The Stability of the Ratio of Nonfinancial Debt to Income

I. - It has recently been shown that the ratio of domestic nonfinancial debt to national product has exhibited a remarkable degree of stability in the United States during the postwar period, indeed as much stability as the ratio of money to national product, but that this has not been the case for its main components i.e., government debt and the main forms of private debt such as business and household debt, and it as been suggested that the same relationships also apply to some other countries. (Friedman, 1981, 1982, 1983). The question has immediately been raised whether this stability is specific to the United States and to the postwar period or whether it is a phenomenon of wider application (Cagan). This note is intended to provide some data that permit a tentative answer to this question which is important for the choice among guides for monetary policy. They suggest a negative answer to the first part of the hypothesis, the stability of the ratio over time in either the United States or in other countries, and indicate that the determination of the ratio are complex and vary over time and among countries. They confirm, however, the second part, the absence of stability for the main components of domestic debt as well as for other broader aggregates of financial assets, such as claims against financial institutions and corporate shares, the evidence for which cannot be presented here due to lack of space.

The data used to study the stability or the fluctations of the ratios of domestic nonfinancial debt and its main components as well as of some related ratios on an international basis over the past century are taken from a forthcoming study of national balance sheets for twenty countries for nine benchmark dates between 1875 and 1980 (Goldsmith). The countries and the dates are identified in Table 1. This discussion, therefore, shares the limitations of the basic data, such as the fairly wide intervals between the benchmark dates of on the average slightly more than a decade; some differences in coverage of debt among countries; and, of course, a substantial margin of uncertainty in

TABLE 1

RECONCILIATION OF ACTUAL AND STANDARD BENCHMARK DATES OF NATIONAL BALANCE SHEETS

Standard benchmark year	1875	1895	1913	1929	1939	1950	1965	1973	1978
Country	Actual benchmark year								
1. Australia	—	—	—	—	—	1956	1965	1973	1977
2. Belgium	1875	1895	1913	1929	1939	1948	1965	1973	1976
3. Brazil	—	—	1913	—	—	1945	1964	1972	1980
4. Canada	—	—	—	—	—	1955	1965	1973	1978
5. Denmark	1880	1900	1913	1929	1938	1948	1965	1973	1978
6. France	1880	—	1913	1929	—	1950	1960	1972	1976
7. Germany	1875	1895	1913	1929	1938	1950	1960	1972	1977
8. Great Britain	1875	1895	1913	1927	1937	1948	1965	1973	1977
9. India	1875	1895	1913	1929	1939	1950	1960	—	1975
10. Israel	—	—	—	—	—	1951	1966	—	1976
11. Italy	1881	1895	1914	1929	1938	1951	1963	1973	1977
12. Japan	1885	1900	1913	1930	1940	1955	1965	1970	1977
13. Mexico	—	—	—	1930	1940	1948	1965	1973	1972
14. Norway	1880	1899	1913	1930	1939	1953	1965	1972	1978
15. South Africa	—	—	1913	1929	1938	1955	1965	1973	1978
16. Sweden	—	—	—	—	—	—	1963	1973	1978
17. Switzerland	1880	1900	1913	1929	1938	1948	1965	1973	1978
18. United States	1880	1900	1912	1929	1939	1950	1965	1973	1978

the estimates of some categories of debt, particularly of mortgage and trade debt.[1] The estimates can therefore be used only to approximate movements extending over several decades.

Two concepts of domestic nonfinancial debt are distinguished, a narrow one which is limited to government debt, debt to financial institutions, mortgage debt and corporate bonds and a broad concept which adds trade debt and miscellaneous debt, two items which are affected with a wider margin of uncertainty in estimation and which differ in the case of miscellaneous debt in coverage among countries. The ratios of the narrow and broad concepts of domestic nonfinancial debt to national product are sometimes compared to similar ratios for total domestic financial debt, which include debt of financial institutions; to total financial assets, also including the value of corporate shares and of foreign assets; and to national assets, i.e., the sum of financial and tangible assets. Finally ratios of money (M-1) to national product are shown for the same countries and dates.

The aim of this article, it should be repeated, is limited to a look at the longer term movements of the ratios of domestic nonfinancial debt and of related broader concepts to national product and to their comparison with similar ratios for money. It would be impossible within the compass of this note — and beyond the author's capabilities — to try to explain, or even to comment upon, the reasons for the level, the movement and the differences among countries, even the more conspicuous of the hundreds of ratios shown in the tables. A few remarks in this direction are limited to the United States and to the averages of eleven countries for which data are available for nine benchmark dates between 1875 and the late 1970s.

II. - Table 2 shows the levels and movements of the ratio on which this note concentrates, that of domestic nonfinancial debt in the narrow definition to national product for eighteen countries for between three and nine benchmark dates depending on the period for which estimates are available. This ratio shows three swings for most countries which are somewhat more pronounced in the United States

[1] The data on money (currency plus demand deposits) are taken for the 1950 to 1978 benchmark dates from publications of the International Monetary Fund, viz. *International Financial Statistics Yearbook*, 1978 and 1981 and the 1961/62 supplement to *International Financial Statistics* (line 34). For the earlier benchmark dates national sources have been used as well as B.R. MITCHELL, *European Historical Statistics*, 1750-1970 (1975) and his *International Historical Statistics - Asia and Africa* (1982).

TABLE 2

THE RATIO OF DOMESTIC NONFINANCIAL DEBT (NARROW DEFINITION)[1] TO NATIONAL PRODUCT IN 18 COUNTRIES; SELECTED DATES, 1875-1978

Standard benchmark year[2]	1875 (1)	1900 (2)	1913 (3)	1929 (4)	1939 (5)	1950 (6)	1965 (7)	1973 (8)	1978 (9)	M[3] (10)	CV[3] (11)
1. Australia	—	—	—	—	—	1.35	1.31	1.13	1.15	—	—
2. Belgium	1.09	1.53	1.71	1.35	1.61	1.23	1.39	1.35	1.38	1.40	0.14
3. Brazil	—	—	0.65	0.55	0.80	0.50	0.26	0.45	0.49	—	—
4. Canada	—	—	—	—	—	1.62	1.60	1.40	1.70	—	—
5. Denmark	1.49	2.08	2.57	2.17	2.00	1.72	1.34	1.58	1.84	1.87	0.21
6. France	2.70	—	2.82	2.09	—	0.72	1.02	1.04	1.06	1.27	0.54
7. Germany	1.10	1.79	2.15	1.02	1.02	0.48	0.58	1.15	1.18	1.16	0.45
8. Great Britain	1.66	2.08	1.55	2.76	2.87	2.51	2.04	1.83	1.84	2.13	0.23
9. India	0.29	0.34	0.39	0.74	1.05	0.43	0.63	0.63	0.54	0.56	0.42
10. Israel	—	—	—	—	—	0.45	0.60	0.84	0.57	—	—
11. Italy	1.59	1.81	1.27	1.36	1.67	1.03	1.28	1.43	1.54	1.44	0.17
12. Japan	0.93	0.73	1.14	2.11	1.78	0.69	1.27	1.27	1.58	1.28	0.37
13. Mexico	—	—	—	0.42	0.56	0.43	0.52	0.61	0.54	—	—
14. Norway	0.96	1.39	1.83	2.24	1.54	1.74	1.72	1.84	2.19	1.72	0.23
15. South Africa	—	—	0.45	0.95	1.14	1.66	1.29	1.44	1.08	—	—
16. Sweden	—	—	—	—	—	—	1.17	1.59	1.82	—	—
17. Switzerland	4.51	3.48	3.57	2.91	3.57	2.19	1.91	1.70	2.36	2.91	0.32
18. United States	0.85	1.04	1.11	1.59	1.55	1.44	1.42	1.43	1.47	1.32	0.19
19. Average[3] (M) Unweighted	1.56	1.63	1.83	1.85	1.87	1.29	1.34	1.39	1.54	1.59	0.14
20. Average[4] (M) Weighted	1.21	1.24	1.34	1.59	1.58	1.30	1.28	1.32	1.40	1.36	—
21. Coefficient of variation (CV)	0.74	0.53	0.49	0.38	0.42	0.54	0.35	0.26	0.33	0.45	0.32

[1] Government securities, corporate bonds, mortgages and debt to financial institutions.
[2] For actual dates cf. Table 1.
[3] Eleven countries (2, 5-9, 11, 12, 14, 17, 18), except ten countries for cols. 2 and 5 (excluding 6).
[4] Weighted by gross national product at year-end dates in terms of purchasing power.

than in the average for the other ten countries for which the data go back to the late 19th century. The ratio rose between ca. 1875 and 1913 as might be expected in a period which experienced the crucial build-up of their financial system. The level of the ratio was considerably lower in the United States than in the average for the ten other mostly European countries.[2] In the interwar period the direction of the movement of the ratios differed between the United States, where it rose by nearly one-third reflecting a sharp increase in the ratios of government debt to income, while the average declined by a similar percentage in the ten other countries to only 1.17 in 1950, the result in part of the inflations and currency reforms accompanying in many of them the two World Wars which reduced the value of outstanding debt, particularly the sharply increasing government debt, in relation to national product. In the three postwar decades the ratio was stable in the United States, and on the average increased by only one-tenth in the other ten countries to 1.40. As a result the ratio of the late 1970s — now practically equal at about 1.50 in both the United States and the average of the other ten countries though slightly above the average of 1.34 for the other 17 countries — was far above the 1880 and 1912 ratios in the United States, but for the average of the other ten countries was more than one-fourth below that of 1913 and was one-seventh below of the level of as much as a century earlier.[3]

The differences among the ratios for the eleven countries measured by the coefficient of variation decreased sharply and almost continuously from 0.74 in the late 19th century to 0.30 in the 1970s. The reversal of this trend between 1929 and ca. 1950 reflects the differential impact of two world wars and of the Great Depression on different countries. The secular decline in the coefficient of variation suggests that with respect to the importance of nonfinancial debt these countries which include all leading free market economies have become more similar to each other.

Variations over time in the ratio, measured again by the coefficient of variation, among the values for the nine benchmark dates, differ

[2] The ten country average of 1.63 for the 1875 benchmark and of 1.97 for 1913 is influenced by the extremely high Swiss values for which there is no obvious explanation; the averages for the other nine countries are 1.31 for ca. 1875 and 1.71 for 1913.

[3] Changes in the weighted average are in the same direction as those of unweighted averages, though considerably less pronounced, and move on a somewhat lower absolute level, particularly for the 1875 and 1913 benchmark dates, due mainly to the then substantially lower value of the ratio for the United States and India which for these two dates have a combined weight of about one-half.

greatly among countries. The coefficients are highest for countries which underwent one or more substantial inflations (France, Germany, Japan) or show a definite upward (India) or downward (Switzerland) trend in the ratio. Because fluctuations in the ratios of individual countries partly offset each other the coefficient of variation for the average of the eleven countries is considerably lower than those for nine of them.

III. - What determines the value of the ratio of nonfinancial debt to national product? Table 3 suggests an answer by showing the relationship of the ratio to a few broader concepts and the relationship among these concepts viz. total domestic debt, which includes debt of financial institutions; total domestic financial assets which also cover corporate stock; total national assets, i.e., the sum of financial and tangible assets; the stock of reproducible capital; and gross national product. It also shows the ratio between the narrow and the broad concept of domestic nonfinancial debt, and that between private and total domestic nonfinancial debt. The ratios linking the various concepts may be regarded as determinants of the ratio of domestic nonfinancial debt to national product.

Although in the case of the eleven-country unweighted average the ratio of domestic nonfinancial debt narrowly or broadly defined was practically the same in the late 1970s as it was a century earlier the value of some of its determinants changed, though generally only moderately. The substantial decline in the ratio of domestic nonfinancial debt to total domestic debt which is due mainly to the increasing importance of debt of financial institutions was offset by an increase of approximately equal proportions in the ratio of domestic financial assets to total national assets, which measures the relative size of the financial superstructure. The two other determinants, the ratio of debt to all financial assets and the ratio of national assets to national product, showed no secular trend. The fair degree of stability of the ratio and its determinants is reflected in the generally low values of the coefficients of variation. The coefficient was lowest for the ratio between the narrow and the broad concept of domestic nonfinancial debt, the ratio of domestic debt to total domestic debt and of total domestic debt to total domestic financial assets; and highest for the ratio of private to total domestic nonfinancial debt due to the pronounced variability of the ratio of domestic government to total domestic nonfinancial debt.

Table 3 permits the identification of movements in the determinants which are behind the substantial increase of the ratio between the

TABLE 3

THE DETERMINANTS OF THE RATIO OF DOMESTIC NONFINANCIAL DEBT (NARROW DEFINITION) TO NATIONAL PRODUCT IN ELEVEN COUNTRIES CA. 1875, 1913, 1950 AND 1978

	$\frac{DNFD'}{DNFD}$ (1)	$\frac{DNFD}{TDD}$ (2)	$\frac{TDD}{TDFA}$ (3)	$\frac{TDFA}{TNA}$ (4)	$\frac{TNA}{GNP}$ (5)	$\frac{DNFD'}{GNP}$ (6)	$\frac{DPNFD'}{DNFD}$ (7)	$\frac{DNFD}{RK}$ (8)	$\frac{RK}{GNP}$ (9)
				I. Eleven Countries[2]					
1875	0.81	0.75	0.88	0.32	9.14	1.56	0.72	0.56	3.42
1900	0.83	0.68	0.85	0.38	9.06	1.63	0.73	0.60	3.30
1913	0.83	0.64	0.84	0.42	9.79	1.83	0.73	0.62	3.42
1929	0.83	0.62	0.81	0.46	9.53	1.85	0.62	0.70	3.37
1939	0.76	0.59	0.84	0.47	9.51	1.87	0.50	0.69	3.25
1950	0.78	0.62	0.84	0.42	7.49	1.29	0.58	0.57	3.02
1965	0.77	0.58	0.83	0.47	7.75	1.34	0.67	0.58	3.18
1973	0.77	0.54	0.88	0.47	8.05	1.39	0.73	0.64	2.99
1978	0.78	0.54	0.93	0.45	8.78	1.54	0.71	0.57	3.68
Mean	0.80	0.62	0.86	0.43	8.79	1.59	0.67	0.61	3.29
C.V.[1]	0.04	0.11	0.04	0.12	0.10	0.14	0.12	0.09	0.07
				II. United States[3]					
1880	0.64	0.81	0.75	0.37	5.84	0.85	0.66	0.57	3.32
1900	0.60	0.73	0.77	0.40	7.67	1.04	0.84	0.59	2.91
1912	0.68	0.70	0.71	0.43	7.63	1.11	0.86	0.59	2.70
1929	0.64	0.73	0.64	0.54	9.97	1.59	0.79	0.78	3.19
1939	0.76	0.58	0.77	0.50	9.09	1.55	0.54	0.68	2.99
1950	0.73	0.63	0.84	0.50	7.41	1.44	0.35	0.73	2.70
1965	0.72	0.65	0.70	0.54	8.09	1.42	0.56	0.76	2.60
1973	0.70	0.65	0.79	0.50	7.81	1.40	0.68	0.72	2.81
1978	0.71	0.66	0.85	0.47	7.83	1.47	0.67	0.67	3.09
Mean	0.69	0.68	0.76	0.47	7.93	1.32	0.66	0.68	2.92
C.V.[1]	0.07	0.10	0.09	0.13	0.14	0.19	0.25	0.12	0.08

[1] Coefficient of variation.
[2] Ten countries (excluding France) in 1900 and 1939; standard benchmark years.
[3] Actual dates.

DNFD' = Domestic nonfinancial { Narrow definition
DNFD = Debt { Broad definition
DPNFD' = Domestic private nonfinancial debt narrowly defined
TDD = Total domestic debt
TDFA = Total domestic financial assets
TNA = Total national assets
GNP = Gross national product
RK = Reproducible capital.

1875 and 1939 benchmarks, half of which was concentrated in the 1900-1913 interval, the sharp decline during the 1940s and the partial recovery near the end of the period. The first movement was due primarily to a sharp increase in the ratio of financial assets to national assets, reflecting an increase in the financial inter-relations ratio (financial: tangible assets) which was only partially offset by a decline in the share of domestic nonfinancial debt in total domestic debt, i.e., the increasing importance of debt of financial institutions. The sharp decline during the decade of World War II is essentially due to a decrease in the ratio of national assets to national product partly attributable to the inflation which reduced the real value of outstanding debt. The other determinants changed only moderately. The recovery of the ratio in the postwar period in the ten countries — that of the United States remaining stable — is the result of movements in opposite directions of some of the determinants. The ratios of total domestic debt to total domestic financial assets increased, reflecting a decrease in the importance of corporate stock, as did the assets to national product, while the ratio of domestic nonfinancial debt to total domestic debt declined as debt of financial institutions increased more rapidly, and the ratio of domestic financial to national assets changed but little in the absence of a trend in the financial interrelations ratio.

The share of private in total domestic nonfinancial debt was stable between the 1875 and 1913 benchmark dates, a period without major wars and the large increases in central government debt which accompany them. In contrast the ratio declined sharply between the 1913 and 1939 benchmarks (and almost certainly even more by 1945) but by the early 1970s had regained its former level.

The movements of the often offsetting various determinants thus explain the secular stability of the 11 country average ratio of the domestic nonfinancial debt to national product by important trends in financial structure such as the increasing relative size of the financial superstructure as well as the deviation from it, and the growing institutionalization of the financial process as well as the influence of the changing importance of central government debt and of corporate stock values and finally, as will become evident, changes in the ratio of debt to the real capital stock and the average capital-output ratio.

For the United States the level and movement of the five determinants of the ratio of domestic nonfinancial debt in its narrow definition which is to be explained are necessarily somewhat different since that ratio shows a much more pronounced increase between 1880 and 1929

and a more moderate decline thereafter than the eleven country average. The increase of the ratio between 1880 and 1912 from 0.85 to 1.59 is due mainly to one of the determinants, the ratio of total domestic financial assets to national assets, which reflects primarily the rapid growth of debt of financial institutions and of corporate stock and an increase in the ratio of national assets to national product, an extended version of the average capital-output ratio. The even more marked rise in the ratio of private domestic nonfinancial debt which more than doubled from 0.56 to 1.25 reflects the relatively slow growth of public, in particular Federal, debt. The small decline in the ratio between 1929 and 1978 is the result of offsetting movements in indidvidual components. Two of them increased, the ratio of the narrow to the broadly defined domestic nonfinancial debt and the ratio of total domestic debt to all financial debt. The increase in the ratio was considerable reflecting the correction of the extraordinarily high level of stock prices in 1929. The other three determinants declined substantially only in the case of national assets to national product.

There is no space to show or to comment on the differences in the combination of the various determinants in the ten other countries, which not rarely differ from that shown in the averages for the eleven countries.

IV. - The ratio of domestic nonfinancial debt, in this case using the more appropriate broad concept, can be factored into two components, the ratio of domestic nonfinancial debt to the stock of reproducible capital and the ratio of reproducible capital to national product. The first component is a rough indicator of the extent to which reproducible capital has been financed by borrowing rather than by the owner's saving and by depreciation allowances. This is true, however, only in the absence of changes in the prices of reproducible tangible assets. Otherwise the ratio understates the share of borrowing if prices rise and overstates it in the much rarer cases when they fall. The second component is nothing but the average capital/output ratio limited to reproducible assets.

Columns 8 and 9 of Table 3 and Table 4 show this breakdown of the domestic nonfinancial debt/national product ratio for the eleven countries and nine benchmark dates. They indicate substantial variations in both components of the ratio among countries as well as over time. The averages, however, show much less variations. In the case of the ratio of domestic nonfinancial debt to the stock of reproducible

capital they range without trend from 0.57 in 1950 to 0.70 in 1929 with a coefficient of variation of only 0.09, while the range for the ratio of reproducible capital to national product is also without trend and about equally wide, viz. from three of the 1950 and 1973 benchmarks to 3.68 in the late 1970s though the coefficient of variation is even lower at 0.07.

For the average of the eleven countries and the nine benchmark dates the ratio of domestic nonfinancial debt to national product of two shown in col. 5 of Table 4 was the result of a ratio of domestic nonfinancial debt to reproducible capital of slightly over 0.60 which indicates that approximately three-fifths of net capital formation was financed by borrowing (disregarding valuation changes in the stock of reproducible capital), and an average reproducible capital-output ratio of about 3-1/2. The relative size of the two components, however, differed substantially among countries as did the resulting ratio of nonfinancial debt to national product. These differences are evident in Table 4.

The ratio of nonfinancial debt to national product ranged from less than two-fifths in India to nine-tenths in Japan, a range of nearly 2-1/2 to 1, and was between one-half and three-fourths in five of the eleven countries. The ratio of reproducible capital to national product varied from about 2-1/2 for India and Japan to slightly above four for Belgium and Switzerland, a relation of about 1-2/3 to 1 and thus considerably lower than the corresponding figure for the ratio of nonfinancial debt to national product. The average coefficient of variation for the eleven countries was also considerably smaller for the ratio of the stock of reproducible capital to national product with 0.17 than for that of nonfinancial debt to reproducible capital with 0.28. The coefficient of variation for the ratio of domestic nonfinancial debt 0.24 is midway between those of its two components suggesting a slight negative relation between them.

There are no obvious relations between either of the two ratios or their combinations and major characteristics of the various economies, including the degree of inflation. In some countries a low ratio of nonfinancial debt to national product was the result of low values of both components (India) and a high ratio that of high values of both components (Switzerland). But the country with the highest ratio of debt to the stock of reproducibles (Japan) has a low ratio of reproducible capital stock to income and an average ratio of nonfinancial debt to income. In the case of the United States the debt-capital stock ratio is slightly above while those of capital stock-income and non-financial debt-income ratios are slightly below the average for the other ten countries.

TABLE 4

FACTORING THE RATIO OF NONFINANCIAL DEBT TO NATIONAL PRODUCT IN ELEVEN COUNTRIES AT NINE BENCHMARK DATES, 1875-1978

	D/K		K/y		D/y	
	M (1)	CV (2)	M (3)	CV (4)	M (5)	CV (6)
Belgium	0.42	0.17	4.15	0.19	1.74	0.18
Denmark	0.70	0.28	3.20	0.27	2.24	0.19
France[1]	0.57	0.20	3.30	0.30	1.88	0.46
Germany	0.46	0.31	3.41	0.35	1.57	0.40
Great Britain	0.84	0.44	3.37	0.36	2.83	0.19
India	0.42	0.27	2.44	0.31	1.02	0.44
Italy	0.52	0.19	3.27	0.08	1.69	0.15
Japan	0.90	0.45	2.48	0.30	2.22	0.32
Norway	0.56	0.17	3.63	0.06	2.02	0.19
Switzerland	0.76	0.27	4.13	0.13	3.14	0.31
United States	0.68	0.12	2.81	0.09	1.92	0.17
Average { Unweighted	0.62	0.31	3.29	0.22	2.03	0.27
Average { Weighted[2]	0.62	0.24	2.97	0.22	1.84	0.27
Coefficient of variation	0.28	0.52	0.17	0.52	0.24	0.43

[1] Seven dates.
[2] Weighted by national product in purchasing power terms.
D = Domestic nonfinancial debt
K = Reproducible capital
y = Gross national product
M = Average
CV = Coefficient of variation.

Variations are of course much more pronounced among the values of the ratio of domestic nonfinancial debt and its two components for cells identified by country and benchmark. This is suggested by the fact that the 95 ratios of domestic nonfinancial debt to national product ranged from 0.41 to 4.84 while of the two components the ratio of domestic nonfinancial debt to reproducible capital extended from 0.23 to 1.41 and that of reproducible capital to national product from 1.61 to 5.13, the range again being considerably wider for the first than for the second component.

An understanding of the movements of the country-wide ratios of domestic nonfinancial debt requires their breakdown into parallel ratios for economic sectors, at least the government, business and household sectors, to permit investigating whether the stability, if any, in the

countrywide ratio is the result of a stability of the several sectoral ratios or of offsetting movements in them. This can be done only where sectorized national balance sheets or at least sectoral data for reproducible capital, debt and product are available for a long period of time. The United States is one of the few countries meeting this requirement, and even here the data permit the distinction of only two sectors, public and private. The resulting rough estimates are shown in Table 5 for nine benchmark dates between 1880 and 1978. The table indicates that the debt/product ratio has differed considerably as between the public and private sectors and that the sectoral ratios have been the result of a different combination of their two components, viz. the ratio of debt to reproducible capital and the capital/output ratio. For the average of the nine benchmark dates the ratio of debt to the stock of reproducible capital was much higher for the government than for the private sectors as is to be expected as only a fraction of the government's debt (particularly the Federal government's) was destined to finance capital formation. The ratio is therefore highest for the 1880, 1939 and 1950 benchmarks. On the other hand, the difference between the ratio of the stock of reproducible capital to national product is fairly small. The variations among benchmark dates are much more pronounced for the ratio of debt to income as well as for its two components in the case of the government, particularly for the ratio of debt to reproducible capital stock, as evidenced by the much higher coefficients of variation.

In discussing the movements over time it is advisable to distinguish between two periods, that from 1880 to 1929 during which the ratio for all sectors together showed a sharp upward trend and that from 1939 to 1978 when the ratio for the five benchmark dates kept close to a value of two.

In the first period the debt ratio of the public sector declined sharply reflecting largely the small increase and between 1880 and 1900 even the reduction of the Federal debt in the face of a rapidly expanding economy. The ratio for the private sectors which dominated the countrywide ratio doubled between 1880 and 1929 as the volume of borrowings from financial institutions, mortgage debt and corporate bonds increased more rapidly than national product. The ratio was practically the same in 1939 as in 1900 and 1912 after a sharp upward bulge in the 1920s. The movements of the debt-income ratio reflected until 1912 mainly those in the capital/output ratio as the ratio of debt to reproducible capital fluctuated only between 0.45 and 0.57. The bulge of 1929, on the other hand, was due chiefly to an increase in the ratio of

TABLE 5

FACTORING OF RATIOS OF DOMESTIC NONFINANCIAL PRIVATE AND GOVERNMENT DEBT TO NATIONAL PRODUCT IN THE UNITED STATES, SELECTED DATES, 1880-1978

	Private sectors			Government			All sectors		
	$\frac{D}{RK}$ (1)	$\frac{RK}{y}$ (2)	$\frac{D}{y}$ (3)	$\frac{D}{RK}$ (4)	$\frac{RK}{y}$ (5)	$\frac{D}{y}$ (6)	$\frac{D}{RK}$ (7)	$\frac{RK}{y}$ (8)	$\frac{D}{y}$ (9)
1880	0.47	2.42	1.12	3.90	1.05	4.11	0.57	2.32	1.33
1900	0.50	3.05	1.53	0.97	2.05	1.99	0.53	2.96	1.56
1912	0.57	2.74	1.57	0.80	2.29	1.83	0.59	2.70	1.60
1929	0.77	3.05	2.35	0.88	3.60	3.18	0.79	3.10	2.43
1939	0.57	2.81	1.60	1.21	3.58	4.34	0.70	2.93	2.05
1950	0.47	2.72	1.28	1.72	2.77	4.77	0.73	2.70	1.97
1965	0.77	2.54	1.96	0.80	2.56	2.06	0.78	2.54	1.98
1973	0.74	3.07	2.26	0.57	2.61	1.49	0.69	2.93	2.03
1978	0.67	3.37	2.25	0.67	2.42	1.63	0.67	3.09	2.06
Average	0.61	2.86	1.76	1.28	2.55	2.82	0.67	2.81	1.89
Coefficient of variation	0.20	0.10	0.26	0.81	0.30	0.46	0.14	0.09	0.18

D = Debt
RK = Reproducible tangible assets
y = Gross product.

Sources:
D: GOLDSMITH, 1984, tables A-23.
RK: 1880 GOLDSMITH in S. Kuznets ed. *Income and Wealth of the United States*, 1952, 310; 1900, 1912 GOLDSMITH, LIPSEY and MENDELSON, *Studies in the National Balance Sheet of the U.S.*, II, 72/75; 1929-1978, MUSGRAVE, *Survey of Current Business*, 3/1979, 4/1981.
y: 1800, BERRY, *Estimated Annual Variations in Gross National Product 1789-1909*, 1968, 32;
1900-1972, *Historical Statistics*, 1975;
1929-1978, Council of Economic Advisors, *Annual Report*, 1983, 163; average of year and year following.

debt to reproducible capital but reflects in part a difference between two sources of basic data.

Between 1939 and 1978, when the estimates are more reliable and homogeneous, the debt ratio of the public sector was reduced by nearly two-thirds, after having reached a peak in 1950 and a trough in 1973 mainly reflecting movements in the Federal debt. The debt ratio of the private sectors, in contrast, after declining through 1950 in continuation of a movement starting in 1930 almost doubled in the following two decades. The increase in the ratio between 1939 and 1978 was shared by both components, though their movements between benchmark dates differed in all intervals except between 1939 and 1950.

V. - The corresponding basic data for the ratio of M-1 to national product are shown in Table 6. Comments will again be limited to the figures and particularly the averages for the eleven countries for which the data go back to the late 19th century. The overall average for the 99 entries is slightly above 30 percent of gross national product but differences among countries and variations over time are substantial.

The (unweighted) average of the ratio for the eleven countries rose considerably between the 1875 and 1913 benchmarks. It was stable from 1913 to 1939, but declined sharply during World War II and its aftermath, a period of substantial inflation in most countries, and again was fairly stable at a considerably lower level during the postwar period. As a result the value of the average ratio was only slightly higher in the late 1970s than it had been a century earlier.

Differences among countries were large and as the stability of the coefficients of variation of the average indicates, did not change over the period. The average of the ratios for the nine benchmark dates ranged from slightly less than 20 percent in India and Germany to nearly 40 percent in France and Great Britain and to 50 percent in Switzerland. The average ratio for the United States of 25 percent was only slightly below the average of the other ten countries.

Most countries showed a similar pattern, viz. a rise to the 1913 or 1939 benchmarks and a decline thereafter, and only small differences between the ratios for the 1875 and 1978 benchmarks. The exceptions are, on the one hand, Great Britain with postwar ratios much lower than those which prevailed until 1948 (partly because of a change in sources); and on the other hand India, where the ratio showed a slow and irregular upward trend; Italy, where the ratios in the 1960s and 1970s were much higher than before; and Switzerland where the ratio though reaching its peak in 1929 remained high. An explanation of these movements would require a review of the monetary history of the eleven countries. The degree of changes in the ratio between benchmark dates, which indicates the greater or lesser stability of the ratios, varied considerably among countries. This is reflected in the coefficients of variation of the values for the nine benchmark dates.

The variations of the ratio of money to national product differed considerably though not radically among countries. The coefficients of variation ranged from 0.20 for India to 0.46 for Italy, but for seven countries lay between 0.28 and 0.34.

Table 7 compares the share of money (M-1) in two appropriate larger aggregates, domestic nonfinancial debt and total domestic debt,

TABLE 6

THE RATIO OF MONEY (M-1) TO NATIONAL PRODUCT IN 18 COUNTRIES, SELECTED DATES, 1850-1978
(percent)

Standard benchmark year[1]	1875 (1)	1900 (2)	1913 (3)	1929 (4)	1939 (5)	1950 (6)	1965 (7)	1973 (8)	1978 (9)	Average[2] (10)	CV[3] (11)
1. Australia	—	—	—	—	—	30.2	18.8	15.6	12.6	—	—
2. Belgium	24.1	31.7	41.5	36.8	54.8	44.5	36.3	26.7	24.8	35.7	0.29
3. Brazil	—	—	17.4	17.9	26.4	17.3	14.7	14.5	7.6	—	—
4. Canada	—	—	—	—	—	16.8	16.1	15.8	12.7	—	—
5. Denmark	22.8	29.4	47.1	43.0	40.8	30.6	23.2	20.4	21.1	30.9	0.33
6. France	28.1	47.2	65.8	47.3	44.2	27.7	30.4	21.7	25.6	37.6	0.38
7. Germany	18.6	21.0	31.1	25.7	17.3	15.4	10.0	15.3	18.2	19.2	0.32
8. Great Britain	46.6	47.4	42.6	52.4	57.4	41.4	21.1	16.8	22.6	38.7	0.38
9. India	10.9	15.2	16.5	14.7	15.6	20.4	17.8	15.8	21.9	16.5	0.20
10. Israel	—	—	—	—	—	26.7	17.4	16.3	11.4	—	—
11. Italy	16.8	16.0	20.7	25.5	24.0	26.7	39.0	56.0	47.0	30.2	0.46
12. Japan	21.0	22.8	22.5	20.7	25.4	11.2	34.0	27.8	31.4	24.1	0.28
13. Mexico	—	—	—	8.8	14.7	10.4	11.3	11.7	11.7	—	—
14. Norway	16.4	25.7	37.0	44.0	23.7	28.8	20.4	21.6	18.6	26.2	0.34
15. South Africa	—	—	—	21.0	30.8	24.8	18.3	19.4	12.2	—	—
16. Sweden	—	—	—	—	—	20.3	16.3	13.9	13.6	—	—
17. Switzerland	(31.7)	(40.8)	52.4	71.0	58.8	55.2	45.4	39.8	47.0	49.1	0.24
18. United States	(13.8)	(22.7)	(27.0)	27.6	35.7	37.7	25.9	20.0	16.2	25.2	0.32
19. Average[2] Unweighted	22.8	29.1	36.7	37.2	36.2	30.9	27.6	25.6	26.8	30.3	0.17
20. Average[2] Weighted	21.8	26.7	30.6	29.9	32.1	32.9	25.4	22.6	22.5	27.2	0.16
21. Coefficient of variation	0.44	0.40	0.41	0.44	0.45	0.42	0.38	0.48	0.40	0.42	0.07

[1] For actual dates cf. Table 1.
[2] Eleven countries (2, 5-9, 11, 12, 14, 17 and 18).
[3] Coefficient of variation.

Sources:
Cols. 7-9 INTERNATIONAL MONETARY FUND, *International Financial Statistics Yearbook*, 1978, 1981, 1961/62 Supplement.
Cols. 1- 6
lines 2, 11, 14, 17 B.R. MITCHELL, *European Historical Statistics, 1750-1970*, 1975; figures do not include coin, important in cols. 1-4.
line 3 R.W. GOLDSMITH, *The Financial Development of Brazil, 1850-1980* (forthcoming).
line 5 E. HOFFMEYER, *Struktureudringer pua penge-og kapitelmarkeder*, 1960, 24, 52, 65.
line 6 MITCHELL, for cols. 1 and 2; *Annuaire Statistique*, 1966, 575, for cols. 3-6.
line 7 Currency and coins from Deutsche Bundesbank, *Deutsches Geld-und Bankwesen in Zahlen 1876-1975*, 1976, 2/4; for deposits, MITCHELL, 681/62; rough estimates for 1850.
line 8 M. FRIEDMAN and A.J. SCHWARTZ, *Monetary Trends in the United States and the United Kingdom*, 1982, table 4.9 except for col. 1 which is a rough estimate.
line 9 R.W. GOLDSMITH, *The Financial Development of India, 1860-1977*, 1983, 11, 71/73, 150.
line 12 R.W. GOLDSMITH, *The Financial Development of Japan, 1868-1977*, 1983, 45, 76, 100.
line 13 R.W. GOLDSMITH, *The Financial Development of Mexico*, 1966, Table 30.
line 15 B.R. MITCHELL, *International Historical Statistics-Asia and Africa*, 1982, 608, 612, 622, 626.
line 18 UNITED STATES BUREAU OF THE CENSUS, *Historical Statistics of the United States: Colonial Times to 1970*, 1975, 992/93 for cols. 2-6; for 1850 sum of currency and bank deposits (op. cit., 993, 1020); for National Product as for Table 5; year end rates.

TABLE 7

THE SHARE OF MONEY IN DOMESTIC TOTAL AND NONFINANCIAL DEBT IN ELEVEN COUNTRIES, CA. 1875, 1913, 1950 AND 1978
(percent)

	Total Domestic Debt				Total Domestic Nonfinancial Debt			
	Ca. 1875 (1)	Ca. 1913 (2)	Ca. 1950 (3)	Ca. 1978 (4)	Ca. 1875 (5)	Ca. 1913 (6)	Ca. 1950 (7)	Ca. 1978 (8)
Belgium	11.7	12.6	17.0	8.1	15.6	15.2	25.5	17.8
Denmark	8.3	9.7	8.1	5.1	12.7	16.4	15.1	10.7
France	7.7	15.1	19.1	10.0	9.0	19.4	28.7	17.0
Germany	8.7	7.5	11.6	5.7	12.1	12.4	18.3	10.6
Great Britain	16.4	14.7	9.1	5.7	22.8	22.4	14.6	7.1
India	24.8	28.9	16.1	12.1	27.2	34.8	20.0	10.5
Italy	7.8	8.8	13.3	11.2	9.2	13.5	20.8	27.2
Japan	11.4	7.7	5.8	7.4	15.5	12.7	20.4	11.0
Norway	8.4	11.2	8.0	4.6	12.5	15.0	14.1	7.6
Switzerland	4.9	7.8	11.7	8.0	6.4	13.7	23.0	18.6
United States	8.4	11.6	12.0	5.2	10.3	16.6	19.1	7.9
Average { Unweighted	10.8	12.3	12.0	7.6	13.9	17.5	20.0	13.3
Average { Weighted	13.9	14.9	12.3	6.9	16.9	20.3	19.5	10.8
Median	8.4	11.2	11.6	7.4	12.7	15.0	20.0	10.7
Coefficient of variation	0.51	0.50	0.35	0.34	0.44	0.37	0.23	0.47

for four benchmark dates (1875, 1913, 1950 and 1978) in the eleven countries. The average share did not change much between the late 19th century and the mid-20th century in the case of total domestic debt, although it was slightly higher in 1913 than at the 1875 and 1950 benchmark dates, but declined sharply in the postwar period, similar to the movements of the ratio of money to national product. The movements of the share of money in total domestic debt in individual countries, however, differed markedly and only two of the eleven countries (Denmark and Norway) showed a pattern similar to that of the average, i.e., no trend until the 1950 benchmark date and a sharp decline thereafter. Nevertheless in eight countries including the United States the share at the end of the period was substantially below that at its start. The exceptions are France, Italy and Switzerland. Inter-country differences, as reflected in the coefficient of variation, were however considerably lower in the second half of the 20th century than at the two earlier benchmark dates.

The ratio of money to domestic nonfinancial debt, which can be followed on the right half of Table 7 is necessarily somewhat higher than that to total domestic debt, but there are also some differences in movements. The main difference is that the average continued to increase until the 1950 benchmark date, but its decline in the postwar period by about one-third was equal to that in the ratio to total domestic debt. As a result the level of the ratio in the late 1970s was only fractionally below that of a century earlier, while in the case of the ratio of money to total domestic debt it was almost one-third lower. Differences among countries were as large at the end as at the beginning of the period, but considerably lower at the 1913 and particularly the 1950 benchmarks.

VI - From the point of view of the question raised at the beginning of this article Table 8 which compares means, medians, ranges and coefficients of variation for the eleven-country averages of the ratios of domestic nonfinancial debt and of money to national product for nine benchmark dates and Table 9 which compares the nine-benchmark averages for the eleven countries are crucial.

On the basis of nine-benchmark-date averages of the coefficients of variation the variability, or stability, is approximately the same for nonfinancial debt as for money. However, the over-time variability of the benchmark averages is considerably higher for the credit ratio with a range from 0.26 to 0.74 than for the money/product ratio which remains

TABLE 8

COMPARISON OF RATIOS OF DOMESTIC NONFINANCIAL DEBT[1] (D) AND OF MONEY[2] (M) TO GROSS NATIONAL PRODUCT IN ELEVEN COUNTRIES AT NINE BENCHMARK DATES, 1875-1978

Benchmark date[3]	Averages				Median		Range		Coefficient of variation	
	Unweighted		Weighted[4]							
	D (1)	M (2)	D (3)	M (4)	D (5)	M (6)	D (7)	M (8)	D (9)	M (10)
1875	1.56	0.23	1.21	0.22	1.10	0.24	0.29-4.51	0.11-0.47	0.74	0.44
1900[5]	1.63	0.29	1.24	0.27	1.66	0.26	0.34-3.48	0.15-0.47	0.53	0.40
1913	1.83	0.37	1.34	0.31	1.71	0.37	0.39-3.57	0.17-0.66	0.49	0.41
1929	1.85	0.37	1.72	0.30	2.09	0.37	0.74-2.91	0.15-0.71	0.38	0.44
1939[5]	1.87	0.36	1.58	0.32	1.67	0.37	1.02-3.57	0.16-0.59	0.42	0.45
1950	1.29	0.30	1.30	0.33	1.23	0.28	0.43-2.51	0.11-0.55	0.54	0.43
1965	1.33	0.28	1.28	0.25	1.39	0.26	0.58-2.04	0.10-0.45	0.35	0.38
1973	1.39	0.26	1.32	0.23	1.43	0.22	0.63-1.83	0.15-0.56	0.26	0.48
1978	1.62	0.26	1.45	0.23	1.54	0.22	0.54-2.36	0.15-0.47	0.38	0.43
Average	1.60	0.30	1.38	0.27	1.54	0.29	—	—	0.45	0.43
C.V.[6]	0.14	0.17	0.12	0.16	0.19	0.22	—	—	0.31	0.07

[1] Narrow definition.
[2] Currency plus demand deposits.
[3] For actual dates cf. Table 1.
[4] Weighted by gross national product at year-end rates in purchasing power terms.
[5] For ten countries (excluding France).
[6] Coefficient of variation.

for the nine dates between 0.38 and 0.48. Moreover the intercountry differences of the credit/product ratios shows a downward trend between the 1875 and 1929 benchmarks and after a substantial rise between 1939 and 1950 another decline in the postwar period, movements which are absent in the money/product ratio.

The similarity of the nine-date averages, however, hides large differences among the eleven countries visible in Table 9. In five of them, including the United States, the average variability in the money/product ratio exceeded that in the nonfinancial debt/product ratio, and by between about 40 and 110 percent; in one country the two coefficients showed virtually the same average; and in another five the average of the money/product coefficients was below that of the nonfinancial debt coefficients to an extent of between one-fourth and fully one-half. Thus in about one-half of the countries the money/product ratio has over the past century been more stable than the nonfinancial debt coefficient and in the other half, including the United States, it has been less stable.

The higher coefficients of variation of both ratios are shown for the countries which have experienced one or more periods of rapid inflation (France and Germany) or in which both ratios have shown a pronounced upward trend (India). The lowest ratio is registered by the United States which had the lowest rate of secular inflation. But there are also countries with relatively low ratios though they suffered one or more periods of rapid inflation (Belgium, Italy, Japan). The relation between stability of the two ratios and the degree of inflation is thus mixed and not easy to explain. The relation between the variability of the two ratios, finally does not seem to be related to the degree of inflation or any other obvious characteristic of individual countries such as their rate of growth of aggregate or per head real product.

For an evaluation of the usability of the ratio of total domestic debt as a guide for monetary policy, its behavior during the postwar period, or even that part of it after the distortions of the war and immediate postwar inflation had disappeared, is probably more relevant than the movements over the past century. It may therefore be worthwhile to look at the ratio for the last three benchmark dates in the mid-1960s, the early 1970s and the late 1970s. It is then found that the range between the lowest and the highest of the three values to their average extends for the 18 countries from four percent in France and the United States to about 60 percent in Brazil and Germany and averages 25 percent. Obviously the range of the variations would be larger for annual, and

TABLE 9

AVERAGE AND COEFFICIENT OF VARIATION OF RATIOS OF DOMESTIC NONFINANCIAL DEBT AND OF MONEY TO NATIONAL PRODUCT IN ELEVEN COUNTRIES FOR NINE BENCHMARK DATES, 1875-1978

	DNFD'/y		DNFD/y		M/y	
	M (1)	CV (2)	M (3)	CV (4)	M (5)	CV (6)
1. Belgium	1.70	0.183	1.40	0.135	0.357	0.285
2. Denmark	2.13	0.191	1.87	0.205	0.309	0.331
3. France	1.95	0.463	1.64	0.538	0.382	0.384
4. Germany	1.52	0.403	1.16	0.453	0.192	0.323
5. Great Britain	2.46	0.192	2.13	0.225	0.387	0.420
6. India	1.00	0.452	0.56	0.423	0.165	0.196
7. Italy	1.69	0.146	1.44	0.165	0.302	0.464
8. Japan	2.02	0.320	1.29	0.371	0.241	0.278
9. Norway	2.02	0.190	1.14	0.338	0.262	0.345
10. Switzerland	3.14	0.308	2.91	0.322	0.491	0.239
11. United States	1.92	0.169	1.32	0.194	0.240	0.277
12. Average (M) Unweighted	1.96	0.275	1.53	0.306	0.303	0.322
12. Average (M) Weighted[2]	1.81	0.277	1.33	0.302	0.260	0.304
13. Median	1.95	0.195	1.40	0.322	0.309	0.323
14. Coefficient of variation (CV)	0.28	0.436	0.400	0.430	0.318	0.245

DNDF Domestic nonfinancial Debt { Broad definition / Narrow definition
M Money (Currency plus demand deposits)
y Gross national product.

still larger for quarterly data. In only three of the 18 countries were the three ratios practically the same. In five countries the ratios showed an upward trend, and in another five a concave or convex movement, while the movement was irregular in the remaining five countries. It would therefore seem that the ratio of domestic debt to national product alone would have provided a reliable guide for monetary policy over the last two decades for only a few countries. This, of course, does not mean that it would have been inferior in that role to the ratio of money to national product.

If the two ratios are compared it is found that the ratio of the range to the mean of the three values averages 31 percent for the ratio of money to gross national product compared to 25 percent for the ratio of

domestic debt to national product. However, the variability of the domestic debt ratio is larger than that of the money ratio in eight countries and smaller in another eight while the two ratios are equal in two countries and is fairly large (in excess of 10 percent) in 12 of the 18 countries. On this excessively simple test the choice between the two ratios is therefore country-specific. To go beyond this statement the comparison would have to be extended to all years, and if possible all quarters, of a period including the years 1979-1983. This has been done by Professor Friedman (1982) for five of the 18 countries (Canada, Germany, Japan, the United Kingdom and the United States) for the early 1960s to 1980, whose calculations show that measured by the coefficients of variation the ratio of credit to national product was more stable than the ratio of money (M-1) — the one used here — in all countries except in Canada. It remains to be seen whether the results will be similar for other countries, an investigation which will have to be limited to the countries which have flow-of-funds statistics that include information on the stocks of the various financial instruments for at least the past decade.

New Haven

RAYMOND W. GOLDSMITH

REFERENCES

CAGAN, P.L., Comment in J. Tobin ed., *Macroeconomics, Prices and Quantities*, The Brookings Institution, 1983.

FRIEDMAN, B., *The Relative Stability of Money and Credit "Velocities" in the United States: Evidence and Some Speculations*. National Bureau of Economic Research, Working Paper No. 645, 1981.

FRIEDMAN, B., "Debt and Economic Activity in the United States," in B. Friedman ed., *The Changing Roles of Debt and Equity in Financing U. S. Capital Formation*, University of Chicago Press, 1982.

FRIEDMAN, B., "The Roles of Money and Credit in Macroeconomic Analysis," in J. Tobin, *op. cit.*

FRIEDMAN, B., *Money, Credit and Nonfinancial Economic Activity: An Empirical Study of Five Countries*, National Bureau of Economic Research, Working Paper No. 1033, 1983.

GOLDSMITH, R.W., *National Balance Sheets*, Chicago University Press, forthcoming.