

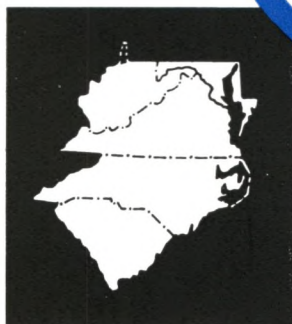
FEDERAL RESERVE BANK OF RICHMOND

# MONTHLY REVIEW

*Liquidity Patterns in Corporate  
Financing*

*Capacity Utilization Indexes*

*The Federal Debt*



MAY 1971

# Liquidity Patterns in Corporate Financing

In the first half of 1967 and again in the last three quarters of 1970 corporations issued unusually large quantities of long-term debt in order to fund unusually large quantities of short-term debt accumulated in earlier periods. The occurrence of this phenomenon in both of these periods was not surprising in view of the similarity of conditions in each period. The total volume of corporate financing and the specific instruments used at any given time depend upon economic activity, interest rates, internal supplies of funds, preferences of the individual corporation, and expectations of future economic activity. Changes in these factors usually result in changes in financing patterns. In particular, changes in monetary and credit policies influence corporate financing. In turn, the influence of corporate financing patterns upon credit markets may result in changes in Federal Reserve policy actions. This article reviews the development of certain corporate financing patterns that have evolved in the past three to four years and the relationship between these patterns and Federal Reserve policy actions.

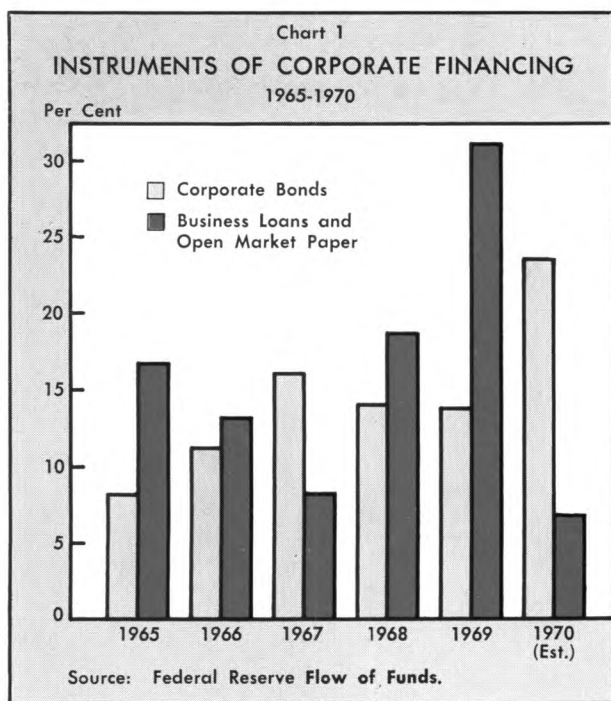
**The Experience in 1967 and 1970** In the spring of 1967 the economy was rebounding from the tight monetary conditions of 1966. The Federal Reserve was aiming for easier conditions in the money and capital markets following its attempts in 1966 to

curtail the rapid economic expansion of the previous two years. During the expansionary period 1965-1966, most corporations had relied heavily on external financing. When interest rates rose and the availability of credit declined, as usually happens in periods of economic expansion, corporations resorted more and more to the use of short-term funds. The tendency of short-term rates normally to be lower than long-term rates except near the end of an economic expansion and the commitment of the borrower to a cyclically high cost of funds for a briefer period of time account for the relative increase in short-term borrowing during most of an expansionary period. As interest rates approached their highest levels in several decades in 1966 (Chart 1), corporations increasingly turned to temporary, although expensive, sources of funds such as bank loans and commercial paper (Chart 2). By late 1966, however, the strength of the monetary slowdown reduced total net new corporate debt to its lowest level since early 1964.

The easing of monetary and credit conditions in late 1966 and early 1967 was evident in the falling interest rates and increases in the amount of credit demanded through most of the latter year. The most striking adjustment, however, occurred in the composition of corporate financing. As interest rates in all sectors of the market retreated from their earlier high levels, corporations sought to fund their recently-acquired short-term debt. New bond offerings reached their peak levels of the 1960's.

A number of factors help explain this financing pattern. An axiom of the theory of corporate finance is that permanent increases in the assets of a firm should be financed with either equity funds or long-term liabilities. This axiom stems from a principle of risk analysis known as hedging: in order to minimize the degree of risk associated with any given financial structure the maturities of the assets and liabilities should coincide. If this principle is observed, the stream of payments associated with a given liability structure will be matched by a stream of income from a similar asset structure. For corporations in particular this practice reduces risk by minimizing the probability that they will have to re-finance maturing liabilities at unfavorable terms.

Thus, many corporations took advantage of the easier credit conditions and lower interest rates in 1967 to reestablish some degree of balance between the maturity compositions of their assets and lia-



bilities. Expectations of continued economic prosperity in the coming years encouraged them to finance with long-term funds.

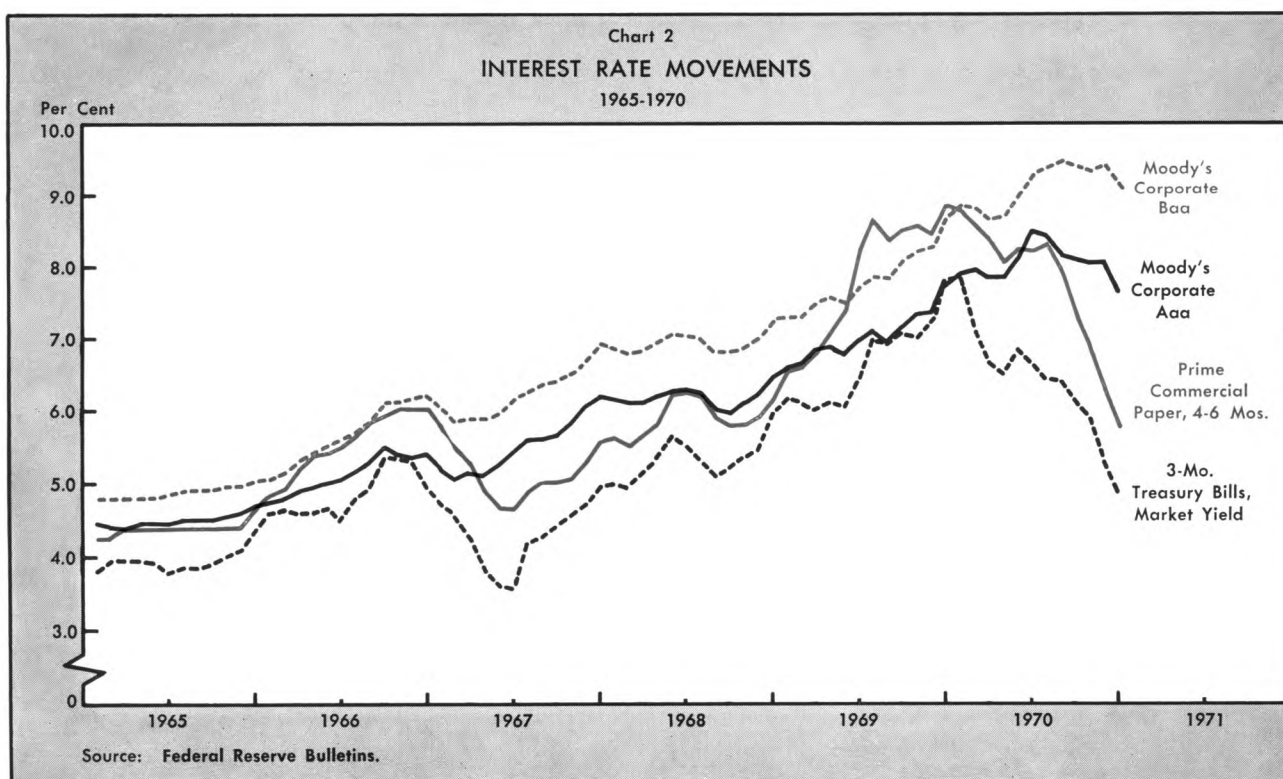
Although monetary and credit policies were relatively expansive in the first three quarters of 1967 and most of the second half of 1968, demand pressures again were a strong force in the credit markets by the fourth quarter of 1967. As the need for external funds increased at a time of reduced credit availability and rising interest rates, corporations again resorted to extensive short-term borrowing. The tightening of monetary policy in 1969 had a much more immediate impact upon credit markets than on the markets for goods and services. Corporations responded by increasing their short-term debt to record levels in 1969. By the end of 1969, however, the need for new external funds diminished as restrictive stabilization policies began to take hold in the real sector of the economy. The economic slowdown reduced the need for inventory and accounts receivable loans by corporations, which partially contributed to the minimum amount of short-term borrowing in 1970.

The reduced demand for credit coupled with the return to relative monetary ease in 1970 led to a downturn of interest rates at the first of the year. Although this trend was interrupted momentarily by financial difficulties and the threat of a liquidity crisis in March and June, a widespread decline of

yields emerged in the second half of the year and evoked corporate financing patterns very similar to those that occurred in 1967.

**1967 Versus 1970** For several reasons the 1970 experience was a magnified version of the 1967 experience. The build-up to the widespread liquidity demands of 1970 was both more pronounced and prolonged than it was in the pre-1967 period. During the earlier period the economy was still building to capacity levels following the recession of 1960-1961, whereas in the pre-1970 build-up the economy was operating at full steam. The demands on the real resources of the economy were greater both from the private and public sector. Business expectations were more attuned to a period of sustained economic expansion.

Given the greater degree of real and financial economic pressures in the pre-1970 period, demands for liquidity were understandably far greater than in the earlier period. The demand for long-term funds in the corporate sector in 1970 was also expanded by the considerable need for capital funds by the public utilities and communications companies. Additionally, the poor performance of profits in both 1970 and prior years forced corporations to finance a larger portion of their total needs with external funds. As indicated by Chart 2, corporations had net bond issues of \$23.5 billion in 1970,





up 70% from 1969. The use of short-term credit dwindled to \$6.8 billion, down from nearly \$32 billion in 1969 and substantially less than the \$8.2 billion of 1967.

**Corporate Financing and Financial Market Equilibrium** These patterns in corporate financing and liquidity adjustment have definite implications for financial analysis and stabilization policy. In addition to the general economic goals of stabilization policy, the Federal Reserve seeks to ease seasonal pressures in the financial markets as well as disturbances that result from unusual developments in specific sectors of the market.

Consider a state of equilibrium in the financial markets in terms of supply, demand, and interest rates. General financial equilibrium would prevail when the supply of and demand for funds are approximately equal within each of the individual sectors of the market so that the market could be cleared by some pattern of stable interest rates. That is, large changes in interest rates from previous equilibrium levels would not be necessary to equilibrate supply and demand. Under such conditions the Federal Reserve needs only to counteract relatively predictable seasonable factors to maintain a state of financial equilibrium without significant rate changes. As various pressures in the real sector develop, such as those occurring in the pre-1967 and pre-1970 periods discussed above, and monetary policy becomes restrictive, financial markets reflect the reduced availability and higher cost of credit. That is, relatively sharp interest rate changes would be required to clear individual financial markets. If the pressure develops on both the demand side and the supply as it did in the 1965-1969 period, then interest rates increase substantially. The rising interest rates prompt corporate borrowers to shift their borrowing toward the short-term end of the market and intensify the upward pressure on short-term rates. Corporations are then faced with increased financial costs, even though such costs are incurred for only a limited period. If the tight money period is prolonged many corporations are forced to refinance their short-term debt under conditions of minimum credit availability and high interest rates. The presence of inflationary pressures in the economy, which usually brings on tight monetary conditions and policies, further raises nominal interest rates to compensate for anticipated price increases. Additionally, profits usually turn down this far along in the cycle thus reducing the credit-worthiness of many firms. By financing permanent additions to their asset structures with excessive short-term debt, many corporations

accentuate the pressures of tight money, and a few may create near-crisis situations for themselves. As is well-known, such situations did develop in the late summer of 1966 and the early summer of 1970. The latter situation was climaxed by the Penn Central crisis.

### **Corporate Financing and Stabilization Policy**

The Federal Reserve took steps to mitigate the effects of such developments on the financial community and the economy. Following the "credit crunch" in the summer of 1966 it promoted easier financial conditions in the first three quarters of 1967 and the second half of 1968 than many observers felt were warranted in light of the emerging problem of inflation. The Federal Reserve strongly defended its actions on a number of grounds, among them the new surtax and the fear of another credit crunch and its multifarious difficulties.

In the first half of 1970, the Federal Reserve used both general and selective credit controls to ease financial conditions. In addition to its usual means of pumping reserves into the economy via open market operations, the Federal Reserve also suspended the interest rate ceilings on certain time deposits in order to allow banks to acquire sufficient funds to meet the loan demands of borrowers who ordinarily issued commercial paper. The Federal Reserve took certain actions that would not have been necessary had the pattern of corporate financing discussed here not been carried to such extreme levels. Although several individual corporations in addition to the Penn Central experienced liquidity problems, a general financial panic did not ensue. Several recognizable changes in the behavior of both the financial and corporate communities did emerge in the summer of 1970. Lenders became very quality conscious, which resulted in an unusually wide spread between the yields on different quality bonds. Unsecured short-term liabilities of corporations (viz., commercial paper) became difficult to issue. Finally, there was, and continues to be, a massive movement to convert short-term debt acquired in 1968 and 1969 into long-term debt. One of the most evident results of this desire for liquidity has been a sharply upward sloping yield curve. A yield curve illustrates the relationship among the levels of interest rates of different maturities (see box). With borrowers seeking funds primarily in the long-term sector of the market, short-term rates have receded much more rapidly than long-term rates. Until the large institutional investors began to supply funds in the bond markets, long-term yields were quite sticky.

**Conclusions** While it would not be warranted to attribute all fluctuations in the financial markets directly to specific patterns in corporate financing, the indirect influence of such patterns is readily evident. Corporations do account for significant proportions of all debt issued in the various sectors of the market. The practice of avoiding the acquisition of long-term debt until the occurrence of more favorable financial conditions and, instead, accumulating excessive short-term debt has undoubtedly accentuated certain interest rate movements. Short-term rates are likely to be higher than

would otherwise be the case during tight money periods and lower in the following periods. Additionally, the deviation from the accepted practice of hedging inevitably places the corporate financial structure in a precarious position. Although the financing technique discussed here is probably convenient and perhaps less expensive, it does tend to disturb conditions in both the corporate financial structure and the financial markets. In order to restore stability more substantial measures must be undertaken than would otherwise be the case.

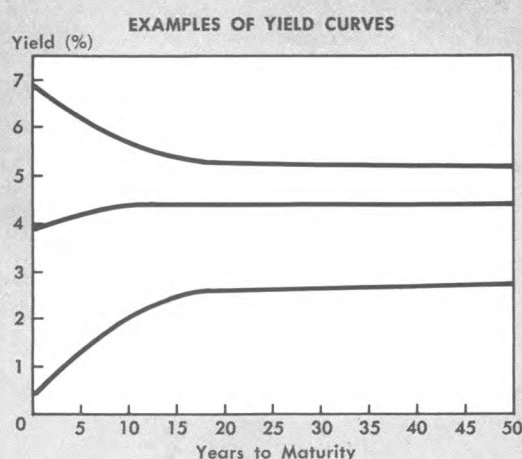
*Philip H. Davidson*

## YIELD CURVES

The yield curve is a graphical tool often used to illustrate relationships among interest rates on instruments of varying maturities. In the accompanying diagram, time to maturity is represented on the horizontal axis and yields are represented on the vertical axis. The curve itself is a schedule of market yields on instruments of comparable credit quality but different times to maturity. The yield curve assumes a variety of typical shapes under various economic conditions. Three sample yield curves are represented here.

The curve exhibiting very little slope is most often observed during periods of economic stability. Yields on short-term and long-term instruments are nearly the same, reflecting the expectations of the market that economic conditions, and thus interest rates, will not change perceptibly over time. The slightly higher levels of long-term rates are generally attributed to relative degrees of liquidity and risk of default.

The sharply upward-sloping curve is usually observed during periods of substantial ease when credit is very plentiful. Investors do not expect such a situation to persist because the rate of real growth in the economy will increase in response to easy credit, resulting in ever-increasing demands upon loanable funds. Expecting interest rates to rise, investors begin moving toward the shorter maturity range where capital losses associated with rising interest rates are minimized. The shift from longer to shorter maturities puts upward pressure on long-term rates relative to short-term rates. This process is reflected in the higher long-term rates seen on the yield curve.



The downward-sloping curve is normally observed during tight money periods when the supply of credit is inadequate to satisfy all potential demand at existing rates. Investors expect credit conditions to be easier at some time in the future, because monetary restraint and high interest rates theoretically will curtail investment spending and reduce the demand for lendable funds. As investors begin to expect rates to fall, they will shift to the longer maturity range in anticipation of the substantial capital gains associated with falling rates. This process is reflected in the lower long-term rates seen on the yield curve.

In the short-run other factors may also influence the slope of the yield curve. As discussed above, different pressures may develop in different maturity sectors of the market. The large demand for long-term funds in the second half of 1970 exaggerated the upward slope of the yield curve.

As a tool for financial analysis the slope of the yield curve, then, may be used to observe both expectations of future rate trends and the impact of current sectoral pressures on in-

# Capacity Utilization Indexes

Plants and equipment are subject to the same fluctuating business conditions that affect the jobs of manufacturing workers. As the employment rate measures the use of labor resources, so do capacity utilization indexes measure the use of plants and equipment.

This article focuses on capacity utilization measurements which apply to the national economy, but it should be noted that the same type of measure is also used in analyses of the individual firm. For example, the forecasting of company costs, cash flows, and capital requirements all depend on evaluations of capacity utilization.

Capacity utilization measures for sectors of the national economy are useful in the study of industrial price movements, business capital investment, and employment. They are also useful in formulating and evaluating the impact of fiscal and monetary policies. For example, monetary policy geared to reduce consumer demand in an inflationary period could be evaluated by the changes in capacity utilization which occurred.<sup>1</sup>

Capacity utilization is defined as the ratio of actual output to capacity output and is written symbolically,

$$CU = \frac{AO}{CO},$$

where CU is capacity utilization, AO is actual output, and CO is capacity output. An index of capacity utilization reflects changes in the extent to which industry achieves its potential output.

Before further discussion of capacity utilization indexes, the underlying concept of capacity output must be clarified. Capacity and capacity output are interchangeable terms which refer to a firm or industry's maximum potential production under certain conditions. The economic and engineering definitions of capacity establish those conditions.

The economic definition of capacity refers to the quantity of output that for the short run can be produced at or near the firm's lowest average cost with a fixed stock of plant and equipment. It assumes that suitable raw materials and labor are available in the amounts needed.<sup>2</sup> The engineering definition also refers to the quantity of output that can be produced in the short run with a fixed stock of plant and equipment and adequate supplies of suitable

materials and labor. Under this definition, however, the limiting factor is the durability of the plant and equipment, not the lowest average cost. Capacity is the maximum output that can be repeatedly produced without causing breakdowns and is likely to be greater than that determined by the economic criteria.

The economic definition incorporates into the concept of capacity actual operating practices such as the length of the typical workweek and downtime for maintenance. These normal working procedures are taken into consideration when estimating the lowest average cost. This is not the case with the engineering definition which takes the durability of the plant and equipment as the only constraint and assumes that normal working procedures are flexible and will not hamper the productivity of plant and equipment.

Publishers of capacity utilization indexes rely upon the concepts of capacity output defined above, though it is not always clear which. The enormous task of determining the level of capacity output empirically has caused them either to seek approximate measures of capacity or to avoid explicit

TABLE I  
McGRAW-HILL OPERATING RATES

Industry	Dec. 1969	Dec. 1968	Preferred Rate Dec. 1969
Iron & Steel	NA	NA	NA
Nonferrous Metals	92	90	98
Electrical Machinery	65	82	91
Machinery	85	82	94
Autos, Trucks, & Parts	85	91	87
Aerospace	82	88	93
Other Transportation			
Equipment	84	84	91
Fabricated Metals	80	83	87
Instruments	83	84	92
Stone, Clay, & Glass	82	79	92
Other Durables	83	85	92
Total Durables	80	84	92
Chemicals	76	82	91
Paper & Pulp	92	93	98
Rubber	89	92	95
Petroleum	97	92	98
Food & Beverages	87	85	94
Textiles	86	91	95
Other Nondurables	87	86	97
Total Nondurables	86	87	96
All Manufacturing	83	85	93
Mining	89	87	99
Electric Utilities	87	88	89
Gas Utilities	84	94	93
All Industry	83	85	93

N.A.: Not Available.

Source: 23rd Annual McGraw-Hill Survey, *Business Plans for New Plants and Equipment, 1970-73*.

<sup>1</sup> *Measures of Productive Capacity*, Report of Subcommittee on Economic Statistics to Joint Economic Committee (Washington, D. C.: Government Printing Office, 1962), p. 4.

<sup>2</sup> *Ibid.*, pp. 3-7.



use of the definitions. As it is extremely difficult to compute capacity empirically, the publishers claim that over time their indexes serve better to reflect trends in capacity utilization than precise levels of capacity utilization.

The purpose of this article is to describe and compare the capacity utilization measures which are published by five organizations: McGraw-Hill Publishing Company, the Board of Governors of the Federal Reserve System, the Wharton School of Finance and Commerce, the Department of Commerce, and the National Industrial Conference Board.

**McGraw-Hill's Operating Rates** The Economics Department at McGraw-Hill publishes industrial operating rates on the basis of an annual survey. Questionnaires, which are sent to a sample of large corporations, ask about recent and planned additions to capacity, the actual operating rate at year end, and the preferred operating rate (considered the profit maximizing rate by McGraw-Hill). However, neither "capacity" nor "operating rate" is defined for the respondents as the difficulty of applying such a definition to a multiproduct corporation might seriously reduce the level of response. McGraw-Hill assumes that within each industry these terms are defined similarly.

To get mean operating rates for each industrial category the responses of individual corporations within those categories are averaged using weights based on employment. The mean operating rates for each industry are further averaged using value-added weights from the Federal Reserve industrial production index to obtain an operating rate for "All Manufacturing."

Conducted since 1947, the McGraw-Hill survey embraces an undisclosed number of firms in 21 major industrial categories such as electrical machinery, chemicals, and mining. In December 1969, the sample represented 66 per cent of capital investment, 58 per cent of fixed assets, and 43 per cent of employment of all manufacturing industry in the U. S. In those industries where sample coverage is narrow, firms are selected to provide a cross section. Commercial business, which includes trade, finance, and services, is such an industry; the sample in that field consists primarily of large chain stores, mail order department stores, insurance companies, and banks.<sup>3</sup>

<sup>3</sup> 23rd Annual McGraw-Hill Survey, *Business Plans for New Plants and Equipment, 1970-73, May 1970* (New York: McGraw-Hill), p. 9.

TABLE II  
FEDERAL RESERVE INDEX OF  
CAPACITY UTILIZATION IN MANUFACTURING

(Per Cent)	
1951	94.0
1952	91.3
1953	94.2
1954	83.5
1955	90.0
1956	87.7
1957	83.6
1958	74.0
1959	81.5
1960	80.6
1961	78.5
1962	82.1
1963	83.3
1964	85.7
1965	88.5
1966	90.5
1967	85.3
1968	84.5
1969	82.9p

p: Preliminary figures.

Source: Federal Reserve Bulletin, October 1970.

### The Federal Reserve Capacity Utilization Index

The Board of Governors of the Federal Reserve System publishes a quarterly index of capacity utilization for total manufacturing. This index relies heavily on McGraw-Hill's operating rates which are collected at the firm rather than establishment level so that a diversified firm is classified according to its main product. For example, a corporation may manufacture electrical machinery, electrical parts for cars, and electrical navigation instruments. If electrical machinery represents most of its sales, the entire output is classified as electrical machinery. By aggregating the industrial categories to total manufacturing, some of the errors resulting from this survey approach will cancel out.

The first step is to compute capacity output for a group of primary-processing and advanced-processing industries. Series used in this calculation are the Board's production index, McGraw-Hill's data on capacity and operating rates, and the census data on gross capital stock. Capacity output for the end of each year is computed by dividing actual output by McGraw-Hill's operating rates for each industry. Two separate steps follow in which (1) the ratio of capacity output to McGraw-Hill's capacity index is regressed on time; and (2) the ratio of capacity output to capital stock is regressed on time. The purpose of this regression is to smooth the utilization series with the more stable capacity and capital stock series. The two regression results are averaged for a final estimate of capacity for both the primary-processing and advanced-processing in-

dustries mentioned above.<sup>4</sup> The final index is a weighted average of the two separate estimates for primary and advanced-processing industries. This capacity index is then divided into industrial production to get capacity utilization.

### The Wharton School Capacity Utilization Index

The Wharton School of the University of Pennsylvania publishes quarterly estimates of capacity utilization for the manufacturing sector including the durable and nondurable goods subsectors, the manufacturing sector combined with mining and utilities, the service sector, the contract construction sector, and a weighted average of all sectors. These estimates are calculated for 36 industries before they are averaged into industrial sectors with Federal Reserve value-added weights. For five of the industries a direct measure of utilization is employed. For the other 31 industries, output is divided by capacity to get the utilization estimate. All but two of the 31 capacity utilization computations use the Federal Reserve Index of Industrial Production for the measure of output.

Estimates of capacity begin with seasonally adjusted monthly output series for each of 31 industries. The monthly data are then averaged into quarterly values. Then periods are identified in

which each industry produced as much as it could. Such a period shows up as a peak in the series and is also classed historically as a time when the industry was pushed to the limit, as in 1947 and during the Korean War. Potential capacity output between peaks is estimated by joining successive peaks with straight line segments. Potential capacity beyond an identifiable peak is determined by a straight line drawn and extrapolated beyond the last two peaks until it lies over the current production period.<sup>5</sup> The *Wharton Quarterly* capacity utilization estimates for the manufacturing sector are shown in Table III.

### The National Industrial Conference Board Capacity Utilization Index

The National Industrial Conference Board computes "a rough index of capacity utilization" for manufacturers of durable and nondurable goods, which is published in its *Semiannual Survey of Investment Conditions*. Begun in 1965, the survey covers approximately 421 large manufacturing companies.

The NICB asks the companies surveyed to indicate if their plant and equipment facilities are (1) inadequate, (2) sufficient, or (3) more than adequate. Those companies indicating more than adequate capacity are asked to specify the extent of under-utilization. Corresponding to each rating is an assumed range of utilization. The midpoints of these ranges are used to weight the assets of the companies checking each response. The sums of the weighted assets are then divided by the unweighted totals of all respondents' assets to give the final utilization rates. For August 1970 these rates were: durables 88.5, nondurables 92.7, total manufacturing 90.6.<sup>6</sup>

### The Department of Commerce Evaluation of Capacity

The Department of Commerce began collecting information on capacity utilization in manufacturing in 1964. Each company participating in the survey is asked how it rates its stock of plant and equipment in light of prospective sales for the coming year. There are three rating choices: (1) more plant and equipment needed, (2) about adequate, and (3) existing plant and equipment exceeds needs.

The survey intentionally bypasses the complicated definitions of product-mix, length of workweek, and number of shifts in hope of getting a large response

TABLE III  
WHARTON INDEX OF U. S.  
CAPACITY UTILIZATION  
Manufacturing

	Quarter	Per Cent
1966	I	95.9
	II	96.9
	III	97.1
	IV	96.9
1967	I	94.1
	II	92.5
	III	92.0
	IV	92.7
1968	I	93.5
	II	93.8
	III	93.2
	IV	93.8
1969	I	94.4
	II	94.8
	III	95.0
	IV	92.4
1970	I	90.6
	II	89.1
	III	87.5

Source: *Wharton Quarterly*, Winter 1971.

<sup>5</sup> *Ibid.*, p. 282. See also L. R. Klein and R. Summers, *The Wharton Index of Capacity Utilization*, Economic Research Unit, Wharton School of Finance and Commerce, University of Pennsylvania, 1966; and *Wharton Quarterly*, Wharton School of Finance and Commerce, University of Pennsylvania.

<sup>6</sup> *Investment Conditions: Second Half, 1970, Semiannual Survey*, National Industrial Conference Board, Inc., New York, pp. 9-10.



TABLE IV  
MANUFACTURERS' EVALUATION OF THEIR CAPACITY BY QUARTER  
(Per Cent Distribution of Gross Capital Assets)

	1968				1969				1970	
	I	II	III	IV	I	II	III	IV	I	II
More Plants and Equipment Needed										
All Manufacturing	40	41	45	47	48	43	44	46	44	42
Durable	39	41	44	45	46	40	40	39	37	34
Nondurable	40	41	45	49	49	46	48	53	51	49
About Adequate										
All Manufacturing	55	53	50	48	47	52	51	49	50	52
Durable	53	50	48	48	47	53	53	53	53	56
Nondurable	58	56	52	48	48	51	49	44	47	48
Existing Plant and Equipment Exceeds Needs										
All Manufacturing	5	6	5	5	5	5	5	5	6	6
Durable	8	9	8	7	7	7	7	8	10	10
Nondurable	2	3	3	3	3	3	3	3	2	3

Source: Department of Commerce, *Survey of Current Business*, September 1970.

which will permit broad comparisons over time.<sup>7</sup> The sample covers manufacturing corporations registered with the Securities and Exchange Commission and non-registered manufacturing companies. Corporations and companies are classified by industry in accordance with their principal products.<sup>8</sup> Table IV shows the per cent of the sample's total assets held by the companies responding to each rating choice.

**Summary and Conclusions** The Wharton School, the Federal Reserve, and the Commerce Department publish their capacity utilization indexes quarterly. The Wharton School and Federal Reserve rate capacity utilization on a 0 to 100 per cent scale, and both prepare indexes for "All Manufacturing." The Wharton School prepares, in addition, indexes for nondurable and durable goods industries, the service industry, the contract construction industry, a combination of manufacturing, mining, and utilities, and an overall index. The Commerce Department prepares a comprehensive index for manufacturing industries and two indexes for the durable and nondurable goods subsectors of manufacturing by listing the three possible responses to its survey and the proportion of the sample answering each. The greatest amount of industrial detail among the quarterly indexes is provided by the Wharton School.

The National Industrial Conference Board publishes three capacity utilization indexes semianually: one for "All Manufacturing" and two for the durable goods and nondurable goods subsectors.

Corporations in the survey are asked questions similar to those used by the Commerce Department. The responses are converted to a final index on the 0 to 100 per cent scale.

The McGraw-Hill Company publishes 25 operating rates annually based on its survey of large corporations. The benchmark data collected in the annual survey is also used along with the Federal Reserve production index to estimate monthly operating rates for 18 industries. More industrial detail is provided in the McGraw-Hill index than any other regularly published index of capacity utilization. McGraw-Hill was also the first organization to publish capacity utilization indexes, and these indexes are essential to the Federal Reserve method of calculating capacity.

Conceptual and measurement problems notwithstanding, capacity utilization indexes have proved useful because of their relationship with other economic measures. Margaret Matulis, formerly with McGraw-Hill, found a "fairly good relationship between the changes in the amount of investment going for expansion and the manufacturing operating rate," and "an even better relationship between . . . the operating rate and wholesale prices of manufactured goods."<sup>9</sup>

Frank DeLeeuw, formerly with the Board of Governors of the Federal Reserve System, noted a good relationship between capacity utilization for all manufacturers and the backlogs of appropriations for new plant and equipment by manufacturers.<sup>10</sup>

*Robert W. Chamberlin*

<sup>7</sup> *Survey of Current Business*, U. S. Department of Commerce, Office of Business Economics, Washington, D. C., March 1964, p. 10.

<sup>8</sup> *U. S. Plant and Equipment Expenditures by Business, Joint Statistical Report*, U. S. Department of Commerce, Office of Business Economics, and Securities and Exchange Commission, Washington, D. C., September 1970, p. 4.

<sup>9</sup> Margaret K. Matulis, "The McGraw-Hill Measures of Capacity and Capacity Utilization," *1968 Proceedings of the Business and Economic Statistics Section of the American Statistical Association*, Washington, D. C., 1968, pp. 22-24.

<sup>10</sup> Frank DeLeeuw, *op. cit.*, p. 1606.

# THE FEDERAL DEBT

## Composition and Ownership

Federal debt outstanding increased more than \$100 billion during the past ten years to total almost \$402 billion. Most of this growth was concentrated in U. S. Treasury marketable bills and notes and special nonmarketable Treasury issues to Government agencies and trust accounts. The average maturity of the marketable debt increased to 5 years 4 months by the end of 1965 but then steadily declined to 3 years 4 months by the end of 1970. Official accounts, including the Federal Reserve System, have increased their holdings of the Federal debt more than any other group. Individuals accounted for the largest increase in debt holdings within the private sector.

**Composition** Based on the recommendation by the President's Commission on Budget Concepts, the Federal debt is defined to include debt instruments issued by Government organizations whose expenditures and receipts are included in the new unified budget adopted in January 1968. The Federal debt, shown in Table I, equals the sum of public debt and direct agency debt. Direct agency debt excludes debt of Government-sponsored agencies.

Table I

### COMPOSITION OF THE FEDERAL DEBT (In millions of dollars and percent of total)

	Dec. 31, 1960		Dec. 31, 1970	
<b>PUBLIC DEBT</b>				
Marketable:				
Treasury bills	39,446	13%	87,923	22%
Certificates of indebtedness	18,442	6	.....	.....
Treasury notes	51,284	17	101,227	25
Treasury bonds	79,794	27	58,563	15
Nonmarketable:				
U. S. savings bonds	47,159	16	51,842	13
Foreign series	.....	.....	5,698	1
Other	6,300	2	3,894	1
Special issues to Government agencies and trust funds	44,346	15	78,106	19
Noninterest and matured debt	3,397	1	1,907	0
Total gross public debt	290,217	98	389,158	97
AGENCY DEBT <sup>1</sup>	6,623	2	12,491	3
FEDERAL DEBT	296,840	100	401,649	100
Debt subject to statutory ceiling	290,165		391,626	

<sup>1</sup> Excludes Government-sponsored agency debt.

Source: U. S. Treasury Department.

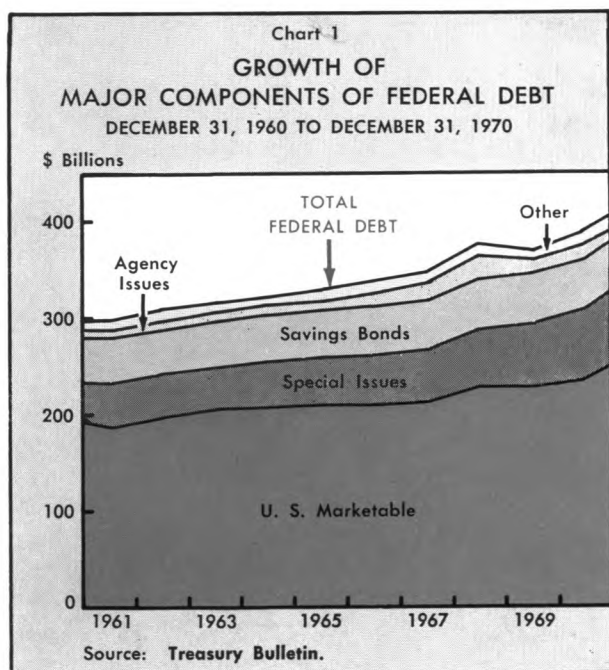
The largest component of public debt is U. S. Treasury marketable securities—Treasury bills, notes, and bonds. This type of debt is the most important part of the public debt not only because of its volume but also because of its marketability and use as the major instrument for conducting Federal Reserve open market operations. These issues are attractive to private investors because they carry no credit risk and can be sold readily before maturity in a well-developed secondary market.

The composition, both by maturity and type, of this marketable debt changed significantly in the 1960's partly as a result of the 4¼% statutory ceiling on interest rates payable on bonds with seven or more years to maturity. Because market rates have exceeded this limit, no bonds have been issued since May 1965, and the increase in debt has been in bills and notes. Advance refundings, i.e., allowing holders to exchange outstanding debt prior to maturity for newly issued debt, successfully extended the average maturity of the debt during the first half of the 1960's. This technique was not used again until the February 1971 refunding because of high market interest rates and capital gains taxation complications that make advance refunding less attractive to investors.

The volume of savings bonds increased slowly but steadily through 1968. During 1969 and 1970, however, investors redeemed more than they purchased because of higher interest rates on alternative forms of financial investment. Preliminary data suggest that this trend may have been reversed, as rates on competing savings instruments have declined below the 5½% rate on U. S. savings bonds (effective June 1, 1970) and as consumers continue to exhibit a high propensity to save.

Special nonmarketable debt issued by the Treasury to Government agencies and trust funds increased nearly \$34 billion from 1960 to 1970. These trust funds comprise contributions arising from various insurance, retirement, and unemployment programs, and may not be placed directly into the Treasury's general revenue fund to cover general expenditures.

The Government agency debt currently includes issues of the Federal Housing Administration, the Government National Mortgage Association, the Export-Import Bank, the Tennessee Valley Authority, and some mortgages of the Defense Department.



Almost 60% of the agency debt included in Federal debt is composed of participation certificates issued by the Government National Mortgage Association. Agency issues grew rapidly from 1965 through 1968, but then declined sharply at the end of 1968 due to the change from public to private ownership of the Federal National Mortgage Association, the Banks for Cooperatives, and the Federal Intermediate Credit Banks. The volume of agency debt included in the Federal debt has declined since 1968 and is expected to decline further as a result of the runoff of participation certificates originally issued by the Federal National Mortgage Association.

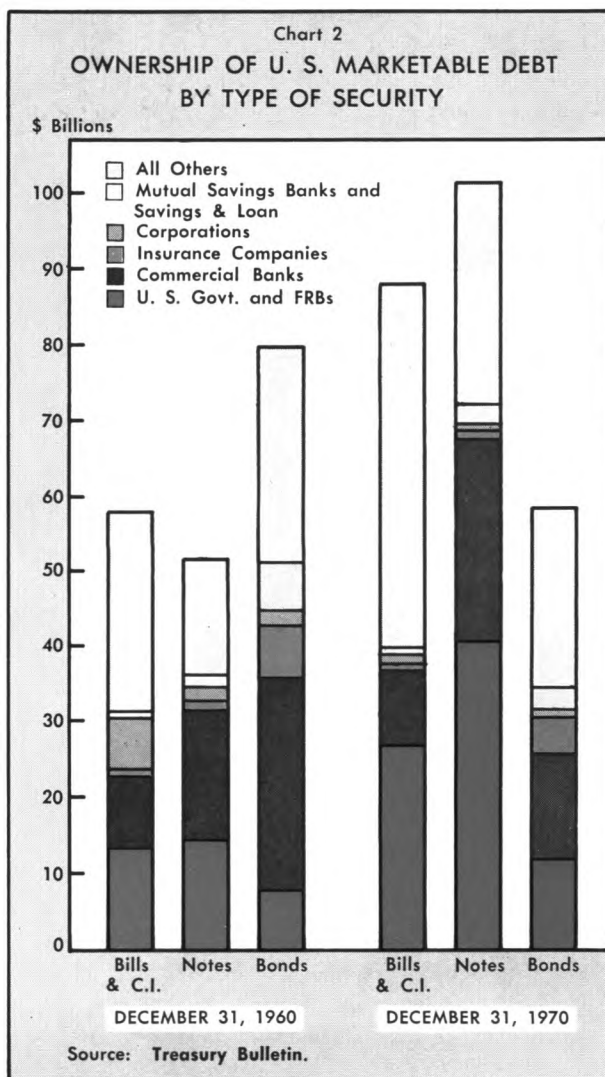
**Ownership** The type of Federal debt has been a significant determinant of the distribution of its ownership. Ownership of two of the four major components of Federal debt is restricted. Commercial banks may not purchase U. S. savings bonds for their own account, and an annual purchase limit of \$5,000 has resulted in individuals being the main holders. Government trust accounts and agencies are the only holders of special Treasury issues.

Federal Reserve Banks and the U. S. Government trust accounts acquired \$44 billion of the \$58 billion increase in the total volume of U. S. marketable debt since 1960. A large part of this increased ownership is attributable to open market purchases conducted by the Federal Reserve. All other institutions included in the Treasury's survey of ownership, except state and local governments, have reduced their holdings of these securities. This de-

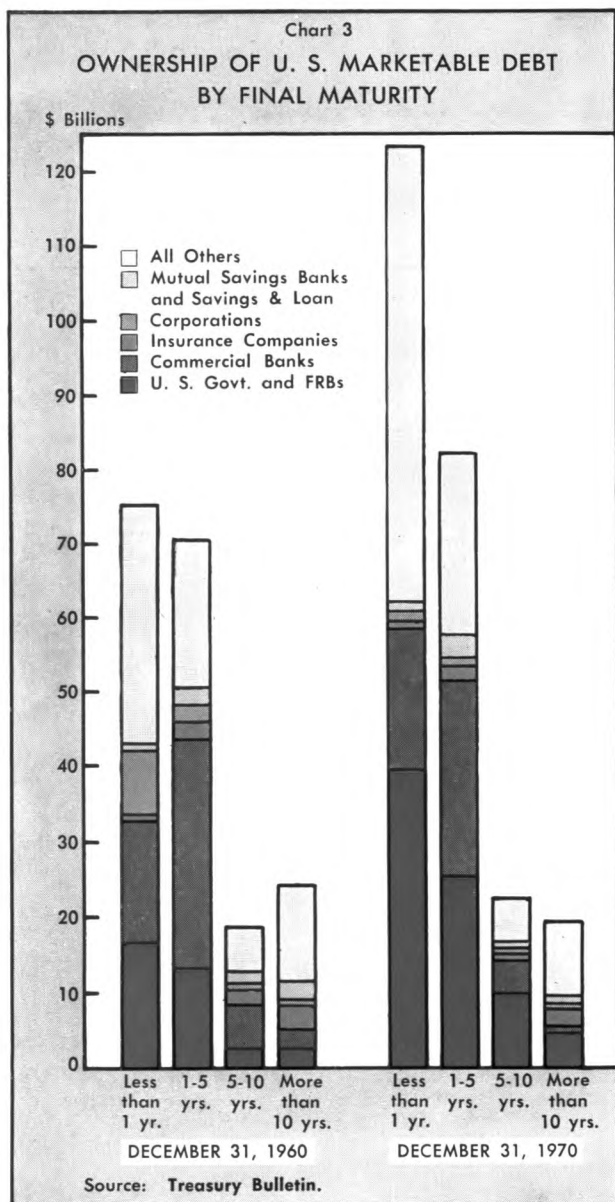
crease resulted from higher returns on alternative investments and reductions in demand for liquidity by these institutions.

Commercial banks are the only private group that have shown an ownership pattern other than the downward trend since 1965. Banks have increased their holdings during periods of financial ease (1967, 1968, and 1970) and have reduced their holdings during periods of monetary restraint (1966 and 1969). The increased use of certificates of deposit as a source of funds also has enabled banks to substitute higher yielding but less liquid agency issues in state and local government securities for the more liquid U. S. marketable securities.

Individuals recorded the largest gain in ownership within the private sector. Most of the increase in holdings came in 1969 as market interest rates rose above rates banks and thrift institutions were







permitted to pay on time deposits. Purchases of Treasury bills by individuals declined in early 1970 when the Treasury raised the minimum purchase requirement from \$1,000 to \$10,000.

Ownership of the U. S. Treasury marketable debt by maturity is partly determined by institutions' liquidity needs, maturity composition of liabilities, and inflows of cash. Liquidity needs are met best by maintaining a position in short-term rather than long-term securities since price fluctuations of the former are less. Commercial bank ownership is concentrated in securities with less than five years to maturity since a large part of bank liabilities are subject to immediate withdrawal. Conversely, long-term issues are the major portion of life insurance companies' portfolios since their cash outflow is predictable and is generally less than the cash inflow from premium payments. Even so, most institutions have increased their relative share of short-term securities as a result of the change in the composition of supply in the 1960's and of the tight credit conditions in the late 1960's.

**Government Sponsored Agencies** Debt issued by Banks for Cooperatives, Federal Home Loan Banks, Federal Intermediate Credit Banks, Federal Land Banks, and the Federal National Mortgage Association is not classified as Federal debt even though the sponsored debt is commonly considered a part of total agency debt. Government sponsored debt has grown from \$8 billion to \$38 billion during the past decade and is expected to continue to grow in importance, especially that of the Federal National Mortgage Association. Virtually all sponsored agency debt is held by private investors. This debt is not subject to the 4¼% ceiling and is not included in the statutory debt limit.

*James R. McCabe*