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CHANGES IN THE BALANCE SHEET OF THE U.S. MANUFACTURING
SECTOR, 1926-1977

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ABSTRACT

This is a report on the results of a research project, sponsored by the NBER's Program on Financial Markets and Monetary Economics, which involves the collection and organization of income account and balance sheet data, at the firm level, for the years 1926-77. The primary data source for the study is Moody's Industrial Manual. Working at the firm level, it is possible to obtain accurate information on the market values of traded securities.

This paper presents and discusses some of the aggregate characteristics of the dataset and also reports the results of estimating a simple portfolio model which attempts to explain changes in firm balance sheet flows for the periods 1927-35 and 1965-77.

The data collected for the study, as well as software necessary to manage them efficiently, are available from the authors. An NBER Technical Paper will shortly be available to describe the dataset and software in detail.

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Introduction

This paper reports the results of a research project which involves the collection and organization of income account and balance sheet data, at the individual firm level, for the years 1926-1977. The primary data source for the study is Moody's Industrial Manual.

By working at the level of the individual firm, it is possible to obtain more accurate information on the market values of traded securities, and more detailed information on the structure of firms' balance sheets than is typically available at the aggregate level. Accurate data on the income accounts and balance sheets of firms over a substantial period of time can provide researchers with a rich source of information, against which specific hypotheses regarding corporate financing and investment decisions can be tested. The data collected for this study, as well as software necessary to manage them efficiently, are available from the authors in either IBM or VAX formats at a nominal fee. An NBER Technical Paper is also available which describes the dataset and software in detail.

The first section of the paper briefly describes the manner in which the data were collected and organized. A more detailed presentation of the characteristics of the dataset and accompanying computer software can be found in the Appendix. Section two considers the aggregate characteristics of the sample. In particular, firm average data on the sources and uses of funds, market valuations, and rates of return are presented for the 1926-1977 period. The third section of the paper reports on the results of utilizing some firm-level data to estimate a simple portfolio model which attempts to explain changes in balance sheet flows.

1. Collection and Organization of the Data

The primary goal of undertaking this research project was to construct a micro dataset covering a substantial period of time for use in testing specific hypotheses regarding firm financing and investment decisions, and the financial markets' valuations of these activities. A secondary goal was to organize and present the data in a manner that would allow other researchers to conveniently access, verify and extend the basic dataset. To that end, the project also involved the creation of computer software to provide easy access to and retrieval of the data.

The sample of firms for the period 1926-1977 is actually composed of nine separate subsamples, drawn periodically from various issues of Moody's Industrial Manual. The composition of these subsamples is outlined in Table 1. The goal was to obtain nine overlapping subsamples of size fifty. Subject to restrictions on fiscal year, degree of consolidation, decipherability of complex transactions, and natural resource intensiveness, fifty-two firms were initially selected using a set of random numbers spanning the number of pages in each Moody's edition. Referring to Table 1, 28 firms in subsamples one through seven were deleted ex post because closer examination revealed inconsistencies with the initial selection criteria. For subsamples eight and nine, only 77 of the 104 firms initially selected survived, due primarily to changes in accounting policies (typically resulting from acquisitions) which could not be reconciled without resort to additional data sources, such as annual reports or Form 10-K's.

For each of the firms in a subsample, the values for 52 data items are recorded annually. These items are listed and described in the Appendix. About thirty of the data items can be transcribed directly from the income account and

balance sheet tables of the Moody's volume corresponding to the subsample (see the third column of Table 1). For most of the remaining data items, it was generally necessary to read the additional information provided in Moody's, and to employ issues of the Manual from several years of the subsample. For instance, multiple issues of the Manual were necessarily referenced when firms retired a debt or preferred stock issue during the subsample interval. In cases where information on the outstanding amounts of individual debt issues for particular years were missing, the sinking fund terms were used to interpolate for the missing values.

The replacement value figures reported for firms' inventories (data item 45) are generally available for the firms of subsample nine from footnotes in Moody's for the years 1976 and 1977. Also, a substantial fraction of firms increased the amount of inventories carried on a LIFO basis in 1974, and also reported the replacement values. To fill in data for missing years, twenty industry-level price indices were used to construct estimates in the manner suggested by Lindenberg and Ross (1981). For subsamples seven and eight, book values of inventories were converted to replacement values using indices for the aggregate manufacturing sector. For all subsamples, book values of plant and equipment were converted to replacement values using Census Bureau deflators for the manufacturing sector. One way in which the quality of these data could clearly be improved would be to gather replacement values from Form 10-K's for recent years, and use industry deflators computed by other researchers for earlier years. The existing software would allow these new deflators to be easily integrated with the main body of data.

2. Aggregate Characteristics of the Sample

Several aspects of the recent performance of U.S. nonfinancial corporations have attracted widespread attention. Since the mid-1960's there has been a dramatic decline in the securities markets' valuations of these firms relative to the replacement costs of their assets, and also relative to the returns generated by these assets (Brainard, Shoven and Weiss 1980; Feldstein 1980). At the same time, nonfinancial corporate businesses have become more reliant on debt securities in financing their growth (Friedman 1980, pp. 21-26). The inflationary environment of the past fifteen years has provided a powerful incentive for those with taxable incomes to increase their indebtedness. Additionally, as Friedman (1980) points out, the postwar trend away from internal sources of funds toward debt financing represents, at least partially, an adjustment toward more normal pre-Depression debt levels.

To place these issues in perspective, this section documents the sources and uses of funds, market valuations, and rates of return for the 1926-1977 period using our sample of manufacturing firms. ~~Details of the composition of the sample are presented in the Appendix.~~ To present the general characteristics of the sample, a substantial amount of aggregation is performed. The balance sheets of the sample firms are consolidated as described in Table 2. For each firm, variables of interest--such as new debt or equity issues--are measured relative to net assets. Then firm data are averaged for each year to provide a time series for a hypothetical firm with the mean characteristics of its subsample. Table 3 shows the results of performing such calculations on the components of net assets for the overlapping years of the subsamples, as well as the years 1926-1927 and the years 1976-1977.

An interesting feature of the results presented in Table 3 is the rather dramatic decline in the Cash Items variable, which is composed primarily of cash and short-term marketable securities. Considered in conjunction with the recent increase in the role of debt in corporate capital structures, the decline is even more striking. Closer inspection reveals that, at least since the mid-1960's, the fall in the share of Cash Items in net assets has been accompanied by an increase in the share of physical capital. The drastic increase in Current Liabilities in 1941 was due primarily to increased corporate taxation.

Sources and Uses of Funds

Figure 1 illustrates the relative importance of internal and external funds in financing the "average" firm, while Figure 2 depicts the role of debt among external sources of finance. In both figures, the large spikes appearing above the years 1937, 1941, 1947, 1951, 1956, and 1974 coincide with periods of unusual inventory accumulation and apparently represent a demand for external funds to finance unplanned inventories. However, this is not true for the broad spike that appears above the years 1965-1968. During this period there was an unusually large demand for funds for capital expenditures and for takeovers.¹

To highlight the longer-run trends, data on sources and uses of funds have been averaged over the individual years of the subsamples, and the results are presented in Table 4. According to these results, net issues of debt securities remained quite constant from the 1936-1941 period through the mid-1960's, when a large shift toward external sources of funds occurred. In fact, the percentage of total sources accounted for by net debt issues since 1965 is about twenty, slightly more than double the pre-1965 period. The results of Table 4 also

clearly illustrate the increased demand for funds to finance nonfinancial activities that has occurred since the mid-1960's. Virtually all of the increase in Total Uses is accounted for by increased expenditures on physical assets. The gradual trend toward external (relative to internal) sources of funds during the earlier postwar years reflects primarily a decline in undistributed profits relative to net assets.

Several features of the 1927-1930 and 1931-1935 periods require comment. First, during 1927-1930 there were virtually no retirements of common stock, and the -0.8 figure under Stock Retirements is due solely to retirements of preferred stock. Net issues of common equity were negligible except for the years 1928 and 1929. Furthermore, the Plant/Equipment data for the years prior to 1935 were estimated as depreciation allowances plus the change in net property account and are thus not comparable with the figures presented for later years. This latter feature accounts for the relatively large discrepancy between Total Uses and Total Sources for 1927-1930. Also, the relatively low figure for Undistributed Profits for the 1927-1930 period, 2.8 per cent of net assets, is not indicative of low profitability, as seventy per cent of funds available for common stock were paid out as dividends during this period.

Market Valuations

Securities markets provide a continuing valuation of corporations and their earnings streams and, therefore, indirectly of their net assets. The ratio of market value, as determined in financial markets, to the replacement value of tangible assets has been dubbed Tobin's 'q', and this section investigates how 'q' has behaved over the 1926-1977 period.

Figure 3 plots 'q' for the average firm in each of the nine overlapping subsamples and also indicates the composition of the ratio as between debt, equity, and preferred stock components. For instance, the distance between the horizontal axis and the first broken line represents the market valuation of debt securities relative to net assets. To assist in interpreting the figure, Table 5 provides the average values for the overlapping years of the subsamples, as well as for 1926-1927 and 1976-1977.² A complete listing of the data used to construct Figure 3 appears as Table 6.

Both Table 5 and Figure 3 clearly indicate the increasing importance of debt in the capital structure of the "average" corporation. What is somewhat surprising is that the sum of debt and preferred stock, relative to net assets, has remained virtually constant over the entire fifty-year period, suggesting that the increase in debt has come primarily at the expense of preferred stock. Another feature of Figure 3 which clearly stands out is the sharp fall and subsequent rapid recovery of the common equity component of the ratio during the 1930-1934 period. This is even more dramatic when one considers that capital goods prices were falling and, thus, reducing net assets and moving the ratio in the opposite direction. The figure also plainly shows the substantial decline of equity values that began in 1968. This slide in the ratio of the market value of equity relative to net assets is steeper and more prolonged than any previous decline illustrated in the diagram.

Because of significant sampling differences between the subsamples, Figure 3 has several substantial jumps which hinder interpretation. This is especially true for the most recent years. Figure 4 and Table 7 present data on 'q' for the period 1965-77 which have been spliced to eliminate the discrete jump for 1971.

The numbers for the period 1965-71 preserve their percentage changes over time but are constrained to meet the 1971 values of the 1971-77 subsample. These adjusted results indicate that the ratio of the market value of debt to the replacement value of net assets increased moderately over the 1965-77 period.

Finally, this spliced series on 'q' is compared, in Table 8, with alternative estimates reported in the literature.

Rates of Return

This subsection presents calculations of several measures of the returns experienced by firms in the sample. Figure 5 compares the rate of return on common stockholders' equity with the total rate of return on net assets, both rates of return measured on a replacement cost basis. In computing both rates, an adjustment is made to place depreciation charges on a replacement-cost basis. Stockholders' equity is defined as net assets (replacement) minus the market values of debt and preferred stock; analogous calculations using book values yield similar figures. An inventory valuation adjustment (IVA) was not included in the Figure 5 data since the database at present does not contain the information necessary to compute IVA prior to 1960. However, an IVA is presented in Table 9, which compares various rates of return for the 1961-1970 and 1971-1977 periods. Coupled with the information presented in Figure 3 and Table 5, these results confirm the significant decline which has recently occurred in the securities markets' valuation of assets relative to the returns generated by those assets. When we consider the differences in sampling procedures, the rates of return (inclusive of IVA) presented in this study are close to those reported by Brainard, Shoven, and Weiss (1980, Table 1, p.463). Their estimates for the

rate of return on net assets are 7.8 and 6.9 per cent for the 1961-1970 and 1971-1977 periods, respectively, compared with the estimates of 8.7 and 7.5 per cent presented in Table 9.

The rates of return reported in Table 9 ignore the effects of both actual and expected inflation upon the real value of the firms' financial assets and liabilities. In particular, the component of the rate of return on net assets which reflects the tax deductibility of the inflation premium contained in nominal interest rates is not included in the calculations. Also, no allowance is made for the distributional effects of realized inflation versus anticipated inflation between creditors and stockholders. However, because the difference between paper assets and paper liabilities, relative to total net assets, is only +0.02 for 1961-70 and -0.055 for 1971-77 one would expect these effects to be small.

Conclusion

This section has presented some of the aggregate characteristics of the sample of manufacturing firms for the years 1926-1977. The results, as regards the postwar period, are broadly consistent with those obtained by other researchers. That is, the data illustrate the increasing importance of external financing--particularly debt--as a source of funds for firms' real investment expenditures. The results also illustrate the dramatic decline that has occurred in the past fifteen years in the securities markets' valuation of net assets relative to replacement values, and also relative to rates of return.

3. Balance Sheet Flows, 1966-1977 and 1927-1935

This section of the paper presents a simple portfolio model explaining the responses of nine balance sheet items to changes in firms' net cash flow, defined as additions to retained earnings plus depreciation allowances, and Tobin's q . The idea underlying the model is that firms face different constraints, and behave differently, when attempting to increase their stock of physical capital than when trying to reduce it. The framework for the investment model is the familiar flexible accelerator model of investment behavior which relates investment to the discrepancy between a desired and actual capital stock.

In the special case where the elasticity of the marginal product of capital with respect to the desired stock is unity, the market value of the existing capital stock provides an estimate of the desired stock. This is the rationale for relating the ratio of fixed investment to capital stock to Tobin's ' q '. However, fixed investment expenditures represent only one use of a firm's resources, and thus only one part of the portfolio decision. The flows of other assets and liabilities must be considered simultaneously, if for no other reason than that the investment expenditures must be financed. The approach taken here is that firms simultaneously determine all asset and liability flows given a desired firm size -- as represented by ' q ' -- and given their cash flow, which is assumed exogenous to the portfolio decision.

The final feature that we desire to incorporate into the model is an allowance for asymmetric behavior in expansionary and contractionary regimes. For the simplest case of a firm for which the speed of capital accumulation is limited by variable adjustment costs, and for which decumulation is limited

by the rate of physical depreciation, the structural parameters of the investment function would reflect the adjustment costs when net investment is positive, and be zero otherwise. Again, if there is an asymmetric response of investment to changes in the independent variables depending upon whether or not further investment is profitable, then there must be an asymmetric response in at least one other balance sheet flow. To estimate such a model, then, it is necessary to classify firm observations into these two regimes. An effective way to jointly classify the observations and estimate the model's parameters is by means of a switching regression [Day, 1969]. We now outline this procedure.

For the two variable case, the estimation procedure can be described as follows. Given T observations on a dependent variable y_t and an independent variable x_t , we desire to estimate for each observation the probability, p_t , that the observation is generated by one regime or the other.

Let,

$$\begin{aligned}
 y_t p_t^{1/2} &= \beta_1 x_t p_t^{1/2} + \epsilon_{1t} p_t^{1/2} && \text{Regime I} \\
 y_t (1 - p_t)^{1/2} &= \beta_2 x_t (1 - p_t)^{1/2} + \epsilon_{2t} (1 - p_t)^{1/2}, \quad t = 1, \dots, T && \text{Regime II} \\
 E(\epsilon_{jt}) &= 0, \quad E(\epsilon_{jt}^2) = \sigma^2, \quad j = 1, 2
 \end{aligned}$$

If we assume that a fixed proportion of the population, λ , is generated by Regime I, the likelihood of an observation can be expressed as:

$$L(\beta_1, \beta_2, \lambda, \sigma^2) = \lambda L_1(\beta_1, \sigma^2) + (1-\lambda) L_2(\beta_2, \sigma^2)$$

Further assuming the ϵ_{jt} to be normal and independently distributed, the likelihood of a sample is:

$$L(\beta_1, \beta_2, \lambda, \sigma^2) = \left[\frac{1}{2\pi\sigma^2} \right]^{T/2} \prod_{t=1}^T \left[\lambda \exp\{-(y_t - \beta_1 x_t)^2 / 2\sigma^2\} \right. \\ \left. + (1-\lambda) \exp\{-(y_t - \beta_2 x_t)^2 / 2\sigma^2\} \right]$$

Maximizing the logarithm of this latter expression with respect to its four arguments:

$$\hat{\beta}_1 = \frac{\sum y_t x_t \hat{p}_t}{\sum x_t^2 \hat{p}_t}, \quad \hat{\beta}_2 = \frac{\sum y_t x_t (1-\hat{p}_t)}{\sum (1-\hat{p}_t) x_t^2}, \quad \hat{\lambda} = \frac{1}{T} \sum \hat{p}_t$$

$$\hat{\sigma}^2 = \frac{1}{T} \sum \{ (y_t - \hat{\beta}_1 x_t)^2 \hat{p}_t + (y_t - \hat{\beta}_2 x_t)^2 (1-\hat{p}_t) \}$$

Let: $\text{pr}(I, y_t) = \hat{\lambda} \exp\{-(y_t - \hat{\beta}_1 x_t)^2 / 2\hat{\sigma}^2\}$, the joint probability of Regime I and y_t ,

$\text{pr}(y_t) = \text{pr}(I, y_t) + (1-\hat{\lambda}) \exp\{-(y_t - \hat{\beta}_2 x_t)^2 / 2\hat{\sigma}^2\}$, the marginal probability of

y_t , then,

$$\hat{p}_t = \frac{\text{pr}(I, y_t)}{\text{pr}(y_t)}, \text{ the conditional probability of Regime I given } y_t.$$

To obtain the empirical results presented below, a switching regression relating investment to q and net cash flow is estimated iterating on the four first order conditions as described by Kiefer [1980]. Given these estimated parameters, the \hat{p}_t are computed and used to weight the observations in the regressions which explain changes in other balance sheet items.

Data

To apply the procedure outlined above, data from the first two panels, 1931

and 1936, and the last two panels, 1972 and 1978, were combined to give nine annual observations (1927-1935) for the earlier period and twelve (1966-1977) for the later period. To make the data in two neighboring panels more compatible, information on firms that overlap was used to adjust the means of the nonoverlapping firms in each separate period. This is done assuming, for each variable, that had a non-overlapping firm been represented in both panels, its mean would have changed between panels in the same way as for the average overlapping firm. For the earlier period there are twelve overlapping firms, and eleven in the later period.

Tobin's q is adjusted and redefined for each firm as the ratio of observed q to the mean value of q over the particular sample period. This is done to correct for persistent deviations of q above unity due to the capitalization of monopoly rents. The q variable enters the regressions with a lag of one year, while the net cash flow variable enters contemporaneously. All variables are measured as deviations around firm means.

Balance Sheet Flow Definitions

The nine dependent variables of interest, measured in current period prices, are:

1. Investment: additions at cost.
2. Δ Cash Assets: Δ [total current assets minus inventories minus accounts receivable]
3. Δ Inventories: Δ [FIFO inventories] minus capital gains (estimated residually for 1927-1935)
4. Δ Net Accounts Receivable: Δ [accounts receivable minus accounts payable]

5. Δ Other Long Term Assets: Δ [book value of plant and equipment minus additions at cost plus excess of cost over book value of acquisitions] (estimated residually for 1966-1977)
6. Δ Short Term Debt: Δ [debt due in less than one year]
7. Δ Long Term Debt: long term debt issues minus retirements
8. Δ Common Equity: [Equity issues minus equity retirements]
9. Δ Other Short Term Liabilities: Δ [total current liabilities minus accounts payable]

These variables are all measured relative to total net assets, lagged one period. Due to the balance sheet constraint, an unit increase in cash flow will result in a unit increase in the difference between the sum of the asset flows and the sum of the liability flows, whereas a unit increase in 'q' will leave this difference unchanged.

Results for 1966-1977

The results of estimating the investment switching regression, computing the regime probabilities and employing them in estimating equations for the other eight balance sheet flow items for the 1966-1977 period appear in Table 10 ~~and Figures 6 and 7~~. The estimate of the mixing parameter, λ , is 0.302 which indicates that about thirty percent of the observations are classified into Regime I (expansion) and about seventy percent into Regime II (contraction). The parameter estimates indicate substantial differences in balance sheet flows, resulting from changes in both 'q' and cash flow (CF), between regimes. With the exception of net accounts receivable, the Regime I coefficients for q are larger for all flow items than those for Regime II, and with the exception of cash assets the same is true for the CF coefficients.

The Regime I results indicate that substantial portfolio reallocations take place in response to increases in 'q' and CF. On the asset side of the balance sheet, the largest responses to changes in both 'q' and CF are in real assets: plant and equipment, inventories, and other long term assets. Recalling that other long term assets primarily represent acquisitions, it is not surprising that its 'q' coefficient is larger than that reported for investment expenditures. On the liability side, this increase in fixed assets is accompanied primarily by increases in long term debt and common equity.

Contrary to prior expectations, cash flow is a more important variable in classifying observations between regimes than 'q', the respective standard deviations of CF and q being 0.02 and 0.30.

Figures ~~8~~^{6 through} and 9 plot the results of aggregating the variables of the investment equation across firms, by regime, using the estimated classification probabilities as weights. That is, the label P^*q is $\sum_i P_{it} q_{it}$. Given the underlying model, the appropriate variables to include in equations explaining aggregate balance sheet flow variables would be P^*q , $(1-P)^*q$, P^*CF , and $(1-P)^*CF$. This procedure would account for the changing distribution of firms by regime.

For example, it can be seen from Figure 8 that while aggregate q was falling during 1973, the proportion of firms classified into Regime I increased dramatically, actually increasing P^*q . This provides a possible explanation for the fact that investment was increasing during a period when aggregate q was falling.

Results for 1927-1935

The same set of regression equations was estimated for the years 1927-1935, but for this earlier period the sample is split into durable and nondurable goods firms. For the 1966-1977 period the difference in results due to this disaggregation was sufficiently minor to warrant pooling the firms. For the earlier period, there are significant timing differences in the peaks and troughs of many of the variables. The 1927-1935 results appear in Table 11 (durables) and Table 12 (nondurables). Figures 10 through 17 plot the results of aggregating the variables of the investment equation across firms, by regimes, using the estimated classification probabilities as weights.

For both durable and nondurable goods samples the observations are about evenly divided between regimes. Qualitatively, the results for the durable goods sample are very similar to the results reported for 196⁶~~6~~-77, but quantitatively unit changes in 'q' and CF do not induce such large portfolio reallocations. This can be explained, at least in part, by firms' greater reliance on internal sources of funds in the earlier period.

On the other hand, the results for the nondurable goods sample indicate that the data are inconsistent with our underlying model. While there is some difference in the coefficient estimates across regimes, these differences do not provide much discriminatory power because of relatively large standard errors of estimate.

Examining the figures which plot the aggregate variables for the 1927-35 period, one can see that the timing, at turning points, between our independent variables and investment is not very supportive of the underlying model. Figures

12, 13 and 14 clearly show, for instance, that investment started its long decline at least one year before 'q' and CF. Also, investment bottomed out in 1932, while 'q' reached its minimum in 1933.

4. Summary and Conclusions

This paper has reported the results of a research project which involved the collection and organization of income account and balance sheet data, at the firm level, for the years 1926-77. Aggregate characteristics of the sample, including sources and uses of funds, financial market valuations and rates of return, were presented and discussed. Another section of the paper presented the results of estimating a simple portfolio model explaining a number of balance sheet flows using the firm level data.

The dataset should provide other researchers with a rich source of information against which specific hypotheses regarding corporate financing and investment decisions can be tested.

APPENDIX

Description of the PANEL Data Set

The PANEL Data System provides income and balance sheet data on a sample of manufacturing firms for the years 1926-1977. The sample of firms is actually composed of nine separate subsamples (panels) drawn periodically from various editions of Moody's Industrial Manual. The general composition of the sample is outlined in Table 1 in the body of the paper.

The goal was to obtain randomly drawn subsamples of size 50, but this was not possible for all panels given our requirements regarding accounting procedures. These criteria involve fiscal year, degree of consolidation, and, in the cases of firms purchasing other firms, accounting based on a pooling of interest. Also, natural resource intensive firms are excluded.

The large quantity and several dimensions of these data necessitate a second component of the PANEL Data System -- an integrated set of computer programs which enable the user to access the data in each of several modes and manipulate it for research purposes.

This section of the Appendix describes the data available in each of the nine panels. Section 1 describes the original, or raw, data and Section 2 describes the transformations that are currently contained in the PANEL Data System.

1. Raw Data

Fifty two items of raw data are available for each firm in each Panel. The first line is a firm header card giving the year of the Panel (e.g. 1972), an eight letter firm identification code, the firm's name, a durable/nondurable classification, the bond rating of the most recently issued debt security, and the page number from Moody's from which the firm's data was generated. The bond rating symbol NR indicates that the firm's debt is unrated. An example of a header card from the 1954 Panel of data is:

PANEL 1954 BRISTOL-MYERS CO. [n A p. 1362

Following each header card, there are 51 lines of raw numerical data. For instance, the line following the header card listed above is:

01 55462,56611,61617,52266,42778,45308,44655

Item 01 is sales and the data are in thousands of dollars, for years 1953, 1952, ..., 1947. Thus, in 1953 Bristol Myers Co. had sales of \$55,462,000. In 1947, sales were equal to \$44,655,000.

Section 3 of the Appendix lists the variable symbols as they appear on printed output, along with a brief description of each of the 52 data items.

Most of the fifty-two raw data items listed are self explanatory. However, some of the data items require additional

explanation and this is done below. Also, some of the data items are not available for each of the nine panels. These exceptions are also discussed below.

Data Item 23, SPLIT V.

This variable records information on the stock splits and stock dividends. For a firm which splits its stock two for one, Split V would equal two. If the firm pays a ten percent stock dividend, this V variable would take on the value 1.10. The main use of SPLIT V is in allowing one to distinguish between issues and retirements of common equity on the one hand, and splits and stock dividends on the other. Thus, this variable must be used in computing new issues and retirements of equity.

Data Item 24, PF NONT.

PF NONT is the amount of preferred dividends associated with a firm's nontraded preferred stock. To value nontraded preferred stock, PF NONT is capitalized by a preferred dividend-price ratio which is user supplied. Currently, the PANEL Data System contains a preferred dividend price ratio corresponding to Moody's "medium grade industrials".

Data Items 38 and 42.

These items give the coupon, maturity date, date of issue, date on which sinking fund begins, amount authorized, and amount outstanding for the traded debt issues number one and two, respectively.

Data Item 45.

This data item gives an estimate of the replacement value of a firm's inventories. The estimates in many cases are actually provided by the firms themselves in footnotes to the Moody's tables. When the only information available is the proportion of inventories in LIFO and the length of time LIFO has been used, one of twenty available price indices is used to estimate the replacement value of LIFO inventories. FIFO inventories are assumed to equal replacement value.

Data Item 46.

This variable is the reported proportion of a firm's inventories that is under the LIFO accounting method.

Data Item 47.

This is the price index associated with a firm's FIFO inventories. It is used to compute an IVA. It is not necessarily the same price index that is used in constructing a replacement estimate for the LIFO portion of inventories.

Availability of Data Items.

All 52 data items are not available for all panels. Items 45 through 51 are available only for the 1978 Panel (years 1971-1977). Item 19, additions at cost, and Item 1, sales, are not reported for the 1931 and 1936 Panels. Data Item 1 for the 1931 and 1936 Panels is replaced with the variable "Income Taxes".

2. Variable Transformations

The PANEL Data System permits the user to define up to 76 variable transformations. The current version of subroutine AGGREG contains 53 transformations. In performing transformations the user can introduce external data via the data file AGGREG. Currently, a capital stock deflator (DEFL), preferred stock dividend-price ratio (PDIV), inventory deflator (PIN), and bond price index (BONDP) are present in the AGGREG file. DEFL is used to convert firms' capital stock (Data Item 14), which is measured on a historical cost basis, to a replacement cost basis; PIN serves a similar function for inventories. PDIV is the (medium grade industrial) preferred dividend-price ratio used to capitalize the dividends paid on the nontraded preferred stock. BONDP is a bond price index.

The transformations currently programmed are listed in Section 4 of the Appendix.

The PANEL Data System software provides access to the data, computation of various averages, and regression of PANEL variables. The PANEL software and data set is available from the authors in either an IBM 370 or VAX 11/780 format for a nominal fee.

3. Listing of the PANEL Data Items

| | | |
|--------|-----------|---|
| # 1 : | SALES | Net Sales |
| # 2 : | OPER INC | Income from Operations |
| # 3 : | TOT PFT | Total Income before Interest and Taxes |
| # 4 : | INT EXP | Interest Expense |
| # 5 : | DEPREC | Depreciation (as reported in property acct's) |
| # 6 : | NET INC | Net Income (avail. for pref/common dividends) |
| # 7 : | PREF DIV | Preferred Dividends |
| # 8 : | COMM DIV | Common Dividends |
| # 9 : | MAINT | Expenditures for Maintenance and Repairs |
| # 10 : | ACC RECV | Accounts Receivable |
| # 11 : | INVENTORY | Inventory, Book Value |
| # 12 : | TOT C.A. | Total Current Assets |
| # 13 : | GROS PLT | Gross Property Account, Book Value |
| # 14 : | NET PLT | Net Property Account, Book Value |
| # 15 : | TOT ASST | Total Assets (excluding intangibles) |
| # 16 : | LYR LIAB | Short Term Debt and Debt Due in One Year |
| # 17 : | ACC PAY | Accounts Payable |
| # 18 : | TOT C.L. | Total Current Liabilities |
| # 19 : | ADD COST | Additions at Cost (Gross P+E Expenditures) |
| # 20 : | HI PRICE | High Price of Common Stock for Year |
| # 21 : | LO PRICE | Low Price of Common Stock for Year |
| # 22 : | NR COMMN | Number of Common Shares at Year End |
| # 23 : | SPLIT V | Variable to Adjust for Stock Splits, Dividends |
| # 24 : | PF NONT | Dividends on Non-Traded Preferred Stock |
| # 25 : | PFD 1 HI | High Price, First Traded Preferred Stock Issue |
| # 26 : | PFD 1 LO | Low Price, First Traded Preferred Stock Issue |
| # 27 : | NR PFD 1 | Number of Shares, First Traded Preferred Issue |
| # 28 : | PFD 2 HI | High Price, Second Traded Preferred Issue |
| # 29 : | PFD 2 LO | Low Price, Second Traded Preferred Issue |
| # 30 : | NR PFD 2 | Number of Shares, Second Traded Preferred Issue |
| # 31 : | CV NONT | Nontraded Convertible Debt, Book Value |
| # 32 : | CV TRAD | Traded Convertible Debt, Book Value |
| # 33 : | CV 1 HI | High Price of Traded Convertible Debt |
| # 34 : | CV 1 LO | Low Price of Traded Convertible Debt |
| # 35 : | DET 1 HI | High Price, First Traded Debt Issue |
| # 36 : | DET 1 LO | Low Price, First Traded Debt Issue |
| # 37 : | DET VAL | Book Value, First Traded Debt Issue |
| # 38 : | ITEM 38 | (See text) |
| # 39 : | DET 2 HI | High Price, Second Traded Debt Issue |
| # 40 : | DET 2 LO | Low Price, Second Traded Debt Issue |
| # 41 : | ITEM 41 | Book Value, Second Traded Debt Issue |
| # 42 : | ITEM 42 | (See text) |
| # 43 : | NT LDEBT | Book Value, Nontraded Debt |
| # 44 : | TOT LTD | Total Book Value of all Long Term Debt |
| # 45 : | ITEM 45 | Inventory at Replacement Value |
| # 46 : | ITEM 46 | Proportion of Inventories in LIFO |
| # 47 : | ITEM 47 | Price Index for FIFO portion of Inventories |
| # 48 : | ITEM 48 | Deferred Taxes |
| # 49 : | ITEM 49 | Deferred Compensation (incl. unfunded pensions) |

50 : ITEM 50
 # 51 : ITEM 51
 # 52 : Durable

Minority Interest
 Other Long-Term Liabilities
 Durable / Nondurable Indicator

4. Listing of the PANEL Transformations

| | | |
|-----------------------|----------|------------------------------|
| # 1 (Firmavg # 53) : | TOT NASS | Total Net Assets (TA) |
| # 2 (Firmavg # 54) : | MV DEBTR | Mkt Value Debt/TA |
| # 3 (Firmavg # 55) : | MV PREFR | Mkt Value Preferred/TA |
| # 4 (Firmavg # 56) : | MV EqtyR | Mkt Value Equity/TA |
| # 5 (Firmavg # 57) : | Q | Tobin's q (#1+#2+#3) |
| # 6 (Firmavg # 58) : | CASH R | Cash Assets/TA |
| # 7 (Firmavg # 59) : | MISC R | Misc. Net Assets/TA |
| # 8 (Firmavg # 60) : | INVT R | Inventories/TA |
| # 9 (Firmavg # 61) : | Liab R | S.T. Liabilities/TA |
| # 10 (Firmavg # 62) : | RECV R | Net Receivables/TA |
| # 11 (Firmavg # 63) : | REPL R | Plt.+Equip.(repl.)/TA |
| # 12 (Firmavg # 64) : | INV/CAP | Inventory(book)/TA |
| # 13 (Firmavg # 65) : | DEF TAX | Deferred Taxes/TA |
| # 14 (Firmavg # 66) : | Oth Liab | Other Liabilities/TA |
| # 15 (Firmavg # 67) : | MIN INT | Minority Interest/TA |
| # 16 (Firmavg # 68) : | CFLO R | (Internal use) |
| # 17 (Firmavg # 69) : | PF ISSUE | Value New Pref. Issues/TA |
| # 18 (Firmavg # 70) : | PF RETIR | Cost Retirements, Pref./TA |
| # 19 (Firmavg # 71) : | Eq Issue | Value New Equity Issues/TA |
| # 20 (Firmavg # 72) : | EQ RETIR | Cost Retirements, Equity/TA |
| # 21 (Firmavg # 73) : | DET NEW | Value New Debt Issues/TA |
| # 22 (Firmavg # 74) : | DET RETR | Cost Retirements, Debt/TA |
| # 23 (Firmavg # 75) : | RE | Add. to Retained Earnings/TA |
| # 24 (Firmavg # 76) : | CF | Cash Flow/TA |
| # 25 (Firmavg # 77) : | GG | (Internal use) |
| # 26 (Firmavg # 78) : | GN | (Internal use) |
| # 27 (Firmavg # 79) : | IG | Additions to Plt.+Equip./TA |
| # 28 (Firmavg # 80) : | DEPR | Depreciation/TA |
| # 29 (Firmavg # 81) : | ACQ | (Internal use) |
| # 30 (Firmavg # 82) : | IGA | (Internal use) |
| # 31 (Firmavg # 83) : | DC | Change in Cash Assets/TA |
| # 32 (Firmavg # 84) : | DM | Change in Misc. Assets/TA |
| # 33 (Firmavg # 85) : | DINV | Change in Inventory/TA |
| # 34 (Firmavg # 86) : | DCL | Change in Current Liabs./TA |
| # 35 (Firmavg # 87) : | DREC | Change in Net. Acct.Recv./TA |
| # 36 (Firmavg # 88) : | XGG | (Internal use) |
| # 37 (Firmavg # 89) : | YGG | (Internal use) |
| # 38 (Firmavg # 90) : | DVR | Dividend/Price Ratio, Common |
| # 39 (Firmavg # 91) : | CG | Capital Gain on Common Share |
| # 40 (Firmavg # 92) : | DK | Common Dividends/TA |
| # 41 (Firmavg # 93) : | PFK | Preferred Dividends/TA |
| # 42 (Firmavg # 94) : | INK | Interest Payments/TA |
| # 43 (Firmavg # 95) : | FGL | (Internal use) |
| # 44 (Firmavg # 96) : | NtDt Rat | Nontraded Debt/TA |
| # 45 (Firmavg # 97) : | ZGG | (Internal use) |

| | | |
|------------------------|----------|--------------------------------|
| # 46 (Firmavg # 98) : | STDT RAT | Short Term Debt/TA |
| # 47 (Firmavg # 99) : | BOND IND | Bond Index |
| # 48 (Firmavg # 100) : | FIFO PR | Proportion of Inventories FIFO |
| # 49 (Firmavg # 101) : | I V A | Inventory Valuation Adjustment |
| # 50 (Firmavg # 102) : | Aggr 50 | (Internal use) |
| # 51 (Firmavg # 103) : | Aggr 51 | (Internal use) |
| # 52 (Firmavg # 104) : | Aggr 52 | (Internal use) |
| # 53 (Firmavg # 105) : | Aggr 53 | (Internal use) |

FIGURE 1

Sources of Funds as a Percentage of Net Assets (1927-77)

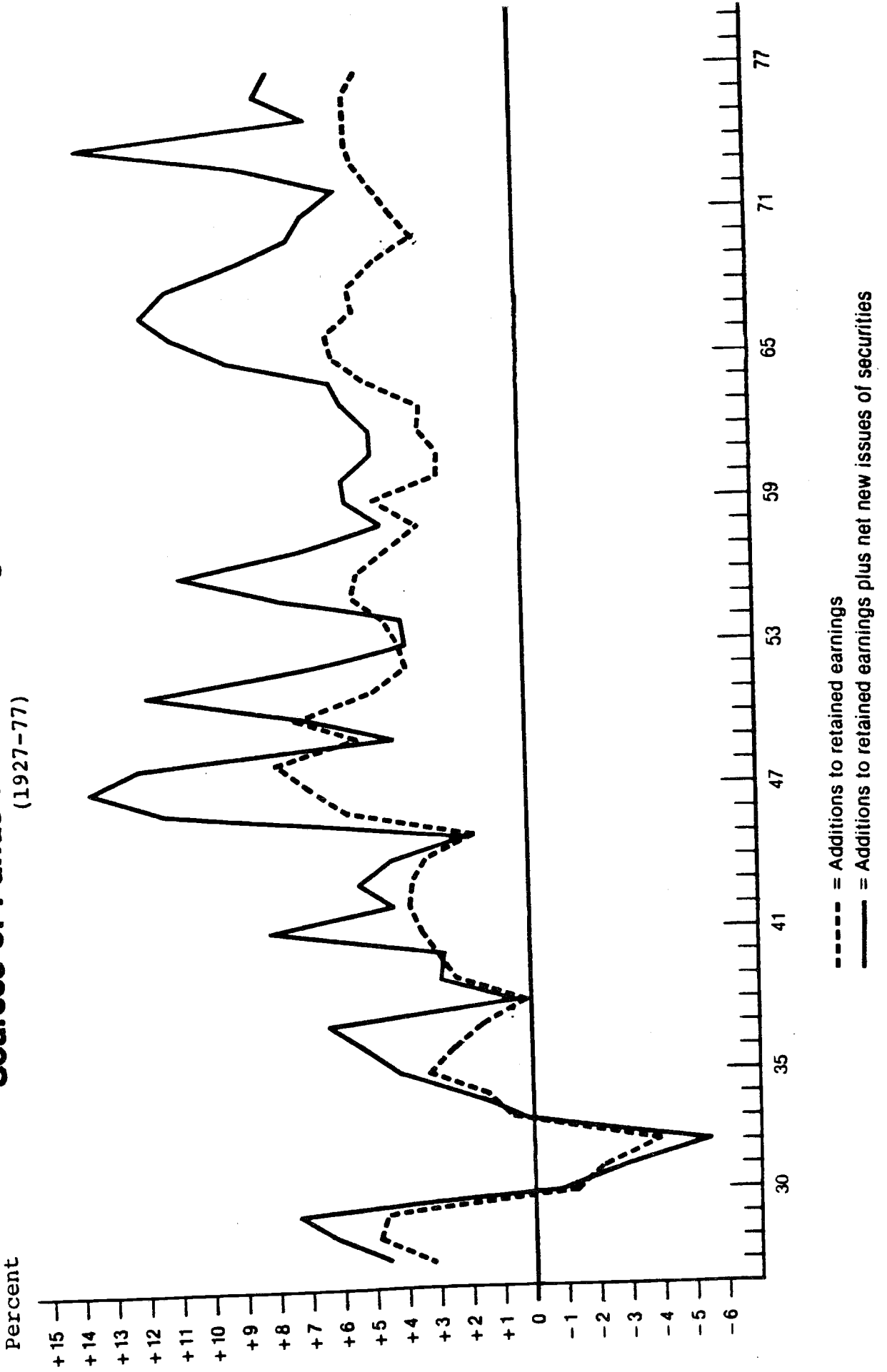


FIGURE 2

Sources of External Funds as a Percentage of Net Assets (1927-1977)

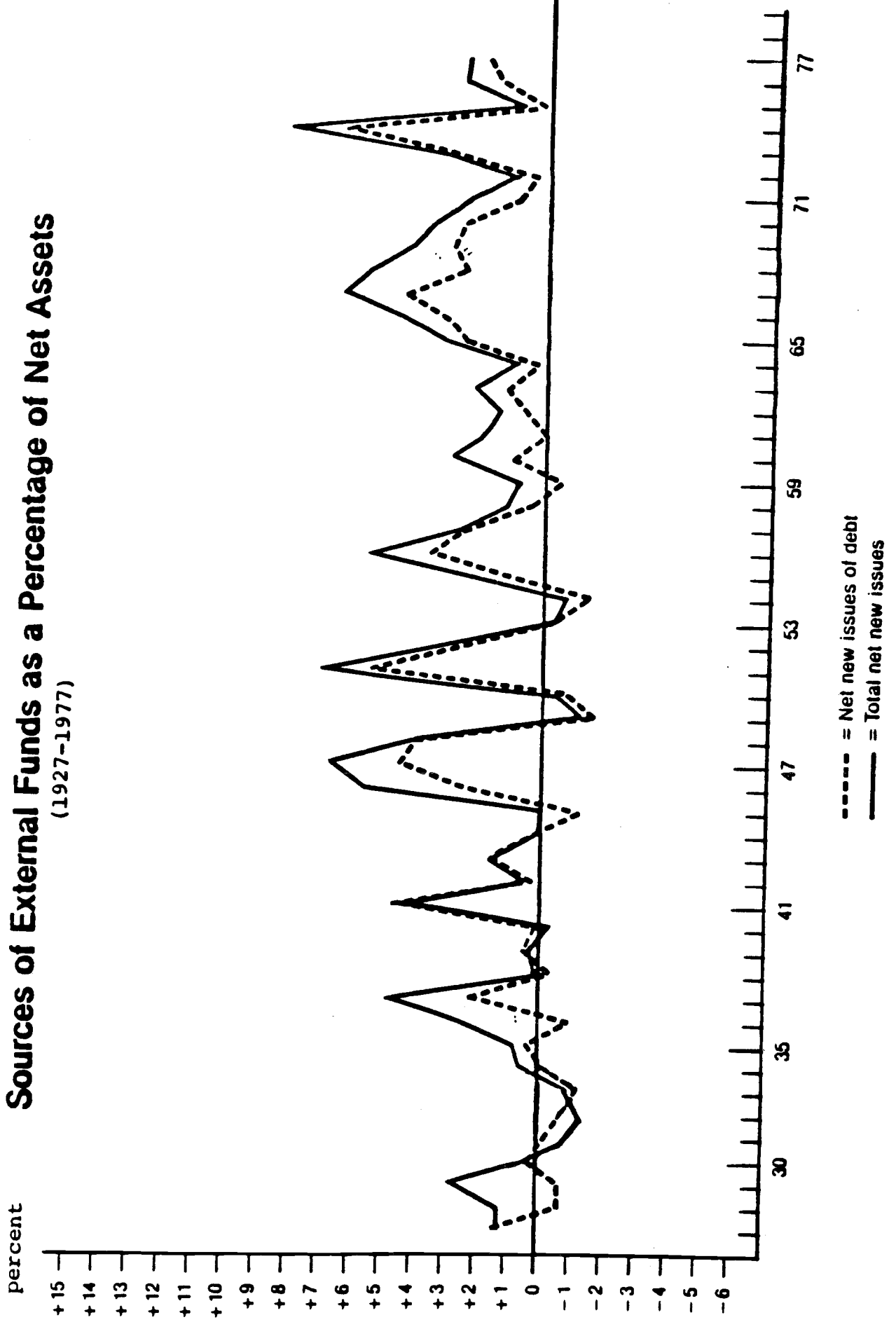


FIGURE 3

MARKET VALUE OF SECURITIES,
RELATIVE TO NET ASSETS
(1926-1977)

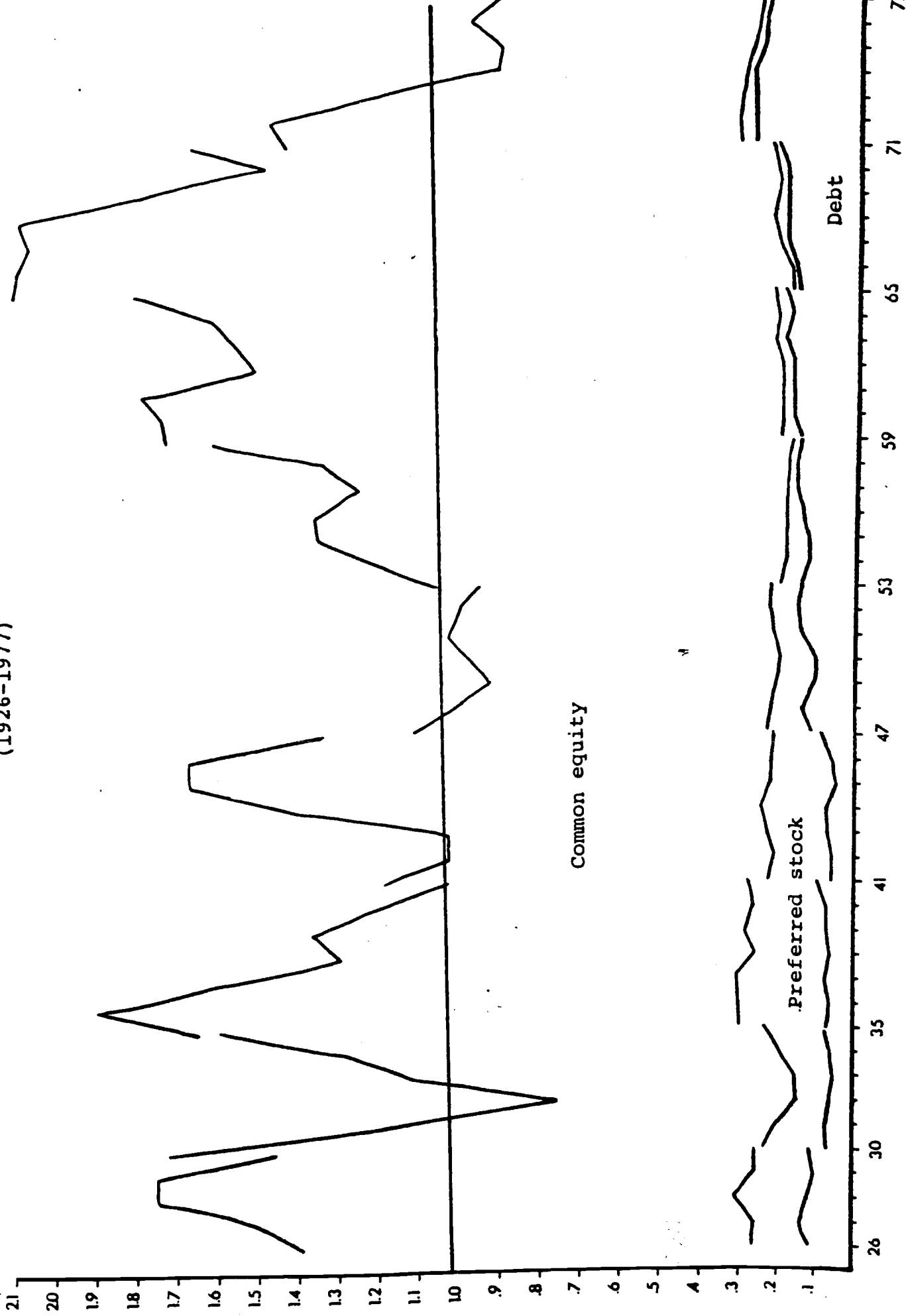


Figure 4

q and components, 1965-1977

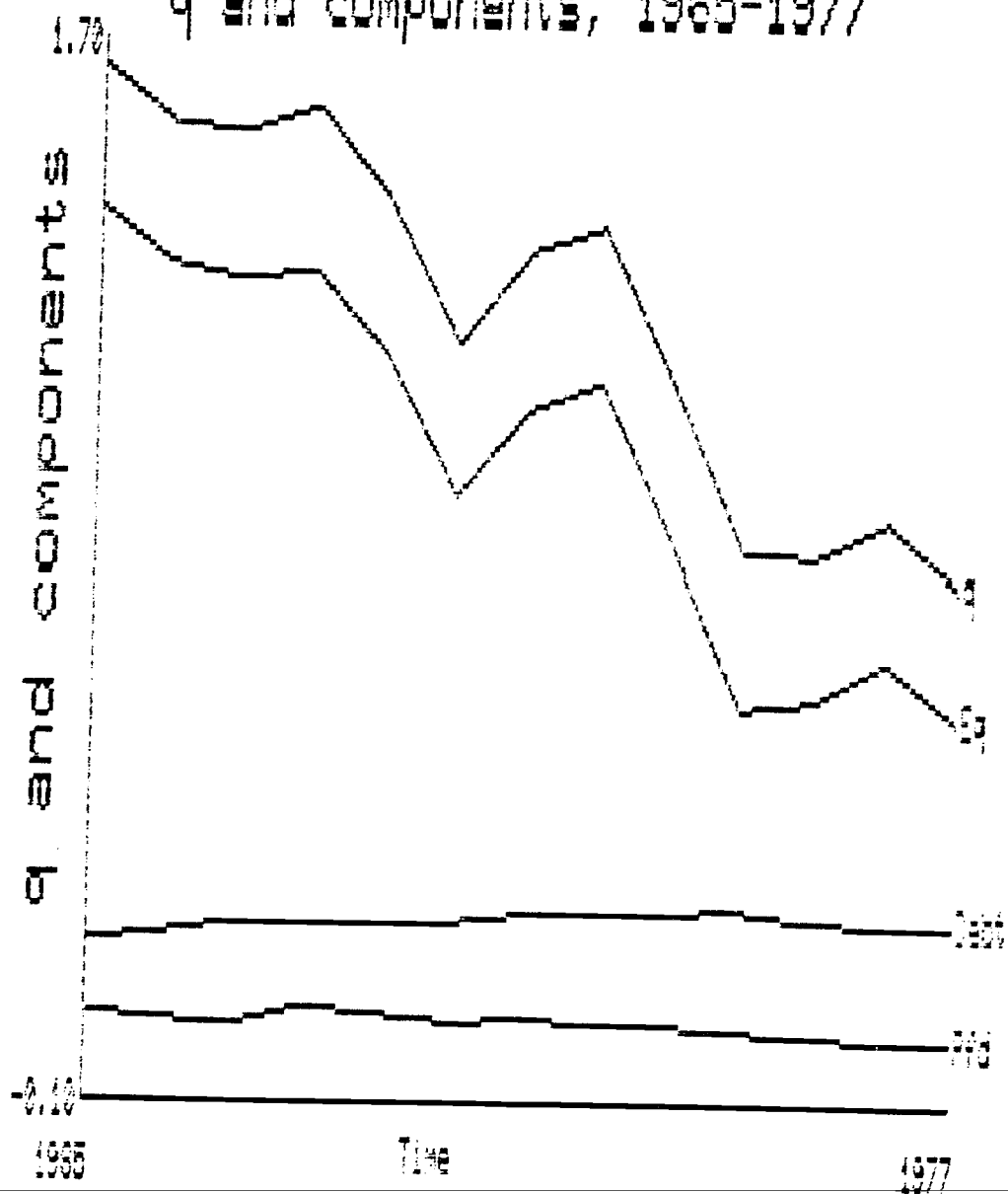


FIGURE 5

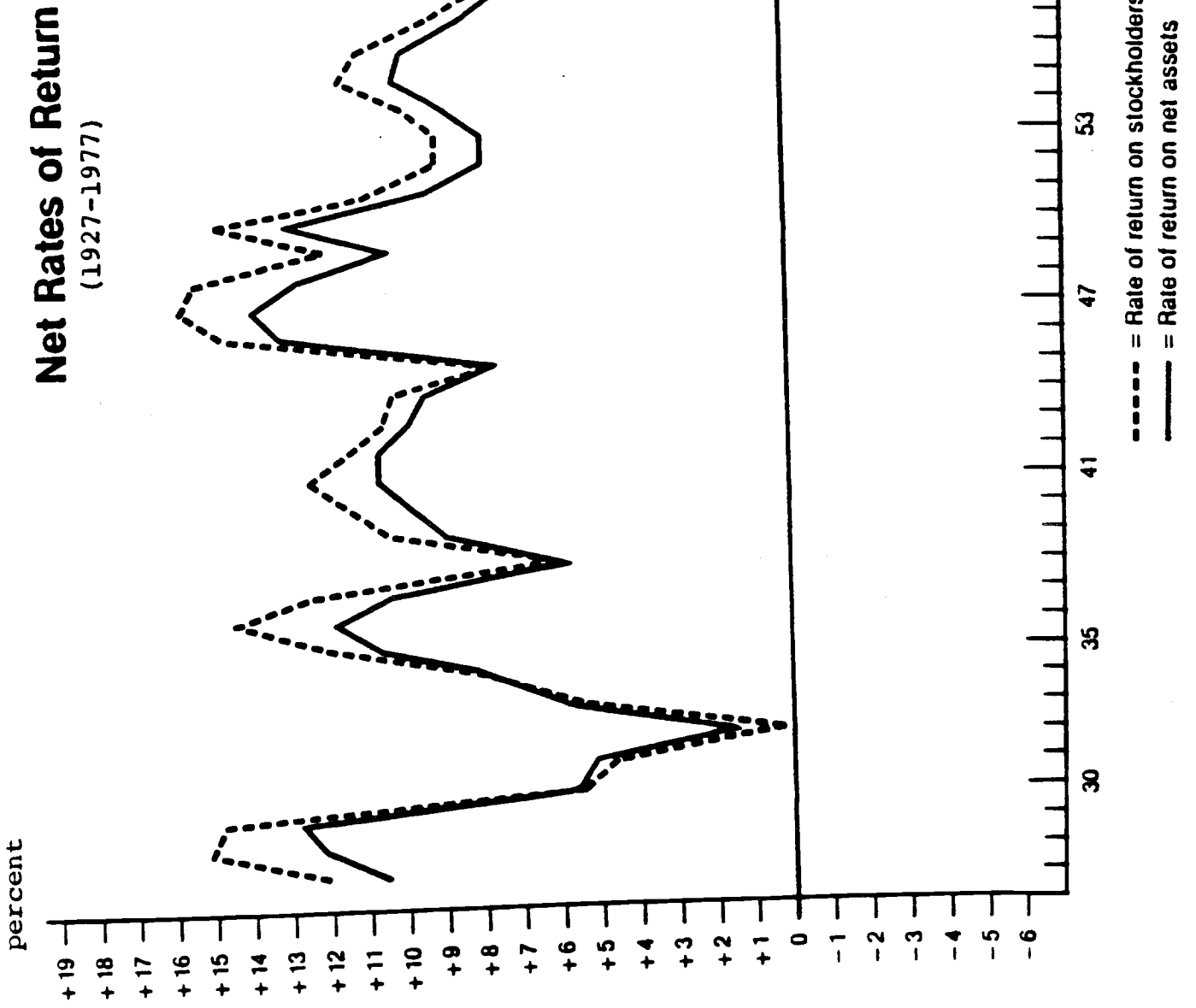


Figure 6

Regime Proportions, 1966-1977

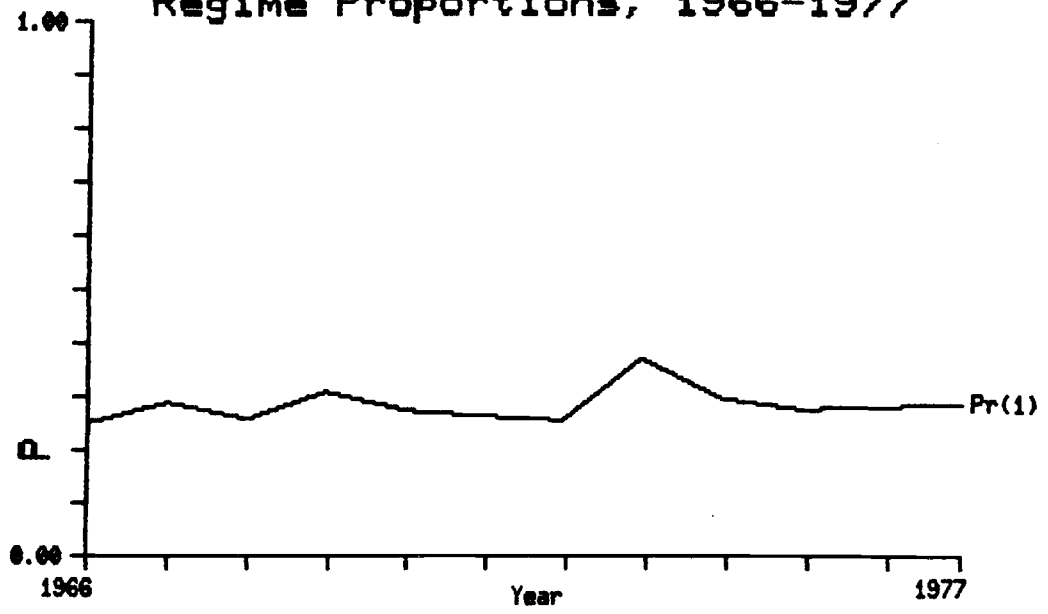


Figure 7

Investment / Assets, 1966-1977

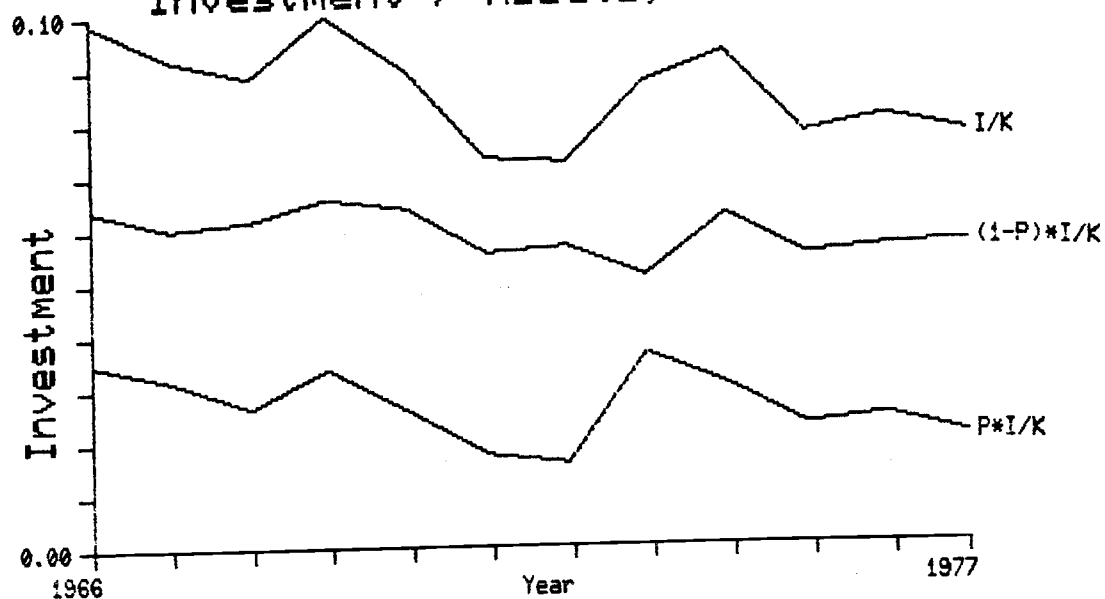


Figure 8

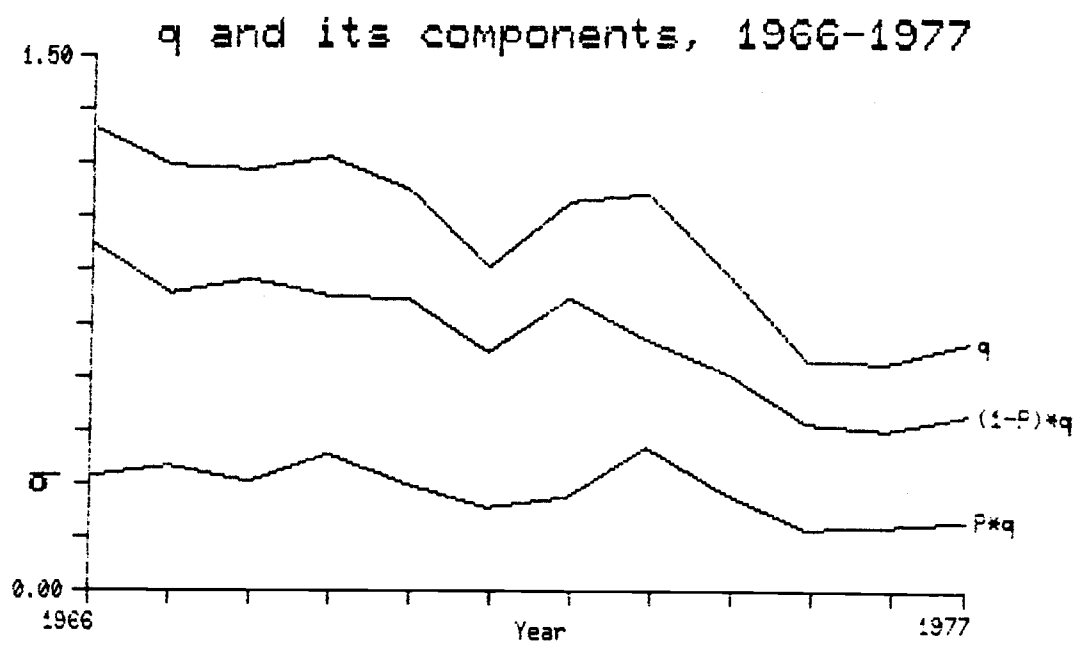


Figure 9

Cash Flow / Assets, 1966-1977

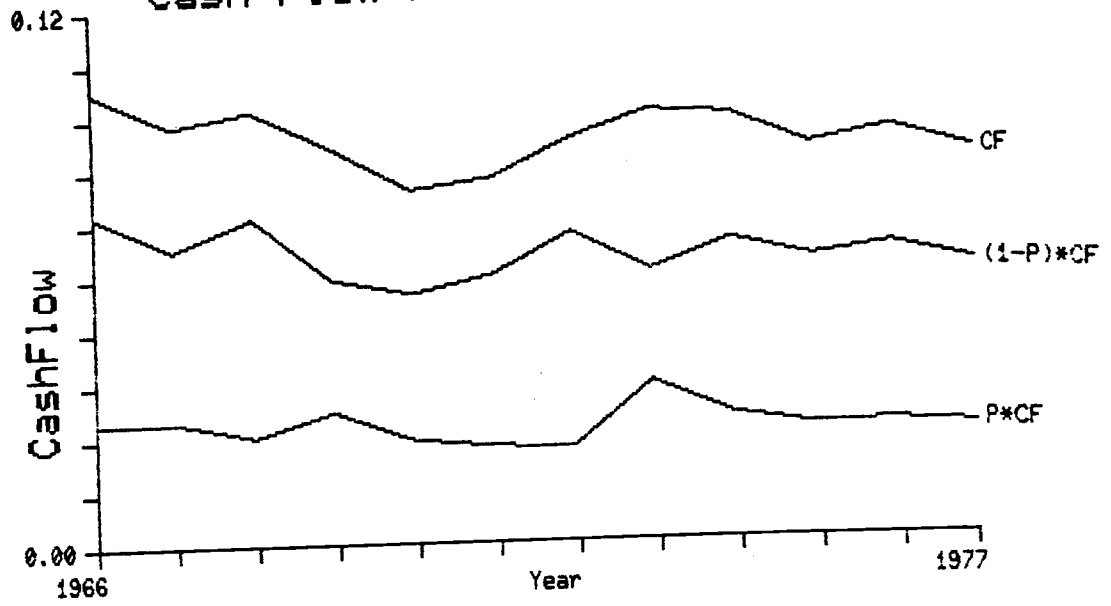


Figure 10

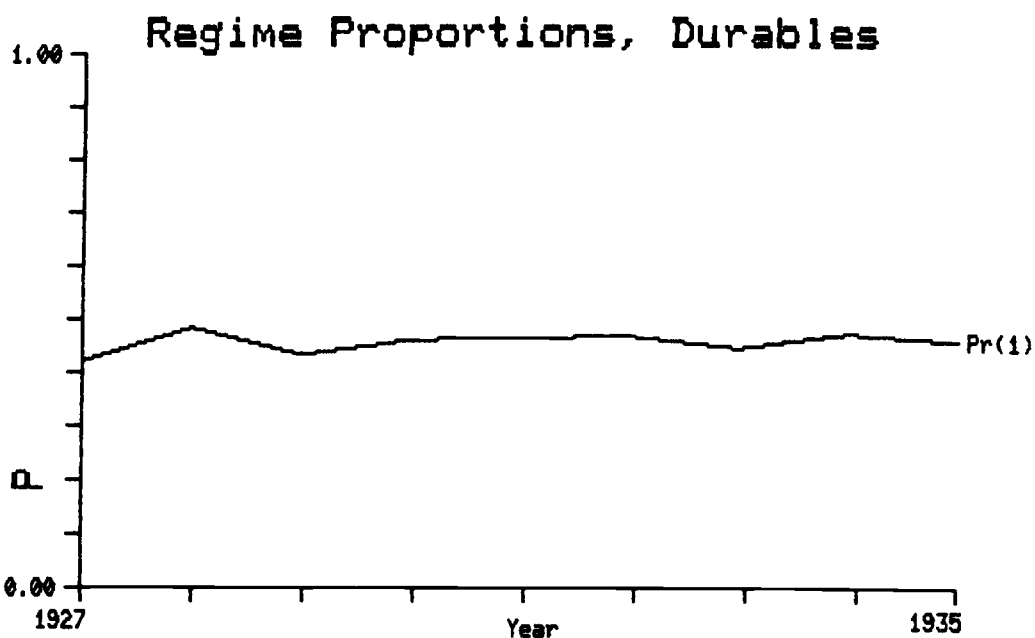


Figure 11

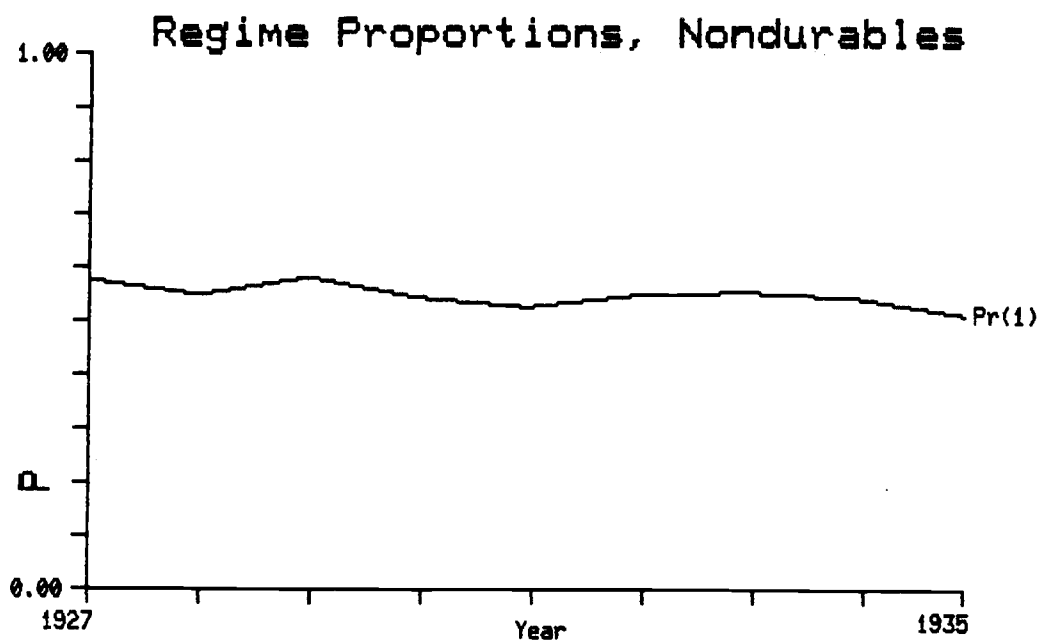


Figure 12

Investment / Assets, Durables

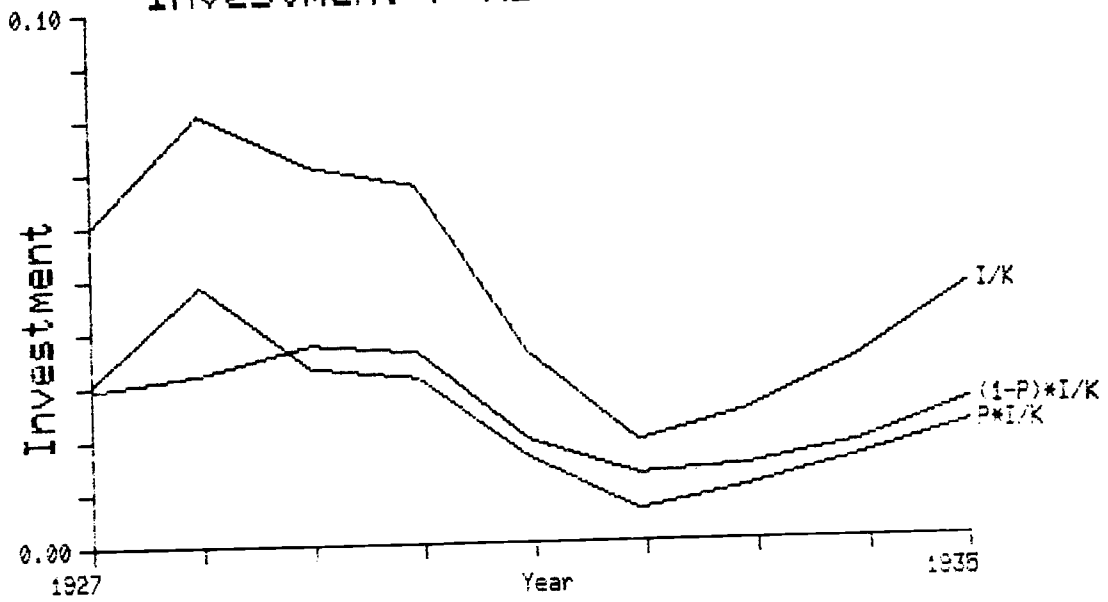


Figure 13

q and its components, durables

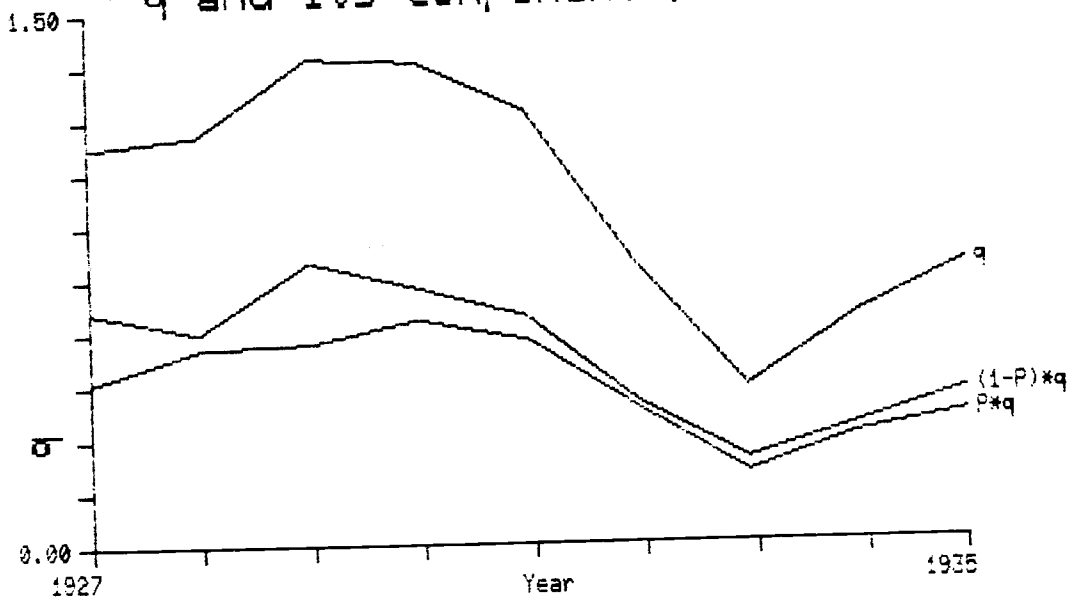


Figure 14
(a): Regime I

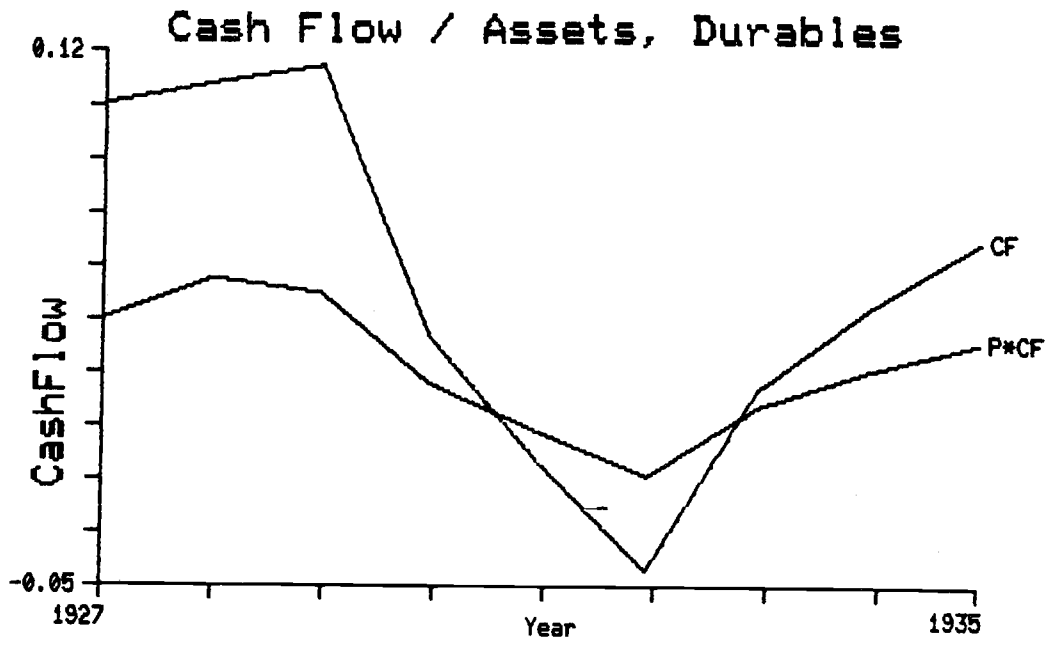


Figure 14
(b): Regime II

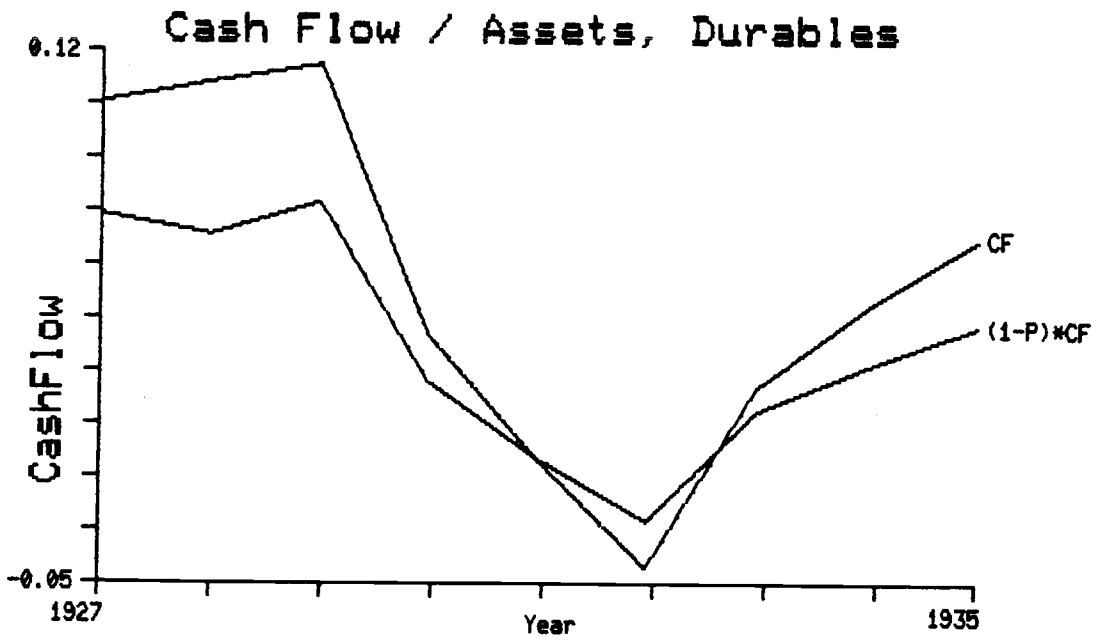


Figure 15

Investment / Assets, Nondurables

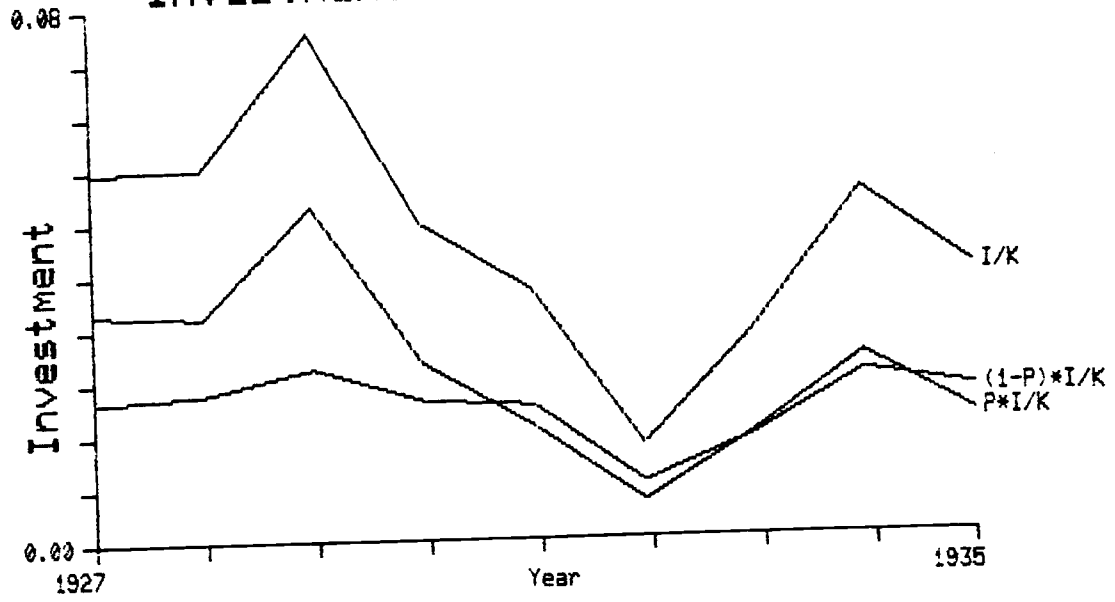


Figure 16
(a): Regime I

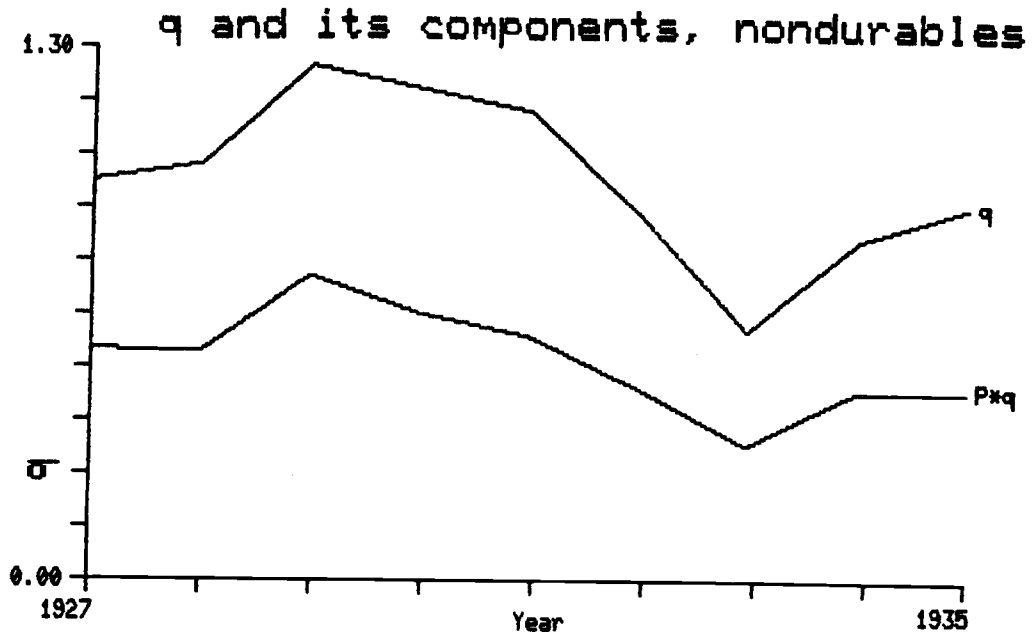


Figure 16
(b): Regime II

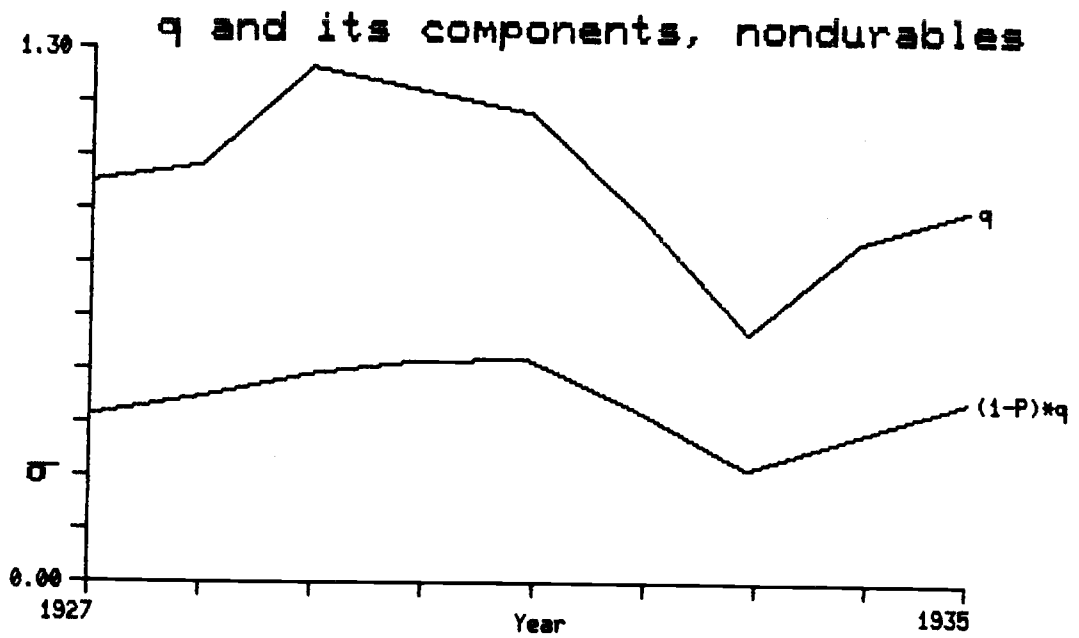


Figure 17
(a): Regime I

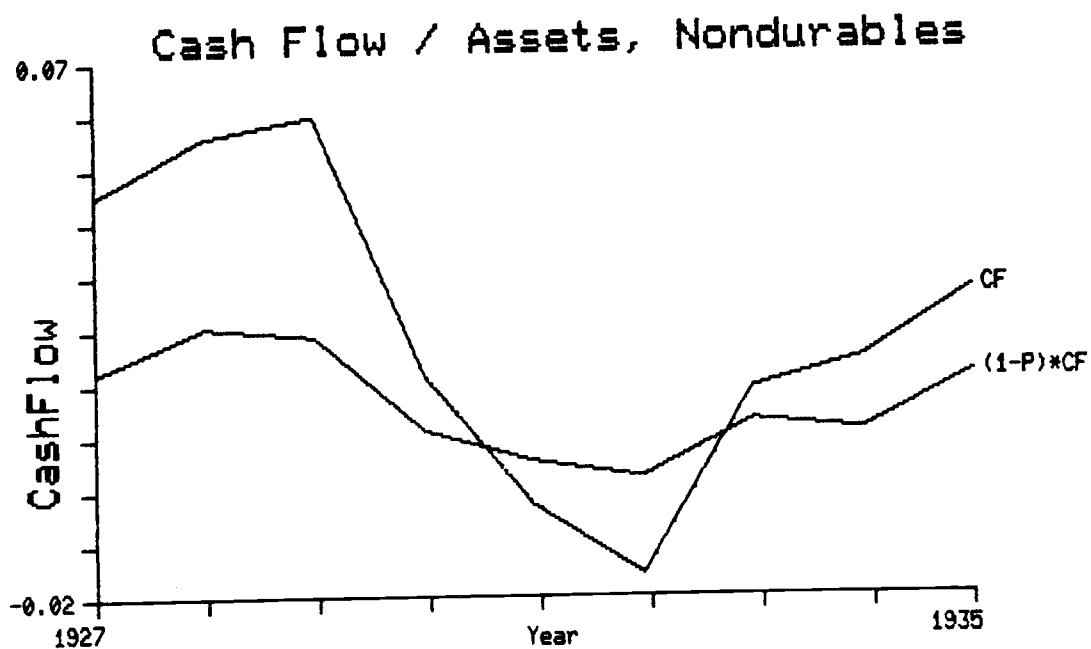


Figure 17
(b): Regime II

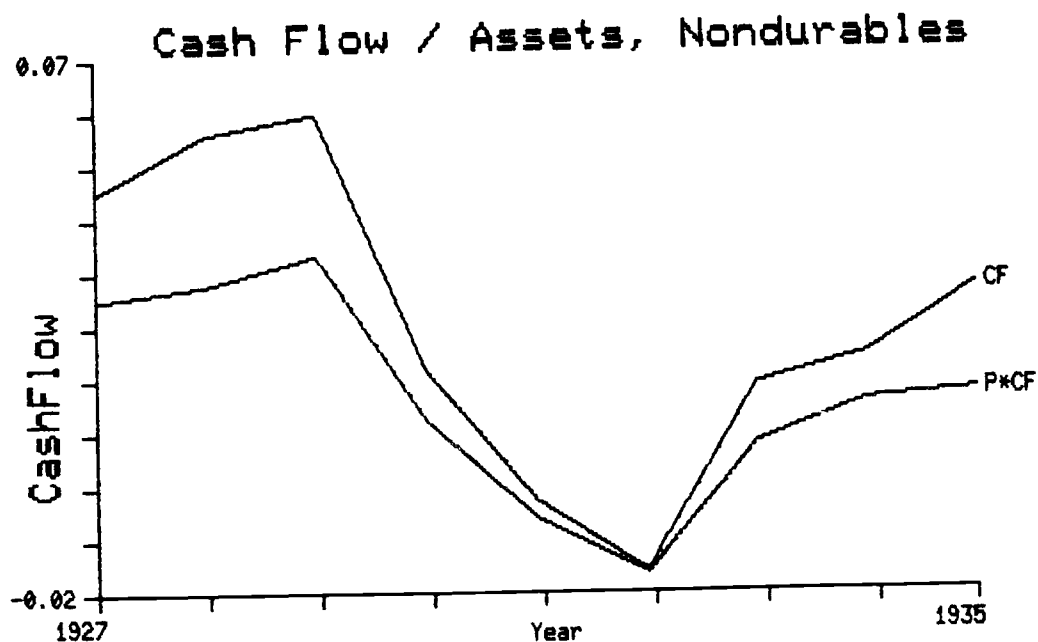


Table 1: Sample Characteristics

| Subsample Number | Panel Number | Volume of Moody's (data source) | Number of Firms in Subsample | Years of Coverage |
|------------------|--------------|---------------------------------|------------------------------|-------------------|
| 1 | 31 | 1931 | 48 | 5 (1926-1930) |
| 2 | 36 | 1936 | 46 | 6 (1930-1935) |
| 3 | 42 | 1942 | 48 | 7 (1935-1941) |
| 4 | 48 | 1948 | 47 | 7 (1941-1947) |
| 5 | 54 | 1954 | 50 | 7 (1947-1953) |
| 6 | 60 | 1960 | 50 | 7 (1953-1959) |
| 7 | 66 | 1966 | 47 | 7 (1959-1965) |
| 8 | 72 | 1972 | 37 | 7 (1965-1971) |
| 9 | 78 | 1978 | 40 | 7 (1971-1977) |

Table 2 : Typical Firm's Balance Sheet

| Net Assets | Liabilities |
|---|-----------------------------|
| Cash Items | Short-term debt |
| Accounts Receivable | Traded long-term debt |
| Inventories (replacement) | Nontraded long-term debt |
| Net Property (replacement) | Preferred stock |
| - Current Liabilities (excluding short-term debt, including accounts payable) | Common stockholders' equity |
| Miscellaneous items (net) | |

Table 3 : Composition of Net Assets, Selected Years

| | Cash Items | Accounts Receivable | Inventories | Net Property | Current Liab. & Accts.Pay. | Miscellaneous |
|---------|---------------------------------|---------------------|-------------|--------------|----------------------------|---------------|
| | (as a percentage of Net Assets) | | | | | |
| 1926-27 | 15.3 | 14.4 | 25.4 | 47.7 | -7.4 | 4.8 |
| 1930 | 18.1 | 11.3 | 22.0 | 48.0 | -5.9 | 6.5 |
| 1935 | 22.6 | 11.0 | 22.3 | 42.7 | -7.3 | 9.2 |
| 1941 | 22.8 | 16.2 | 31.3 | 42.7 | -20.5 | 7.7 |
| 1947 | 22.0 | 16.4 | 32.7 | 45.6 | -21.3 | 6.0 |
| 1953 | 24.5 | 16.0 | 33.6 | 47.5 | -26.0 | 4.3 |
| 1959 | 16.9 | 17.5 | 31.8 | 48.0 | -19.1 | 5.5 |
| 1965 | 14.8 | 20.1 | 33.2 | 47.0 | -21.9 | 6.6 |
| 1971 | 10.1 | 20.6 | 31.6 | 49.5 | -19.2 | 7.1 |
| 1976-77 | 9.1 | 19.4 | 31.4 | 53.7 | -19.3 | 5.5 |

Note: rows may not sum to 100 per cent because of rounding.

Table 4 : Sources and Uses of Funds as a Percentage of Net Assets

| | <u>Sources</u> | | | | | | |
|---------|----------------|-------------|--------------|---------------------------|---------------|------------------|-----|
| | Total Sources | Debt Issues | Debt Retire. | Stock Issues ¹ | Stock Retire. | Undistr. Profits | CCA |
| 1927-30 | 7.3 | 2.4 | -2.3 | 2.1 | -0.8 | 2.8 | 3.1 |
| 1931-35 | 2.6 | 0.9 | -1.5 | 0.9 | -0.9 | -0.1 | 3.3 |
| 1936-41 | 7.5 | 2.4 | -1.4 | 1.6 | -0.6 | 2.2 | 3.3 |
| 1942-47 | 10.3 | 2.8 | -1.5 | 2.0 | -0.7 | 4.1 | 3.6 |
| 1948-53 | 11.0 | 2.9 | -1.2 | 0.7 | -0.7 | 5.4 | 3.5 |
| 1954-59 | 10.6 | 2.4 | -1.4 | 1.5 | -0.5 | 4.4 | 4.2 |
| 1960-65 | 10.6 | 2.6 | -1.5 | 1.6 | -0.4 | 3.6 | 4.7 |
| 1966-71 | 13.9 | 4.5 | -1.5 | 2.1 | -0.3 | 4.6 | 4.6 |
| 1972-77 | 12.5 | 4.8 | -2.4 | 1.5 | -0.6 | 4.9 | 4.3 |

| | <u>Uses</u> | | | | | | |
|---------|-------------|-----------------|------------|-------------|-------------|-------------|---------------------|
| | Total Uses | Plant/Equipment | Cash Items | Inventories | Receivables | Misc. (net) | Current Liabilities |
| 1927-30 | 6.4 | 5.2 | 1.0 | -0.2 | -0.6 | 0.7 | 0.3 |
| 1931-35 | 2.5 | 2.5 | 0.3 | 0.1 | -0.1 | 0.0 | -0.3 |
| 1936-41 | 7.2 | 4.7 | 1.0 | 2.9 | 1.6 | 0.1 | -3.1 |
| 1942-47 | 10.6 | 7.8 | 2.6 | 3.2 | 0.9 | -1.8 | -2.1 |
| 1948-53 | 10.9 | 7.4 | 2.1 | 2.7 | 1.3 | -0.1 | -2.5 |
| 1954-59 | 10.4 | 7.1 | 0.6 | 1.8 | 1.6 | 0.2 | -0.9 |
| 1960-65 | 10.4 | 7.6 | 0.7 | 1.8 | 1.7 | 0.4 | -1.8 |
| 1966-71 | 13.7 | 8.7 | 0.7 | 3.2 | 2.1 | 1.0 | -2.0 |
| 1972-77 | 12.7 | 8.6 | 1.4 | 3.1 | 2.4 | 0.2 | -3.0 |

¹ Both preferred and common shares.

Table 5 : Market Value of Securities Relative to Net Assets

| | Debt | Preferred | Common | Total | Debt Relative to Preferred+Common |
|---------|------|-----------|--------|-------|-----------------------------------|
| 1926-27 | .120 | .146 | 1.195 | 1.46 | .089 |
| 1930 | .089 | .153 | 1.353 | 1.59 | .059 |
| 1935 | .068 | .194 | 1.351 | 1.61 | .044 |
| 1941 | .076 | .170 | 0.853 | 1.10 | .074 |
| 1947 | .099 | .110 | 1.001 | 1.21 | .089 |
| 1953 | .131 | .057 | 0.793 | 0.98 | .154 |
| 1959 | .138 | .026 | 1.474 | 1.64 | .092 |
| 1965 | .156 | .015 | 1.775 | 1.95 | .087 |
| 1971 | .202 | .028 | 1.275 | 1.51 | .155 |
| 1976-77 | .213 | .014 | 0.615 | 0.84 | .339 |

Table 6: Tobin's "q" and its components, 1926-1977

| Year | Debt Ratio | Preferred Ratio | Common Ratio | Tobin's q |
|-------|------------|-----------------|--------------|-----------|
| 1977 | 0.211 | 0.012 | 0.566 | 0.789 |
| 1976 | 0.215 | 0.015 | 0.664 | 0.894 |
| 1975 | 0.219 | 0.017 | 0.597 | 0.833 |
| 1974 | 0.234 | 0.025 | 0.584 | 0.843 |
| 1973 | 0.230 | 0.036 | 0.860 | 1.125 |
| 1972 | 0.225 | 0.043 | 1.121 | 1.389 |
| 1971 | 0.225 | 0.044 | 1.076 | 1.345 |
| ----- | | | | |
| 1971 | 0.178 | 0.011 | 1.474 | 1.663 |
| 1970 | 0.169 | 0.011 | 1.276 | 1.456 |
| 1969 | 0.165 | 0.013 | 1.606 | 1.784 |
| 1968 | 0.169 | 0.017 | 1.793 | 1.978 |
| 1967 | 0.170 | 0.009 | 1.780 | 1.959 |
| 1966 | 0.153 | 0.011 | 1.816 | 1.980 |
| 1965 | 0.144 | 0.015 | 1.944 | 2.103 |
| ----- | | | | |
| 1965 | 0.167 | 0.016 | 1.606 | 1.789 |
| 1964 | 0.162 | 0.020 | 1.414 | 1.596 |
| 1963 | 0.166 | 0.022 | 1.352 | 1.540 |
| 1962 | 0.161 | 0.022 | 1.311 | 1.493 |
| 1961 | 0.161 | 0.022 | 1.601 | 1.784 |
| 1960 | 0.159 | 0.025 | 1.540 | 1.725 |
| 1959 | 0.154 | 0.027 | 1.543 | 1.724 |
| ----- | | | | |
| 1959 | 0.122 | 0.025 | 1.404 | 1.550 |
| 1958 | 0.137 | 0.030 | 1.125 | 1.291 |
| 1957 | 0.133 | 0.031 | 1.036 | 1.200 |
| 1956 | 0.129 | 0.036 | 1.157 | 1.322 |
| 1955 | 0.114 | 0.050 | 1.150 | 1.314 |
| 1954 | 0.116 | 0.048 | 1.003 | 1.166 |
| 1953 | 0.128 | 0.049 | 0.857 | 1.033 |
| ----- | | | | |
| 1953 | 0.134 | 0.064 | 0.730 | 0.928 |
| 1952 | 0.144 | 0.066 | 0.769 | 0.978 |
| 1951 | 0.128 | 0.071 | 0.814 | 1.012 |
| 1950 | 0.098 | 0.077 | 0.784 | 0.959 |
| 1949 | 0.111 | 0.081 | 0.718 | 0.910 |
| 1948 | 0.129 | 0.085 | 0.776 | 0.990 |
| 1947 | 0.115 | 0.103 | 0.871 | 1.089 |

Table 6 (Continued)

| Year | Debt Ratio | Preferred Ratio | Common Ratio | Tobin's q |
|-------|------------|-----------------|--------------|-----------|
| 1947 | 0.083 | 0.116 | 1.132 | 1.330 |
| 1946 | 0.062 | 0.148 | 1.465 | 1.675 |
| 1945 | 0.052 | 0.162 | 1.456 | 1.671 |
| 1944 | 0.066 | 0.159 | 1.170 | 1.394 |
| 1943 | 0.066 | 0.150 | 1.033 | 1.250 |
| 1942 | 0.055 | 0.143 | 0.821 | 1.018 |
| 1941 | 0.061 | 0.158 | 0.965 | 1.185 |
| ----- | | | | |
| 1941 | 0.091 | 0.181 | 0.744 | 1.015 |
| 1940 | 0.065 | 0.188 | 0.960 | 1.212 |
| 1939 | 0.069 | 0.204 | 1.088 | 1.361 |
| 1938 | 0.061 | 0.197 | 1.028 | 1.286 |
| 1937 | 0.071 | 0.215 | 1.315 | 1.601 |
| 1936 | 0.059 | 0.231 | 1.624 | 1.913 |
| 1935 | 0.071 | 0.220 | 1.350 | 1.642 |
| ----- | | | | |
| 1935 | 0.065 | 0.168 | 1.353 | 1.587 |
| 1934 | 0.057 | 0.134 | 1.089 | 1.280 |
| 1933 | 0.049 | 0.104 | 0.958 | 1.111 |
| 1932 | 0.055 | 0.099 | 0.608 | 0.762 |
| 1931 | 0.065 | 0.131 | 1.004 | 1.201 |
| 1930 | 0.071 | 0.159 | 1.488 | 1.718 |
| ----- | | | | |
| 1930 | 0.107 | 0.147 | 1.219 | 1.473 |
| 1929 | 0.100 | 0.157 | 1.514 | 1.771 |
| 1928 | 0.113 | 0.192 | 1.463 | 1.769 |
| 1927 | 0.126 | 0.140 | 1.245 | 1.511 |
| 1926 | 0.114 | 0.152 | 1.146 | 1.412 |

Table 7: Tobin's "q" and its components, 1965-1977

| Year | Debt Ratio | Preferred Ratio | Common Ratio | Tobin's q |
|------|------------|-----------------|--------------|-----------|
| 1965 | 0.060 | 0.182 | 1.419 | 1.661 |
| 1966 | 0.045 | 0.193 | 1.326 | 1.564 |
| 1967 | 0.035 | 0.215 | 1.299 | 1.549 |
| 1968 | 0.069 | 0.213 | 1.309 | 1.591 |
| 1969 | 0.054 | 0.209 | 1.172 | 1.435 |
| 1970 | 0.043 | 0.214 | 0.931 | 1.188 |
| 1971 | 0.044 | 0.225 | 1.076 | 1.345 |
| 1972 | 0.043 | 0.225 | 1.121 | 1.389 |
| 1973 | 0.036 | 0.230 | 0.860 | 1.126 |
| 1974 | 0.026 | 0.234 | 0.584 | 0.844 |
| 1975 | 0.017 | 0.219 | 0.597 | 0.833 |
| 1976 | 0.015 | 0.215 | 0.664 | 0.894 |
| 1977 | 0.012 | 0.211 | 0.566 | 0.789 |

Table 8: Alternative Estimates of Tobin's q, 1965-77

| Year | Ciccolo- Baum | Brainard- Shoven- Weiss | Economic Report of the Pres. | Lind- enberg & Ross |
|------|------------------|-------------------------------|---------------------------------------|---------------------------|
| 1965 | 1.661 | 1.740 | 1.360 | 1.960 |
| 1966 | 1.564 | 1.390 | 1.210 | 1.620 |
| 1967 | 1.549 | 1.580 | 1.220 | 1.820 |
| 1968 | 1.591 | 1.560 | 1.260 | 1.840 |
| 1969 | 1.435 | 1.300 | 1.120 | 1.610 |
| 1970 | 1.188 | 1.200 | 0.910 | 1.480 |
| 1971 | 1.345 | 1.260 | 1.000 | 1.580 |
| 1972 | 1.389 | 1.370 | 1.080 | 1.630 |
| 1973 | 1.126 | 1.070 | 1.020 | 1.280 |
| 1974 | 0.844 | 0.690 | 0.760 | 0.960 |
| 1975 | 0.833 | 0.740 | 0.730 | 1.000 |
| 1976 | 0.894 | 0.830 | 0.830 | 0.980 |
| 1977 | 0.789 | 0.720 | 0.770 | 0.880 |

Sources: Ciccolo-Baum: calculations by the authors based on a sample of firms from the PANEL data base; Brainard-Shoven-Weiss: Brookings Papers on Economic Activity 2:1980, p.466; Economic Report of the President: January 1979, table 30, p. 128; Lindenberg-Ross: in "Tobin's Q Rates and Industrial Organization," Journal of Business, 54,1-32.

Table 9 : Rates of Return (per cent)

| | Rates of Return on Stockholders' Equity | | Rates of Return on Net Assets | |
|-----------|--|-------------|----------------------------------|-------------|
| | With IVA | Without IVA | With IVA | Without IVA |
| 1961-1970 | 9.3 | 9.7 | 8.7 | 9.1 |
| 1971-1977 | 6.3 | 8.6 | 7.5 | 9.0 |

Table 10: Balance Sheet Flows Due to Unit Increase in q or Net Cash Flow (CF)

(Manufacturing Firms, 1966-77)

A. REGIME I ($\lambda=0.302$)

| Flows | ASSETS | | LIABILITIES | | |
|-----------------------------|--------|-------|---------------------------|------|------|
| | q | CF | Flows | q | CF |
| Investment | .038 | 1.75 | Δ Short term debt | .035 | .386 |
| Δ Cash assets | -.006 | -.015 | Δ Long term debt | .098 | 1.44 |
| Δ Inventories | .028 | .840 | Δ Common equity | .024 | .779 |
| Δ Net accts. receiv. | .009 | .170 | Δ Other short term | .001 | .324 |
| Δ Oth. long term | .083 | 1.19 | | | |
| SUMS | .152 | 3.93 | SUMS | .158 | 2.92 |

B. REGIME II ($[1-\lambda]=0.698$)

| Flows | ASSETS | | LIABILITIES | | |
|-----------------------------|--------|------|--------------------------|-------|------|
| | q | CF | Flows | q | CF |
| Investment | .019 | .237 | Δ Short term debt | .017 | .018 |
| Δ Cash assets | -.014 | .204 | Δ Long term debt | .061 | .203 |
| Δ Inventories | .017 | .494 | Δ Common equity | .001 | .177 |
| Δ Net accts. receiv. | .012 | .138 | Δ Oth. short term | -.007 | .284 |
| Δ Oth. long term | .036 | .574 | | | |
| SUMS | .070 | 1.65 | SUMS | .072 | .682 |

NOTE: The difference between asset and liability column sums may not add to zero or one due to rounding.

Table 11: Balance Sheet Flows Due to Unit Increase in q or Net Cash Flow (CF)

(Durable Goods Firms, 1927-35)

A. REGIME I ($\lambda=0.487$)

| ASSETS | | | LIABILITIES | | |
|-----------------------------|-------|-------|--------------------------|-------|------|
| Flows | q | CF | Flows | q | CF |
| Investment | .038 | .388 | Δ Short term debt | .003 | .038 |
| Δ Cash assets | -.013 | .131 | Δ Long term debt | .009 | .079 |
| Δ Inventories | .003 | .641 | Δ Common equity | .011 | .093 |
| Δ Net accts. receiv. | -.008 | .164 | Δ Oth. short term | -.014 | .092 |
| Δ Oth. long term | -.004 | -.006 | | | |
| SUMS | .016 | 1.31 | | .009 | .303 |

B. REGIME II ($[1-\lambda]=0.513$)

| ASSETS | | | LIABILITIES | | |
|-----------------------------|-------|------|--------------------------|-------|-------|
| Flows | q | CF | Flows | q | CF |
| Investment | .018 | .085 | Δ Short term debt | .008 | .007 |
| Δ Cash assets | -.026 | .186 | Δ Long term debt | .008 | -.065 |
| Δ Inventories | .026 | .663 | Δ Common equity | .009 | .032 |
| Δ Net accts. receiv. | -.006 | .067 | Δ Oth. short term | -.014 | .055 |
| Δ Oth. long term | -.002 | .028 | | | |
| SUMS | .010 | 1.03 | SUMS | .011 | .029 |

NOTE: The difference between asset and liability column sums may not add to zero or one due to rounding.

Table 12: Balance Sheet Flows Due to Unit Increase in q or Net Cash Flow (CF)

(Nondurable Goods Firms, 1927-35)

A. REGIME I ($\lambda=0.546$)

| ASSETS | | | LIABILITIES | | |
|-----------------------------|-------|------|--------------------------|-------|------|
| Flows | q | CF | Flows | q | CF |
| Investment | .016 | .238 | Δ Short term debt | -.008 | .067 |
| Δ Cash assets | -.014 | .068 | Δ Long term debt | -.002 | .088 |
| Δ Inventories | -.043 | .984 | Δ Common equity | -.008 | .185 |
| Δ Net accts. receiv. | -.004 | .111 | Δ Oth. short term | -.018 | .069 |
| Δ Oth. long term | .010 | .021 | | | |
| SUMS | -.035 | 1.42 | SUMS | -.036 | .409 |

B. REGIME II ($[1-\lambda]=0.454$)

| ASSETS | | | LIABILITIES | | |
|-----------------------------|-------|------|--------------------------|-------|-------|
| Flows | q | CF | Flows | q | CF |
| Investment | .017 | .032 | Δ Short term debt | -.008 | .041 |
| Δ Cash assets | -.023 | .142 | Δ Long term debt | .003 | -.054 |
| Δ Inventories | -.038 | .931 | Δ Common equity | -.011 | .216 |
| Δ Net accts. receiv. | -.002 | .101 | Δ Oth. short term | -.016 | .061 |
| Δ Oth. long term | .008 | .057 | | | |
| SUMS | -.038 | 1.26 | SUMS | -.032 | .264 |

NOTE: The difference between asset and liability column sums may not add to zero or one due to rounding.

FOOTNOTES

1. Takeovers show up on the balance sheet in Miscellaneous Items as this variable contains the difference between the actual cost of an acquisition and its book value. Generally, acquisitions exceeding ten per cent of the purchasing firm's net assets disqualified the firm from the sample.

2. Debt due in less than one year is valued at book. Nontraded long-term debt is valued using a bond price index generated for each year for each subsample.

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