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Mercantile Credit, Monetary Policy, and Size of Firms

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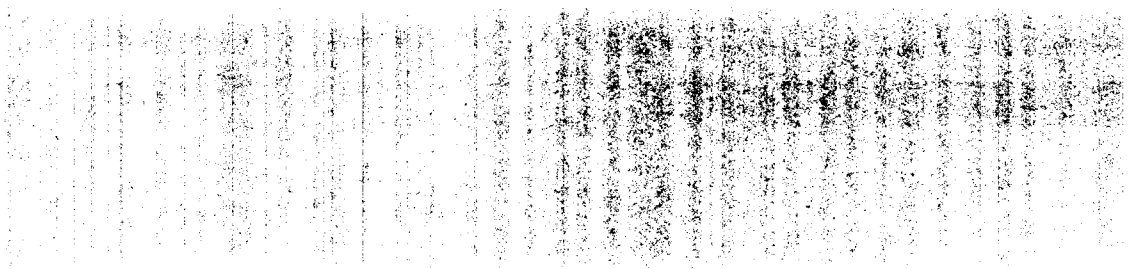
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MERCANTILE CREDIT, MONETARY POLICY, AND SIZE OF FIRMS *

Allan H. Meltzer

IN the continuing debate about the role of money, credit, and monetary policy in our society, one of the major issues centers around the specific incidence of "tight money" on individual business firms. On the one hand, leading proponents of monetary controls as a regulatory device have emphasized the general, impersonal nature of such controls. They have argued that the impact of monetary policy is determined by the reaction of individual borrowers to changed market conditions.

On the other hand, critics of general controls have suggested that institutional changes have led to discrimination by suppliers in the market for money and credit. Differences in size of firm, market structure, or type of industry, the amount of liquid assets which firms may accumulate, imperfections in the capital markets, and a variety of other institutional phenomena have been offered as reasons for the failure of monetary policy to operate as a general, impersonal, control device. Some of these institutional restrictions have been summarized under the general heading of "credit rationing."

Both conjecture and empirical observation of the structure of bank loans have suggested that credit rationing favors large firms.[1] But those who suggest that this is the case ignore

important institutional arrangements that work in the opposite direction. Banks and financial institutions are not the only sources of credit for small firms. The existence of a large volume of interfirm (mercantile) credit makes it apparent that business firms borrow from each other.[2]

Variations in the volume and distribution of mercantile credit are important accompaniments of monetary policy changes. During the recent tight money period, for example, the increase in mercantile credit by the manufacturing sector was three times larger than the increase in the money supply (currency plus adjusted demand deposits).

We show below that, when money was tightened, firms with relatively large cash balances increased the average length of time for which credit was extended. And this extension of trade credit appears to have favored these firms against whom credit rationing is said to discriminate. Hence the credit provided by banks and financial institutions seems to have been redistributed to restore much of the general, impersonal nature of monetary controls during 1955–57. Moreover, the reduction in cash balances by liquid firms helps to explain the increase in the income velocity of money during the recent tight money period.

The following section examines the relationship between a measure of monetary tightness and the liquidity of manufacturing firms of varying size. Section II discusses the important factors influencing the allocation of trade credit. Section III points out differences in the sources and allocation of funds for large and small firms during 1955–57 and compares the impor-

[1] Professor W. L. Smith has suggested that small firms "are more dependent on the banking system than large firms are, have fewer alternative sources of funds, and seem in general to be more vulnerable to the effects of tight credit." *Compendium of Papers Submitted by Panelists Before the Joint Economic Committee*, March 31, 1958, 505–506.

Over a year earlier, the Committee had summarized the situation as follows: Chairman Patman: "It is the little fellow that is hurt, and the big fellow is not hurt at all." "Monetary Policy: 1955–56," Hearing before the Subcommittee on Economic Stabilization of the Joint Economic Committee, December 10 and 11, 1956, 34–35. See also J. K. Galbraith, "Market Structure and Stabilization Policy," this REVIEW, XXXIX (May 1957), 124–33.

[2] Lending by suppliers to their customers through the extension of trade credit has long been recognized as a form of interfirm relationship. Sayers and Foulke have noted that one of the prime reasons for the development of mercantile credit in the nineteenth century was the need of merchants to obtain short-term credits in circumstances under which banks did not lend. R. S. Sayers, "Central Banking in the Light of Recent British and American Experience," *Quarterly Journal of Economics*, LXIII (May 1949); R. Foulke, *Behind the Scenes of Business*, Dun and Bradstreet, 1937.

[429]

tance of trade credit with that of other flows. A section discussing the limitations of this analysis and a concluding section complete the paper.

I. The Influence of "Tight Money" on Liquidity Position

The use of receivables to reallocate credit implies that some firms have access to funds which can be made available for this purpose. Information on recent periods indicates that large firms were able to obtain proportionally greater access to funds than were small firms.[3] One obvious source of such funds is the commercial banking system. Others are the capital markets, insurance companies, and financial intermediaries. A further source of funds comes from the liquid assets which the lending firm holds at the time that the decision is made to increase or allow the additional extension of credit to customers.

Define liquidity position, or stock of liquidity, as the ratio of cash plus government securities to current liabilities, a variant of the "quick" or "acid test" ratio commonly used by businessmen and accountants.[4] Indications that the average liquidity position of firms increases monotonically with size of firms have been used to suggest that large firms are not affected by changes in monetary policy. But such a proposition ignores (1) the way in which liquidity responds to changes in the money market, and (2) the way in which the larger

firms may increase the extension of mercantile credit when their sales to small customers are falling. Hence, we can not assume that large size or relatively high liquidity results in firms acting as if the restriction of credit has not taken place.

The money market variable, M, is defined as the product of the rate of interest and an index of tight money.[5] Liquidity position, or stock of liquidity, L, is measured, as above, by the ratio of cash plus government securities to current liabilities.[6]

Table 1 shows the results obtained from a linear regression equation of the money market variable, M, on L. All groups show that liquidity position was relatively low during periods of monetary tightness and relatively high during periods of easy money.[7]

There is some tendency for the marginal effect of M to increase with size. This is particularly true for the groups with assets less than ten million dollars. However, with the exception of Groups I and II, differences between size groups are small. Despite this indication that the marginal effect of M on L is rather independent of size, we should recall that the largest group has by far the largest absolute amount of cash, government securities, and current liabilities. The largest dollar amount of funds is therefore released by the group with assets of $100 million and over.

While the money supply increased by less

[3] For example, Table 1 of the Federal Reserve study, "Member Bank Lending to Small Business, 1955–57," shows that all but the smallest group of firms increased their loans from commercial banks but that only the groups with total assets of $25 million or more increased by more than the average for all firms. Table 4 (page VI–12) in the "Life Insurance" survey shows that large firms gained relatively in their share of the number and amount of bonds authorized as investments of life insurance companies. Cf. *Financing Small Business*, Federal Reserve Board, 1958.

The FTC-SEC "blown-up" sample of manufacturing corporations indicates that both large and small manufacturing corporations gained in loans but that during 1956 and 1957 the large firms gained relatively to the small. The data suggest the importance of mercantile credit as means by which small retailers and wholesalers borrow.

[4] This definition has the advantage of being computed and published by FTC-SEC in *Quarterly Financial Report for Manufacturing Corporations*. There is no strong reason, other than common use, for preferring this definition to others. Like similar measures of stock liquidity, it ignores the possibility that some firms have open lines of credit arranged with banks.

[5] Operationally, the interest rate is measured by the end of quarter rate of interest on new issues of Treasury bills. The ratio of free reserves to total reserves in central reserve city and reserve city banks at the end of each quarter is used as a measure of the "tightness of money." Since a negative value indicates that excess reserves are borrowed from the Fed, this ratio is subtracted from 1.00 to obtain an index of monetary tightness. (Thus, negative free reserves increase quarterly observations for the rate of interest, and positive free reserves decrease them.) The seasonally adjusted value of the product of these two variables is referred to as the "money market variable" in the text. This is one of many measures which might be chosen. It has the advantage of combining both the interest rate and a measure of the availability of loans.

[6] Data used below have been obtained from the Federal Trade Commission-Securities and Exchange Commission *Quarterly Financial Report for Manufacturing Corporations*. All data have been seasonally adjusted.

[7] This result is obtained using quarterly data for two periods. The first starts approximately six months after the signing of the Federal Reserve-Treasury Accord of 1951; the second begins in 1954, a sub-period during which there has been a much-discussed use of monetary controls. The fourth quarter 1957 is the terminal date for both series.

TABLE 1. — RESULTS OF REGRESSION OF M ON L

Size class of firms (Total assets in $ million)	1951–IV through 1957–IV		1954–I through 1957–IV	
	b^a	r	b^a	r
Group I Under .25	−.02 (.008)	45	−.02 (.006)	61
Group II .25–.99	−.06 (.01)	74	−.05 (.007)	86
Group III 1.0–4.99	−.07 (.008)	89	−.08 (.006)	94
Group IV 5.0–9.99	−.08 (.008)	89	−.08 (.006)	94
Group V 10.0–49.99	−.12 (.01)	88	−.12 (.01)	94
Group VI 50.0–99.99	−.09 (.008)	92	−.10 (.006)	96
Group VII 100.0 and over	−.09 (.01)	91	−.09 (.009)	90
Total (in $ million)				

a Marginal effect of "money market" on liquidity; figures in parentheses are the standard errors obtained from the regression of M on L.

than $1 billion for the tight money period, the sample as a whole shows a decrease in cash plus government securities of more than $5 billion.[8] Table 2 shows the relative share of total liquid assets (cash plus governments) held by different size groups on various dates during the recent tight money period.

It is unlikely that discrimination in favor of large firms and against small firms would make the results (shown in Table 2) a consequence of general monetary controls. Moreover, to the extent that a reduction in liquid assets represents a significant proportion of the assets available for increasing receivables, the largest firms were in a position to allocate the assets thus released into an increase in their holdings of accounts and notes receivable.[9]

[8] More than 80 per cent of the decrease represents the experience of the group of largest firms. Groups I, II, and III do not show any relative decline in total liquid assets held. The groups of smallest firms show the largest absolute *increase* in liquid asset holdings.

[9] To some extent, it may be suggested that an inability to separate industries by size of total assets weakens this conclusion. This is, of course, more likely to be the case for the intermediate groups where differences in industry group may have led to a cancelling of positive and negative changes and where "large" and "small" may need redefinition in terms of the industry. Our largest group may be

II. Factors Influencing Allocation of Trade Credit

If the suppliers of firms affected by credit rationing respond to a decrease in the demand for their product by increasing the ratio of accounts plus notes receivable to sales, a reallocation of assets and credit occurs.[10] Even if the extension of credit terms results from action initiated by the customer, the effect on the balance sheets will be the same. In either case, employees of the lending firm responsible for financial operations must make a decision: in effect they must decide to collect the outstanding receivables more aggressively and refuse to ship additional orders to delinquent accounts, or, by default, permit the average collection period to lengthen.

For large firms increased credit extension is a relatively inexpensive method of maintaining or increasing sales when credit rationing acts to the potential disadvantage of their customers.[11] And the lending firm may sell both to firms which do and do not borrow. Hence, extended credit terms need not be granted to all customers [12] further reducing the cost to the lender.[13]

biased by its industrial composition, but whatever its industry composition, it is clear that such firms are large, hold a substantial proportion of the liquid assets of manufacturing corporations, and experienced a substantial reduction in such holdings during the tight money period.

[10] For the lending firm, receivables are higher and liquid assets are lower than when stated invoice terms are followed; for the borrower, payables and liquid assets are increased.

[11] Assuming a rate of interest of twelve per cent per annum as the opportunity cost of funds to the lending firm, the granting of a ninety day payment period in lieu of the "regular" thirty day terms is equivalent in cost to a 2 per cent reduction in the selling price of the product. The use of interest bearing notes to finance receivables will, of course, reduce the cost to the lender.

The smaller (borrowing) firms, unable to obtain funds from banks, will value the resulting possibility of holding higher inventories at the marginal profit rate resulting from additional sales. For the borrowers, the alternative presented in this way is less costly or more flexible than other prominently available alternatives: selling accounts receivable to factoring companies, large percentage reductions in inventory, loss of control of the firm.

[12] The Robinson-Patman Act specifically prohibits differential treatment of this kind with respect to pricing practices.

[13] The extent to which the average collection period is practiced as a form of non-price competition aids in understanding the degree to which so-called "administered" prices are in fact more flexible than they appear if only announced changes in market prices are considered.

TABLE 2. — PERCENTAGE OF TOTAL CASH PLUS GOVERNMENT SECURITIES HELD AS ASSETS, MANUFACTURING SECTOR ONLY [a]

Size class of firms (Total assets in $ million)	1955– II	1955– IV	1957– III	1955–II to 1957–III		1955–IV to 1957–III	
				Change in relative share	Dollar change ($ million)	Change in relative share	Dollar change ($ million)
Group I Under .25	2.31%	2.15%	3.15%	+0.84%	+169	+1.00%	+146
Group II .25–.99	4.82	4.56	5.29	+0.47	+27	+0.73	−48
Group III 1.0–4.99	8.13	7.68	9.23	+1.10	+122	+1.55	+3
Group IV 5.0–9.99	4.78	4.60	4.37	−0.41	−200	−0.23	−298
Group V 10.0–49.99	13.16	12.92	12.92	−0.24	−323	0	−668
Group VI 50.0–99.99	7.05	7.02	7.78	+0.73	+47	+0.76	−169
Group VII 100.0 and over	59.77	61.06	57.24	−2.53	−1841	−3.82	−4144
Total (in $ million)	27,724	30,904	25,726		−1999		−5178

[a] Detail may not add to total because of rounding.

Define the net mercantile credit position, R, of a firm or group as the ratio of the total outstanding accounts and notes receivable, r, minus the outstanding accounts and notes payable, p, shown on the quarterly balance sheet to the dollar amount of quarterly sales, s. Then we define $(r - p)/s = R$, the ratio of net receivables to sales.

Firms with the largest average liquidity position are shown by the scatter diagrams to be more likely to have relatively low liquidity position accompanying relatively high ratios of net receivables to sales.[14] Moreover, given that they are both larger and on the average more

[14] For groups I, II, and III, the scatter diagrams give no evidence of a negative relationship between R and L; for the two groups of largest firms, the negative slopes of the simple regression lines which we would draw are considerably clearer.
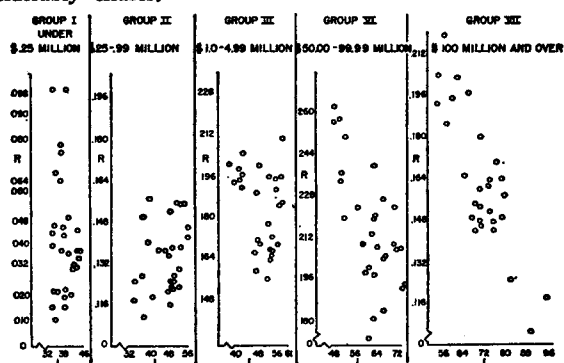
liquid, they are less likely to have experienced credit rationing in the financial markets. A period of tight money is likely to affect them primarily through a decrease in sales to customers who cannot increase or maintain inventories.[15] Then, if high values of R result from relatively high sales obtained by granting longer credit terms, from a decrease in liquidity position, or a combination of the two, we have as a regression equation

$$R = a + b_1 L + b_2 S + u \qquad (1)$$

where R and L are defined as before, S is an index of seasonally adjusted sales (first quarter 1951 = 1.00), a and b are parameters, and u is a random variable. Obviously, once the interrelationships between firms are considered, the effects of L and S on R are no longer completely independent. However, the partial correlation coefficients show that the two effects are not closely related for all size groups. Table

[15] This effect has been previously noted in a discussion of recent British experience. H. F. Lydall; "The Impact of the Credit Squeeze on Small and Medium Sized Manufacturing Firms," *Economic Journal*, LXVII (September 1957), 428–29. However, Lydall does not consider the relationships between firms and the way in which the reduction in liquidity by the large firms may succeed in reducing the credit rationing effect of a tight money policy for the small firms. At the same time, the large firms, by lending, may limit or reverse the accompanying reduction in their sales.

3 presents these coefficients obtained when equation (1) was used to estimate the relationship for each of the seven size groups.[16]

Groups which experienced the largest dollar decline in liquid assets (Table 2) have the strongest negative relationships between L and R in Table 3. Of these, only Group VII shows a positive relation between S and R.[17] Thus, net receivables for this group should rise faster than sales and by a larger amount than for any other group. To the extent that a reallocation

57 and 1954–57. But the positive coefficients between R and S (Table 3) are biased downward. When credit terms lengthen, all firms do not obtain the same terms. Credit is allocated among customers and sales are increased by financing inventories for firms which might otherwise be unable to purchase or which might purchase smaller amounts. Since many customers will continue to observe stated invoice terms and since we know only the average net receivables-sales ratio, the increase in R shown in

TABLE 3. — RESULTS OBTAINED FROM REGRESSION EQUATION (1) [a]

| Size class (Total assets in $ million) | Period: 1951–IV—1957–IV inclusive | | | | | | Sub-period: 1954–I—1957–IV inclusive | | | | | |
	b_1 (marginal effect of L on R)	b_2 (marginal effect of S on R)	R^* (multiple correlation coefficient)	r_1^* (partial correlation of L on R)	r_2^* (partial correlation of S on R)	S (Mean of sales index)	b_1	b_2	R^*	r_1^*	r_2^*	S
Group I Under .25	−.16 (.18)	+.03 (.05)	.23	0	0	.96	−.02 (.02)	+.09 (.05)	.50	0	41	.96
Group II .25–.99	+.21 (.06)	+.16 (.04)	.58	58	57	.95	+.30 (.10)	+.19 (.06)	.57	57	57	.97
Group III 1.0–4.99	−.21 (.11)	−.12 (.09)	.32	32	18	.96	−.03 (.07)	−.01 (.06)	0	0	0	.97
Group IV 5.0–9.99	−.26 (.04)	−.16 (.06)	.75	75	46	.84	−.26 (.06)	−.19 (.11)	.74	71	38	.83
Group V 10.0–49.99	−.20 (.09)	−.16 (.15)	.52	39	0	1.04	−.24 (.03)	−.28 (.06)	.95	89	77	1.05
Group VI 50.0–99.99	−.08 (.06)	+.10 (.04)	.73	12	46	1.18	−.09 (.05)	+.10 (.04)	.87	34	51	1.23
Group VII 100.0 & over	−.16 (.04)	+.03 (.01)	.79	60	43	1.29	−.12 (.04)	+.04 (.02)	.86	60	47	1.43

Figures in parentheses are standard errors.
[a] Similar results are obtained if the ratio r/s is substituted for $(r-p)/s$.
* Adjusted for degrees of freedom.

of credit takes place, it is the largest firms which should be the principal lenders.

With the exception of Group II,[18] only the two largest groups show a positive relationship between sales and net receivables during 1951–

[16] The use of an index of sales eliminates the direct effect of size from the regression equation. Data were obtained from the Federal Trade Commission-Securities and Exchange Commission *Quarterly Financial Report for Manufacturing Corporations*. All data have been seasonally adjusted.

[17] Group VII also showed the largest relative and absolute reduction in liquid assets and a substantial increase in the ratio R during 1955–57.

[18] The results for Group II are mixed. Sales for Group II rose during 1956–57, and equation (1) shows a positive relation between S and R. This suggests that the aggregate of Group II firms increase net receivables faster than sales when sales rise and use trade credit as a form of "nonprice competition." However, the positive coefficient for L indicates that R is low when L is low; L fell during 1956–57. But the absolute increase in receivables from high S was not sufficient to raise the ratio R, for this group during tight money.

Table 3 will reflect only partially the increased lending by suppliers to their customers.

III. Changes in Sources and Allocation of Funds

The estimates of equation (1) suggest that firms with the largest assets are more likely to increase trade credit faster than sales when increases in credit are restricted by monetary policy. Here we contrast the experience of the three groups of smallest and the two groups of largest firms to estimate the magnitude of relative and absolute changes in sales, net receivables, and other sources and allocation of funds. Consideration of the major sources of funds and the differences between groups of large and small firms indicates the extent to which interfirm "lending" reallocated credit.[19]

[19] References in this section are to a table of sources and allocation of funds based on the FTC-SEC *Quarterly Financial Report*.

Date the start of the tight money period in either the second quarter or fourth quarter 1955; consider the third quarter 1957 as the end of tight money. From either second or fourth quarter 1955 to third quarter 1957, only Groups VI and VII show a larger proportion of the increase in net receivables than of the increase in sales.[20] Moreover, the increase in net receivables by Group VII was greater than the increase in short-term loans by banks to all manufacturing firms.

Clearly, changes in the amount of trade credit extended are of importance in understanding the operations of the credit system during this period. The non-manufacturing sectors were able to "borrow" $5½ billion in additional trade credit from the manufacturing sector. This amount exceeds the increase in aggregate loans (short-term plus long-term) which the manufacturing sector received from banks; moreover, it exceeds the total increase in currency plus adjusted demand deposits during these quarters (1.2 billion).

Assertions that the proportion of total bank credit which the smallest firms obtained during 1956–57 are evidence of discrimination against small firms ignore the relatively large share of such credits which the group obtained in the months immediately preceding.[21] However, the share of short-term loans from banks which Group I obtained was relatively small. But, their relatively large increase in cash plus government securities and their ability to obtain longer term credit from both banks and non-banks may be both an indication of their preferences during this period and a denial that monetary policy favored large firms.[22]

[20] The largest firms, Group VII, increased their net receivables by nearly $3 billion, by more than the aggregate increase of all other groups. The increase by Group VII from second quarter 1955 through third quarter 1957 represented 25 per cent of the stock of net receivables existing at the start of the period.

[21] From second quarter 1955 through third quarter 1957, Group I increased long-term loans from banks and non-banks by slightly more than they increased assets or their share of the stock of assets.

[22] The group of smallest firms emerges as the only group which increased its relative sales position and its dollar holdings of cash and government securities. During the relatively prosperous period accompanying tight money, this group substantially increased its share of sales. Though they have the smallest proportion of total sales, their increase in sales was larger than the increase for any group other than Group VII. At the same time, they increased

The principal sources of funds for the group of largest firms were the non-bank markets for long-term debt and the market for equity.[23] But the absolute increase in new funds which the group obtained from banks was less than the increase in net receivables; the "loans" extended to their customers exceeded their new borrowings from banks.[24]

Consideration of sources of funds gives little indication that the banking system discriminated sharply against the smallest firms in the manufacturing sector. In addition, the data make clear (1) that the total dollar volume of net receivables and inventory increased substantially during the period and (2) that firms with total assets of $100 million and above increased their relative and absolute share of both. Furthermore, the data indicate (3) that non-bank sources were the principal suppliers of credit to the largest firms and (4) that manu-

their share of total assets. Although small firms did not increase investment very rapidly, evidence available for the earlier part of this period suggests that they were able to complete investment plans which they made. See my "Comment on Market Structure and Stabilization Policy," this REVIEW, XL (November 1958), 413–15.

[23] Since, on the average, these firms earned more than 63 per cent of the after tax profits of all manufacturing corporations during this period, their relative success in obtaining funds from the equity markets is not surprising.

[24] The data present an example of the way in which a more than proportional increase in an asset or liability by the largest firms may be misread. Almost 81 per cent of the net investment in plant and equipment was done by the firms in Group VII, almost 90 per cent by Groups VI and VII combined. But, using the first quarter 1951 as a base, Groups VI and VII are the only groups whose sales increased from 1951 to 1955. The three groups of smallest firms did not reach their 1951 sales level until 1956. (Changes in price are not considered.) Undoubtedly, more of the larger firms operated close to capacity during much of this period. It is, therefore, likely that the increase in their sales led to an accelerated increase in their investment in plant and equipment. Cf. F. Modigliani, "Comment on Hickman's Capacity, Capacity Utilization, and the Acceleration Principle," Studies in Income and Wealth, XIX (National Bureau of Economic Research, 1957), 450–68. As noted above, much of this increase in investment was financed by increases in capital and not from a relatively large increase in the proportion of bank credit which they received.

A similar result occurs when we consider increases in inventory. For Group VII, the seasonally adjusted ratio of inventory to sales increased from 0.66 to 0.77 between second quarter 1955 and third quarter 1957. For Groups I and II, the inventory-sales ratio fell during the period. It is likely that increases in inventory by large firms were an additional source of financial aid to smaller firms. By holding larger inventories for their customers, larger firms are able to make more rapid deliveries. Faster deliveries reduce the demand to hold inventory and the demand for working capital loans by their customers.

facturing corporations were important suppliers of credit to non-manufacturing firms.

When money market conditions change, a first approximation to the extent of possible differences in the effect of monetary policy on large and small firms may be obtained from an analysis of changes in the allocation of credit by the financial system. However, a more complete investigation which considers the impact of monetary controls on groups of firms stratified by size shows that the largest firms in the manufacturing sector reallocate the stock of credit made available by banks and financial institutions. The reallocation of credit and the release of previously held liquid assets appears to restore much of the general nature of monetary controls.

IV. Limitations

Certain disadvantages are inherent in the approach. There are numerous problems both with respect to reliability and comparability associated with the use of the FTC-SEC sample. There is no apparent way to separate the effects associated with type of industry or product classification from effects of size. Changes in the sample composition, which occur annually, limit confidence in comparisons over time. These differences are not unimportant and may impart biases of which we are unaware. In particular, there are sampling problems associated with the smallest group of firms which render precise interpretations difficult.[25]

A more fundamental problem occurs with respect to the inferences which may be drawn from these results. It would be desirable to know whether the initiative for the type of lending which we have described results from actions undertaken by the customer or the supplier, whether industry structure, relative size of customer liquidity position, or absolute size of lending firm is more important as a criterion for credit extension. It is extremely difficult to draw inferences from aggregate data about the way in which decisions are made by individual firms. Hence, such inferences must be regarded as an indication of the types of differences which might exist if we investigated individual firms and attempted to formulate empirically testable propositions about the way in which they behave.

Finally, there are limitations in the coverage of this study. Data are available for the manufacturing sector only. More detailed study of the behavior of firms engaged in wholesaling and retailing must be omitted. Data are not available for industry groups stratified by size. Thus, while we might infer, e.g., that the manufacturing sector as a whole extended credit to the wholesaling and retailing sectors, the size or industry classification of firms receiving these credits is unknown.

V. Conclusion

There has been much discussion and little investigation of the way in which changes in monetary policy influence the behavior of firms.[26] In part, the controversy in this area stems from the inadequacy of the present theory of the firm to cope with the reactions of firms to changing money market conditions or to provide precise quantitative predictions of the short-run behavior of firms. Both balance sheet and income statement variables[27] must be included to obtain reasonably accurate predictions of short-run behavior. Even limited use of such variables may improve social policy propositions by providing sufficient information about the units over which we aggregate.

Data for the tight money period of 1955–57 suggest that the banking system increased (the sum of short and long-term) loans to the various size groups in the manufacturing sector in rough correspondence to the share of total assets held by the group. Undoubtedly, it was

[25] This should not be construed as a criticism of the FTC-SEC procedures. Users of these data are aware of the high standards set and the high percentage of response obtained.

[26] For example, Professor Baumol recently advised that he would be surprised if an investigation shows that monetary and fiscal controls "constantly favor the one group [oligopoly] against the other [competitive]." His argument is based on the proposition that "Oligopolists seek to maximize sales for some fixed profit level. The result of the 'tight money' will decrease sales and hence the reduction in the demand for his product and the increase in his cost will lead the oligopolist to reduce output." *Compendium of Papers Submitted by Panelists Before the Joint Economic Committee*, March 31, 1958, 55–56. But, for a contrary view, see also footnote 2 *supra*.

[27] Cf. K. E. Boulding, *A Reconstruction of Economics* (New York, 1950); W. W. Cooper, "Theory of the Firm: Some Suggestions for Revisions," *American Economic Review*, XXXIX (December 1949).

easier for large firms to obtain non-bank funds. This alone would seem to indicate that a tight money policy discriminates primarily against smaller, less liquid firms. Consideration of interfirm relationships modifies this result and implies that institutional restrictions which limit the general nature of monetary controls are, at least in part, offset.

We have argued that firms which accumulate liquid balances in periods of easy money use these balances to provide trade credit during periods of tight money. (These "loans" were an important source of credit to non-manufacturing firms.) But reductions in the cash balances of the largest firms during tight money contribute to a rise in velocity. Studies of individual firm behavior may indicate that there is a level of liquidity below which such firms would pre-fer reduced sales to further increases in receivables and a further drop in cash balances. If such a limit can be reached, the increase in velocity which stems from this source may be slowed or stopped. If so, relatively large increases in monetary tightness would be proportionally more restrictive than small increases.

Finally, we suggest that large (relatively liquid) firms may use credit policy, as an alternative to direct price reductions, to increase sales during periods of tight money. Confirmation of these results should be of considerable interest in discussions of administered prices. Such investigation may, at the same time, indicate a way in which firms evade or avoid the restrictions imposed by the Robinson-Patman Act.

APPENDIX

PERCENTAGE OF CHANGE IN SOURCES AND ALLOCATION OF FUNDS BY SIZE GROUPS

MANUFACTURING CORPORATIONS ONLY *

Size in millions of dollars	Second Quarter 1955 — Fourth Quarter 1955						Fourth Quarter 1955 — Third Quarter 1957					
	Group I Under .25	Group II .25–.99	Group III 1.00–4.99	Group VI 50.0–99.99	Group VII over 100	All Mfg. Millions $	Group I	Group II	Group III	Group VI	Group VII	All Mfg. Millions $
1) Increase in short-term loans from banks	3.27%	2.69%	1.54%	22.50%	47.11%	$530	1.41%	7.45%	11.84%	2.41%	53.89%	$2,898
2) Increase in long-term loans from banks	21.43	0	23.57	42.86	−18.57	$140	2.42	5.74	13.90	8.29	53.20	$1,532
3) Increase in other long-term debt	13.00	9.60	4.60	9.20	48.60	$500	2.45	4.16	6.50	8.87	73.58	$4,489
4) Increase in equity of which:	1.27	2.78	3.54	12.12	72.32	$3920	2.78	−0.33	4.87	7.60	80.40	$19,176
(5) Increase in capital stock, capital surplus, and minority interest	−1.44	1.83	3.38	13.20	83.36	$1803	3.84	0.82	2.78	4.38	84.15	$8,254
6) Change in cash and Gov't Securities **	0.72	2.36	3.74	6.79	72.44	+$3179	−2.82	+0.93	−0.06	+3.26	+80.03	−$5,178
7) Change in net receivables **	−33.90	−6.78	+9.60	−38.42	+174.01	−$177	3.41	6.35	8.88	8.95	59.82	+$5,685
8) Increase in inventory	2.25	5.15	10.13	10.07	56.37	$3337	2.92	2.29	8.35	4.04	69.14	$9,172
9) Increase in plant and equipment	2.45	2.37	2.26	11.17	72.18	$2613	1.60	0.24	3.95	8.03	82.40	$14,997
10) Increase in sales	13.65	11.91	10.81	10.83	39.94	$3618	11.01	11.87	11.39	6.02	56.30	$6,041
11) Increase in total assets	2.88	3.37	5.62	9.95	64.35	$11,282	3.51	2.99	8.27	7.52	71.26	$39,702

Group Sales and Assets As a Proportion of Total

Manufacturing on Benchmark Dates

	2nd Quarter 1955						4th Quarter 1957					
	Group I	Group II	Group III	Group VI	Group VII	All Mfg. Millions $	Group I	Group II	Group III	Group VI	Group VII	All Mfg. Millions $
12) Sales	4.51	8.18	12.34	7.20	48.27	$69,962	5.42	8.63	12.20	7.28	48.50	$79,621
13) Total Assets	3.77	5.50	9.15	7.11	56.69	$178,864	2.87	5.05	8.85	7.31	59.05	$219,788
14) Total Net Receivables	1.03	6.06	13.43	8.53	44.42	$12,109	2.15	6.28	12.00	9.14	47.05	$17,617

* Source: FTC-SEC Quarterly Report.
** Minus signs for the individual size groups in line (6) and (7) indicate that the dollar change for the group was opposite to the change for the aggregate of all manufacturing firms.

(Continued)

22. A Comment on Market Price and Stabilization Policy, by Allan H. Meltzer. *Review of Economics and Statistics*, November 1958.

23. Management in the 1980's, by Harold J. Leavitt and Thomas L. Whisler. *Harvard Business Review*, November-December 1958.

24. Extremal Principles for Simulating Traffic Flow in a Network, by Abraham Charnes and William W. Cooper. *Proceedings of the National Academy of Science*, February 1958.

25. Determining the "Best Possible" Inventory Levels, by Kalman Joseph Cohen. *Industrial Quality Control*, October 1958.

26. The Theory of Search: Optimum Distribution of Search Effort, by A. Charnes and W. W. Cooper. *Management Science*, October 1958.

27. The Role of Expectations in Business Decision Making, by R. M. Cyert, W. R. Dill, and J. G. March, *Administrative Science Quarterly*, December 1958.

28. Application of Linear Programming to Financial Budgeting and the Costing of Funds, by A. Charnes, W. W. Cooper, and M. H. Miller. *Journal of Business*, January 1959.

29. Nonlinear Network Flows and Convex Programming Over Incidence Matrices, by A. Charnes and W. W. Cooper. *Naval Research Logistics Quarterly*, September 1958.

30. The Role of the Field Staff Representative, by Myron L. Joseph. *Industrial and Labor Relations Review*, April 1959.

31. Models in a Behavioral Theory of the Firm, by R. M. Cyert, E. A. Feigenbaum, and J. G. March. *Behavorial Science*, April 1959.

32. An Organizational Model of Soviet Industrial Planning, by David Granick. *The Journal of Political Economy*, April 1959.

33. Lower Bound Formulas for the Mean Intercorrelation Coefficient, by Richard H. Willis. *Journal of the American Statistical Association*, March 1959.

34. The Problem of Pricing in Comparisons of International Ratios, by David Granick. *Soviet Studies*, April 1959.

35. Some Uses of Model Prototypes in an Operations Research Study, by A. Charnes and W. W. Cooper. *California Management Review*, Spring 1959.

36. Growth, Fluctuations, and Stability, by Albert K. Ando and Franco Modigliani. *The American Economic Review*, May 1959.

37. Theories of Decision-Making in Economics and Behavioral Science, by Herbert A. Simon. *The American Economic Review*, June 1959.

38. The Behavior of the French Money Supply: 1938-54, by Allan H. Meltzer. *The Journal of Political Economy*, June 1959.

39. Definable Terms and Primitives in Axiom Systems, by Herbert A. Simon. *Berkley Symposium*, February 1959.

40. The Cost of Capital, Corporation Finance, and the Theory of Investment: Reply, by Franco Modigliani and Merton H. Miller. *The American Economic Association*, September, 1959.

41. Price Tags for Business Policies, by Melvin Anshen. *Harvard Business Review*, January-February 1960.

42. Heuristic Programs, Computer Simulation, and Higher Mental Processes, by Walter R. Reitman. *Behavioral Science*, October, 1959.

43. Chance-Constrained Programming, by Abraham Charnes and William W. Cooper. *Management Science*, October 1959.

44. A Proposal for an Integrated Course in Statistics and Accounting, by Richard M. Cyert and John T. Wheeler. *The Accounting Review*, January 1960.

45. Latent Motives, Group Discussion, and the "Quality" of Group Decisions in a Non-objective Decision Problem, by James G. March and Edward A. Feigenbaum. *Sociometry*, March 1960.

46. Manipulation of Item Marginal Frequencies by Means of Multiple-Response Items, by Richard H. Willis. *Psychological Review*, 1960.

(Continued)

47. Business Decision Making, by James G. March. *Industrial Research*, Spring 1959.

48. Bargaining Behavior. I. "Prominence" as a Predictor of the Outcome of Games of Agreement, by Richard H. Willis and Myron L. Joseph. *Conflict Resolution*, June 1959.

49. Research on a Behavioral Theory of the Firm, by Richard M. Cyert and James G. March, 1960.

50. Simulation of the Firm, by Kalman J. Cohen. *The Journal of The American Economic Association*, May 1960.

51. Forecasting Sales by Exponentially Weighted Moving Averages, by Peter R. Winters. *Management Science*, April 1960.

52. Balanced Growth of Firms in a Competitive Situation with External Economies, by Michio Morishima and Gerald L. Thompson. *International Economic Review*, May 1960.

53. Task Ordering and Organizational Development in the Common Target Game, by Harold J. Leavitt. *Behavioral Science*, July 1960.

54. Stimulus Pooling and Social Perception, by Richard H. Willis. *Journal of Abnormal and Social Psychology*, 1960.

55. Optimal Properties of Exponentially Weighted Forecasts, by John F. Muth. *Journal of the American Statistical Association*, June 1960.

56. How Aspiring Managers Promote Their Own Careers, by William R. Dill, Thomas L. Hilton, and Walter R. Reitman. *California Management Review*, Summer, 1960.

57. Algorithms for Solving Production-Scheduling Problems, by B. Giffler and G. L. Thompson. *Operations Research*, July-August, 1960.

58. The Manager and the Black Box, by Melvin Anshen. *Harvard Business Review*, November-December 1960.

59. Looking Around: Humanities for the Businessman, by Leland Hazard. *Harvard Business Review*, November-December 1960.

60. The Logistic Process: Tables of the Stochastic Epidemic Curve and Applications, by Edwin Mansfield and Carlton Hensley. *The Journal of the Royal Statistical Society*, 1960.

61. Mercantile Credit, Monetary Policy, and Size of Firms, by Allan H. Meltzer. *The Review of Economics and Statistics*, November 1960.