THE MARKET VALUE OF OUTSTANDING GOVERNMENT DEBT, 1919-1975

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Several new series on the market value of outstanding government debt are reported and their methods of construction described. The new series on Federal debt are compared with other existing estimates and are shown to be markedly superior to them.

1. Introduction

In this article, I report and describe the construction of several new statistical series on the market value of outstanding government debt. The construction of these series was an early step in a larger project attempting to evaluate the extent to which government bonds are treated as net wealth by the public. For such a purpose, the official statistics on par values of outstanding debt are useless. Although the larger study on net wealth will not be completed for some time yet, the underlying series on government debt and their method of construction seem sufficiently important to be reported now.

The series are found in tables 1 and 2. Table 1 reports the total nominal market value of Federal, State, and Local debt outstanding. Table 2 reports the outstanding amounts of the major components of the totals in table 1. Amounts outstanding are as of the end of the calendar year.

The method of construction is considerably more accurate than any used to date, especially for Federal debt in the years 1941-1975, when market prices and par values outstanding are available for each individual issue.

2. Federal debt

The only Federal debt considered was that issued by the Treasury Department. Agency debt was omitted. The reason for the latter omission has to do with the appropriate kinds of debt to consider in investigating the net wealth issue that motivated construction of the series. In any event,

agency debt is generally negligible compared to Treasury debt, and its inclusion would make little difference. Discussion is most easily conducted by type of security.

Bonds

(1) 1941–1975.   For these years, data on over-the-counter closing quotations on public marketable securities for the last trading day of the year were obtained from the *Treasury Bulletin*. For a few years, data for December were not reported; in such cases, the data for the first available trading day the following January were used. The *Bulletin* reports the market price and the outstanding amount (valued at par) of each security. These were multiplied together, divided by 100, and summed to give the market value of bonds outstanding for each year.[1]

(2) 1919–1940.   The data for this period are not nearly as detailed as for subsequent years. The aggregate par value of all Treasury and Liberty bonds outstanding for December of each year was obtained from the Federal Reserve System's *Banking and Monetary Statistics, 1914–1941*. These were multiplied by the December bond prices obtained from the same source.

Notes

(1) 1941–1975.   The same kind of price and volume data as for bonds was used, from the same source.[2]

(2) 1928–1940.   The aggregate par value of all Treasury notes outstanding for December of each year was obtained from *Banking and Monetary Statistics*. Prices for individual issues outstanding were obtained from the *Wall Street Journal* for the last trading day of the year. Because the amounts outstanding of each issue were not available, a simple average was taken of all the prices for each year and used to multiply the aggregate amount outstanding.

(3) 1921–1927.   The same method was used as for 1928–1940, except that the prices were obtained from the *Commercial and Financial Chronicle*.

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[1]Occasionally, an essential piece of data is not reported for an issue, such as the price or volume outstanding. In such a case, the issue was ignored.

[2]Occasionally, the price of an issue is not reported. In such cases, the market value of the issue was estimated using the present value formula:

$$V = \frac{F(1+R)}{(1+r)^{N}(1+r(D/365))},$$

where F is the face value, R is the coupon rate, r is the market bid rate, N is the number of whole years left to maturity, and D is the number of days in the last fractional year to maturity. This formula ignores compounding of interest payments; but most notes for which the formula was used had less than one year to maturity, so the approximation is good.

(4) 1919-1920. Volume outstanding was obtained from *Banking and Monetary Statistics*. Prices were unavailable, so the prices for bonds were used.

Certificate of indebtedness

(1) 1967-1975. There were no certificates outstanding.

(2) 1942-1966. Prices are not reported for certificates, so their value was computed from the present value formula

$$MV = \frac{F(1+R)}{(1+r(D/365))},$$

where MV is market value, F is the face value outstanding, R is the coupon rate, r is the market bid rate, and D is the number of days left to maturity. Data on all variables on the right-hand side were obtained from the *Treasury Bulletin*.

(3) 1935-1941. There were no certificates outstanding.

(4) 1928-1934. Aggregate par value of all certificates outstanding was obtained from *Banking and Monetary Statistics*. Prices of individual issues were obtained from the *Wall Street Journal*, averaged, and used to multiply the volume.[3]

(5) 1921-1927. The same method was used as for 1928-1934, except that prices were obtained from the *Commerical and Financial Chronicle*.

(6) 1919-1920. Volume outstanding was obtained from *Banking and Monetary Statistics*. Prices were unavailable, so the prices for bonds were used.

Bills

(1) 1941-1975. Because bills are sold on a discount basis, prices are not reported. The following formula, used by the securities market, gives the price for a given issue:

$$P = 100\left(1 - \frac{D}{360}r\right),$$

where P is the price, D is the number of days to maturity, and r is the bid rate of interest. Prices obtained from this formula then were multiplied by outstanding volume to obtain market values of outstanding issues. These were summed to obtain totals for each year. All data are from the *Treasury Bulletin*.

[3]Prices on the last trading day of the year were used except for 1934, when the last certificates outstanding were redeemed at the end of November. For 1934, the last price available was used.

(2) 1930–1940. The aggregate par value of all bills outstanding was obtained from *Banking and Monetary Statistics*. Yields for individual issues outstanding were obtained from the *Wall Street Journal* for the last trading day of the year. From these, prices were obtained as for 1941–1975, averaged, and used to multiply the volume.

(3) 1929. Bills were issued only in the last month or two of the year. Outstanding volume figures are unavailable, but it seems that the total amount was small. Consequently, the value was set at zero.

(4) 1919–1928. Bills did not yet exist.

2.1. Summation and adjustments

For each year, the totals obtained for bonds, notes, certificates, and bills were added together to give the total market value of marketable Federal debt outstanding for that year. This series is reported in table 1 under the name *MVSUM*.

One possible problem with the *MVSUM* series for the years after 1940 is that the *Treasury Bulletin* might not report every single outstanding issue. For example, issues not traded or quoted on the day being reported might be omitted (although there were instances when prices were not quoted but the issue still was listed, as mentioned in footnote 1). To check this possibility, the par values of all issues reported were added together for each year to give the series *PARSUM* reported in table 3. This series then was compared with the Government's own reported figures on the aggregate par value of marketable debt, obtained from *Banking and Monetary Statistics* and the *Annual Statistical Digest, 1971–1975*, and reported in table 3 as *PARGOV*. Note that before 1941, when the *Treasury Bulletin* did not report the individual issues, *PARGOV* was used as the measure of the aggregate par value of outstanding debt, as explained above; this is why *PARGOV* and *PARSUM* are identical before 1941.

The ratio of *PARGOV* to *PARSUM* is reported in table 4 as *RATIO1*. For most years, this ratio exceeds one, suggesting omissions from the *Treasury Bulletin*. The few observations when *RATIO1* is less than one are somewhat puzzling. They may indicate omissions from the Government's reported totals, or they may indicate years when certain issues reported in the *Treasury Bulletin* should have been omitted. On the assumption that the Government's reported totals are always correct, I have multiplied *MVSUM* by *RATIO1* to obtain the adjusted market value series *MVSUMA*, reported in table 1.

2.2. Holdings by federal institutions

For many purposes, it is desirable to eliminate the Federal debt held by

the Federal Reserve System. (For example, this debt implies no net taxes for the public.) This was done by multiplying the total market value figure *MVSUMA* by one minus the fraction of total marketable Federal debt outstanding, valued at par, held by the Federal Reserve. This calculation assumes that the Federal Reserve's holdings have the same composition as the total marketable Federal debt. The resulting figures are reported in table 1 under the name *MVPRIV1*. The par value of securities held by the Federal Reserve is reported in table 3 as *FRSEC*.

For other purposes, it also may be desirable to eliminate the Federal debt held by Federal agencies and trust funds. This was done by multiplying the *MVSUMA* figure by one minus the fraction of total marketable Federal debt outstanding, valued at par, held by the Federal Reserve and by the Federal agencies and trust funds. For the years 1919–1935, data on agency and trust fund holdings were obtained by averaging the end-of-fiscal year figures for the current and succeeding years as reported in *Banking and Monetary Statistics*. For the years 1936–1975, data were obtained from the *Treasury Bulletin*. As with the correction for Federal Reserve holdings, I have assumed in making this calculation that the agency and trust fund holdings have the same composition as the total marketable Federal debt. The resulting figures are reported in table 1 under the name *MVPRIV2*. The par value of securities held by the agencies and trust funds is reported in table 3 as *ATFSEC*.

2.3. Savings bonds, special issues, and miscellaneous issues

Savings bonds and special issues are non-marketable issues that can be redeemed only by the original purchaser. Savings bonds are sold to the public; special issues are sold to Federal Government agencies and trust funds. Savings bonds and special issues constitute a significant fraction of the total Federal debt. Unfortunately, because they are not traded on the market, there are no prices quoted on them, so that it seems impossible to compute directly what their market value would be if they were traded.

One reasonable proxy of the would-be market value of these issues is simply their par value, reported in table 3 under the names *SAVBOND* and *SPEC*. The data on savings bonds are from the *Treasury Bulletin* for 1942–1975 and from *Banking and Monetary Statistics* for 1919–1941. The data on special issues are from *Banking and Monetary Statistics* for 1919–1969 and the *Annual Statistical Digest* for 1970–1975. The amounts outstanding are as of December of each year.

Another reasonable proxy for the would-be market value is obtained by multiplying the par values of these issues by the ratio of *MVSUM* to *PARSUM*, that is, by the ratio of the market value of marketable Federal debt to the par value of that same debt. This ratio is reported in table 4 as

Table 1
(millions of dollars).[a]

Date	MVSUM	MVSUMA	MVPRIV1	MVPRIV2	MVPRIV3	MVPRIV4	MVTOTG1	MVTOTG2
1919	21457	21457	21187	21018	21018	21187	27196	27366
1920	18811	18811	18567	18322	18322	18567	24666	24911
1921	20944	20944	20718	20335	20335	20718	28065	28448
1922	20298	20298	19874	19460	19460	19874	28300	28715
1923	19787	19787	19657	19262	19262	19657	28640	29035
1924	19514	19514	18971	18554	18554	18971	29277	29694
1925	19137	19137	18754	18300	18300	18842	29865	30407
1926	18345	18345	18015	17567	17567	18220	30035	30687
1927	17705	17705	17036	16607	16607	17374	30276	31044
1928	16334	16334	16096	15730	15730	16577	29261	30109
1929	15866	15866	15312	15016	15016	15940	28814	29738
1930	16113	16113	15287	15053	15053	16068	30258	31273
1931	16176	16176	15368	15137	15137	15761	30136	30759
1932	17630	17630	15936	15634	15634	16287	31628	32281
1933	18305	18305	16301	15721	15721	16672	30250	31200
1934	20244	20244	18458	17575	17575	19016	34200	35640
1935	18976	18976	17359	16343	16444	18188	34058	35801
1936	24632	24632	22759	21649	22015	23757	40970	42712
1937	25002	25002	23458	21782	22512	26016	40250	43754
1938	28521	28521	26358	24777	25994	30731	44878	49615
1939	32158	32158	29845	27941	29998	36133	49729	55864
1940	34959	34959	32805	30838	33982	41326	55348	62686
1941	44312	43730	41360	38977	45432	54797	65992	75357
1942	78335	78468	72119	69154	84591	96438	104208	116056
1943	117401	117488	105716	101858	129764	146344	149020	165600
1944	158688	158754	140240	134997	174647	196202	193482	215037
1945	200451	204119	179208	172018	221490	248688	240614	267812
1946	177937	181460	157468	151002	202148	233664	220824	252340
1947	164384	167721	144900	139601	192257	227131	211565	246439

Year	MVSUM	MVSUMA	MVPRIV1	MVPRIV2	MVPRIV3	MVPRIV4	MVTOTG1	MVTOTG2
1948	153228	159570	135930	130381	186156	224048	208074	245966
1949	149717	155512	136577	131236	188093	228738	213372	254016
1950	149249	154765	133665	128217	187137	227588	217365	257816
1951	141535	141649	118023	111691	168854	212413	200990	244549
1952	147232	147333	122847	116162	173608	219525	207690	253606
1953	154379	154456	128564	121454	179110	227448	217023	265361
1954	158163	158215	133217	126156	183980	233662	229429	279112
1955	160477	160575	136204	128536	185493	237076	234072	285655
1956	154001	154072	130140	122107	176179	229840	224500	278161
1957	162160	162217	138272	129006	180847	235934	233307	288394
1958	165319	168448	143174	134063	183170	237097	237644	291571
1959	177035	177145	152074	142574	187875	241698	245270	299093
1960	186197	186233	159250	148767	195235	247046	262736	317546
1961	192685	191099	162940	152326	198598	252720	273010	327133
1962	200656	200644	170182	158334	205317	260208	293288	348178
1963	200721	202804	169987	156177	203876	261384	297662	355170
1964	210943	208054	171785	157724	206418	267057	310967	371606
1965	206862	206862	167564	152611	201120	261739	306942	367561
1966	212015	211608	168624	152422	201636	269888	312329	380531
1967	214145	215504	168777	150935	209062	274944	309762	384643
1968	222990	224502	174314	159711	206771	283010	322661	396740
1969	215580	217190	164569	149567	197027	283511	292520	379004
1970	238694	240737	180345	163734	214116	309240	335013	430137
1971	259396	259397	189886	171628	225356	329891	364801	469336
1972	260204	263917	195461	176503	232887	347328	390974	505415
1973	261046	261397	185446	165169	223516	351938	393391	521813
1974	278295	274939	196702	175913	237481	376189	384225	522933
1975	359701	357731	271119	252014	318463	454436	473809	609869

MVSUM is the market value of all marketable issues of Treasury debt. *MVSUMA* is *MVSUM* adjusted for errors and omissions in the *Treasury Bulletin*. *MVPRIV1* is *MVSUMA* less the estimated market value of holdings by the Federal Reserve System. *MVPRIV2* is *MVPRIV1* less the estimated market value of holdings by Federal agencies and trust funds. *MVPRIV3* is *MVPRIV2* plus the estimated market value of U.S. savings bonds outstanding. *MVSAVB*, reported in table 2. It is the market value of Treasury debt not held by any Federal entity. *MVPRIV4* is *MVPRIV1* plus *MVSAVB* plus the estimated market values of special issues outstanding, *MVSPEC*, reported in table 2. It is the market value of all Treasury debt outstanding except that held by the Federal Reserve System. *MVTOTG1* is *MVPRIV3* plus the market value of State and Local debt, *MVSL*, reported in table 2. *MVTOTG2* is *MVPRIV4* plus *MVSL*.

Table 2

(millions of dollars).ᵃ

Date	MVBONDS	MVNOTES	MVBILLS	MVCI	MVSAVB	MVSPEC	MVSL
1919	14186	4049	0	3222	0	0	6179
1920	13008	3596	0	2207	0	0	6344
1921	14401	4342	0	2202	0	0	7730
1922	15181	4028	0	1089	0	0	8841
1923	14797	4057	0	920	0	0	9378
1924	15866	3105	0	543	0	0	10723
1925	16290	2064	0	783	0	88	11565
1926	16705	1031	0	609	0	205	12468
1927	14545	1920	0	1240	0	338	13669
1928	12121	2275	0	1938	0	481	13532
1929	12235	2327	0	1305	0	628	13798
1930	12439	2354	127	1193	0	781	15205
1931	11638	2323	572	1643	0	393	14998
1932	12432	2394	642	2162	0	351	15994
1933	13346	2332	1002	1625	0	371	14529
1934	14895	2402	1953	994	0	558	16625
1935	14175	2399	2402	0	102	728	17613
1936	20055	2376	2201	0	366	632	18955
1937	20681	2370	1951	0	731	2227	17738
1938	24821	2394	1306	0	1217	3156	18884
1939	28306	2398	1455	0	2057	4231	19731
1940	31259	2390	1310	0	3151	5370	21360
1941	36580	5633	2099	0	6454	6982	20560
1942	51277	9869	6674	10566	15437	8882	19617
1943	70142	11235	13067	22958	27906	12721	19256
1944	94013	17700	16421	30554	39650	16312	18834
1945	125429	19655	17029	38338	49472	20008	19124
1946	123979	10137	17030	26791	51146	25050	18676
1947	119518	11569	15115	18182	52656	29574	19309

Year	C1	C2	C3	C4	C5	C6	C7
1948	21918	32343	55775	24080	12203	3657	113287
1949	25278	35303	56856	24110	12302	4710	108595
1950	30228	35004	58919	0	13602	40094	95553
1951	32136	37227	57163	29336	18053	18085	76061
1952	34082	39232	57446	16936	21643	29983	78670
1953	37913	41228	57656	26520	19476	31454	76929
1954	45449	42621	57824	28480	19479	23111	82082
1955	48579	43914	56958	15725	22237	42898	79616
1956	48321	45628	54072	19014	25082	34852	75054
1957	52460	45821	51840	34720	26748	20846	79846
1958	54475	44816	49107	36277	26423	25770	76849
1959	57395	44323	45301	19642	39168	43242	74983
1960	67500	44327	46469	18516	39209	52219	76253
1961	74413	43509	46271	5512	43578	71839	71756
1962	87970	43043	46983	22755	47910	54181	75810
1963	93787	43697	47699	10933	48973	58477	82339
1964	104549	46578	48693	0	55835	58820	96288
1965	105822	45666	48509	0	59358	49794	97709
1966	110643	52000	49264	5928	64246	48315	93524
1967	109699	57090	49077	0	67461	60580	86104
1968	113730	59475	49221	0	72015	74855	76102
1969	95493	71481	47461	0	77017	81134	57430
1970	120897	78513	50382	0	84699	103277	50808
1971	139445	86277	5728	0	96451	117347	45598
1972	158086	95482	56384	0	100716	120015	39472
1973	169875	108146	58347	0	105104	123400	32541
1974	146744	117919	61568	0	119554	130551	28189
1975	155432	116868	66450	0	155106	170348	34247

MVBONDS is the market value of all Treasury bonds outstanding. *MVNOTES* is the market value of all Treasury notes outstanding. *MVBILLS* is the market value of all Treasury bills outstanding. *MVCI* is the market value of all Treasury certificates of indebtedness outstanding. *MVSAVB* is the market value of all U.S. savings bonds outstanding. *MVSPEC* is the market value of all Federal special issues outstanding. *MVSL* is the market value of all net State and Local debt outstanding.

Table 3

(millions of dollars).[a]

Year	PARSUM	PARGOV	FRSEC	AFTSEC	SAVBOND	SPEC
1919	23815	23815	300	188	0	0
1920	22105	22105	287	288	0	0
1921	21653	21653	234	396	0	0
1922	20867	20867	436	426	0	0
1923	20380	20380	134	407	0	0
1924	19413	19413	540	415	0	0
1925	18749	18749	375	445	0	88
1926	17496	17496	315	427	0	205
1927	16336	16336	617	396	0	338
1928	15646	15646	228	351	0	481
1929	14630	14630	511	273	0	628
1930	14219	14219	729	206	0	781
1931	16354	16354	817	233	0	393
1932	19301	19301	1855	330	0	351
1933	22258	22258	2437	705	0	371
1934	27536	27536	2430	1200	0	558
1935	28514	28514	2431	1526	153	728
1936	31944	31944	2430	1439	475	632
1937	32975	32975	2564	1684	964	2227
1938	33807	33807	2564	1874	1442	3156
1939	34539	34539	2484	2045	2209	4231
1940	35448	35448	2184	1995	3195	5370
1941	42154	41600	2254	2267	6140	6982
1942	76371	76500	6189	2891	15050	9000
1943	115115	115200	11543	3783	27363	12700
1944	161533	161600	18846	5337	40361	16300
1945	195228	198800	24262	7002	48183	20000
1946	173171	176600	23350	6293	49776	24600
1947	162502	165800	22559	5239	52053	29000
1948	151240	157500	23333	5477	55051	31700
1949	149320	155100	18885	5327	56707	33900
1950	146968	152400	20778	5364	58019	33700
1951	142585	142700	23801	6379	57587	35900
1952	148498	148600	24697	6742	57940	39200
1953	154523	154600	25916	7116	57710	41200
1954	157748	157800	24932	7043	57672	42600
1955	163200	163300	24785	7798	57924	43900
1956	160326	160400	24915	8363	56293	45600
1957	164142	164200	24238	9379	52474	45800
1958	172338	175600	26347	9498	51192	44800
1959	188186	188300	26648	10098	48154	43500
1960	188963	189000	27384	10639	47159	44300
1961	197627	196000	28881	10886	47458	43500
1962	203012	203000	30820	11987	47535	43400
1963	205468	207600	33593	14137	48827	43700
1964	215451	212500	37044	14361	49734	46100
1965	214600	214600	40768	15512	50324	46300

Table 3 —Continued

Year	PARSUM	PARGOV	FRSEC	ATFSEC	SAVBOND	SPEC
1966	218419	218000	44282	16692	50752	52000
1967	225071	226500	49112	18699	51581	57200
1968	235206	236800	52937	15403	51917	59100
1969	234151	235900	57154	16295	51549	71000
1970	245611	247713	62142	17092	51842	77931
1971	262037	262038	70218	18444	54275	85545
1972	265717	269509	69906	19360	57579	95482
1973	269861	270224	78516	20961	60317	106624
1974	286344	282891	80500	21390	63349	117761
1975	365191	363191	87934	19397	67464	118294

*PARSUM is the par value of all marketable issues of Treasury debt outstanding, obtained by adding together for each year the par values of the individual issues outstanding as reported in the Treasury Bulletin. PARGOV is the par value of all marketable issues of Treasury debt outstanding as reported by the Federal Government itself in Banking and Monetary Statistics and the Annual Statistical Digest. FRSEC is the par value of marketable issues of Treasury debt held by the Federal Reserve System. ATFSEC is the par value of marketable issues of Treasury debt held by Federal agencies and trust funds. SAVBOND is the par value of all U.S. savings bonds outstanding. SPEC is the par value of all Federal special issues outstanding.

RATIO2. A necessary condition for this proxy to be good is that the maturity structure of savings bonds and special issues be similar to that of marketable securities. The proxies yielded by this method are reported in table 2 as MVSAVB and MVSPEC.

Neither of these proxies is perfect. Obviously, changes in interest rates will cause par values and would-be market values to differ. However, savings bonds and special issues can be redeemed for fixed values at any time by the holder. Savings bonds can be redeemed at any time before maturity (except for a brief period immediately after purchase) according to a predetermined schedule, which includes a penalty for early redemption. Special issues can be redeemed on demand. In such circumstances, the par value is a better measure of the securities' value to their holders when market interest rates have risen above the securities' coupon rate, and the MVSAVB and MVSPEC values are better measures when interest rates are below coupon rates.

Finally, there are a small number of miscellaneous issues such as foreign-denominated issues and convertible bonds whose peculiarities render a market valuation virtually impossible. Because of this and because of their small aggregate volume, they were ignored.

4. Savings bonds and special issues: Inclusion in the debt series

A problem arises if one wants to know the market value of Treasury debt

Table 4

Year	RATIO1[a]	RATIO2[b]	Year	RATIO1[a]	RATIO2[b]
1919	1	0.901	1951	1.0008	0.99264
1920	1	0.851	1952	1.0007	0.99148
			1953	1.0005	0.99907
1921	1	0.96726	1954	1.0003	1.0026
1922	1	0.97273	1955	1.0006	0.98331
1923	1	0.9709			
1924	1	1.0052	1956	1.0005	0.96055
1925	1	1.0207	1957	1.0004	0.98793
			1958	1.0189	0.95927
1926	1	1.0485	1959	1.0006	0.94075
1927	1	1.0838	1960	1.0002	0.98536
1928.	1	1.044			
1929	1	1.0845	1961	0.99177	0.975
1930	1	1.1332	1962	0.99994	0.98839
			1963	1.0104	0.9769
1931	1	0.98912	1964	0.9863	0.97908
1932	1	0.91342	1965	1	0.96394
1933	1	0.8224			
1934	1	0.73518	1966	0.99808	0.97068
1935	1	0.6655	1967	1.0063	0.95145
			1968	1.0068	0.94806
1936	1	0.77111	1969	1.0075	0.92069
1937	1	0.75823	1970	1.0086	0.97184
1938	1	0.84365			
1939	1	0.93107	1971	1	0.98992
1940	1	0.9862	1972	1.0143	0.97925
			1973	1.0013	0.96733
1941	0.98686	1.0512	1974	0.98794	0.97189
1942	1.0017	1.0257	1975	0.99452	0.98497
1943	1.0007	1.0199			
1944	1.0004	0.98239			
1945	1.0183	1.0268			
1946	1.0198	1.0275			
1947	1.0203	1.0116			
1948	1.0414	1.0131			
1949	1.0387	1.0027			
1950	1.037	1.0155			

[a]*RATIO1* is the ratio of *PARGOV* to *PARSUM*, both of which are reported in table 3.
[b]*RATIO2* is the ratio of *MVSUM*, reported in table 1, to *PARSUM*, reported in table 3.

held by the public. The problem is in defining the term 'public'. In the narrowest sense, this term can mean any non-Federal entity. In this case, one would add together *MVPRIV2*, which is the market value of marketable issues not held by any Federal government entity, and *MVSAVB*, which is the market value of savings bonds (presuming *MVSAVB* is the appropriate measure of this value). The result is reported in table 1 as *MVPRIV3*.

However, many Federal agencies, such as the Postal Service, are Federally owned but off the Federal budget. They may compete with private industry to provide their services; they generate their revenue in whole or in part by their own operations without taxes. Any interest income they earn on their holdings of Treasury debt goes to reducing the price they charge for their services to the public. Holdings by such agencies of Treasury debt should not be treated as Government holdings for many purposes. Unfortunately, it would take an enormous amount of effort to sort out which agencies' holdings should not be treated as Government holdings and how much of such holdings there are. An upper bound, then, on debt held by the public can be found simply by treating all agency and trust fund debt as if it were not held by the Government. This is done by adding together *MVPRIV1*, which is the market value of marketable debt not held by the Federal Reserve, and *MVSAVB* and *MVSPEC*. The result is reported in table 1 as *MVPRIV4*.

3. State and Local debt

The aggregate par value of net State and Local debt outstanding was obtained from the *Statistical Abstract of the United States*, various issues. This value is net of government holdings. Prices were obtained from the Federal Reserve System's *Annual Statistical Digest, 1971–1975, Banking and Monetary Statistics, 1941–1970*, and *Banking and Monetary Statistics, 1914–1941*. The first two references report prices for State and Local issues; the third reference reports prices for high grade municipals. These prices are for December, whereas the volumes outstanding are for June (the end of the fiscal year). The volumes were converted to December figures by averaging with the succeeding year's volume. The market value series for State and Local debt is reported in table 2 under the name *MVSL*. Adding *MVSL* to *MVPRIV3* gives one total for the market value of all government debt, reported or *MVTOTG1* in table 1. Adding *MVSL* to *MVPRIV4* gives another total, reported as *MVTOTG2* in table 1.

4. Comparison with other estimates

Tanner (1979) uses a different method to estimate the market value of the outstanding stock of Federal debt in the hands of the public for the years 1946–1974. He uses the formula

$$GDEB_t = IP_t + \frac{IP_{t+1}}{1+r} + \frac{IP_{t+2}}{(1+r)} \quad \cdots + \frac{IP_{t+m}}{(1+r)^m} + \frac{PV}{(1+r)^m},$$

where *GDEB* is the market value of the government debt in year t, *IP* is the

interest payment to the public in year t (assumed to remain at the same level until the debt is retired), PV is the par value of the debt in the hands of the public, r is the interest rate in year t of government bonds, and m is the average length of maturity of the debt. Because interest payments to the public are not separated out from total interest payments, they were approximated by multiplying the total figure by the share of the par value debt held by the public. The resulting $GDEB$ series is reported in table 5.

Table 5

(billions of dollars).

Date	GDEB[a]	Date	GDEB[a]
1946	217.8	1961	200.5
1947	211.2	1962	207.7
1948	198.4	1963	210.9
1949	208.0	1964	209.3
1950	203.7	1965	207.7
1951	193.7	1966	198.4
1952	190.8	1967	195.2
1953	191.3	1968	207.7
1954	199.3	1969	198.3
1955	196.4	1970	204.0
1956	187.7	1971	223.8
1957	185.9	1972	237.9
1958	191.6	1973	249.6
1959	189.9	1974	246.8
1960	196.2		

[a]$GDEB$ is Tanner's (1979) measure of the market value of Federal debt not held by any Federal entity.

The $MVPRIV3$ series in table 1 is the most like $GDEB$ in the kind of debt included, and a comparison between it and $GDEB$ reveals three striking differences. First, the $MVPRIV3$ series is lower than $GDEB$ in all years except 1968. Second, the two series show different overall temporal patterns. The $MVPRIV3$ series falls from \$202 billion in 1946 to \$169 billion in 1951, a drop of 16 percent, and then rises to \$237 billion in 1974, an increase of 41 percent. The $GDEB$ series falls from \$218 billion in 1946 to \$191 billion in 1952, a drop of 12 percent, and then rises to \$247 billion in 1974, an increase of 29 percent. Third, the year-to-year changes in the two series are very different, as can be seen from table 6. The $GDEB$ series shows a number of changes that differ in sign from the corresponding changes in the $MVPRIV3$

Table 6

(change from preceding year; millions of dollars).

Year	MVPRIV3C[a]	GDEBC[b]
1947	−9891	−6600
1948	−6101	−12800
1949	1938	9600
1950	−957	−4300
1951	−18282	−10000
1952	4754	−2900
1953	5502	500
1954	4869	8000
1955	1514	−2900
1956	−9314	−8700
1957	4667	−1800
1958	2323	5700
1959	4705	−1700
1960	7361	300
1961	3362	100
1962	6719	100
1963	−1441	3200
1964	2542	−1600
1965	−5297	−1600
1966	565	−9300
1967	−1623	−3200
1968	8869	12500
1969	−11904	−9400
1970	17080	5700
1971	11240	19800
1972	7531	14100
1973	−9372	11700
1974	13963	−2800

[a]MVPRIV3C is the change in MVPRIV3, reported in table 1, from the previous year.

[b]GDEBC is the change in GDEB, reported in table 5, from the previous year.

series. The correlation between the two sets of changes is only 0.57. This difference in year-to-year changes is for many purposes the most important difference between the MVPRIV3 and GDEB series because it implies that at least one of the series displays considerable inaccurate variation. Given that the MVPRIV3 series is extremely accurate for the post-1941 years, these differences between the MVPRIV3 and GDEB series strongly suggests that the latter is unreliable.

Part (A) of table 7 reports the correlation matrix for GDEB and several of the market value series listed in table 1. The series from table 1 are highly

Table 7[a]

(A) Correlation of market value series, 1946-1974

	MVSUM	MVSUMA	MVPRIV1	MVPRIV2	MVPRIV3	MVPRIV4	GDEB
MVSUM	1.000						
MVSUMA	0.998	1.000					
MVPRIV1	0.972	0.973	1.000				
MVPRIV2	0.950	0.953	0.995	1.000			
MVPRIV3	0.962	0.967	0.966	0.966	1.000		
MVPRIV4	0.971	0.972	0.912	0.888	0.953	1.000	
GDEB	0.779	0.788	0.736	0.737	0.863	0.852	1.000

(B) Correlation of annual changes in market value series, 1947-1974

	MVSUMC	MVSUMAC	MVPRIV1C	MVPRIV2C	MVPRIV3C	MVPRIV4C	GDEBC
MVSUMC	1.000						
MVSUMAC	0.965	1.000					
MVPRIV1C	0.888	0.942	1.000				
MVPRIV2C	0.865	0.919	0.992	1.000			
MVPRIV3C	0.869	0.924	0.967	0.972	1.000		
MVPRIV4C	0.848	0.881	0.843	0.821	0.904	1.000	
GDEBC	0.509	0.548	0.515	0.522	0.570	0.536	1.000

[a]The variables in part (B) are the changes from the preceding year for the variables in part (A).

correlated among themselves and less highly correlated with GDEB. Part (B) of table 7 reports the correlation matrix for the annual changes in the same series. Again, the changes for the table 1 series are highly correlated among themselves and not highly correlated with the GDEB changes. It seems that any of the series from table 1 is preferable to GDEB.

Yawitz and Meyer (1976) use still a different method for constructing a market value for Federal debt, but they do not report their series. Consequently, a comparison of it with the series constructed in this paper is not possible. However, their method is related to Tanner's, so there is some reason to believe that it, too, produces unreliable estimates.

It is interesting and somewhat surprising that the par value of Federal debt seems to be a better proxy for the market value than does Tanner's GDEB (or, presumably, Yawitz and Meyer's series). For example, the correlation between the par value of those same securities included in MVPRIV3 and the market value MVPRIV3 itself is 0.974 for 1947–1974, compared to 0.863 between MVPRIV3 and GDEB. The correlation between annual changes in par values and in the MVPRIV values is 0.871 for 1947–1974, compared to 0.570 between changes in MVPRIV3 and in GDEB. Similar results hold for the other market value series reported in table 1 and their corresponding par value series.

5. Summary

In this paper I have reported several new series on the market value of outstanding government debt. The underlying data are very accurate, especially for Federal debt after 1941, leading to very accurate market value estimates. A comparison with other series constructed by other methods shows that the series reported here are a considerable improvement over previous estimates.

References

Tanner, J. Ernest, 1979, An empirical investigation of tax discounting, Journal of Money, Credit, and Banking 11, May, 214–218.

Yawitz, Jess B. and Lawrence H. Meyer, 1976, An empirical test of the extent of tax discounting, Journal of Money, Credit, and Banking 8, May, 247–254.