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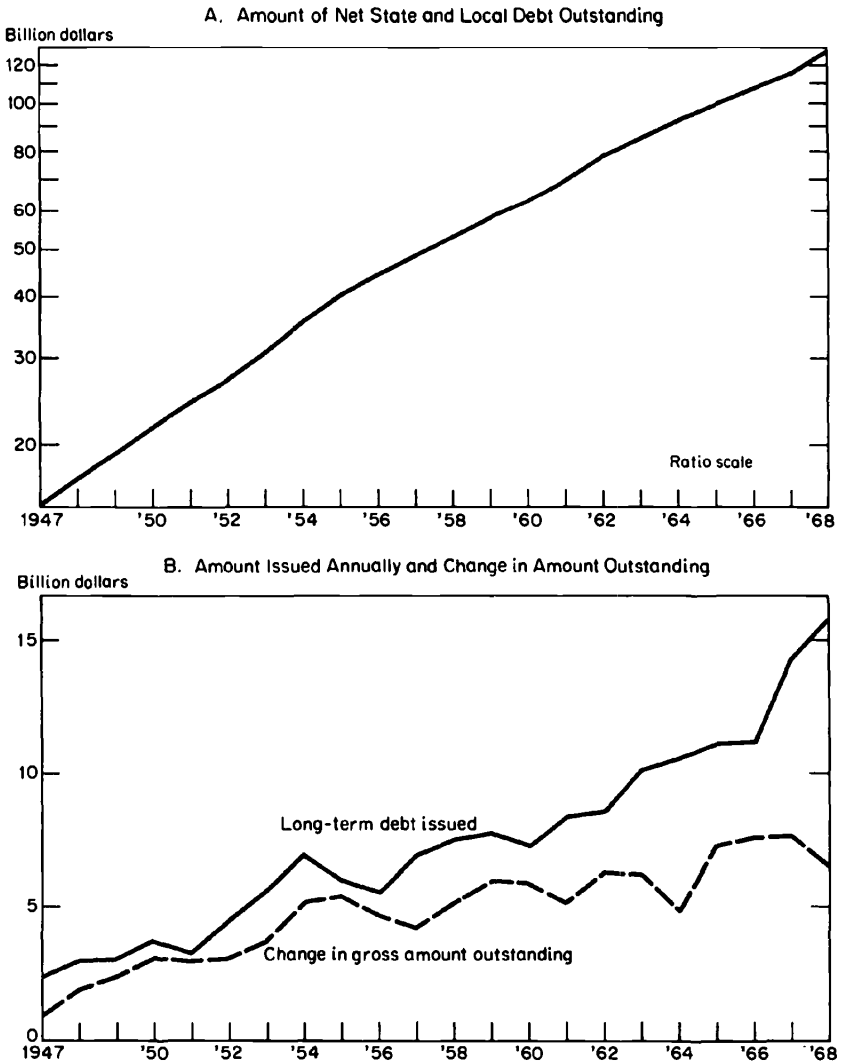
5

POSTWAR TRENDS IN AGGREGATE CHARACTERISTICS AFFECTING QUALITY

The major measurable determinants of the prospective quality of state and local debt may be found by examining instrument and borrower characteristics. The primary purpose of this chapter is to present those instrument and borrower characteristics that the economist, rating agency, etc., can use to assess quality. It is for the person assessing the quality to determine the significance of the level of and changes in these characteristics and the effects of the future external environment. Available, quantifiable characteristics are emphasized; however, pertinent nonquantifiable characteristics are discussed and other useful characteristics are suggested. While postwar data are stressed, characteristics in earlier periods, when available, are presented for comparison.[1] A brief evaluation of the significance of the postwar levels and changes in these characteristics is presented at the end of the chapter. Pertinent instrument and borrower characteristics for several meaningful classifications of state and local debt are examined in the following chapter.

[1]There is obviously no base period which is not subject to criticism as being atypical. Many of the characteristics which the author examines were periodically compiled starting in the years immediately following World War II. Because state and local borrowing was often postponed during World War II and because the economy was extraordinarily liquid in the immediate postwar period, available characteristics from earlier periods are presented for comparison and the atypical nature of the immediate postwar period is recognized in the analysis.

CHART 4
Amounts of State and Local Debt Outstanding and Issued Annually, 1948-68



Source: Data in Appendix Tables 1 and 2.

Debt Service Charges in the Postwar Period

The first variable in our model indicating the quality of state and local debt is the amount of debt service charges. While exact figures on debt service charges are not available, some useful estimates can be made. The postwar amounts of state and local debt outstanding, presented here for selected years, are often used as a surrogate for debt service charges. Postwar patterns in maturities and interest costs for state and local debt are discussed. Estimates of the total amount of state and local debt service charges are then presented.

One of the most noticeable trends during the post-World War II period has been the rapid growth in the amount of state and local debt outstanding. The rapid growth in the net amount (excluding issues held by state and local governmental units and their agencies) of state and local debt outstanding during the postwar period is traced on semilog scale in the upper portion of Chart 4. The amount of net state and local debt outstanding has increased at a compound yearly rate of approximately 10 per cent from 1947 through 1968. Net state and local debt grew much more rapidly – albeit from a lower base – than total net debt, total net public debt, or total net private debt throughout the postwar period.[2]

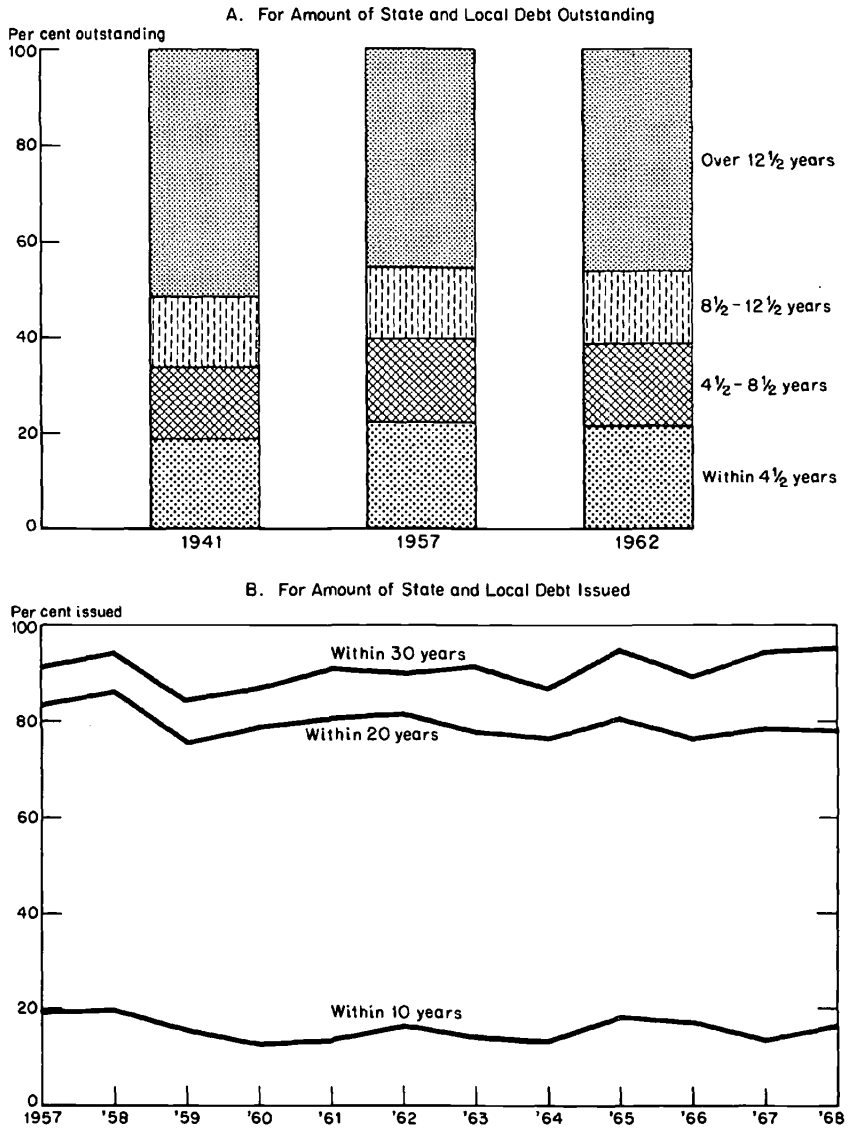
The bottom portion of Chart 4 shows the annual amount of long-term state and local debt issued and the yearly change in the amount of debt outstanding. Despite larger long-term debt retirements (due to the increased amount outstanding), the volume of state and local debt outstanding has grown by an increasing amount. The approximately $7 billion average annual increase in the 1960's is nearly double the roughly $4 billion average annual increase in the early 1950's.

The increasing amount of state and local debt outstanding may not be a very meaningful proxy for debt service charges if the maturity schedules or interest costs of such debt have changed appreciably. The top portion of Chart 5 shows that the cumulative maturities scheduled for long-term state and local debt outstanding shortened slightly between 1941 and 1957, then remained relatively constant through 1962. The bottom portion of the chart demonstrates that the average maturities of long-term state and local debt issued annually remained relatively constant between 1957 and 1968. Thus, it may safely be assumed that the amount of long-term debt maturing annually will probably continue to range between 4 and 5 per cent of the total long-term debt outstanding for at least the next few years.

The interest cost of state and local debt has moved upward in the postwar period. At the present time the average interest cost of all state and local debt

[2]Based on data to be found in Appendix Table 4.

CHART 5
Proportionate Maturity Schedules



Sources: U.S. Bureau of the Census, *State and Local Government Debt: 1941; Compendium of Government Finances, 1957*; and *Compendium of Government Finances, 1962*. Unpublished data obtained from the Investment Bankers Association.

TABLE 9

Estimated State and Local Debt Service Charges, 1948-68
(in millions of dollars)

Year	Interest on All State and Local Debt	Long-Term Debt Retired	Long-Term Debt Refunded	Interest plus Est. Long-Term Principal Charges[a]	Short-Term Debt Issued	Est. Total Debt Service Charges[b]
1968	3,889	6,002	138	9,753	8,659	18,412
1967	3,634	5,886	174	9,346	8,025	17,371
1966	3,268	5,641	221	8,688	6,523	15,211
1965	3,012	5,040	789	7,263	6,537	13,800
1964	2,826	5,045	657	7,214	5,423	12,637
1963	2,653	4,643	1,277	6,019	5,481	11,500
1962	2,424	4,227	261	6,390	4,763	11,153
1961	2,225	3,696	54	5,867	4,513	10,380
1960	2,028	3,458	53	5,433	4,006	9,439
1959	1,740	3,222	59	4,903	4,179	9,082
1958	1,537	2,839	143	4,233	3,910	8,143
1957	1,376	2,716	60	4,023	3,274	7,306
1956	1,220	2,315	75	3,460	2,706	6,166
1955	1,059	2,351	76	3,334	2,593	5,927
1954	916	2,327	158	3,085	3,350	6,435
1953	797	1,982	127	2,652	2,757	5,409
1952	724	1,747	330	2,141	2,049	4,190
1951	647	1,278	98	1,827	1,637	3,464
1950	613	1,178	122	1,669	1,611	3,280
1949	578	822	105	1,295	1,333	2,628
1948	543	1,113	187	1,469	1,005	2,747

Sources: Interest figures from U.S. Department of Commerce, *Historical Statistician on Governmental Finances,* Vol. VI, No. 4 of *1962 Census of Governments;* and *Summary of Governmental Finances* in 1965-68. Other figures from records of *The Daily Bond Buyer.*

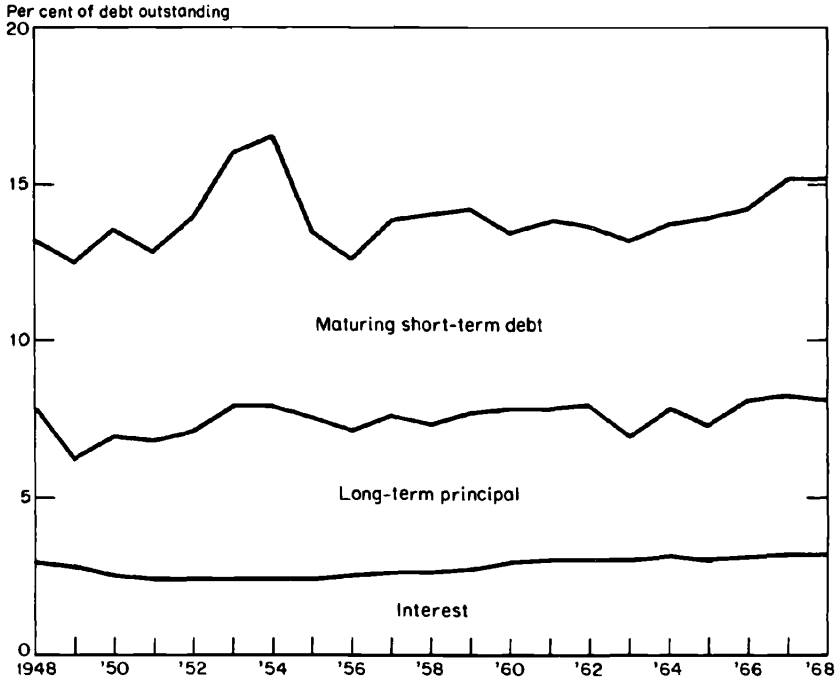
[a]Interest plus long-term debt retired in period less long-term debt refunded.

[b]Interest plus estimated long-term principal charges plus all short-term debt issued.

outstanding is slightly above 3 per cent. This interest cost will probably continue to increase since the marginal interest rate exceeded 5 per cent in the mid-1960's.

Because of the rapid increase in the amounts of debt outstanding, the relatively constant maturity schedules and the increasing average interest costs, it is evident that state and local debt service charges increased rapidly in the postwar period. Table 9 shows estimated state and local debt service

CHART 6
Debt Service Charge Measures as a Per Cent of Debt Outstanding, 1948-68



Sources: Table 9 and Appendix Table 1.

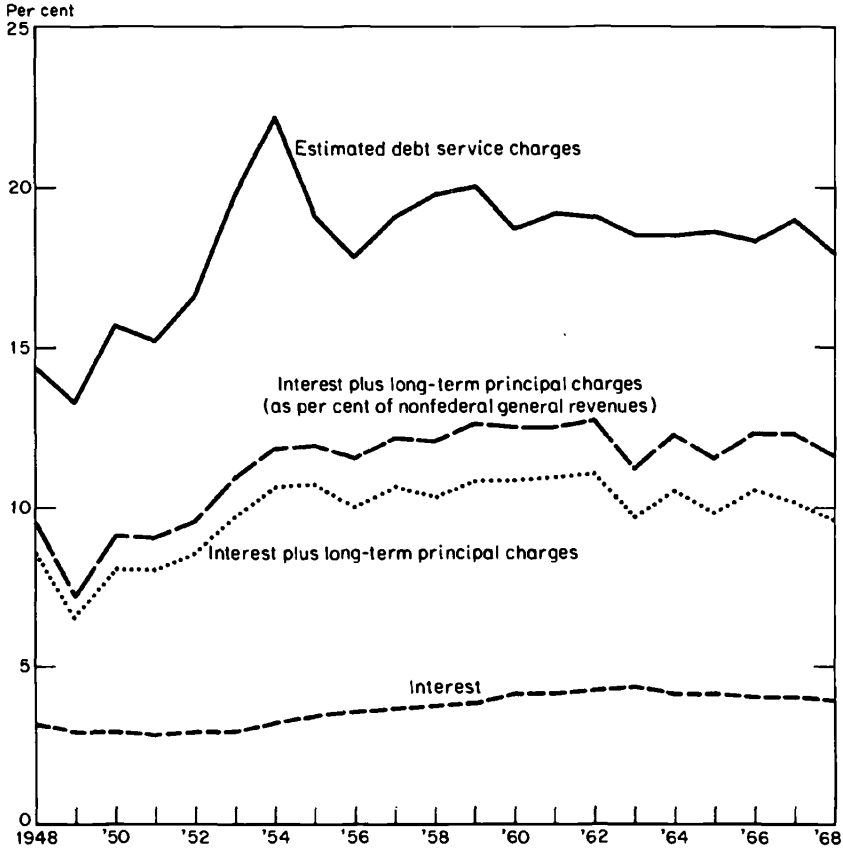
charges from 1948 through 1968. The long-term debt retired annually (except through refunding) was added to the interest on all state and local debt to estimate the interest plus long-term principal charges. The dollar amount of short-term debt issued during the year was then added to this figure to obtain estimated total debt service charges.

Chart 6 shows that the resulting debt service charge measures, although very rough estimates, have been a remarkably stable per cent of total debt outstanding from 1948 through 1968. This reasonably stable relationship indicates that, when properly used, state and local debt outstanding is a meaningful proxy for the service charges on such debt.

Over-all State and Local Cash Inflows

The model developed in the preceding chapters indicated that the ability to meet debt service charges was a function of the relation of such charges to the

CHART 7
Debt Service Charge Measures as a Per Cent of State and Local General Revenues, 1948-68



Sources: Table 10: Governments Division, U.S. Bureau of the Census, *Historical Statistics on Government Finances,* Vol. VI, No. 4 of *1962 Census of Governments;* and *Governmental Finances,* 1965-68 issues.

difference between the potential over-all cash inflows and cash outflows having priority over the charges. The direct relationships between debt service costs and over-all state and local general revenues[3] appears in Chart 7. This chart shows that interest costs rose from under 3 per cent of general revenues in the late 1940's and early 1950's to slightly over 4 per cent in the early and mid-1960's. Interest costs plus net long-term retirements rose from around 8

[3]State and local general revenues are all state and local revenue except utility and liquor-store revenues and insurance-trust revenues.

per cent to above 10 per cent of general revenues during the same period. Estimated total debt service charges as a proportion of general revenues were under 15 per cent in the late 1940's but increased over 18 per cent in the early and mid-1960's. Two other observations can be made from this chart. First, the rate of increase in debt service charges as a percentage of general revenues has slowed in recent years. Second, if federal government aid is removed from state and local general revenues, the increases in debt service charges as a percentage of state and local revenues have been more pronounced.

Estimates of debt service charges prior to the postwar period were available for only three years: 1922, 1927 and 1932. In 1922 and 1927 interest was approximately 9 per cent of general revenues, interest plus net maturing long-term debt was 13-15 per cent of general revenues, and estimated debt service cost was 22-24 per cent. Debt service costs continued to rise into the 1930's while general revenues declined slightly; therefore, debt service charges were a much higher percentage of state and local general revenues in 1932.[4]

Before turning to the cash outlays which will be paid before debt service charges, the sources of over-all state and local cash inflows should be examined. The major sources of state and local general revenues changed appreciably between the pre- and early post-World War II periods (see Table 10). Most of these changes continued at a more moderate pace throughout the postwar period. Most noticeable are the decreases in the proportionate amounts of property taxes and license fees (most of the other taxes category) and the proportionate increases in receipts from sales and income taxes and fiscal aid from the federal government. The changing nature of proportionate sources of state and local revenues help indicate the prospective reliability of cash inflows and help indentify the significant underlying resources.

Reliability implies dependability even under trying economic or social conditions. In the preceding chapters, it was indicated that the general property tax had been one of the most reliable sources of tax revenues during trying times. Even in depression periods when tax payments lagged behind schedule, it was generally possible to borrow against delinquent property taxes. Specific sales taxes on consumer necessities, excise taxes and most licenses also appear to be reliable, although they tend to fluctuate somewhat with economic prosperity. Income taxes, general sales taxes and general revenue taxes seem to be most vulnerable to economic fluctuations.

Based on these generalizations, the contemporary scene is far more complex than the situation prior to the 1929 state and local debt default period. The sources of state and local revenues have become more diversified and the

[4]Revenue figures and interest costs from Bureau of the Census, U. S. Department of Commerce. Long-term principal charges and amount of short-term debt issued obtained from *The Daily Bond Buyer.*

TABLE 10

Selected General Revenue Items as a Percentage of General State and Local Revenues, 1922-68

Year	General Revenues ($ billions)	Percentage Distribution					
		Property Taxes	Sales Taxes[a]	Income Taxes[b]	Other Taxes[c]	Fiscal Aid[d]	Misc. General Revenues
1968	101.3	27.4	22.6	9.7	7.0	17.0	16.3
1967	91.6	28.7	22.5	8.8	6.9	16.9	16.2
1966	83.0	29.7	23.0	8.2	7.5	15.8	15.9
1965	74.0	30.5	23.1	8.1	7.5	14.9	15.9
1964	68.4	31.0	23.0	8.0	7.7	14.6	15.6
1963	62.3	31.9	23.2	7.7	8.0	13.9	15.4
1962	58.2	32.7	23.2	7.5	8.0	13.5	15.2
1961	54.0	33.3	23.1	7.2	8.4	13.2	14.9
1960	50.5	32.5	23.5	7.2	8.4	13.8	14.7
1959	45.3	33.1	23.0	6.6	8.8	14.1	14.5
1958	41.2	34.1	23.8	6.7	9.0	11.8	14.5
1957	38.2	33.7	24.8	7.2	9.8	10.1	14.4
1956	34.7	33.9	25.1	7.0	10.1	9.6	14.3
1955	31.1	34.5	24.6	6.4	10.1	10.1	14.4
1954	29.0	34.4	25.1	6.6	10.1	10.2	13.7
1953	27.3	34.3	25.4	6.9	10.0	10.5	12.9
1952	25.2	34.4	25.2	7.3	9.8	10.2	13.1
1950	20.9	35.1	24.6	6.6	9.7	11.9	12.0
1948	17.3	35.5	25.8	6.6	9.5	10.8	11.9
1946	12.4	40.4	24.2	7.0	10.1	6.9	11.4
1940	9.6	46.1	20.6	4.0	10.6	9.8	8.9
1936	8.4	48.8	17.7	3.2	10.2	11.3	8.9
1932	7.3	61.7	10.3	2.1	10.6	3.2	12.0
1927	7.3	65.1	6.5	2.2	10.0	1.6	14.7
1922	4.8	69.5	3.2	2.1	9.2	2.3	13.7

Sources: U.S. Department of Commerce, *Historical Statistics on Governmental Finances,* Vol. IV, No. 4 of *1962 Census of Governments;* and *Governmental Finances in 1965-68.*

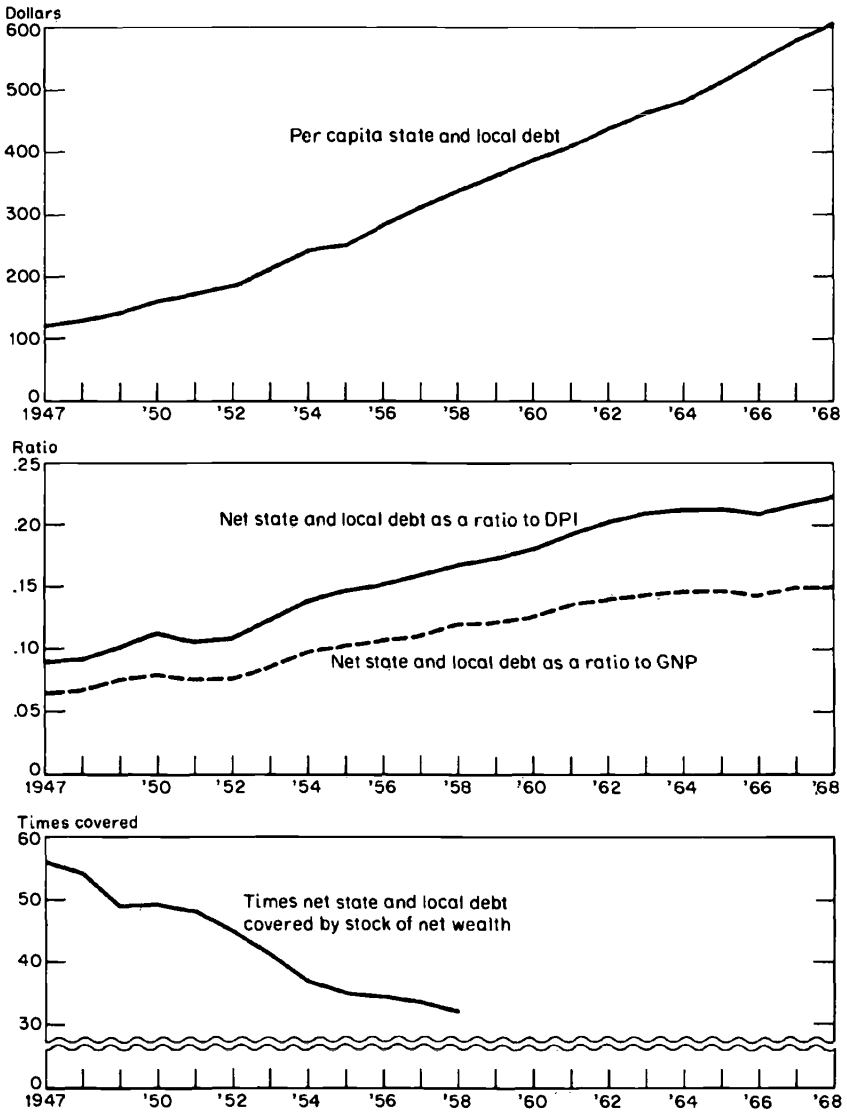
[a]Includes general and specific sales taxes and gross receipts taxes.

[b]Includes business and personal income taxes.

[c]Most of these taxes are motor vehicle licenses and registration fees and operators license.

[d]Aid from the federal government to state and local governmental units.

CHART 8
Selected Aggregative Measures of the State and Local Debt Burden, 1947-68



Sources: Data in the top panel is from the U.S. Bureau of the Census. Data in the middle and bottom panels are from Appendix Table 4.

increase in fiscal aid (both federal aid to states and state aid to local units) should help financially weak units. On the other hand, the relative decline in the previously dependable property taxes and license receipts and the proportionate increase in revenues based on cyclically vulnerable income and consumption may make state and local cash inflows more rather than less vulnerable to cyclical economic disturbances. Even fiscal aid, the fastest growing source of state and local revenues in the postwar period, is suspect. Most federal taxes are vulnerable to declines in income and consumption.[5] Nearly two-thirds of state and local cash inflows including fiscal aid appear to be derived from taxes and other revenues based on income and consumption. Thus, the shifts in the primary sources of cash inflows seem to indicate that, *ceteris paribus*, relatively more general revenues should be required to support a given level of state and local debt.

State and local cash flows depend on the growth of the tax base and the tax-paying ability of their constituents. While the tax base is partially a function of the type of tax assessed, both the base and tax-paying ability must ultimately be paid from the wealth, production and income of our economy. Chart 8 demonstrates the relationship between state and local debt outstanding, a surrogate for debt service charges, and the population, Gross National Product and Disposable Personal Income in the United States from 1947 through 1968. The chart also reveals the number of times that net state and local debt is covered by the stock of net wealth of the United States from 1947-58. Chart 8 discloses that per capita state and local debt increased from $119 in 1947 to $606 in 1968. During the same period, the ratio of net state and local debt outstanding to GNP rose from .065 to .149 and the ratio of debt to DPI rose from .088 to .218. In the 1947-58 period, the coverage of net state and local debt by the stock of net debt fell; in 1947 net wealth was 54.2 times the net debt, in 1958 wealth was 32 times debt.[6]

It is pertinent to observe what happened to most of these same measures prior to the most recent major default period, the 1929 depression era. The amount of per capita debt increased from $65 in 1918 to $130 in 1928. During the same period the ratio of net debt to GNP increased from .076 to .129 and the coverage of net debt by net wealth fell from 62.9 times to 34.9 times.[7]

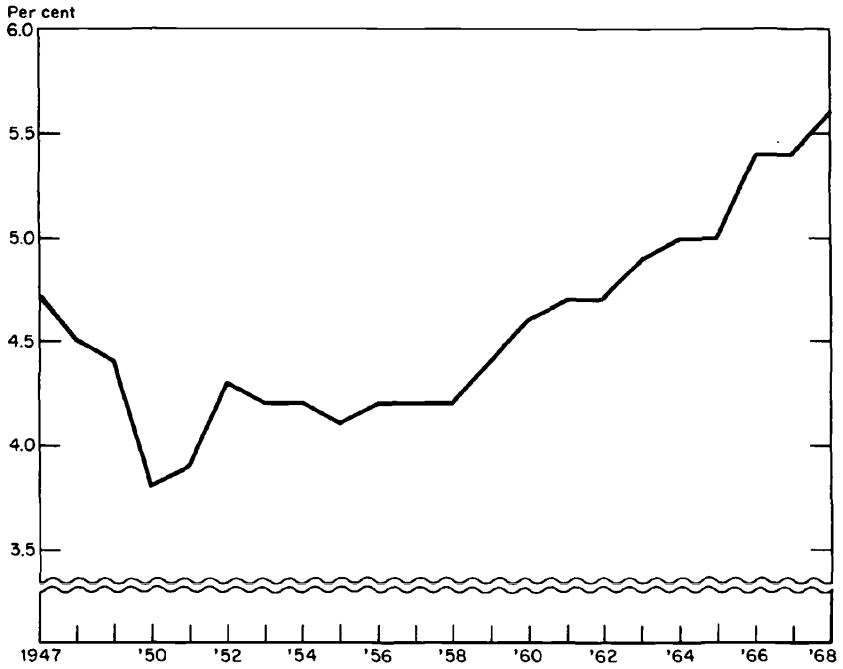
The relationship between the over-all debt of a state or local governmental unit and the total estimated full property values in that unit is another useful

[5]This vulnerability is limited by the ability and willingness of the federal government to use deficit financing.

[6]For yearly figures see Appendix Tables 2 and 4. Per capita figures are based on the population estimates of the Bureau of the Census.

[7]*Ibid.*

CHART 9
Median Over-All Tax-Supported Debt to Estimated Full Property Valuation for 200 Largest U.S. Cities, 1947-68



Source: Unpublished data from Dun & Bradstreet.

comparison. Estimated true property values are primarily a proxy for wealth, but also may be indicative of the property tax base. Chart 9 shows that the ratio of the median over-all taxable debt to estimated true property values for the 200 largest U. S. cities rose from less than 3 per cent in the late 1940's to more than 5 per cent in the mid-1960's. The median for the same ratio for the 190 largest U. S. cities had been slightly above 7 per cent in 1935. The decidedly faster growth of estimated full property values relative to debt was a significant indicator of defaults in the last major default period.[8]

Resources Available to Pay Debt Service Charges

The discussion so far has emphasized the relationship between debt service

[8]Based on unpublished information obtained from Dun and Bradstreet. The past performance of the debt to estimated true property value relationship was discussed on pages .

charges and gross state and local revenues and the resources underlying these revenues. The relationship between debt service charges and the resources available to pay those charges is conceptually much more meaningful. It is very difficult, however, to estimate the resources available to meet debt service charges. Three aspects, plus the previously discussed over-all cash inflows, are significant in determining the resources available to pay debt service charges: the flexibility in the use of state and local revenues; the estimated cash outlays that will be made prior to debt service charges; and the cash and near cash balances available to meet the charges.

The importance of flexibility in the use of revenues was demonstrated during the last major default period. In that period the revenues of some governmental units were sufficient, but the mechanics of their allocation prevented application where needed. Despite the demonstrated importance of flexibility, it seems that the debt structure and revenue system are more rigid today than they were during the 1929-33 depression period or even in the years immediately following World War II.

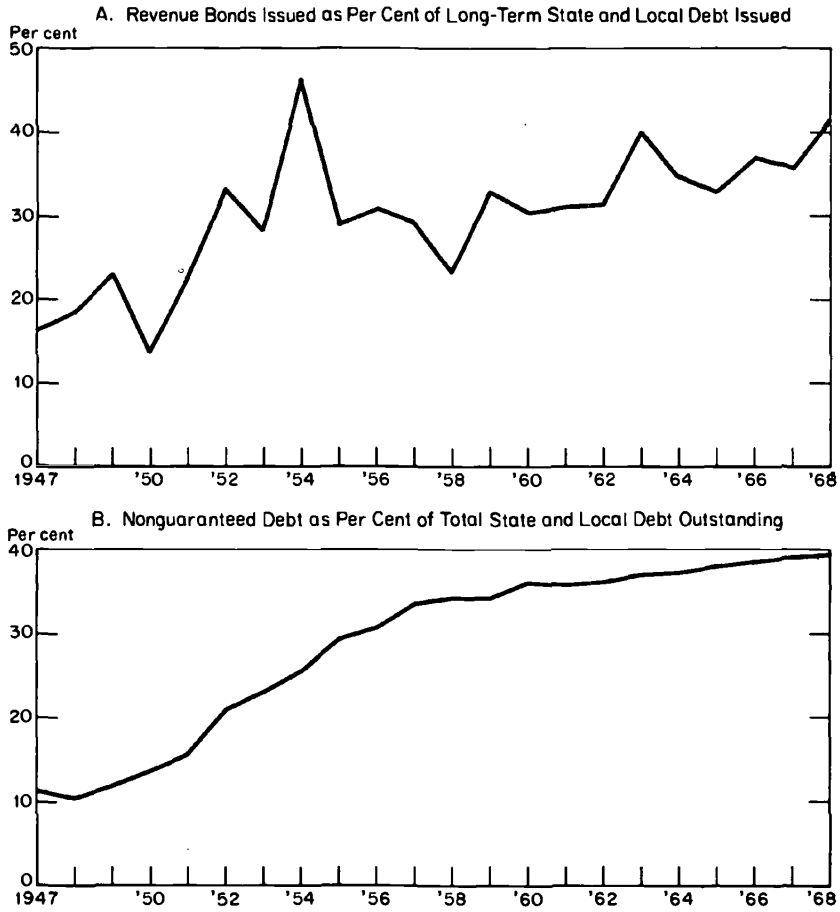
Two state and local financial techniques appear to be reducing the flexibility of state and local revenue systems. The first of these is earmarking. In earmarking liens are placed on certain revenues or fractions of revenues in favor of a particular series of general obligations. This may be accomplished either by legislative fiat or by contract with bondholders. There are few details about the amount of earmarking in the 1920's and early 1930's, but the practice then appears to have been rudimentary by present standards and limited primarily to highway-user taxes. Today, however, earmarking is a common practice in many governmental units and extends to most of the major segments of the state and local revenue system.[9]

The second financial technique reducing the flexibility in revenue systems is the use of certain designated revenues and can be distinguished from the full faith and credit pledged by similar issuers of general obligations.[10] These bonds are payable solely from limited liability obligations. The revenues from which limited liability obligations are to be paid are usually restricted solely for this use. Therefore, even if the designated revenues (which the Bureau of the Census classifies as general revenues) are several times the debt service

[9]Evidence of the widespread use of earmarking in the postwar period appears in: Tax Foundation, Inc., *Earmarked State Taxes*, Project No. 38, New York, 1964; and Citizens Research Council of Michigan, *Earmarking of Tax Revenues*, Detroit, 1962.

[10]Nearly all of the limited obligations of state and local units are conventionally called "revenue bonds." The U. S. Bureau of the Census uses the term "non-guaranteed debt" to represent the limited liability obligations of state and local units. Non-guaranteed debt includes limited liability special assessment bonds, whereas, these bonds are not included in the conventional revenue bond category. However, because of the small amount of special assessment bonds outstanding or recently issued, the terms revenue bonds and non-guaranteed debt are used interchangeably to describe the limited liability obligations of state and local governments.

CHART 10
Proportionate Amount of Limited Liability Obligations Issued and Outstanding During the Postwar Period, 1947-68



Sources: Data in Appendix Tables 1 and 2.

requirements, the revenues remaining after debt service charges are paid cannot be used for other purposes.

The top portion of Chart 10 shows that limited liability bonds have been an increasing portion of long-term state and local debt issued during the postwar period, representing over one-fourth of such debt issued in all but one of the years since 1952. Similar historical data in Appendix Table 1 reveal that revenue bonds had always accounted for less than 10 per cent prior to 1943. The combined information from Chart 10 and Appendix Table 1 demonstrates the long and more or less steady increase in reliance on

revenue bonds and the commensurate decline in reliance on general obligations throughout the postwar period.

This trend has increased the relative amount of limited liability debt outstanding while lessening that of general obligations outstanding. Historical data in Appendix Table 2 suggest that limited liability obligations accounted for less than one-ninth of state and local debt outstanding throughout the 1920's and 1930's. Most of the limited liability obligations that were outstanding up to the early 1930's were special assessment bonds.[11] Chart 10 also shows that in 1948, 10.3 per cent of the dollar amount of state and local debt outstanding was in non-guaranteed obligations. The relative importance of non-guaranteed debt (almost entirely in the form of revenue bonds) has increased rapidly since 1948 – rising to 34.2 per cent of total indebtedness in 1958 and to 39.3 per cent in 1968. Because general obligations are usually scheduled for more rapid retirement than are revenue bonds and because the heavy volume of revenue bonds issued will probably continue, it seems likely that the future will see even higher proportions of state and local debt that are payable solely from designated revenues.

The greater rigidity in the use of state and local revenues, resulting from earmarking and revenue-dedication, might create serious problems in periods of declining economic activity and declining government revenues. If the degree of earmarking and revenue dedication that exists today had prevailed during the 1929 depression period, many more state and local debts would probably have gone into default. Also, many difficulties that were merely temporary would probably have swelled to chronic and unmanageable proportions. Therefore, the declining degree of flexibility in the use of state and local revenues seem to indicate that, *ceteris paribus,* relatively more revenues are required to support a given level of state and local debt.

The estimated cash outlays to be made prior to debt service charges are the second major consideration in determining the resources available to meet debt service charges. No directly quantifiable information is available on this problem, although an understanding of the nature of state and local cash outlays gives some insights into the problem.

Table 11 illustrates the proportion of total general expenditures spent in major functional areas in selected years from 1922–68. The information on this table indicates that educational expenditures have grown in relative importance and constituted approximately 40 per cent of total general expenditures by the mid-1960's. Roads and highways, the second highest functional expenditure, have declined in proportional importance from about one-fourth

[11] It is estimated that the proportionate dollar amount of revenue bonds to total state and local indebtedness was .5 per cent in 1925, 2 per cent in 1931 and 5 per cent in 1937. It is estimated that limited liability special assessment bonds were 6–7 per cent of total state and local indebtedness in the late 1920's. However, an extremely low dollar amount of limited liability special assessment bonds was issued after the 1929 depression period.

TABLE 11

State and Local General Expenditures Classified by Major Function for Selected Years 1922-68

Year	General Expenditures ($ billions)	Percentage Distribution				
		Education	Roads & Highway	Public Welfare	Health & Hospitals	Protection & Sanitation
1968	102.4	40.2	14.1	9.6	7.5	7.7
1967	93.8	40.8	14.9	8.8	7.2	7.9
1966	82.8	40.2	15.4	8.2	7.1	8.1
1965	74.5	38.3	16.4	8.5	7.2	8.3
1964	69.3	37.9	16.8	8.4	7.1	8.4
1963	64.0	37.1	17.4	8.5	7.2	8.4
1962	60.2	36.9	17.2	8.4	7.2	8.7
1961	56.2	36.6	17.5	8.4	7.3	8.7
1960	50.9	36.1	18.2	8.5	7.3	8.8
1959	48.9	35.4	19.6	8.5	7.6	8.7
1958	44.9	35.7	19.1	8.5	7.7	8.9
1957	40.4	35.0	19.4	8.6	7.7	9.2
1956	36.7	36.0	18.9	8.6	7.6	9.2
1955	33.7	35.3	19.1	9.4	7.5	9.1
1954	30.7	34.4	18.0	10.0	7.8	9.1
1953	27.9	33.6	17.9	10.4	8.2	9.1
1952	26.1	31.9	17.8	10.7	8.4	9.7
1950	22.8	31.5	16.7	12.9	7.7	9.2
1948	17.7	30.4	17.2	11.9	6.9	9.7
1946	11.0	30.4	15.2	12.8	7.4	10.4
1940	9.2	28.6	17.0	12.5	6.6	8.7
1936	7.6	28.5	18.6	10.8	6.1	9.5
1932	7.8	29.8	22.4	5.7	5.9	9.7
1927	7.2	31.0	25.1	2.1	4.9	10.9
1922	5.2	32.7	24.7	2.2	4.9	10.3

Sources: U.S. Department of Commerce, *Historical Statistics on Governmental Finances,* Vol. IV, No. 4 of *1962 Census of Governments;* and *Summary of Governmental Finances in 1965-68.*

[a]Functions were 5 per cent or more of the total.

TABLE 12

Amount of State and Local Expenditures, by Character, Selected Years, 1922-68
(amounts in millions of dollars)

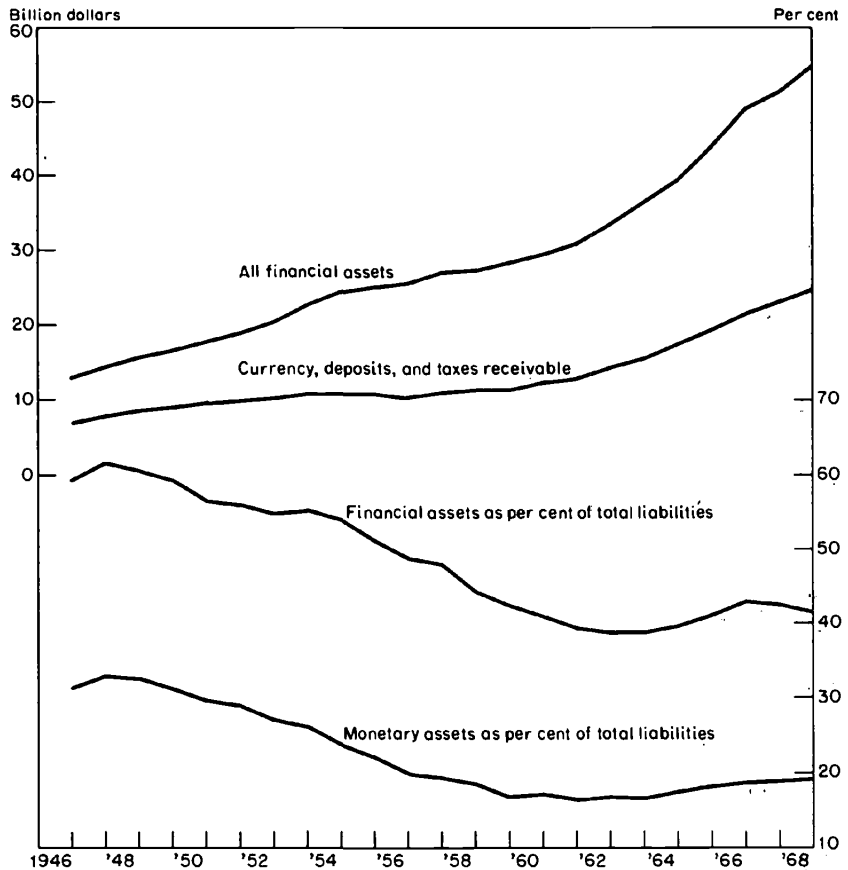
		Current Operations		Capital Outlays		Assistance and Subsidies	
Year	Expenditures	Amount	% of Total	Amount	% of Total	Amount	% of Total
1968	116,245	75,311	64.8	25,731	22.1	5,659	4.9
1967	106,675	68,248	64.0	24,506	23.0	5,010	4.7
1966	94,906	60,212	63.4	22,330	23.5	4,315	4.5
1965	86,554	53,929	62.3	20,535	23.7	4,127	4.8
1964	80,579	49,687	61.7	19,087	23.7	3,885	4.8
1963	74,698	45,473	60.9	17,637	23.6	3,737	5.0
1962	70,547	42,736	60.6	16,791	23.8	3,708	5.3
1961	67,023	39,800	59.4	16,091	24.0	3,607	5.4
1960	60,999	36,318	59.5	15,104	24.8	3,518	5.8
1959	58,572	33,369	57.0	15,351	26.2	3,329	5.7
1958	53,712	30,862	57.5	13,986	26.0	3,159	5.9
1957	47,553	27,983	58.8	12,616	26.5	2,828	5.9
1956	43,152	25,828	59.9	11,407	26.4	2,620	6.1
1955	40,375	23,186	57.4	10,705	26.5	2,660	6.6
1954	36,607	21,508	58.8	9,125	24.9	2,634	7.2
1953	32,937	19,965	60.6	7,905	24.0	2,558	7.8
1952	30,863	18,533	60.0	7,436	24.1	2,472	8.0
1950	27,905	15,948	57.2	6,047	21.7	2,918	10.5
1948	21,260	13,415	63.1	3,725	17.5	2,381	11.2
1946	14,067	9,690	68.9	1,305	9.3	1,209	8.6
1940	11,240	6,176	54.9	2,515	22.4	1,075	9.6
1936	8,501	5,228	61.5	1,524	17.9	752	8.8
1932	8,403	5,179	61.6	1,876	22.3	388	4.6
1927	7,810	4,590	58.8	2,356	30.2	93	1.2
1922	5,652	3,477	61.5	1,518	26.9	152	2.7

Sources: U.S. Department of Commerce, *Historical Statistics on Governmental Finances*, Vol. IV, No. 4 of *1962 Census of Governments;* and *Summary of Governmental Finances in 1965-68.*

of general expenditures in the 1920's and 1930's to approximately 15 per cent in the mid-1960's. Other categories constituting over 5 per cent of general expenditures in recent years include public welfare, health and hospitals, and protection and sanitation.

Table 12 reveals the proportion of total state and local expenditures for current operations, capital outlays and assistance and subsidies. In spite of severe financial problems in the early 1930's, current operating expenditures continued to rise; however, capital outlays declined. In recent years the proportionate amount spent on current operations has risen while the propor-

CHART 11
Absolute and Relative Amounts of State and Local Financial Assets, 1946-68



Sources: Goldsmith, Raymond W., Lipsey, Robert E., and Mendelson, Morris, *Studies in the National Balance Sheet of the United States,* Vol. II, Princeton for NBER, 1963, Table III-6, pp. 216-217. Recent figures from unpublished FRB worksheets and *Governmental Finances,* 1959-68 issues.

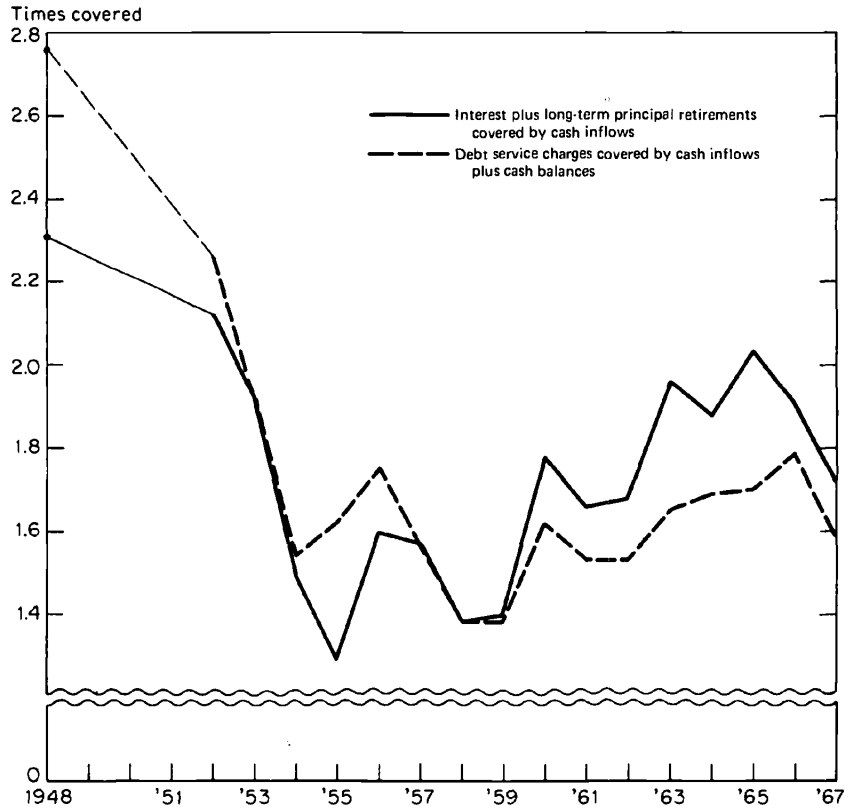
tionate amount spent on capital outlays declined. Expenditures for assistance and subsidies which rose throughout the 1930's have declined as a proportion of total expenditures in the 1950's and early 1960's.

Several additional general observations can be made about the cash outlays with priority over debt service charges. First, state and local expenditures for public welfare and assistance and subsidies will not increase rapidly even if the economy declines, as the federal government has taken over much of this function. These expenditures, however, will probably increase moderately and cannot be expected to decline. Second, the unionization of many state and local employees has increased the rigidity of state and local salaries and wages and may lead to increases in these expenditures even in times of economic slack. Third, state and local units are now legally obligated to sustain essential services and meet employee payrolls before paying debt service charges. In the debt default period during the early 1930's, many state and local governmental units with revenue deficiencies postponed maintenance expense, reduced services and cut employees' salaries in order to meet debt service charges. In the Asbury Park Case (1938) and the Sheffield Case (1948) the courts found that necessary and proper state and local expenses must be paid before debt service charges. These cases would appear to make state and local expenditures substantially more rigid than they were in the 1930's.

The third major consideration in determining the resources available to meet debt service charges is the amount of money and other liquid assets of state and local units that might be available to pay debt service charges. Chart 11 shows the amount of currency, deposits and receivable taxes held by state and local units (excluding pension and retirement fund amounts) and the total amount of financial assets held by these units. Both of these amounts grew absolutely throughout the postwar period. Chart 11 also shows that these cash and financial asset holdings did not grow as fast as the growth in the total liabilities of the units. This relative decline in cash and financial asset holdings was particularly pronounced in the mid- and late 1950's. There was a slight relative recovery in the mid-1960's; however, cash and financial asset holdings relative to financial liabilities did not climb back to the level they held during the mid-1950's.

Because of the inexact measurements of reliable cash inflows, cash outlays to be paid before debt service charges and the proportion of financial assets that could be used to pay debt service charges, any direct comparisons of net cash available to meet debt service charges and debt service charges seems tenuous. Therefore, the comparison presented in Chart 12, while conceptually correct, is tenuous as a quantitative measure. For Chart 12 net cash flows available to meet debt service charges are estimated to be total general revenues less all general expenditures for education, public welfare, health and hospitals, and protection services and less one-half of the remaining general expenditures excluding interest. This net cash flow figure is compared with interest plus estimated long-term principal charges, and then this net cash

CHART 12
Times Estimated Debt Service Charges Are Covered by Estimated Usable Cash Resources, 1948-67



Sources: Debt service charges from Table 9, usable cash balances estimated from Chart 11, estimated usable cash inflows from Chart 7 and Table 11.

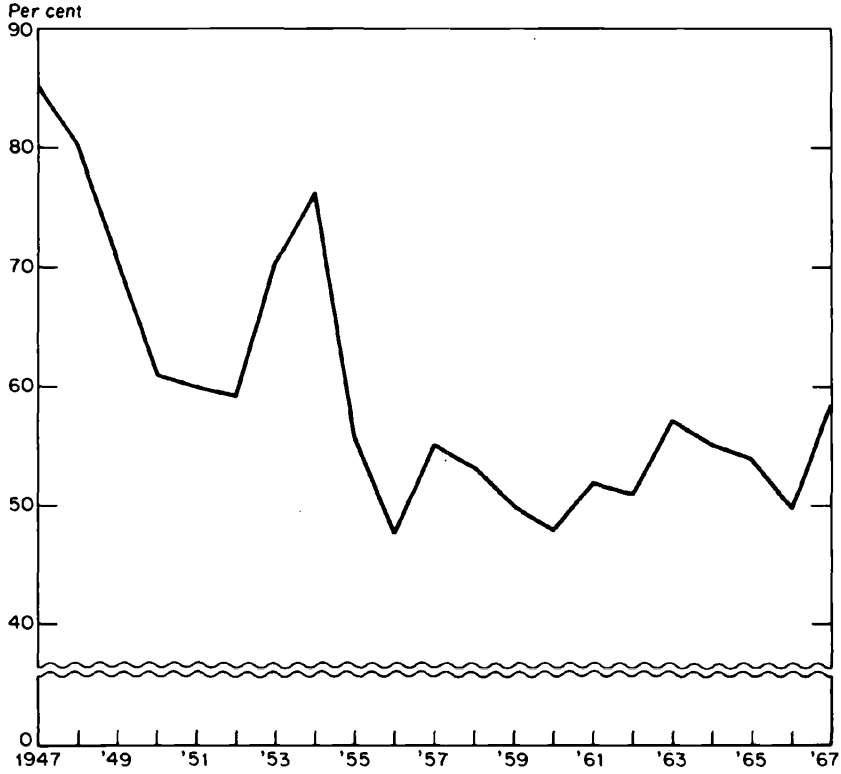
flow figure plus one-half of state and local currency, deposits and taxes receivable balances are compared with estimated total debt service charges.[12]

The tentative results of Chart 12 indicate that net cash flows available to meet debt service charges declined relative to debt service charges from 1948

[12]The basis for the expenditure weighting was the fact that the amount of expenditures for education, public welfare, health and hospitals, and protective services have not declined appreciably in any year since 1927. Expenditures for most other functions have tended to decline somewhat, particularly in depression or recession periods. Few, if any, of these remaining expenditures could decline 50 per cent at the present time. Half of the currency, deposit and taxes receivable balances were used to represent the cash balances state and local governments might be able to use to meet debt service charges.

CHART 13

Long-Term State and Local Debt Issued as a Per Cent of



Sources: Governments Division, U.S. Bureau of the Census, *Historical Statistics on Governmental Finances,* Vol. IV, No. 4 of *1962 Census of Governments* and *Governmental Finances,* 1965-67 issues.

through most of the 1950's, then began to increase relative to debt service charges in the early 1960's. The decline in the late 1940's and early 1950's was at least partially caused by the rapid increase from a low level of state and local debt and the relation of the high liquidity of many state and local units in the immediate postwar period. The increase in the early 1960's was caused primarily by the increased liquidity of state and local units and by a decline in the relative importance of public welfare, health and hospitals, and protective services expenditures. In the mid-1960's then conditions were reversed, and net cash flows declined somewhat relative to debt service charges.

Financial Prudence and Willingness to Pay

The last variables in our model indicating the quality of state and local debt are measures appraising the financial prudence and willingness to pay of the

TABLE 13

Purpose of Long-Term State and Local Debt Issued from 1948 through 1968
(expressed as a per cent of annual amount issued)

	Education	Ground Transportation	Ports and Airports	Water and Sewer	Other Utilities	Health and Welfare	Recreation	Industrial	Public Housing	Veterans Aid	Refunding	Other and Unidentified
1948	13.8	14.1	3.6	10.5	4.1	1.2	1.0	.0	4.9	21.5	6.4	18.7
1949	17.5	17.3	2.2	13.3	4.8	1.6	1.2	.0	6.8	8.8	3.6	22.8
1950	19.2	13.8	1.8	13.2	3.6	2.6	.9	2.2	3.3	17.2	3.1	19.1
1951	17.8	17.7	.8	14.2	5.4	4.1	.2	.1	11.0	1.3	2.7	24.6
1952	22.0	21.3	1.4	9.5	5.1	.8	.5	.1	9.6	2.3	7.1	20.3
1953	23.7	28.5	.9	11.6	2.8	2.4	.8	.1	9.1	2.5	1.5	16.0
1954	20.5	30.6	1.3	9.7	8.6	1.1	.8	.0	6.5	2.3	2.6	15.9
1955	25.4	22.8	1.7	11.9	2.8	1.6	.7	.1	9.5	2.8	1.1	19.6
1956	26.7	12.8	2.5	13.8	11.9	1.1	.7	.3	4.7	2.0	1.1	22.3
1957	35.6	15.5	2.7	14.8	7.2	2.0	1.2	.1	1.7	4.9	.7	13.8
1958	34.2	15.7	2.6	14.4	4.2	2.9	1.3	.4	3.4	4.6	1.2	15.1
1959	29.1	11.1	4.7	14.7	11.2	1.5	1.0	.3	5.3	4.7	1.4	15.0
1960	32.0	14.0	4.4	14.5	3.4	1.4	.9	.6	5.9	2.8	.6	19.4
1961	32.2	13.8	3.8	15.4	4.5	1.2	1.7	.7	4.6	5.7	1.2	15.3
1962	32.8	12.8	3.7	13.7	5.1	1.6	1.8	1.0	6.0	1.4	3.2	16.9
1963	27.8	7.9	2.7	13.5	8.6	2.1	1.0	1.2	5.8	.0	13.5	16.0
1964	30.6	6.5	3.6	14.8	7.5	.9	2.0	1.8	6.8	1.1	6.1	18.2
1965	31.3	8.1	2.3	13.0	4.3	1.8	1.4	2.0	5.6	.4	7.7	22.2
1966	31.3	14.1	2.3	13.6	3.1	4.7	1.0	4.5	4.8	.0	.9	19.6
1967	29.5	10.8	3.5	12.9	3.6	5.1	1.0	9.7	4.5	.0	.9	18.5
1968	28.4	13.7	3.7	11.4	5.6	5.1	1.1	9.8	4.8	.0	.7	15.6
1948-68	28.1	14.1	2.8	13.2	5.6	2.4	1.2	2.3	5.6	3.2	3.4	18.1

Sources: Summarized from an unpublished monograph by the Board of Governors of the Federal Reserve System and data from the Investment Bankers Association.

Note: Due to the rounding of individual figures, some of the yearly totals do not add to 100.0 per cent.

borrowing governmental unit. The amazing record of what some state and local governments have done with limited cash inflows relative to their debt service charges and the need to have some assurance as to the good faith and management of the borrowing unit indicate that this category of variables should not be ignored. Four types of measures are examined: the purpose of the indebtedness, the debt retirement arrangements, the voter debt approval record and the revenue collection performance of the governmental unit.

The purpose of state and local indebtedness is generally considered appropriate when the outlay is (1) extraordinarily large and nonrecurring and (2) in the public interest. Postwar policies and practices related to the first of these two requirements appear to be favorable. Table 13 shows that most of the proceeds from the sale of long-term state and local debt during the postwar period have been used to finance capital intensive purposes such as education, roads and bridges, housing and utilities. Chart 13 shows that long-term state and local debt issued has fluctuated between roughly 50 and 60 per cent of state and local capital outlays in the last decade. In addition to supporting the idea of debt being issued for appropriate purposes, the relationship in Chart 13 indicates that, in the aggregate, current cash inflows are covering all state and local current outlays as well as some of their capital outlays. Deficits in the state and local current account had been one of the important historical indicators of individual state and local debt default situations.

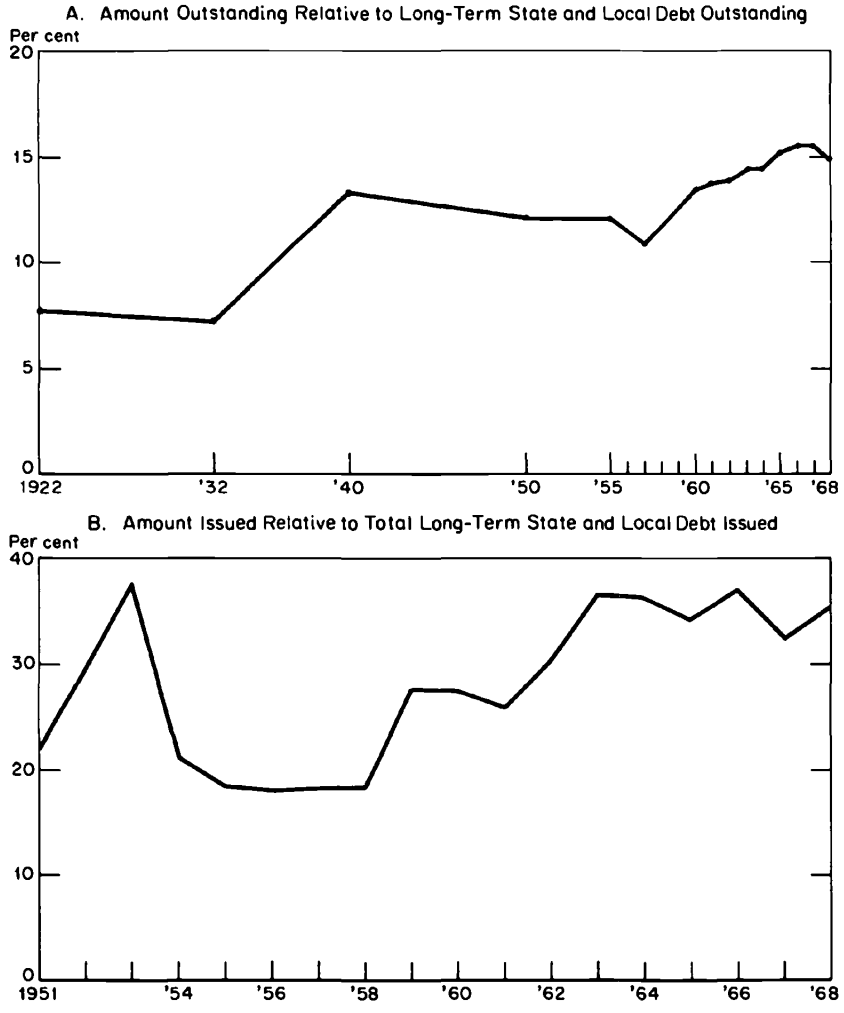
The second of these two requirements, borrowing in the public interest, is a highly subjective concept which may change with shifts in conditions and attitudes. It is usually concluded that the use of public credit for essentially private purposes is inappropriate and may lead to serious problems if the private interests involved get in financial difficulties. The use of public credit for essentially private purposes was determined as a cause in all of the four previous major state and local debt default periods.

A review of Table 13 reveals that the only contemporary practice in which state and local debt is used for essentially private purposes is the use of long-term debt proceeds for industrial aid. Typically these industrial aid bonds are issued to build factories for lease to business concerns. Table 13 shows that the amount of long-term state and local debt used for industrial aid has been slightly more than 2 per cent of all long-term state and local issued from 1948 through 1968. While the amount of industrial aid bonds outstanding is still relatively small, state and local debt issued for industrial aid could be a serious trouble spot.[13] Moreover, Table 13 shows that the relative amount of industrial aid bonds issued has grown very rapidly in the mid-1960's.[14]

[13]There are five known cases in which the business concern using the plant financed by industrial aid bonds has failed or been forced to leave the site. These five cases are general obligations and the communities involved have made all debt service payments so far. It will be interesting to observe what happens if an industrial aid revenue issue is involved in a similar situation.

CHART 14

Relative Amounts of Long-Term Debt of Special Districts[a] and Local Statutory Authorities[b] Outstanding and Newly Issued in Selected Years



Sources: Data in Appendix Tables 1, 2 and 3. Amount of special district and local statutory authority debt issued is from the Investment Bankers Association (for 1957-68 data) and from *Federal Reserve Bulletins* (for 1951-56 data).

[a] Excluding School Districts

[b] Excludes state statutory authorities. In addition, the debt outstanding figure probably excludes some local statutory authorities. Further breakdown of these figures are not available at the present time.

It is also questionable whether the borrowing of some special districts and statutory authorities is in the public interest. Borrowing by these types of political subdivisions often does not require voter approval, is generally not subject to debt restrictions and may conceal the indebtedness from the great mass of voters and taxpayers. Past state and local debt default records have a liberal sprinkling of cases in which the issuing special district or statutory authority has been unable to obtain public support when it has gotten into financial difficulties. The top part of Chart 14 shows that the outstanding amount of long-term debt by special districts other than school districts[15] and local statutory authorities has risen from 7.7 and 7.2 per cent of total long-term state and local debt outstanding in 1922 and 1932 respectively to over 15 per cent of total long-term state and local debt outstanding in the mid-1960's. The lower part of Chart 14 shows that the relative proportion of long-term state and local debt issued by special districts (other than school districts) and local statutory authorities has been increasing in recent years. The bonds of these special districts and local statutory authorities accounted for approximately a third of all long-term state and local debt issued so far in the 1960's. If state statutory authorities were included the proportionate share would be even larger – Table 16 (page 94) shows that state non-guaranteed debt, much of which was statutory authority debt, constituted over half of all state indebtedness outstanding in the 1960's.

The objective here is not to condemn the issuance of all debt by all special districts and statutory authorities. Borrowing by these political subdivisions may be the only method possible when there are unrealistic debt limits or when the debt financed service benefits several governmental units. However, past misuse of borrowing by some special districts and statutory authorities indicates that the increased relative growth in bonds issued by these political subdivisions should be carefully scrutinized for possible financial dangers.

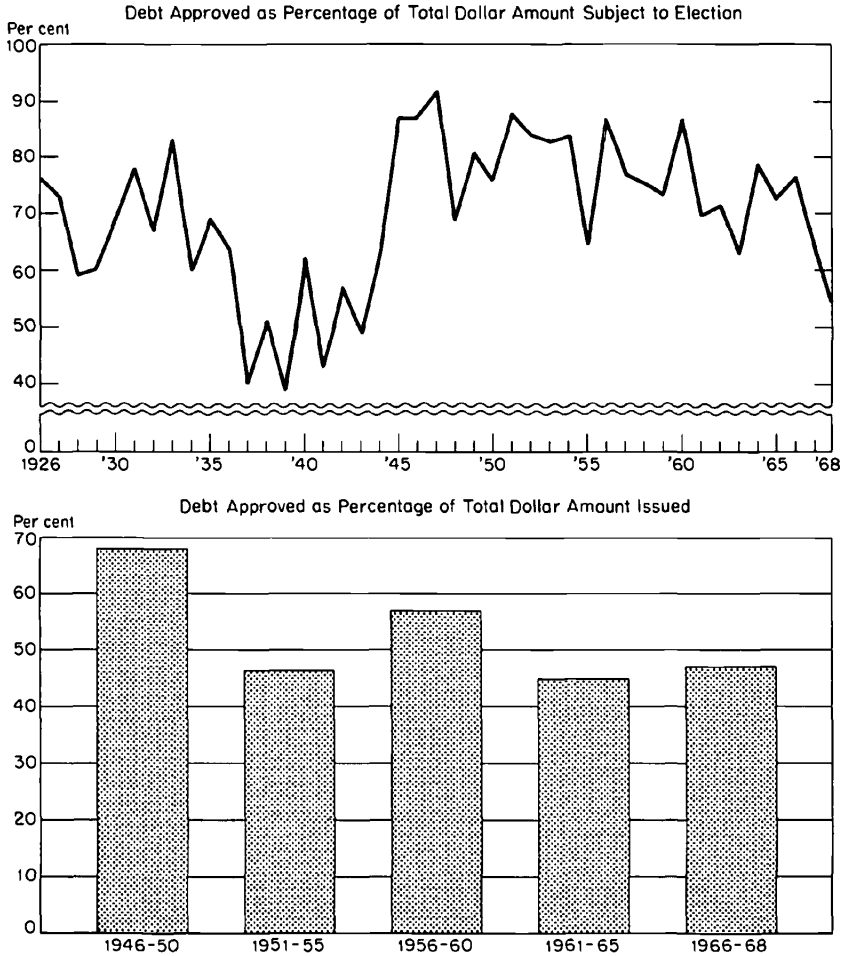
The continuous postwar increase in state and local limited liability obligations, discussed earlier and documented in Chart 10 (page 61), should also be carefully scrutinized. If the limited cash inflows are insufficient to pay the debt service charges on these obligations, many state and local units may be unwilling to support such indebtedness.[16]

[14]After December 31, 1968, the interest on issues of over $1 million of state and local debt issued for industrial aid became subject to the federal income tax. The effect of this legislation will probably be a drastic reduction in the volume of state and local industrial aid bonds issued.

[15]The indebtedness of school districts was not included because such indebtedness is generally not concealed, often requires voter approval and had the lowest over-all incidence of defaults of all political subdivisions in the 1929 depression period.

[16]During the postwar period, some issuing or benefiting government units have aided their limited liability obligations, while others have openly refused to do so. For example, Kansas City, Missouri, advanced supplementary funds so that interest on its Auditorium Plaza Garage revenue bonds could be paid promptly and in full. On the other hand, West Virginia refused to aid the defaulting West Virginia Turnpike and Chicago refused to aid the defaulting Calumet Skyway.

CHART 15
Proportionate Dollar Amounts Approved in State and Local Bond Elections and Debt Approved as a Percentage of Total Dollar Amount Subject to Election



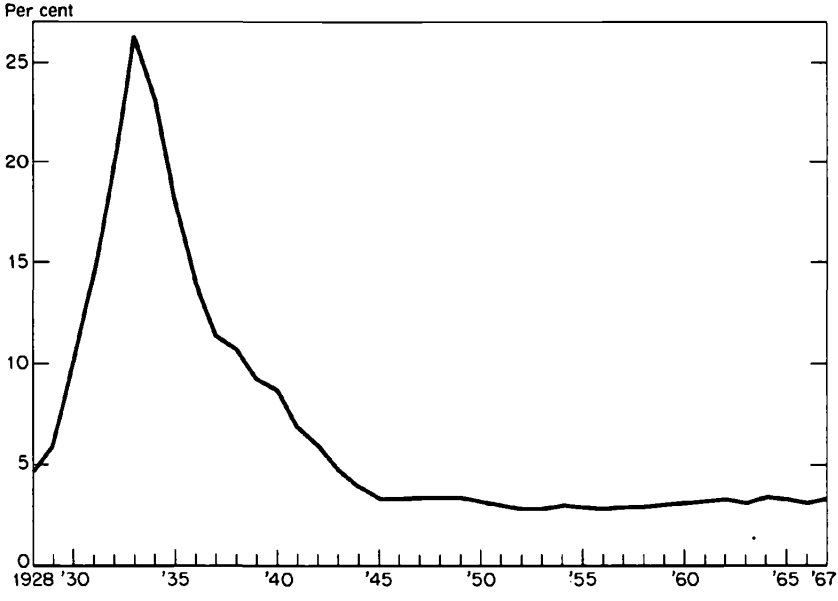
Sources: The Bond Buyer, *Municipal Financial Statistics,* Vol. VII (April 1969); and the Investment Bankers Association, *Statistical Bulletins.*

The retirement arrangements for state and local debt is the second important measure indicating financial prudence and willingness to pay. Unmanageable debt service charges (often temporary) have been a cause of past difficulties. Two opposite extremes in debt retirement arrangements seem to have led to payment difficulties. A kind of perennial optimism leads some state and local borrowers to undertake loans for short periods, repayable in one or a few very large instalments. If the maturity of these large instalments coincides with an economic decline, financial difficulty is often the result. The opposing tendency is to stretch out the repayment period over too long a time interval. Such a debt retirement arrangement risks decay or obsolescence of the improvement before the last of the debt has been repaid.

State and local units generally seem to have been exercising prudent debt retirement practices throughout the postwar period. Chart 10 (page 61) demonstrated that the maturity schedules had not shifted much in the late 1950's and the early mid-1960's. Throughout the postwar period most state and local debt was scheduled to mature within the probable useful life of the improvement. Nearly all general obligations are now serial bonds with reason-

CHART 16

Median Proportion of Property Taxes Uncollected in Year Assessed for Approximately 200 Largest U.S. Cities, 1928-67



Note: Data from 1928-46 for cities with populations of over 50,000 in 1940; this totaled 197 cities. After 1946 data was for the 200 largest cities.

Sources: Medians for 1928 and 1929 were computed from Dun & Bradstreet data by the NBER staff. Remaining figures are from unpublished Dun & Bradstreet data.

ably level debt service payments scheduled throughout the life of the bond. The use of serial general obligations generally contributes to effective financial systems; however, serial maturities inject greater rigidity into budget charges for debt service in times of stress. A sizable number of limited liability obligations have term maturities; however, many of these bonds have sinking funds for debt retirement. The primary negative aspect in current debt retirement arrangements seems to be a disregard of obsolescence in estimating the probable useful life of some improvements. Chart 5 shows that over 45 per cent of state and local debt outstanding in 1962 matured in over twelve and one-half years. It appears that some improvements, e.g., toll road revenue bonds maturing in thirty or forty years, may be technologically obsolute before the bonds which finance them mature.

Another type of variable which may aid in assessing financial prudence and willingness to pay is the proportionate amount of state and local debt approved in bond elections. The top portion of Chart 15 traces the amount of indebtedness approved as a percentage of the total amount subject to state and local bond elections from 1926 through 1968. There has been a slight downward trend in the percentage approved in the postwar years; however, the average percentage approved in the 1960's is approximately the same as the percentage approved in the 1920's and early 1930's.

The bottom portion of Chart 15 compares the dollar amount approved in bond elections over five year periods with the amount of debt issued in the same five year periods. The 1966 – 68 period covers the latest three years for which data are available. The amount approved relative to the amount issued has been lower in the 1960's than in the late 1940's or 1950's. This finding should probably have been anticipated by the larger proportion of limited liability obligations and special district and statutory authority debt in the 1960's. The fact that a smaller portion of debt issued is approved by the electorate of the issuing body – whether because less is subject to electoral approval or because less is approved in such elections – would appear to weaken financial prudence and willingness to pay.

The last type of variable which may be indicative of financial prudence and willingness to pay is the measurement of the revenue collection performance of state and local governmental units. At the present time there is only one available measure which aids in evaluating the revenue collection performance. This measure is the proportion of current property taxes currently delinquent for the 200 largest cities. The median per cent of current property taxes which were delinquent for these units between 1928 and 1967 are revealed in Chart 16. The information in this chart shows that, while the proportion of currently delinquent property taxes has risen slightly in recent years, delinquent property taxes are proportionately much less than they were thoughout the 1930's. The reassuring implication of this analysis must be tempered by the fact that tax delinquencies have coincided in time with

past defaults rather than leading them and by the wide dispersion among tax delinquencies. For example, in 1967, roughly 8 per cent of the largest cities had current tax delinquencies of over 10 per cent.[17]

Evaluation of Effects of Aggregate Characteristics

The following interpretations represent the author's evaluation of the postwar level of and changes in aggregate instrument and borrower characteristics. In the author's evaluation, the combined aggregate instrument and borrower characteristics affecting the quality of state and local debt, taken alone, indicate that the over-all quality of state and local debt has weakened in the postwar period. This conclusion of weakened quality is based on the assumption that the external environment has not changed appreciably. The starting or absolute level of quality of state and local debt in the immediate postwar period is not judged at this point.

State and local debt, and the resulting debt service charges, increased very rapidly throughout the postwar period. Cash resources which can be used to pay state and local debt service charges appear to have grown less rapidly than debt service charges. Postwar trends in the three areas determining cash resources lend support to this conclusion. First, over-all state and local cash inflows grew nearly as rapidly as debt service charges. The tax base and tax-paying ability, on which these cash inflows depend and which must ultimately come from the wealth, production and income of the U. S. economy, however, grew much less rapidly than debt service charges. Also, a larger proportion of postwar state and local cash inflows come from taxes based on cyclically vulnerable income and consumption.

Second, the proportion of state and local cash inflows which can be used to meet debt service charges appears to have fallen in the postwar period. This relative decline was caused by the higher degree of restricted use of state and local revenues and by the greater degree of rigidity in many state and local expenditures that must be paid prior to meeting debt service charges. Third, the stock of money and other liquid assets that state and local units have which might be available to meet debt service charges has not grown as fast as debt service charges in the postwar period.

Financial prudence and willingness to pay on the part of the issuing unit presents a heterogenous picture in the postwar period. The organization, quality of personnnel and techniques used in state and local financial administration appear to have improved in the postwar period. Most postwar borrowing has been for capital improvements and, in the aggregate, state and local units have not had deficits in their current accounts. Also, debt retirement arrangements do not seem to have changed appreciably in the postwar period.

[17]Based on unpublished information from Dun and Bradstreet. Unfortunately, dispersions were not readily available for other years.

Factors which may weaken financial prudence and willingness to pay include: (1) the increased state and local borrowing for essentially private purposes; (2) the increased use of debt payable solely from certain designated revenues; (3) the increased borrowing by special districts and statutory authorities (often not requiring voter approval, not subject to debt restrictions and concealed from many voters and taxpayers); and (4) the fact that some state and local improvements may be technologically obsolete before the bonds financing them mature.

Appendix: The Identification of Quantitative Characteristics Associated with Defaults on Municipal General Obligations[18]

The Sample Tested

In order to use multivariate statistical techniques it was necessary to find a sample of municipal general obligations in which a fairly large number of defaults had occurred. The most recent period which fulfilled these conditions was the early 1930's. Unfortunately, there was only one source of accurate default data and adequate quantitative characteristics which might determine the payment performance of general obligations in this period: the quantitative information on Michigan municipalities maintained at the Municipal Advisory Council of Michigan. The late Louis H. Schimmel, past president of the Council, allowed us to use this data to test the effect of the available quantitative characteristics on payment performance.

Use of this quantitative information on general obligations of Michigan municipalities in the 1930's introduced several possible sources of bias. The results of the statistical tests used may be representative for one geographic area (and not of the rest of the United States) and for one time period (which might have had different causes of payment problems than other periods). Also, the quantitative information available at the present time is greater and is more detailed than that available for Michigan municipalities in the 1930's. This was, however, the only known sample where there was both an adequate amount of defaults, by far the preferable measure of debt payment performance, and an adequate amount of quantitative information.

The sample selected for analysis in this paper was twenty-four of the twenty-five largest cities in Michigan in the 1930's. Initial tests and a case history of the Detroit situation suggested that it was a special case which should be excluded from the sample. Seventeen of the twenty-four Michigan cities studied had some debts in default during the 1929-37 period. At the end of 1933, when all of these seventeen units were in default and when the amount in default was the highest, $4,878,000 of the $102,612,000 of total debt outstanding for the twenty-four units was in direct default.

[18]This appendix consists of exerpts from a more comprehensive study financed by the Relm Foundation of Ann Arbor, Michigan.

The eleven available quantitative characteristics for this sample that might affect the payment performance of these Michigan municipal units were:

X_1 – dollar amount of notes outstanding
X_2 – population
X_3 – total assessed property values
X_4 – dollar amount of taxes levied
X_5 – tax levy per $1,000 assessed value
X_6 – dollar amount of debt outstanding
X_7 – per capita debt
X_8 – debt/assessed property values
X_9 – per cent of current taxes delinquent
X_{10} – tax levy per capita
X_{11} – assessed property values per capita

The population figures were from the 1930 census, the assessed values were for the 1932-33 fiscal year, while the remaining measures were as of July 1933.

Three multivariable statistical techniques – factor analysis, multiple discriminate analysis and multiple regression – were used to examine the relationship between these quantitative measures and the payment records of the twenty-four units studied. Factor analysis was used to try to identify groupings of measures affecting the dollar amount in default. Several different high vs. low default classes were used with multiple discriminate analysis. The discriminate function between the seven cities with no defaults on their indebtedness and the seventeen cities with one or more defaulted issues seemed most meaningful on conceptual grounds and provided the most meaningful results. The proportionate amount of outstanding indebtedness in default at the end of 1933 was used on the dependent variable in the regression analysis.

Results of Factor Analysis

Factor analysis identified four potential groupings of the quantitative characteristics. These groupings, with a descriptive title selected by the author, and their characteristics are listed in the order of their relevance to the group.

Aggregate Size Characteristics
X_2 – population
X_4 – dollar amount of taxes levied
X_3 – total assessed property value
X_6 – dollar amount of debt outstanding
X_1 – dollar amount of notes outstanding

Relative Tax and Debt Burden

X_8 – debt/assessed property values
X_9 – per cent of current taxes delinquent
X_7 – per capita debt
X_5 – tax levy per $1,000 assessed property values

Per Capita Wealth, Taxes and Debt

X_{11} – assessed property values per capita
X_{10} – tax levy per capita
X_7 – per capita debt

Willingness to Pay Characteristics

X_9 – per cent of current taxes delinquent
X_{10} – tax levy per capita
X_5 – tax levy per $1,000 assessed property values
X_1 – dollar amount of notes outstanding

The willingness to pay characteristics had an eigen value considerably below the generally acceptable level of 2.0. The three other factor groupings explained slightly over 80 per cent of the variance in the proportionate dollar amounts in default of the twenty-four units.

Results of Multiple Discriminate Analysis

Initially all eleven available quantitative characteristics were used to discriminate between the seventeen municipal units which defaulted and seven units which did not default during the period. Four characteristics – tax rate per $1,000 of assessed valuation (X_5), per capita debt (X_7), debt assessed property values (X_8) and the tax delinquency rate (X_9) – were significant at the $p < .10$ level (using the t test). The probability that the discriminate function was due to chance was a relatively high .22. The confusion matrix (assuming equal a priori probabilities and equal costs), however, showed only one misclassification between the nondefaulting and defaulting groups.

Various numbers and combinations of the available characteristics were then tried to improve the discriminate function. The most impressive results occurred when four characteristics – tax rate per $1,000 assessed valuation (X_5), per capita debt (X_7), tax delinquency rate (X_9) and assessed property values per capita (X_{11}) – were used. None of the characteristics was almost a linear combination of the other characteristics, three of the four characteristics were significant at the $p < .10$ level (using the t test), and the probability that the discriminate function was due to chance fell to .04. The confusion matrix however (assuming equal a priori probabilities and equal cost) indicated there were three misclassifications between the defaulting and nondefaulting groups. The results were very similar when debt/assessed property values (X_8) was substituted for per capita debt (X_7).

Discriminate analysis was also tried with several other high vs. low default classes, e. g., municipal units with less than 5 per cent of their outstanding

indebtedness in default vs. those with over 5 per cent of their debt in default. The significant characteristics were generally the same; however, as the classifying proportionate amount in default increased, the dollar amount of notes outstanding (X_1) and the tax levy per capita (X_{10}) tended to become more significant (usually at the $p < .10$ level) and per capita debt (X_7) became less significant. The probability that the discriminate function was due to chance was usually higher and there were more misclassifications in the confusion matrix with these classes than with the default vs. nondefault classes.

Results of Regression Analysis

Multiple linear regression analysis using the proportionate amount of outstanding indebtedness in default as the dependent variable (y) identified similar quantitative characteristics as being related to debt payment performance. The following multiple linear regression equation resulted when the regression coefficients that were not significant at the $p < .10$ level (using the t test) were eliminated:

$$y = -.1888 - \underset{(.0000018)}{.0000049X_2} + \underset{(.00000009)}{.00000026X_4} + \underset{(.00625)}{.00929X_5}$$

$$-\underset{(.00153)}{.00347X_7} + \underset{(1.262)}{3.1999X_8} + \underset{(.080)}{.194X_9} - \underset{(.0061)}{.0163X_{10}} + \underset{(.000127)}{.000305X_{11}}$$

The quantitative characteristics in this regression equation explained approximately 64 per cent of the observed differences in the municipalities default ratios. All of the regression coefficients were significant at the $p <$ 025 level (using the t test), with the exception of the coefficient of X_5 which was significant at the $p < .075$ level. While the variables in a regression equation should primarily be looked at as acting together, it was worrisome that the multicollinearity between some of the independent variables caused the coefficients of several of these variables to have signs the opposite of those predicted by the conceptual model.

When the multicollinearity is restricted, the coefficients of the independent variables, quantitative characteristics, have signs consistent with the conceptual model. Multicollinearity is restricted when at least one of the size characteristics, X_2 or X_4, is eliminated; when only one of the debt burden measures, X_7 or X_8, is used; and when either tax levy per capita, X_{10}, or assessed property values per capita, X_{11}, is eliminated. Since the t value of either X_2 or X_4 fails drastically if one of these two size characteristics is eliminated, it seems appropriate to eliminate both of these variables. The following multiple coefficients of determination result from the following combination of variables:

$r^2 = .44$	$r^2 = .43$	$r^2 = .42$	$r^2 = .40$
X_5	X_5	X_5	X_5
X_8	X_8	X_7	X_7
X_9	X_9	X_9	X_9
X_{10}	X_{11}	X_{10}	X_{11}

The multiple linear regression equation with the highest r^2 was:

$$y = .06142 - \underset{(.00247)}{.00310X_5} + \underset{(.1700)}{.3521X_8} + \underset{(.07277)}{.07209X_9} - \underset{(.00108)}{.00115X_{10}}$$

All of the variables in this and the other three equations were significant at the $p < .10$ level and the signs of the coefficients could always be explained in terms of the conceptual model.

When multicollinearity is restricted, the signs of the variables in both the discriminate analysis and the regression analysis seem consistent with the conceptual model formulated in Chapter 2 of this study. Debt to assessed property values, or per capita debt, would seem to be a meaningful proxy for the relationship between debt service charges and revenues available to meet those charges. Assessed property values per capita and the property tax levy per $1,000 of assessed property values should indicate the relative wealth of the unit and the extent to which the municipal government is tapping this wealth. These characteristics should improve the quality of the debt to assessed property value or population ratio. The tax levy per capita and tax delinquency rate would seem to fit into the conceptual model as tests of the financial prudence and willingness to pay of the municipal government and its constituents.

Conclusions

Multivariable statistical techniques indicated that the quantitative characteristics of the twenty-four Michigan municipalities were good indicators of payment performance in the 1930's. Nearly all of the quantitative characteristics seemed significant except for the size characteristics – population, amount of notes, amount of long-term debt, total assessed property values and amount of taxes levied. This exception was probably at least partially caused by the sample selected – the second through the twenty-fifth largest cities in Michigan.