or it may be viewed as supplying a given amount of reserves and allowing interest rates and other variables to adjust.

The Federal Reserve has periodically followed each type of procedure. For many years, the System followed the interest rate approach. On October 6, 1979, the Federal Reserve decided to focus on controlling various reserve aggregates such as nonborrowed reserves, total reserves, and the monetary base.[4] Under this procedure, interest rates are

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[3] Under the new law, after the eight-year phase-in period the reserve requirement on most demand deposits at the largest commercial banks will be 12 per cent, while most time and savings deposits will not be subject to any reserve requirements. If a customer of a large bank were to shift $1,000 out of his demand deposit and into, say, a personal time deposit at that bank, the bank's required reserves would decrease by (.12 x $1,000 =) $120.

[4] Nonborrowed reserves are total reserves less borrowings by banks from the Federal Reserve. The monetary base is total reserves plus currency. The following analysis assumes the Federal Reserve supplies a given amount of total reserves.

—within wide limits—allowed to adjust to changes in the demand for reserves. This second way of viewing the role of the Federal Reserve is adopted in the following analysis.

The Aggregate Demand for Goods and Services

There are two hypotheses concerning the public's aggregate demand for goods and services—the traditional Keynesian hypothesis and the availability hypothesis. Both are described and examined in the analysis that follows.

The traditional Keynesian hypothesis postulates that the aggregate demand for goods and services depends on market interest rates and other factors. For example, as market rates increase, aggregate demand generally declines. This is because higher interest rates increase the cost of financing additional consumption and investment expenditures. Other variables affecting aggregate demand include government spending and taxation policies.

The availability hypothesis consists of two parts, the first of which states that, although aggregate demand may change as market interest rates change, the size of the response is very small. According to this hypothesis, decisions to consume and invest are made primarily on the basis of factors other than interest rates. Thus, relatively large changes in market interest rates have relatively small, perhaps insignificant, effects on GNP, at least within a reasonable amount of time.

The second part of the availability hypothesis states that an important factor affecting the aggregate demand for goods and services is the availability of credit from banks and other depository institutions. The argument is as follows. First, as market interest rates rise, banks and other financial intermediaries ration the credit they make available to their customers rather than increase the interest rates they charge. Second, some consumers and investors do not have direct access to money and capital markets, and therefore must depend primarily on financial intermediaries for funds. The implication of this second part of the availability hypothesis is that the aggregate demand for goods and services—and hence GNP—depends much less on interest rates than on the amount of credit made available by banks and other financial intermediaries to households and businesses.

Uses of the Model

The framework described above can be used to examine the relationship among economic and financial variables. For example, suppose the Federal Reserve supplies $40 billion in reserves. Suppose further that, given other variables, market interest rates of 15 per cent are consistent with $2,000 billion in GNP and with desired holdings by the public of $300 billion in demand deposits and $1,000 billion in time and savings deposits. Also, suppose that reserve requirements and other factors are such that banks desire to hold $40 billion in reserves when market interest rates are 15 per cent, demand deposits are $300 billion, and time and savings deposits are $1,000 billion. Then, the Federal Reserve's $40-billion supply of reserves is consistent with the $2,000-billion level of GNP. Also, given the $40-billion supply of reserves, an equilibrium exists in the market for reserves, and interest rates, monetary assets, and GNP are determined.

The results would not differ in substance if, instead, the Federal Reserve is assumed to control either nonborrowed reserves or the monetary base. For a description of the new operating procedures, see J. A. Cacy and Glenn H. Miller, Jr., "Review and Outlook: A New Approach to Solving Old Problems," *Economic Review*, Federal Reserve Bank of Kansas City, December 1979, pp. 7-13.

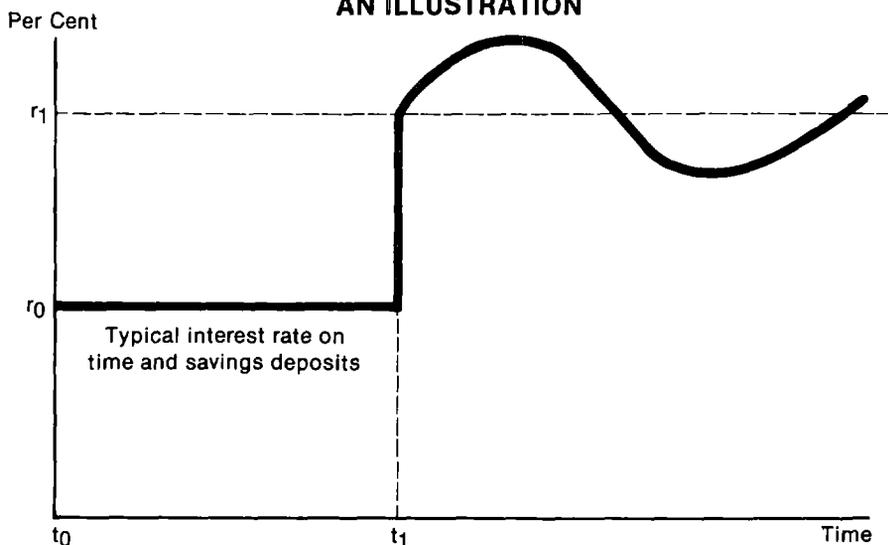## Two Effects of Regulation Q Removal

This framework is used in the remainder of the article to examine the effects on monetary policy and the economy of removing Regulation Q. Removal will have two effects. First, there will be a once-and-for-all effect on economic and financial variables. Assuming the ceiling rates are below market-clearing levels, deposit rates will rise once-and-for-all to equilibrium levels when the ceilings are removed. This in turn has a once-and-for-all effect on other variables. Of course, when Regulation Q is removed, the public and banks will no doubt require time to adjust their spending and portfolio behavior to take account of the changed economic environment. Therefore, this once-and-for-all effect may take time to occur fully. Once it has, however, no further change will occur.

The second effect, which continues long after the ceilings are removed, is that removing Regulation Q will affect the volatility of economic and financial variables. The interest rates on time and savings deposits will fluctuate more because they will be allowed to adjust to changing economic conditions. This in turn affects the volatility of other financial and economic variables.

Chart 1 illustrates these two effects of Regulation Q removal on the interest rates on time and savings deposits. The chart assumes that, from time t_0 to t_1, a typical interest rate paid on time and savings deposits is fixed at r_0 by a Regulation Q interest rate ceiling. At time t_1 the ceiling is removed. Ignoring adjustment lags, the time and savings deposit interest rate rises to its market-clearing level, assumed to be r_1. The chart also illustrates the second continuing effect of Regulation Q removal, namely that after time t_1 the interest rate on time and savings deposits is more volatile than before, fluctuating around the equilibrium value in response to changing economic conditions.

Chart 1
THE ONCE-AND-FOR-ALL AND CONTINUING EFFECTS OF REGULATION Q REMOVAL ON TIME AND SAVINGS DEPOSIT INTEREST RATES: AN ILLUSTRATION

THE ONCE-AND-FOR-ALL EFFECTS
OF REMOVING REGULATION Q

As indicated, the removal of Regulation Q will lead to a once-and-for-all increase in the interest rates on time and savings deposits. This increase in turn leads to once-and-for-all changes in market interest rates, monetary aggregates, and GNP.
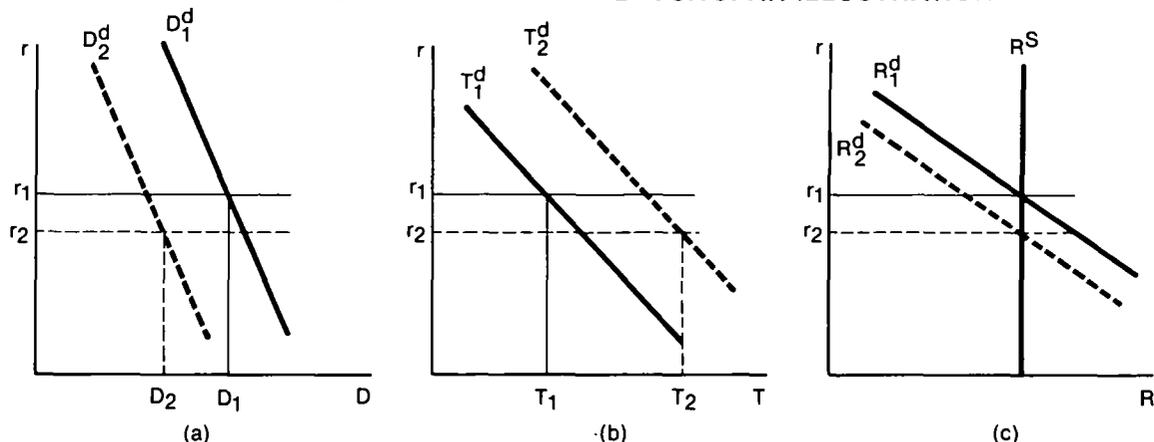
Market Interest Rates

The once-and-for-all rise in the interest rates on time and savings deposits increases the demand for these deposits and decreases the demand for demand deposits and other monetary assets. Because reserve requirements on demand deposits exceed those on time and savings deposits, these changes in the demand for deposits tend to reduce the derived demand for reserves. *The decline in the demand for reserves leads to a decrease in market interest rates, assuming the supply of reserves is given by Federal Reserve actions.* In summary,

removing Regulation Q will increase the demand for and level of time and savings deposits, reduce the demand for and level of demand deposits, and reduce market interest rates.

These effects are illustrated in Chart 2. The chart shows downward-sloping demand curves for demand deposits, D, time and savings deposits, T, and reserves, R, indicating that the quantities demanded of deposits and reserves increase as market interest rates, r, decline. The chart assumes that with Regulation Q in existence the demand curve for demand deposits is D_1^d, the demand curve for time and savings deposits is T_1^d, and the derived demand curve for reserves is R_1^d. Given the supply of reserves, R^S, the market interest rate is r_1, implying levels of demand deposits and time and savings deposits of D_1 and T_1, respectively. The chart then assumes that removing Regulation Q shifts the demand curve for demand deposits back to D_2^d, shifts the demand curve for time and savings deposits out

Chart 2
THE ONCE-AND-FOR-ALL EFFECTS OF REGULATION Q REMOVAL ON
MARKET INTEREST RATES AND DEPOSITS: AN ILLUSTRATION

(a)   ·(b)   (c)

NOTE: A subscript 1 denotes a regime with Regulation Q, and a subscript 2 denotes a regime without Regulation Q.

to T_2^d, and shifts the demand curve for reserves back to R_2^d.[5] Market interest rates therefore fall to r_2, demand deposits fall to D_2, and time and savings deposits increase to T_2.

The Monetary Aggregates

Since Regulation Q removal will affect the levels of demand deposits and time and savings deposits, removal will also affect the levels of the monetary aggregates which include these deposits. For example, since removal will decrease demand deposits, it will also decrease M1-A—which consists of demand deposits plus currency[6]—and probably M1-B as well—which is equal to M1-A plus checkable deposits at all depository institutions.[7] However, removal will increase M2, which is equal to M1-B plus savings and small-denomination time deposits at all depository institutions, money market mutual fund shares, and overnight repurchase agreements and Eurodollars. M2 will increase because the increase in time and savings deposits in M2 will more than offset the decrease in other components of this aggregate.

GNP

The removal of Regulation Q will also affect GNP. Assuming the traditional Keynesian

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Table 1
THE ONCE-AND-FOR-ALL EFFECTS OF REGULATION Q REMOVAL

Variable	Expected Change
Market Interest Rates	Decrease
M1-A	Decrease
M1-B	Decrease
M2	Increase
GNP:	
Traditional Keynesian Hypothesis	Increase
Availability Hypothesis	Increase

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hypothesis, the decrease in market interest rates tends to encourage spending and therefore leads to an increase in GNP. Assuming the availability hypothesis, the increase in M2 that is associated with an increase in credit availability—as well as the decline in market interest rates—tends to increase GNP.[8]

Summary

Table 1 summarizes the once-and-for-all effects of Regulation Q removal on market interest rates, the monetary aggregates, and GNP. Of course, these effects may not occur immediately. There are lags inherent in the adjustment by the public and banks to the changed environment. Also, when Regulation Q is phased out over several years—as under

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[5] Regulation Q removal also changes the slopes of the curves shown in Chart 2, but these effects are not illustrated. They are examined in the next section.

[6] Regulation Q removal will likely affect currency in the same qualitative manner as demand deposits. This effect, however, is probably relatively small.

[7] M1-B includes some savings deposits. In particular, it includes NOW accounts, credit union share drafts, and savings deposits subject to automatic transfer. The interest rate ceilings on these savings deposits in M1-B will be phased out under current law. However, these deposits are a small percentage of M1-B, about 4 per cent in January 1980. Therefore, unless these deposits increase substantially relative to other M1-B assets, Regulation Q removal will probably affect M1-B as it will M1-A, rather than as it will M2.

[8] Assuming the availability hypothesis, it is conceivable that the increase in GNP could increase the public's demand for currency and demand deposits more than enough to offset the negative effect on the demands for these monetary assets of higher time and savings deposit interest rates. If so, currency, demand deposits, M1-A, and M1-B would all increase rather than decrease. Although this possibility is conceivable, it is not assumed to occur. The remainder of this article abstracts from the feedback effect of GNP on the public's demands for monetary assets whenever the availability hypothesis is considered.

current law—the once-and-for-all effects may occur over a considerable period of time. The table assumes that monetary policy and all other factors determining market interest rates, monetary assets, and GNP are unchanged. Thus, the table shows only the effects of removing Regulation Q.

In light of the once-and-for-all effects of Regulation Q removal, the Federal Reserve might alter monetary policy. For example, the System might offset the probable negative effect of Regulation Q removal on the level of M1-A. Chart 2 could illustrate this change in policy by showing a rightward shift in the supply of reserves. Such a shift would tend to lower market interest rates and increase demand deposits and therefore M1-A. Alternatively, monetary policy might offset Regulation Q removal's positive effect on M2. In the chart, a leftward shift in the supply of reserves would tend to increase market interest rates and reduce deposits and therefore M2.

THE CONTINUING EFFECTS OF REMOVING REGULATION Q

In addition to the once-and-for-all effects on economic variables, Regulation Q removal will have continuing effects on the volatility of these variables. Also, the responsiveness of economic variables to changes in monetary policy may be altered on a continuing basis.

The Volatility of Market Interest Rates, the Monetary Aggregates, and GNP

Volatility refers to fluctuations in variables around their equilibrium or expected values. Volatility arises because the economy is continually subject to unexpected changes or shocks —i.e., unexpected occurrences that alter the demands for and supplies of goods, services, and assets. These demand and supply changes lead to fluctuations in economic variables. That is, they cause the variables to be volatile.

As discussed earlier, removing Regulation Q will increase the volatility of interest rates paid on time and savings deposits by allowing these interest rates to change in response to changes in demand and supply conditions. This greater volatility, in turn, affects the volatility of market interest rates, the monetary aggregates, and GNP. Whether the volatility of these variables increases or decreases depends on

Table 2
THE CONTINUING EFFECTS OF REGULATION Q
REMOVAL ON VOLATILITIES

Variable	Expected Change Assuming a Shock to the Demand For:			
	Reserves	Demand Deposits	Time and Savings Deposits	Goods and Services
Market Interest Rates	Decrease	Decrease	Decrease	Decrease
M1-A	Increase	Decrease	Increase	Uncertain
M1-B	Increase	Decrease	Increase	Uncertain
M2	Decrease	Decrease	Increase	Uncertain
GNP:				
Traditional Keynesian Hypothesis	Decrease	Decrease	Decrease	Increase
Availability Hypothesis	Decrease	Decrease	Increase	Uncertain

NOTE: This table assumes no Regulation Q-induced financial innovation. Given such innovation, the volatility of each variable may decrease when Regulation Q is removed.

Chart 3

**THE EFFECTS OF AN INCREASE IN BANKS' DEMAND
FOR RESERVES WITH AND WITHOUT REGULATION Q**
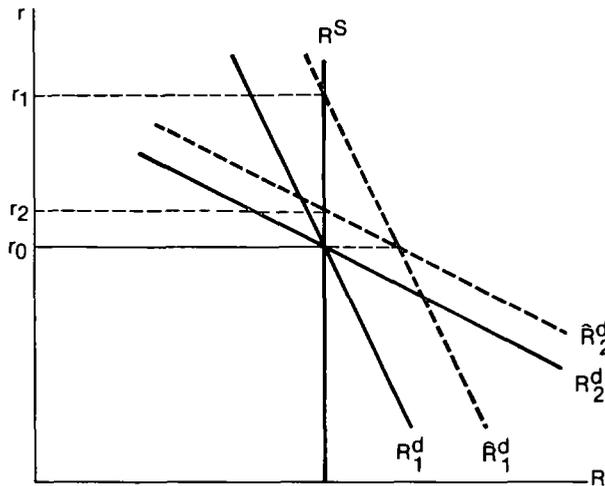
NOTES: A subscript 1 denotes a regime with Regulation Q, and a subscript 2 denotes a regime without Regulation Q.

A cap (‿) denotes a regime with a shock, and no cap denotes a regime without a shock.

which demand and supply conditions change in response to shocks. In the context of the framework of analysis used in this article, shocks may alter the demand for reserves, for deposits, and for goods and services. With regard to these shocks, this section analyzes and Table 2 summarizes the effects of Regulation Q removal on market interest rates, the monetary aggregates, and GNP.

Market Interest Rates. For shocks that alter the demand for reserves, removing Regulation Q will tend to decrease the volatility of market interest rates. That is, market interest rates will change less in response to shifts in the demand for reserves in the absence of Regulation Q. This effect is illustrated by Chart 3. The chart assumes that the demand curve for reserves is R_1^d while Regulation Q is effective, and R_2^d after Regulation Q is removed. The demand curve R_2^d is shown to be less steeply sloped than R_1^d. This reflects the fact that after Regulation Q is removed, the demand for reserves will

respond more to changes in market interest rates—meaning that a given change in interest rates will lead to a larger change in the amount of reserves demanded.[9]

The chart assumes that a shock occurring while Regulation Q is effective shifts the demand curve for reserves from R_1^d to $\hat{R}_1^d$. After Regulation Q is removed, the same shock shifts the demand for reserves from R_2^d to $\hat{R}_2^d$. In response to the shifts in demand, market interest rates increase from r_0 to r_2 after Regulation Q is removed, which is less than the rise from r_0 to r_1 while Regulation Q is effective.

The demand for reserves will respond more to changes in market interest rates after

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[9] Besides altering the slope of the demand curve for reserves, Regulation Q removal also shifts this curve and the demand curves for deposits, as the previous section indicated. For simplicity, Chart 3 does not illustrate these shifts examined earlier.

Regulation Q is removed because the demand for demand deposits will respond more—even though the demand for time and savings deposits will respond less.[10] The demand for demand deposits will respond more because the impact on this demand of a change in interest rates on time and savings deposits—allowed by removal—will reinforce the impact of a change in market interest rates.[11] The demand for time and savings deposits will respond less because the impact on the demand for these deposits of a change in the interest rates on them will offset—rather than reinforce—the impact of a change in market rates.[12]

The foregoing analysis has shown that, for shocks that alter the demand for reserves, removing Regulation Q will tend to decrease the volatility of interest rates. A similar analysis would show that removal will also tend to reduce interest rate volatility with respect to shocks that alter the demand for deposits or the demand for goods and services.

The Monetary Aggregates. After Regulation Q is removed, the volatility of demand deposits will increase and the volatility of time and savings deposits will decrease with respect to a shock that alters the demand for reserves. This is because demand deposits will respond more, and time and savings deposits will respond less, to changes in market interest rates after removal.

Since M1-A includes demand deposits but not time and savings deposits, Regulation Q removal will increase the volatility of this aggregate. M1-B's volatility will also probably increase.[13] However, the reduced volatility of time and savings deposits in M2 makes this broader monetary aggregate less volatile with respect to shocks affecting the demand for reserves.

Moreover, for shocks that alter the demand for demand deposits, Regulation Q removal will decrease the volatility of each monetary aggregate. However, for shocks that alter the demand for time and savings deposits, removal will increase the volatility of each aggregate. For shocks that alter the demand for goods and services, Regulation Q removal will have an uncertain effect on the volatility of each monetary aggregate.

GNP. Regulation Q removal will decrease the volatility of GNP with regard to shocks that alter the demand for reserves. Assuming the traditional Keynesian hypothesis, GNP changes as market interest rates change. Thus, because market rates will be less volatile after Regulation Q is removed, GNP will be less volatile. Assuming the availability hypothesis, GNP changes as interest rates and M2 change. GNP will be less volatile in this case because removing Regulation Q will decrease the volatility of both interest rates and M2 with respect to shocks affecting the demand for reserves.

Regulation Q removal will also decrease the volatility of GNP in response to shocks that alter the demand for demand deposits.

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[10] The impact on the demand for reserves of the change in demand deposits will dominate the impact of the change in time and savings deposits, due to the higher reserve requirements on demand than on time and savings deposits.

[11] For example, when market interest rates increase, the demand for demand deposits would decrease more if interest rates on time and savings deposits increase also, as they would in the absence of Regulation Q.

[12] For example, when market rates increase, the demand for time and savings deposits would decrease less if the interest rates on them increase also, as they would after Regulation Q is removed. It is conceivable that the demand for time and savings deposits will actually increase with market interest rates after Regulation Q is removed. However, the following analysis assumes that the demand for time and savings deposits will still depend negatively on market rates after Regulation Q is removed.

[13] Removal could decrease M1-B's volatility, though, if it increases the savings deposits in this aggregate substantially relative to other M1-B assets.

Assuming the traditional Keynesian hypothesis, removal decreases GNP's volatility in response to shocks altering the demand for time and savings deposits, but increases GNP's volatility in response to shocks altering the demand for goods and services. Assuming the availability hypothesis, removal increases GNP's volatility given shocks that alter the demand for time and savings deposits, but it has an uncertain effect on GNP's volatility in response to shocks affecting the demand for goods and services.

A Caveat: Regulation Q-Induced Financial Innovation. Throughout this analysis of the effects of Regulation Q removal on volatility, the shocks examined have been assumed independent of whether or not Regulation Q is removed. However, it is possible—and perhaps even probable—that Regulation Q's existence is itself responsible for some shocks to the economy. This is the case, for example, if Regulation Q's existence induces financial innovation.

Indeed, the spread of money market mutual funds, bank repurchase agreements, and numerous other financial contracts may have been due in part to the continued existence of effective Regulation Q interest rate ceilings. Such innovation may have introduced shocks to the economy that might not occur when Regulation Q is removed. Thus, removing Regulation Q may tend to reduce the volatility of all economic variables.

The Responsiveness of the Economy to Changes in Monetary Policy

In addition to affecting, on a continuing basis, the volatility of economic variables, removing Regulation Q will have continuing effects on the way variables respond to changes in monetary policy.

The magnitude of the response of market interest rates to changes in monetary policy will be reduced by removing Regulation Q.

Suppose, for example, the Federal Reserve increases the supply of reserves, which tends to decrease market interest rates. Market rates will fall less after Regulation Q is removed because, as shown earlier, removal will increase the responsiveness of the demand for reserves to changes in market rates. Similarly, because demand deposits will respond more to changes in market interest rates after Regulation Q is removed, M1-A, and probably M1-B, will respond more to monetary policy-induced changes in reserves and interest rates. However, since time and savings deposits will respond less to changes in interest rates, M2 will respond less to monetary policy changes. The size of response of GNP to changes in monetary policy will also be reduced by removing Regulation Q. Assuming the traditional Keynesian hypothesis, the smaller change in market interest rates after Regulation Q is removed in turn induces a smaller change in GNP. Assuming the availability hypothesis, the smaller change in M2 after Regulation Q is removed in turn induces a smaller change in GNP.[14]

Table 3 summarizes the continuing effects of Regulation Q removal on the size of responses in market interest rates, the monetary aggregates, and GNP to changes in monetary policy. These effects may have implications for

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14 The volatility of the response in the economy to changes in monetary policy may depend on the status of Regulation Q. This is because Regulation Q's existence may induce financial innovation which alters the structure of the economy. For example, suppose Regulation Q's existence encourages banks and others to create new substitutes for time and savings deposits which are not subject to interest rate ceilings. In this case, the relationship between monetary policy and the economy may change. The more Regulation Q-induced financial innovation there is, the more volatile the effects of monetary policy may be. Removing Regulation Q might tend to reduce the uncertainty about the relationship between monetary policy and the economy and, therefore, improve the effectiveness of monetary policy.

Table 3
THE CONTINUING EFFECTS OF REGULATION Q REMOVAL ON THE SIZE OF RESPONSE TO CHANGES IN MONETARY POLICY

Variable	Expected Change
Market Interest Rates	Decrease
M1-A	Increase
M1-B	Increase
M2	Decrease
GNP:	
Traditional Keynesian Hypothesis	Decrease
Availability Hypothesis	Decrease

the Federal Reserve's conduct of monetary policy. For example, because M1-A is more responsive to policy changes, when the growth rate of this aggregate deviates from desired paths, the Federal Reserve may need to adjust the supply of reserves by less when Regulation Q is removed. Alternatively, because removal decreases the responsiveness of M2 to changes in the supply of reserves, when M2 growth deviates from path a larger change in the supply of reserves may be needed after removal.[15]

SUMMARY

This article has investigated theoretically the implications for monetary policy and the economy of removing Regulation Q deposit interest rate ceilings. It was shown that removing Regulation Q will have once-and-for-

all effects on the levels of market interest rates, the monetary aggregates, and GNP, as well as continuing effects on the volatility of these variables and on their responsiveness to changes in monetary policy.

Regulation Q removal will have the once-and-for-all effect of reducing market interest rates and increasing GNP, assuming no offsetting monetary policy actions. Removing the ceilings will also decrease M1-A and probably M1-B but will increase M2. The Federal Reserve may alter its conduct of monetary policy to offset these once-and-for-all effects on levels.

The volatility of market interest rates, the monetary aggregates, and GNP is in general different in a world without Regulation Q than in a world with Regulation Q. Removing the ceilings will decrease the volatility of market interest rates and probably also of GNP. The volatility of the monetary aggregates may increase, depending on the type of shock that occurs. However, Regulation Q removal will more likely reduce the volatility of these variables as well. This is because Regulation Q's existence may itself be responsible for shocks to the economy due to induced financial innovation.

Finally, Regulation Q removal will have a continuing effect on the response of the economy to changes in monetary policy. Removal will decrease the size of response of market interest rates, GNP, and M2—and increase the response of M1-A and probably of M1-B—to changes in monetary policy. Also, the volatility of all responses may decrease after Regulation Q is removed. These effects may imply a need to alter the conduct of monetary policy. Smaller or fewer changes in policy may be needed to return M1-A and M1-B to their desired paths, but larger or more policy changes may be necessary to control M2, interest rates, and GNP.

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[15] In the extreme, after Regulation Q is removed even large changes in the supply of reserves might not be sufficient to return M2 to path. In this extreme case, it could be difficult for monetary policy to significantly affect market interest rates and GNP, as well. Such an extreme case is unlikely, however.