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DID MONETARY FORCES CAUSE THE DEPRESSION?

It is an uncomfortable reflection on the current state of economics that this question is still an open one. In the early 1930's, no one doubted that the answer was yes.[1] In the 1940's and '50's, no one doubted that the answer was no.[2] And since the brilliant exposition of a monetarist point of view by Friedman and Schwartz in 1963, there does not appear to be a consensus on either side of the issue.[3] The purpose of this paper is to review the discussion by Friedman and Schwartz to discover precisely what they did and did not conclude and then to approach the question anew, asking some questions that were not asked by Friedman and Schwartz. My conclusion is that monetary forces did not cause the Depression.

Before starting the analysis, there are a few epistemological matters to be disposed of. The idea of historical causation has generated a lot of confusion. Economic historians do not seem to be as much at sea on this matter as historians in general because of their preference for explicit theoretical models, but the question of what constitutes an acceptable cause is still not crystal clear.[4]

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[1] League of Nations (B. Ohlin), Course and Phases of the World Economic Depression (Geneva, 1931); Great Britain, Committee on Finanee and Industry, (Macmillan Committee), Report (London, 1931).

[2] Thomas Wilson, Fluctuations in Income and Employment (London, 1942); A. H. Hansen, Monetary and Fiscal Policy (New York, 1949), p. 152; R. A. Gordon, Business Fluctuations (New York, 1952), Chapter 14; James S. Duesenberry, Business Cycles and Economic Growth (New York, 1958), Chapter 12.

[3] Milton Friedman and Anna Jacobson Schwartz, A Monetary History of the United States, 1867-1960 (Princeton, 1963), Chapter 7, reprinted as The Great Contraction (Princeton, 1965). Henceforth F&S.

[4] For a general discussion of historical causation, see Morton White, Foundations of Historical Knowledge (New York, 1965).

We must distinguish first between proximate and final causes, to use Aristotelian terminology. In terms of a well-worn example, the firing of the gun is a proximate cause of the man's death, but only the decision to pull the trigger may be the final cause. (The law recognizes that even that decision may not be a final cause if the killer is not sane.) In terms of economic models, movements of endogenous variables may be proximate causes, but only movements of exogenous variables can be final causes. We must therefore be careful to specify what kind of causation we refer to at each stage of the argument.

In economic models, we often think of the endogenous variables as variables in structural relations and the exogenous variables as parameters. Changes in exogenous variables then appear as shifts in structural relations, and if the economy is normally in equilibrium, it is shifts in curves that cause endogenous variables to move. A proximate cause in these terms will be at least in part a movement along a curve, since the values of endogenous variables are determined by the intersections of curves, but a final cause must be a shift in a curve. (One kind of shift, it should be noted, is particularly hard to identify. This is a shift that changes the slope of a curve without altering its value at equilibrium. If the change in the curve's slope reduces the stability of the system, a change in another part of the system that previously would have had only minimal effects may cause large movements of the endogenous variables. In this case, although it will be difficult to observe, we should say that the change in the shape of the curve is the final cause of the endogenous variables' movements.)

The distinction between endogenous and exogenous variables is important both for the analysis of policy decisions today and for the analysis of counter-factual statements about the past. Policy variables must be exogenous.

Similarly, it only makes sense to speculate about the effects of changing the path of exogenous variables in the past. One can discuss a hypothetical path for an endogenous variable only if one specifies how its exogenous determinants moved to produce this path.

The parallel between counter-factual and policy questions extends further than their reliance on exogenous variables. Neither set of questions is the same as the inquiry into historical causation. To say that a specific policy action could have avoided an event that happened is not the same as saying that the event was caused by a contrary policy action. It might have been, but it might equally well have been the result of an independent movement by another variable. And to insist that the event was caused by the absence of the policy action cited is to destroy the concept of historical causation. There are always an infinite number of things that did not happen that could have affected an event. If the absence of each of them is a "cause" of the event in question, then there is no possibility of agreement on causes and no reason to seek it. Unless one can demonstrate that the absence of some action was a deviation from past behavior, so that one can talk of the cessation of a process, the absence of an action cannot be admitted as a valid cause.

Similarly counter-factual statements must be distinguished from historical statements. To say that one event caused another is not to say that the absence of the first event would have meant the absence of the second. For the former proposition to be true, the first event must have been a sufficient condition for the second. For the latter proposition to be true, the first event must have been a necessary condition for the second. The distinction is clear in theory, but often not in practice. Nevertheless, we must be aware of the difference between the proposition that monetary

forces caused the Depression and the proposition that monetary forces could have prevented the Depression from occurring. The former is a historical proposition; the latter, a counter-factual one. Neither implies the other.

Having distinguished between proximate and final causes, between endogenous and exogenous variables, and between historical and counter-factual propositions, it is time to turn to the question at hand.

I

Almost everyone is familiar with the conclusion reached by Friedman and Schwartz in their classic Monetary History of the United States that "the contraction [of 1929-33] is in fact a tragic testimonial to the importance of monetary forces." (F&S, 300) Not everyone, however, accepts this conclusion or its implications for current monetary policy. This reluctance reflects in part the weight of other evidence, but it also reflects an uneasiness about the theoretical structure within which this conclusion is derived. The purpose of this section is to inquire into the logical structure of this derivation.

The best way to start is to quote in its entirety the paragraph that opens with the statement just quoted:

> The contraction is in fact a tragic testimonial to the importance of monetary forces. True, as events unfolded, the decline in the stock of money and the near-collapse of the banking system can be regarded as a consequence of nonmonetary forces in the United States, and monetary and nonmonetary forces in the rest of the world. Everything depends on how much is taken as given. For it is true also, as we shall see, that different and feasible actions by the monetary authorities could have prevented the decline in the stock of money--indeed, could have produced almost any desired increase in the money stock. The same actions would also have eased the banking difficulties appreciably. Prevention or moderation of the decline in the stock of money, let alone the substitution of monetary expansion, would have reduced the contraction's severity and almost as certainly its duration. The contraction might still have been relatively severe. But it is hardly conceivable that money income could have declined by over one-half and prices by over one-third in the course of four years if there had been no decline in the stock of money. (F&S, 300-01)

The testimonial is not provided by what did happen according to this paragraph. The question of causes for the actual monetary collapse is in fact left open. It can be regarded as a consequence of nonmonetary forces, although that is not Friedman and Schwartz's view. Their conclusion appears rather to be the result of speculations on what would have happened had the world been different. We must distinguish these counter-factual propositions from actual historical statements, these suggested remedies for the Depression from possible causes of the Depression. But first we must examine Friedman and Schwartz's views on the causes of the monetary collapse.

The question left open by Friedman and Schwartz in the paragraph just quoted is in fact a critical one. If the stock of money was endogenous--if it was determined by "nonmonetary forces in the United States and monetary and nonmonetary forces in the rest of the world"--then it does not make sense to talk of a change in the stock of money independent of these forces. If, on the other hand, the stock of money was controlled by "the monetary authorities" as Friedman and Schwartz appear to assume when they say that "different and feasible actions by the monetary authorities could have prevented the decline in the stock of money...," then it does make sense to talk of an independent monetary policy.

Friedman and Schwartz therefore do not mean to leave this question open. They are being very cautious in this paragraph, but their real views are shown elsewhere. In the previous paragraph, for example, they say, "The monetary collapse was not the inescapable consequences of other forces, but rather a largely independent factor which exerted a powerful influence on the course of events." (F&S, 300) This sentence appears to say that the change in the stock of money affected other economic variables, but was not

affected by them. This restatement is true to the spirit of the quotation, but not quite accurate on the letter. The word "inescapable" is the problem. Does this mean that the collapse was the consequence of other forces, but that it could have been avoided? If so, and it is hard to see how else to interpret it, then the quotation cannot be interpreted in the manner done just above.

It would appear that Friedman and Schwartz are saying that the stock of money is determined jointly by "nonmonetary forces" and by "the monetary authorities." The stock of money then is an endogenous variable, because it is determined within the system, and the actions of the monetary authorities are the true exogenous variables. "Monetary forces," to whose importance the contraction is a tragic testamonial, must be interpreted as the actions of the monetary authorities. What evidence do Friedman and Schwartz present about the influence of the actions of the monetary authority--as distinct from the stock of money--on the Great Contraction?

As Friedman and Schwartz remind us later in this chapter, "The banking and liquidity crisis must...be distinguished from the contraction in general." (FUS, 409) We therefore must distinguish two stages in the effects of actions by the monetary authorities. In addition, we must distinguish between historical propositions and counter-factual propositions as mentioned above. We are left therefore with four separate propositions:

1. Actions by the monetary authorities caused the banking and liquidity crisis.
2. Actions not undertaken by the monetary authorities could have avoided the banking and liquidity crisis.
3. An independent banking and liquidity crisis, that is, a crisis that was not itself a result of the general contraction, caused or intensified the Depression.

4. If the banking and liquidity crisis had not occurred, the Depression would not have occurred or would not have been as severe as it was.

These propositions are substantially independent of one another. The first two and the last two are completely independent as they refer to different parts of the economic system. In addition, propositions two and four could be true even if propositions one and three were not. A banking and liquidity crisis, for example, caused by events unconnected with the Federal Reserve, might nevertheless have been avoided by the Federal Reserve if it had understood what was happening and acted in time. Similarly, even if the general contraction was caused by events other than a banking and liquidity crisis, it might still be true that a policy designed to shore up the banking sector would have helped the entire economy. On the other hand, if propositions one and three are true, then it is likely that propositions two and four are also. They need not be, if there were other forces that would have caused the banking and liquidity crisis or the Depression in the absence of the actual causes, but propositions one and three constitute at least prima facie evidence for propositions two and four.

Friedman and Schwartz defend only proposition two, and their argument even here is weak. They are ambiguous on propositions one and three, and they deal with proposition four only in passing. These authors--singly and together--have dealt with proposition four in other places, and they may have felt it was unnecessary to repeat themselves in the analysis of the Depression.[5]

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[5]The discussion in Milton Friedman and Anna Jacobson Schwartz, "Money and Business Cycles," Review of Economics and Statistics, 45 (February 1963), supplement, is of particular interest since it is contemporaneous with the Monetary History.

Nevertheless, their omission is a real one, because their treatments in other places are either theoretical or else not directed primarily at the 1930's. The question of what would have happened to the general level of economic activity--as opposed to the stock of money--if monetary policy had been different in 1930, 1931, or 1932, is still moot.

Starting with proposition one, there is only one action of the Federal Reserve that is singled out for opprobrium: the combination of a rise in the discount rate and the absence of attendant open-market purchases following the fall of the British Pound in September 1931. (F&S, 318-19) In addition, the fall in the stock of money before October 1930, "reflected entirely a decline in Federal Reserve credit outstanding." (F&S, 308) It is not clear what this statement means, since the term "reflected" does not discriminate between the results of an accounting identity and a causal network. But even if the statement means to assert that the decline in Federal Reserve credit caused the decline in the stock of money, this still does not say that actions by the Fed caused the decline.

The extent of borrowing from the Fed is usually taken to be the result of a decision by the banks, not by the Fed. This decision is of course affected by the Fed's discount rate, but it is also affected by other variables, specifically the short-term interest rate. It is therefore not a policy decision by the Fed. The policy action in question must be the failure of the discount rate to fall more swiftly in the course of 1930. Friedman and Schwartz quote with approval a contemporary judgment that the discount rate should have been lowered more rapidly. (F&S, 341) In light of the fall in the discount rate from 6% to $2\frac{1}{2}$% in the first half of 1930, however, it may be questioned whether a more rapid fall would have been effective. This is a complex point, and we will return to it later.

Most of the analysis of changes in the stock of money is conducted in terms of the three determinants isolated by Friedman and Schwartz. Of these, at most one is under the direct control of the Federal Reserve, and the discussion of changes in the stock of money suggests strongly that the declines were the result of endogenous forces. The supply of high-powered money--total reserves--may or may not have been controlled by the Fed. Most recent work on the supply of money assumes that the Fed controls the quantity of unborrowed reserves, not the quantity of total reserves. If the Fed wished to set total reserves as its policy instrument, it could structure the situation to force borrowing to conform, but it is not at all clear that the Fed was doing this in the early 1930's. In addition, the supply of total reserves was <u>increasing</u> from 1930 to 1933. Friedman and Schwartz object that the increase was entirely too small, but they do not say that the Fed moved the stock of high-powered money in a perverse direction. (F&S, 342-4) With the single exception noted (in 1931) and its possible although dubious companion (in 1930) the alleged sins of the Fed were sins of omission rather than sins of commission.

The argument presented by Friedman and Schwartz therefore appears to say that the contraction was not caused by the Fed, although it could have been stopped or alleviated by the Fed. They say something very close to this when they assert, "Even if the contraction had come to an end in late 1930 or early 1931, as it might have done in the absence of the monetary collapse that was to ensue, it would have ranked as one of the more severe contractions on record." (F&S, 306) The contraction therefore was not initiated by the Fed. To the extent that the banking crisis and the decline in the stock of money were not caused by affirmative action of the Fed--as opposed

to being permitted by inaction--the later parts of the contraction were not also. Phrased differently, Friedman and Schwartz's argument is consistent with the assertion that in the absence of other contractionary forces, the Fed's actions would not have brought about the financial crisis. Their argument is rather that the Fed did not act to sterilize these other forces.

In connection with proposition two, Friedman and Schwartz argue that two sorts of actions could have been undertaken by the monetary authorities to alleviate the financial crisis. The easiest would have been open-market operations by the Federal Reserve. Friedman and Schwartz have an extended discussion of the effect of open-market purchases by the Federal Reserve at several points during the contraction. In each case, the effect on the money stock is calculated and comments are made about bank failures, but the discussion is not extended to real variables. (F&S, 391-9) In addition, Friedman and Schwartz argue that a nineteenth-century style restriction of payments by the banks in late 1930 or 1931 would have avoided future banking crises. (F&S, 311, 316) They are not arguing that such a restriction would have been optimal, only that it would have created less financial distress than the actual crises did.

Now proposition two is a counter-factual one. A counter-factual proposition by its nature cannot be observed. It must be inferred from a conception of the system being analyzed. And as economists have long recognized, one needs to know the structure of the system to make statements about the effect of hypothetical shifts of one variable on others. Yet Friedman and Schwartz never attempt to specify the structural relations of their system. For example, they assert that the lack of excess reserves in 1930 indicates that the banks would not have accumulated excess reserves if the total supply of reserves had expanded faster than it did. (F&S, 341) But how is one to

know this? Without an explicit theory of bank's demand for excess reserves, it is impossible to say with confidence when banks will or will not accumulate excess reserves. As a result, Friedman and Schwartz's assertions about proposition two are subject to question. In the absence of a set of structural relations, they can be regarded as assertions only, not proofs or demonstrations.

Proposition three is an assertion that an exogenous banking panic led to the contraction of economic activity. It is not enough to show that there was a banking panic to establish the proposition. If the banking panic was caused by the contraction, then proposition three would be false and proposition four meaningless. This would be so even if the banking panic had intensified the contraction, since the panic would then be endogenous to the system, and there is no way to envisage the existence of the panic separately or independently of the contraction in general. Only if the banking panic was caused independently of the contraction, and if the panic then caused the contraction, would proposition three be true. Friedman and Schwartz admit that the first banking panic in October 1930 is essentially unexplained. They advance several possible explanations without giving strong weight to any one. The succeeding panics, they say, were the results of the fall in bond prices and other changes in the capital markets as a result of the contraction and the first panic. (F&S, 353-7) In addition, they note without much comment that there seems to be no reflection of the banking panics in the real variables. (F&S, 313, 322) Not only are the banking panics not independent of the contraction, but their effect on the contraction is not immediately apparent. Consequently, proposition three is at best moot with respect to the first banking panic and highly suspect with respect to the others.

Proposition four is in some sense the fundamental one, since proposition two is of only limited interest if proposition four is not true. Yet Friedman and Schwartz deal with it only casually. There appear to be four separate times when they confront this question explicitly, and we examine them in turn. Near the beginning of their analysis they say, "Had a decline in the stock of money been avoided, velocity also would probably have declined less and thus would have reinforced money in moderating the decline in income." (F&S, 303-05) This assertion clearly presupposes that money has an effect on income, but it does not directly argue for the existence of this effect. A little later there is a statement in a similar vein: "Perhaps if those tentative stirrings of revival [in early 1931] had been reinforced by a vigorous expansion in the stock of money, they could have been converted into sustained recovery." (F&S, 313) Again Friedman and Schwartz assume that there is a connection, but they do not detail it or defend it. Indeed, the word "perhaps" seems to indicate that they do not wish to rely on this brief comment too much.

At a later point in the argument, Friedman and Schwartz note that the tapering off of the decline in the stock of money in 1932 was followed by a general improvement in economic conditions. But they also say, "There is, of course, no way of knowing that the economic improvement reflected the monetary improvement." (F&S, 324) On the next page they say that the monetary problems of the latter part of 1932 were accompanied by difficulties in the economy in general. (F&S, 325) They make no causal statement (and no denial of causality).

It is clear from the tone of the discussion that Friedman and Schwartz believe that proposition four is true. But they do not argue for it in their analysis of "the Great Contraction." Their analysis is confined almost exclusively to financial variables, and their few comments about real variables

are made in passing and in a tentative fashion. They do not try to detail a mechanism whereby changes in the financial sector were supposed to cause changes in real variables, nor do they try to test the existence or effectiveness of such a mechanism. Proposition four therefore may be true; it is not proven by the analysis of Friedman and Schwartz.

This review of Chapter 7 of the Monetary History shows that with the exception of proposition two, the propositions outlined above as being aspects of the argument about the testimonial of the Depression on the effectiveness of monetary forces have not been even asserted strongly by Friedman and Schwartz. They do not assert that there were independent actions by the Federal Reserve or by the banking system that led to the contraction, nor do they insist strongly on the existence of a causal connection between the financial and real sectors. It follows that they do not make a convincing case that monetary forces caused the Depression.

II

We now turn from a consideration of secondary materials to an analysis of primary ones. Friedman and Schwartz do not specify the mechanism by which monetary forces could have affected the real sector of the economy, but the literature distinguishes several. We examine them in turn. It should be noted that the distinction bewween exogenous and endogenous variables is dropped for this stage of the argument. We are looking for mechanisms--proximate causes in Aristotelian terminology. If we find proximate causes, we can then ask if they are also final causes.

We want to ask whether shifts of or movements along monetary curves--that is, supply and demand curves for financial assets--caused movements of real variables by means of movements along stable supply and demand curves

for goods and services. This question cannot be asked directly, of course, since these curves cannot be observed. The approach therefore must be indirect. We assume, first, that the supply and demand curves for goods and services were stable, and, second, that the observed changes in monetary variables were caused within the financial sector. We then ask if the observed changes in the monetary variables were in the right direction and large enough to explain a substantial part of the observed movements of real variables by means of movements along the assumed stable supply and demand curves for goods and services. It should be remembered that these stable supply and demand curves are not observed; they are only assumed to exist for the purposes of the argument. If the answer to the question just posed is negative, one possible explanation of the observed movements of the real variables is that these supply and demand curves were in fact not stable.

We restrict our attention to the years before 1932. The Depression was well underway by 1932, and its causes are not to be found in events of that year. This is not to say that events in 1932 did not make the Depression worse and impede recovery, only that we are not asking about such forces at this time. In addition, the response by the Federal Reserve to Britain's departure from gold in August, 1931, is too well known to need reiteration here. There is no reason to doubt the generally accepted conclusion that the rise in interest rates in 1932 had a depressing effect on the economy.[6] One might dispute the magnitude of this effect, but this is not the place to do so.

There are three broad "channels" through which monetary forces are

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[6]Note Tobin's agreement in his critical review of F&S. See James Tobin, "The Monetary Interpretation of History," American Economic Review, 55 (June, 1965), 464-85.

thought to affect the economy as a whole.[7] Changes in the financial markets are changes in the quantities of financial assets available. If all markets are working perfectly, prices change to bring the new quantities in line with asset-holders' demands. The first channel therefore is through changes in the prices of financial assets, or alternatively, changes in their rates of return. The second channel is really a subset of the first. When the prices of assets change, the wealth of people owning these assets change. If their actions are dependent on the wealth they own, this change will affect their behavior. The effects of price changes therefore are considered in two aspects: their effects on rates of return, and their effects on wealth. If all markets are not working perfectly, however, there may be effects of the changes in quantities that are not reflected in price changes. A third possible channel therefore is through the direct effect of changes in the quantities of financial assets on behavior.

What were the effects of changes in interest rates?[8] Long-term interest rates were lower in the late 1920's than they had been in the early part of the decade. They rose slightly in 1929, but stayed below the levels of the early 1920's. They fell slightly in 1930. It is hard to see how these small movements could have generated large enough movements along investment demand or consumer demand curves to have had an important effect. One might say that the Depression would have been alleviated had bond yields fallen more sharply, but that obviously is not the same as saying that the Depression was

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[7] Frank de Leeuw and Edward M. Gramlich, "The Channels of Monetary Policy," Federal Reserve Bulletin, 55 (June, 1969), 472-91.

[8] All data on interest rates are from Federal Reserve Board, Banking and Monetary Statistics (Washington, 1943).

caused by a rise in interest rates.[9]

Beginning at the end of 1930, the yields on lower-grade (Baa) bonds began to rise, although the yield on high-grade bonds did not. This movement could not have initiated the Depression, since it followed the start of the decline by over a year. It could have had an important effect at a later stage, and we will return to it when we discuss quantities.

Short-term interest rates were very high at the end of the 1920's, although the highest rates were those connected with the stock market. The rate on prime commercial paper only rose to a peak of 6.25% for September and October, 1929. These high rates were deflationary, but not sufficiently so to cause the Depression by themselves. The interest rates that appear in investment demand equations are almost always long-term rates, and the rise on short-term rates in the fall of 1929 had only the smallest of echoes in the long-term rates.

Short-term interest rates fell sharply after the stock-market crash, and it is hard to see how a fall in interest rates can be deflationary. There is an assumption, however, under which they might have been. Prices, which had been drifting downward during the latter half of the 1920's, fell by 10% or more in each of the years 1930, 1931, and 1932. If people anticipated these price declines, then the anticipated real rates of return in these years were in excess of 10%. The real short-term interest rate then was higher in the early 1930's than in the late 1920's. But here we find ourselves in a quandry. We are seeking to explain the Depression, which includes the deflation as one of its important aspects, by means of the influence of

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[9] To say that the Depression was caused by the failure of interest rates to fall is nonsensical. Since interest rates were more or less constant for the last half of the 1920's, why didn't the Depression start in 1925?

interest rates. On the other hand, we now appear to be explaining the movements of this interest rate by means of the deflation. The question is whether the rise of the real short-term interest rate was the cause or the effect of the price decline. If the rise in interest rates caused the deflation--ignoring other complications--the rise in interest rate must have preceded the onset of the deflation. The rise in interest rates must have caused people to spend less on goods and services which in turn must have caused the deflation. In addition, the real interest rate is the money rate plus the expected rate of deflation, and expectations are formed only after a lag. The discrepancy between the nominal and real rate would only become large, therefore, after the deflation had been underway for at least a few months. For both of these reasons, the nominal interest rate must have risen if the rise in interest rates caused the deflation. But as we have seen, the rise in short-term interest rates was too limited to have had such an effect. As with the long-term interest rate, one can say that the failure of the short-term rate to fall further accentuated the Depression--although it would have had to be negative for the real short-term rate to be lower in the early 1930's than it was in the 1920's under the assumption at hand--but one cannot say that the movement of short-term interest rates caused the Depression.

The stock market has been mentioned as an influence on the returns from fixed-yield securities. We now need to consider directly the changes within this market. As everyone knows, stock prices rose in the 1920's and fell in the early 1930's. All other things being equal, this means that the cost of capital to corporations fell in the 1920's and rose in the early 1930's. But of course all other things were not equal. Specifically, the earnings of corporations rose and fell with stock prices. The changes in the price-

earnings ratios of stocks therefore were not as large as the changes in their prices.

Table 1 shows the behavior of stock prices and price-earnings ratios for 1927-32. Price-earnings ratios of common stocks rose at the end of the 1920's, but their largest rise came before the stock-market boom at the end. In fact the average price-earnings ratio for 1929 was below the ratio of 1927 and 1928. Except for utilities, the price-earnings ratios of stocks then stayed within the range established in the late 1920's through 1932.

How are we to interpret these ratios? If corporations thought of the price-earnings ratio as the cost of funds, then they thought of funds as being cheap in the late 1920's and not particularly expensive in the early 1930's. But this view has several problems. First, we are seeking an explanation of the Depression, but again seem to be using an integral part of the Depression itself as an explanatory variable. Price-earnings ratios were not as low as stock prices in the early 1930's because corporate earnings also were low. This is what we are trying to explain, not the raw material for an explanation.

Second, it is highly unlikely that any corporate executive calculated the cost of finance in the early 1930's on the basis of current earnings. Firms planning to invest undoubtedly tried to estimate their earnings over some period longer than one year. If they expected earnings to rise back to a level not too different from that of the 1920's, then they might have thought that the price of stocks was a better indicator of the cost of capital than the current price-earnings ratio. In this case, the fall in stock-market prices would have increased the cost of capital raised by common stocks. This is not to say that the total cost of capital to firms rose when the stock market fell. If firms were willing to let their debt-equity structure

vary widely, then only the lowest cost of capital--whether from issuing stocks or bonds--would have affected their decisions. Firms did issue stock in 1928 and 1929 during the stock-market boom and bonds when the stock market was lower in 1927 and 1930, (see Table 3) but it would be rash to claim that they perceived the risk of bankruptcy in 1930 as nonexistant. The existence of bankruptcy risk bars the inference that firms were indifferent between different degrees of leverage, despite the evidence of corporate sensitivity to relative costs of alternative financing.[10] We may say, therefore, that the cost of capital to corporations rose in the early 1930's, although not by as much as the stock market fell. But to the extent that this rise was the result of an increase in the risk of bankruptcy, it was a result--not a cause--of the Depression.

The conclusions to be drawn from this discussion of the rates of return on financial assets are rather meager. The only adverse changes in the prices of financial assets that were not clearly the results of changes elsewhere in the economy were the rise in short-term interest rates in the late 1920's and the stock market crash. The former is a relatively isolated movement which was not communicated to long-term interest rates. The latter is of importance only if one thinks that the absolute price of stock enters into the cost-of-capital calculations of corporations independent of the price-earnings ratio. In addition, there are some other movements of interest rates which can be seen only as consequences of non-financial forces, not as causes. The rise of the real short-term interest rate (under appropriate assumptions) in the early 1930's and the fall in the price-earnings ratio of common stocks

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[10] Alexander Robichek and Stewart Meyers, "Some Problems in the Theory of Optimal Capital Structure," Journal of Financial and Quantitative Analysis, 1 (June, 1966), 1-35.

in 1929 fall into this category.

The wealth effect of a restrictive monetary policy or of contractionary monetary conditions in general comes from the loss in the value of financial assets when interest rates rise. In the early 1930's, however, interest rates were either constant or falling, with a few prominent exceptions. In addition, the price level was falling and increasing the real value of financial assets of a given price. In general, therefore, the wealth effect of restrictive monetary conditions was absent. The first and largest exception to this statement is of course the stock market. The value of stocks fell by $85 billion from its peak in 1929 to its trough in 1933.[11] This must have exerted a depressing effect on consumption. The quantity of money fell too, and as already noted, the price of lower-grade corporate bonds rose in 1931. These movements also must have had a depressing effect, albeit of a far smaller size. It is likely that any negative wealth effect coming from this movement was more than offset by gains in the value of financial assets from other causes. With the exception of the decline in stock prices, therefore, we may ignore the wealth effect of monetary forces in the early 1930's.

We now turn to the effects of changes in the quantities of financial assets. If all financial markets were working perfectly, then changes in the quantities of financial assets would have had no effects other than those communicated by changes in their prices. It follows that it is only worth looking at quantities directly--as opposed to examining the effects of changing quantities on the prices of financial assets--if there is evidence of rationing or other malfunction in some markets. The question at hand therefore is whether such evidence exists. The data for this part of the

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[11] U. S. Bureau of the Census, Historical Statistics of the United States (Washington, 1960), p. 150.

inquiry are presented in Tables 2 through 6, which represent a part of a larger flow-of-funds analysis of the economy in these years. As can be seen from the data in Table 5, the quantity of money fell continuously in the early 1930's. Loans of all sorts (except for "other" in one year) and deposits of all sorts fell in each of the first three years of the 1930's. To see the effects of these declines, we must look at the other financial assets and liabilities held in the economy. We examine the three main sectors of the economy in turn: non-agricultural individuals, non-financial corporations, and unincorporated businesses. The relevant data are shown in Tables 2 through 4.

Non-agricultural individuals made the same net financial investment in 1930 that they did in 1929. The net financial investment in 1931 was a little smaller, but still larger than in either 1927 or 1928. It is hard to think that the spending of non-agricultural individuals was limited by their holdings of financial assets. If one looks at financial <u>assets</u> directly, one observes that the rate of acquisition of assets was positive through 1931, although this rate was lower in 1930 and 1931 than it had been in the late 1920's. Even though people were drawing down their money holdings (starting in 1928), they were acquiring enough other financial assets to offset this movement.

Now the markets for stocks and bonds are considered to be among the most perfect in the world. If people were constrained by their cash balances, therefore, it must have been because they were unable to sell the stocks and bonds they owned due to a lack of purchasers, not due to a lack of a market. (Ignore for the moment that individuals were net <u>purchasers</u> of financial assets.) The result of their attempts to sell under these conditions would have been a fall in the prices of stocks and bonds. Were the prices of financial assets falling? For a surprising number of assets, the answer is

no. High-grade corporate and government bonds (which individuals continued to buy in the early 1930's) did not decline in value. The price of corporate stocks did fall, of course, but no faster than corporate earnings. As mentioned above, this movement is susceptible of more than one interpretation. On the other hand, the price of lower-grade (Baa) corporate bonds fell sharply in 1931. Friedman and Schwartz asserted that this price fall was the result of a scramble for liquidity--by banks, not individuals--but this suggestion will not stand up. (F&S,312) Only the prices of lower grade bonds fell; the price of high-grade corporate and government bonds stayed more or less constant. A liquidity scramble, ceteris paribus, should affect the prices of all assets held by the illiquid parties. A fall in the price of one asset (or one class of assets) by contrast reflects a change in expectations about this asset relative to others. Specifically, the fall in low-grade bonds in 1931 is evidence of a growing risk of corporate failure, not of illiquidity by bond holders. (Banks were net sellers of bonds in 1931 because they perceived the risk more quickly or because they were more risk averse than individuals. The fact that they sold while individuals bought is not evidence of a liquidity scramble by banks.) There is therefore no evidence that individuals were short of financial assets in 1930 or 1931. It is rather that they were reducing their cash balances to buy securities of various sorts.

Individuals were changing the composition of their portfolios in other ways too. The fall in the rate of acquisition of financial assets after 1929 was offset by the fall in the rate of acquisition of financial liabilities. People stopped borrowing against securities in 1929; against commodity purchases, in 1930 (consumer debt); and against houses in 1931. While their net financial investment stayed more or less constant through 1931, individuals were reducing their leverage starting in 1930. In the light of individuals'

continued purchases of financial assets and the price stability of many of these assets, the decline in cash balances, as well as the decline in the rate of purchase of common stock, must be interpreted as the results of a change in individuals' desires--in response to changes in prices, incomes and expectations--not as signals of constraints on their actions in the form of a shortage of money or other financial assets. (The decline in consumer loans, at least through 1931, must be understood similarly, since the new purchases of bonds more than offset the decline in consumer loans.)

The analysis of non-financial corporations follows similar lines, although the corporations were net borrowers rather than net lenders. Non-financial corporations continued to have negative net financial investment through 1931, although the size of the negative net financial investment was below the level of the late 1920's in 1930 and 1931. As with individuals, changes were taking place behind these totals. Non-financial corporations stopped acquiring financial assets in 1930. In the late 1920's, they were able to borrow enough and issue enough equity to pay for their real investment and also to pay for financial assets. In the early 1930's, they paid for part of their real investment by selling some financial assets. They decreased their consumer loans, their holdings of U.S. government securities, and their cash balances.

Does this mean that the volume of real investment undertaken by non-financial corporations was not limited by financial considerations in the 1920's, but was limited in the 1930's? If corporations were sensitive to the composition of their financial portfolios, it might mean this. But the context in which this change took place needs to be remembered. Let us assume that net financial investment in 1930 and 1931 was at its maximum extent due to the inability of corporations to issue any more debt or equity. How much

of the fall in real investment can be explained by the imposition of such a constraint? Net real investment fell by $6.8 billion between 1929 and 1931, but net borrowing only fell by $2.4 billion in the same period. Only about one-third of the fall in net investment therefore can be explained by a decrease in the amount that corporations could borrow, even under the assumption that the amount they could borrow was set by some sort of rationing process.[12] Even if there were a constraint on the amount corporations could borrow, this constraint would not account for the major part of the fall in net investment.

Unincorporated businesses had larger negative net financial investment in the early 1930's than in the late 1920's. This change was the result of drawing down the accounts receivable by these firms by more than bank credit was reduced. In light of the discussion of individuals given above, the most plausible interpretation of these data is that the accounts receivable fell because sales fell, not vice versa.

Before concluding, let us examine more closely the notion of cash balances as a constraint. When cash is scarce, the price of cash, that is, the short-term interest rate, is normally high. Yet the rate of interest on bank loans was very low in the early 1930's. One way to resolve this apparent paradox is to assume, as mentioned above, that real short-term rates were high, but there are two arguments militating against this explanation. First, short-term interest rates fell very sharply in early 1930. As noted above, it seems unlikely that people's expectations changed that rapidly in these six months. Second, short-term interest rates did not rise after 1932 (except for the transitory rise following the Fed's restrictive policies after the fall of

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[12] The remaining $4.4 billion fall in net investment was accounted for by a fall in net savings.

the Pound) when prices stopped falling. There does not seem to be any evidence of a constraint on purchasing power deriving from a scarcity of cash balances.

Summarizing this part of the argument, it is hard to view the supply of cash balances or of financial assets in general as constraints upon the system. This is true in general because the total supply of assets does not seem to have been restricted; instead, people did not want to borrow at existing rates. For the same reason, it seems hard to think of a scarcity of money when people were acquiring assets (through 1931) and short-term interest rates were very low. And even if corporations were limited by the inability to sell the particular securities they wanted to sell, this constraint accounted for only about one-third of the fall in investment.

III

This discussion has failed to turn up many monetary forces that can be listed as causes of the Depression. Of the items discussed, the rise in short-term interest rates in the late 1920's and the decline in stock prices in the early 1930's were virtually the only monetary events that can be seen as possible causes for the Depression. The reader of this discussion, however, may think that two important characteristics of the early 1930's have been omitted: the pervasive bank failures and the effect of monetary forces on expectations. These items are not in the normal lists of channels of monetary policy, but then the Depression was not an ordinary recession. We need to analyze these phenomena before we conclude.

The discussion here does not concern the question raised earlier as to whether the bank failures should be seen as exogenous or endogenous. It also does not concern the effect of bank failures on interest rates and on the

stock of money or other assets since the effects of changes in these magnitudes have already been discussed. It deals instead with other effects of bank failures, which seem to be primarily the effects of bank failures on expectations. The discussion of bank failures therefore can be merged with the general discussion of expectations.[13]

There is no doubt that the ebulliant hopes and expectations of the 1920's were altered by the events of the 1930's. That simple statement more or less exhausts our knowledge of this subject. There is no knowledge of when this change took place, except as it pertains to the dream of instant riches in the stock market. There is no way to know which of the many negative bits of news produced this change or even whether any single bit mattered as much as the aggregation. And finally, there is no knowledge of the effects of the change in expectations on behavior. We may assume that they were negative, but their magnitude is unclear. Formal models of the 1930's do not include a variable for expectations.[14] Friedman and Schwartz talk about expectations only as they affected the deposit-currency ratio and through it the stock of money. The negative inference from this absence of attention is that the effects (outside of the effect on the stock of money) were small, but this inference is surely weak at best.

We can now give our answer to the question posed in the title of this paper: did monetary forces cause the Depression? We have outlined three possible routes by which monetary forces could have caused the Depression; we consider them in turn.

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[13] Friedman and Schwartz argue that the existence of the Fed made the banking system more susceptible to cumulative banking crises than it had been before. (F&S, 311) If so, this provides an example of a hard-to-identify change in the slope of a curve at a given equilibrium. This example, however, concerns the cause of bank failures, not the effects. It therefore does not bear directly on the argument here.

First, the rise in short-term interest rates in the late 1920's was deflationary, but it is hard to think that it was the cause of the Depression. With the exception of those rates connected intimately with the stock market, the rates neither rose very high nor did they stay high very long. Their movements were not communicated to long-term rates and therefore presumably not to investment also. Their effect on consumption also must be discounted in the face of growing consumer borrowing through 1929. (See Table 2) The only way these high rates could have caused the Depression was by their effect on the stock market.

Second, the decline in stock prices certainly had a depressing effect. The effect on investment undoubtedly was negative even though price-earnings ratios did not fall and even though the flow of funds through retained earnings fell much more rapidly than the flow through financial markets. The effect on consumption similarly was negative, although it too was hardly the full explanation of the fall in consumption.

Thirdly, the question of expectations must be left open at this point. There is no evidence that monetary forces--other than the stock market--had a more adverse effect on expectations than nonmonetary forces. And there is no evidence that the change in expectations had a large effect relative to the effects of changes in observed economic magnitudes. There is also no evidence to the contrary.

We conclude, therefore, that monetary forces, with the exception of the stock market crash, did not cause the Depression. The relative importance of the decline in stock prices is still to be determined.

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[14] The two most complete models that deal with the 1930's are J. Tinbergen, Business Cycles in the United States, 1919-32, Vol. II of Statistical Testing of Business Cycle Theories (Geneva, 1939), and Lawrence Klein and Arthur S. Goldberger, An Econometric Model of the United States, 1929-1952 (Amsterdam, 1955).

Table 1

PRICES AND PRICE-EARNINGS RATIOS OF COMMON STOCKS

	1927	1928	1929	1930	1931	1932
Prices (1941-43 = 100)						
Industrials	14.82	20.85	16.99	11.90	6.32	5.18
Railroads	39.76	43.52	42.24	30.20	10.57	8.70
Utilities	30.96	47.24	51.22	38.75	23.66	21.97
Composite	17.66	24.35	21.45	15.34	8.12	6.89
Price-Earnings Ratios						
Industrials	15.77	17.38	13.07	15.66	13.74	16.71
Railroads	11.94	12.40	10.67	11.94	11.74	11.76
Utilities	18.43	22.93	21.80	17.45	11.95	14.98
Composite	15.91	17.64	13.32	15.81	13.31	16.80

Source: Standard & Poor's Trading and Security Statistics, "Security Price Index Record," 1972 edition, p. 128.

Table 2

FLOW-OF-FUNDS DATA FOR NON-AGRICULTURAL INDIVIDUALS

(Billions of Dollars)

	1927	1928	1929	1930	1931	1932
Net Financial Investment	4.9	1.7	7.9	7.9	7.2	2.5
Change in Assets	9.3	7.1	9.5	5.3	3.3	-.7
Change in Liabilities	4.4	5.4	1.6	-2.7	-3.9	-3.2
Assets						
Currency & Demand Deposits	2.7	-1.9	-.8	-.3	-1.5	-1.3
U.S. Govt. Securities	-2.4	-1.1	-.4	-.1	.8	.7
State & Local Bonds	.4	.4	.5	.6	1.8	.1
Corporate & Foreign Bonds	2.0	1.6	.7	.7	.6	-.4
Common Stocks	1.0	2.5	4.1	.9	.1	--
Mortgages	1.2	1.6	1.9	.8	-.2	-.2
Life Insurance	1.2	1.2	1.0	.9	.8	.3
Other	3.2	2.8	2.5	1.8	.9	.1
Liabilities						
Mortgages: 1-4 Family	1.6	1.7	1.3	.1	-.5	-1.0
Mortgages: Multi Family	.7	.8	.7	.4	--	-.1
Borrowing on Securities	1.3	1.6	-1.3	-2.1	-2.0	-1.0
Consumer Debt	.2	.8	1.0	-.7	-1.2	-1.3
Other	.6	.5	-.1	-.4	-.2	.2

Sources: See Appendix.

Table 3

FLOW-OF-FUNDS DATA FOR NON-FINANCIAL CORPORATIONS
(Billions of Dollars)

	1927	1928	1929	1930	1931	1932
Net Financial Investment	-4.2	-3.0	-4.6	-2.8	-2.2	1.5
Change in Assets	.5	2.6	1.1	-1.0	-2.8	-1.1
Change in Liabilities	4.8	5.7	5.7	1.8	-.6	-2.7
Assets						
Cash	--	1.2	--	-.2	-2.1	-.4
U.S. Govt. Securities	.1	.3	-.1	-.5	-.3	.1
Consumer Loans	--	.5	.6	-.5	-.6	-.9
Other	.4	.6	.6	.2	.2	.1
Liabilities						
Bonds (straight)	2.1	.7	.2	1.6	.6	-.3
Common Stock	.8	2.3	3.6	1.1	.3	.1
Mortgage	.8	.8	.9	.5	-.1	-.4
Commercial Loans	-.2	.6	.3	-1.4	-1.9	-1.5
Other	1.3	1.3	.7	--	1.7	-.6

Sources: See Appendix.

Table 4

FLOW-OF-FUNDS DATA FOR UNINCORPORATED BUSINESSES

(Billions of Dollars)

	1927	1928	1929	1930	1931	1932
Net Financial Investment	-.5	-.7	-.6	-1.9	-2.8	-1.5
Change in Assets	-.3	-.1	-.1	-2.4	-3.6	-2.3
Change in Liabilities	.2	.6	.5	-.5	-.8	-.7
Assets						
Receivables (non-farm)	-.2	-.2	-.2	-2.0	-2.5	-2.0
Cash	-.2	--	.2	-.3	-.9	-.1
Other	.1	.1	-.1	-.1	-.2	-.2
Liabilities						
Bank Debt	-.2	.1	.1	-.7	-.8	-.6
Other	.4	.5	.4	.2	--	-.1

Sources: See Appendix.

Table 5

FLOW-OF-FUNDS DATA FOR COMMERCIAL BANKS

(Billions of Dollars)

	1927	1928	1929	1930	1931	1932
Change in Assets	3.4	5.1	-.6	-3.3	-9.9	-4.7
Assets						
Cash, etc.	.5	2.4	-.9	-.9	-3.5	-1.1
U.S. Govt. Securities	.7	.4	-.5	.1	1.2	1.2
Corporate & Foreign Bonds	.5	--	-.5	.7	-.8	-.4
Security Loans	1.4	.8	.4	-1.0	-2.5	-1.4
Consumer Loans	.1	.2	.2	-.2	-.5	-.4
Commercial Loans	-.5	.7	.4	-2.1	-2.7	-2.2
Other	.7	.6	.3	.1	-1.1	-.4
Liabilities	3.0	4.3	-.4	-3.1	-9.1	-3.0
Demand Deposits: Corporate	-.1	1.4	.1	-.4	-1.9	-.3
Demand Deposits: Individuals & Unincorporated Business	1.3	-2.4	--	-.8	-.7	-.5
Demand Deposit: Other	.1	.3	--	-.1	-.5	-.3
Time Deposits	1.5	.8	-.6	-.2	-3.6	-1.7
Interbank Deposits	.5	-.1	--	.5	-1.6	.6
Borrowing from Federal Reserve	-.1	.5	-.4	-.4	.4	-.4
Change in Bank Float	-.6	2.1	-.8	-1.0	-.9	-1.0
Cash Issues of Common Stock	.2	.4	1.1	.1	--	--
Change in Surplus	.4	.8	-.2	-.2	-.8	-1.7
Other	.2	1.3	.2	-.8	-.3	.6

Sources: See Appendix.

Table 6

FLOW-OF-FUNDS DATA FOR FEDERAL RESERVE BANKS
(Billions of Dollars)

	1927	1928	1929	1930	1931	1932
Change in Assets	.2	--	.1	-.3	.5	.4
Assets						
Gold & Gold Certificates	-.1	-.2	.3	.1	--	.2
Bills Discounted for Members	-.1	.5	-.4	-.4	.4	-.4
U.S. Govt. Securities: Bonds	.2	-.2	--	.1	.2	.1
U.S. Govt. Securities: Bills, etc.	.1	-.2	.3	.1	-.1	1.0
Other	.1	.1	-.1	-.2	--	-.5
Liabilities						
Federal Reserve Notes	-.1	--	.1	-.2	1.0	.1
Deposit of Member Banks	.3	-.1	--	.1	-.5	.5
Other	-.1	.1	--	-.2	--	-.2

Sources: See Appendix.

Unless otherwise cited, all data are from Goldsmith, A Study of Saving in the United States, Vol. I, Princeton University Press, 1955.

Table 2

Row 1. Line 2 minus line 3

2. Sum of lines 4-11

3. Sum of lines 12-16

4. P. 359, col. 6

5. P. 360, col. 15

6. P. 360, col. 16

7. P. 360, col. 17

8. P. 473, col. 6

9. P. 720, sum of cols. 4-7

10. P. 360, col. 11 adjusted to maintain internal consistency

11. (P. 359, cols. 7, 8) + (P. 360, cols. 12, 13, 14) + (p. 361, col. 19) + (p. 473, cols. 5, 7, 8)

12. P. 361, col. 20

13. P. 361, col. 21

14. P. 361, col. 22

15. P. 361, col. 23

16. P. 361, col. 24 + col. 27

Table 3

Row 1. Line 2 minus line 3

2. Sum of lines 4-7

3. Sum of lines 8-12

4. First differences of (p. 382, col. 2 + p. 385, col. 4 + p. 386, col. 4 + p. 391, col. 1) adjusted to exclude cash holdings of financial corporations.

Table 3 (continued)

Row 5. P. 536, col. 28.

6. First differences of p. 703, cols. 3, 4, 6, 7, 8, 9, 12 minus first differences of p. 705, cols. 1, 2, 4, 5, 6, 7, 8, 9.

7. P. 575, col. 3, first differences + p. 749, col. 5, first differences + p. 1085, col. 2.

8. P. 487, col. 2.

9. Pp. 496-7, cols. 2, 3, 4, 6, 7, 8, 10, 13, 17, 18, 19.

10. (P. 731, col. 1, first differences, minus p. 587, col. 6) + (p. 732, col. 1 first differences, minus p. 591, col. 3) + .75 x (p. 733, col. 1, first differences) minus (p. 595, col. 3) + .25 x (p. 733, col. 1, first differences) minus (p. 599, col. 6).

11. P. 859, col. 1, first differences + p. 651, col. 6 minus p. 859, col. 6.

12. P. 1035, Table F26, col. 3 + p. 494, cols. 3, 6, 7 minus p. 493, col. 12.

Table 4

Row 1. Line 2 minus line 3.

2. Sum of lines 4, 5, 6.

3. Sum of lines 7, 8.

4. P. 857, col. 9.

5. P. 853, col. 1, first differences.

6. P. 853, col. 2, first differences + p. 853, col. 5, first differences.

7. P. 859, col. 6.

8. P. 597, cols. 3, 4, 6 + p. 599, col. 6.

Table 5

Row 1. Lines 2-8.

2. P. 409, col. 8, first differences.

3. P. 535, col. 14.

Table 5 (continued)

Row 4. P. 543, col. 14.

5. P. 710, cols. 3, 4, first differences.

6. P. 703, cols, 2, 10, first differences.

7. P. 859, col. 1, first differences.

8. P. 539, col. 8 + p. 577, cols, 6, 7, first differences + p. 410, col. 2, first differences,+ p. 409, col. 4, first differences + p. 735, cols.4, 5, 6, first differences minus p. 651, col. 6 minus p. 651, col. 9.

9. Sum of lines 11-20.

10. P. 385, col. 4, first differences.

11. P. 379, col. 4.

12. P. 385, cols. 2, 3, 5, 6, 8, first differences.

13. P. 386, col. 1, first differences.

14. Banking and Monetary Statistics, p. 19.

15. Banking and Monetary Statistics, p. 331.

16. P. 383, col. 2.

17. P. 517, col. 8.

18. Line 1 minus line 9.

19. P. 431, Table L43, col. 2, first differences + Federal Government deposits from Banking and Monetary Statistics, p. 75, + "other liabilities" from Historical Statistics of the U.S., p. 632, multiplied by ratio of increase in assets of banks in Goldsmith, p. 409, col. 1 to increases in bank assets from Historical Statistics, p. 632.

Table 6

All data from Banking and Monetary Statistics, Table 86, pp. 331-2.