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**Common Stock Values and Inflation—
The Historical Record of Many Countries**

by
Phillip Cagan

National Bureau of Economic Research
and Columbia University



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COMMON STOCK VALUES AND INFLATION—THE HISTORICAL RECORD OF MANY COUNTRIES

Phillip Cagan

Why Stocks are Viewed as a Hedge Against Inflation

A perennial threat to long-term investors is the depreciation in the purchasing power of financial assets owing to a general inflation of commodity prices. The literature of investment advice is full of warnings about inflation and what to do about it. Down through the ages investors have traditionally sought protection in real property of various kinds—land, buildings, commodities, precious metals, and jewels. In modern times financial assets have been the preferred form of investment because of their greater convenience and, compared with unproductive property, positive rate of nominal return. But most financial assets have a value which is fixed at time of issue in terms of the national currency and thereafter will decline in *real* value if the currency depreciates. To be sure, France, Finland, Israel, and other countries¹ have experimented with bonds whose nominal values are linked to a price index, but such securities are not available in most countries.

Bonds are not, of course, wholly unresponsive to inflation. If inflation comes to be widely expected, the coupon rate of return will rise on new issues to compensate for the anticipated depreciation in the purchasing power of the principal, while the market value of outstanding bonds will depreciate commensurately. Since the rate of inflation is subject to considerable uncertainty ahead of time, the adjustment of interest rates on new issues is far from precise,

and some gain or loss in real terms for lender and borrower cannot be avoided.

For most investors common stocks have come to be viewed as the primary hedge against the uncertainty of future inflation rates. The rationale is that corporate profits can be expected to rise along with an inflation of selling prices, thus allowing dividends to keep up with inflation. Insofar as dividends rise, the market price of common stocks will tend to rise also. Although not every company will be affected equally, the average rise of a broad group of common stocks might be expected to match the average rise of consumer prices.

The basic premise of this view—that inflations have neutral effects on the fortunes of the entire business sector—is generally not true, however. This was demonstrated once again during the Vietnam War period. Inflation overtook the U.S. economy in 1965, and prices continued rising despite a tightening of monetary policy in 1966 and 1969 to restrain the growth in aggregate demand. As a result of monetary restraint and a business recession, stocks fell sharply in 1969 and 1970. Over the half decade 1965-70 an index of U.S. common stocks depreciated 15 per cent in real value. (A recovery in 1971 brought their real value almost back to the 1965 level, but in the first part of 1973 a resurgence of inflation depressed stocks again.)

Aside from major shifts in monetary policy, stocks also reflect the changing fortunes of business as the economy passes through the different stages of inflation. Earnings usually expand in the first stages of

¹ See John Hein, "A Note on the Use of Index Clauses Abroad," *Journal of Finance*, December 1960, 546-52.

inflation because costs lag behind selling prices. Later, in the decelerating stages of an inflation, costs may increase faster than prices do, putting a squeeze on profit margins. The rosy prospects for business earnings which emerge in the first stage of inflation may thus be dashed in a later stage by a profits squeeze, whereupon stock values may decline sharply. Over the business cycle as well, stock values tend to lead the movements in general business activity while selling prices lag, thus giving rise to out-of-phase cyclical movements.²

Over the long run, as adverse or favorable short-run developments come and go, adjustments delayed by lags have time to be completed. Whether stocks are early or late in responding to inflation does not matter to the long-term investor who does not attempt via short-run purchases and sales to anticipate the timing and magnitude of inflation. The main question to him is whether stocks withstand long-run depreciations of the currency. Stocks will provide the desired hedge if they adjust to inflation eventually, even if gradually.

World War II and After

How closely do stocks in fact move with prices in the long run? The period covering World War II and the subsequent quarter century provides a good test. For most countries this was a period with severe inflation at the beginning and the end and mild inflation inbetween. The response of stocks in this recent period is relevant to how they will respond in the near future. And the availability of data for this period allows a comparison of experience in a broad list of countries. Breadth is necessary to isolate the effect of inflation from numerous other influences on stock values. Movements in stock

values among countries are correlated but, in general, not closely.³

Table 1 covers all countries reporting stock and consumer price indexes to the International Monetary Fund. The table shows the annual percentage rate of change in the stock index, the rate of change in the price index, and in column 3 the difference, that is, the rate of change of the deflated stock index (because of rounding it may not exactly equal the difference between columns 1 and 2 as shown). Column 4 gives the cumulated percentage change in the deflated stock index over the period. To illustrate, stocks in the U.S. during World War II rose on average 2.7 per cent per year and consumer prices rose 6.0 per cent per year; hence in real terms stocks fell 3.2 per cent per year (after rounding). The total decline in stocks relative to consumer prices over the period was 25 per cent.

The total return to a portfolio of stocks is the rate of change in market value *plus* the dividend yield. The figures in Table 1 understate the total rate of return on stocks by the dividend yield.⁴ This is an undesirable omission, but data on dividend yields are unfortunately not generally available. We may conjecture, however, that the omission is not serious for present purposes, since the dividend yield is likely to vary among countries by far less than inflation rates do and not to be influenced greatly by the rate of inflation. The dividend yield is primarily determined by the rate of return to business equity and by the prospects for real growth in earnings.

Table 1 is in three sections, covering World War II, the postwar period to 1969, and the combined period. The prewar year of reference is 1939, except for three countries in which the stock index for that year was not available or another year seemed

² John Lintner examines short-run fluctuations in his forthcoming study, described in the 1973 *Annual Report of the National Bureau*, pp. 23-36.

³ See Duncan M. Ripley, "Systematic Elements in the Linkage of National Stock Market Indices," *Review of Economics and Statistics*, August 1973, 356-61.

⁴ From 1925 to 1970 annual average dividend yields of industrial shares varied largely between 3 and 7 per cent in the U.S. and between 4 and 7 per cent in Great Britain.

more appropriate in order to include the entire inflationary movement. The first section ends in various years around 1950, for each country in a year which captures most of the wartime rise in stock values and excludes the Korean War upsurge. The year 1969 was the latest available at the time of computation. The index link for Japan from before to after World War II is questionable, but Japan has been included for completeness.

During World War II stocks depreciated

in real value in most of the countries. The wartime depreciations can be readily understood in terms of short-run business conditions. Profits sagged for a variety of reasons including wartime controls and taxation, and stocks fell in real value. Not until peace restored normal conditions did stocks recover sufficiently to begin to make up for the wartime inflation.

In the postwar years, shown in the second section of Table 1, stocks in most countries rose substantially. How much of this

TABLE 1
Stock Values and Consumer Prices Since Pre-World War II

Country	Period	Rate of Change (per cent per year)			Total Change in Deflated Stock Values (per cent)
		Stock Values	Consumer Prices	Deflated Stock Values	
WORLD WAR II					
Australia	1939-49	4.9	4.6	0.3	3
Austria	1937-50	7.0	11.6	-4.6	-45
Belgium	1939-50	7.6	11.6	-4.0	-35
Canada	1939-50	3.2	4.6	-1.4	-14
Denmark	1939-48	3.1	5.5	-2.4	-20
Finland	1939-49	7.6	20.6	-13.0	-73
France	1939-50	19.7	26.9	-7.2	-55
India	1939-50	1.4	10.0	-8.6	-61
Ireland	1939-50	3.5	5.4	-1.9	-19
Italy	1939-50	24.7	34.9	-10.2	-67
Japan	1936-50	6.5	38.2	-31.8	-99
Mexico	1939-48	12.6	12.9	-0.3	-3
Netherlands	1939-50	5.7	7.2	-1.5	-15
New Zealand	1939-48	5.4	4.0	1.4	14
Norway	1939-48	5.3	5.5	-0.2	-1
Peru	1939-50	-0.1	13.4	-13.5	-77
Portugal	1939-50	-0.4	6.7	-7.1	-54
South Africa	1939-50	6.4	4.2	2.3	28
Spain	1940-51	2.4	10.7	-8.3	-60
Sweden	1939-49	2.6	4.1	-1.5	-14
Switzerland	1939-50	1.4	4.2	-2.8	-26
U.K.	1939-50	3.2	5.1	-1.9	-19
U.S.	1939-48	2.7	6.0	-3.2	-25
Venezuela	1939-49	6.6	7.3	-0.7	-7

(continued)

TABLE 1 (continued)

Country	Period	Rate of Change (per cent per year)			Total Change in Deflated Stock Values (per cent)
		Stock Values	Consumer Prices	Deflated Stock Values	
POST-WORLD WAR II					
Australia	1949-69	5.0	4.3	0.8	16
Austria	1950-69	11.1	4.6	6.6	247
Belgium	1950-69	3.2	2.4	0.8	16
Canada	1950-69	7.9	2.4	5.5	183
Chile	1950-69	25.5	26.4	-0.9	-15
Denmark	1948-69	3.8	4.2	-0.4	-8
Finland	1949-69	11.1	5.5	5.6	207
France	1950-69	9.9	4.7	5.2	169
Germany	1950-69	13.3	2.2	11.1	718
India	1950-69	1.5	4.0	-2.5	-38
Ireland	1950-69	6.4	4.0	2.5	60
Israel	1950-69	8.9	8.4	0.4	9
Italy	1950-69	8.1	3.3	4.7	146
Japan	1950-69	13.5	4.7	8.8	535
Mexico	1948-69	4.7	5.2	-0.5	-9
Netherlands	1950-69	7.5	3.6	3.9	110
New Zealand	1948-69	4.7	3.6	1.2	28
Norway	1948-69	1.5	3.7	-2.2	-38
Peru	1950-69	1.3	8.5	-7.2	-74
Philippines	1950-69	1.7	2.4	-0.7	-12
Portugal	1950-69	7.2	2.5	4.7	145
South Africa	1950-69	7.1	3.1	4.0	114
Spain	1951-69	5.5	5.4	0.1	3
Sweden	1949-69	8.0	4.0	4.0	125
Switzerland	1950-69	6.2	2.3	3.9	110
U.K.	1950-69	7.5	3.9	3.6	98
U.S.	1948-69	9.0	2.1	7.0	334
Venezuela	1949-69	3.5	1.4	2.1	52

(continued)

postwar appreciation was a catching up to the wartime depreciation? The final section of Table 1 combines the war and postwar periods to reveal the long-run response to the wartime inflation. These figures are plotted in a scatter diagram in Chart 1, with the extreme points labeled. It is clear that stocks generally appreciated more in the countries with extreme inflation (India and Peru are the main exceptions).

Countries with inflation rates less than five per cent per year generally lie above the 45-degree line (Denmark and Norway are the exceptions), which means that stocks appreciated in real terms (and by even more than shown here if dividends are included). Among these countries with low inflation rates, there is *no* relation between the rate of increase in stocks values and in consumer prices. The rate of inflation was apparently

TABLE 1 (continued)

Country	Period	Rate of Change (per cent per year)			Total Change in Deflated Stock Values (per cent)
		Stock Values	Consumer Prices	Deflated Stock Values	
WORLD WAR II and POSTWAR					
Australia	1939-69	5.0	4.4	0.6	20
Austria	1937-69	9.5	7.4	2.0	92
Belgium	1939-69	4.8	5.8	-1.0	-25
Canada	1939-69	6.2	3.2	3.0	144
Denmark	1939-69	3.6	4.6	-1.0	-26
Finland	1939-69	9.9	10.5	-0.6	-16
France	1939-69	13.5	12.9	0.7	22
India	1939-69	1.4	6.2	-4.7	-76
Ireland	1939-69	5.4	4.5	0.9	29
Italy	1939-69	14.2	14.9	-0.7	-20
Japan	1936-69	10.5	18.9	-8.4	-94
Mexico	1939-69	7.1	7.5	-0.4	-12
Netherlands	1939-69	6.8	4.9	1.9	79
New Zealand	1939-69	4.9	3.7	1.3	46
Norway	1939-69	2.6	4.3	-1.6	-38
Peru	1939-69	0.8	10.3	-9.5	-94
Portugal	1939-69	4.4	4.1	0.4	12
South Africa	1939-69	6.8	3.5	3.4	175
Spain	1940-69	4.3	7.4	-3.1	-59
Sweden	1939-69	6.2	4.0	2.2	94
Switzerland	1939-69	4.4	3.0	1.5	55
U.K.	1939-69	5.9	4.3	1.6	61
U.S.	1939-69	7.1	3.2	3.9	224
Venezuela	1939-69	4.5	3.4	1.1	41

Source: International Monetary Fund, *Financial Statistics*, with some earlier data from United Nations, *Statistical Yearbook* and individual country reports.

(concluded)

too small to dominate over the other influences on stock values. Stocks were a satisfactory investment in these countries, despite the inflation, because their nominal values rose for a variety of other reasons more than enough to offset the depreciation of the currency.

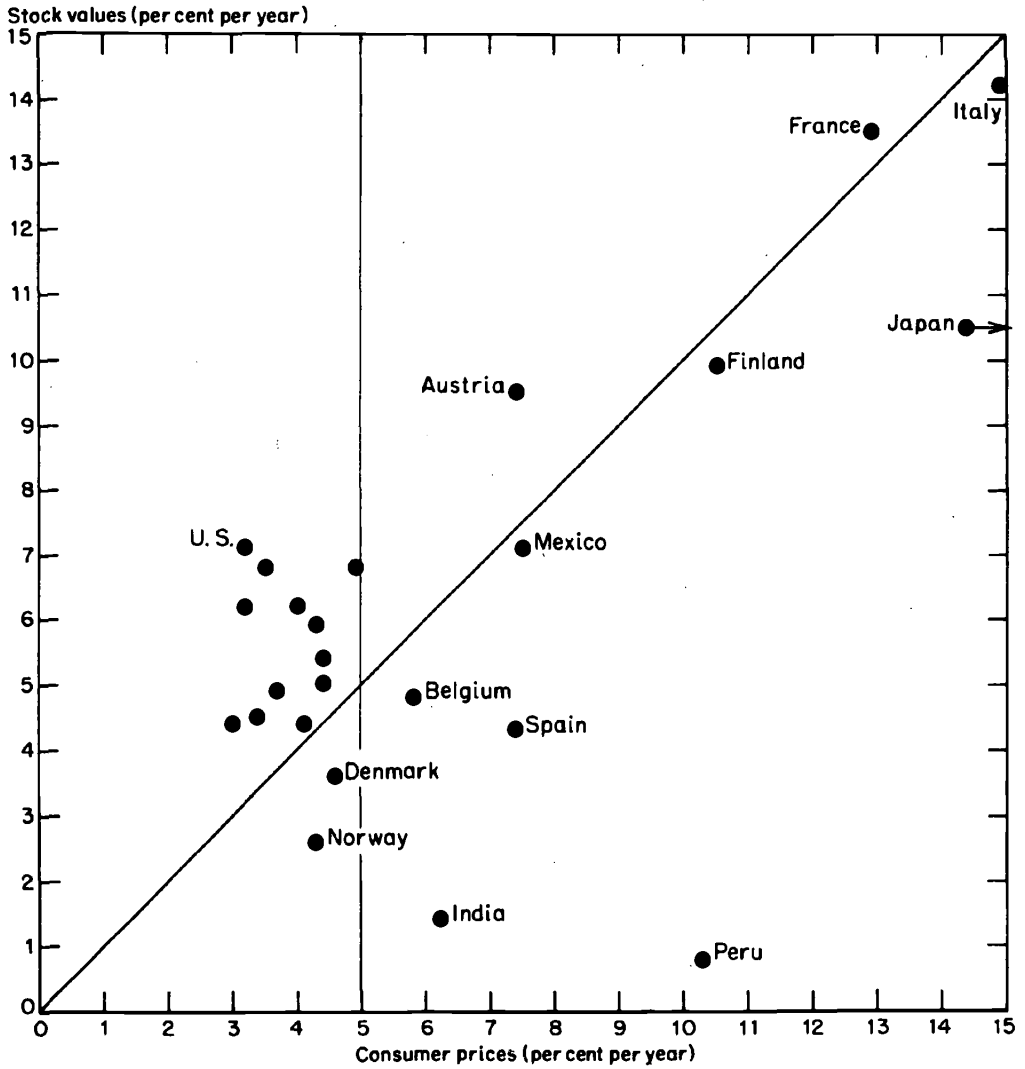
Countries with inflation rates greater than five per cent per year exhibit a covariation between the rates of change of stock values and prices, although stocks depreciated in real terms in all except Austria and France.

For these countries, ten in all, the Kendall rank correlation coefficient is $+0.53$ (significant at the .02 level).

Thus stocks eventually provided protection against the wartime inflation, but they took a long time to recover from the depreciation in the initial stages. Table 2 shows how long they took to make up for the World War II inflation. Although stocks in some countries kept up with the inflation almost from the beginning and by 1948 showed no depreciation in real terms (Aus-

CHART 1

Average Rates of Change of Stock Values and Consumer Prices,
Pre-World War II to 1969



tralia, Netherlands, New Zealand, and South Africa) and in some countries fell so far behind that they had not caught up by 1969 (India, Japan, and Spain), the recovery in most countries took until the early or middle 1950s and in some until the 1960s. The median year by which stocks recovered to their prewar real values was the mid-1950s—that is, it took a decade and a half to regain the lost purchasing power.

Pre-World War II

Data for a large number of countries do not exist for earlier periods, but a small group of major countries can be examined for periods as far back as the mid-1880s. Table 3 presents various combinations of the period since the mid-1880s for the U.S., Great Britain, Germany, and France, and later subperiods including six other developed countries. The beginning and ending years of the subperiods differ slightly among the countries in order to avoid starting or ending the period during a rapid movement in stock values. In most cases, however, the figures would not be altered greatly by adding a year or two at either end. Since consumer price indexes were not available for the full period or for all countries, the table uses the available index of wholesale prices, which may at times diverge appreciably from the consumer index. The stock indexes were confined so far as possible to industrial shares, omitting utilities and railroads which are often regulated and thus do not fare well in inflationary periods. The stock indexes also tend to favor the large well-established firms and may not, therefore, always reflect what happened to all common stocks.⁵

For the longer periods in Table 3, most stocks appreciated substantially in real terms and more than preserved the capital in-

TABLE 2

First Postwar Year from 1948 to 1969
in Which Deflated Stock Values
Exceeded Prewar Level

Country	Year
Australia	1948
Austria	1955
Belgium	1956
Canada	1951
Denmark	1960
Finland	1956
France	1955
India	None
Ireland	1963
Italy	1959
Japan	None
Mexico	1949
Netherlands	1948
New Zealand	1948
Norway	1956
Peru	None
Portugal	1964
South Africa	1948
Spain	None
Sweden	1951
Switzerland	1955
U.K.	1959
U.S.	1951
Venezuela	1952

vested. Since these figures omit dividends, total rates of return (dividends plus appreciation) were higher by the amount of dividends. Except for World War I, all the cases in Table 3 of depreciation in real terms would turn positive with the inclusion of dividends. Nevertheless, it is apparent that inflation was not a minor consideration but

⁵ The broader the index, the faster it is likely to rise because it includes newer and smaller companies which cover the faster growing sectors of the economy. For example, from 1896 to 1965 in the U.S. the Dow Jones Index of 30-odd industrials rose 4.8 per cent per year while the more comprehensive Standard and Poor's index rose 5.4 per cent per year.

TABLE 3
Stock Values and Wholesale Prices for Pre-World War II Periods

Country	Period	Rate of Change (per cent per year)			Total Change in Deflated Stock Values (per cent)
		Stock Values	Wholesale Prices	Deflated Stock Values	
<i>Pre-World War I</i>					
U.S.A.	1871-1915	2.2	-0.6	2.7	234
Great Britain	1867-1914	1.1	-0.3	1.4	96
France	1856-1914	0.4	-0.5	0.9	69
Germany	1856-1913	0.6	-0.2	0.6	59
<i>Mid-1890s to World War I</i>					
U.S.A.	1896-1915	4.5	2.1	2.4	57
Great Britain	1896-1914	0.2	1.6	-1.4	-22
France	1896-1915	2.2	2.0	0.1	2
Germany	1896-1913	0.5	2.0	-1.5	-22
<i>World War I</i>					
U.S.A.	1913-19	7.4	11.4	-4.0	-21
Great Britain	1913-19	8.7	15.6	-6.8	-34
France	1913-19	5.7	21.2	-15.5	-60
Switzerland	1916-19	-4.9	20.4	-25.3	-53
Japan	1915-19	15.9	22.3	-6.5	-23
<i>World War I and Postwar</i>					
U.S.A.	1913-40	3.2	0.4	2.7	108
Great Britain	1913-39	2.4	0.9	1.5	47
France	1913-39	3.7	7.5	-3.7	-62
Switzerland	1916-39	1.6	-1.6	3.1	106
Japan	1915-39	0.6	3.6	-3.0	-51
<i>Interwar</i>					
U.S.A.	1919-40	1.9	-2.7	4.6	164
Canada	1919-39	5.6	-2.8	8.4	440
Great Britain	1919-39	0.5	-3.5	4.0	122
France	1919-39	3.1	3.3	-0.2	-4
Germany	1924-39	-0.3	-2.9	2.6	47
Austria	1923-38	-4.3	-0.9	-3.4	-40
Netherlands	1919-39	-5.8	-5.3	-0.4	-8
Sweden	1924-39	1.0	-1.3	2.4	42
Switzerland	1919-39	2.6	-4.8	7.4	340
Japan	1919-39	-2.5	-0.2	-2.3	-37

Source: Various country reports.

absorbed a substantial part of the nominal appreciation of stocks.⁶

There is considerable variation among the countries in both nominal and real rates of change. The consistently high U.S. performance, reflecting the rapid growth of its economy in the past century, stands out. No doubt part of the variation among countries is due to deficiencies of the individual indexes, many of which are small samples and not entirely representative of all stocks and wholesale prices. But the variation also reflects the important fact that stock values are largely determined by business conditions and by profits which can behave differently than selling prices in the short run. As a result, stocks generally preserved their real value by rising faster than the rate of inflation, but their rate of rise here is not associated with the rate of inflation as in the later period (Chart 1).

How did stocks perform *vis-à-vis* bonds? Since bonds do not appreciate in an inflation, the market value of outstanding bonds depreciates in real value. In an inflationary period which is not anticipated, therefore, they are generally inferior to stocks, which do generally rise even though not at first so fast as prices. When prices decline, however, bonds become an investment which more than preserves the real value of the principal. Even so, for most countries in the deflationary interwar period, stocks had a higher return in real terms, assuming dividend and bond yields were roughly comparable. The choice between stocks and bonds depends, of course, on the rate of interest prevailing, expectations of inflation, and degree of preference for the greater stability of nominal bond prices.

Investments in land or property would have done better than stocks or bonds in some periods. Prices of tangible assets appear to follow prices of goods and services fairly closely.⁷ But such investments other than homes are more difficult to manage and are subject to considerable fluctuation and risk. They are not a practical alternative for the average investor.

Conclusions from the Historical Record

The common stocks represented in the indexes examined here have more or less maintained their real value over long periods of currency depreciation except mainly for hyperinflations and war devastation. But stocks may take many years to catch up to an inflationary episode. The rise in stock values among 30-odd countries during World War II was not related to the rise in prices, and in all but three countries (Australia, New Zealand and South Africa) stocks rose less. Stock values caught up after the war, but it took 15 years as a median time; and, except where the inflation had been sizable, the relation between inflation and stock values was obscured by other influences on stock values.

In short, the data presented here indicate that a comprehensive group of stocks will protect against inflation, apart from hyperinflation or wartime devastation, but not concurrently. Compared with bonds or other fixed-value assets, stocks if broadly selected pass the test as an inflation hedge only for long-term holdings. In the U.S., given those limitations, they have performed especially well.

⁶ Hyperinflations and wartime destruction present special extreme cases. In the German hyperinflation of World War I, stocks depreciated in real terms, according to the available data, by 82 per cent from 1913 to 1923. Unfortunately, because the index does not link over the currency reform in November 1923, we cannot determine how stocks stood after the reform compared with the pre-reform years. During World War II stock losses were severe for Japan and no doubt also for Germany, though a German index does not exist for that period either.

⁷ R. Goldsmith and R. Lipsey, *Studies in the National Balance Sheet of the United States*, Vol. I, NBER, 1963, pp. 176-77.

Note:

An appendix listing the individual price and stock series used in this study may be obtained from the author upon a request addressed to him at the National Bureau of Economic Research, 261 Madison Avenue, New York, New York 10016.

This is one part of a National Bureau project to study the effect of inflation on financial institutions and markets supported by a grant from the American Life Insurance Association.

The preliminary search and survey of sources was done by Doris Preston with the advice of Raymond Goldsmith. The compilation of data and checking of sources was done by Hanna Stern.

Miss Stern died in 1972 at a time when she was working on this study. She had compiled the earlier stock data for ten Western countries. I dedicate the study to her fine contribution of careful scholarship to this and many previous studies of the National Bureau.

The stock data for Japan were compiled by Naoya Takebe, an exchange scholar at the National Bureau during 1971-72 from the Japan Economic Research Center. Susan Tebbetts finished the compilation of wholesale prices and IMF data and prepared the tables.