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FACTS AND FACTORS IN THE RECENT EVOLUTION OF BUSINESS CYCLES IN THE UNITED STATES

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ABSTRACT

A reexamination of data indicates a great diversity of cyclical experience in both the distant and recent history, but also a distinct moderation of the business cycle in the postwar era (shorter and milder contractions). This is consistent with long and widely held views, but contrary to some recent claims.

A list of possible sources of the moderation is presented, and several hypotheses are examined. There is evidence that some structural shifts (in employment, not in the consumption-investment mix) had a net stabilizing influence. Institutional changes helped mainly by improving the functioning of the financial system. Automatic fiscal stabilizers played an important role. It is difficult to grade the record of macroeconomic policies because it is very mixed, and the active and passive elements in policy are both important and intermingled. Historical assessments and statistical tests suggest that this is true for both fiscal and monetary actions, which were often mistimed, misestimated, or mismatched. Still, some net stabilization was probably achieved. Also, the moderation of the business cycle itself induced some positive changes in expectations and behavior of private economic agents.

Most of these factors worked better in the first than in the second half of the postwar period, when cyclical instability increased along with rises in the levels and variability of inflation and interest rates.

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During the troublesome 1970s the old but temporarily dormant problem of the business cycle once again moved to the forefront of the economic profession's active interest. Among the most intensely debated issues is that of continuity vs. change in cyclical behavior. Are business cycles all alike? Have they changed in any systematic way and, if so, why?

This is the first in a sequence of two papers, the purpose of which is to review in a selective and critical way the recent developments and literature bearing on these questions. It examines the hypothesis that the U.S. economy was cyclically less unstable after World War II than before and concentrates on the role of structural, institutional, and policy changes. The second paper (Zarnowitz 1989) looks at the behavior of nominal and real wages, prices, and interest rates in the context of prewar alterations of inflation and deflation and postwar predominance of inflation.

I. Have Business Cycles Moderated?

1. Old and New Data Problems

The main novelties in the post-World War II business cycles include a shift toward longer expansions and shorter as well as shallower contractions in aggregate output and employment, combined with a persistence of inflation during peacetime recessions (see Zarnowitz 1985, section II.1, and Zarnowitz and Moore 1986). How well documented are these developments? What are their principal sources, consequences, and implications? Substantial work on these questions has been done in the last few years, much of it published in voluminous proceedings from a 1984 NBER conference (Gordon 1986a).

The earliest influential statement that a significant "progress towards economic stability" is under way was made by Burns (1960). Later data

confirmed in large measure Burns' analysis and projections, according to the new NBER studies (Gordon 1986b).

However, Christina Romer (1986a, b, c, d, and 1987a) presents new annual series for GNP, 1869-1918, and the unemployment rate, 1890-1930, and argues that the greater stability of U.S. economy in the postwar era as compared with the pre-1930 era is mainly a "figment of the data." She constructs estimates for the postwar period imitating the procedures used by the creators of the standard prewar estimates (Kuznets 1946, 1961; Shaw 1947; Lebergott 1964) and shows that these artificial data are about as volatile as the existing historical series. She then produces her own series for selected periods before the Great Depression, using regression index methods that in effect force the prewar data to reflect certain postwar relationships. Not surprisingly, these rearranged series are considerably smoother and have smaller cyclical amplitudes than the corresponding original estimates, being in both respects more similar to the postwar data.

It is certainly true, and well known, that the information and measurement techniques available to the pioneers in U.S. historical statistics were inferior to those that we have now. Yet it does not necessarily follow that simply imposing the recent patterns on the old data will improve the latter. Just to mention some of the assumptions that must hold true for Romer's methods to be applicable, her unemployment revisions require that the output-employment relations in each sector, the cyclicality of labor force participation rates, and the sectoral composition of employment all be the same in both the pre-1930 and post-1948 periods (Weir 1986). Yet at least some of these assumptions have already been falsified by the data. The same goes for the Romer GNP series where, e.g., the elasticity of GNP to commodity output in terms of deviations from trend is taken to be the same before 1918 as after

1948. The implicit theorizing behind these calculations ignores the structural and other changes that occurred in the economy over the past century.[1] More fundamentally still, Romer's estimation procedure precludes any possibility of stabilization, thus making her conclusion inevitable and prejudging the issue in question (Lebergott 1986).

In support of Romer's position (but not her approach), it can be said that much of the direct historical evidence consists of cyclically sensitive series, which would indeed exaggerate the fluctuations in the economy at large (as noted in Zarnowitz 1981). Although not overlooked by Kuznets and others who created the basic macroeconomic series for the United States, this problem results just from lacking data and so has no real solution short of introducing new pertinent historical information.

Regrettably, no one can create comprehensive historical time series where the required data simply do not exist. But several considerations suggest that the problem is less critical than it appears.[2] (1) Monthly indexes of commercial and industrial activity exist for the United States in trend-adjusted form since 1834, without trend adjustments since 1882. They have a broad coverage in terms of the industries and processes important at the time: manufacturing, mining, agricultural marketings, construction, railway freight-ton miles, electric power, foreign-trade volume. The sectors worst represented, notably private and government services, played a much smaller role historically than in the last four decades. (2) Before the 1950s, business contractions were typically accompanied by declines in financial and nominal aggregates or indexes: security prices, bonds and shares traded, interest rates, business failures, bank clearings, industrial and agricultural commodity and wholesale prices. The evidence from these series tends to confirm the evidence from indexes of real activity with regard to the

identification and dating of business cycles. (3) Further support for the historical chronology of business expansions and contractions created by the NBER comes from accounts of contemporary observers (business annals), the directional consensus of series on real and financial activity and prices (diffusion indexes), and chronologies independently derived by others (Burns and Mitchell 1946, ch. 4; Zarnowitz 1981).

2. Evidence on Changes in Volatility

Recent studies of whether the economy has become more stable in the post-Word War II era are generally based on estimates of short-term variability calculated from time-series data for selected macro variables. Typically, the authors use first differences in logarithms of the aggregates or deviations from long-term trends.

The detrended real GNP series had standard deviations of 2.1 in 1950-80, according to current Commerce data, and 3.4-4.5 in 1872-1928, according to the Gallman-Kuznets-Commerce estimates (Balke and Gordon 1986b). The corresponding Romer figure for 1872-1928 is 2.8, much smaller than the others but still significantly above that for 1950-80.

Confidence that business cycles have indeed moderated is strengthened by the evidence from other important time series. Thus the fluctuations in money and credit diminished markedly after 1945 as compared with the earlier era (Milton Friedman and Anna Schwartz 1963a; Benjamin Friedman 1986). Standard deviations of annual changes in real and nominal GNP, business fixed investment, and civilian employment were 2.1-2.4 times as large in 1891-1914 than in the post-World War II period, according to a list of estimates in Schultze 1986 (p. 61). For nonfarm aggregate hours worked, manufacturing production, steel production, and money supply (M2), the corresponding ratios are 1.7-1.8. The latter measures, based on relatively reliable data, still

indicate much greater stability in recent times. (Note that these comparisons exclude the perhaps uniquely volatile interval between 1914 and 1945, with its two great wars and the depressions of the early 1920s and the 1930s.)

Charts 1-3 help us compare the variability of real GNP, the wholesale price index and money supply M2 over subperiods of the last century. The division used here, 1875-1918, 1919-1945, and 1946-83, is restricted by the available data and suggested by the end years of World Wars I and II. To concentrate on short-run relative changes rather than longer trends and to counteract heteroskedasticity, series of log differences are used.

The graphs and the associated descriptive statistics (Table 1) provide strong indications that the rates of change in output, prices, and money (q, p, and m, respectively) all tended to be much less volatile after 1945 than in either of the two earlier eras. Thus, the standard deviations for 1875-1918 are about 1 1/2 - 2 times larger, and those for 1919-1945 are 2-3 times larger, than their counterparts for 1946-83 (Table 1, column 4, lines 1-12). The coefficients of variation, i.e., ratios of standard deviations to means, yield identical rankings of the subperiods (columns 4, 5, and 9). The interquartile ranges give similar results; the total ranges are very broad, suggesting the presence of large outliers, e.g., for output in 1875-1918 and prices in 1946-83.

The averages of q and m do not differ strongly across the subperiods, while the averages of p do, reflecting the mixture of inflation and deflation in 1875-1918, the prevalence of deflation in the interwar period, and the persistent inflation of recent times. For q, the medians exceed the means throughout and the skewness measures (not shown) are indeed negative in each case. For m and p, the distributions are skewed toward low values (negatively) in the 1920s and 1930s only (cf. columns 3 and 6.)

Besides having generally larger fluctuations, q, p, and m also show higher proportions of negative signs in the first seven decades covered than in the last four. The curves in Charts 1-3 fall much more often and further below the zero level in 1875-1945 than in 1945-83. In the latter period, aggregate level declines were relatively infrequent for real GNP and rare indeed for the broad indexes of producer (and consumer) prices and measures of the stock of money.

In contrast, interest rates generally became more rather than less cyclical at least since the early 1950s, i.e., the fluctuations in their level show increased persistence, amplitude, and conformity to business expansions and contractions. The rate on prime commercial paper is used here because this series is available over a long historical period in relatively consistent form.[3] The quarterly changes in this rate (i) show great volatility in 1875-1918, more persistence in the two later periods (Chart 4). This is probably due to the effects of the dissolution of the gold standard and/or the founding and activities of the Federal Reserve System (cf. Barsky, Mankiw, Miron, and Weil 1988).

A very conspicuous feature of Chart 4 is the sharp contrast between the amplitudes of i in 1933-53 (very small) and thereafter (first moderate, then rapidly increasing and very large). This reflects the strong heteroskedasticity of interest rates: the higher their levels, the larger their changes. The commercial paper rate fluctuated in a relatively narrow range in 1875-1918; followed a pronounced downward trend between 1920 and 1934; remained very low during the depressed 1930s, World War II, and the immediate postwar years; and finally moved in large and increasing swings around an accelerating upward trend in 1950-81 and fell sharply thereafter.

Clearly, the very high variability of the nominal interest rates in the second half of the post-1945 period is closely related to rising inflation, recurrent attempts to disinflate, and the resulting instability of inflationary expectations. In 1875-1945 inflation did not persist in peacetime but alternated with deflation. Indeed, it is only in the last quarter century or so that expectations of a "secular" inflation developed, driving up interest. The short-term sensitivity of the price level declined but recessions and major slowdowns typically induced temporary reductions in the rate of inflation, which presumably helped to make the recent movements in the general level of interest rates decidedly procyclical.

According to standard deviations of i, the variability of short-term rates was somewhat greater in 1946-83 than in 1875-1918 and the lowest in 1919-45 (Table 1, column 4, lines 13-16). The corresponding measures for log differences show a nearly perfect tie between the three subperiods, with standard deviations of about 0.13 for each of them. Thus, logarithmic transformations remove virtually all of the observed heteroskedasticity, and relative changes in interest rates are far more stable over time than the absolute changes.

3. Evidence on Changes in Cyclical Behavior

The measures discussed in the previous section are based on variations over short unit periods such as quarters or years, not on variations over intermediate periods of varying length that are characteristic of business cycles. They therefore reflect strongly the influence of short erratic movements and are probably better viewed as estimates of volatility than cyclicality. Moreover, they do not distinguish between expansions and contractions in economic activity. To examine changes in the durations and magnitudes of cyclical fluctuations, there is still no alternative to the reference cycle method applied in the historical NBER studies.

No systematic changes over time can be detected in the total duration of business cycles, which averaged about four years, give or take a few months, before and after World War II. This is particularly true when the wartime episodes characterized by extra long expansions are excluded (Table 2, col. 2). But the relative length of cycle phases changed dramatically: in 1885-1945, for example, business expansions were less than twice as long as contractions, in 1945-82 they were 3-4 times as long. Or to put it differently, the proportions of time in contractions averaged more than 30-40% in the six decades beginning in 1885 but only 20-25% in the four decades following 1945. This finding does not depend significantly on the incidence of wars or the few doubtful links in the chronology that may represent slowdowns rather than absolute declines in macroeconomic activity (columns 3 and 4).

Judging from the average percentage amplitudes of cyclical declines (C) and rises (E) in industrial activity and employment, contractions became not only much shorter but also much milder in the post-World War II cycles (cols. 6 and 9). Expansions also moderated greatly but less than contractions, so the E/C amplitude ratios increased (cols. 5-8 and 7-10). These changes are large and quite unlikely to be statistical artifacts, although they may well be overstated because of the differences between the historical and recent data.

Table 3 lists the average durations and amplitudes of fluctuations in the levels of the four variables whose quarter-to-quarter variability was examined above with the aid of charts 1-4. Also included here is the series of current-dollar GNP estimates, which helps to document that prices and values were historically no less cyclical than quantities. However, GNP had no declines after 1960, nor the producer price index after 1967 (Table 3, lines 3 and 6).

The shift toward longer expansions and shorter contractions can be seen clearly by comparing the post-1945 duration measures for nominal and real GNP, prices, and interest rates with their counterparts for the pre-World War I and interwar periods (columns 5-6). History shows that monetary aggregates had declines associated with major business contractions, which are few and far between, and only slowdowns marking the milder recessions. Indeed, M2 (and M1) had no declines of any cyclical persistence at all after the 1948-49 recession (lines 10-12). The period 1918-38 featured the longest, the post-World War II era the shortest and least frequent, cyclical downswings in all cases (as well as for several other related variables that were examined).

For all but one of these series, too, the declines were on average the largest in the interwar and the smallest in the post-1945 era (column 8). The exception is the commercial paper rate where these ranks are reversed. The same relationship applies to the per-quarter amplitudes of fall (column 10). The differences in size among the average rises are relatively smaller and less systematic across the variables (columns 7 and 9). Worth noting, however, are the large percentage amplitudes of expansions in income, output, and prices during the interwar period and in interest rates during 1946-83.

4. Qualifying and Interpreting the Results

The main point emerging from this examination of the data is that the hypothesis of reduced cyclical instability in the last forty years receives broad support from independently compiled series on several principal aggregative variables. The underlying historical data come from well-known sources: for real income, Gallman and Kuznets; wholesale prices, Bureau of the Labor Statistics; money, Friedman and Schwartz; interest rates, Macaulay and the Commercial and Financial Chronicle. Balke and Gordon 1986a present quarterly series on levels of these (and other related) variables.

The least dependable of the historical estimates under review are probably those for quarterly real GNP. Balke and Gordon obtained them by interpolating the annual series with the index of industrial production and trade from Warren M. Persons 1931 for the period 1875-1930 and the Federal Reserve industrial production index for 1931-45. The method of interpolation is state-of-the-art and well employed, but the quarterly series used as interpolators have, inevitably, limited and selected coverage.[4] However, comparisons of more reliable annual output series produce qualitatively similar conclusions (cf. Baily 1978, esp. pp. 13-18).

It is true that inconsistency of coverage over time argues against relying on comparisons of historical series of aggregate output alone, hence it is useful to examine changes in long and reasonably consistent series on individual production series in physical units as in Romer 1987b. Here standard deviations of first differences in the logarithms of data on 11 agricultural goods, 14 mineral products, and 13 manufactured commodities are presented for the "prewar" (1889-1914), "interwar" (1922-39), and "postwar" (1947-84) periods.[5] The prewar-to-postwar ratios for these measures average 1.2, 1.1, 1.5, and 1.2 for farming, mining, manufacturing, and all products, respectively. The corresponding statistics for the interwar-to-postwar ratios are 1.8, 2.0, 1.4, and 1.8. I interpret these results to indicate a tendency for these series to show less volatility in the post-World War II era than in the quarter century before World War I and the highest volatility in the interwar years. In my view, the overall evidence clearly supports this ranking[6], even though Romer herself prefers to stress that the prewar-postwar differences are small.

Moreover, it is important to recognize that moderation of business cycles does not necessarily require a diminution over time in fluctuations of

individual products or even industries. Even with no change in the dimensions of these movements, a shift in the relative importance from sectors characterized by large fluctuations to sectors characterized by small fluctuations would reduce the overall instability of the economy. As is well documented, the structure of the economy has indeed undergone a major shift of this nature (cf. Zarnowitz and Moore 1986; Zarnowitz 1989). The share in total output and employment of services that have low cyclicality has increased gradually but very strongly at the expense of the share of goods whose cyclicality is in general much higher. In terms of employed labor in particular, the weight of agriculture fell most dramatically from very high levels, but the relative declines of mining and manufacturing were also large.

Other developed economies followed in time along similar historical trends. Sheffrin 1988 compares the historical and recent dispersion of annual growth rates in output for six European countries. His estimates based on GNP or GPD data are all larger for 1871-1914 than for 1951-84, but the differences are small, except for Sweden. Backus and Kehoe 1988 add several countries for which relatively good and long annual data on national income are available. They find that the standard deviations of detrended log output series were 1.1 to 2.5 times larger in the pre-World War I years than in the post-World War II years for Australia, Canada, Norway, Sweden, and the United Kingdom. Comparable ratios for series of log differences tend to be somewhat larger. The corresponding estimates for the United States are near the upper end of the range, 1.8 - 2.1. Denmark, Germany, Italy, and Japan show mostly lower prewar/postwar output volatility rates (0.8-1.3) but here the statistics appear to be less reliable. The variability of output in most countries was much higher in the interwar period than in the postwar period, with ratios ranging from 1.0 to 3.2 for the detrended series and from 1.2 to 3.6 for log differences. For U.S., the figures are 3.9 and 3.1.

In sum, there are good reasons to agree with Weir (1986, p. 365) whose conclusion from comprehensive tests and a critique of Romer's results is that "To the simple question of whether cyclical fluctuations around trend in GNP and unemployment have become smaller since World War II the data are more than adequate to deliver a definitive answer: yes." Similarly, Balke and Gordon 1986, after discussing several alternatives and presenting a new regression index for real GNP, 1869-1908, based on Romer's "backcasting" method but using in part different data and additional explanatory variables, find "not a shred of evidence to support the view that the greater volatility of real GNP before 1929 is 'spurious'" (p. 3).

The debate has been instructive, even though inevitably hampered by deficient data. My own view is that the historical series are indeed more likely to err in the direction of too much than too little volatility. But this bias is (1) not all necessarily "cyclical"; (2) partly offset by shifts in weights that tend to favor the cyclically more stable sectors; and (3) almost certainly too small overall relative to the observed changes to refute the hypothesis of a significant stabilization in the postwar period. This position is consistent even with the evidence from comparisons between the pre-war and postwar periods alone. (The interwar period certainly shows an especially high degree of variability, but this is hardly sufficient to establish that it should therefore be treated as unique or anomalous.)

II. What May Have Caused the Changes in Cyclical Behavior?

1. A List of Hypotheses

Part I argued that the hypothesis of reduced economic instability is supported by a comparative analysis of a variety of pre- and post-World War II

data for the United States. What are the possible sources of the observed moderation of the business cycles?

Several explanations have been proposed or are possible. They can be identified briefly and grouped broadly, as follows.

I. Structural changes in the private economy:

   A. Shifts toward cyclically more stable components of demand.

   B. Shifts toward cyclically more stable industries, occupations, and incomes.

II. Increase in the size of government, a sector that does not decline in recessions.

III. Institutional changes:

   A. Rise of the fiscal "automatic stabilizers" -- procyclical income taxes, countercyclical transfer payments and welfare benefits.

   B. Postdepression financial reforms such as federal insurance programs for bank deposits, savings and loan accounts, and mortgages. The role of deposit insurance in reducing financial crises (combined with discretionary lender-of-last-resort actions).

   C. Private stabilizing arrangements--pension plans, maintained corporate dividends.

IV. Discretionary policies:

   Increased role of countercyclical polices-- fiscal or monetary or both -- with direct and indirect net stabilizing effects through

   A. Reductions in the variability of aggregate demand (nominal GNP).

   B. Reductions in the variability of aggregate supply in response to the greater stability of demand.

   These effects can be interpreted as a change in the propagation mechanism (see V below) or smaller shocks to the economy (see VI.1 below).

V. Gains in learning and confidence:

A. Consumers and businessmen learn from history (which reflects the working of factors I-IV above) to expect less cyclical instability in the future.

B. Their greater confidence leads them to modify their behavior in ways that help stabilize the economy.

VI. Smaller shocks to the economy:

A. Decreased shifts to aggregate demand (nominal GNP) due to countercyclical, and counterinflationary discretionary policies, institutional and structural changes, and gains in confidence (I-V above).

B. Decreased shifts in aggregate private demand (consumption, investment, exports) due to greater stability in preferences and/or accumulation of wealth and capital.

C. Decreased shifts in aggregate supply due to greater stability in technical progress and/or expectations of profits.

VII. Gains in technology, information, and knowledge:

A. Reduced inventory fluctuations through better management techniques (using advances in economic models, data production and analysis,

B. Fewer major policy errors (such as persistent moves in the wrong direction). Better guidance from economic advisers, forecasters.

VIII. Changes in the flexibility of wages and prices:

A. Business contractions of the past aggravated by deflation and deflationary expectations.

B. Money wages and price stickier in the postwar era.

C. On balance, the greater stickiness makes for more stability.

2. Some Observations and Plan of Procedure

The above list is purposely inclusive, and there are some overlaps, as indicated. Some of the hypotheses are widely accepted (notably III); some are much discussed but also very controversial (II, IV, and VIII); and still others are mere possibilities, little explored and perhaps remote (VI, 2 and 3; VII). All are at best partial, more than one may be valid, and none need be dominant. Hence the proper strategy is not to test them against each other, but rather consider that they may apply in some combination. Ideally, one would wish to quantify the contributions of all factors that prove relevant, but this very ambitious goal is well beyond our present reach.

The last set of hypotheses list (VIII) concerns matters of great analytical importance and difficulty. As shown in part I, there is evidence of decreased cyclical variability not only of real output but also of nominal wages and prices in the postwar era (even while inflation came to stay). However, it turns out that there is no simple relationship between these developments. Price flexibility may be stabilizing or destabilizing, depending on the prevailing conditions, specifically the size and volatility of inflation or deflation as wll as the sources of the disturbances to the economy. These topics are treated in a separate companion paper (Zarnowitz 1989).

Part III, which follows directly, deals with the first two topics on our list, i.e., structural changes and the expansion of government. Part IV examines the third set of hpotheses under the heading "institutional changes and financial instability." Part V looks at the role of macroeconomic policies and related changes in the behavior of private agents (sets IV and V). I shall have little to say about the other possibilities listed under points VI and VII. The last part of the paper sums up the results.

III. Structural Changes and the Size of Government

1. Components of Expenditures

Real consumer expenditures on durable goods have large fluctuations most of which correspond well to business cycles at large, allowing for some tendency to lead (See Table 4, lines 1 and 7, for a summary of the interwar and postwar evidence). In contrast, consumption of nondurable goods and services shows relatively small cyclical movements even in the turbulent interwar period, rising and falling on the average about one third as much as the durables (cf. lines 1 and 2). In 1947-83, nondurable goods had only a few declines, none longer than one quarter, and services rose continuously at growth rates exceeding substantially those of goods consumption.[7]

The main reason for the observed sharp differences is simple: durable goods are accumulated, render services and depreciate over time, and their purchases are postponable. Hence, the sensitivity to business cycles of these puchases is typically high. There is no reason why this relationship should have varied over time or should not persist in the future. The demand for services is relatively stable in part because services cannot be stored. The nondurables fall in between. Of course, major depressions would be associated with larger declines extending to nondurable goods and services as well.

New and replacement demands for plant and equipment (business fixed investment) and housing (residential investment) give rise to outputs of durable capital goods and structures, which, like the consumer durables, have large fluctuations and high conformity to business cycles. In 1919-41, the cyclical swings in business investment (producers' durable equipment and nonresidential structures) were huge, exceeding those in household investment (consumer durables and housing). In 1947-83, movements in all these

aggregates were on the average more nearly equal in percentage terms. That is, the reductions in the relative amplitudes between the interwar and the postwar periods, while all very large, were much greater for business investment than for household investment (compare the corresponding entries in columns 7 and 8).

The cyclical conformity of the investment series was high both before and after World War II (columns 1-4). Inventory investment, though always very volatile, also moved in both periods in a basically procyclical fashion, but much more irregularly.[8] Timing shifted to longer leads at peaks in the postwar era (columns 5-6).

Studies that employ variance-analytic methods produce further information, with generally similar results. When total fixed investment is defined to include consumer durables as well as producers' durable equipment and residential and nonresidential structures, its variance accounts for about one quarter of the variance of real GNP in the interwar and postwar periods alike (Gordon and Veitch 1986, pp. 299-300). However, the components of this broad concept of private investment show much larger covariance in 1919-41 than in the recent era. The contribution of nonresidential structures fell and that of consumer durables rose strongly.

Further, the covariance between total investment and the rest of output was large and positive in 1919-41, small and negative in 1947-83. This is consistent with the notion that government spending crowded out some investment in postwar years.

Inventory investment remained volatile but typically procyclical in both the interwar and postwar period (Blinder and Holtz-Eakin 1986). It continued to play a major role in the recent business cycles, especially at turning points and in contractions. Indeed, the variance of inventory investment

increased after World War II, while that of final sales decreased strongly.[9] These findings are not surprising, since the recent era was one of relatively short and mild aggregate fluctuations and it has long been known that inventory changes are particularly important in just this type of cycle (Abramovitz 1950).

Compared with the mostly moderate cycles of 1919-29, the share of inventory investment was larger in the postwar GNP contractions but smaller in expansions. This, plus the appearance of long leads of inventory investment at peaks of the recent business cycles, may reflect an increase in the importance of "autonomous" spending (in the sense of Nurkse 1954), as suggested by Abramovitz 1986. Such spending would follow a rising trend and include much of government purchases (notably for defense) as well as some relatively stable elements of private fixed-capital formation that do not depend signficantly on income.

This offers an occasion to note that there is little in these results to encourage the hypothesis that better inventory control reduced instability (see point VII.1 on our list above). The variability of output tends to exceed that of final sales in all periods, which is difficult to reconcile with the popular buffer stock model in which inventory adjustments are supposed to smooth production in the face of random shocks to demand.[10] Presumably, inventories are held in large part for other reasons, notably to facilitate production at all its stages and counteract the (procyclical) delivery lags and uncertainties of vendor performance. Not only are the supply or cost disturbances often important, but the demand shifts will generally be persistent rather than random and very short. The evidence is mixed on whether the adjustments of inventories to changes in sales have became more prompt and complete. And, as already noted, inventory investment overall apparently grew more rather than less volatile in the postwar era.[11]

Has the structure of GNP by type of expenditure changed so as to contribute to the observed moderation of the business cycle in the postwar period? Such a change could take the form of a shift from the highly variable investment to the relatively stable consumption components. But the estimates in Table 5 show that the average share in real GNP of consumption of nondurables and services actually declined from about 65% to 54% between 1919-41 and 1947-83. Half of the resulting gap was offset by the rise from 18% to 24% in the combined share of consumer durable goods and gross private domestic investment (the only investment component to show a relative decline was nonresidential structures; cf. columns 2 and 4). The other half was taken up by the increase in government purchases of goods and services,a generally acyclical GNP component, from 17% to 22%. In the private sphere, then, the shift would appear to have been in the destabilizing rather than stabilizing direction (the role of increased government is considered below).

It is true that the GNP shares themselves show some cyclical variations: during business recessions the percentage of consumption usually increases, that of investment decreases. The results reported in Table 2 reflect in part the fact that long and severe contractions occurred in the interwar but not in the postwar period. However, these differences are mostly small and irregular.[12]

It seems at least safe to eliminate the changes in the consumption-investment mix of the private demands on output as a major source of the reduction in cyclical instability.

2. Shifts in the Structure of Employment

The trend towards services affected primarily the cyclical variability of employment rather than output. Employment in service industries increased much faster than employment in the production of goods at least since 1929,

while labor productivity grew much less in the former than in the latter sector (Fuchs 1968). More generally shifts in the industrial composition of employment were generally from the categories that are highly recession-prone to those that are not, and the same goes for shifts in the distribution of personal income by major sources and types and for shifts in the occupational structure of the labor force (see Zarnowitz and Moore 1986, pp. 536-551; Gordon 1986b, pp. 18-19).

Table 6 sums up some of these trends. The share of employment[13] in agriculture dropped enormously in the past century (col. 1). Farm output is not particularly sensitive to fluctuations in aggregate demand but farm prices are, and alternations of financial prosperity and distress in agriculture played a considerable role in the historical record of business cycles. The share of the generally cyclical industries producing mostly "goods" but also some important capital-intensive "services" (manufacturing, mining, construction -- also, transportation, communications, and public utilities) peaked at slightly more than 40% in 1948-53 and declined since to near 30% (col. 2). The proportion of government employment rose from approximately 4% to 20% (col. 3).[14] The rest of the private sector consisting of trade, finance, insurance, real estate, and services in the narrower sense (professional, personal, business and repair services) gained steadily from near 20% to about 45% (col. 4). These activities are on the whole not very cyclical. Together with the government, they accounted for about 23% in 1869, 44% in 1929-37, and 64% in 1979-81 (col. 6).

No one questions the rise in importance of services broadly defined, both private and governmental; indeed, similar trends are observed in other highly developed economies as well. What is not so clear is just how much was the business cycle affected by all this, and when.

DeLong and Summers 1986a estimate that the standard deviations of annual log differences declined between 1893-1940 and 1947-82 by 67% for total GNP and 56% for private nonfarm GNP (pp. 685-86). Both reductions are very large and may be overstated, just as other estimates based on the admittedly weak pre-World I GNP data, but what matters here is that the difference between the two figures is not large. Using only these and a few similar measures, the authors in effect dismiss summarily all "accounting explanations" (i.e., the linking of the change in cyclical variability to structural shifts) as being of little importance. But their method and estimates are open to serious criticism, particularly because they consider only the changing roles of agriculture and government, and ignore the great increase in the weight of private service industries.[15]

The shrinkage of agriculture had little effect on the variability of economic activity in the United States, whereas the growth of government did exert a stabilizing influence (as recognized in DeLong and Summers 1986a and Zarnowitz and Moore 1986). Between 1869 and the 1930s, the shares of both the "volatile" and the "stable" parts of nonfarm private economy increased to about equal levels (each accounted for some 34% of employment in 1929-37, see Table 6, lines 1-3). This helps explain why the structural shifts in that period had no visible net moderating effect on business cycle contractions before World War II. Only after 1950 did the combined weight of the more cyclical sectors in the private nonfarm economy decrease significantly (column 2). It is highly probable that this development made the recent macroeconomic slowdowns and declines milder than they would have been otherwise.

It is noteworthy that public and private services, as a broadly defined category, while scoring great gains in terms of employment, grew but slowly in terms of output. According to the present Commerce statistics in 1982

dollars, services already accounted for 41% of real GNP in 1929, with the share of goods being 43% and that of structure 16%. In 1985, the corresponding estimates are 46% services, again 43% for goods, and 11% for structures.

Between the years 1929 and 1933, real GNP dropped 30%, output of goods 32%, structures 67%, and services only 13%. The annual data show no declines at all for services in any of the eight business contractions of 1948-82 (Table 7, line 1). This is in sharp contrast to the output of goods (both final sales and inventory change) and structures. Although their weight declined, structures suffered large contractions, which contributed to the severity of the recessions since the late 1960s (see Table 7, part A, for more detail).

When quarterly data are used, services show only five declines in 1951-82, all but one short and all small. Even when inventory change is excluded, goods had 25 declines, five of which equaled or exceeded two quarters. Structures fell 20 times, including 12 episodes that lasted 2-9 quarters. On average, the percentage declines in services were little over half the size of those in goods and one quarter the size of those in structures (Table 7, part B.).

In sum, the hypothesis that structural shifts contributed to the moderation of postwar business cycles should be neither rejected nor viewed as self-sufficient. It is neither more nor less than a partial explanation that leaves much room for the other hypotheses.

3. The Effects of Increased Government

Some economists, including most prominently Keynes 1936, believe that a decentralized market system can suffer long periods of deficient aggregate demand and high unemployment. If so, larger government, merely by adding to

employment and demand, can raise the average level of macroeconomic activity, provided that the public and private sectors are on the whole complementary rather than competitive.[16]

To classical equilibrium theorists, this view is simply untenable. To mainstream economists of various persuasions, it will appear inconsistent with the idea they share that the steady state or long-run condition of the economy tends to be one of full-employment equilibrium. However, it is possible to accept the hypothesis as valid for some particular episodes, even while rejecting it as a general proposition. The case in point is the comparison between the Great Depression and World War II.

Eisner 1986 presents a recent formulation of the argument that higher real defense and other government expenditures raised the Hicksian "floor" level of real GNP during the recessions of the postwar era and kept output longer at or near the full employment "ceiling" during the expansions. The story begins after the depressed 1930s when huge increases in defense spending and then mobilization helped to restore full employment in World War II. After demobilization, the civilian part of the government remained much larger than it had been before the war; moreover, the military part started growing again before long as new hostilities developed.

During and after the war, public debt and private incomes and liquid assets all rose sharply, while shortages resulted in much pent-up demand. Hence, consumers were able and willing to spend freely on goods (particularly durables) that became available with the reconversion of productive capacities to peacetime needs. U.S. government aid to the war-ravaged allied and former enemy countries was a major factor in their recovery and the reinvigoration of trade. Private investment, stimulated rather than crowded out by the growth of government outlays, consumption, and exports, was also strong most of the time.

However, other parts of the economic history of the last half-century do not fit well into an account that stresses the stabilizing role of large government. Surely some policy actions have adverse macroeconomic effects, and the larger the government the greater is its capacity to generate large disturbances of this kind. Each of the major wars raised the level of aggregate demand for some time, but each also generated large and serially correlated shocks to output and prices. The rise in inflation associated with government monetary policies was recognized as the main threat to the economy in the late 1960s and the 1970s. The intermittent attempts to disinflate added to the cyclical instability of this period and the early 1980s. Government was increasingly perceived as too large and too costly, interfering with more efficient markets and hence often destabilizing.

Governments are complex and their "size" is difficult to define, let alone measure. The share of GNP represented by government purchases of goods and services, however, provides one estimate of the public sector's weight in economy. Table 8 shows how this ratio, labeled G/Q, varied at successive business cycle peaks and troughs in 1920-38 and 1948-82. The purchases G, in real terms, fell in 1919-20 from high World War I levels and rose in 1940-41 to high World War II levels; they also bulged during the Korean and Vietnam wars.[17] Apart from these episodes, though, G generally trended upward in business expansion and contraction alike. Given the declines of real GNP (Q) in recessions, the acyclical behavior of G translates into a mildly countercyclical behavior of G/Q. That is, the ratio tends to be higher at troughs than at peaks, as indicated by the averages at the bottom of the table.

Do these data suggest a net stabilizing effect of government's contribution to GNP? Only in a strictly limited sense. First, there is nothing new

about this relationship. Total federal expenditures rose as often during recovery as during recession in the ten business cycles of 1879-1914 as well as in the four cycles of 1921-38 (Firestone 1960, chs. 4 and 5).[18] Second, the peak-trough differences in G/Q were more regular and generally larger in 1920-38 than in 1948-82 (cf. columns 3-4 and 7-8). In the interwar cycles, each trough ratio exceeded the ratios at both the preceding and the following peak, while in the postwar cycles this was not always the case. (Of course, the G/Q ratios were most of the time larger after than before World War II.)

IV. Institutional Changes and Financial Instability

1. Federal Budget since 1869: Growth and Cyclicality

According to Firestone (1960), persistently large federal budget deficits occurred in the period 1879-1945 only during the two world wars and in the depressed 1930s. A balanced budget was viewed as a requirement of sound fiscal policy, at least in peacetime. Surpluses rose during expansions when the tax base broadened, declined and occasionally yielded to deficits during contractions when the tax base narrowed. Thus, stabilizing elements of fiscal response to cyclical change may well have existed for more than a hundred years, but they played a minor role as long as the federal budgets were small in relation to the economy and had very small and mostly positive balances.

Table 9 documents the huge growth of the federal budget (receipts and expenditures) from 2-3% of GNP in 1869-1914 to 5-6% in 1920-38 to 17-23% in 1948-82.[19] Receipts exceeded expenditures by less than one percent of GNP in both the peak and trough years of the six business cycles of 1869-94 (columns 1-2). In the six cycles of 1895-1914, the federal budget was on the average in balance, with deficits of less than 1/2 of one percent of GNP at peaks and

troughs alike (columns 3-4). Small surpluses prevailed in 1920-27, larger deficits in the depressed 1930s (columns 5-8).

In 1948-61, the budget was in the red during recessions and in the aftermath of the Korean war but still in the black at other times. However, the surpluses were relatively small even at the top of the cycle, except for 3.2% in 1948 (cf. the averages in cols 9-10). During the long expansion of the 1960s there were only two years of balanced budgets and one of a surplus, five of much larger deficits. Since 1970, deficits occurred in each year, ranging from less than one percent of GNP in the peak years 1973 and 1979 to more than 4% in the trough years 1975 and 1982 (cf. columns 11-12).

The peak-trough differences reflect the cyclical or "passive" component of the measured deficit, which varies as changes in economic conditions affect federal tax revenues and transfer payments (whose volume and weight rose immensely in the postwar era). The cyclical deficit is closely associated with changes in the relationship between personal disposable income and total income (GNP). In recessions, taxes fall more than proportionately with income and transfer payments rise as more people collect unemployment insurance and some other benefits such as those affected by welfare programs and social security. Real disposable income, therefore, declines much less than real GNP and may even keep growing slowly. In expansions, disposable income rises less than GNP because of the faster growth of taxes and the decline in transfers.

Regressions of annual changes in real aggregates suggest that each one-dollar rise (fall) in GNP raised (lowered) disposable income by 76 cents in 1898-1926, 95 cents in 1923-40, but only 39 cents in 1949-82 (DeLong and Summers 1986a, p. 694). These are rough estimates owing to the weakness in the early data, but there are no good reasons to doubt the existence of a significant difference of this sort between the pre- and post-World War II periods.

2. Automatic Stabilizers

The cyclical changes in personal and corporate tax receipts, unemployment benefits, and to a lesser extent some other taxes and transfer payments represent the "automatic stabilizers" that rose to prominence in the first two decades of the postwar era. The term sums up what is probably the most familiar and widely accepted of the hypotheses that attempt to explain the moderation of business cycles after World War II.[20] The personal income tax emerged as the largest source of federal revenue with a progressive rate structure, hence as the main stabilizer. The corporate income tax, though much smaller and more nearly proportional, is more elastic cyclically because corporate profits rise and fall strongly (much more than any other type of income) when the economy expands and contracts. At the same time, the flow of dividend payouts to stockholders tends to be generally well maintained. Large stabilizing effects on disposable income of changes in corporate and personal taxes and transfer payments were found early by econometricians (Duesenberry, Eckstein, and Fromm 1960).

Insofar as households' earnings effectively limit their expenditures, the diminution of the response of disposable income to cyclical changes in GNP implies a dampening of fluctuations in consumption. Although the liquidity constraints probably declined in this generally prosperous postwar period as consumers' wealth and credit-worthiness rose, it is not surprising that they still appear to affect aggregate consumption substantially (as shown in Flavin 1981). Presumably many households of modest means and uncertain prospects simply cannot save enough during expansions or borrow enough during contractions to make their outlays as smooth and independent of current incomes as envisaged by the basic versions of the permanent-income and life-cycle theories.

According to estimates from an annual macroeconomic model, the multiplier effects on real GNP of an exogenous increase in real government expenditures fell from 3.2-5.1 in 1926-40 to 1.6-2.5 (Hickman and Coen, 1976, p. 194). This is based on a simulation of high-employment conditions in the prewar period: data unadjusted for the massive unemployment and excess capacity in the 1930s produce much higher prewar multipliers yet. The strong decline in the multipliers is attributed entirely to the built-in stabilizers of the tax-transfer system, i.e., to the strong reduction in the marginal response of real disposable income to real GNP. The consumption function itself was not a source of the observed stabilization. The prewar multipliers are much larger than the postwar ones for each of the ten years of simulation, but particularly for years 4-5 when they peak (see ibid., pp. 187-197).

DeLong and Summer 1986, p. 694, approximate disposable income before 1929 as total income minus total government revenues and gross corporate internal saving. The marginal response of disposable income to GNP, estimated in real terms, was .76 in 1898-1916, .95 in 1923-40, and .39 in 1949-82. These regressions provide additional evidence consistent with the hypothesis that automatic stabilizers strongly reduced the variability of disposable income and hence consumption in the postwar era.[21]

The federal government budget surplus in constant dollars declined in each period of cyclical decline in real GNP since 1948, according to the contemporaneous Commerce data (Table 10, columns 1-3). Most of the earlier declines reflect shifts from a surplus to a deficit (1948-49, 1957-58, 1960, 1969-70), the later ones reflect rising deficits (1953-54, 1973-75, 1980, and 1981-82). The intervals listed in column 1 correspond closely to, but are not always identical with, the NBER-dated business contractions. The swings to deficits were generally large, averaging nearly 70% of the declines in output

(see the averages at the bottom of the table). The 1953-54 recession looks like an exception, but this is because the deficits had already increased during the preceeding 1952-53 phase of the Korean war.

In contrast, during expansions the budget in real terms moved from a deficit at the trough to a surplus at the peak (1954-57, 1958-60, and 1960-69) or, more recently, from a larger to a smaller deficit (1970-73, 1975-80, and 1980-81). To this there are two exceptions, however. In 1949-53 the change was toward a somewhat larger deficit, which again is attributable to the effects of the Korean war. The expansion that began in late 1982 was accompanied by an exceptionally large deficit buildup. When this last sui generis and incomplete phase is omitted, the mean change in the real federal surplus is +23, positive but small (less than 8% of the rises in output).

It is important to recognize that comparisons based on the quarterly dates of cyclical peaks and troughs in real GNP ignore intraphase variations, which are often large for the volatile surplus/deficit series. It is appropriate for our purposes to concentrate of cyclical movements, but caution is required, especially in dealing with long phases. A memo included in Table 10 shows the results of a variant approach which recognizes the major slowdown ("minirecession") of 1966-67. It suggests that fiscal policy actions tended to be very stimulative in 1960-67, restrictive in 1967-69. For 1960-69 as a whole, the former effects prevail. However, further analysis of the data does not indicate the need for more disaggregation over time.[22]

The active and passive components of the budget deficit, due respectively to fiscal policy actions and changes in the economy at large, are of course unobserved, and it is an important caveat that the distinction between the two is difficult to define and implement statistically. The active component is identified with the full-employment or structural surplus (deficit). That is,

estimates of how taxes and expenditures react to macroeconomic change are used to calculate what the budget balance would be if all labor force were employed at the prevailing incentives to work and all existing capital were in use. Then the cyclical component is taken to equal the difference, full-employment deficit minus actual deficit. But the basic assumptions of this approach, that the trend of the economy is one of full employment and separable from business cycles, have been questioned. Measures of the economy's potential, whether in terms of output or employment, are of uncertain quality, hence so are the related fiscal variables, probably a fortiori.

Despite these problems, the fiscal decomposition calculus yields some interesting uniformities. The changes in the passive component of the federal surplus are all negative during recessions and almost all positive during expansions (Table 10, columns 5 and 10). These estimates suggest a strong prevalence of automatic stabilizing effects. The active component (columns 4 and 9) declined in all contractions except 1953-54, but generally much less than the passive component (the reverse is true only for 1948-49 and the 1966-67 slowdown). In expansions, rises and declines in the active component nearly cancel each other out, producing a mixed and weak record. On the whole, then, the active component contributed much less than the passive component to the movement in the total surplus/deficit.

Estimates of this type may overstate the benefits from automatic stabilizers because they fail to pay explicit attention to the role of inflation. Government tax receipts, expenditures, and budget balances all depend not only on real economic activity but also on prices and nominal incomes. Thus, according to the Holloway 1987 estimates scaled to the size of the economy and the budget in the early 1980s, the deficit rose by $25-30 billion when the unemployment rate increased by one percentage point and fell

by $7-9 billion when the inflation increased by one percentage point; each $100 billion increase in current-dollar GNP lowered the deficit by about $34-38 billion. These results imply automatic stabilization, given a procyclical movement of inflation. But when inflation accelerates during a recession, as exemplified in 1974, there is less of a shift toward a greater deficit and therefore less of a stabilizing (or more of a destabilizing) effect.

During each of the four business recessions of 1970-82, a period of long spells of high inflation and supply shocks, nominal GNP typically continued to rise while real GNP declined. In these years, the progressivity of personal taxes geared to current-dollar incomes acquired the perverse effect of pushing people into higher tax brackets even though their real incomes had fallen. In 1981, large reductions in marginal tax rates were enacted and tax indexation was introduced to begin in 1985. Deficits still moved countercyclically through the recession of 1981-1982 but they remained unprecedentedly high during the business expansion of 1983-87, averaging 4.6% of GNP (equal to the trough year 1982 and much higher than in any previous postwar recession).

In sum, the stabilizing effects of cyclical changes in the budget appear to have been very important in the 1950s and 1960s, as recognized at the time. They were probably significantly reduced by inflation and the "bracket creep" in the 1970s, and by an accelerated, long rise in deficits and the attendant worries about the long-term consequences of this new trend in the 1980s.[23]

3. Financial Crises, Banking Panics, and Deposit Insurance

Some of the worst business declines of the pre-World War I and the interwar periods were associated with major financial crises. Typically, these events followed a speculative boom and collapse of prices of certain assets and involved an abrupt curtailment of credit and scramble for

liquidity. Many crises spread from Europe to the United States or in the opposite direction. Kindleberger 1978 provides an extended list of these episodes, which for England and France goes back to 1720. Table 11, drawing on this chronology, shows the dates of eight U.S. crises (and the preceding speculative peaks) from 1818-19 through 1929 (part A, lines 1-2).

Most but not all of the crises accompanied business cycle downturns (compare lines 1-2 and 6-7). The speculative booms or "manias" occurred usually late in business expansions, but 1818, 1836, and 1920 represent apparent exceptions. They culminated in crashes, i.e., sharp declines in asset prices or large business or bank failures, and sometimes in panic rushes to liquidate the speculative assets in favor of money. These events followed the business cycle peaks in 1857, 1893, 1907, 1921, and 1929 by intervals of 2-5 months. In 1873, the crisis preceded the NBER peak date by a month; the 1819 and 1837 episodes fall in years of contraction.

Morgenstern 1959, pp. 541-555, presents and discusses an annual chronology of international stock exchange panics and supplements it with lists of monthly high and low stock index values. These panics involve massive and rapid sales of stocks at falling prices. The high and low dates for seven Wall Street debacles on Morgenstern's list are shown in Table 11, lines 3 and 4, along with two additional declines, in 1920-21 and 1930. In each of these cases, the market dropped sharply, as documented by the entries in line 9. Four of the nine declines have no counterparts among Kindleberger's financial crises (cf. lines 1-2 and 3-4). The stock market peaks in 1873, 1890, and 1907 led business cycle downturns by 8, 2, and 4 months, respectively, those in 1893 and 1929 lagged by one month each, and those in 1884 and 1931 occured in mid-contraction (cf. lines 3 and 7).[24]

A number of severe business contractions were associated with banking panics, that is, great surges in bank failures, runs on banks, fears of further failures, and often widespread suspensions of convertibility of deposits into currency. For the period covered by their monetary history, Friedman and Schwartz (1963b, chs. 2-5 and 7) identify and discuss the panics of 1873, 1884, 1890, 1893, and 1907, as well as the banking crises of 1930 and 1931 that led to the final great panic and the nationwide banking holiday in March 1933. But cumulative bank failures and panics culminating in restrictions on cash payments can be traced back as far as 1814 and 1818, before and during the long depression of 1815-21. They also occurred in 1837, after a downturn that followed the curbing of a monetary expansion, inflationary boom, and speculation in public lands; and in 1857, when a boom in commodities, railroad shares, and building sites broke down sharply in mid-year, to be followed by a business downswing through 1858.

No financial crises occurred for one third of a century after 1933, despite the tumultuous nature of this period, which witnessed one short but severe depression (1937-38), the inflations and disruptions of two wars, and five busness contractions in 1945-60. Federal insurance of bank deposits, effective since the beginning of 1934, prevented bank panics by radically reducing both bank failures and the depositors' fears for safety of their money. The Federal Deposit Insurance Corporation assumed responsibility for losses of insolvent banks and the public soon learned that it no longer bears these losses. Most ailing banks, particularly the large ones, were reorganized or merged with sound banks to avert failure. The FDIC is a rare example of a clearly and promptly successful reform measure. Commercial bank suspensions averaged 635 per year in 1921-29, 2,274 in 1930-33, 54 in 1934-42, and 4 in 1943-60 (Friedman and Schwartz 1963b, Table 16, p. 438). Total

losses to depositors fell 95% between 1930-33 and 1934-42 and melted further to neglible amounts in 1943-60.

Despite its evident benefits, federal deposit insurance is by no means an unmixed blessing, since it reduces the bankers' need to be careful and the depositors' incentives to be watchful. Overindebtness and undercapitalization are serious macro problems for banks and thrift institutions, poor management and fraud are serious micro problems. Risks that look acceptable in good times often turn out to be excessive when conditions deteriorate, and there is little that government supervision can do about it. Banking panics are a major aggravating factor but not a necessary part of either financial crises or general business downturns.

4. Financial Instability After the Great Depression

The depression of the 1930s produced a large reduction in private debt and a temporary rise in financial conservatism. Fears of an imminent depression were widespread and persistent in the commentaries and forecasts of the late 1940s. World War II financing left the economy awash in Treasury securities, that is, high-quality liquid assets. The long-term trend in the composition of commercial bank portfolios during the postwar era was toward loans at the expense of security investments. Gradually the liquidity ratios of banks and corporations declined, and the volume of business and consumer loans held in the financial sector rose; but in the 1950s and the early 1960s liquidity was still high overall and the level of debt was still relatively low.

It is this prevalence of favorable balance-sheet conditions in the private economy that is credited with the absence of financial crises in the first two decades of the postwar era (Minsky 1980; Wolfson 1986, pp. 190-192). In addition, the strong growth of government and aggregate demand,

output, and profits presumably helped, as did the fact that inflation was still restrained. Such financial disturbances as did occur were brief and mild.[25]

The first post-depression financial crisis widely recognized as such occurred in 1966 and involved a high degree of disintermediation--withdrawals of funds from savings and loan associations and banks for direct investment in the money market. The flow of credit to nonfinancial corporations fell as much as 40% in the second half of the year. Monetary policy turned very tight in May and eased only in late August and September, after banks were forced to liquidate large amounts of their investments in government and municipal securities. Yet no general business contraction developed, despite the sharp declines in the growth rates of bank reserves and money, the shrinkage and high cost of credit, and the drop in housing. Total output and employment merely slowed down in what became known as the "minirecession" of 6/1966-10/1967 (the dates are from Moore 1983, p. 460).

Each of the next four crises (or crunches) did occur during a business contraction, as shown in Table 11, part B. Each was triggered by a particular shock: the bankruptcy of the Penn Central Railroad in June 1970; news about the effective insolvency of the Franklin National Bank in May 1974; troubles with the First Pennsylvania Bank and crisis in the silver futures market in March 1980; the Penn Square Bank failure and the confidence crisis connected with large bank losses on loans to government security dealers, energy producers, and some less developed countries in May-August 1982.

5. Business Cycles and Crises

The disruptive events varied but the economic and financial developments that preceded and followed them had some important common characteristics. The precrunch periods witnessed high levels of real investment but declining

corporate cash flows, hence increased demands for credit. Corporations had to borrow funds not only to finance the growing backlog of ongoing investment projects and rising inventories but also to meet payments on increasingly burdensome debts. Banks suffered growing losses on their business loans and tightened their lending, particularly to new customers. Prior restrictive actions of monetary authorities added substantially to the pressure on banks in some cases (1966, 1980) but not in others (1974).

The concomitants and aftermath of the crisis--high interest rates, falling investment, liquidation of credit-- always affect real economic activity adversely, but in varying degrees reflecting differences in public policies and private expectations. A prompt intervention of the Fed as a lender-of-last resort and easing of monetary policy is the one recognized way to end the immediate crisis and cut the resulting losses.

Some accounts of the role of financial instability stress endogenous developments that follow each crisis and are temporarily remedial but then inevitably bring about new imbalances and another crisis. After credit supply and business activity turn down, the excess debt is gradually paid off and liquidity is restored, which paves the way for an economic revival. However, during long phases of predominant expansion and prosperity, debt tends again to accumulate slowly to insupportable levels, primarily of short-term issues. Eventually, the developing shortage of reserves and liquid assets, and the increasing riskiness of financial positions, create growing pressures on banks to raise the price and reduce the availability of credit. At this point, the financial system is highly vulnerable to shocks, and a cutback in the flow of credit, whatever its particular immediate cause, is likely to spread and depress investment and output. (Cf. Minsky 1977, 1980; Sinai 1976; Eckstein and Sinai 1986).

General developments of this type are indeed familiar to economic historians, and the instability of bank credit is an old and major theme in the literature. But it is important to recognize another lesson of history, namely that many business contractions, including some of great severity, were not associated with either massive sellouts of illiquid for cash assets or just the imposition of tight rationing on bank loans (some examples are found in Table 11). In short, business cycles do not require financial crises or credit crunches, though they may be aggravated by them.

Moreover, financial problems no less grave than those associated with recessions can arise during business expansions without disrupting their progress. This is well demonstrated by two recent events: the drain of uninsured deposits from the Continental Illinois National Bank in May 1984, and the run on state-insured savings banks in Ohio in March 1985.[26] These incidents show (1) that the system remains sensitive to confidence crises, and (2) that the latter can be prevented from spreading into major panics by credible insurance of deposits and, when needed, lender-of-last-resort actions of supplying additional reserves to banks.

Nor are major stock-exchange panics however severe, a necessary or sufficient cause of business contractions. The first post-depression panic and the largest single-day market crash occurred on October 19, 1987-- fifty-eight years after the previous record decline, that of October 28, 1929. It followed upon a three-year boom in common stock prices that greatly exceeded the scope of the concurrent expansion in output and profits and eventually could not be justified by any reasonable prospects of further gains in the foreseeable future. While some warnings of an impending global disaster appeared in the press, most professional forecasters only reduced their predictions to show lower but still positive growth next year (Zarnowitz

1987). The actual outcome was merely small dips in the more sensitive components of real consumption and investment around the end of 1987. Fifteen months after the crash, the economy was still expanding and near full employment. The market itself, however, remained weak at significantly reduced trading levels, although stock prices regained some of the lost ground in a slow and erratic upward drift.

6. Some Measures of the Effects of Crises

Among the main consequences of a financial crisis or panic is a sharp increase in the frequency and average size of bankruptcies. Total liabilities of business failures more than doubled in each of the six crises of 1884-1933 (counting 1929-33 as one episode) and more than quadrupled on two of these occasions, in 1893 and 1920-21 (Table 11, A, line 8). They were relatively low and stable in the early postwar period but increased strongly in each of the four business contractions since 1970 (Table 11, B, line 6).[27]

On average, failure liabilities rose 126% during the "credit crunch" years of the period 1957-1982, which is about 2/3 of their mean amplitude for the financial crisis years of 1884-1932 (Table 12, lines 3 and 4). The earlier episodes were shorter so that the contrast in terms of the average amplitudes per month is greater, approximately 4 to 10.

The declines in stock prices varied from 17% to 52% for the "panics" of 1873-1931 and from 11% to 43% for the "bear markets" of 1957-82 (Table 11, A, line 12, and B, line 7). The postwar-to-prewar average ratio of total amplitudes is here again close to 2/3, that of the mean per-month amplitudes close to 4/10 (Table 12, lines 8 and 9). In sum, the stock market declines of 1957-82 were longer but smaller and gentler than those associated with the historical crises or panics. The contrast is reduced but not entirely eliminated when the panics of 1929-31, which are by far the sharpest, are treated as a separate category (the 1987 episode could also be so treated).

The overall variability of stock returns was exceptionally high during the 1930s but not significantly different in the periods before the first and after the second world war (Officer 1973; Shapiro 1988). This is taken by Shapiro to indicate a lack of stabilization in real economic activity in the postwar period. But this argument is not persuasive because (1) it is based entirely on indirect evidence and depends on the closeness of the relationship between stock prices and real activity, which it overstates, and (2), it ignores the possibility of a change in this relationship, e.g., that the market has grown more sensitive to movements in cyclical and policy indicators.[28]

As documented in Schwert 1988, the evidence is weak that the volatility of macroeconomic variables (real and money growth, inflation and interest rates) can help predict the volatility of stock returns, while the opposite chain of influence is somewhat stronger. In 1929-40, the stock market variance increased much more than the variance of macro indicators, but the contrary prevailed in periods of war and earlier financial crises or banking panics. In relation to aggregate economic activity, stock prices are primarily important as an expectational or symptomatic, rather than a causal, factor, despite their presumed effects on real investment (cf. Fischer and Merton 1984). Comprehensive stock price indexes compare well with other individual leading indicators of business cycles, but their performance is often marred by excessive volatility.[29]

Finally, let us consider changes in the ratio of deposits to currency (D/C) as an indicator of changes in the confidence depositors have in safety of their "money in the bank." Widespread fears concerning uninsured deposits cause runs on the banks: massive conversions of deposits into currency that lower D/C. Indeed, declines in that ratio occurred in each of the banking

crises or panics of 1890-1933 as well as in 1920-21 and 1929, while 1873 and 1884 witnessed at least slowdowns in the rising trend of D/C (Table 11, A, lines 5 and 10).[30] On the other hand, the deposit-currency ratio increased in each of the postwar credit crunches, except 1966 and 1973-74 (Table 11, B, lines 1 and 8). The contrast between the historical and recent behavior of D/C extends to the signs of the mean total and per mouth amplitudes of the ratio (Table 12, lines 11-15).

This evidence simply confirms that the FDIC reform succeeded in eliminating one important source of aggravation in past business contractions, namely recurrent and cumulative panics. For banks, drops in D/C meant losses of both deposits and reserves, transitory rises in the deposit-reserve ratio D/R, and an urgent need to acquire liquidity. As banks strove to obtain cash reserves and reduce demand liabilities, D/R usually turned down, joining the decline of D/C in exerting a downward pull upon the stock of money. The argument that monetary authorities could have countered these adverse effects with sufficiently large and prompt increases in the base or high-powered money (C + D) is difficult to evaluate, since such increases have not occurred. History suggests that banking panics were as a rule followed by disruptive contractions in money and credit (cf. Cagan 1965, pp. 223-228). It is possible that the ability of monetary policy to cope with severe crises of this type has improved, but finding out whether this is so could be very costly and it is fortunate that the Fed was spared such tests for a long time now.

To sum up, the disorders in markets for speculative assets and credit were substantially less frequent and less grave in the postwar era than in the interwar and earlier periods. Financial disturbances are related to shifts in the demands for real and liquid assets and as such have mixed sources -- real,

monetary, and expectational. They also have mixed effects in that they can contribute to real as well as monetary instability. The financial crises or credit crunches identified in Table 11 were generally associated with relatively large up and down movements in growth rates of both real GNP and M2, as can be verified by inspection of Charts 1 and 3. In both series the variations are visibly smaller after World War II than before. The financial system functioned more smoothly in recent times, in large measure because of the effective deposit insurance and absence of general banking panics, and the net overall effect of this on real economic activity was certainly stabilizing and significant. However, we should be careful not to overstate the relationship between financial crises and business contractions which has never been as central and close as some theories would have it.[31]

V. Macroeconomic Policies and the Business Cycle

1. Fiscal Policy: Motivations, Potential, and Record

The idea that government policies should be used to offset fluctuations in aggregate private demand was inspired by attempts to combat depressions of the interwar period.[32] Although the Employment Act of 1946 called for promotion of "maximum employment, production, and purchasing power," it took a long time before the objective of macroeconomic stabilization gained practical acceptance in the political process. Not until the Kennedy-Johnson tax cut initiative in the first half of the 1960s was tax policy deliberately used to increase employment.

There are well-known political and economic obstacles to effective use of discretionary countercyclical policies. Limitations of economic forecasting, and particularly the difficulty of predicting the timing of a downturn, are

such that it is usually late during or after a recession that the administration may decide to ask for a tax cut or a program of increased expenditures. Congressional action will require more time. Hence, even if the taxpayers and beneficiaries of federal expenditures responded promptly with more spending, which is uncertain, the total lag is often apt to be so long as to make the policy ineffective or even destabilizing. This would be so especially for short and mild contractions.[33]

The federal budget is the focus of conflict about the distribution of income and wealth as various interest groups attempt to influence its structure. Political pressures and perceptions of public interest interact with partisan interest and self-interest of elected and appointed officials in ways that elude any simple analysis. But the net effect of this clash of different motivations and pressures must surely be to impede consensus and impair the effectiveness of fiscal action as a tool for a discretionary stabilization policy.

True, the potential of fiscal policy to influence the economy has grown greatly in the last half-century with the vast expansion of the budget in real and relative terms, but the ability of the government to use this power for the public good has not. This is attributable partly to deficient knowledge, partly to conflicting interests, and partly to the increasing complexity of the government and its interactions with the private economy.

A review of the historical record yields evidence consistent with this argument. The label "too much too late" often applies to changes in federal expenditures, notably to the public works programs that operated with long lags, peaking in mid-expansions (Zarnowitz and Moore 1982). Some abrupt destabilizing changes in defense spending might have been avoided, as in 1953 when the cessation of Korean hostilities caused prompt and sharp cutbacks that

aggravated the 1953-54 recession. The budgetary policy of 1959-60 was excessively tight because of mistimed fears of inflation and high interest rates, plus overoptimistic forecasts of real growth. It is easy to see this in retrospect, and tempting to relate it to the weakness and shortness of the recovery of 1958-60 (cf. Lewis 1962). Federal expenditures on goods and services fell in real terms between mid-1968 and mid-1973, particularly during fiscal 1970. This may have contributed to the recession of 1970 (Gordon 1980, p. 145), although it did not appear to retard the expansion of 1971-73.

Tax policies fare better in post-mortem appraisals, but only partially.[34] The prompt raise of taxes in mid-1950 to finance the Korean war was a commendable move. In contrast, during the Vietnam war, which heated up in 1965, taxes were increased too late and inefficiently. The surcharge of 10 percent on the personal income tax, passed by Congress in 1968, was temporary and recognized as such; hence its main effect was to reduce saving rather than spending, in broad agreement with the permanent-income and life-cycle theories of consumption. (The expiration of the surcharge in 1970 also affected primarily the saving ratio, not consumption.) The tax cut of March 1975 was enacted into law at the very end of the 1973-75 recession. It was followed by futher reductions in 1975-76, but the March rebate was explicitly temporary and probably again not very effective (Blinder 1981). Altogether, repeated errors of fiscal policy added much to the woes of the 1970s, along with the wage-price controls and decontrols, and the oil shocks (cf. Blinder 1979, esp. chap. 7).

An activist "new economics" strategy was pursued in the 1960s to counter the "fiscal drag" attributed to overly high levels of the high employment surplus. New tax incentives to stimulate investment were legislated in 1962, large reductions in the personal income and excise taxes in 1964 and 1965.

The result was that the initially sluggish business expansion was strengthened and probably prolonged but also that the active component of real federal surplus fell strongly to remain negative ever since (cf. Table 10, columns 4 and 9). After 1965, the federal budget was in deficit each year but one (1969), i.e., during expansion and contraction alike. Had fiscal policies been guided by considerations of either macroeconomic stabilization or growth, they would have hardly produced this result.[35]

2. Readings of the Monetary Record

Historical assessments of monetary policy often implicitly proceed from the premise that changes in monetary aggregates are controllable by the Federal Reserve. This presumes that the Fed (1) can have a paramount influence upon the supply of money if it so chooses, and (2) should pursue the policy of targeting money supply, directly or indirectly via the monetary base. Thus the Fed is blamed for causing cyclical instability by allowing recurrent large accelerations and decelerations of the stock of money. Drops in the money growth rates are viewed as leading to major slowdowns as in 1966 or recessions as in 1957, 1960, 1970, and 1980-81; sharp rises, to "overheated" expansions as in 1967-68 and 1972-73 (for illustrations, see Gordon 1980 and 1987, chap. 14). Similar but much more persistent and grave errors of monetary policy would be held accountable for the greater cyclical instability of the past, most notably the "great contraction" of 1929-33 (Friedman and Schwartz 1963b, chap. 7).

Monetary policy is clearly more focused on short-term stabilization than fiscal policy is, for several reasons. The governing bodies of the Federal Reserve System, that is, the Board and the Open Market Committee, are relatively small and the influence of the chairman is often strong, so decisions can be reached much more quickly than in the Congress. The Fed is

less subject to political pressures, though its much debated "independence" is, for better or worse, effectively limited, mainly by the need to avoid clashes with the president and Congress. Conflicts between bureaucratic self-interest and public interest are probably less frequent and sharp here than in the fiscal area.[36] Yet, great obstacles to operative and timely monetary control remain as a result of deficient knowledge, uncertainty, and indecisiveness in the face of costly alternatives.

There is much that is simply unknown or not well understood about the role of money, notably to what extent it is active vs. passive (or exogenous vs. endogenous). Even economists who believe money matters a great deal disagree on how best to define it and agree that monetary policy operates with long and variable lags. Hence, uncertainty prevails about the proper timing of monetary actions, so policy makers may often differ on when to do what. There are always alternative forecasts with nonnegligible probabilities of occurrence, and alternative courses of policy, each of which imposes different costs on different classes of people (e.g., to cause more inflation means losses to fixed-income recipients; more unemployment, losses to some workers). Under these conditions, monetary policy makers will seek more evidence and consensus, delay hard decisions or proceed piecemeal. They will be unable to "take charge" in time so that their actions may be too weak to prevail or have too slow and hence unintended effects. Such outcomes have received less attention than they deserve.[37]

Another possibility is that the Fed is unwilling to assert active control over money. If its main concern is with the stability of interest rates and if the cyclical shifts in income and money demand are caused by fluctuations in the quantities of goods and services people want to buy, then money supply will simply accomodate these shifts.[38] In fact, these conditions were

probably often closely approximated in recent times. After having pegged interest rates at low levels to finance government needs during and after World War II, the Fed turned to the money market indicators in recurrent attempts to reduce movements in short-term rates and/or free reserves by open market operations. These operating procedures, which let money supply behave procyclically, were consistently attacked by monetarist critics. In the 1970s, the Fed set monetary aggregate targets as well as a federal funds target but observed mainly the latter. After October 1979, nonborrowed reserves were used for three years as the main target and interest rates began to swing widely, but the fluctuations in monetary growth also increased greatly. In effect, much of the time changes in the credit extended by banks determined the changes in the money supply.

In the second half of the post-1945 era monetary growth rates have been on the average larger and more volatile than in the first half, as shown clearly in Chart 3, part C. It is equally evident, though, that the relative changes in M2 were much more variable yet before World War I and, especially, in the interwar period (Chart 3, A and B). Was it the policy initiatives of the newly created Federal Reserve System that caused the apparent rise in monetary instability in the early 1920s and then, a fortiori, in the 1930s? And was it the improved Fed policy that caused the apparent post-World War II stabilization? The notion of such long periods of continuously poor, then continuously good performance seems rather farfetched. It is easier to explain the record by recognizing that monetary change is in large measure endogenous. But this does not by any means imply that Federal Reserve actions were unimportant. In particular, the fact that no significant periods of negative monetary growth rates occurred after 1948-49 is very probably related to successful preventive actions by the Fed. By the same token, the Fed must

also bear the responsibility for the inflationary upward tilt in money growth during the last thirty years (even after allowing for the "normal" amount of inflationary wartime finance).

3. Money and Economic Activity: Some Short-Run Dynamics

Changes in money and income are positively correlated, but do the effects of money on income dominate the effects of income on money or vice versa? For money to be dominant, it must have a demand function that is reasonably stable over time and a supply function that includes at least one critical factor independent of the determinants of demand. Under contemporary conditions it is the central bank that is seen as providing that factor through its control over the monetary base.

Evidence available through 1973 favored a simple and stable money demand function of the form

$$M_t - P_t = a_0 + a_1 Q_t - a_2 i_t + a_3 (M_{t-1} - P_{t-1}) + u_t^d, \quad (1)$$

where all variables are in logs and M, P, Q, and i denote the money stock, the price level, output, and the interest rate, respectively.[39] However, after 1974 equation (1) went astray by systematically overpredicting M1, specifically its largest component, demand deposits. This prompted an intensive but on the whole frustrating search for improved specifications (Judd and Scadding 1982.) After 1981 the apparent shortfall of the demand for M1 was replaced by an excess. The velocity ratio, GNP/M1, instead of following a long upward trend, started drifting downward. The probable sources of the observed instability of money demand are diverse and time-specific: financial deregulation and innovations, changes in the Fed's targets, the shift from rising to declining inflation.[40]

Money supply, consisting of outside money such as currency and inside money such as bank deposits, is the product of the money multiplier and the

monetary base. The multiplier μ depends on the reserve-deposit ratios chosen by banks (subject to any existing legal reserve requirements) and on the currency-deposit ratios chosen by households and firms. The base B (sum of currency and bank reserves) depends mainly on Federal Reserve dynamic and defensive operations. The theory predicts that money supply is positively related to i, the level of market interest rates (apart from any influence of i on the conduct of monetary policy).[41]

Attempts to estimate separately money demand and money supply functions encounter grave problems of simultaneity and identification (Cooley and LeRoy 1981). Suppose the Fed follows an interest rate stabilization strategy with the target value i_t^*. Then

$$i_t - i_t^* = \alpha B_t + \epsilon_t^i, \tag{2}$$

where $\alpha > 0$. If, as suggested by the earlier discussion,

$$\mu_t = \beta i_t + \epsilon_t^m, \tag{3}$$

then

$$M_t = \mu_t + B_t = b_1 i_t - b_2 i_t^* + v_t \tag{4}$$

where $b_1 = \beta + 1/\alpha$, $b_2 = 1/\alpha$, and $v_t = \epsilon_t^i - \epsilon_t^m$. Although i_t^* does not appear in equation (1), one cannot reasonably assume it to be independent of the unobserved determinants of money demand. If, say, money demand increases, exerting an upward pressure on i_t, then according to (2) the Fed will either accomodate the shift or revise i_t^* or use some balanced combination of the two moves. As this indicates, correlations are likely to exist between u_t^d and B_t, i_t and i_t^*, and u_t^d and v_t.

Monetary policy is more complicated than (2) implies: while often accomodative, it has at times attempted to be countercyclical. To approximate the latter case, allow for partial responses of B_t to output, Q_t, and inflation, $P_t - P_{t-1}$, both with negative signs. Incorporating (3) as well, the result is a money supply function of the following type:

$$M_t = c_0 + c_1 i_t - c_2 Q_t - c_3(P_t - P_{t-1}) + u_t^s. \quad (5)$$

This equation resembles (1) closely. In fact, the two include the same variables, except for lags that probably belong in both functions.[42] A reasonable inference is that shifts in the demand for money are apt to be related to shifts in the policy reaction functions or "monetary regimes" so that the two are difficult to separate (cf. Gordon 1984). Equations such as (5) may be used to distinguish roughly between systematic and random components of policy ($M-u^s$ vs. u^s). In some recent models of short-term economic fluctuations driven by "money surprises" this distinction is critical.

Theory cannot either prove or disprove the causal role of money in business cycles, but it does show when the conditions required for money to be the prime moving force do not exist. The volume of inside money can adjust to the level of real activity, and it is inside money in form of various deposits that constitutes the bulk of the total stock of money. The composition of monetary aggregates changes endogenously, and the stability of money demand is not assured. Another reason why money may be endogenous is that central bank policies are often accomodative.

The most probable explanation of the historical correlation of short-term changes in money and real activity is a composite one. First, much of the time both money and output respond to the common influence of the factors that drive the business cycle. This is merely another way of saying that the quantity of money supplied adjusts to the quantity of money demanded, which is a function of real income, prices, and interest rates, as in the above equations. It is practically impossible to distinguish this case from that of any direct effects of output or income changes on monetary growth. Second, some of the time monetary authorities take the initiative in altering the

course of money targets and the economy for better or worse. These actions are generally episodic but often important, hence of great practical and theoretical interest.

4. Economic Indicators and Policy Variables: Some Estimates of Their Interactions

Historical policy assessments provide information of episodic and qualitative nature. Statistical work can lead to more general and quantitative results and also help distinguish between the active and passive elements in the make-up of economic policies.

Consider a vector autoregressive (VAR) model, which includes output and monetary and fiscal variables, all taken in stationary form and with several lags. Evidence from quarterly series for the postwar period shows that output depends strongly on the policy-related variables. But such equations are badly misspecified because they omit important dynamic factors within the private economy. For example, Zarnowitz and Braun (1989) find that when the rate of change in an index of leading indicators ℓ (which excludes monetary and financial components) is added to a model that includes the rate of change in real GNP (q), any one of three measures of monetary growth (base, b; money stock, m_1; or broad money stock, m_2) and a fiscal index (G), then the monetary and fiscal effects on q are drastically reduced.[43]

The Zarnowitz-Braun equations, estimated on quarterly series for 1949-82, include up to six variables, the two additional ones being the rate of change in the GNP implicit price deflator (p) and the commercial paper rate (i).[44] Table 13 sums up and extends some of the main results of this study. The exogeneity (F) and neutrality (group t) tests based on the equations for q with four lagged terms in each variable show very strong positive effects of ℓ and strong negative effects of i (lines 1-3). Growth in the stock of money, whether measured by m_1 or m_2, influences q positively but much less,

whereas growth in the monetary base b makes no significant direct contribution. The fiscal index G affects q more, with coefficients that are predominantly negative. When charted, G is found to have risen in six of the seven contractions between 1949 and 1982 (the exception, 1953-54, is explained by the drop of defense spending after the upsurge of the Korean war period). This countercyclical movement presumably reflects the working of automatic stabilizers.[45] As for inflation (p), its role in influencing q remains undetected by these tests.

All variables in our equations except q and ℓ depend heavily on their own lagged values, but none are exogenous in the sense of being independent of the others (lines 1-12). The effects of interest rates, mostly negative, are particularly pervasive (column 5). The time trends are significant in most cases (column 7). There are some interactions between the monetary variables and the fiscal index G (lines 4-9). There is much inertia in prices, so that the inflation rate is highly autoregressive and not greatly influenced by short lags in other variables (line 10). Short-term nominal interest rates depend on changes in output and money (m_1), but not very consistently (line 11). Some interrelations appear between i, p, and ℓ .[46]

There is much interest in longer lags, and the results for some equations with eight lagged terms are presented in Table 13, lines 13-18. They must be treated with extra caution, however, as the estimation of so many parameters imposes much strain on the limited available data. Still, it is good to see that these tests do not differ greatly from those that use four lagged terms per variable. Lagged values of q and G and m_2 now influence q more strongly, and the monetary effects on p also increase, as would be expected. The leading index terms ℓ affect G and i as well as q. Interest effects remain important.

Table 13, part B, collects some test statistics for 1919-40, a short but particularly dramatic period in business cycle history. Here one must stress first the caveats about the weaknesses in the data and the small sample problem. On the fiscal side, only federal expenditures (gx) are used. The interwar leading index (ℓd) is inferior to the postwar index (ℓ).[47] Nevertheless, the results for the interwar period seem generally reasonable and in several respects similar to those for the postwar period. The lagged values of q and the monetary variables acquire more significance in the interwar equations (columns 1 and 2). Interestingly, ℓd is strongly influenced by the monetary variables, particularly m_2 (line 30), in part probably because ℓd includes stock price change. The role of ℓd itself is considerable (column 6). Inflation p neither depends on other variables strongly nor affects them strongly in these regressions (line 28 and column 4). The main interwar/postwar difference revealed by a comparison of parts A and B of the table lies in the effects of i on q, which show up prominently in 1949-82 but not in 1919-40. Presumably, the reason is that the interest rates had low levels and small variations in the interwar period, particularly in the depressed 1930s, much higher levels and larger changes in the postwar period, specifically since the late 1950s (see Chart 4, parts B and C).[48]

The test statistics summarized in Table 13 can be interpreted to mean that active and passive elements coexist in processes related to both monetary and fiscal policies. The estimates for the postwar period suggest that interest rates mattered on the whole more than monetary aggregates. This is consistent with monetary policy operating mainly through its effects on short-term nominal rates but does not necessarily imply that accomodative policies prevailed. The net inverse relationship between monetary growth and the lagged interest terms may to some extent reflect the Fed's strategy of trying

to bring on desired changes in the quantity of money demanded in response to the policy-directed interest changes. There is no evidence here of any consistent cyclical pattern in b or m_1 or m_2 or that any of these variables had systematically positive or negative effects on i.[49] The predominance of negative signs among the coefficients of lagged fiscal terms in the equations for q suggests a relatively strong role for automatic stabilizers.

The tests for 1919-40 as well as for 1886-1914[50] indicate that output was significantly influenced by lagged rates of growth in the stock of money, whereas the output-to-money links are not in evidence. In the interwar period, interest rate effects appear to have been very weak. The same applies to federal expenditures in both the interwar and the pre-World War I periods. The single factor that affects output most in both 1949-82 and 1919-40 is the change in a leading index which reflects largely real investment (and related production and employment) decisions. This result underscores the importance of the aggregate outcomes of these decisions and the expectations that drive them; it also cautions against the use for policy analysis of models that fail to include any indicators in this class (of investment in its early stages, profitability, etc.).

5. Economists' Assessments and Public Perceptions

The expected values of policy parameters vary for different theories, and the estimated values vary for different model specifications. Thus, fiscal policy effects are several times larger and more persistent in large-scale econometric models of the extended Keynesian income-expenditure or IS/LM type than in early reduced-form monetarist models (Christ 1975; Meyer and Rasche 1980). Such differences reflect not only theoretical disagreements but also the scope of the applied models, i.e., how they disaggregate the economy and what they take as exogenous. The long fiscalist-monetarist debate of the

1960s and 1970s generated much heat and frustration but eventually also some concessions on both sides: that fiscal policy probably has significant short-run effects on output and employment, and monetary policy has rather stronger and more lasting effects (for a collection of retrospective views, see Hafer 1986).

It this debate, government policies were generally treated as exogenous; but, in general, it must surely be true that they both influence the course of events and depend on the observed and expected changes in the economy. It is impossible to distinguish between the elements of response and impulse without a policy rule or reaction function, which amounts to treating policies as endogenous. This research strategy is indeed much favored recently, but it faces difficult problems. The technical ones include simultaneity and identification (as illustrated in section V.3 above). On the substantive side, supporters of the rules approach argue that policymakers should act according to a preannounced contingency plan to reduce uncertainty. Critics agree but say that this is normative, not positive economics: as actually conducted, most policies are discretionary, reacting to new developments in isolated, unpredictable ways (Sims 1982; for a countercriticism, see McCallum 1982).[51]

Recent equilibrium models with incomplete information predict that only unanticipated changes in money and nominal demand can have real effects (through price misperceptions they create). This approach yields the proposition that a monetary policy defined by a generally known feedback rule is "ineffective" in the sense that changes due to it are met exclusively by price adjustments (Lucas 1973; Sargent and Wallace 1975; Barro 1976). The "real business cycle" (RBC) models go further and essentially separate the evolution of real economic activity from changes in nominal variables (Kydland

and Prescott 1982; Long and Plosser 1983; King and Plosser 1984). Monetary policy plays no role in this subset of equilibrium models. Neither the incomplete-information nor the RBC models rule out real effects for discretionary fiscal policies and automatic stabilizers that react immediately to changes in the economy (McCallum and Whitaker 1979).

In contrast to these new "classical" models, the contemporary "Keynesian" models accept and try to rationalize the existence of wage and price rigidities in explicit or implicit labor-market and product-market contracts (Phelps and Taylor 1977; Fischer 1977; Okun 1981; Taylor 1983). Here business cycles are linked to fluctuations in aggregate demand and both anticipated and unanticipated policies, monetary and fiscal, are potentially effective. But these theories, too, adopt rational expectations and the idea that policies consist in part of systematic reactions to the developments in the economy. The public can and does anticipate such reactions, and the government should take the public's reactions into account.

Confidence in the effectiveness of Keynesian stabilization policies reached a high point in the mid-1960s, after two decades of strong growth, only mild recessions, contained inflation, and finally popular tax cuts in the midst of a prolonged business expansion. It took a long period of rising prosperity to dispel the great fears of a depression that motivated the Employment Act of 1946. But already by the late 1970s discretionary macro policies were largely in disrepute as Keynesian economics came under sharp challenge for its apparent inability to cope with the concurrence of upward trends in both inflation and unemployment. The monetarist attack was remarkably successful in spreading beyond the profession and influencing policy making and public opinion at large. The related new classical school of thought reinforced the attack but mainly within the profession, while the

ideas of the "supply-side" economists were, on the contrary, primarily influential outside. But the success of the challengers proved itself short-lived as they, too, could be seen to have failed often enough in their predictions and prescriptions for the late 1970s and 1980s. Held against the new theories are (1) the surprising fickleness of the demand function for money; (2) the severity of business declines in 1980-82, viewed as evidence of high costs of a preannounced and credible disinflation policy; (3) the resurgence of a Phillips curve, allowing for expectations and supply shocks; and (4) the persistence of high budget deficits and low saving rates during the long expansion after 1982.[52]

The highly favorable and reassuring trend of events between the late 1940s and the late 1960s produced a great rise in public optimism that economic growth and prosperity can be maintained and recessions kept mild and short. Thus, the Standard and Poor's index of common stock prices moved strongly upward throughout this period, and its cyclical declines were short and relatively mild, despite its high sensitivity.[53] The Survey Research Center index of consumer sentiment, available since 1952, averaged as high as 91 (1966:1=100) in its first ten years and 96 in 1962-68, even though it too fell significantly in each recession and the "minirecession" of 1966, leading at the business cycle turns. This index depends inversely on unemployment and inflation, positively on stock prices and its own lagged value (Lovell 1975).

By the same measure, investor and consumer confidence suffered serious setbacks during the years 1969-80. The S&P index had no trend but early and long recession-bound declines in 1969-70 and 1973-74 (also a lengthy extra one in 1977). The SRC index, similarly, had long and large contractions in 1969-70 and 1972-75; moreover, its expansions in this period were relatively weak and short (1971-72, 1975-77). The market's and consumers' perceptions

and expectations were presumably depressed because of a succession of bad news in several areas. Inflation was not only rising but also becoming more volatile, which increases uncertainty (see, e.g., Zarnowitz and Lambros 1987). A steepening upward trend and large fluctuations around it marked the behavior of interest rates, in contrast to their earlier restraint (chart 4-C). The energy crises contributed to higher prices and unemployment, and to lower productivity.

Considering its length and severity, the 1981-82 recession was associated with a relatively mild decline in stock prices and a remarkably short and small decline in consumer sentiment. The bull market came back to stay in the 1980s, surviving so far even the debacle of August-October 1987. The consumer sentiment index recovered quickly in 1982-83 and remained very high during the five years 1984-88. There is little doubt about the reasons for the new rise in optimistic attitudes and expectations: disinflation and downward movements in interest rates and unemployment. These positive developments apparently outweighed by far any depressant effects from news of high budget and trade deficits, rising debt, and weakening dollar.

A reasonable inference from these observations (which could be amplified) is that persistent changes in the economy's performance can have important effects on the perceptions and expectations of private agents. The changes are recognized with significant (but probably variable) lags, and the same should apply to the timing of the agents' reactions. All this seems entirely consistent with rational behavior, without requiring an implausibly high degree of foresight. It also supports the notion of self-fulfilling expectations. Thus, a rise in optimism about the economy would encourage productive activity.

It may not matter immediately whether the public credits successful government policies or some other factor (say, an institutional or technological change), but the "reputational" effects of macroeconomic stabilization policies are clearly of special interest. Recall the hypothesis V in section II.1: If recessions are expected to be shorter and milder, they will be so because people will see less reason to curtail or postpone spending, hence consumption will slow less and investment will decline less. Baily 1978 argues that private behavior has indeed changed in this direction during the 1950s and 1960s as people learned to anticipate monetary and fiscal policies and believe that they are capable of keeping the economy close to the full-employment targets. He shows that employment reactions to changes in output and inventory reactions to changes in final sales were weaker in 1962-71 than in 1948-61. These results are certainly interesting and consistent with the hypothesis stated above but not necessarily with a narrower formulation relating to the success of discretionary macro policies. Private economic behavior may have changed in response to the general climate of greater stability rather than specifically the new policy activism. When the climate deteriorated in the 1970s and public interest shifted to the seemingly unyielding problem of inflation, private confidence and supportive behavior seem to have decreased markedly.

The rising budget deficits may have undermined the belief in flexible countercyclical uses of fiscal policy, but the popular credibility of monetary policy remains high in the 1980s, after what is widely viewed as success of the Fed in reducing inflation. The most widely held view of what causes recessions is that it is the Fed driving up interest rates to contain inflation. This can be seen clearly in the business, financial, and general press, where little shows up of the strong skepticism about macro policies

that is so evident in the contemporary professional literature (consider, e.g., the prevailing views in Gordon 1986a). As long as inflation is not clearly the main danger, the public would seem ready to support antirecession policies. This attitude itself may have favorable behavioral implications.

VI. Conclusions

Many sections of this long paper on a large subject include summaries, so this part can concentrate on a few major points and be brief.

1. A review of data and results reported in the literature shows much diversity of cyclical experience in both the more distant and the recent U.S. economic history. The postwar period as a whole, however, was one of distinctly reduced instability when compared with earlier times.

2. Some net stabilizing effects can be attributed to shifts in the structure of employment and, up to a point, to the increased size of the government. No evidence is found that changes in the consumption-investment mix of private demand contributed to the postwar moderation of business cycles.

3. The fiscal automatic stabilizers played an important positive role, but mainly in the 1950s and 1960s, before the rise in inflation and the consequent distortions.

4. The smoother functioning of the financial system helped reduce overall instability. Most of the credit here goes to the federal deposit insurance and prevention of general banking panics.

5. The record of discretionary fiscal policies was very mixed. Statistical tests suggest a small role for federal expenditures before World War II, and significant inputs from the broadly defined fiscal index in the postwar equations for output (this probably includes automatic stabilizer effects).

The results of historical assessments are more favorable for the first than the second half of the postwar period, and also more favorable for tax than expenditure policies.

6. Quarterly rates of change in money supply were more volatile in 1875-1918 and, particularly, 1919-45 than in 1946-83, although monetary growth increased and became more variable in the second half of the postwar period. These differences parallel those in output variability. Also, in earlier times money growth rates declined below zero recurrently (mostly at cyclical frequencies), whereas after 1949 they remained generally positive. Evidence from vector autoregressions for the postwar period is consistent with the concept of monetary policy that is moderately active but working mostly through interest rates (output was more influenced by factors other than money). Estimates for the earlier periods and interpretations of monetary developments suggest that the exogenous elements in money may be smaller after World War II than they were before. On balance, however, monetary policy probably made a modest contribution to the greater stability of real economic activity in the last forty years.

7. Economic agents gradually realized that business recessions have become shorter and milder, which strengthened their confidence and induced behavior that promoted more stable growth. But expectations change with the trend of events, e.g., the rise in inflation and unemployment during the 1970s had the opposite effects.

Footnotes

[1]These changes and their treatment in the literature are reviewed later in this paper (see especially part III).

[2]The following paragraph and the next one draw on the materials presented in Zarnowitz 1981, Zarnowitz and Moore 1986, and Moore and Zarnowitz 1986.

[3]Cf. Gordon 1982, p. 1114: "The series on the 4-6 month commercial paper ... comes from historical Federal Reserve Board publications and is chosen because of its homogeneity over the full period between 1890 and 1980." The data for 1875-89 are for the commercial paper rate in New York City from Macaulay 1938 pp. A141-161. The data for 1981-83 are for the 6-month paper from the Federal Reserve Bulletin.

[4]The interpolation procedure follows that of Chow and Lin 1971, assumes that the quarterly errors are subject to an AR(1) process, and allows for a constant and a linear time trend (Gordon and Veitch 1986, pp. 328-335). The index of industrial production and trade is based on bank clearings outside New York City, 1875-1914; pig iron production, 1877-1918; imports of merchandise, 1903-14; gross earnings of leading railroads, 1903-14; employment, 1903-18; cotton consumption, 1915-18; net ton-miles of freight, 1915-18; electric power production, 1919-30; index of volume of manufacturing, 1919-30; railroad car loadings, 1919-30; construction contracts, deflated, 1919-30, and index of volume of mining, 1919-30 (Persons 1931, Chaps. 7-10, passim). The uneven and spotty nature of the compilation, especially before 1903, is beyond question, yet there is no way to quantify the errors of the resulting estimates. Other available indexes of business activity have similar shortcomings and none is demonstrably superior to others (cf. also Zarnowitz, 1981).

[5]Data on refined sugar production are not available for the interwar period and data on beer and distilled spirits production are influenced by the end of prohibition in 1933-34. Hence, the measures reported in the text below exclude these three series from the manufacturing group.

[6]For example, when medians are used, the prewar/postwar ratio for all comparable 35 series is still 1.2, while the interwar/postwar ratio is 1.5.

[7]Measures of the type used in Table 4 are not available for the levels of these aggregates in the postwar period (to show any cyclical movements, the series have to be differenced).

[8]Note the change from short lags to long leads at peaks (lines 6 and 11, column 5). As for the frequencies of the "extra" turns (columns 3 and 4), they relate to specific cycle movements that are generally at least two quarters long; had we counted all directional reversals, their number would have been much larger, especially for inventory investment with its frequent short oscillations.

[9]Most of the comparisons in Blinder and Holtz-Eakin 1986 refer to the years 1929-41 (or 1929-46) and 1947-83. They compute long-term trend or "natural" values of the estimates of real GNP, final sales, and inventory investment, so as to reduce the problem of the "aberrant observations" for the Great Depression and World War II, then apply the variance decomposition analysis to the detrended series (ibid., pp. 186-189, 212-214).

[10]Evidence from other countries supports that for the United States in this regard (West 1988). On the issues in the current debate concerning the sources of inventory fluctuations and the role of inventories as a cyclical propagation mechanism, see Maccini 1987 and Zarnowitz 1985, pp. 541-542 and 557-558.

[11]See text and note 9 above. As a qualification, one should note large changes in the variability of real inventory investment during the postwar period: generally downward before 1973, upward thereafter. (On changes in moving standard deviations about trend lines for the major expenditure components of real GNP, see Brooks and Gigante 1979).

[12]For example, the share of gross private nonresidential fixed investment in GNP averaged 10.2% in the seven trough years and 10.7% in the seven peak years of the 1953-83 period (with standard deviations of 1.1% in both cases). When computed from quarterly figures for expansions and peaks on the one hand and contractions and troughs on the other, the results are actually slightly reversed, with the respective means (s.d.) of 10.3(0.8) and 10.5(1.0).

[13]Employment is defined in terms of "persons engaged in production," which includes full-time workers, part-time workers converted to full-time equivalents, and self-employed.

[14]This covers general government at all levels, including armed forces, plus a relatively small component of "government enterprise" (only the latter may be more appropriately thought of as producing goods rather than services).

[15]The approach does not distinguish between cyclical and other short-term movements and between expansions and contractions (cf. comments by Eisner 1986, pp. 721-22). The estimates before 1929 are based on several strong assumptions about the proportion of farm output in GNP and the composition of government expenditures.

[16]Note that this point concerns just the size of the government and its direct consequences. True, the size of the government is also importantly related to the effectiveness of fiscal built-in stabilizers and the potential (for good or bad) of discretionary policies, but these are in principle distinct matters that will be considered separately below.

[17]These movements are prominent in federal government purchases, a major part of which relates to national defense, much smaller in total purchases (G), which cover both the federal government and state and local governments.

[18]In contrast, as shown ibid., total federal receipts were definitely procyclical throughout (cf. next section).

[19]Note the contrast with Table 8, which shows that total government purchases of goods and services accounted for similar shares of GNP in 1920-38 (13-21%) and 1948-82 (14-22%). The reasons are (1) Table 8 includes, Table 9 excludes state and local governments, and (2) Table 8 excludes, Table 9 includes transfer payments. The percentage increase in federal expenditures between 1929 and 1986 was more than five times as large as that in state and local expenditures. Federal transfer payments, small before World War II, grew more than twice as fast as federal purchases of goods and services between 1948 and 1982.

[20]Early formulations are found in Robert A. Gordon 1952 and Burns 1953; see Zarnowitz 1972, section III and IV, for further historical detail and references.

[21]Some recent results relying on neoclassical models of intertemporal substitution of labor, production, and consumption suggest that output response to temporary changes in real military expenditures (viewed as truly exogenous) was stable before and after 1945 and dampened rather than multiplicative. However, work along these lines (Hall 1980; Barro 1981) yields estimates with very high standard errors for total government spending and does not necessarily contradict the view the built-in stabilizers improve macroeconomic performance.

[22]For a review of some of the more important fiscal policy actions, which complements the decomposition analysis that follows, see section IV-1 below.

The results of Moore 1983, ch. 8, a study of annual data for 1946-75, are generally consistent with the findings and interpretations of this paper.

[23]Federal tax revenues declined from 20.9% of GNP in 1981 to 19.5% in 1984 then recovered to 20.4 in 1987 (Economic Report 1988, pp. 248 and 341). Meanwhile the share of total federal spending varied in the range of 23.0-24.7 of GNP. The ratio of U.S. government debt to GNP, which fell dramatically from its wartime peak between 1945 and 1981, began to rise steadily thereafter (from 32.6% to 52.3 in 1987). Contrary to the hypothesis that deficits induced by tax cuts should stimulate saving in anticipation of high future tax cuts should saving in anticipation of higher future tax burdens (Barro 1984), the share of consumption rose and the personal saving rate declined markedly (from 7.5% to 4.3%) between 1981 and 1987.

[24]Numerous studies indicate that stock price indexes are highly sensitive to changes in aggregate economic activity, prospects for profits, and credit costs and availability. They tend to lead at business cycle peaks and troughs, but not very regularly, and they have frequent "extra" movements of their own as well (cf. Moore 1983; Fischer and Merton 1984; Zarnowitz 1987).

[25]There was a short "bond market crisis" in March 1953 when the Treasury issued new 3 1/4 percent, 30-year obligations and prices of outstanding bonds with 2 1/2 percent coupons fell sharply, but the Fed eased promptly, which may have helped to keep the 1953-54 recession mild and brief (Friedman and Schwartz 1963b, pp. 612-614; Wojnilower 1980, pp. 281-282). Eckstein and Sinai 1986 define a "credit crunch" as a "crisis stemming from the collision of an expanding economy with a financial system that has been depleted of liquidity" and place the first such postwar episode in 1957 (pp. 49 and 61). But this was hardly a "crisis," only a short phase of tighter nonprice credit rationing. In the fall of 1959, there was a more severe credit stringency and

the first disintermediation as rates on government securities rose above the regulated ceiling rates on time deposits (Wojnilower 1980, pp. 282-284). The two crunches were associated with brief recessions in 1957-58 and 1960-61), the first one moderate, the second one very mild (see Table 11, part B, lines 3-5).

[26]The 1984 drain was stopped even by the FDIC guarantee of all deposits of the Continental Bank. To prevent other bank failures and a possible panic, FDIC had to purchase from Continental loans with a book value of $4.5 billion and the Fed had to lend Continental over $5 billion. (These amounts were much larger than those involved in previous bank rescue operations). The resolution of the Ohio emergency required closing the banks for six days (a depression-style "bank holiday") and providing them with federal deposit insurance.

[27]Failure liabilities have a long record as a highly sensitive leading indicator with large countercyclical movements that reflect more the changes in the size than in the number of the failures (Zarnowitz and Lerner 1961). They exhibit strong contrasts in amplitude between mild and severe contractions, often rising only modestly and irregularly during the former but explosively during the latter when accompanied by great financial strain.

[28]The volume, quality, currency, and frequency of the relevant data all increased greatly in the postwar era. The cyclicality and volatility of interest rates rose strongly in the second half of this period (see Chart 4).

[29]When other components of the leading index are combined, the resulting series is much smoother and gives fewer false signals than the Standard & Poor's index of 500 common stocks. To give just one recent example, the market fell in 1977 while the index of leading indicators and real GNP did not. On several other occasions, stock prices would show large "extra"

declines, the leading index much shorter and smaller ones (or no significant declines at all when the stock price component is excluded). Cf. Zarnowitz and Boschan 1975; Moore 1983, ch. 9.

[30]Monthly data on currency, deposits, and reserves begin in May 1907. For 1867-74, only the January or February figures are available; for 1875-81, only February and August figures; and for 1882-1906, only June figures (Friedman and Schwartz, 1963b, Appendixes). Annual data are deficient for the purpose of measuring short-term reactions of the public to the actual or anticipated banking difficulties as they may be swayed by longer trends.

[31]DeLong and Summers calculated variances for the logarithm of the ratio of actual to potential output (real GNP) and the change in the log of output, using quarterly Gordon data for 1890-1910, including and excluding selected panic periods (1986, pp. 686-690). They used two alternative definitions of panics, one following Sprague 1910 (1890, 1893, 1907) and one broader, based on jumps in interest rates and yielding twelve episodes in the two decades covered. The largest reductions in the standard deviations obtained in these experiments for output in either form were about 17%, most were considerably smaller. The elimination of panic-related episodes had a much stronger effect on the variance of money growth in this period (a reduction of nearly 40% is reported).

[32]On the early advocacy of countercyclical monetary policy, see Keynes 1923; on the shift to fiscal stimulation, Keynes 1936; on the contemporaneous evolution of "classical" economists' views on unemployment and policies, Friedman 1967; Mayer 1988; Haberler 1988.

[33]Moves to raise tax rates, or to reduce or discontinue expenditures on social programs or public works, being politically unpopular, would likely involve even longer delays.

[34]Some tax reductions were fortuitously well-timed. This applies to the tax cut that was enacted (over a presidential veto) in April 1948, and to the expiration of the Korean war taxes in January 1954.

[35]Critics often blame the "Keynesian consensus" for helping to legitimize deficit spending intellectually, which is certainly not without some historical justification (cf. Mayer 1988). But Keynes favored deficits in depressions, not prosperity. Also, the deficits persisted under different administrations, legislatures, and ideologies. To a large extent, the explanation is simply that fiscal actions were taken in response to immediate political concerns, which notably include vocal demands for lower taxes or currently needed government services.

[36]The literature on the political aspects of monetary policy is vast and growing; for a very recent collection of paper and references, see Willett 1988, Parts Three and Four.

[37]The early monetarists' emphasis on the interrelated problems of uncertainty, ignorance, and lags led them only to reject activist policies, not to question whether, under discretionary policies, monetary changes have dominant short-term effects on economic activity. See, e.g., Laidler 1981, esp. p. 19.

[38]In terms of an old but still widely used macroeconomic model of Hicks 1937, this is the case where the demand for goods fluctuates more than the demand for money (the IS curve is more unstable than the LM curve) and the Fed pursues the policy of targeting interest rates by open market operations in government securities (Poole 1970).

[39]This is a short-run formulation in which portfolio adjustment costs are assumed to cause a given lag pattern in the reaction of real balances to changes in either Q or i (Goldfeld 1973). Somewhat different dynamic specifications are obtained when the gradual adjustment is assumed to occur

instead in nominal balances (Goldfeld 1976), the price level (Laidler 1980) or both (Gordon 1984). Q is usually represented by real GNP, P by the implicit price deflator, and M by M1, that is, currency plus checkable deposits.

[40]See Gordon 1984 for a comprehensive and discerning analysis of the dynamics of money demand. Our derivations in the text below resemble some of his. Gordon's empirical work proceeds by successive approximations that yield statistically significant improvements but at a considerable loss of simplicity.

[41]A rise in i creates incentives for the banks to increase their borrowing from the Fed and to decrease their excess reserves; it may also cause the public to reduce their holdings of time deposits relative to checkable deposits. In practice, however, most of these effects (which would raise either B or μ and hence M) are likely to be weak most of the time as they rely on changes in interest differentials (i relative to the discount rate or deposit rates) that will be small and short-lived, at least without certain working regulatory restraints. Also, excess reserves are apt to be small and mostly random, except in depressions following financial crises.

[42]The distinction between real and nominal balances is not very helpful in dealing with short-run changes, given the sluggishness of price reactions in countries with relatively low and not very volatile inflation. Under these conditions, too, expected inflation will not be an important additional factor in the money demand function.

[43]The index G is derived in Blanchard 1985 and used in form taken from Blanchard and Watson 1986, App. 2.2, pp. 149-156. The index $G_t = \tilde{G}_t/\bar{Z}_t$, where $\bar{Z}_t$ is exponentially fitted trend for government spending and $\tilde{G}_t = .79(Z_t - Z_t^*) + .08B_t + .21D_t + .79D_t^*$. Z, B, and D represent the

actual values of spending, debt, and deficit ($D_t = Z_t - T_t$, where T is taxes), while Z^* and D^* represent the estimated full-employment values of Z and D.

[44]The regressions include also constant terms and time trends (because of the presence of trends in some of the series). Unit root tests provided some guidance on the transformations performed on the data.

[45]When the "cyclically adjusted" federal deficit series from deLeeuw and Holloway 1983 was used in the equations for q in lieu of the index G, its test statistics generally lacked significance. These estimates, along with the corresponding series for federal receipts and expenditures, were designed to improve on the earlier "high-employment" variants and help isolate the effects of the budget on economic activity. They are carefully constructed and presented (see charts, ibid., pp. 26 and 36) and show only a loose association with business cycles, i.e., mixed timing and low conformity characteristics. What this suggests is that, when the strong response through automatic stabilizers is eliminated from the government budget data, the remaining "fiscal shocks" are scattered and random, hence weak on the average.

[46]For these three variables, Table 13 includes only a subset of the calculated equations, namely those with the highest R^2. (The same applies to equations 13-18 below in part A and 10-12 in part B of the table.) The observations in the text are based on the broader evidence as given in Zarnowitz and Braun 1989, Table 6.

[47]Fixed investment is better represented in ℓ and inventory investment is not directly represented at all in ℓd. The postwar data and processing techniques are generally better, the coverage is broader. Still, ℓd is a quite serviceable index. No comparable data are available for the pre-World War I period, and an existing poor substitute does not work well, as shown in Zarnowitz and Braun 1989 (see ibid. for more detail).

[48]The interwar equations in Zarnowitz and Braun 1989 include interest rates in first difference form, while the results reported in Table 13, part B, refer to levels of i (as do those in part A). But the conclusion that q was not significantly influenced by interest rates in 1919-40 holds whether one uses levels or changes in i.

[49]In a VAR model of Sims 1980, the effect of money on production is sharply reduced by the addition of the interest rate, which Sims argues is evidence against the importance of monetary policy. On the other hand, McCallum 1986 interprets the same findings as evidence that policy was mainly interest-oriented. Here the same question is raised in the context of a model that is less incomplete. But no VAR model can answer convincingly such interpretative problems.

[50]See Zarnowitz and Braun 1989, Tables 5C and 8.

[51]Because conditions change, consistent policies often become suboptimal although departures from a publicly adopted strategy are likely to prove worse in the long run as they undermine policy makers' credibility (Kydland and Prescott 1977; Calvo 1978; Fellner 1980). For best results, then, a policy rule must take into account how people's expectations of future policy actions influence their present behavior and state of the economy. This suggests game-theoretical elements of potential conflict or cooperation in the interaction between the government and the private sector (on a general formulation of the proble, see Lucas 1987.

[52]Just as supply-siders credit the tax reductions for this expansion so some critics credit the budget deficits, noting the contrast with Europe, where fiscal conservatism coincided with persistently high unemployment at the same time. See, e.g., Blinder 1986 and Tobin 1986 for critiques of the monetarist and new classical theories, Lucas and Sargent 1978 for a critique of Keynesian theories.

[53]The downturns in the index anticipated each of the four recessions and the upturns each of the four recoveries of 1948-61, plus two episodes of slowdown-speedup sequences beginning in 1962 and 1966.

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Table 1
Estimated Variabilities of Changes in Output, Prices, Money and Interest:
Selected Statistics for 1875-1983 and Three Subperiods

Line (1)	Period[a] (2)	Mean[b] (3)	Standard Deviation[b] (4)	Coefficient of Variation[c] (5)	Median[b] (6)	Interquartile Range[b] (7)	Range[b] (8)	Rank of Subperiod[d] (9)
				Real GNP (Log Differences)				
1	1875-1918	.99	2.37	2.40	1.04	2.40	16.72	2
2	1919-1945	.75	3.56	4.76	1.19	4.38	15.09	1
3	1946-1983	.78	1.18	1.52	.87	1.47	7.71	3
4	1875-1983	.85	2.42	2.83	.91	2.27	16.72	
				Wholesale or Producer Price Index (Log Differences)				
5	1875-1918	.28	3.28	11.59	0	4.28	19.49	2
6	1919-1945	-.20	4.11	20.53	.33	3.60	32.13	1
7	1946-1983	1.13	2.26	2.01	.59	1.44	22.10	3
8	1875-1983	.46	3.24	7.07	.46	2.84	34.18	
				Money Stock M2 (Log Differences)				
9	1875-1918	1.60	1.84	1.15	1.45	1.99	10.40	2
10	1919-1945	1.42	2.77	1.95	1.63	3.10	15.76	1
11	1946-1983	1.64	.96	.59	1.67	1.40	5.53	3
12	1875-1983	1.57	1.89	1.21	1.62	1.90	15.76	
				Commercial Paper Rate (Changes)				
13	1875-1918	-.00	.82	n.a.	0	1.02	5.64	2
14	1919-1945	-.04	.40	n.a.	0	.16	2.80	3
15	1946-1983	.06	.92	n.a.	.09	.46	8.49	1
16	1875-1983	.01	.78	n.a.	.01	.60	8.49	

[a]Number of quarterly observations: 1875-1918, 175; 1919-45, 107; 1946-83, 151; 1875-1983, 433.

[b]Multiplied by 100 for lines 1-12, unmodified for lines 13-16.

[c]Ratio, standard deviation divided by mean (absolute value)

[d]Based on entries in columns 4 and 5 (which have the same ranks), from the largest to the smallest.
n.a. Not applicable (means in column 3, lines 13-16, are equal or close to zero).

Source: See text and Balke and Gordon 1986.

Table 2
Average Durations and Amplitudes of Business Expansions and Contractions, Three Subperiods of 1885-1982

Period (Number of B.C. Covered)[a] (1)	Mean Duration of B.C. Covered[b] (2)	E/C Duration Ratio[c] (3)	Percent of Time in Contraction[d] (4)	Average Amplitude in Percent[e]					
				Industrial Activity[f]			Employment[g]		
				E (5)	C (6)	E/C (7)	E (8)	C (9)	E/C (10)
All cycles									
1885-1912 (8)	40	1.4	42	+39	-15	2.6	+23	-10	2.3
1912-45 (8)	51	1.9	34	+68	-29	2.3	+28	-16	1.8
1945-82 (8)	56	4.1	20	+35	-11	3.2	+15	-3	5.0
Excluding marginal recessions and wartime									
1885-1912 (6)[h]	54	2.0	33	+50	-17	2.9	+27	-12	2.2
1912-45 (6)[i]	45	1.1	47	+50	-27	1.9	+22	-18	1.2
1945-82 (6)[j]	45	3.1	25	+26	-11	2.4	+11	-3	3.7

Source: National Bureau of Economic Research (NBER) business cycle files. For more detail, see Zarnowitz and Moore 1986, tables 9.1 and 9.4.

[a]Dates refer to the first and last year of the period. Based on the monthly NBER reference cycle chronology for the United States, B.C. = business cycles.
[b]In months, rounded.
[c]Total duration of expansions in months (E) divided by total duration of contractions (C), rounded.
[d]Months in contractions divided by the total months covered, times 100, rounded.
[e]E = average percentage rise in expansions. C = average percentage decline in contractions. E/C = ratio of E to C without regard to sign.
[f]1885-91: Axe-Houghton index of trade and industrial activity; 1891-1920: Babson index of physical volume of business activity; 1920-82: FRB index of industrial production. Here the three subperiods are: 1891-1914 (7); 1914-45 (7); 1945-82 (8).
[g]1891-1919: Factory employment index, Jerome; 1919-33: Factory employment index, BLS; 1933-82: Employment in nonagricultural establishment, BLS.
[h]The following phases designated as contractions in the NBER chronology are treated as retardations rather than recessions and included, along with the preceding and following phases, in long expansions: 3/1887-4/1888 and 6/1899-12/1900.
[i]Excludes two wartime cycles: 12/1914-8/1918-3/1919 (World War I) and 6/1938-2/1945-10/1945 (World War II).
[j]Excludes two wartime cycles: 10/1949-7/1953-5/1954 (Korean War) and 2/1961-12/1969-11/1970 (Vietnam War).

Table 3

Durations and Amplitudes of Cyclical Movements in Estimates of Nominal and Real GNP, the Price Level, Money Stock, and Short-Term Interest Rates, Pre-World I, Interwar, and Post-World II Periods

Line	Period[a]	Number of Cyclical Movements[b]		Average Duration in Quarters[c]		Average Percentage Amplitude[c]		Average Percentage Amplitude per Quarter[d]	
		Rise	Fall	Rise	Fall	Rise	Fall	Rise	Fall
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Gross National Product (GNP) in Current Dollars					
1	1878-1914	10	10	10.0	4.6	24.4	-8.1	2.4	-1.8
2	1920-1938	4	5	10.5	6.0	37.2	-21.2	3.5	-3.5
3	1948-1960	3	4	12.3	2.8	28.0	-2.2	2.3	-0.8
				GNP in Constant Dollars					
4	1878-1914	12	12	8.9	3.2	17.3	-5.1	1.9	-1.6
5	1919-1938	4	5	11.0	6.0	30.1	-14.1	2.7	-2.4
6	1948-1982	7	8	16.3	2.6	20.9	-2.5	1.3	-1.0
				Wholesale Price Index					
7	1876-1914	11	10	6.6	6.9	12.1	-11.8	1.8	-1.7
8	1920-1939	4	5	8.2	8.6	15.4	-21.6	1.9	-2.5
9	1948-1967	4	5	12.5	5.0	8.7	-4.8	0.7	-1.0
				Money Stock (M2)					
10	1878-1908	4	4	26.0	3.2	82.3	-5.9	3.2	-1.8
11	1920-1938	2	3	22.5	8.7	48.3	-15.4	2.1	-1.8
12	1948-1949[e]	...	1	...	4	...	-0.9	...	-0.2
				Commercial Paper Rate[f]					
13	1875-1913	10	10	9.1	6.0	2.7	-2.8	0.3	-0.5
14	1918-1937	5	6	5.6	7.7	1.8	-2.4	0.3	-0.3
15	1946-1983	9	9	11.2	5.1	4.3	-3.4	0.4	-0.7

[a]Annual dates of the first and last turning points of the series during each period.

[b]Identified according to specific cycle peaks and troughs dated by inspection of the charts of the series. Only complete upward and downward movements (called "rise" and "fall", respectively) are counted.

[c]Measured from trough to peak for rises and from peak to trough for falls.

[d]Column 9 = column 7 ÷ column 5. Column 10 = column 8 ÷ column 6.

[e]Only one cyclical decline in the level of M2 occurred in the period 1946-83, dated 1948:1 (peak) - 1949:1 (trough).

[f]The entries in columns 7 - 10 are average amplitudes of absolute (not percentage) changes.

Source: See text and Chart 2.

Table 4

Summary Measures of Cyclical Conformity, Timing, and Amplitude for Selected Components of Private Consumption and Investment, 1919-41 and 1947-83

	Series	Business Cycle Turns Matched (Missed)[a]		Specific Cycle Turns Matched (Extra)[b]		Average Lead (-) or Lag(+)		Average Amplitude[d]	
		Peaks (1)	Troughs (2)	Peaks (3)	Troughs (4)	Peaks (5)	Troughs (6)	Rise (7)	Fall (8)
		Number		Number		Quarters		Percent	
				1919-1941					
1.	Consumption, durable goods	5(0)	5(0)	5(3)	5(3)	-0.4	-0.4	+63	-32
2.	Cons., nondur. goods & serv.	4(1)	4(1)	4(1)	4(1)	-0.5	-0.2	+24	-9
3.	Residential structures	5(0)	5(0)	5(3)	5(3)	-0.2	-0.8	+101	-33
4.	Producers' durable equipment	5(0)	5(0)	5(2)	5(2)	0.2	0.4	+121	-41
5.	Nonresidential structures	4(1)	4(1)	4(2)	4(2)	-1.2	-0.2	+172	-44
6.	Change in bus. inventories	5(0)	5(0)	5(4)	5(4)	+1.0	-0.4	+19[e]	-15[e]
				1947-1983					
7.	Consumption, durable goods	7(1)	7(1)	7(3)	7(3)	-2.3	-1.3	+33	-10
8.	Residential structures	7(1)	7(1)	7(5)	7(5)	-2.9	-0.9	+36	-21
9.	Producers' durable equipment	7(1)	7(1)	7(3)	7(3)	-0.4	0.6	+30	-12
10.	Nonresidential structures	6(2)	6(2)	6(4)	6(4)	-1.0	1.2	+22	-9
11.	Change in bus. inventories	8(0)	8(0)	8(2)	8(2)	-4.4	-0.2	+45[e]	-47[e]

[a]The following dates from the quarterly NBER reference cycle chronology are covered:
1919-41: Peaks, 1920:1, 1923:2, 1926:3, 1929:3, 1937:2 (five).
Troughs, 1921:3, 1924:3, 1927:4, 1933:1, 1938:2 (five).
1947-83: Peaks, 1948:4, 1953:2, 1957:3, 1960:2, 1969:4, 1973:4, 1980:1, 1981:3 (eight).
Troughs, 1949:4, 1954:2, 1958:2, 1961:1, 1970:4, 1975:1, 1980:3, 1982:4 (eight).

Entries without parentheses show the number of those business cycle peaks or troughs that are matched by like cyclical turning points in the quarterly series listed on the left. Entries within parentheses show the number of those business cycle peaks or troughs that could not be so matched.

Table 5

Composition of Real Gross National Product by Type of Expenditure, 1919-41 and 1947-83

	1919-1941[a]		1947-1983[b]	
	Average Level (bil 1972 dol.) (1)	Percent of Real Real GNP[c] (2)	Average Level (bil. 1982 dol.) (3)	Percent of Real GNP (4)
Real gross national product	274.8	100.0	2,130.2	100.0
Personal consumption expend.	194.5	70.8	1,302.7	61.2
Durable goods	16.7	6.1	150.0	7.0
Nondurable goods and services	177.8	64.7	1,152.7	54.1
Nondurable goods	n.a.	n.a.	550.9	25.9
Services	n.a.	n.a.	601.9	28.2
Gross private domestic investment	33.0	12.0	353.5	16.6
Producers' durable equipment	12.5	4.5	136.8	6.4
Nonresidential structures	13.0	4.7	92.6	4.4
Residential structures	9.7	3.5	110.3	5.2
Change in business inventories	-2.2	-0.8	13.8	0.6
Net exports of goods and servcs.[d]	2.9	1.1	-3.1	[e]
Exports	13.3	4.8	170.3	8.0
Imports	10.4	3.7	173.2	8.1
Govt. purchases of goods & servcs.	47.0	17.1	475.4	22.3

[a]Based on data presented in Balke and Gordon 1986, pp. 810-836, and discussed in Gordon and Veitch 1986, pp. 328-335.

[b]Based on data in Economic Report 1988, pp. 250-251.

[c]Percentage entries may not add up to 100 because of rounding.

[d]Exports minus imports.

[e]A very small fraction of one percent.

n.a. Not available.

Table 6

Percentage Distributions of Employment in Cyclically Volatile and Stable Industries, Selected Years and Periods, 1869-1981

Year or Period[a]	Agriculture[b] (1)	Nonfarm "Volatile"[c] (2)	Government[d] (3)	Private "Stable"[e] (4)	Totals[f] Most Cyclical[g] (5)	Totals[f] Least Cyclical[h] (6)
1869	48.3	28.9	3.5	19.3	77.2	22.8
1899	36.9	35.1	4.1	23.9	72.0	28.0
1929-37	21.3	34.1	10.1	34.3	55.4	44.4
1948-53	10.6	40.8	13.9	34.6	51.4	48.5
1957-60	7.6	39.1	15.6	37.7	46.7	53.3
1969-73	4.3	35.9	20.1	39.6	40.2	59.7
1979-81	3.4	32.4	19.0	45.2	35.8	64.2

[a]Based on averages for peak years (first two lines) and business-cycle periods measured from peak to peak, with peak years given half weight.
[b]Includes forestry and fisheries.
[c]Includes manufacturing, mining, contract construction, transportation, communications, and public utilities.
[d]Federal, state and local. Includes armed forces.
[e]Includes wholesale and retail trade, finance, insurance, real estate, and other service industries.
[f]May not add up to 100 because of rounding.
[g]Sum of corresponding entries in cols. 1 and 2.
[h]Sum of corresponding entries in cols. 3 and 4.

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, 1973, part 3, table 4, p. 76 (for 1869-1960); 1984 supplement to Survey of Current Business, p. (for 1969-81).

Table 7
Output of Services, Goods, and Structures During Business Contractions, 1948-1982

A. Annual Data in Constant Dollars[a]

Line	Category	Changes Between Years 1948-49 (1)	1953-54 (2)	1957-58 (3)	1960-61 (4)	1969-70 (5)	1973-75 (6)	1979-80 (7)	1981-82 (8)
		Percent							
1	Services	2.7	0.3	1.4	4.7	2.4	5.6	2.2	0.9
2	Goods	-2.6	-4.9	-3.6	0.5	-1.8	-4.3	-0.8	-4.8
3	Structures	1.5	6.6	1.8	3.0	-4.6	-19.1	-7.6	-9.1
4	Total GNP	.03	-1.3	-0.8	2.6	-0.3	-1.8	-0.2	-2.6
	Final Sales								
5	Goods[b]	1.6	-3.8	-2.7	0.5	-0.2	0.2	0.9	-1.4
6	Total[c]	2.0	-0.8	-0.4	2.6	0.4	0.1	0.5	-1.1
		Billions of 1982 Dollars							
7	Inventory change	-9.7	-4.8	-3.4	7.3	8.2	20.5[d]	-6.9	-24.5

B. Quarterly Data in Constant Dollars[e]

		Declines by Duration in Quarters					Average	Average Change per Quarter	
		One (1)	Two (2)	Three (3)	Four or More (4)	Total (5)	Duration (6)	Mean (7)	St. Dev. (8)
		Number					Quarters	Percent	
8	Services	4		1		5	1.4	0.6	0.4
9	Goods	20	4	1		25	1.2	1.0	0.9
10	Structures	8	5	3	4	20	3.3	2.0	1.9

[a]From Economic Report of the President, January 1987, Table B-7, p. 253.
[b]Final sales of goods equals output of goods (line 2) minus inventory change (line 7), which consists of goods only.
[c]Equals GNP minus inventory change; or, alternatively, services plus structures, plus final sale of goods.
[d]1973-74: 33.3; 1974-75: -12.8.
[e]From Business Statistics: 1982, A Supplement to the Survey of Current Business, November 1983, p. 192. Final sales are used for goods. These data cover the period 1951-1982 and are in billions of 1972 dollars.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Table 8

Ratio of Government Purchases to GNP at Business Cycles Peaks and Troughs, 1920-38 and 1948-82

Business Cycle		Ratio G/Q		Business Cycle		Ratio G/Q	
Peak	Trough	Percent		Peak	Trough	Percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1920:1		14.0		1948:4		13.5	
	1921:3		16.7		1949:4		15.3
1923:2		12.6		1953:2		22.1	
	1924:3		13.9		1954:2		20.5
1926:3		11.9		1957:3		19.2	
	1927:4		13.4		1958:2		21.1
1929:3		12.7		1960:2		19.4	
	1933:1		20.6		1961:1		20.3
1937:2		17.3		1969:4		21.4	
	1938:2		21.1		1970:4		21.6
				1973:4		19.6	
					1975:1		21.2
				1980:1		19.1	
					1980:3		19.5
				1981:3		19.1	
					1982:4		20.9
Mean ratio		13.7	17.1			19.2	20.0
Standard deviation		2.2	3.6			2.6	2.0

NOTE: The dates in columns 1-2 and 5-6 are from the quarterly reference cycle chronology of the NBER. The entries in columns 3-4 and 7-8 are the ratios of total (federal and state and local) government purchases of goods and services to the gross national product, both variables being measured in real terms (1972 dollars for 1920-38, 1982 dollars for 1948-82). Source: Balke and Gordon 1986, pp. 793-795 and 833-834 (columns 3-4); Economic Report 1988, pp. 250-251 (columns 7-8).**###3-21%) and 1948-82 (14-22%). The reasons are (1) Table 10 includes, Table 11 excludes state and local governments, and (2) Table 10 excludes, Table 11 includes transfer payments. The percentage increase in federal expenditures between 1929 and 1986 was more than five times as large as that in state and local expenditures. Federal transfer payments, small before World War II, grew more than twice as fast as federal purchases of goods and services between 1948 and 1982.

Table 9

Federal Government Receipts, Expenditures, and Surplus or Deficit in Percent of Gross National Product at Business Cycle Peaks and Troughs, Selected Subperiods of 1869-1982

Statistic[a]	1869 - 1894		1895 - 1914		1920 - 1927		1929 - 1938		1948 - 1961		1969 - 1982	
	P(6) (1)	T(6) (2)	P(6) (3)	T(6) (4)	P(3) (5)	T(3) (6)	P(2) (7)	T(2) (8)	P(4) (9)	T(4) (10)	P(4) (11)	T(4) (12)
						Receipts						
Mean	3.3	3.2	2.2	2.3	5.4	5.7	4.7	5.0	18.2	17.0	20.3	19.5
S.D.	0.8	1.0	0.4	0.4	1.7	2.1	1.1	2.3	1.0	1.4	0.7	0.9
						Expenditures						
Mean	2.6	2.7	2.3	2.3	4.7	4.7	5.8	8.0	17.6	18.5	20.8	22.6
S.D.	0.8	0.7	0.6	0.3	2.0	2.4	3.8	0.0	3.0	1.6	1.5	1.7
						Surplus or Deficit (-)						
Mean	0.6	0.4	-0.0	-0.0	0.7	1.0	-1.2	-3.0	0.6	-1.4	-0.6	-3.1
S.D.	0.3	0.6	0.3	0.2	0.4	0.3	2.7	2.3	2.1	0.7	1.2	1.6

NOTE: P refers to business cycle peak years, T to business cycle trough years, according to the annual reference cycle chronology of the National Bureau of Economic Research (NBER). The dates refer to the first and last business cycle turns (P and T, respectively) in each of the five periods. Receipts, 1869-1938: excludes receipts from borrowing. Prior to 1931, total receipts; thereafter, net receipts (excluding refunds for overpayment of taxes, transfers to Federal trust funds, and capital transfers to the Treasury from government corporations). Expenditures, 1869-1938: excludes debt repayment. Prior to 1931, total expenditures; thereafter, net expenditures (net of refunds paid and of capital transfers.) Surplus or deficit: receipts minus expenditures. Data for 1948-1982 are from the national income and product accounts. Federal expenditures include grants-in-aid to state and local governments. Sources: 1869-1938, U.S. Department of Commerce, Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1957, p. 711 (data from Annual Report of the Secretary of the Treasury, 1958). For GNP, Balke and Gordon 1986, pp. 781-782. 1948-1982: Economic Report of the President 1988, p. 341 (receipts, expenditures, surplus or deficit) and p. 248 (GNP).

S.D. = standard deviation.

Table 10

Cyclical Changes in Real GNP and Real Federal Surplus or Deficit
(Total and Active and Passive Components), Quarterly, 1948-1986

Real GNP Peak-Trough	Change in Billions of 1982 Dollars[a] Real GNP	Real Federal Surplus[c] Total[d]	Active[e]	Passive[f]	Real GNP Trough-Peak	Change in Billions of Dollars Real GNP	Real Federal Surplus Total[d]	Active[e]	Passi
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10
1948:4-1949:4	-22	-31	-20	-11	1949:4-1953:2	+342	-7	-55	+49
1953:2-1954:2	-44	-1	+28	-29	1954:2-1957:3	+160	+35	+26	+9
1957:3-1958:1	-55	-35	-9	-26	1958:1-1960:2	+161	+39	+16	+23
1960:2-1960:4	-13	-17	-3	-14	1960:4-1969:3	+782	+20	-27	+47
1969:3-1970:2	-29	-48	-15	-33	1970:2-1973:4	+356	+28	+10	+18
1973:4-1975:1	-120	-78	-14	-64	1975:1-1980:1	+591	+36	-11	+47
1980:1-1980:2	-76	-30	-2	-28	1980:2-1981:3	+108	+10	+16	-6
1981:3-1982:3	-110	-92	-37	-55	1982:3-1986:1[h]	+391	-136	-152	+16
Mean, 1948-82	-59	-41	-9	-32	Mean, 1949-81	+357	+23	-4	+27
					Mean, 1949-86	+361	+3	-22	+25
			Memo: Recognizing the Slowdown of 1966-67[i]						
1966:1-1967:2	+65	-39	-31	-8	1960:4-1966:1	+536	+5	-49	+54
					1967:2-1969:3	+180	+53	+53	0
Mean, 1948-82[j]	-45	-41	-11	-30	Mean, 1949-81[k]	+304	+25	+1	+24
					Mean, 1949-86[k]	+314	+7	-16	+23

[a]Refers to changes during cyclical contractions in real GNP, as dated in column 1.

[b]Refers to changes during cyclical expansions in real GNP, as dated in column 6.

[c]Negative entries represent shifts in the direction of deficit (i.e. declines in surplus, changes from surplus to deficit, or rises in deficit); positive entries represent shifts in the direction of surplus (i.e., declines in deficit, changes from deficit to surplus, or rises in surplus).

[d]Based on data for the actual federal government surplus in 1982 dollars from the U.S. Department of Commerce (1986 revision).

[e]Based on estimates of high-employment surplus (Federal Reserve Bank of St. Louis, 1947-54) and cyclically adjusted surplus (Holloway 1986, for 1955-85) as modified in Gordon 1987 (see pp. 589-590).

[f]Differences, column 3 minus column 4.

[g]Differences, column 8 minus column 9.

[h]1986:1 is the last date covered in the source. It is not a peak date (the expansion continues) but it is followed by a one-quarter decline and slow growth phase in the rest of 1986.

[i]The slowdown in real GNP corresponding to the "minirecession" of 1966-67 is treated as extending from 1966:1 to 1967:2 and interrupting the expansion of 1960:4-1969:3.

[j]Includes the entries on the first eight lines of the table (1948-49 through 1981-82) and the entries for 1966-67 on the line above.

[k]The entries for 1960-69 are replaced by those for 1960-66 and 1967-69.

Source: Gordon 1987, Table A-2, pp. 584-587.

Table 11

Selected Chronologies and Measures of Financial Crises in the United States

A. 1818-1933

	Years:	1818-19 (1)	1836-37 (2)	1856-57 (3)	1873 (4)	1884 (5)	1890 (6)	1892-93 (7)	1907 (8)	1920-21 (9)	1929 (10)	1930 (11)	1931 (12)	193 (13)
						Speculative Peaks and Financial Crises[a]								
1.	Specul. peak	8/18	11/36	End of 56	3/73			12/92	Early 07	Summer 20	9/29			
2.	Crises	11/18-6/19	9/37	8/57	9/73			5/93	10/07	Spring 21	10/29			3/
						Stock Exchange Panics: High and Low Months[b]								
3.	High				2/ 73	2/84	5/90	2/93	1/07	10/19	9/29	4/30	3/31	
4.	Low				11/73	12/84	12/90	8/93	11/07	8/21	11/29	12/10	12/31	
						Banking Crises and Panics[c]								
5.	Date	1818+	1837+	1857+	9/73	5/84	1890	6/93+	10/07+			10/30*	3/31*	1933
						Business Cycle Expansions (E) or Contractions (C)[d]								
6.	Type of phase	C	C	E	E	C	C	C	C	C	C	C	C	Trou-
7.	Date	1815-21	1836-38	12/54-6/57	12/70-10/73	3/82-5/85	7/90-5/91	1/93-6/94	5/07-6/08	1/20-7/21	8/29-3/33	8/29-3/33	8/29-3/33	193
						Change in Liabilities of Business Failures[e]								
8.	Percent					174	143	425	169	508	41	33	23	f
						Change in the Common Stock Price Index[g]								
9.	Percent				-22	-19	-17	-26	-35	-32	-33	-40	-52	h
						Change in the Deposit/Currency Ratio[i]								
10.	Percent				+1	0	-1	-15	-20	-7	-4	-10	-32	-24

[a]Based on the entries for the United States in Kindleberger 1978 ("A Stylized Outline of Financial Crises, 1720-1975," following p. 251).

[b]Compiled from the international chronologies and data in Morgenstern 1959, pp. 546-547 and 552 (Tables 139 and 140), except for the 1919-21 and 1930 dates, which are additional declines in the S&P index.

[c]Based on Friedman and Schwartz 1963, chs. 2, 3, 4, 5, and 7, passim. + denotes a restriction on cash payments instituted in the given year, including the nationwide banking holiday of March 1933. * denotes the onset of a banking crisis (ibid., pp. 308-315).

[d]Based on the NBER business cycles chronology.

[e]Computed from Dun and Bradstreet data, seasonally adjusted (quarterly 1875-1894, monthly 1894-1982). Low-to-high percent change in each period, defined in years (see column headings). Based on quarterly data.

[f]Liabilities reached a peak in 1932:2, 113% above their level at the beginning of the depression in 1929:3, then declined 72% through 1933:4.

[g]Computed from Standard and Poor's common stock price index; industrials, rails, and utilities, monthly, 1871-1939 (prior to 1918, the index is converted from that of Cowles Commission). High-to-low percent change in each period, based on the dates in lines 3 and 4 above.

[h]Index reached the depression trough in 3/1933, 12% below 1/1933 and 81% below the pre-depression peak of 9/1929.

[i]Based on data in Friedman and Schwartz 1963, pp. 799-804 (Table B-3, column 3). High-to-low percent change in each period (annual February or June dates used for 1890-93, monthly dates thereafter).

Table 11
(concluded)

B. 1957-1982

Years:	1957-58 (1)	1959-60 (2)	1966 (3)	1969-70 (4)	1973-75 (5)	1980 (6)	1981-82 (7)
			Precrunch Period/Credit Crunch[i]				
1. Period	55:4-57:4	59:2-60:2	66:1-66:3	69:1-70:1	73:1-74:3	78:2-80:1	81:1-81:4
			Bear Markets[j]				
2. Period	7/56-12/57	7/59-10/60	1/66-10/66	12/68-6/70	1/73-12/74	2/80-4/80	11/80-7/82
			Financial Crises[k]				
3. Month			8/66	6/70	5/74	3/80	6-8/82
			Business Cycle Expansions (E) or Contractions (C)[d]				
4. Type of Phase	C	C	E	C	C	C	C
5. Dates	8/57-4/58	4/60-2/61	2/61-12/69	12/69-11/70	11/73-3/75	1/80-7/80	7/81-11/82
			Change in Liabilities of Business Failures[e]				
6. Percent	51	68	25	163	139	153	279
			Change in the Common Stock Price Index[f]				
7. Percent	-19	-10	-17	-29	-43	-11	-19
			Change in the Deposit/Currency Ratio[l]				
8. Percent	+9	+4	-2	+7	-6	+2	+5

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[i] From Eckstein and Sinai 1986, p. 49 (one of the "Stages of Postwar Business Cycles" in Table 1.3).
[j] Based on the monthly index of stock prices of Standard & Poor's Corporation (500 common stocks).
[k] From Wolfson 1986, p. 133 (Table 11.1).
[l] Computed from ratios of currency to demand and time deposits (components of the monetary stock M2). Based on seasonally adjusted monthly data compiled by the Board of Governors of the Federal Reserve System.

Table 12

Summary Measures of Change During Periods of Financial Instabililty: Business Failures, Stock Prices, and Deposit-Currency Ratio, 1873-1982 and Subperiods

	Period (1)	Number of Observations (2)	Duration (months) Mean (3)	Duration (months) S.D. (4)	Total Amplitude (%) Mean (5)	Total Amplitude (%) S.D. (6)	Average Amplitude (% per month) Mean (7)	Average Amplitude (% per month) S.D. (8)
			Liabilities of Business Failures[a]					
1.	1884-1907	4	7	3	228	132	41	28
2.	1920-1932	4	9	2	151	238	14	19
3.	1884-1932	8	8	3	189	183	27	26
4.	1957-1982	7	12	6	126	87	11	8
5.	1884-1982	15	11	6	160	145	20	21
			Index of Common Stock Prices[b]					
6.	1873-1907	5	8	2	-24	7	-3	1
7.	1920-1931	4	10	8	-39	9	-7	6
8.	1873-1931	9	9	5	-31	5	-5	5
9.	1956-1982	7	15	7	-21	12	-2	2
10.	1873-1982	16	12	7	-26	12	-4	4
			Deposit-Currency Ratio[c]					
11.	1873-1907	5	11	3	-7	10	-0.9	1
12.	1920-1933	5	5	4	-15	12	-4	4
13.	1890-1933	10	8	4	-11	12	-3	4
14.	1957-1982	7	12	7	+3	5	0.2	0.4
15.	1873-1982	17	10	6	-5	12	-1	3

Note: Decimals are used in computations, the results are rounded. S.D. denotes standard deviation.

[a]For the individual entries (rounded), see Table 7, A, line 8, and B, line 6.
[b]See Table 7, A, line 9, and B, line 7.
[c]See Table 7, A, line 10, and B, line 8.

Table 13
Exogeneity and Neutrality Tests from Quarterly Regression Equations, 1949-82 and 1919-40

A. 1949-1982

Line	Dependent Variable[a]	Monetary Variable[b] (m.v.)	Test Statistics[c] for q (1)	m.v. (2)	G (3)	p (4)	i (5)	ℓ (6)	r (7)	$\bar{R}^{2}$[d] (8)
			Four Lagged Terms[e]							
1	q	b					*(**)	*(**)		.41
2	q	m_1	+(*)	o(*)	+(o)		*(**)	**(**)		.44
3	q	m_2		(o)	+		+(*)	**(**)		.43
4	b	b	(o)	**(**)		+(o)	*		(*)	.71
5	m_1	m_1		*	*(+)		**		(*)	.54
6	m_2	m_2		**(**)			**(o)		(*)	.76
7	G	b		+(+)	**(**)		*		(*)	.87
8	G	m_1			**(**)		*	(o)	(*)	.86
9	G	m_2		+(o)	**(**)		+	(o)	(*)	.87
10	p	b		+(o)	o(*)	**(**)	+		(*)	.63
11	i	m_1	+	**			**(**)			.95
12	ℓ	m_1				o	*	+(*)	(+)	.46
			Eight Lagged Terms[f]							
13	q	m_2	*	+	*			**(+)		.55
14	m_2	m_2		*	*(*)		**		(+)	.81
15	G	b		+	**(**)		*	o	(*)	.88
16	p	b		*		*(**)	o			.64
17	i	b				o	**(**)	*	(o)	.95
18	ℓ	b		(o)			+		(*)	.47

Table 13
(concluded)

Line	Dependent Variable[a]	Monetary Variable[b] (m.v.)	Test Statistics[c] for q (1)	m.v. (2)	gx (3)	p (4)	i (5)	ℓ (6)	$\bar{R}^2$[d] (7)
			B. 1919-1940						
1	q	b		*	+			*(*)	.51
2	q	m_1	o	+(+)	+			*(+)	.50
3	q	m_2	o	*				*(+)	.50
4	b	b	*(*)				o(+)	+(o)	.46
5	m_1	m_1		**(*)	(o)				.56
6	m_2	m_2		*(*)	(+)	o		o	.60
7	gx	b	o(+)	($\bar{o}$)	*($\bar{+}$)		($\bar{o}$)		.37
8	gx	m_1	($\bar{+}$)		+($\bar{+}$)			(o)	.35
9	gx	m_2	($\bar{o}$)		*($\bar{*}$)	(o)			.35
10	p	m_1		o		**(o)	(o)	+($\bar{+}$)	.58
11	i	m_2					**(**)		.97
12	ℓd	m_2		**(+)	o	($\bar{o}$)	($\bar{o}$)	+(+)	.49

[a] q = ΔlnQ (first difference in natural logarithm of real (GNP); b = ΔlnB (monetary base); m_1 = ΔℓnM1 (narrow money supply); m_2 = ΔlnM2 (broad money supply); G = fiscal index, level, p = ΔlnP (implicit price deflator); i = commercial paper rate, level; ℓ = ΔlnL index of leading indicators, excluding three components: M2 in constant dollars, change in business and consumer credit outstanding, and the index of stock prices); gx = ΔlnGX (federal expenditures, ld = ΔlnLD (composite index of leading series).

[b] Identifies the monetary variable (m.v.) used in the given equation (i.e., b or m_1 or m_2). For the significance levels of m.v., see column 2.

[c] Significance at the 1/10 of 1% level is denoted by **; at the 1% level, by *; at the 5% level, by +; and at the 10% level, by 0. Symbols without parentheses refer to the F-statistics for groups of lagged values of each variable covered. Symbols within parentheses refer to the t-statistics for the sums of regression coefficients of the same groups (with a dash above the symbol indicating a negative t).

[d]Squared correlation coefficients adjusted for the degrees of freedom.

[e]Sample period: 1949:2-1982:4. Degrees freedom: 109.

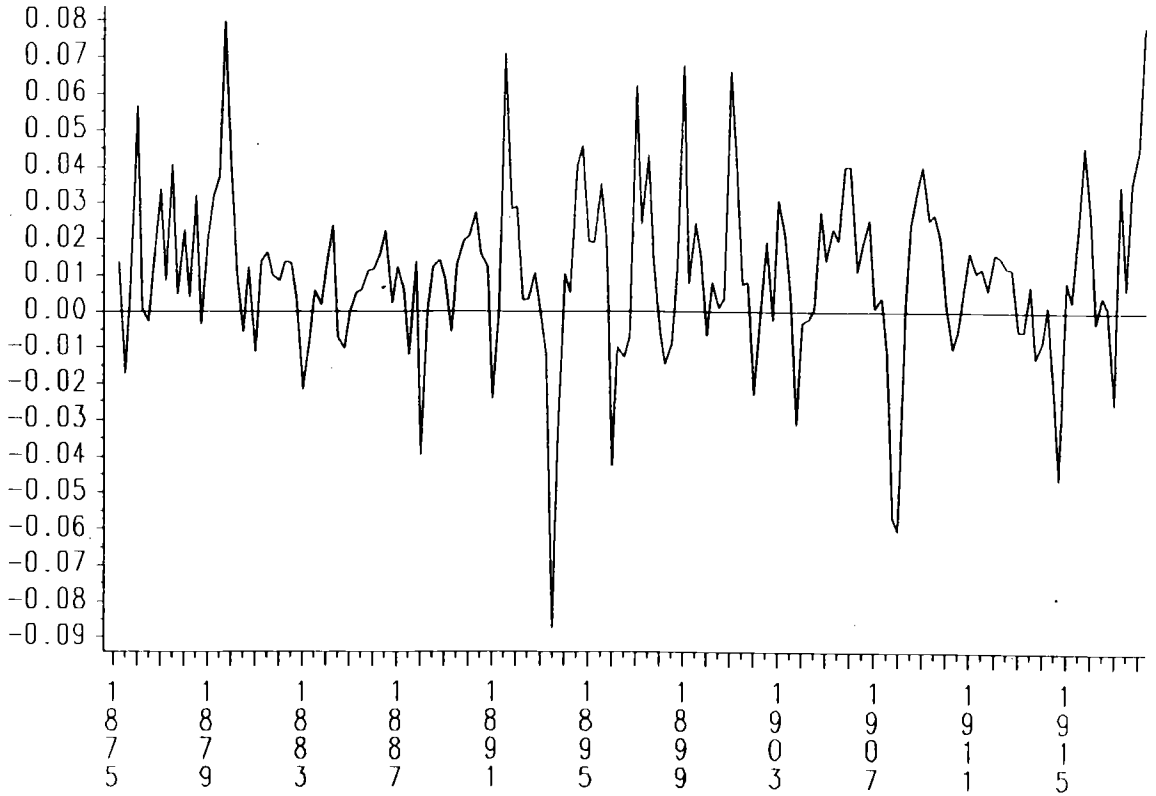
[f]Sample period: 1950:2-1982:4. Degrees freedom: 81.

[g]Sample period: 1920:4-1940:4. Degrees freedom: 55. Four lagged terms.

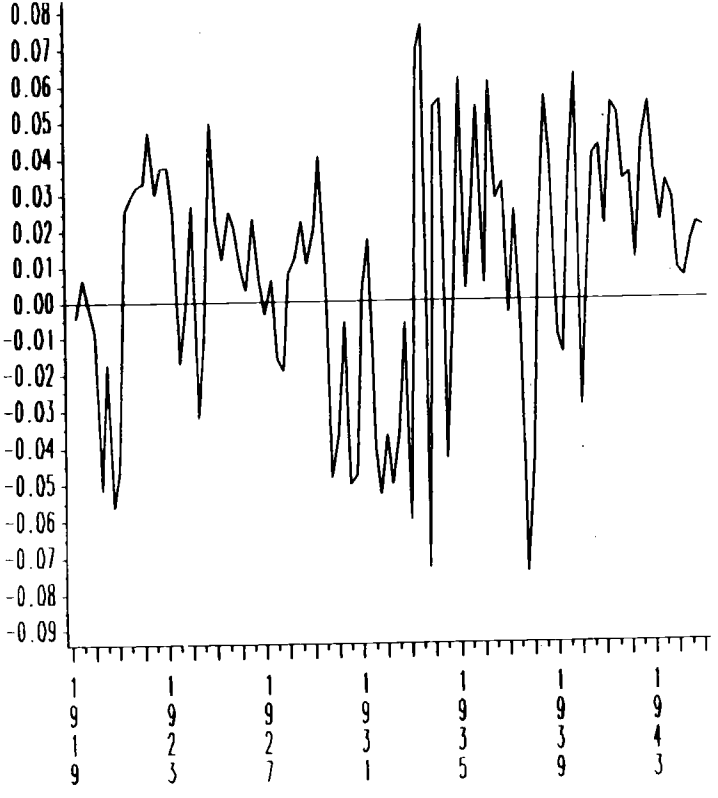
Sources: Balke and Gordon 1986 (q,b,m_1,m_2,p and i), based on Commerce national income and product accounts, Federal Reserve data on monetary aggregates and interest rates, and adjustments from Gordon 1982 and Gordon and Veitch 1986; Blanchard 1985 (G); Firestone 1960 (GX); Bureau of Economic Analysis, U.S. Department of Commerce (L); Shiskin 1961 (LD). For more detail, see Zarnowitz and Braun 1989, Table 1.

Chart 1
Real Gross National Product, Log Differences,
Quarterly 1875-1983

A. 1875-1918



B. 1919-1945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c. 1946-1983

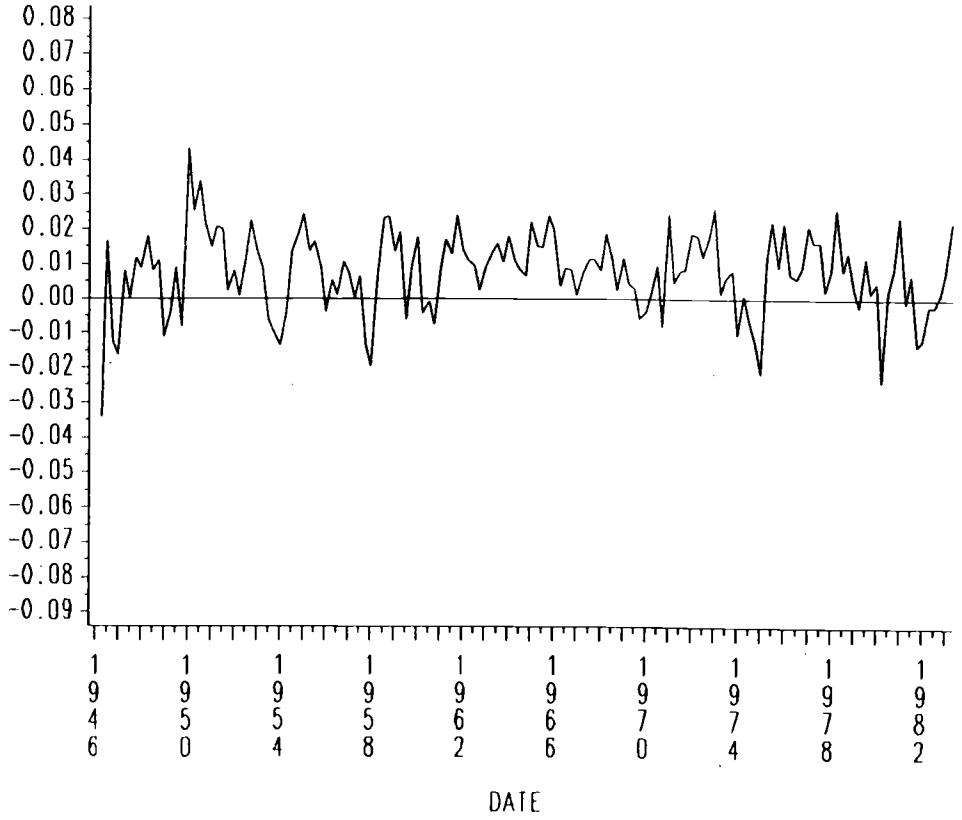
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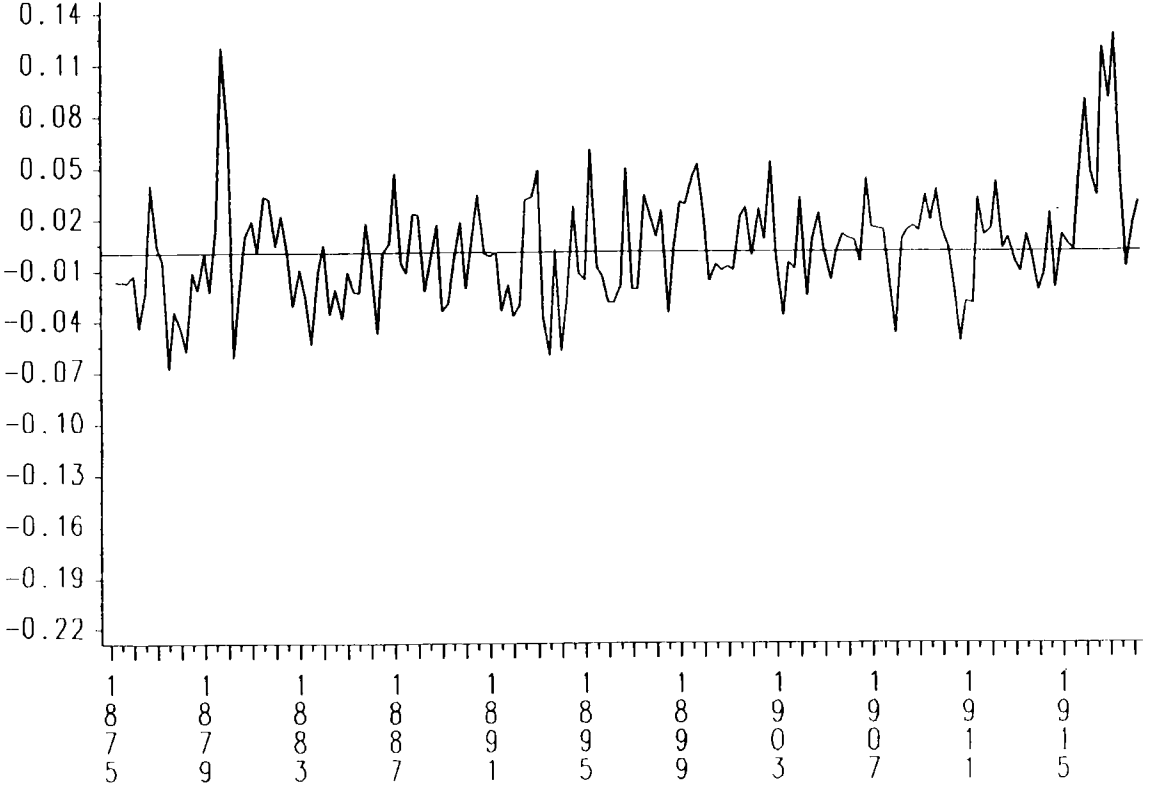
Chart 2
Wholesale (Producer) Price Index, Log Differences, Quarterly 1875-1983

A. 1875-1918



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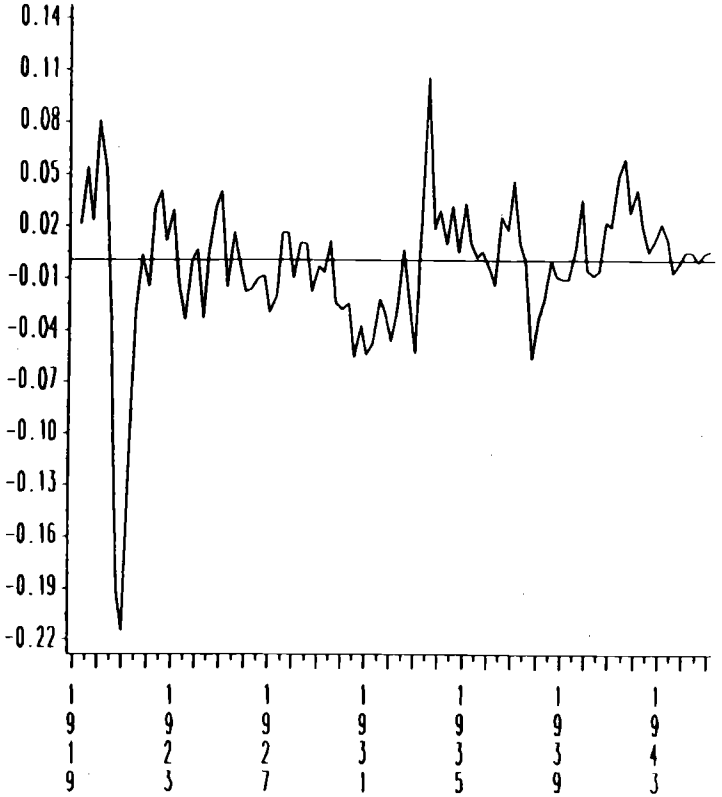
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c. 1946-1983

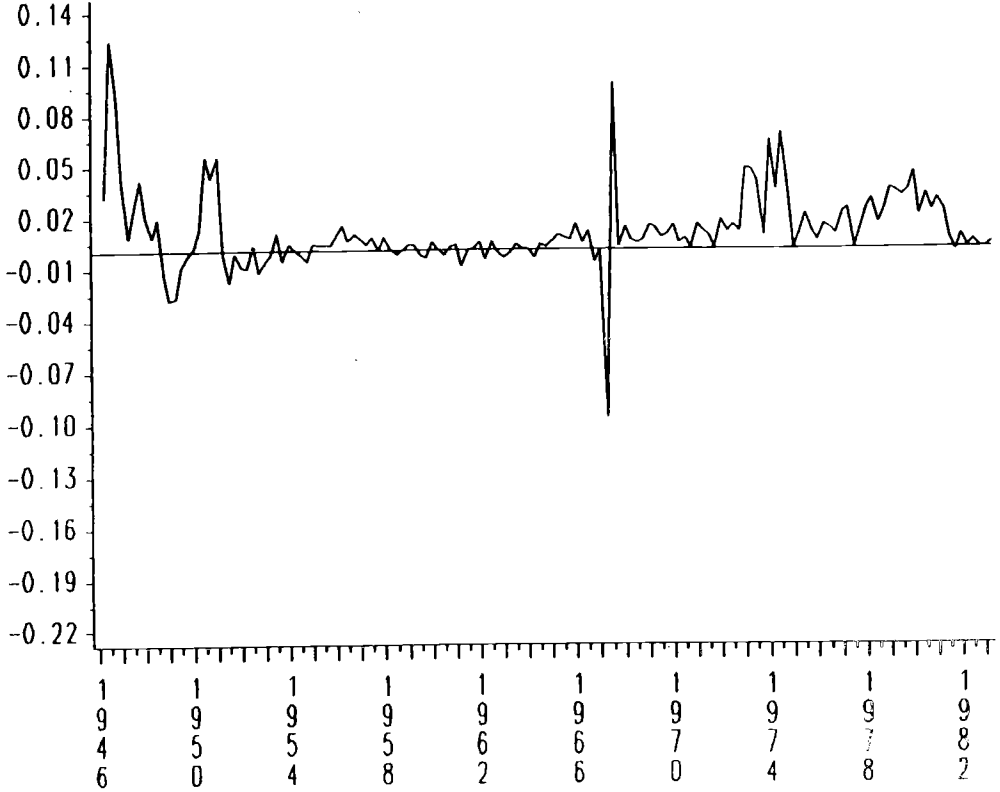
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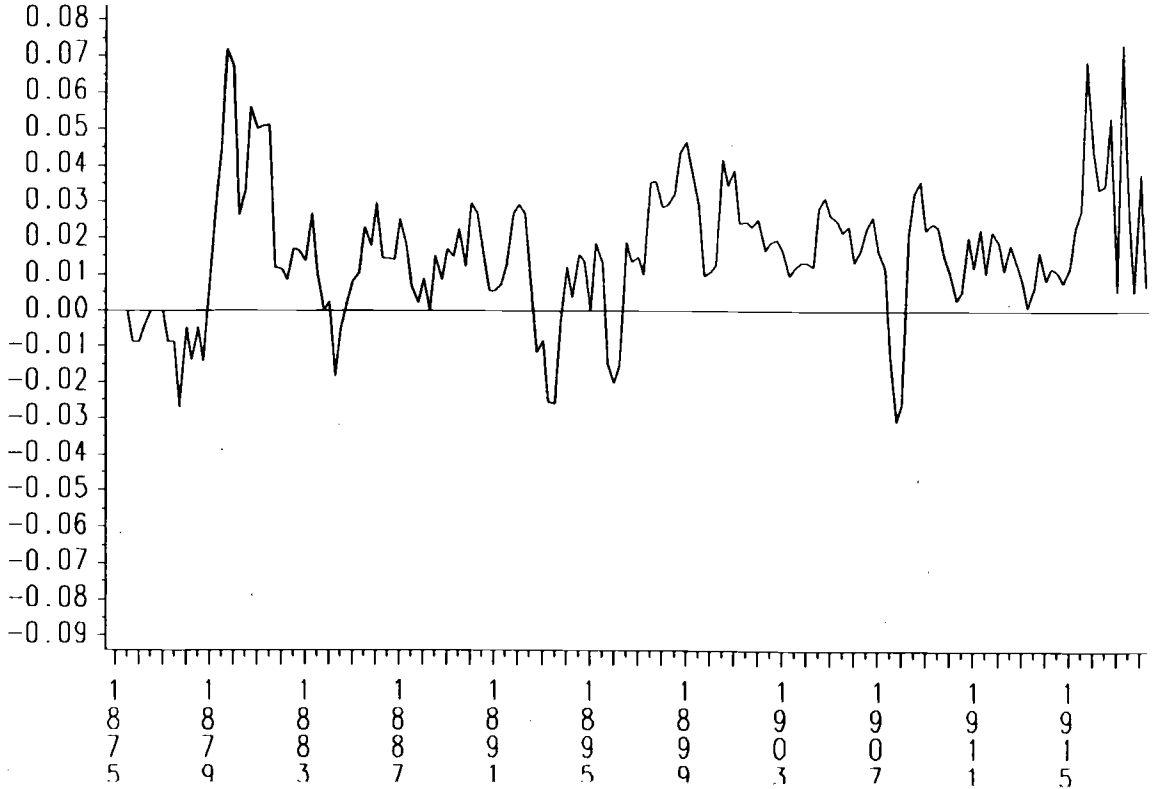
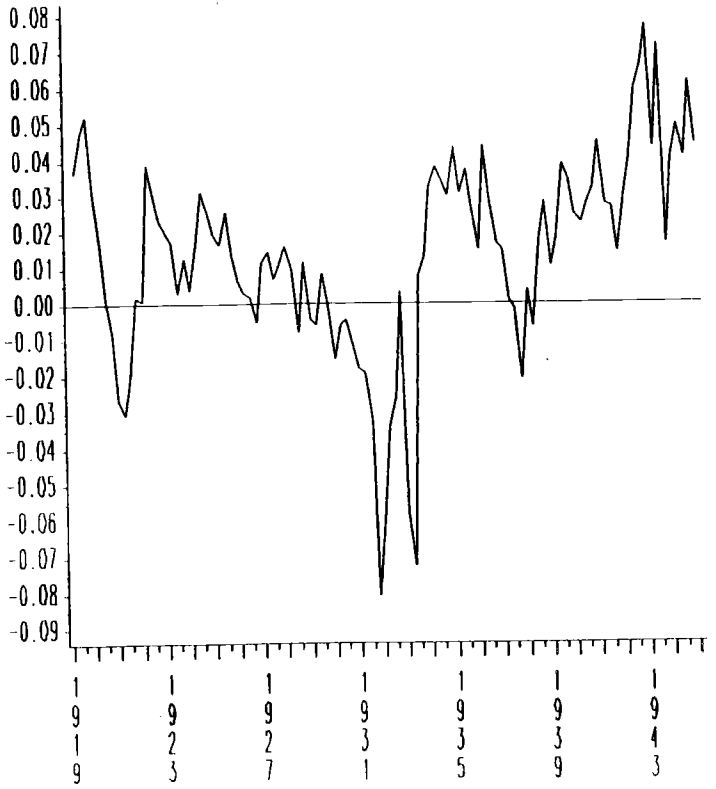
Chart 3
Money Supply (M2), Log Differences, Quarterly

A. 1875-1918



B. 1919-1945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c. 1946-1983

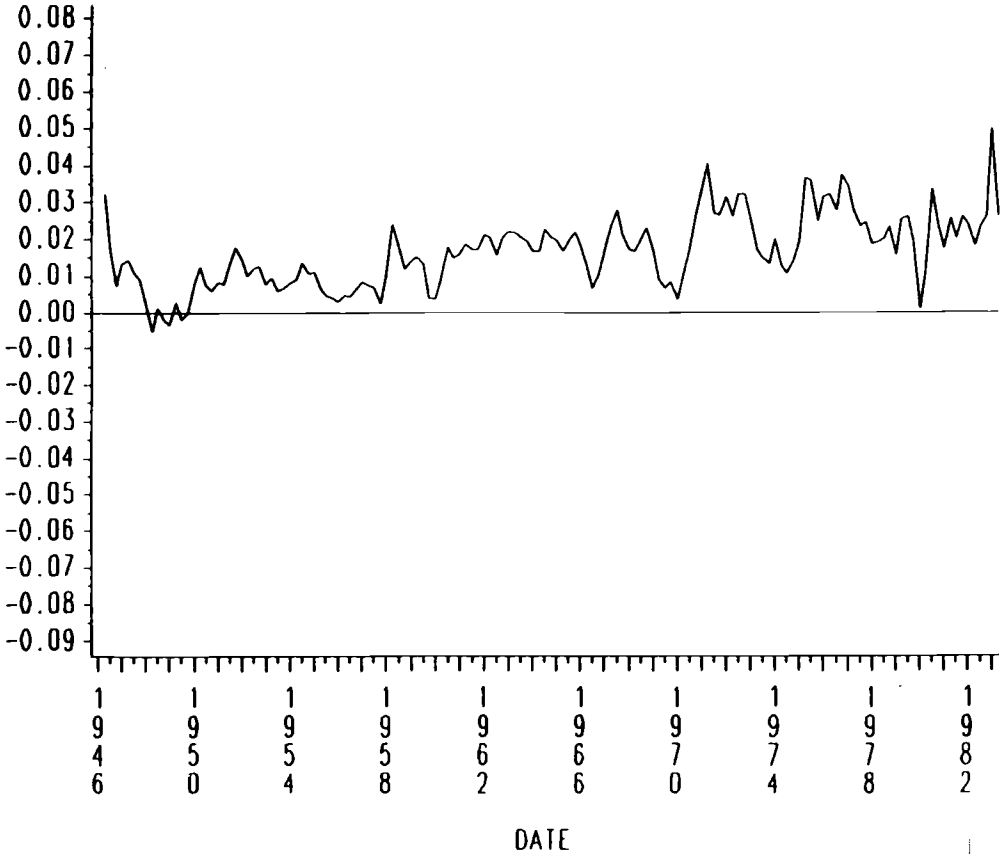
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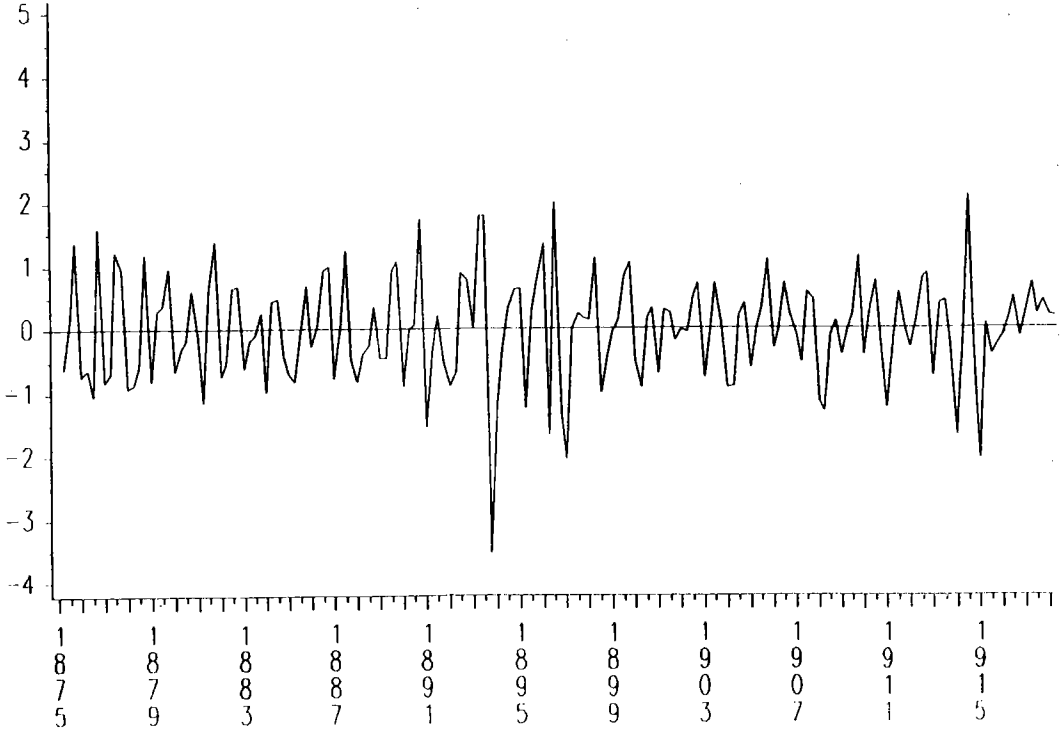
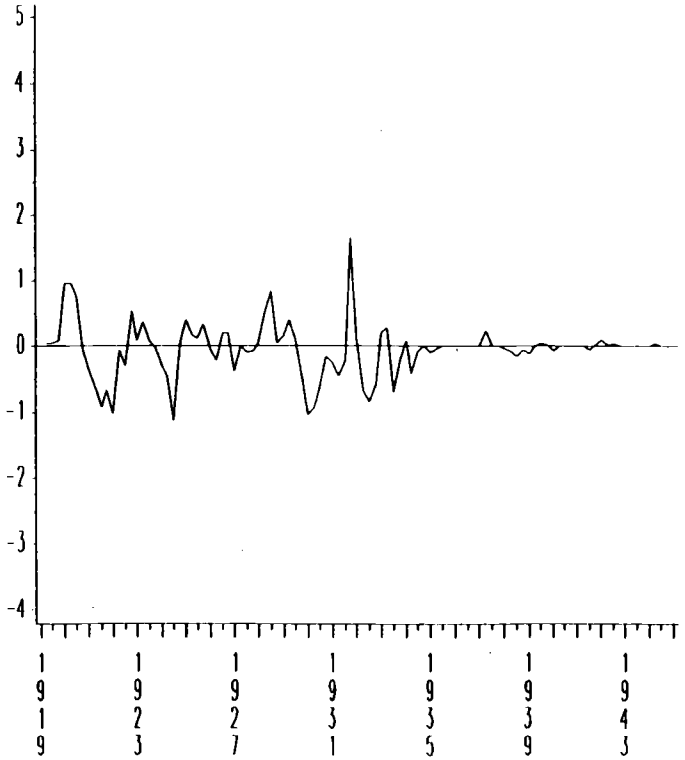
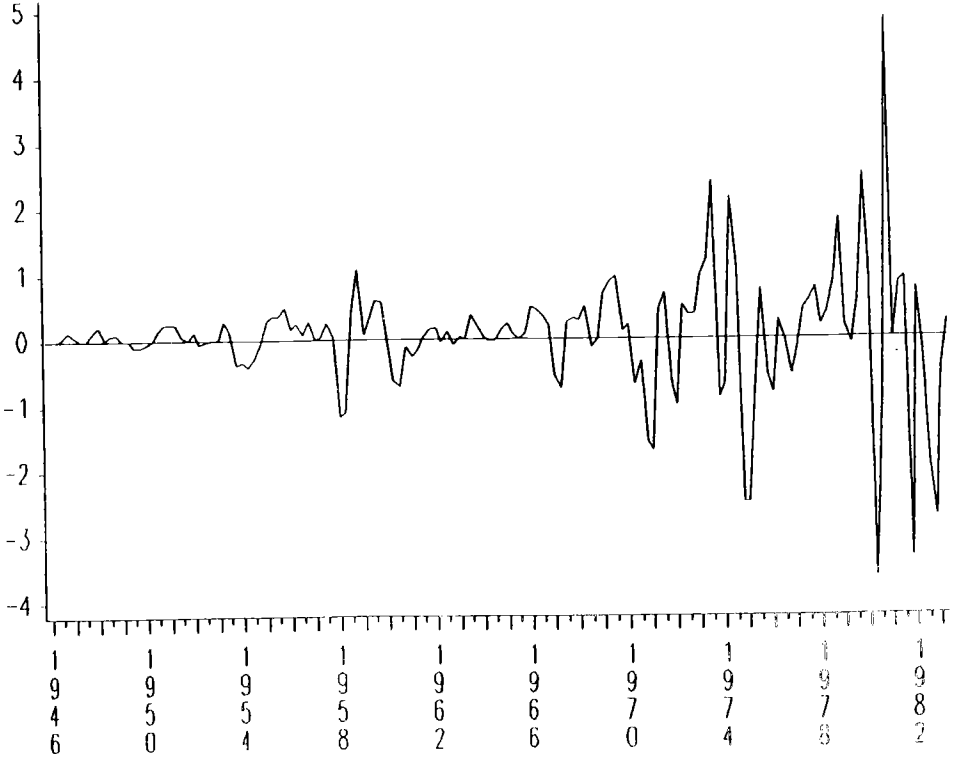
Chart 4
Commercial Paper Rate, Quarterly Changes, 1875-1983
A. 1875-1918



B. 1919-1945



c. 1946-1983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