

The Economic Impact of the Stock Market Boom and Crash of 1929

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In a recent issue of *Newsweek* three eminent economists were asked:

“John Kenneth Galbraith has said that we are reliving the dismal history of 1929. Do you think the stock market will keep falling? If it does, will there be another Great Depression?”

They replied in the following ways:

Henry Wallich: After 1929, the Dow Jones industrial average dropped by about 90 percent. I see nothing of that sort ahead. And even if the stock market suffered further reverses, the economy still would not be decisively affected.

Milton Friedman: The stock crash in 1929 was a momentous event, but it did not produce the Great Depression and it was not a major factor in the Depression's severity Whatever happens to the stock market, it cannot lead to a great depression unless it produces or is accompanied by a monetary collapse.

Paul Samuelson: In our economy, the market is the tail-and the tail does not wag the dog, which is gross national product. The decline has cut a quarter of a trillion dollars from people's net worth and that will be a depressant, but not a major one, on consumption and investment spending.

A week later Professor Galbraith replied sharply that “The 1929 crash had a deeply depressing effect on consumer spending, business investment and overseas lending and it disrupted the international trade and monetary system. From the evidence, it was an important factor in the depression that ensued.”¹

¹*Newsweek*, May 25, 1970, p. 78, and June 1, 1970, p. 4.

Since Professor Galbraith is outnumbered three to one in this debate, let me cite just one more opinion for his side. In June, 1934, the Senate Committee on Banking and Currency concluded two years of often sensational hearings on "Stock Exchange Practices" with the following observation:

The economic cost of this down-swing in security values cannot be accurately gauged. The wholesale closing of banks and other financial institutions; the loss of deposits and savings; the drastic curtailment of credit; the inability of debtors to meet their obligations; the growth of unemployment; the diminution of the purchasing power of the people to the point where industry and commerce were prostrated; and the increase in bankruptcy, poverty, and distress—all these conditions must be considered in some measure when the ultimate cost to the American public of speculating on the securities exchanges is computed.²

Over the 40 years since the stock market crash a great many economists, historians and other observers have contributed to this dialogue. Yet we seem no closer to any agreement on the economic impact of the boom and crash. The two most recent books on the subject take virtually opposite positions. One could also take the

TABLES

1	Dividend Income	214
2	New York Stock Exchange Data	215
3	Estimates of Capital Gains and Losses from Value of Stock Outstanding on New York Stock Exchange	215
4	Estimation of Annual Capital Gains and Losses on Common and Preferred Stocks Held by Non-Farm Households	216
5	Ownership of Preferred and Common Stock by Households, and Changes due to Savings and Capital Gains (Losses)	217
6	Value of Stocks from Estate Tax Returns and Estimated Capital Gains in Year of Death	217
7	Realized Capital Gains and Losses from Income and Estate Tax Returns	218
8	Stock Yields, Earnings/Price Ratios and New Issues of Stocks and Bonds	219
9	Bank Debits and Deposit Turnover (Velocity), for Demand Deposits in Commercial Banks	220

²U.S. Senate, Committee on Banking and Currency, 73 Cong., 2 sess., *Report No. 1455*, "Stock Exchange Practices," p. 7.

agreement of Milton Friedman and Paul Samuelson upon its minimal impact as a sure sign that something is wrong, that the subject must deserve further study!³

Impact on Aggregate Spending

My purpose in this paper is to clarify theoretically and to quantify empirically how much impact the movements of the stock market had upon the economy. The first task is to obtain, from the vast bulk of the literature on the great crash, a set of well-defined hypotheses as to *how* the boom and crash might have had their effect. In terms of modern macroeconomic theory this requires that we demonstrate some ultimate impact, direct or indirect, upon aggregate spending: consumption, investment, net exports, or government spending. This impact might be transmitted through a variety of causal channels--changes in family incomes or wealth, changes in conditions of money or credit, changes in confidence or expectations, et cetera. But no explanation or hypothesis is well defined until it connects up with a change in some form of spending. A great many of the attempted explanations in the literature fail this elementary test.

In the next six sections of the paper I will set forth six hypotheses distilled from the preceding literature, and expressed as far as possible in layman's terminology. Once each hypothesis is properly specified, we face the more difficult empirical problems. I have derived rough quantitative estimates of the *direct, initial* impacts of the stock market experience upon specific macroeconomic variables: consumption, investment, money supply, et cetera. The market might have affected consumption via its influence upon dividend income (hypothesis No. 1), wealth (No. 1), or expectations (No. 3). It might have affected investment spending via stock yields and the cost of finance (No. 2), or expectations (No. 3). It might have affected either consumption or investment spending via its impact on the supply of money or credit (Nos. 5, 6), or the liquidity of financial intermediaries (No. 4).

This paper estimates only the direct, first round impacts of the stock market boom and crash. To study the full impact, direct and

³Robert T. Patterson, *The Great Boom and Panic* (Chicago, 1965), pp. 215-245. Robert Sobel, *The Great Bull Market* (New York, 1968), pp. 12-13, 146-159. John Kenneth Galbraith, *The Great Crash, 1929* (Boston, 1954) is of course the classic work. One useful previous attempt to estimate the market's impact is Giulio Pontecorvo, "Investment Banking and Security Speculation in the Late 1920's," *Business History Review*, XXXII (1958) 166-191.

indirect, would of course require an explicit macroeconomic structural model, specifying multiplier-accelerator interactions among spending categories, feedbacks between the financial and real sectors, and dynamic lags. In other words, to explain the full impact of the stock market would be virtually to explain the entire depression economy itself. I have not attempted a task of that magnitude, though I have drawn upon the econometric models of Klein and others at several points in the analysis. For a discussion of the great depression some sort of neo-Keynesian model, including a monetary and financial sector, is clearly more appropriate than a neo-classical model which posits a continuous full employment equilibrium. My implicit macroeconomic model is of that neo-Keynesian variety.

I. Effect on Consumption of the Loss of Dividend Income

The first hypothesis to be tested is: The stock market boom generated higher dividends and capital gains which augmented the income and wealth of American households and raised consumer spending. The crash brought lower dividends and capital losses, and thus lowered consumer spending.

We can dismiss at a glance the possible impact of changes in dividend income (see Table 1). During the boom years of 1928 and 1929 dividends fell far behind the rise of stock prices. The year-to-year increase of aggregate dividends reached just \$0.6 billion in 1928-29, while the annual decrease after the crash reached \$1.2 billion in 1931-32. Even if we assume that this entire change in dividend income went to changes in consumption ($MPC = 1$), it would never account for more than about 20 percent of the annual change in consumer spending. The shift in 1929-30, right after the crash, was only 4 percent of the shift in consumer spending.

If we turn to capital gains and losses we encounter a surprising problem of measurement. A glance at the financial pages of any major newspaper indicates that the nation's stock exchanges are probably the most intensely monitored sector of the entire economy. Yet for all the data on the fluctuations in the prices of individual stocks or of price indices, there is little information on aggregate values. We do have monthly figures on the total value of outstanding shares on the New York Stock Exchange (see Table 2). In principle, several adjustments should be made in these numbers in order to obtain a measure of the capital gains and losses experienced by American households. We should correct for new stock issues and

retirements, and more important, for the portion of these listed stocks which are owned by corporations or foreigners.⁴

We sometimes forget that the New York Stock Exchange was only one of 34 exchanges operating in this country in the 1920's. We really want to know the capital gains and losses from all corporate stocks traded on all these exchanges (and even those traded privately perhaps). The only clue we have as to the relative importance of the nation's largest exchange is the fact that on July 31, 1933, the value of outstanding stock on the NYSE (\$32.762 billion) represented 34.5 percent of the total for all 34 exchanges.⁵

If we boldly assumed that (1) the relative size of the NYSE and other exchanges remained constant, and (2) prices on all the exchanges always moved parallel to those on the NYSE, we could get one rough estimate of aggregate gains and losses to households by doubling the shifts in value shown in the NYSE data.⁶ The results are shown in Table 3.

Capital Gains and Losses

A second approach relies upon Goldsmith's estimates of national wealth for 1922, 1929, and 1933, plus his annual estimates of household saving through purchases of corporate stock. The capital gains and losses (differences in holdings on balance sheet dates, less cumulated saving during the interval) are allocated annually according to changes in an index of common stock prices. This more complicated procedure is presumably superior because it reflects changes in stocks outstanding (e.g., new issues) and in the proportion held by households. The results are shown in Tables 4 and 5. The fairly close conformance of the two procedures is also reassuring.

⁴Goldsmith's data indicate that at the end of 1922 households held 73 percent of the corporate stock appearing on the national balance sheet. At the end of 1929 they still held 74 percent, but by the end of 1933 their share had fallen to 56 percent (while the share of non-financial corporations had risen sharply). See Raymond W. Goldsmith, Robert E. Lipsey, and M. Mendelson, *Studies in the National Balance Sheet of the United States* (New York, 1963), II, 319.

⁵Senate Committee on Banking and Currency, *Report on "Stock Exchange Practices,"* pp. 8-9.

⁶This would involve inflating the NYSE data by 1/34.5 to include other stock exchanges and deflating by .74 to reflect the share of outstanding stock held by households (see note 4 above). No correction has been made for new issues or stock retirements.

Obviously households experienced very large "paper" gains and losses on corporate stocks in the market boom and bust of 1927-33. But how many of these paper gains and losses were actually "realized" through sales? We can get some indication from the gains and losses recorded on income tax returns. The data, from a very careful study by Lawrence Seltzer, are given in Table 7. The IRS source data contain some biases of course. Taxpayers presumably under-report their capital gains and exaggerate their losses. Prior to 1928 persons with net deficits in their statutory income were not required to file returns (this probably meant primarily an under-reporting of capital losses, which offsets the above biases). The most serious downward bias arises from the exclusion of capital gains upon property transferred ("realized"?) at death; we must look to estate tax records to adjust for this omission. The second limitation in the data is that they cover gains and losses upon all property, not just corporate stocks. Detailed data for 1936 reveal that 79 percent of realized capital gains and 68 percent of losses arose from corporate stocks and bonds. Thus, by using Seltzer's original data for all gains and losses we can surely offset any downward bias due to under-reporting.⁷

In order to estimate capital gains "realized" at death we look to a study of estate tax data by Horst Mendershausen (see Table 6). The high tax exemption on estates means that we have data only on the wealthiest 1 percent of those dying in each year, persons with gross estates of over \$100,000. But the ownership of corporate stock is heavily concentrated in the upper income groups, so we have probably captured a substantial portion of the gains and losses from such stock.⁸ The gains or losses "realized" during the year of death are

⁷Lawrence H. Seltzer, *The Nature and Tax Treatment of Capital Gains and Losses* (NBER, New York, 1951), pp. 110-112, 145.

⁸Horst Mendershausen, "The Pattern of Estate Tax Wealth," in Raymond W. Goldsmith, *A Study of Saving in the United States* (Princeton, 1956), III, 287, 324-326. Let us make an illustrative calculation of the corporate stocks held by decedents with estates of less than \$100,000. About one million adults died in 1929. Assume an average estate of \$20,000, of which 10 percent was held in corporate stocks (these should both be very generous estimates). Then the bottom 99 percent of decedents owned \$2 billion of stock, just matching the holdings of the wealthiest 1 percent.

Obviously not all stocks transferred at death were actually sold at the time by the heirs. But since we are seeking an upward biased estimate of "realized" capital gains and losses, we include the full amount of these estate transfers in our final estimate. This procedure easily compensates for the omission of the untaxed estates, as noted above.

estimated very roughly from the percentage rise or fall in an index of stock prices. These figures are then added to Seltzer's to provide an upward-biased estimate of total realized capital gains and losses (see Table 7).

Impact of Capital Gains or Losses on Consumer Spending

Having estimated both the paper and realized capital gains and losses in the stock market, we now come to the really tough empirical question. How much impact did they have upon the consumer spending of American households?

Ando and Modigliani, in their study of the "life cycle" saving hypothesis, have estimated that the marginal propensity to consume out of net worth is about .06. That is, for each dollar of his net worth a consumer will increase his spending by six cents. This coefficient is generated from annual time series data for 1929-59, and is generally confirmed in Ando's estimates for 1900-28; hence it seems reasonable to apply it to the years around 1929. John Arena has estimated a similar function which, however, includes a separate term for the capital gains on net worth during each year. He derives (from post-war data) an MPC on these capital gains of about .03, but he cannot confirm statistically a significant difference between this capital gains coefficient and his estimate of the broader Ando-Modigliani coefficient for net worth.⁹

If we apply the Ando-Modigliani coefficient to the total paper capital gains and losses in the stock market,¹⁰ the implied shifts in

⁹Albert Ando and Franco Modigliani, "The 'Life Cycle' Hypothesis of Saving: Aggregate Implications and Tests," *American Economic Review*, LIII (1963), 55-84, and corrections in LIV (1964), 112-113. John J. Arena, "Capital Gains and the 'Life Cycle' Hypothesis of Saving," *American Economic Review*, LIV (1964), 107-111. In more recent estimates using the MIT-FRB econometric model, Ando and Modigliani have derived a coefficient of .04; see Frank deLeeuw and Edward Gramlich, "The Channels of Monetary Policy," *Federal Reserve Bulletin*, (June, 1969), p. 481. I can think of several arguments for questioning the stability of this parameter during the extraordinary years of stock market boom and crash, but they are not unambiguous enough to suggest an alternative estimate.

¹⁰Strictly speaking we should be deducting from capital gains (or losses) any changes in household borrowing to finance stock purchases, in order to arrive at changes in net worth. Brokers' loans, bank loans, and other loans on securities were large in the boom of 1928-29, probably reaching a peak of \$18 billion in September, 1929. But the year-to-year change in such loans, which is the relevant statistic for changes in net worth, never exceeded about \$3 billion. Such small amounts would not significantly affect our estimates. See Shaw Livermore, "Loans on Securities, 1921-32," *Review of Economic Statistics*, XIV (1932), 191-194, and Goldsmith, *A Study of Saving*, I, 710.

consumer spending are a very large part of the actual historical changes in consumption.¹¹

YEARS	Estimated Shift in Consumption Due to Stock Market Changes (\$ billions)	Observed Change in Consumer Outlays (\$ billions)
1928	2.2	1.7
1929	-1.1	2.9
1930	-2.7	-7.4
1931	-3.2	-10.9

The meaningless 1929 comparison would presumably be clarified if we could use quarterly data to separate the nine months of boom and the three months of crash. Note also that the results are quite sensitive to the value of the coefficient; if we had used Arena's estimate (.03) our inferred consumption shifts would be half as large.

If, by contrast, we apply the Ando-Modigliani coefficient not to the paper capital gains and losses, but only to the much smaller realized gains and losses, the impact upon consumption becomes nearly negligible. In 1928 it would shift consumer spending by only \$0.3 billion.

It obviously makes a great deal of difference whether we calculate the impact on consumption from the large paper capital gains and losses or from the much smaller realized gains and losses. Which, then, is the correct procedure? Pontecorvo and other observers have suggested that only the realized gains and losses should be considered as influencing consumption.¹² A simple version of this argument would imply that the stock had to be sold (the gain realized) in order to finance the consumer spending. On theoretical grounds this is a weak argument, since it assumes a sharp segmentation of consumer wealth. Consumers who enjoyed capital gains (increased net worth) could finance their spending by selling off other assets or by borrowing (perhaps even using their stock as collateral!).

¹¹First column derived by multiplying capital gains and losses from Table 4 by .06. Observed consumer outlays from Barger's data, in Marvin Hoffenberg, "Estimates of National Output, Distributed Income, Consumer Spending, Saving, and Capital Formation," *Review of Economic Statistics*, XXV (1943), 169.

¹²Pontecorvo, *op. cit.*, pp. 186-187.

*Impact on Consumption Overestimated
Through Use of Paper Capital Gains and Losses*

Theoretically, then, the larger paper gains and losses seem to be the appropriate variable by which to estimate changes in consumer spending. Despite the theoretical appeal of the larger estimates, there are three arguments which lead me to conclude that they substantially overestimate the market's impact upon consumer spending. First, presumably consumers normally respond to shifts in stock prices only imperfectly, and with some lag in recognition and adjustment. Spending decisions are not based on day-to-day or even month-to-month fluctuations in net worth, but upon some subjective perception of more "permanent" changes. To approximate such responses we might appropriately "smooth out" some of the sharpest fluctuations in stock prices. Many households obviously held stocks right through the sharp peak in the market in September, 1929, without adjusting their spending either to their temporary capital gains or to the counterbalancing paper losses after the crash.¹³

Secondly, the unusually low ratio of realized to paper gains and losses during the boom and crisis years of 1927-31 may be the symptom of a short-term downward shift in the Ando-Modigliani MPC out of net worth. Perhaps individuals decreased their propensity to spend out of capital gains in order to retain more of their wealth in the rising market. On the other hand, the capital losses after the crash, and the resulting illiquidity and danger of bankruptcy, may have temporarily raised the MPC coefficient for net worth, compelling consumers to make unusually large reductions in their spending for given reductions in their wealth.

A third piece of evidence strengthens my inclination to consider the estimated shifts of consumption based upon paper gains and losses as an upper limit value. Nancy Dorfman has run a regression of per capita real consumption upon Milton Friedman's estimates of permanent income per capita, for the years 1919 to 1938. The crucial years 1927 to 1930 all fall perfectly on the regression line. There are no large residuals to show an effect of capital gains (no counted in permanent income) upon consumption.¹⁴

¹³Our use of annual data (and omission of the strong peak during 1929) is one crude way of "smoothing" our capital gains data.

¹⁴Nancy S. Dorfman, "The Role of Money in the Investment Boom of the Twenties and the 1929 Turning Point" (unpublished Ph.D. dissertation, University of California, Berkeley 1967), pp. 170-172. Admittedly a better test would be to look at residuals in the Ando-Modigliani consumption function.

Although the aggregate data leave considerable leeway for doubt, I am presently inclined to conclude that capital gains and losses in the stock market during 1927 to 1931 caused shifts in aggregate consumer spending of less than \$1 billion per year.

Concentration of Stock Ownership

Another line of research may eventually help to reduce the range of uncertainty about the impact of the market upon aggregate consumer spending. We can move toward the microeconomic level of analysis. Rhetoric in the 1920's, often repeated uncritically by historians, spoke of stock market speculation as a popular pastime for the masses. Housewife, shoe-shine boy, and laborer supposedly joined the businessman and the Wall Street "insider" to seek their fortunes. Yet all the responsible estimates clearly show that only a small minority (8 percent) of the population actually owned stock, and that within this minority the substantial holdings were heavily concentrated in the hands of the wealthy few, with 500,000 to 600,000 individuals owning between 75 and 85 percent of the outstanding stock.¹⁵

Given this heavy concentration of stock ownership, we should not expect to observe much direct impact (via capital gains and losses) upon the purchases of mass consumption items. Rather the effects on spending should be concentrated in luxury consumer goods and services, and in consumer durables. Ideally we should undertake multivariate analysis of these consumer purchase categories to sort out the particular influence of the stock market. We must settle instead for a glance at the gross output data. The available evidence gives only selective and weak support to our hypothesis of large impacts. Automobile sales did reach record levels in the spring of 1929 and fell off dramatically in November; between 1929 and 1930 the reduction in this one item was over \$1 billion. But how much of this decline was caused by capital losses in the stock market? Other monthly data on luxury consumer spending--such as railroad passenger mileage, foreign travel, hotel occupancies, or visits to National

¹⁵ Alfred L. Bernheim, et al, *The Security Markets* (New York, The Twentieth Century Fund, 1935), chapter III and Appendix I. The number of stockholders apparently did increase sharply during the boom years, probably between 50 and 100 percent. The total number of stockholders reached approximately ten million individuals in 1930, but the percentage of value held by the highest income groups increased even during these years of spreading ownership.

Parks--adhere closely to seasonal and trend values, reflecting no visible response to the boom or crash.¹⁶

II. Effect on Capital Spending

The second hypothesis is: Low yields on stocks and the easy speculative atmosphere of the boom market stimulated corporations to finance expanded real investment spending through new stock issues. After the crash, higher yields and a more restrictive market caused a contraction of real investment spending.

It is true that the average yield on common stocks (the ratio of dividends to prices) fell substantially during the 1920's from nearly 6 percent in 1923 to under 3 percent at the peak of the boom in September, 1929 (see Table 8). At the peak of the boom, yields on common stocks were well below those on less risky corporate and government bonds.¹⁷

But falling current yields or earnings/price ratios did not necessarily make stocks a cheap form of financing. If a businessman believed that the market price of his company's stock accurately reflected the potential growth of its future earnings, he would not consider a low current yield ratio "cheap"; his opportunity cost of financing would consider those higher future earnings. On the other hand, if stock buyers were bidding yields down in anticipation of speculative capital gains from the stock market, rather than capital gains from future company performance in the real economy, then businessmen might consider stock prices "unrealistically" high, and perceive the yields as "cheap."¹⁸

The temporary bulge in stock issues in 1928-29 suggests that many businessmen did consider them a financing bargain. The data collected by the *Commercial and Financial Chronicle* on issues of corporate stocks and bonds for "new capital" show a dramatic increase during the decade, and a sharp decline after the crash (see Table 8). Raymond Goldsmith's data show that new issues of stocks

¹⁶U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957* (Washington, D.C., 1960), p. 462. *Survey of Current Business*, Annual Supplement, 1932, pp. 9, 119-123, 273-275.

¹⁷*Historical Statistics*, pp. 656, 658 (See Table 8.) Pontecorvo, *op. cit.*, pp. 178-179. Robert Sobel's claim that price/earnings ratios were not abnormally high in the boom is quite misleading; he gives fragmentary data rather than the more comprehensive averages, and for 1928 rather than 1929. See Sobel, *op. cit.*, pp. 119-122.

¹⁸Dorfman, *op. cit.*, chapter VII.

and bonds provided about one-third of total corporate sources of funds (1923-29), making them second in importance to internal sources (55 percent) such as retained earnings and depreciation allowances. Stocks alone provided about 19 percent of total financial sources; this was a much higher percentage than Goldsmith observed for other years of the 20th century. These statistics certainly lend apparent support to the hypothesis that easy financing via corporate stocks stimulated real investment spending.¹⁹

Appearances can be deceptive! A further examination of these statistics will cause us to reject the hypothesis. The basic source of confusion is the failure to distinguish between financial capital and physical capital. The term "new capital" as used in the *Financial Chronicle* refers to financial capital, to those issues not used for refunding or retirement of old securities. Many of these "new capital" issues provided funds for corporate mergers or acquisitions, or for financial "working capital." We want to know how much of this new financial capital actually paid for new physical capital, plant and equipment or inventories.

A series published by Moody's Investors Service of new security issues for "productive purposes" (see Table 8) gives us a good measure of such real capital formation, although it excludes inventory accumulation and involves some rough estimation. The data give striking refutation to our hypothesis. While new issues of stocks and bonds were rising dramatically from \$2.6 billion to \$8 billion, the amount going to finance real investment remained virtually constant, between \$1.5 and \$2 billion per year. Between 1921 and 1929 new issues financed only about 26 percent of corporate gross investment, at a steady pace apparently little affected by the stock market boom.²⁰

A very thorough study by George Eddy of "Security Issues and Real Investment in 1929" provided decisive and more detailed evidence for that climatic year of the boom. After carefully tracing the ultimate use made by each corporation of its share of the \$8.002

¹⁹Raymond W. Goldsmith, *Financial Intermediaries in the American Economy since 1900* (Princeton, 1958), pp. 222-223.

²⁰George Eddy, "Security Issues and Real Investment in 1929," *Review of Economic Statistics*, XIX (1937), 90-91. Dorfman, *op. cit.*, p. 108. The division of new issues between stocks and bonds was strongly influenced by yields and expectations (Pontecorvo, *op. cit.*, pp. 176-179). But we cannot infer from this fact how stocks and bonds shared the financing of real investment. Eddy's data for 1929 show that the stock issues went disproportionately to mergers and other financial purposes, while the bond issues went disproportionately to real investment.

billion of new issues listed in the *Financial Chronicle*, Eddy concluded that only \$2.002 billion financed real investment spending. Common and preferred stock accounted for 74 percent of the \$8 billion of new issues, but only 54 percent (\$1.074 billion) of the \$2 billion of real investment. Thus the booming stock market of 1929 directly financed only \$1.1 billion out of \$17.2 billion of gross private investment.²¹

What about the second part of our hypothesis, the impact of the crash upon stock financing of real investment? Moody's series of "productive" new issues reached its peak in 1930 (not 1929!) but we know that this was due mainly to large new bond issues, especially by public utilities. Stock yields rose sharply as prices collapsed, and after mid-1930 new issues slowed to a trickle. But even if we assume that new issues of stock financed no real investment at all after 1929, this could only have caused a reduction of \$1.1 billion in annual real investment spending. If we believe that the real economic decline which began in mid-1929 had its major causes outside the stock market, then we would expect some decline in externally financed real investment even without the crash. External finance is always most important in an expanding economy, while internal finance (liquidity, cash flows from retained earnings) matters more in recession.²²

In summary, the stock market boom induced a flood of new corporate stock issues, some substituting for bonds or other securities and some doubtless representing net financial expansion which would not otherwise have occurred. But the volume of real physical investment financed directly by new stock issues remained constant and apparently unaffected by the market boom. The stock market crash probably reduced real investment by much less than \$1 billion per year, with the main impact largely offset in 1930 because of shifts back to bond issues.

²¹Eddy, *op. cit.*, pp. 79-86. Hoffenberg, *op. cit.*, p. 169. See below, pp. 21-22, for brief discussion of indirect uses of those funds.

²²This is the "bifurcation hypothesis" of investment theory. See Michael K. Evans, *Macroeconomic Activity: Theory, Forecasting, and Control* (New York, 1969), pp. 90-92, 128-129.

III. Psychological Impact on Consumption

The third hypothesis is: The stock market boom of 1928-29 improved consumer and business expectations, confidence, and optimism, and thus raised consumption and investment spending. The crash brought lower expectations and pessimism, and therefore lowered spending.

Casual assertion of the great psychological impacts of the stock market boom and crash pervades the literature. Perhaps its popularity is directly related to the difficulty of proving or disproving it. If all other casual connections between the market and the economy have been found wanting, one can always fall back upon the psychological impact. I will attempt to demonstrate the severe limitations of the assertion by showing its conceptual weakness and by indicating the direct and indirect evidence against its importance.

All decisions are based upon "expectations." Behavioral theories in the social sciences, and particularly those in economics, do not ignore or deny the role of expectations or psychology in decisions. Rather, they assume that these inner psychological states are usually (and on the average) related in some stable, predictable fashion to observable, "objective" conditions in the decision maker's environment. Most businessmen, for example, make their decisions about real investment spending with "psychological expectations" that are strongly influenced by such "objective" data as income, sales, capacity utilization, interest rates (or stock prices!), prices vs. costs, etc.

We do not enhance our explanatory powers, then, if we refuse to probe beneath such vague and all-embracing terms as "confidence" or "expectations" to the underlying objective conditions. Instead we should construct behavioral models in which we spell out more precisely and explicitly just how we believe the decision making actors respond to given information and situations. Perhaps they will extrapolate (or "forecast") the present level of prices or costs or profits into the future. Or perhaps they will usually "expect" some rate of increase or decrease from present levels. Once we have specified these "normal" responses we can speak more meaningfully, and more narrowly, of a "shift in expectations," as referring to some change in the response parameters.

How does this conception apply to our discussion of the stock market? It means that much of the shift from "optimism" and "confidence" in 1928 or 1929 to "pessimism" and "a mood of hesitation" in 1930 or 1931 represented merely a normal, predictable response to changes in objective conditions--declining GNP, falling

profits, rising unemployment. We should then rephrase our hypothesis to ask whether there was some *additional "subjective" shift* of expectations, some alternation of the "normal response" of decision makers to these changing objective conditions, and whether any such shift was related to the stock market.

What sort of direct evidence do we have regarding the influence of the stock market upon the "optimism" or "pessimism" of Americans, or the influence of those attitudes upon spending decisions? The evidence is overwhelming that "expectations" about the future of the stock market itself shifted upward in 1928 or 1929; masses of buyers began betting upon a rising market. Similarly, the evidence of "panic" psychology in the market in October and November, 1929, is undeniable. There is also much testimony to suggest that these states of "confidence" or "panic" among buyers and sellers of stocks were influenced by the perception of changing conditions in the real economy. For example, the belief in a "new era" of "permanent prosperity" surely influenced the way many people capitalized current corporate earnings in 1929.

The state of expectations in the stock market in December, 1929, and the first half of 1930 is more ambiguous. Certainly the mood of panic had receded. Stock prices stabilized and even recovered some of their lost ground, and most observers suggested a feeling of mild optimism about the future of the market.

But our chief purpose is not to describe the shifting "expectations" about the stock market itself, nor to explain those shifts in terms of changes in the real economy. We seek some evidence that the changing expectations in the market "carried over" and influenced expectations about spending on real output, consumption and investment. At this crucial juncture there is remarkably little supporting evidence for the hypothesis. Where are the people saying, "The stock market boom has so raised my optimism [though not my income or wealth!] that I am going to buy a car, or add a wing to my factory"?

In the midst of the crashing market on Black Thursday (October 24, 1929) President Hoover issued a statement that "the fundamental business of the country--that is, the production and distribution of goods and services--is on a sound and prosperous basis." Similar statements were issued by economists, businessmen, and newspaper editors over the next several months. Historians, like Monday morning quarterbacks, have cited these statements as examples of poor forecasting or empty rhetoric. Let us admit that Hoover's statement was a bad forecast, and even a bad description of

the present state of the economy at the time. It is still a striking piece of evidence against our expectations hypothesis. Hoover is trying to reassure the "panicky" speculators. He assumes that the real economy influences expectations in the stock market, not the other way around! The frequent repetition of such optimistic commentary in early 1930 strongly suggests that "pessimism" and "panic" in the stock market did not immediately cause a sharp adverse shift in expectations about the real economy.²³

Let us turn now to the indirect evidence on the expectations hypothesis. Assume that there was a substantial subjective increase in "optimism" in 1928-29, beyond any changes in "objective" economic conditions, or that there was a substantial "pessimistic" shift in subjective expectations after the crash. If these altered attitudes affected spending decisions, we would then expect to find large "unexplained residuals" in our consumption or investment functions. The actual spending should be substantially higher in 1928-29 and substantially lower in 1930-31 than we would "predict" (estimate) from an econometric model which assumes stable, "normal" responses to changes in the objective variables.²⁴

I have examined a number of plausible models for consumer and investment spending which have been fitted to data from the American economy in the inter-war years (e.g. 1920-1941). None of them show the sort of large residuals for the years 1928-31 which would support our hypothesis of subjective shifts toward "optimism" and "pessimism." In Nancy Dorfman's regression of per capita real consumption on per capita real consumption on per capita

²³Sobel, *The Great Bull Market*, pp. 137-146. Hoover's quotation is on p. 137.

²⁴It is not necessary to believe that our econometric model is perfectly correct in its specification for this approach to be useful. It is enough that our excluded variable (the shift in expectations) be uncorrelated with the included variables, such as permanent income, profits, or past physical capital. If the correlation were high, movements of the included variables would "pick up" and "mask" much of the influence of our expectations variable, leaving no residuals. I would argue that stock market expectations depend mainly upon capital gains and losses. These capital gains are not included in measured income or profits and their statistical correlation appears to be fairly low (I have not tested this rigorously.). If, however, stock market expectations are strongly influenced by the performance of the real economy (as well as by market performance), this correlation will undermine my procedure. Many economists do assume that in general the stock market is a fairly good "barometer" or "leading indicator" whose movements reflect or anticipate (i.e., correlate with) swings in the real economy. But the historical discussions also emphasize that any such correlation broke down during 1928-30, when the market was "over-optimistic" relative to the real economy.

permanent income, the years 1927-31 fall right on the line. In Lawrence Klein's econometric model (I) real investment is a function of past and current profits and the initial stock of physical capital. His regression does show actual investment in 1929 which is \$1.1 billion above the estimated investment level. But the Moody's investment series and George Eddy's careful study of the stock issues and real investment in 1929 seem to close that loophole. Klein's more detailed model (III) of plant and equipment investment (as a function of current and lagged output and initial capital stock) has no residuals over \$750 million. These results seem to leave fairly little empirical maneuvering room for any massive expectations effects upon aggregate spending.²⁵

IV. *Impact on Banks*

Our fourth hypothesis is: The crash threatened the liquidity and solvency of financial intermediaries, especially investment trusts, holding companies, and commercial banks. Their illiquidity or failure restricted credit flows or tied up or destroyed liquid assets which were essential to consumers and businesses.

Galbraith has argued that the investment trusts and holding companies caused a reduction of real investment spending. They fought to sustain the dividends of the operating companies which they controlled, since these dividends were their vital source of income and liquidity in a falling stock market. High dividends at a time of tumbling profits meant a sharp drop in retained earnings which could finance real capital formation.²⁶

This argument is logical enough, but the effect in 1929 must have been quantitatively insignificant. The total assets of investment companies and investment holding companies reached a peak of \$7.4 billion in 1929 and declined to \$3 billion by 1933. Compare this to commercial bank assets of \$66 billion, or to the value of stock on the New York exchange alone of \$65 billion. These investment companies owned only 3.6 percent of outstanding corporate stock, and

²⁵Dorfman, *op. cit.*, pp. 170-172. Lawrence R. Klein, *Economic Fluctuations in the United States, 1921-1941* (New York, 1950), pp. 68-69, 102-114.

²⁶Galbraith, *The Great Crash*, p. 183. Galbraith implies that investment holding companies were sharply different from other corporations in their determination to sustain dividends during recession. But John Lintner has shown that dividends for *all* corporations behave this way. This puts the burden of proof more heavily upon Galbraith, since only the differential behavior of investment holding companies would support his argument. See Lintner, "The Determinants of Corporate Savings," in Walter W. Heller, et al (eds.), *Savings in the Modern Economy* (Minneapolis, 1953), pp. 248-253.

thus controlled about that share of corporate dividends. Even if every single dollar of corporate dividends which they received had been retained and had been spent on real investment, only about \$225 million of added investment would have occurred (3.6 percent of the \$6.3 billion of corporate dividends).²⁷

There is virtually no evidence to support the popular impression that the suspension and failure of commercial banks after 1929 was the result of their prior involvement in financing stock market "speculation." It is easy to tell colorful stories about Charlie Mitchell and his National City Company, the highly promotional and hard selling investment banking affiliate of the National City Bank of New York (of which Mitchell was also president). It is much more difficult to show that the success or failure of such affiliates (did many fail?) affected the solvency of the commercial banks.²⁸

The waves of bank failures began not right after the stock market crash, but after October, 1930, and again in 1931 after the international monetary crisis. The heaviest losses were suffered not on stocks but on real estate and business loans, and on government and corporate bonds. Bank failures came not to Wall Street, where the stock market credit was concentrated, but to small independent country banks and to banks in communities which had suffered the heaviest losses of income and employment in the depression.²⁹

Commercial banks owned only 0.8 percent of the outstanding corporate stock in 1929, a total of \$1.2 billion. Of course their really significant involvement in Wall Street came through "loans on securities" to brokers and dealers or to individual speculators. These loans "for purchasing or carrying securities" reached \$8.3 billion in 1929, compared to total commercial bank assets of \$66 billion. Thus

²⁷Raymond W. Goldsmith, *The Share of Financial Intermediaries in National Wealth and National Assets, 1900-1949* (New York, 1954), pp. 68-71. Goldsmith, *Financial Intermediaries in the American Economy since 1900*, pp. 73-74. Some investment (especially holding) companies used financial "leverage" of course, controlling (but not receiving) all of the dividends of a company while owning 51 percent (or often less) of its stock. As an offset against this, they often owned shares of stock in companies whose dividend policies they did not control. I have assumed for convenience that these effect roughly cancelled.

²⁸Patterson, *The Great Boom and Panic*, pp. 50-52. I have not investigated in any detail the possible linkages exposed by the Congressional Hearings of 1932-34 on "Stock Exchange Practices."

²⁹Lester V. Chandler, *America's Greatest Depression, 1929-1941* (New York, 1970), pp. 77-84. Milton Friedman and Anna Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton, 1963), chapter 7.

if all these loans had defaulted after the crash, the losses would have represented 13 percent of bank assets. In fact, however, bankers suffered very little loss on such loans. The risks and losses were borne by the borrowers, and the banker could easily check on a daily basis to assure himself that the security collateral was sufficient to cover the loan.³⁰

V. *Impact on Credit*

Our fifth hypothesis is: Stock market speculation absorbed credit funds, diverting them away from financial real investment (or consumer) spending. After the crash the release of funds from speculation made money and credit more available to finance real spending.

This argument, as stated above, still has several points of confusion or ambiguity imbedded in it. Does it refer to all credit, to bank credit, or to money? Does it assume some sort of fixed, limited "pool of funds," where increased allocations to one user (the stock market) automatically mean decreased allocations to others? With these problems in mind we shall consider several versions or variations of the original hypothesis.

In one important mechanical sense, stock market transactions cannot "absorb" funds: for every buyer of stock who gives up funds there is a seller who receives them! Dollars going "into the market" do not disappear, but "come out the other side." Even if the first seller uses his funds to buy other stocks, eventually some seller removes his funds from the market. From this perspective, then, one might in principle measure the impact of market transactions upon the real economy by comparing what stock sellers *actually do* with their funds to what buyers *would have done* with their funds if they had not bought stocks. The alternatives for both groups obviously include: buying current output (either consumption or investment); buying existing physical capital; buying other stocks (outstanding, or new issues); buying bonds, mortgages or other financial assets; retiring old debts or securities; "hoarding" bank deposits or currency.

In practice this formulation does not seem to lend itself to empirical verification. It does suggest one specific inquiry, however. What happened to the billions of dollars raised by new issues of

³⁰Goldsmith, *Financial Intermediaries in the American Economy since 1900*, p. 225. Goldsmith, *A Study of Saving*, I, 710. Charles O. Hardy, *Credit Policies of the Federal Reserve System* (Washington, D.C., 1932), p. 174.

corporate stocks which were *not* used to finance real investment spending? If they went to financing mergers or acquisitions, what did the recipient companies or individuals do with the funds?

If they were re-lent into the call loan market, where did they eventually flow into real expenditures? Further study of the financial statements of the issuing corporations (along the lines of Eddy's study) might at least permit us to identify the first links in these chains of transactions. It appears likely that in the late 1920's most of the financial capital from new issues went to mergers and acquisitions. Perhaps as much as \$3 billion of corporate funds (including the excess cash balances of many corporations *not* issuing new stocks) went into brokers' loans.³¹

Another fruitful perspective comes from the modern theory of "balancing portfolios." Imagine that all holders of wealth--individuals, corporations, financial intermediaries, etc.--desire to hold some mixture of assets: physical capital, consumer durables, stocks, bonds, mortgages, insurance policies, money, or other financial assets. A strong speculative boom which attracts investors to the stock market will thus reduce their demands for other assets in their portfolios. Lower bond and mortgage prices mean higher interest rates. Lower prices on existing physical capital mean a lower profit on investment in new physical capital. While lower yields and higher prices on stocks would stimulate real investment by stock-issuing corporations (our second hypothesis above), the higher cost of financing (and perhaps lower profit expectations) would reduce those types of real investment customarily financed by bonds or mortgages. Thus while directly or indirectly raising real investment through stock issues, the stock market boom also indirectly depressed it elsewhere in the economy. Conversely, the market crash shifted asset demands back toward bonds and mortgages, and encouraged real investment activities which they financed. Unfortunately, I have not yet figured out a way of testing or quantifying the implication of this "portfolio balancing" theory.

Perhaps the most controversial version of this fifth hypothesis focuses narrowly on bank credit. Did the "speculative" stock market boom "absorb" bank credit or "tie up" bank deposits, leaving less credit and money available to meet the "legitimate" needs of industry, agriculture, and commerce? The Federal Reserve leaders used this argument to justify their restrictive monetary policy actions

³¹Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (Washington, D.C., 1943), pp. 497-498.

in 1928 and 1929. The issue was vigorously debated among monetary economists through the early 1930's. After examining this debate, and gathering some relevant statistics, I have come to the following conclusions.

1. Loans by banks to stock exchange brokers and dealers did not keep billions of dollars "tied up in financial circulation." The brokers merely extended the chain of financial intermediation, channeling funds through margin loans to corporations issuing new stocks or to individuals selling old stocks. By these channels the real savings of bank depositors soon flowed into some form of expenditure.³²

2. During 1928 and 1929 virtually all the increase in brokers' loans came from non-bank sources (corporations, foreigners, wealthy individuals). To the extent that brokers or their customers used these outside funds to repay debts to banks, bank credit was actually released for other uses. In the three months after the crash in October 1929, these non-bank lenders withdrew over \$4 billion of funds from brokers' loans. The banks were able to increase their intermediation in this crisis, lending \$1.3 billion to stock brokers and speculators in the first week of the crash alone. This was done without a proportionate contraction of bank credit to other customers, because the Federal Reserve (especially the New York Bank) expanded bank reserves.³³

3. Stock market transactions did not tie up large amounts of bank deposits. Stock brokers could themselves handle a huge transactions volume by bookkeeping entries on their own books, or by netting out daily balances among brokers. Because of this economizing of their deposit balances, brokers' deposits had an extremely high and elastic velocity of turnover. During the mid-1920's brokers required only about \$20 million of deposit balances to conduct billions of dollars of transactions!³⁴

³²Lauchlin Currie, "The Failure of Monetary Policy to Prevent the Depression of 1929-32," *Journal of Political Economy*, XLII (1934), 145-177. John H. Williams, "The Monetary Doctrines of J. M. Keynes," *Quarterly Journal of Economics*, XLV (1931), 558-573. Harold Barger, "The Banks and the Stock Market," *Journal of Political Economy*, XLIII (1935), 763-777. Harold L. Reed, *Federal Reserve Policy, 1921-1930* (New York, 1930), chapter V. Hardy, *op cit.*, pp. 148-172.

³³*Banking and Monetary Statistics*, p. 494. Portecorvo, *op cit.*, p. 181. Friedman and Schwartz, *op. cit.*, p. 335.

³⁴Hardy, *op cit.*, p. 167.

Of course the "speculators," the buyers and sellers of stocks, also utilized bank deposits, not only in New York but all around the country. But they too could conduct transactions through their brokers' accounts rather than bank accounts, and could increase the average velocity of their deposits by lending in the call loan market.³⁵

The argument that the stock market "tied up" bank deposits implies that there was only a fixed "pool of funds" available. With a fixed total money supply (and fixed velocity!) more dollars circulating in the financial sector (the stock market) must mean fewer dollars available for transactions in the real sector. But this implicit assumption does not fit the facts in our case. Both the dollar volume of stock market transactions and its rate of increase were small compared to the volume and rate of increase of bank debits, that is the transactions volume in bank demand deposits (bank debits = MV = money supply multiplied by transactions velocity or annual turnover). The \$90 billion of shares traded on the New York Stock Exchange in 1929, even if each transaction had been conducted by check (rather than on brokers' accounts), amounted to only 15 percent of the \$592 billion of debits in the reporting New York City banks. The estimated \$225 billion of stock transactions on all exchanges were 18 percent of bank debits (\$1237 billion) in all commercial banks. The \$16.7 billion rise in stock transactions from 1928 to 1929 on the NYSE was only 16 percent as large as the (\$102 billion) rise in debits of New York City banks, while the rise in all exchanges (\$42 billion) was 26 percent of the rise in debits of all commercial banks. Most of this increase in bank debits came through rising average velocity, and only a little through increased deposits. As noted above, the stock market exhibits a uniquely high transactions velocity for money.³⁶

³⁵*Ibid.*, p. 168.

³⁶See Tables 2 and 9 for data in this paragraph. There are no available statistics on the dollar volume of stock exchange transactions, even for the New York Stock Exchange. I constructed the series in Table 2 by multiplying the number of shares traded by the average price of shares outstanding. If we assume that lower priced shares trade more actively, then these figures may have a slight upward bias.

The NYSE data on shares traded do not include odd lot transactions (of less than 100 shares). Round lot transactions accounted for roughly 2/3 of total shares traded on the NYSE. In 1928-29 that exchange conducted about 60% of the share trading volume on all exchanges (U.S. Senate, Committee on Banking and Currency, 73 Cong., 2 sess., *Hearings on "Stock Exchange Practices,"* Part 17, p. 7854). Thus we can "inflate" the NYSE volume ($\$90 \times 3/2 \times 10/6 = \225 billion) to obtain an estimate for trading volume on all exchanges.

Most versions of this fifth hypothesis have contained theoretical flaws or have implicitly assumed institutional arrangements or conditions contrary to the historical facts. The "portfolio balancing" theory is logical enough, but it implies both upward and downward shifts in different categories of spending, and it is not readily amenable to quantitative estimation.

VI. Effect of Tight Monetary Policy

Our sixth and last hypothesis is: Fear of a speculative boom and bust in the stock market led the Federal Reserve to tighten monetary policy and retard aggregate spending in 1928 and 1929. Fear of a recurrence of speculation after the crash inhibited the Federal Reserve from adopting a vigorously expansionary monetary policy to combat the deepening recession during 1930.

Notice the lack of symmetry in the hypothesis. Both before and after the crash the Federal Reserve's response to the stock market led to monetary contraction. I believe the research of Elmus Wicker and Milton Friedman make a persuasive case for both parts of the hypothesis, though I am not ready to assign a dollar value to the economic impact of the Fed's behavior.

There was sharp disagreement within the Federal Reserve system about how to combat security speculation in 1928-29. One group, dominating the Board in Washington, favored direct action, "moral suasion" to restrict bank loans to brokers or speculators. They hoped in this way to fight speculation without restricting credit to other "legitimate" borrowers in industry, commerce, and agriculture. The other group, led by the New York Bank, denied that the Fed could control the ultimate use of credit which it created, and advocated a sharp rise in discount rates to squelch speculation and permit a resumption of easier money thereafter. But both groups agreed on their dual objectives of preventing speculation and promoting a stable economy; they differed only over the means to reach these goals. Friedman contends that the chosen policies restricted too little to stop stock market speculation, but too much to permit the economy's stable growth. Wicker agrees that tight money over-restricted the economy. But he differs with Friedman in believing that tight money actually furthered speculation; the higher interest rates attracted more non-bank funds to Wall Street than the Fed could withdraw through its direct action on the banks.³⁷

³⁷Friedman and Schwartz, *op. cit.*, pp. 254-256, 290-292. Elmus Wicker, *Federal Reserve Monetary Policy, 1917-1933* (New York, 1966), chapters 9 and 10.

During the stock market crash of October 1929, the New York Federal Reserve Bank acted aggressively to permit the banks to replace the credits to brokers and dealers which were being recalled by non-bank lenders. After the panic had subsided the New York Bank continued to press within the system for lower discount rates and expanded open market purchases of government securities. Most of the Federal Reserve Board and the presidents of the other Federal Reserve Banks continued to reject such expansionary monetary policies throughout 1930. One important reason was their fear that premature and excessive credit expansion might cause a resumption of speculation in the stock market. They also believed that they had already (at least passively) eased credit conditions through lower discount and acceptance rates; any attempt to "force" further credit expansion upon an economy whose demand for credit had diminished would be either futile or dangerously inflationary. Thus confusion in monetary theory must share the blame with fear of speculation as a cause of Federal Reserve failure in 1930.³⁸

Even if we agree that the stock market boom and crash influenced the Federal Reserve toward a more restrictive monetary policy, the impact upon the money supply (or interest rates, or other financial variables in our implicit macroeconomic model) remains uncertain. What is the appropriate counterfactual? If the Federal Reserve officials had not been so preoccupied with the dangers of speculation, what policy rules or criteria would they have followed instead, and what alternative discount rates, reserve levels and money supply would they have specified? The struggles for power within the Federal Reserve System and the confusions over "real bills," international money, and other aspects of monetary theory which prevailed during those years make this more of an exercise in political and intellectual, rather than in economic, history.

My own hunch, informed mainly by the research of Friedman and of Schwartz, Wicker, and Chandler, is that they would have lowered the discount (and acceptance) rates more quickly in the last half of 1929, but would probably not have conducted vigorous open market purchases of bonds. The larger fallacies of their "real bills" theories would probably still have inhibited large open market purchases once the recession gained momentum in 1930-31. The greatest impact of the stock market, therefore, probably came right at the turning point in 1929, when a relatively small shift in monetary controls might have counteracted the early stages of mild recession.

³⁸Friedman and Schwartz, *op. cit.*, pp. 367-375. Wicker, *op. cit.*, pp. 144-158.

*VII. Other Channels of Causation
Between the Stock Market and the Economy*

At least three avenues for further inquiry remain wide open. Many points of theory and evidence on the preceding six hypothesis certainly need more work. I have tried to identify some of the weak spots along the way.

Second, other hypotheses, other channels of causation connecting the stock market and the economy, need to be specified and examined. I can suggest a few possibilities.

1. Did the boom and crash increase the inequality of income distribution, and would this have significant impacts on consumer or investment spending?

2. How did the stock market affect America's net exports, and other components of her balance of payments? How much were sales of foreign bonds and securities increased, and with what effects? Did the boom market attract unusual inflows of short-term foreign capital into call loans, or into stocks themselves?

3. What impacts arose from shifts of stock ownership among sectors of the economy during boom or crash? Shifts between business and households might affect consumption versus investment spending. Shifts between financial and non-financial corporation might alter real investment or the liquidity of the public. What was the impact of the increase and changing composition of loans to brokers and dealers? Of brokers' loans to customers buying on margin?

Third, we must explore the full, indirect impacts of the stock market boom and crash upon the macroeconomic system. Most of the estimates presented in this paper indicate that the direct effects were "small," or at least smaller than previous writers have suggested. The largest impacts, a shift or perhaps \$1 billion per year in consumer spending and some shift in the money supply in 1929-30 might be incorporated in subsequent models.

Of course even if all the direct effects from the stock market were small, they might indeed still have had a very large ultimate economic impact, if acting upon a dynamically unstable economy. Even a tiny initial disturbance could then trigger a huge depression. But in that case we should concentrate our historical explanations of the depression upon the nature and historical sources of that system's instability in the larger economic structure. To emphasize the stock market boom and crash would be to mistake the symptom for disease.

TABLE 1
DIVIDEND INCOME

YEARS	Dividends (\$ billions)	Change in Dividends over previous year (\$ billions)	Change in Dividends as % of change in National Income	Change in Dividends as % of change in Consumer Spending
1927	5.0	+0.3	*	*
1928	5.3	+0.3	8%	18%
1929	5.9	+0.6	19	21
1930	5.6	-0.3	2	4
1931	4.3	-1.3	9	12
1932	2.7	-1.6	11	14
1933	2.2	-0.5	*	23

*In opposite direction.

Source: Marvin Hoffenberg, "Estimates of National Output, Distributed Income, Consumer Spending, Saving, and Capital Formation,"
Review of Economic Statistics, XXV (1943), 156,169.

TABLE 2
NEW YORK STOCK EXCHANGE

YEARS	Market Value of All Listed Stocks January 1 (\$ billions)	Average Price Per Share Outstanding*	Volume of Shares Traded (millions)	Value of Shares Traded (\$ billions)
1925	27.072	64.61	452.211	29.2
1926	34.489	66.03	449.103	29.6
1927	38.376	69.38	576.991	40.0
1928	49.736	79.64	920.550	73.3
1929	67.478	80.08	1 124.609	90.0
	89.668 (Sept.)	89.13 (Sept.)	—	—
1930	64.708	54.50	810.633	44.2
1931	49.020	34.27	576.765	19.8
1932	26.694	17.60	425.234	7.5
	15.663 (July)	11.89 (July)	—	—
1933	22.768	22.29	654.816	14.6

*Average of twelve monthly figures (first day of each month).

New York Stock Exchange Yearbook, 1932-33, pp. 110-113, 117, 157.

TABLE 3
ESTIMATES OF CAPITAL GAINS AND LOSSES
FROM VALUE OF STOCK OUTSTANDING
ON NEW YORK STOCK EXCHANGE
(\$ BILLIONS)

Beginning of Year	Stock Outstanding N Y S E	Change	Estimated Capital Gains or Losses on all Exchanges
1925	27.072	7.417	14.8
1926	34.489	3.887	7.7
1927	38.376	11,360	22.7
1928	49.736	17,742	35.5
1929	67.478	22,190	44.4
Sept. 1929	89.668	-24,960	-49.9
1930	64.708	-15,688	-31.4
1931	49.020	-22,326	-44.6
1932	26.694	-11,031	-22.1
July 1932	15.663	7,105	14.2
1933	22.768	10,327	20.7
1934	33.095	—	—

TABLE 4

ESTIMATION OF ANNUAL CAPITAL GAINS AND LOSSES
ON COMMON AND PREFERRED STOCKS
HELD BY NON-FARM HOUSEHOLDS
(1922 - 1933)

End of Year	Stock Prices	Change in Stock Prices	Allocation of Capital Gains or Losses
1922	75.1		
1923	73.9	-1.2	-\$ 0.9 billion ⁴
1924	88.1	14.2	10.9
1925	106.7	18.6	14.3
1926	111.4	4.7	3.6
1927	141.2	29.8	22.9
1928	188.3	47.1	36.2
Sept. 1929	237.8	49.5	38.1
1929	163.7	<u>-74.1</u>	<u>-57.0</u>
		88.6	68.1
1930	117.0	-46.7	-\$44.6 billion ⁵
1931	61.2	-55.8	-53.2
June 1932	35.9	-25.3	-24.1
1932	51.0	15.1	14.4
1933	77.1	<u>26.1</u>	<u>24.9</u>
		86.6	-82.6

Total capital gains from end of 1922 to end of 1929 (\$68.097 billion) derived by taking the change in holdings between those dates (\$138.296 - 55.520 = \$82.776 billion)¹ and subtracting the cumulation of saving in the form of corporate stocks during the intervening years (\$14.679 billion).² Similarly, the total capital losses between the end of 1929 and the end of 1933 (\$82.646 billion) are derived by taking the change in holdings (\$57.113 - 138.296 = \$81.183 billion)¹ and subtracting the cumulation of saving (\$1.463 billion).²

These total capital gains and losses are then allocated on an annual basis according to changes in Standard and Poor's Index of Common Stock Prices.³ In addition, the peak (September, 1929) and through (June, 1932) prices are used in order to give an estimate of capital gains and losses to those dates.

¹ Raymond W. Goldsmith, Lipsey, and Mendelson, *Studies in the National Balance Sheet of the United States* (New York, 1963), II, 319.

² Raymond W. Goldsmith, *A Study of Saving in the United States* (Princeton, 1955), I, 482 - 483.

³ Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (Washington, D.C., 1943), 480 - 481. The average of December and January prices was used, in order to maintain comparability with Goldsmith's data. See *Studies in the National Balance Sheet*, II, 15.

$$^4 \$1.2 \times \frac{68.097}{88.6} = \$0.9$$

$$^5 \$46.7 \times \frac{82.646}{86.6} = \$44.6$$

TABLE 5

OWNERSHIP OF PREFERRED AND COMMON STOCK BY HOUSEHOLDS,
AND CHANGES DUE TO SAVINGS AND CAPITAL GAINS (LOSSES)
(\$ BILLIONS)

YEARS	Jan. 1 Holdings	Saving ¹	Capital Gains ²	Dec. 31 Holdings
1923	55.5	1.1	-0.9	55.7
1924	55.7	1.1	10.9	67.7
1925	67.7	1.9	14.3	83.9
1926	83.9	1.6	3.6	89.1
1927	89.1	1.8	22.9	113.8
1928	113.8	2.9	36.2	152.9
1929	152.9	4.3	38.1	195.3 (Sept.)
	195.3 (Sept.)	—	-57.0	138.3
1930	138.3	0.9	-44.6	94.6
1931	94.6	0.3	-53.2	41.7
1932	41.7	0.0	-24.1	17.6 (July)
	17.6 (July)	—	14.4	32.0
1933	32.0	0.2	24.9	57.1

¹Raymond W. Goldsmith, *A Study of Saving in the United States* (Princeton, 1955), I, 482 - 483.

²My estimates, based on Goldsmith data. See previous table.

TABLE 6

VALUE OF STOCKS FROM ESTATE TAX RETURNS
AND ESTIMATED CAPITAL GAINS IN YEAR OF DEATH

Year of Death	Number of Returns	Gross Estates (\$ millions)	% Held in Stocks	Value of Stocks (\$ millions)	Estimated Capital Gains in Year of Death* (\$ millions)
1922	13,013	2495	31.3	781	133
1923	12,403	2350	31.4	738	-118
1924	14,013	2958	32.9	973	156
1925	13,142	3386	37.4	1266	215
1926	9,353	3146	38.9	1224	49
1927	8,079	3503	43.3	1517	319
1928	8,582	3844	48.4	1860	465
1929	8,798	4109	47.7	1960	-294
1930	8,333	4042	47.2	1908	-763
1931	7,113	2796	38.2	1068	-972
1932	8,727	2027	31.8	645	-129
1933	10,353	2244	34.9	783	266

*Applying percent rise in Standard and Poor's Index of Common Stocks during the year to the value of stock indicated.

Source: Horst Mendershausen, "The Pattern of Estate Tax Wealth," in Raymond W. Goldsmith, *A Study of Saving in the United States* (Princeton, 1955)

TABLE 7
REALIZED CAPITAL GAINS AND LOSSES
FROM INCOME AND ESTATE TAX RETURNS
(\$ MILLIONS)

YEARS	Net Gain	Net Loss	Excess of Gains	Gains Realized at Death*	Total Realized Gains
1922	991.4	759.6	231.8	133	365
1923	1168.5	976.8	191.7	-118	74
1924	1513.7	476.8	1036.9	156	1193
1925	2932.2	359.7	2572.5	215	2788
1926	2378.5	212.8	2165.8	49	2215
1927	2894.6	276.1	2618.5	319	2938
1928	4861.8	357.4	4504.4	465	4969
1929	4769.3	1876.7	2892.6	-294	2599
1930	1261.2	2620.8	-1359.6	-763	-2123
1931	501.2	3219.3	-2718.1	-972	-3690
1932	183.5	2865.6	-2682.1	-129	-2811
1933	620.7	2024.0	-1403.3	266	-1137

*Estimates from Table 6.

Source: Lawrence H. Seltzer, *The Nature and Tax Treatment of Capital Gains and Losses* (NBER, New York, 1951), p. 367.

TABLE 8

STOCK YIELDS, EARNINGS/PRICE RATIOS
AND NEW ISSUES OF STOCKS AND BONDS

YEARS	Yield on Common Stock (Percentages)	Earnings/Price Ratio (Percentages)	New Issues of Stocks and Bonds	
			<i>Financial Chronicle</i> (\$ billions)	<i>Moody's Investors Service</i> (\$ billions)
1923	5.94	11.38	2.635	1.624
1924	5.87	10.27	3.029	1.941
1925	5.19	11.19	3.605	1.824
1926	5.32	10.05	3.754	1.801
1927	4.77	7.57	4.657	1.781
1928	3.98	7.30	5.346	1.495
1929	3.48	6.23	8.002	1.787
Sept. 1929	2.92	—	—	—
1930	4.26	—	4.483	1.939
1931	5.58	—	1.551	.796
1932	6.69	—	.325	.203

Sources: U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957*, pp. 656, 658.

George Eddy, "Security Issues and Real Investment in 1929," *Review of Economic Statistics*, XIX (1937), 91.

Lester V. Chandler, *American Monetary Policy, 1928-1941* (New York, 1971), p. 28.

TABLE 9

**BANK DEBITS AND DEPOSIT TURNOVER (VELOCITY),
FOR DEMAND DEPOSITS IN COMMERCIAL BANKS
(1921 - 1933)**

YEARS	ALL COMMERCIAL BANKS		N. Y. CITY WEEKLY REPORTING MEMBER BANKS	
	Debits (\$ billions)	Velocity	Debits (\$ billions)	Velocity
1921	569	32.6	203	54.9
1922	620	34.2	235	61.8
1923	658	34.1	234	65.5
1924	687	34.4	258	66.5
1925	788	36.3	307	71.9
1926	838	37.7	332	77.8
1927	915	41.0	384	85.3
1928	1075	46.8	490	106.3
1929	1237	53.6	592	124.4
1930	892	40.4	376	77.0
1931	658	33.2	258	54.7
1932	456	27.3	165	37.6
1933	424	26.8	158	34.8

Source: Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics* (Washington, D.C., 1943), p. 254.

DISCUSSION

PHILLIP D. CAGAN

Did the 1929 stock market crash deepen the subsequent business depression? In the public's view it did, but economists have been skeptical. Now that wealth variables have recently made their way into consumption functions, a reappraisal of the 1929 crash is in order. George Green's paper re-examines the question and still concludes that the crash had minor effects on economic activity. His paper is concerned with measuring the size of the capital gains and losses and then assessing the effect. I generally agree with his conclusion that it had minor effects. Let me comment first on the measurement of capital gains and losses and then on the wealth variable and its effects.

Measurement of Capital Gains and Losses

Green's figure for capital losses needs to be scaled down. By no stretch of the imagination can one say that the entire decline in stock prices in 1929-1933 helped to produce the business contraction. Stock prices fell first because business earnings fell and second because there was a revaluation of dividend-price ratios. Only the second of these begins to approximate an independent effect of the crash. A change in the market value of a given stream of dividends is on a different footing than a decline in dividend payments.

To be sure, nothing that happens in the stock market is completely independent of what goes on in the economy. A change in dividend-price ratios may be justified by business prospects. But at

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least it is largely determined within the stock market, in the sense that it reflects the anticipations and preferences of market participants. Changing preferences first overvalued stocks before 1929 and undervalued them afterward. The large reduction in financial wealth allegedly constrained expenditures for both consumption and investment. But the part due to the decline in dividends reflected the reduction in activity and played no independent role. After all, land values collapsed in the 1929-33 debacle too, but I haven't heard the depression blamed on that.

It seems to me to come closer to the usual view of the crash to count just the amount due to the revaluation of dividend streams. I would make one further minor adjustment to exclude revaluations reflecting changes in the level of interest rates. While this can be ignored in the pre-crash period when corporate bond yields were roughly constant, a small adjustment is needed for the subsequent period, when yields rose.

To calculate the capital gains up to the 1929 crash, I start with 1925, well before most of the outlandish speculation began. Another starting point would not give greatly different results. In Green's Table 8 we find that the dividend yield on stocks fell 1.7 percentage points from 1925 to 1929. This is a change in preferences by market participants--speculative fever if you like. We may recalculate the market value of the 1929 dividend stream, using the 1925 dividend yield of 5.19 percent. The 1929 stream of \$5.9 billion thus had a capitalized value of \$114 billion. By the lower dividend yield in 1929 of 3.48 percent, the capitalized value was \$169 billion. The increase of \$56 billion is my estimate of the capital gain. It is an overestimation, since it includes new issues. We should count just the increase in value of new stock after it had been issued, but such refinements would not alter the general order of magnitude. Green's figure for the capital gain--which includes the rise in stock prices due to both the increase in dividends and in dividend yields, but does not adjust for new stock issues--is given in his Table 5 as \$115 billion for the same period. By excluding the effects of dividend payments, we cut his total in half.

On the down side we obtain a similar cut. From 1929 to 1932 the dividend yield rose 3.2 percent, of which 0.1 percent can be attributed to a rise in corporate bond yields. The 1929 dividend stream, when capitalized at the higher dividend yield prevailing in 1932 and with an adjustment for the rise in bond yields, had a market value of \$90 billion, a decline from 1929 of \$80 billion.

Green's figure for the capital loss is \$179 billion, again over twice as much.

Effect of the Decline in Wealth

Now what was the effect of the decline in financial wealth on the economy? Conceivably it could have affected the demand for money balances, business investment, and consumer expenditures. In the usual demand function for money balances, real wealth has an elasticity of about unity. The crash reduced the demand for money balances, therefore, by the same percentage as the decline in total wealth and thus, for a given money stock, stimulated the economy. While this effect is not usually attributed to the crash, such stimulative effects, as well as the other depressing effects, should be counted. Given some of the crazy results we can sometimes derive from models, it might turn out that stock market crashes are good for the economy!

The effects usually mentioned, however, are those which affect expenditures directly. A stock market decline can instill pessimism about the business outlook and thus discourage investment undertakings. It can also make everyone feel poorer and want to consume less. It is this latter result which the so-called wealth effect is concerned with. Green uses a coefficient of .06 for the wealth effect on consumption, which comes from some earlier work of Ando and Modigliani. With the .06 coefficient, Green uses his figure for a capital gain of \$115 billion in the 1925-29 period to find that consumption was higher by \$7 billion in 1929 compared with 1925. The capital losses thereafter imply that consumption in 1932 was lower compared with 1929 by \$11 billion, which was 38 percent of the actual decline in consumption.

This makes the wealth effect on consumption appear to be very important. To obtain the independent effect, however, this figure should be reduced to the lower capital loss figure (which I calculated) of \$80 billion. If we take .06 of that, we get \$4.8 billion, which was 17 percent of the actual decline in consumption. The revision is appropriate, because the coefficient was estimated from a multiple regression which held other influences on consumption constant. Only the part of the change in wealth uncorrelated with other influences should be counted. Moreover, this uncorrelated part was probably a smaller fraction of the total decline in wealth in

1929-32 than in the post-World War II period, when dividend streams were fairly stable and most of the variation in stock prices reflected revaluation. The 17 percent figure still makes the crash appear to be important though not so eye-catching. To find the total effect on the economy, we should multiply by the total effect on aggregate expenditures of an autonomous change in wealth. Based on fiscal multipliers of current econometric models, the multiplier appears to lie between one and two.

Green argues that his estimate is probably too high. He points out that a consumption function containing only permanent income does not have large residuals in the 1925-1932 period. You can see this in the chart of the permanent income function that I fitted for Milton Friedman in his study of the consumption function. It shows no important residuals during this period. In other words, we don't need the addition of market wealth to explain consumption in the 1925-32 period. The decline in permanent income incorporates the decline in dividends, and nothing seems to be left over for the rise in dividend-price ratios to explain. One might argue that there was a lag in the effect of the stock market decline and only when the capital losses appeared to be permanent did people begin to take them into account in their consumption. But that would push the effects on consumption into the middle or later 1930's, at which time consumption was higher than the regression predicted, not lower as such a lagged wealth effect would imply.

Green relies heavily on this evidence that the consumption function without wealth fits the data fairly well. But, of course, one's conclusion here depends on what importance he attaches to the wealth effect. According to the earlier Ando-Modigliani study, wealth has a significant independent effect. The issue is whether changes in the market value of wealth affect aggregate expenditures importantly in the short run.

Increase in the Role of Monetary Effects

The recent attention to the wealth variable increases the role of monetary effects in the FRB-MIT econometric model, which is laudable. The early versions slighted those effects. Interest rates, although included in all the relevant equations, did not play a major role, whereas the market value of wealth enhances interest-rate effects due to changes in monetary growth. This econometric application follows upon the lavish attention which the theoretical literature has paid to the wealth effects of money. The result in the

FRB-MIT model is that wealth, and in particular the stock market, becomes the major channel of monetary effects on the economy.

I find this hard to believe. First of all, do people adjust their consumption to ephemeral changes in wealth? It is true that they do not know which way the market is going to change, so that current stock prices are the best estimate of future discounted levels. But that doesn't mean that consumption is adjusted as quickly to changes in stock prices as to an increase in wage and salary income. It is also true that every time the stock market takes a plunge *the Wall Street Journal* runs a story on how bad business is at Tiffany's. No doubt the stock market hits luxury expenditures, but such effects are very limited. Moreover, it seems to me that Tiffany's suffers more from the short-run psychological elation or despair of winning or losing in the stock market than from an adjustment of consumption levels to permanent changes in wealth.

Moreover, conventional theory teaches (correctly I believe) that changes in monetary growth produce portfolio adjustments and substitutions among assets and affect expenditures through the supply of loanable funds and the rates of return on assets. These substitution and liquidity effects are not fully represented by the usual expenditure equations because of the variety of channels and interest rates involved, which are hard to measure with the available statistical techniques.

I am not denying that new money adds to wealth, but the increase in wealth due to a change in the money stock is usually insignificant. As the new emphasis on wealth implies, the important effect of monetary policy on wealth comes through changes in interest rates, which can produce large changes in the market value of wealth, and this could no doubt have some effect on spending. But these are likely to be transitory changes in wealth, while the main effects of wealth on consumption will be those of a permanent nature. The changes in interest rates produced by variations in monetary growth tend to be temporary, aside from the effect of changes in the anticipated rate of increase of prices.

It would be helpful to re-examine the 1920's and 1930's with the new consumption durables and other refinements. Either wealth has entered the equation spuriously, or it had a much greater effect in 1929-33 than Green, I, and others believe. Perhaps the stock market reflects changes in monetary growth without being a transmission mechanism of monetary effects. Would it remain significant if one put lagged monetary growth in as a proxy for channels of monetary effects otherwise omitted? Or possibly the wealth variable represents

something else. Some recent work suggests that it is a proxy in the equations for consumer sentiment or expectations about the future. Sentiment and wealth are not conceptually the same thing, though they might vary similarly over business cycles. Consumer sentiment does not work through the stock market, for the would limit its influence to a relatively small group; and, while the stock market may influence consumer sentiment, so do many other things.

Whether on the right track or not, the present emphasis on wealth as a major channel of monetary effects gives an ironical twist to the old view that changes in wealth are an undesirable side effect of monetary policy. In the early 1950's, for example, monetary policy was thought to require large changes in interest rates to be effective, and this was considered dangerous precisely because it would produce large variations in wealth. Recall Lawrence Seltzer's 1946 article entitled "Is a Rise in the Rate of Interest Necessary or Desirable?" in the *American Economic Review*. He expressed a widespread view that variations in wealth could endanger the solvency of financial institutions and, for that reason as well as others, induce changes in consumer and business expectations and expenditures which would be volatile and difficult to control. Seltzer was concerned over possible increases in interest rates in the early post-World War II years, but similar views lay behind the condemnation of stock market speculation in the 1920's. The view that changes in wealth are a very clumsy and undesirable way to stabilize economic activity is still very strong. With the new emphasis of the Federal Reserve on growth of the monetary aggregates, monetary policy has to be willing to allow wide fluctuations in interest rates and runs up against its long-standing tradition of preventing such fluctuations.

Extent of Recent Declines in Wealth

Recent experience has shown, however, that quite large declines in the market value of securities can occur without serious repercussions on the economy. I have made some rough estimates of the recent capital losses of the *household sector* from the flow of funds account. In 1965 that sector held bonds worth \$65 billion. Applying the change in an index of market yields for each bond group, and assuming (to be on the low side) an average maturity of the bonds outstanding of only five years, the capital loss in market value up to 1970 was 13 percent. In addition, the cost of living rose another 26 percent, so in real terms the decline was 36 percent. Jus

from 1968 to 1970 the capital loss was 7 percent in nominal value and 19 percent in real terms. Again for the household sector, corporate share holdings declined 14 percent from 1968 to 1970; adding in the price rise, there was a 25 percent decline in their corporate share holdings in real terms.

Of course, actual wealth did not decline equally because of new savings. If we look at the net financial worth of households, it nevertheless declined \$49 billion, or 3 1/2 percent, from 1968 to 1970. A decline in this total is an unusual occurrence, and even these figures do not allow for the market decline in bond prices, which the flow of funds takes at their maturity value. By my figures this would increase the decline by another \$6 billion. The total decline in wealth from 1968 to 1970 was about 16 percent in real terms. If we apply a .05 coefficient to the dollar change, consumption from 1968 to 1970 would supposedly have been reduced \$12 billion in real terms. That is a large figure. It excludes financial institutions, which also suffered tremendous capital losses in terms of the market value of their assets. (Depreciation due to inflation is counted in the figures for deposit holdings of the household sector.)

Yet what terrible consequences resulted from this gigantic decline in financial wealth? We did have the 1969-70 credit crunch, but it was due to monetary restraint and not to the decline in wealth. If anything, the decline in wealth alleviated the crunch by inducing more saving, which augmented the supply of loanable funds. Financial institutions were under strain, but much of that reflected the re-channeling of credit flows produced by deposit-rate ceilings and other regulations and cannot be attributed to the decline in asset values. To be sure, savings and loan associations were technically insolvent in 1969 with the sharp rise in mortgage yields; that reflected a very special situation which everyone agrees needs to be corrected by institutional reforms.

Apart from financial institutions, what was the effect of the decline in household wealth? Not all the evidence is in, but I do not detect serious consequences for the economy. I believe we have vastly overrated the dangers of interest-rate fluctuations and the accompanying changes in wealth. While they have some troublesome side effects, they are not a high price to pay, when necessary, for a flexible monetary policy to stabilize national income and prices. Moreover, while interest rates may fluctuate more at times if policy pays less attention to them, more stable monetary growth should, on the whole, result in less fluctuation in interest rates as well as in economic activity.