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THE CAUSES OF AMERICAN BUSINESS CYCLES: AN ESSAY IN ECONOMIC HISTORIOGRAPHY

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ABSTRACT

This paper surveys the causes of American business cycles for the century 1890 - 1990. Causes are taken to be exogenous shocks to a model with largely endogenous policy makers. Causes are classified as either real or monetary and domestic or foreign. All four causes were found to have led to cycles in the past century. This diversity was found in all time periods and for all size cycles. There were more domestic than foreign causes, confirming the relative independence of the American economy from external conditions. There were more real than monetary causes, conflicting with the popular view that monetary shocks are the source of most cycles.

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This paper surveys American business cycles over the past century. Its task is to identify the causes of these cycles; other papers in this collection address the nature of policy responses to these causes. This paper can be seen as a test to discriminate between two views of the American economy. The first is expressed in a characteristically vivid statement by Dornbusch, who proclaimed recently: "None of the US expansions of the past 40 years died in bed of old age; every one was murdered by the Federal Reserve (Dornbusch, 1997)." This stark view can be contrasted with its opposite in the recent literature: "[N]one of the popular candidates for observable shocks robustly accounts for the bulk of business-cycle fluctuations in output (Cochrane, 1994, p. 358)."

I expand the time period to consider the past century, but it is easy to distinguish the past forty years, that is, the period since World War Two. A survey of business-cycle causes over an entire century runs into several problems, of which three seem noteworthy. First, it is not at all clear what "cause" means in this context. Second, the Great Depression was such a large cycle that it cannot be seen as just another data point. Third, the survey relies on the existing literature on business cycles, which is why I have entitled it an essay in economic historiography. The paper proceeds by discussing each of these problems in turn, then turning to the data, and finally drawing some conclusions from the preceding efforts.

I

The cause of a business cycle typically is taken to be a shock or innovation to a

relationship in the economy. There are myriad relationships in a complex economy like ours, and some way needs to be found to impose order on the analysis of shocks. Order typically is imposed by abstracting from the actual economy to an abstract model. A more operational definition of cause therefore is a shock to a relationship in a macroeconomic model. It follows that shocks may be specific to models, which differ both on their level of detail and on their basic assumptions.

With differing levels of inclusiveness, one person's shock may be another's movement of an endogenous variable. Government actions are a case in point. Variation in government purchasing is taken to be exogenous in many economic models, and it is eligible as a business-cycle cause in these models. But the growth of political economy has led people to endogenize government actions. Only deviations from the rule then would be admissible as a shock. Brown (1956) long ago looked for Keynesian stimuli during the Great Depression. He sanitized government spending to eliminate automatic stabilizers, that is, variations due to the state of the economy, to find the high-employment surplus. Keynesian stimuli then were changes in his calculated budget, not the actual budget. As Brown recognized half a century ago, the stimulus--or shock--was specific to the specification of the normal budgetary rule, that is, to the correction used.

Actions by the Federal Reserve fall into the same category. The Fed tries to respond to economic conditions. Are Fed actions endogenous or exogenous? Various authors have tried to endogenize the Fed. Wheelock (1991) and Toma (1997) have modeled the Fed in the interwar period. Taylor and others have proposed monetary policy rules to analyze Fed behavior since the Second World War Taylor (1993a, 1993b). A typical policy rule indicates that the Fed raises

interest rates when inflation rises and when the economy is operating above its trend level. Such Fed actions would be considered endogenous in a model that treated the Fed symmetrically with Brown's treatment of the budget.

An example may make this distinction clear. OPEC countries raised the price of oil sharply following the Yom Kippur War in the fall of 1973. Prices began to rise in the United States as a result, and the Fed sharply restricted monetary growth. A recession followed that Paul Samuelson quipped had "Made in Washington" stamped on its bottom. Was the recession "caused" by the oil shock or by monetary policy?

The answer to this question depends on the model. If we are using a model that regards Fed actions as exogenous (perhaps because we are searching for policies that can insulate the American economy from external shocks) then the Fed is the appropriate cause. If we are instead using a model that endogenizes the Fed (looking for sources of instability in the United States or world economy) then the oil shock is the obvious candidate. Causes, in other words, do not have independent existences. They are functions of the models being used and the questions being asked. They are exogenous events whose identification is endogenous to intellectual inquiry.

Christiano, Eichenbaum and Evans (1998) survey monetary shocks. They are interested in the response of the economy to exogenous shocks. But they recognize that the very identification of these shocks is specific to the model being used. They survey, for example, the narrative approach used by Romer and Romer (1989) to identify exogenous shocks coming from the Fed. Christiano, Eichenbaum and Evans argue that even these shocks are specific to the implicit model underlying Romer and Romer's narrative.

This ambiguity is present within any class of similar economic models, but there are

further ambiguities that come from the variety of theories that support macro models. Real business cycle theories find technology shocks to be the source of fluctuations. Demand shocks like Fed actions and oil price rises do not figure in these models. Technology shocks, however defined, are the underlying causes of fluctuations in income. If one is agnostic about what model is most accurate and useful, then the very idea of cause is ill defined. Cochrane (1994) started from this unstructured position, employing a sequence of progressively more tightly specified VARs to indicate what kinds of shocks cause business cycles. He concluded that technology shocks were not an important source of variation in output. This is less ideological than it seems; as noted above, Cochrane concluded that there was no single class of exogenous shock--from either supply or demand--that was the main source of business cycles.

If time-series analysis shows variety rather than uniformity of shocks, another approach may be more useful. I propose here to use a historical account. I examine American business cycles over the last century to inquire into their causes. Because this paper will be followed by others on policies, I interpret "cause" to mean the shock that initiates a downturn, trying to identify the source of instability rather than policy responses that may have aggravated the contraction. The Federal Reserve and the national government are endogenous. This view is consistent with Dornbusch's implicit framework, since murder is a wilful deviation from normal behavior. In the 1970s, the oil shock is the identified villain, not the Fed.

This approach differs from that of Romer and Romer (1989). They looked for monetary shocks in the postwar period, "to identify episodes when there were large shifts in monetary policy or in the behavior of the monetary sector that were not driven by developments on the real side of the economy (p. 122)." But they implemented this search by looking "for times when

concern about the current level of inflation led the Federal Reserve to attempt to induce a recession (p. 134)." The problem with their approach for my paper is whether a monetary contraction in response to inflation is a shift in policy or simply policy itself. I interpret most actions by the Fed to reduce inflation as the job of the Fed and therefore endogenous. The Fed's response to the first oil shock in 1973 did not represent a break with previous Fed policy. I therefore classify the Fed's contractionary actions as endogenous and attribute the recession to the oil price shock.

I work with an elementary open-economy model: an augmented IS-LM model or Mundell-Fleming model. The model distinguishes domestic and foreign shocks as well as real and monetary shocks. The model recognizes demand shocks far more easily than supply shocks, which appear as shifts in the aggregate supply curve and are classified as real shocks. This level of abstraction and general orientation of underlying assumptions about the economy is typical of the historical literature on business cycles in the United States. This simple two-by-two classification is shown in Table 1.

Mention of the Fed brings up the second problem that must be cleared away. The Great Depression was the largest contraction in our history. It dwarfs all other contractions in the past century. Output lost in the Depression was almost one-half of the sum of output lost in all downturns during the past century (Romer, 1994, p. 604). If one is interested in minimizing losses from foregone income, it may make more sense to explain the Great Depression than to worry about other, smaller fluctuations in output. Policies that avoid similar catastrophe's may be more important than policies that fine tune the economy.

The literature on the Great Depression also is larger than the literature on all other

business cycles combined. The Great Depression has stood as a challenge to economists since the severity of the Depression became clear. Keynes (1936) was an important response to this challenge, but not the only one. Generations of macroeconomists have attempted to incorporate this massive fluctuation into their theories. Only recently, as prosperity appears more and more permanent, has explaining the Depression become part of history rather than economics. Historians however distrust current visions of a New Era that are so reminiscent of the 1920s--pride goes before a fall. We cannot afford to ignore or belittle the Great Depression.

This paper is concerned with shocks. Was the Great Depression due to a larger shock than all others? Was the economy simply unlucky in the 1930s? Should we be keeping our eyes open for similar dreadful shocks in the future? I have argued that the shock that produced the Great Depression was the First World War (Temin, 1989). It surely is good advice to avoid world wars--and not just for the economic consequences of the subsequent peace.

But the story is not so simple. The Second World War was an even bigger shock to the world economy than the First. This can be seen easily by comparing the maximum share of national output devoted to the war effort in the two wars. The United States devoted 45 percent of its output to the war effort at the high point of expenditures in World War Two, compared to only 13 percent at the similar point in World War One. For Britain, the maximum shares of output in the two wars were 57 percent in World War Two and 38 percent in World War One. For Germany, the most heavily involved in both wars, the comparable numbers are 76 percent and 53 percent. In addition to devoting a great share of production to war in the second global conflict, these countries also maintained high war expenditures longer (Feinstein, Temin and Toniolo, 1997, p. 189).

Yet the larger shock of World War Two was not followed by the same economic strains as the interwar period. Economic (and political) policies were very different in the aftermath of the two world wars. The United Nations, IMF, and World Bank were all planned while the second great war was still going on. It became apparent by 1947 that even these new institutions were not going to be sufficient to guarantee economic--and therefore political--stability in Europe. President Truman, in one of the great actions of an international leader in our century, then extended aid to Europe in the form of the Marshall Plan. The First World War followed the economically tranquil Victorian and Edwardian periods; there was no expectation and no preparation for the forces unleashed by the war. The Second World War, by contrast, followed the Russian Revolution, the Great Depression, and the Nazi domination of Europe. Policy makers had ample warning--if they cared to learn from history--that the world economy would not heal itself from the injury of the war quickly or smoothly without help.

Current thought attributes the Great Depression to the inability of interwar policy makers to deal with the shock of the First World War. Their solution to the immediate postwar chaos represented by hyperinflations in Eastern Europe was to revive the gold standard. But this solution froze the major industrial economies into insupportable positions and allowed little flexibility to deal with strain. The inability of policy makers to abandon the gold standard then produced the Great Depression (Temin, 1989; Eichengreen, 1992; Bernanke, 1995).

Sins of omission can be just as harmful as sins of commission, but they are not exogenous shocks. Of course, if a behavioral equation predicts a change in policy that did not take place, then one can attribute the inaction to a negative shock to this relation. But the Depression was marked by governments and central banks acting in character, doing what they

had been doing before even though conditions had changed. Historians of the Fed have been more struck by the consistency of its policies during the slide into the Great Depression than by its innovations. Wheelock (1991, p. 115) concluded, for example, "[I]f member-bank borrowing was low, as it was in the early 1930s, the Fed bought few securities because it appeared that the proximate objective of purchase--monetary ease--had already been achieved. The Fed seems to have employed this strategy consistently from 1924 to 1933."

In keeping with the resolution described above to the first problem, I focus on the shocks that precipitated the contraction in the early 1930s. We need to remember that these shocks only had the effects attributed to them because of the context in which they came. Context here means both the strains on the international economy that derived from the world war and the policy rules that dictated national policies in the United States and other countries. These factors are critical to an understanding of the Great Depression, but they are put to one side here.

There is an additional complication. It is hard to think that a single shock in the late 1920s, however large, could have plunged the United States and the world into the Great Depression. In addition, economists and historians have been unable to find a shock in the late 1920s that seems to be anywhere near large enough to have had this effect, even in the interwar context that magnified the effects of economic shocks. This corresponds with our understanding of the economy. A century or more of evidence shows that the economy generally functions close to full employment. The combination of shocks and policies that characterize the economy keep productive resources generally employed. It follows that a single shock, even in the unfavorable interwar environment, was unlikely to have led to the Great Depression.

Friedman and Schwartz (1963) distinguished two stages in the Great Depression, and

writers since then have followed their lead. Perhaps there were two shocks that together knocked the economy out of this normal equilibrium. I recall studying a model of this sort by James Duesenberry when I was a graduate student and just before he became Chairman of the Board of the Boston Federal Reserve Bank. He started from a simple accelerator-type model where both output and capital were functions of the previous year's output and capital. The rate of growth of income in such a model depends linearly on the capital-output ratio while the rate of growth of capital is a hyperbolic function of the same ratio. It follows that the two relations intersect twice or not at all. If twice, then the intersection at the higher rate of growth (and lower capital-output ratio) is stable, and the intersection at a lower rate of growth is unstable. A small shock lands the economy between the two equilibria, returning it to the high-growth point. Multiple shocks--or a single larger shock--could push the economy below the lower equilibrium. In that case, the economy would continue to decline and not return quickly to its high-growth equilibrium (Duesenberry, 1958, pp. 203-08).

Just such a framework appears to fit the need here, brought up to date with appropriate bells and whistles. As just noted, there was no spectacular shock in the late 1920s to drive the economy far from its high-growth, near full-employment equilibrium. Instead, there was a sequence of shocks that drove the economy ever further from this equilibrium. The Great Depression should be thought of as a sequence of two (or more) recessions coming on top of one another. A recession starting in 1931 contracted the economy from its already depressed state. It requires only the addition of a breakdown of the banking and legal systems, as in Bernanke (1983) and Field (1992), to make the sequence of recessions large and durable enough to add up to the Great Depression.

The general literature on business cycles has made great strides since Duesenberry wrote his book. Progress may be seen in myriad journal articles and in any macro text where various mechanisms that might lead to recessions are described. Theoretical arguments are tested for fluctuations in general by sophisticated time-series techniques which generally confirm their validity. This literature, however, shies away from discussion of any specific business cycle. The accompanying text often refers to a recession or two, but as illustration rather than as the subject of careful analysis. The causes of interest here show up as errors, shocks and innovations in these abstract models. In Cochrane's (1994) analysis, for example, it is hard to discover even what period the data are from.

It is possible to map statistical errors into historical events (Temin, 1969, 1976). But one can do this exercise only relative to a specific model. Different models clearly give different residuals. If the goal is to find events that can be represented by the residuals, it may be possible to find events to explain one set of residuals as easily as another. But the variety of models extant today makes that kind of exercise unrealistic as a way to identify causes for multiple cycles.

As a result of the focus on general explanations, the literature on specific cycles is surprisingly sparse. Only occasionally do economists turn their attention to the explanation of a single downturn. The literature on earlier recessions, not surprisingly, is even more sketchy than the literature on recent ones. An inquiry that looks for specific shocks therefore is condemned to mine a narrow seam of literature. This raises the third problem mentioned at the start: this essay draws on the existing literature with all of its shortcomings. For example, it is no accident that Friedman and Schwartz (1963) found monetary causes to be important. Similarly, Aaron Gordon

(1961) found real causes to dominate. This turns out not to be a problem because most authors, including these, focused on the transmission of cycles, the endogenous factors that turned shocks into cycles, rather than the exogenous shocks themselves. The more serious problem is the short shrift often given to the shocks.

Another characteristic of the narrative literature is its age. Almost all of it, including the sources I have just cited, was written before rational expectations became central to macroeconomics and before technology shocks were recognized as possibilities. The narratives do not highlight expectations, and they generally do not distinguish between anticipated and unanticipated changes in any careful way. That is not to say the historical authors were innocent babes in the woods. They were sophisticated observers, and they were aware of the various influences that have been modeled in the past two or three decades. But without a formal model, these authors were imprecise in their identification of shocks to the American economy.

The lack of attention in the recent economics literature to specific business cycles is curious. It could reflect the difficulty of assigning causes to any single cycle. Economists differ on such large downturns as the Great Depression and smaller ones like 1990. But controversy generally has encouraged contributions, not discouraged them. The lack may be a reflection of disinterest in history among economists. In this case, only the latest recession is of interest, and only for a short while. With the exception of macroeconomic texts which need illustrations, this hypotheses is consistent with the observations. The lack also may be a reflection of economic methodology in which general structures are more important than individual events. This methodological bias of course supports the ideological stance of the previous hypothesis.

I do not aim to disentangle this knot. I only want to set the stage for my historiographic

exercise. Given the scarcity of sources, however, I could not resist speculating on the source of this scantiness.

II

The first task in collecting data is to define the population to be studied. I use Romer's (1994) dates for business cycles. She dated cycles by the previous peak and utilized a consistent algorithm to find cycles in industrial production before and after World War Two. The algorithm has two steps. First, cumulate "lost" industrial production between a peak and the subsequent attainment of this peak level of production, where lost production is the difference between the actual production in any month and the previous peak level. Second, classify periods where the cumulative loss exceeds 0.421 as recessions. This filter is designed to omit minor fluctuations in output; the cut-off value is the loss in the smallest postwar NBER reference cycle. Like Romer, I focus on the contractionary phase of cycles.

I restrict the sample further to include only the century 1890-1990, albeit including the recession of 1990. I also decompose the Great Depression into two recessions, in 1929 and 1931, respectively. I distribute the cumulative loss of output during the Great Depression between them as 1/3 and 2/3. This division shows the recession of 1929 would have been the deepest of the century even without the following economic collapse. But the bulk of the loss is attributed to the Great Depression itself.

There were eight cycles in each of three periods--1890 to World War One, from then to the end of World War Two, and from then to 1990--with one more in 1990. The four largest cycles were all in the middle period, in the interwar years. In other words, even without the Great Depression, the cumulative loss in production was far higher between the wars than in

comparable years either before or after. Business cycles clearly did not vanish after World War Two, but they were less frequent than before World War One. The three periods have the same number of cycles despite their varying length.

I searched the economic history literature for discussions of these cycles. Only a few sources were found, since individual cycles generally have not been a concern of economic historians or economists generally--as noted above. The Great Depression of course is a notable exception to this general pattern. The causes of cycles then were classified in the simple two-by-two matrix shown in Table 1: domestic or foreign, real or monetary.

Table 2 shows the causes listed in the literature for each cycle of the past century except 1916, the second smallest downturn, for which no sources could be found. Also listed in Table 2 are the losses of industrial production (in months of production) from Romer (1994, Table 7) to show the relative sizes of the different cycles. I was able to select a single dominant cause for all the cycles except one (1981). Given the diversity of causes represented in Table 2, adding subsidiary causes for individual cycles only reinforces the conclusion that shocks are diverse.

I classify shocks by the loss of output in the subsequent recession, but I do not want to suggest that there was a tight correspondence between the size of the shock and the size of the subsequent economic decline. Some economic institutions and policies transmitted and even augmented shocks more than others. But that is not the topic of this essay. I therefore ignore the transmission of economic shocks and focus only on their origins.

Consider first the difference between the columns of Table 1. There is a preponderance of domestic causes. Cycles in the interwar period were mainly domestic, although the largest (1931) was international. Weighted by cycles, the interwar period was insulated from the world.

Weighted by lost production, the interwar period was more vulnerable to international shocks than years either before or after the wars.

Consider now the rows of Table 1. There are roughly the same number of real and monetary causes, slightly more real. My convention has been to regard a change in the price of real assets, whether oil or equities, as real. Another classification might yield somewhat different results, but I doubt if the conclusion of a roughly equal number of monetary and real shocks would change. There is a trend toward real causes, particularly if the period before the First World War is compared with the period after the Second.

To go beyond these general conclusions requires a deeper level of analysis. I turn to the literature on individual cycles. They are discussed in order of their size, to give the largest cycles price of place. Not surprisingly, the largest cycles also have been the subject of the most sustained inquiry, and it is possible to say more about them than about cycles at random.

The largest cycle by far in Table 2 is 1931, the downturn that started in the midst of an already depressed economy. This cycle, it should be recalled, is not derived from Romer's (1994) algorithm. Her cycles are dated from the previous peak. This cycle acquired much of its power from coming on top of an earlier contraction. In her classification, this "cycle" is the second part of the cycle beginning in 1929, a true peak of economic activity. The negative shock explains how a recession was turned into a depression. This shock may well have been the most potent single shock of the last century--measured by its effects as transmitted through endogenous policies--and it deserves to be classified as its own cycle.

The contraction starting in 1931 has been laid squarely at the door of the Fed. Friedman and Schwartz argued forcefully for this position 35 years ago. In their dramatic words: "On

October 9, the Reserve Bank of New York raised its rediscount rate to 2 1/2 per cent and on October 16, to 3 1/2 per cent--the sharpest rise within so brief a period in the whole history of the System, before or since (Friedman and Schwartz, 1963, p. 317)." This sharp rise followed a gradual decline in the discount rate from its peak of six percent in 1929 to its low of 1.5 percent in April 1931. The Fed's actions then more than doubled the discount rate in two weeks--like raising the discount rate today by five or six percentage points. This should be contrasted with stock market jitters today on the rumor of a possible one-quarter percent rise. Friedman and Schwartz continued that the Fed's action "intensified internal financial difficulties and was accompanied by a spectacular increase in bank failures and runs on banks (*Ibid.*)."

Friedman and Schwartz characteristically did not say that the Federal Reserve's action *caused* the bank failures and runs on banks, only that the Fed's action "was accompanied by a spectacular increase in bank failures and runs on banks." We however can bite the bullet and say what Friedman and Schwartz presumably intended and have been quoted for over thirty years as saying, namely, the Fed's dramatic increase in the discount rate sent the already depressed economy into a tail spin. For Friedman and Schwartz and for countless others, it was the Fed's mistaken policy that was the cause of the Great Depression.

As explained above, the model within which shocks are defined in this paper includes an endogenous Federal Reserve. Only if the Fed acted out of character, or failed to act when it normally would have, can Fed action or inaction be classified as a shock to the economy. In this case, the Fed was acting in character. The problem was that the Fed acted totally traditional and predictably under stress, not that it deviated from any existing norm.

Friedman and Schwartz noted, "The Fed reacted vigorously and promptly to the external

drain, as it had not to the previous internal drain (*Ibid.*)." In other words, the Fed did its job in response to an external drain while it had not done so in response to an internal drain. Several other authors have argued that the Fed's inaction was business as usual. The Fed read low interest rates and the lack of member-bank borrowing as monetary ease (Wheelock, 1991; Toma, 1997). Its action in October 1931 was in character as well. The Fed acted "vigorously and promptly" to preserve the gold value of the dollar.

It was the inability of central banks and political leaders to free themselves from this inflexible monetary arrangement that led them to undertake contractionary actions as the economy declined. The Great Depression was the inevitable result of sustained and cumulative deflationary policies in almost all the major industrial countries (Temin, 1989). This view has received ample support from econometric analyses of the world depression and become widely held (Eichengreen and Sachs, 1985; Bernanke, 1995).

Friedman and Schwartz, although they saw the Great Depression as a primarily American affair, agreed with this characterization of the Fed's action in October 1931. Their detailed discussion of the decision to raise the discount rate so dramatically reveals that the Fed was concerned overwhelmingly with the preservation of the dollar. None of directors thought that it was doing anything other than being a traditional and responsible central banker. Friedman and Schwartz reported also that the Fed's decision was widely supported throughout the American financial community (Friedman and Schwartz, 1963, pp. 380-84). More recently, Romer (1993, p. 26) concurred, characterizing the Fed as having a "slavish adherence to the gold standard."

Romer (1993), like most other economists, also cites the sequence of banking panics first emphasized by Friedman and Schwartz (1963) as intensifying the Great Depression. There is no

doubt that banking panics are bad for economic activity. But were the banking panics of the early 1930s a cause of the 1931 cycle? There is first the problem of definition, whether bank runs should be thought of as exogenous shocks that precipitate economic decline or whether they are part of the transmission mechanism by which economies can contract. More important is the question whether banking panics would have continued if the Fed in October 1931 had expanded instead of contracting. Commentators from Friedman and Schwartz to the present have asserted that they would not. Grossman (1994) found that the only variable consistently associated with the presence of banking crises was adherence to the gold standard. Bank failures and Fed policy were both endogenous. The external gold drain was the exogenous cause of the 1931 cycle in America.

What then was the cause that led to the Fed's action? It was the external gold drain that followed Britain's departure from gold in September 1931. The British action was in turn a result of the German financial crisis in July 1931. Hot money was moving around the industrial world, speculating against currencies that looked increasingly weak as other currencies failed (Eichengreen, 1992; Eichengreen and Temin, 1997). The sequence of speculative attacks, loss of reserves and devaluation or currency controls in a sequence of countries in 1931 differed from the parallel sequence in 1997 only by being European and American instead of Asian.

The cause of the cycle beginning in 1931 then was foreign monetary, FM. It has been entered as such in Table 2. Because this cycle is an outlier, the way it is treated in any quantitative analysis determines the importance of international monetary shocks in precipitating American cycles.

Turning to the second largest cycle, 1929, there is consensus among economic historians

that the shock was domestic, and a growing agreement that it was real. I argued for a real shock twenty years ago in the form of an autonomous fall in consumption from 1929 to 1930 (Temin, 1976). Some authors have claimed that consumption did not fall unusually, but others have confirmed that it did (Mayer, 1980; Hall, 1986; Lebergott, 1996). It has been explained in part as a result of the stock-market crash which both increased consumers' leverage and their uncertainty (Mishkin, 1978; Romer, 1990).

A new paper provides a stronger explanation for this fiscal shock. Olney (1998) argues that the structure of consumer credit made consumption highly volatile at this moment in history. If a consumer defaulted on an automobile loan, to take the most important form of consumer credit, he or she did not retain any equity in the automobile used as security. Consumers therefore cut back consumption in an effort to retain their equity in their new cars. A dramatic fall in consumption was the result.

The exogenous fall in consumption in 1930 has been transformed into an endogenous fall in consumption by the research just cited. Being endogenous, it does not qualify as a cause of the cycle. We must move further back in the chain of causation. Two events of 1929 appear to have precipitated the sharp fall in consumption: the stock-market crash in October 1929, and the decline in industrial production which began in mid-1929. While these events are not satisfactorily explained, they have been regarded as bubbles, whose end is indeed exogenous (De Long and Shleifer, 1991; Rappoport and White, 1993). And since they involve the real economy, they are classified here as domestic real shocks.

This view is opposed by studies that document the slow growth of the money supply in 1928 and 1929 and the high interest rates that accompanied the stock-market boom (Friedman

and Schwartz, 1963; Field, 1984; Hamilton, 1987). But Romer (1993, p. 29) observed that the slowdown in monetary growth was not large by historical standards and that real interest rates fell after the stock-market crash. She concluded, "The source of this sharp decline is almost surely not contractionary monetary policy." In addition, there is little discussion in this literature about whether the Fed was acting in or out of character in the late 1920s. The implicit assumption appears to be that the Fed was acting in its traditional fashion. If so, then for this reason also, the rate of growth of the money supply does not qualify as a shock to the economy. I therefore list 1929 in Table 2 as resulting from a domestic real shock, DR.

The next two largest cycles, 1920 and 1937, are best considered together. They were the other large cycles of the interwar years, and they have been discussed together in the literature. For both of them, as for 1929, there is agreement that the shock was domestic. And for both of them, there is disagreement whether the shock was fiscal or monetary. The fiscal shock in 1920 was the cancellation of many war contracts when the Armistice ended the First World War. The fiscal shock in 1937 was the budget contraction after payment of the second soldier's bonus in 1936. The monetary shock in 1920 was a contraction by the Fed, facing its first postwar test. The monetary shock in 1937 was the rise in the reserve ratio mandated by the Fed in order to sop up the tremendous rise in unborrowed reserves among member banks. The Fed apparently thought it was in a liquidity trap and that these excess reserves were the sign of a perfectly elastic supply of money.

Romer (1992) tested these explanations against each other. She used a simple reduced form in which income this year responds to fiscal and monetary shocks last year. The coefficients on fiscal and monetary shocks were unknown coefficients to be determined by the

data. She constructed two equations in two unknowns by inserting values in the reduced form for 1920 and 1937. Solving, she found that the coefficient on fiscal shocks was essentially zero; monetary shocks were the cause of both cycles. It is easy to criticize this simple model, but it is hard with the limited available data to improve upon it. I accept Romer's conclusion and cite domestic monetary, DM, shocks for 1920 and 1937.

This treatment of 1920 is faithful to the literature, but may not approach the ultimate cause of this cycle. It was the end of the war that led to all of these domestic actions. If the domestic actions were endogenous, then the cause of the cycle was the cessation of hostilities which produced a negative international fiscal shock. This was the view of an early Keynesian analysis of this cycle, performed during the Second World War to predict if there would be a repetition after that war (Samuelson, 1943). Romer (1988) took a different approach to the end of the war. She argued that there was "a positive supply shock in 1921" that came from accumulated stocks of raw materials during the war. They appeared in the United States only after the release of shipping capacity from wartime controls and use. But Romer argued in her later paper that this was only a negligible part of the cause of the 1920 cycle (Romer, 1992, p. 764).

This abbreviated survey of the literature on the four largest cycles of the past century shows several aspects of the literature. First, there is no single type of shock that was responsible for them all. Three out of the four possible kinds of shocks distinguished in Table 1 are represented as causes of the four largest cycles of the century. This is a very strong conclusion. If one rejects the results of recent scholarship and reverses the causes of the contested cycles in 1920, 1929, and 1937, the conclusion still stands. And people who wish to remain agnostic and

cite multiple causes for these cycles obviously preserve the conclusion of many different kinds of shocks.

Second, three out of four cycles were responses to domestic shocks. While instability in the international economy was capable of wreaking havoc at home, most often cycles originated in domestic disturbances. Third, the evidence adduced by economists and economic historians to identify the shocks causing these cycles ranges from formal models to informal narratives, with various quantitative and qualitative explorations in the middle. It is possible that we find so many different causes because we use so many different lenses to view the world. This is a persistent problem, but there does not appear to be a good correlation between the research method used and the conclusion reached.

I turn now to a survey of the other cycles of the past century. I provide briefer narratives of the next ten cycles, ordered by production lost. This list includes all but one of the cycles for which the cumulative loss exceeded one month of industrial production. The remaining ten smaller recessions are surveyed in an appendix. There is no economic content to this division. I want to expose enough narratives to show their varied nature, but not enough to bore my audience excessively. And we have better stories about larger cycles.

The cycle of 1907 started in the European money market. There were problems in Europe that led to restriction by the Bank of England and the Reichsbank. The Bank of England additionally looked with disfavor on bills financing trade with America--as the Old Lady of Threadneedle Street had done before, most notably in 1836 (Temin, 1969). The resultant monetary stringency in the United States was enough to generate a cycle, but it was augmented by a domestic banking panic. The banking panic in turn led banks to suspend payments, that is,

to refuse to change bills into specie at par (Sprague, 1910).

Friedman and Schwartz regarded the suspension of payments as another cause of the cycle. They argued that the suspension turned a mild contraction into a severe one (Friedman and Schwartz, 1963, p. 163). De Long and Summers (1986) argued to the contrary that the financial panic was contained by the suspension, reducing its effects on production. Both sets of authors agree that the domestic expectations changed in response to the foreign stimulus. The expectations were endogenous, leaving only the foreign monetary cause.

The cycle of 1893 also was involved with international finance, but its origin appears firmly domestic. The Sherman Silver Purchase Act of 1890 set the stage for a possible American devaluation in the form of shifting from a gold to a silver standard. Silver had decreased in price in the course of the preceding two decades as new discoveries and technology vastly increased the supply of that metal. Cleveland's election in 1892 made this possibility into a probability, and there was a run on the dollar in 1893. Interest rates rose as people rushed to sell government bonds, and banks suspended payment as they would do again in 1907. The decade of the 1890s was marked by many dislocations in the economy, but the cycle of 1893 was caused by flirting with devaluation (Calomiris, 1993; Fels, 1959; Hoffman, 1970).

The next largest cycle was 80 years later in 1973. There can be no doubt that the cause of this cycle was the quadrupling of oil prices by OPEC. This oil shock was clearly apparent at the time and has been the object of countless studies since. Many commentators at the time and later argued as well that Fed was excessively aggressive in its attempt to limit the resulting inflation (Gordon, 1980; Zarnowitz, 1992). This policy choice--poor policy from the point of view of industrial production--was the reason Samuelson regarded the Fed as the villain in this cycle.

From the point of view of this paper, in which central-bank actions are endogenous if in character, the Fed's action must be regarded as the inevitable result of an inflationary shock. A respectable central bank resists inflation, just as it resisted devaluation in 1931. The cause of this cycle then was foreign real, FR.

The 1923 cycle, with the next largest loss of production, followed hard on the heels of the 1920 cycle. Recovery was rapid, and the boom led to bottlenecks, inflation, rising interest rates, and expectations of another recession (Gordon, 1961, p. 423). Even though this was a large cycle, it came in the middle of sustained expansion of production and has received little attention. To the extent that this cycle reflected strains in the preceding expansion, it must be judged to have been caused by domestic real causes.

It is clear where this review of individual cycles is going. The first four cycles in this extended review are listed as the result of four different kinds of shocks. All of the types of shocks distinguished in Table 1 are represented. As with the larger interwar cycles, there is no single kind of shock that has been the origin of American cycles.

The 1981 cycle clearly was caused by the second oil shock, as the 1973 cycle was caused by the first. But the rise in oil prices and the beginning of the downturn were separated by an election which confirmed the hard-line monetary policy undertaken by the Fed under Carter. Volcker was appointed by Carter, and his fiercely contractionary, "monetarist" policies led both to Carter's disgrace and defeat at the polls and then Reagan's apotheosis and subsequent great victory in his reelection. Since this was a departure from Fed policy during the 1970s, it must be regarded as a cause of the 1981 cycle (De Long, 1998). This cycle then had two causes: foreign real and domestic monetary.

Not much is known about the cycle of 1910. Although relatively large, it was not accompanied by a breakdown of the financial system. It consequently did not receive much contemporary attention and has not been the focus of subsequent research. Friedman and Schwartz (1963, p. 174) commented that a drop in wholesale prices contributed to the recession, and I classify the shock as domestic real as a result.

The cycle of 1957 was caused a decline in federal government expenditures as the federal debt neared its legal limit. The Eisenhower Administration made the decision not to ask for an increase in this limit, presumably in the interests of fiscal responsibility. Defense expenditures had been high in the first half of 1957, and the decline in the second half was large. Both durable and non-durable investment decreased, and production fell (Brown, 1960; Freeman, 1960; Gordon, 1961; Gordon, 1980, Moore, 1959; Osborne, 1958). Although monetary policy during the 1950s has been criticized as unnecessarily restrictive (Romer and Romer, 1989), a real shock was the cause of this cycle.

Moving back half a century, the cycle of 1896 appears in the literature as a coda to the cycle of 1893, much as the cycle of 1923 is seen as a continuation of the process begun in the cycle of 1920. Uncertainty about the exchange rates was increased by the Democratic Party's nomination of Bryan for President. He proclaimed in ringing words at the convention, "You shall not crucify mankind upon a cross of gold." This was not calculated to calm the financial markets. As with 1893, the cause must be seen as domestic monetary. The threat was to the exchange rate, but it came from within the United States, not from foreign sources.

Returning again to the 1950s, the cycle of 1953 followed the end of the Korean War. It was caused by the decrease in government spending that resulted from the sharp cutback in

military activity (Brown, 1960; Freeman, 1960; Gordon, 1961; Gordon, 1980; Zarnowitz. 1992). This cycle therefore was like that of 1920 in having its cause in the fiscal shock of peace. It differed from 1920 in coming directly after the war and not having an intermediate boom. The more direct link between the end of hostilities and a cycle in 1953 may reflect the smaller size of both the preceding war.

The cycle of 1948 also resembled that of 1920 in following a war. The parallel appears more direct than for 1953 because the war was far larger and because the downturn followed an immediate postwar boom. But while the cycle of 1920 was one of the largest of the past century, that of 1948 was quite small. Commentators have regarded the contraction as an inventory recession (Freeman, 1960; Gordon, 1980; Hamberg, 1952). There was an ever changing economic scene in Europe after the war, but the realignment of European currency values in 1948 was accompanied without turmoil in the international financial markets.

This is a good place to end this review of individual cycles. The literature on smaller cycles lacks the intensity of the discussion of larger fluctuations. It consequently is harder to discriminate among the suggested causes advanced by different authors. The appendix contains a narrative account of the remaining cycles in Table 2, where the conclusions of the narrative are presented graphically.

As with the four largest cycles, there is variety to spare in the causes of these ten cycles. All four types of causes are listed, although a foreign monetary cause was important in only one cycle, 1907. In fact, monetary causes of any sort are not prominent in this intermediate tier of cycles. Real causes outnumber monetary ones by two to one. Foreign real shocks were confined to the period after World War Two for these intermediate-sized cycles.

The appendix contains short narratives of the smallest ten cycles of the past century, omitting 1916 about which no information could be found. All four types of causes were represented among these smaller cycles, although domestic real and foreign monetary shocks were most numerous. There were slightly more real than monetary causes. There also were more domestic than foreign causes, as with larger cycles. Smaller cycles do not appear to have different causes than larger cycles.

III

The results of this study are summarized in Table 3. The first row shows the unweighted distribution of shocks over the past century, where each cycle is counted as one observation. The second row weights the cycles by the loss of production shown in Table 2 to show the months of production lost in cycles started by different causes. (In both rows, the cycle of 1981 with its dual cause is divided in two.)

As noted above in examining subsamples, all four types of causes played a role in American cycles of the past century. It is not possible to identify a single type of instability as the source of American business cycles. This is true for the century as a whole, for each sub-period, and for each size class. The dominant conclusion of this inquiry is that sources of instability are not homogeneous. The literature on American business cycles provides no basis for Dornbusch's stark indictment of the Fed. Instead, this informal survey supports the results of Cochrane's (1994) time-series tests on postwar data.

Domestic real shocks were the most numerous, simply counting cycles (in the first row of Table 3). These shocks ranged from inventory adjustments to the changes in expectations that led to the dramatic fall in consumption in 1930. Even though they are grouped together in this

classification, domestic real shocks were themselves quite diverse. Nonetheless, this conclusion may be surprising. The anti-Fed view is not even supported as an approximation.

Foreign real shocks were not an important source of American instability, with the exception of the two oil shocks. The oil shocks represent a new kind of instability for the American economy. It is unlikely that this change is due simply to the growing importance of international trade. It appears to come also from increased concentration in various markets that allow dramatic price changes to take place. But we have had only two oil shocks, which is not enough to test hypotheses. We do not know if there will be more such shocks or whether OPEC will turn out to be a transitory source of instability.

Monetary shocks, both domestic and foreign, appear to have decreased over time. The difference between this conclusion and the opposite view represented by Dornbusch's statement may come from the model I am using in which the Fed is endogenous. If the Fed "caused" a downturn by responding to some other shock, then I regard the other shock as the cause, while someone regarding the Fed as exogenous might classify the Fed's action as the shock. But this interpretation may not be true to Dornbusch's intent. His use of the term, "murdered," suggests exogenous acts by the Fed. I did not find evidence that they were important in the period since World War Two.

This comparison has taken all cycles to be equal. It is instructive to ask whether large cycles were caused by different shocks than small shocks. The narratives of cycles suggested this was not the case; the second row of Table 3 takes another look. Foreign monetary shocks emerge as the most important type of shock, measured by the amount of production lost. The contrast between the weighted and unweighted sums is due to the great size of the 1931 cycle.

This downturn, which dwarfs all others of the past century, accounts for 21 of the 26 months of production lost as a result of foreign monetary shocks. If the Great Depression is seen as a special case, then the weighted and unweighted sums provide more similar pictures.

With the exception of the Great Depression, domestic shocks were much more important in the past century than foreign shocks. Aside from the Great Depression, foreign monetary shocks led to very small losses in output. And foreign real shocks led to even less. The view of the American economy that sees it as largely independent of the rest of the world gets abundant confirmation in the record of the past century--leaving the Great Depression to one side.

The losses due to real and monetary shocks are surprisingly similar. As noted above in the narratives, each kind of shock caused both large and small cycles. There appears to have been little bias in their incidence. Real shocks were slightly more important, as suggested by the unweighted sum. This conclusion appears stronger for the postwar years than for the century as a whole. For the past 40 years, production lost in business cycles has been caused more by real shocks than monetary ones. For only one, small cycle--the most recent--was the real shock possibly a productivity shock.

Finally, I reiterate that this has been an exercise in historiography. I have examined the secondary literature on business cycles in America over the past century and found the patterns exhibited here. The conventional call for more research is particularly apt here. Macroeconomic theory has developed in many directions since most of the research surveyed here was performed. The history of American business cycles offers a fertile field for empirical research.

Appendix

This appendix contains short narratives of the smallest ten cycles of the past century,

omitting 1916 about which no information could be found. This is not a discontinuity; the literature on small cycles often approaches zero. The cycles are discussed chronologically on the grounds that the range of size--from one-half to one month's production lost--is too small to be interesting. Chronological order also preserves some continuity in economic conditions as the narrative progresses.

1900: This small cycle was caused by a mild monetary stringency following the start of the Boer War (Friedman and Schwartz, 1963, p. 148). It's cause is FM.

1903: This "rich man's panic" followed the great merger wave at the turn of the century. No specific cause for the cycle has been identified in the literature. I judge it to result from a readjustment of equity prices after the enthusiasm of the merger wage had cooled a bit. This shift of expectations about the real economy makes the cause DR.

1914: This cycle followed the outbreak of the First World War. As usual, there was a brief panic that raised interest rates and led to a contraction of economic activity. The cause is FM.

1918: This cycle was caused by the decline in spending at the conclusion of World War One (Gordon, 1961). It was the immediate effect of the war's end, limited in scope and followed by a brief boom and then the larger cycle of 1920. The cause of this cycle is a reduction in domestic spending, DR, even though this spending was related to the United States activities in Europe. The cycle was not a response to a fall in the demand for exports.

1927: This cycle is attributed to the Ford Motor Company shutdown in 1927 for a model change (Gordon, 1961, p. 424). This is not supported by anything more than temporal correspondence. Nonetheless, in the absence of other causes, I classify this cause as DR.

1939: Like 1900 and 1914, this cycle was the result of financial stringency caused by panic at the beginning of a war. The cause is FM.

1960: This cycle took place during the Eisenhower tight budgetary regime. While some people have regarded the budget surplus as a cause of contraction, the surplus was planned--in conjunction with expansionary monetary policy--as a stimulus to private investment. The cause of the contraction was "the drastic tightening of money that occurred in 1959-60 (Gordon, 1980, p. 131)." The cause is DM.

1969: Like 1918, this cycle was caused by the decline in government spending attending the end--or at least the winding down--of the Vietnam War (Gordon, 1980, p. 145; Zarnowitz, 1992, p. 114). The cause is DR.

1980: This cycle is the smallest downturn classified as a cycle. It is a precursor of the larger cycle in 1981; there is no separate cause for it noted in the literature. The following cycle, starting in 1981, is rightly attributed in part to Volcker's influence; this one, simply the result of the oil shock, FR.

1990: Blanchard (1993) and Hall (1993) said that this cycle was due to an exogenous fall in consumption--like 1929. Cochrane (1994) objected that consumption is endogenous; the consumption fall must have been caused by a change in expectations. Blanchard labeled these expectations, "animal spirits," and both he and Hall referred to the invasion of Kuwait as a shock that discouraged consumption. Hansen and Prescott (1993) claimed a technology shock as the cause of the recession. Without resolving this disagreement, I classify the cause as DR.

Table 1

A Two-by-Two Classification of Causes

	Domestic	Foreign
Real	DR	FR
Monetary	DM	FM

Source: See text.

Table 2

Causes of Cycles in the United States

Peak	Loss	DR	FR	DM	FM
1893	2.6			*	
1896	1.36			*	
1900	0.8				*
1903	1.16	*			
1907	3.04				*
1910	1.53	*			
1914	0.75				*
1918	0.71	*			
1920	6.64			*	
1923	1.89	*			
1927	0.68	*			
1929	10.4	*			
1931	20.78				*
1937	5.79			*	
1939	0.65				*
1948	1.17	*			
1953	1.20	*			
1957	1.39	*			
1960	0.92			*	
1969	0.99	*			
1973	2.47		*		
1980	0.42		*		
1981	1.68		*	*	
1990	0.93	*			

Source: See text.

Table 3

Causes of American Cycles

(numbers of cycles and months of lost production)

	DR	FR	DM	FM
Cycles	11	2.5	5.5	5
Lost Production	22.05	3.73	18.15	26.02

Source: Table 2.

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