

Monetary Analysis and the Postwar Rise in the Velocity of Money in the United States¹

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I. Introduction

In earlier issues of this journal, Professor *Ritter* and I discussed some factors contributing to changes in the income velocity of money². His initial article was concerned, in general, with the relevance of the development of a money market, as in the United States, to secular changes in the income velocity of money and the effectiveness of monetary policy. More specifically, it pertained to the relevance of the growth of corporate holdings of non-money liquid assets to a post-World War II rise in the income velocity of money, and so on. My article, on the other hand, was critical of *Ritter's* analytical basis for his major notion, and I presented an alternative explanation of the velocity changes in question.

Since the publication of our respective articles, however, there have been reports on additional studies concerning our subject³. In the monumental among these, *Milton Friedman* and *Anna Jacobson Schwartz* review the postwar rise in the velocity of money in the U. S.⁴, and in their review they reject the explanation, as publicized by *Ritter*, that the postwar growth of money substitutes contributed to a secular rise in velocity. In another report on some research, I indicate the prospect of empirical support for a slight variation of the notion originally publicized by *Ritter* in the present journal. Namely, I concluded that an effect of increasing firm size is to "pull the less active precautionary balances into the more active transactions sphere, at least with respect to capital expenditures". This then led me to the additional conclusion that "there should be further study on the velocity or turnover of money balances ... as a function of firms by asset size". Since some of this research has been done, the present paper

¹ *Mary Ann B. Frazer* and *Bert Davis* wrote and ran the programs for the regression and determination coefficients presented in this paper.

² See *Lawrence S. Ritter*, "The Structure of Financial Markets, Income Velocity, and the Effectiveness of Monetary Policy", September 1962, pp. 276-689; *William J. Frazer, Jr.*, "Some Comments on Professor Ritter's Interpretations of Keynes and Changes in Income Velocity", March 1963, pp. 70-79; and *Ritter's* reply, in the latter issue, pp. 80 to 82.

³ See *Milton Friedman* and *Anna Jacobson Schwartz*, *A Monetary History of the United States, 1867-1960* (Princeton University Press, 1963); and *William J. Frazer, Jr.*, "The Financial Structure of Manufacturing Corporations and the Demand for Money: Some Empirical Findings", *The Journal of Political Economy*, April 1964.

⁴ *Friedman* and *Schwartz*, op. cit., Chapter 12.

reports on some results in an attempt to deal systematically with the relationships between the empirical findings and the variety of view outlined above. In brief: a measure of near moneyness is related to the velocity of cash for the corporate manufacturing sector; linear approximations are made to this and other relationships; and slope parameters and other results are reported. The relationships are shown to concern the precautionary motive for holding money, a "neglected" factor in the *Friedman-Schwartz* study, an elementary model involving the definition of velocity, and the earlier *Ritter* article.

Several topics follow: (1) the secular rise in velocity and explanations of that rise, (2) the precautionary motive for holding money balances and its relationship to the demand for money by the corporate manufacturing sector, and (3) the precautionary motive and some results from tests of cross-section data for manufacturing corporations.

II. The Secular Rise in Velocity

In relating the secular changes in the whole economy to those in the corporate manufacturing sector, certain substitute measures are used. The dollar volume of *sales* is used as a substitute measure for *income* and the *cash account* is used for the *money supply*. Consequently, the velocity measure for the corporate manufacturing sector becomes the ratio of *sales* to *cash*. These changes are cited below, and the *Friedman-Schwartz* review of such changes is briefly outlined.

Some changes in key variables. The secular rise in velocity over the post-World War II years in the U.S. is indicated as follows:

	<i>Per cent change from 1948 to 1960¹</i>
<i>The economy as a whole</i>	
Total gross national product (or income) <i>increased</i> . . .	94 per cent
The money supply ² <i>increased</i>	27 per cent
Income velocity, as indicated by the variables underlying the latter changes, <i>increased</i>	53 per cent

¹ These are both years in which cyclical peaks occurred.

² The money supply change is estimated from averages of daily December figures. The present money supply figures, moreover, include "currency held by the public and demand deposits adjusted", whereas *Friedman* and *Schwartz* view money as the "total of Currency held by the public plus demand and time deposits adjusted in commercial banks". The difference in statistical definition should cause no great problem, however, since (1) the present data for the money stock held by corporations are from balance sheets and likely include some time deposits, and (2) *Friedman* and *Schwartz* show the respective money supply series to vary in the same direction.

*The corporate manufacturing sector*¹

The quarterly average of sales <i>increased</i>	109 per cent
The average end-of-quarter cash holdings <i>increased</i> . .	29 per cent
The quarterly average for velocity (sales/cash) <i>increased</i>	54 per cent
The quarterly average for the ratio of government securities ² to bank loans <i>declined</i>	23 per cent

Note that the changes for the entire economy correspond roughly in direction and magnitude to the changes for the corporate manufacturing sector. The additional change for the ratio of government securities to bank loans is used as an indicator of the extent of change in near money. *Ritter* deals with corporate holdings of government securities in terms of the development of the money market as a key source of money substitutes, and *Friedman* and *Schwartz* also deal with money substitutes mainly on the asset side. As indicated by a proposition from an earlier paper³, however, an absence of bank indebtedness is a significant source of liquidity and should be considered along with the supply of non-cash liquid assets: e.g.,

“the larger firms tend to make adjustments in their short-run cash needs primarily by purchasing and disposing of liquid securities rather than by repaying a portion of their bank indebtedness and subsequently increasing this indebtedness”.

The Friedman-Schwartz review. Friedman and Schwartz review two sets of circumstances by which most students attempt to explain the postwar rise in velocity. They also present a third set that is advanced as their own explanation. These are briefly stated as follows⁴:

- “(1) A greater rise in the return on alternative assets than in the net direct return on money...
- (2) A reduction in the value attached to monetary services because of institution changes which have created closer substitutes for money than formerly existed⁵...
- (3) A decline in the value attached to monetary services because of changed expectations of holders of money about the likely degree of future economic stability.”

¹ The data for the corporate manufacturing sector are from U.S. Federal Trade Commission and Securities and Exchange Commission estimates as reported in the U.S. Government Printing Office's *Quarterly Financial Report for Manufacturing Corporations*.

² The data for “government securities” are taken from corporate balance sheets. The category contains some non-cash liquid assets other than government securities.

³ *Frazer*, “The Financial Structure...”, *op.cit.*

⁴ See *Friedman* and *Schwartz*, *op.cit.*, pp.644–645.

⁵ *Ritter*'s earlier explanation of the postwar rise in velocity would seem to me to fall in this second category. He concentrates on the development of a money market and holdings of government securities by the non-financial business sector. See *Ritter*, “The Structure of...”, *op.cit.*

The first set of circumstances follows on logical grounds from the given rise in velocity itself, and from the usual assumptions concerning the optimization of returns from holding assets¹. As an effective matter, money was being disposed of at a faster rate than the output of goods and services was rising. This explanation is difficult to reject on empirical grounds, even though other sets of circumstances may explain a rise in velocity.

The second set, as it concerns the non-financial business sector in particular, is less difficult to reject. *Friedman* and *Schwartz* express some reservations.

The third set of circumstances is supported by the *Friedman-Schwartz* study as an explanation of the postwar rise in velocity. Apparently, this set of circumstances, along with the first set, has some support. It is essentially a set of circumstances operating via the definition of the precautionary motive for holding money balances and in terms of an elementary model set forth earlier in this journal. The definition and the model in question are reviewed below.

III. The Precautionary Motive and the Demand for Money

The definition of the precautionary motive for holding money balances may be shown to consist of two parts and enter into an elementary monetary model in two different ways. One of these concerns the principal notion of this paper. The other concerns the *Friedman-Schwartz* explanation of the postwar rise in velocity in the United States. To illustrate the interrelationships between the principal notion, the two distinct parts of the definition, and the elementary model, all are reviewed. That part of the definition entering into the model and concerning the *Friedman-Schwartz* explanation is shown to generate a rise in velocity. That part of the definition relating to near moneyness (as indicated by the ratio of government securities to bank loans), and the second part of the definition of the precautionary motive, on the other hand, is shown to enter into the model so as to generate a decline in velocity, given the decline in the ratio. As pointed out in the next section (section IV), following the empirical testing, this latter result is contrary to *Ritter's* earlier explanation of the postwar rise in velocity in the United States. It is especially relevant to the latter explanation, because of its emphasis on money market instruments such as those referred to by *Ritter*.

The definition in question is given some empirical meaning. A subsequent review of empirical findings (section IV) is shown to support the present approach.

The principal notion. The principal notion is as follows:

¹ The assumptions in question concern maximizing behaviour and rationality.

As wealth or assets (and presumably income) increase the less active precautionary balances get drawn into the more active transactions sphere and thus contribute to a rise in the income velocity of money.

I would apply this notion to firms with assets in excess of 10.0 billion dollars. This group should contain the preponderance of firms most likely to operate in the highly developed money market of the type prevailing in the United States over the post-World War II years. The restriction to considerations of the larger size firms would seem to be justified by a basic requirement. Firms, it would seem, must reach a certain size before their financial managers become sufficiently expert to effect economies in the use of cash balances. These would result via specialization in the management of the cash account and through the use of money market transactions.

The precautionary motive and the demand for money. The precautionary motive, as defined by Keynes, concerns two types of demand for money. These are, as one may recall,

- (type 1) the demand for cash as a proportion of assets (or income) "to provide for contingencies requiring sudden expenditure and for unforeseen opportunities of advantageous purchases...",
- (type 2) the demand for an asset whose "value is fixed in terms of money to meet a subsequent liability (e.g., bank indebtedness) fixed in terms of money..."¹.

We may relate both aspects of the definition to an elementary monetary model and to the definition of income velocity. First, let us recall three statements from an earlier paper that are relevant to the second aspect of the definition. Strong evidence was presented in support of the truth of the three statements²:

"Bank borrowing as a proportion of assets is inversely related to firm size."

"The percentage of assets held in government securities is directly related to firm size."

"The percentage of assets held in cash is inversely related to firm size."

The reasoning in terms of the definition of the precautionary motive and the principal proposition set forth above goes this way: As assets (and presumably income or sales)³ increase firms reduce their bank indebtedness, cash balances

¹ See *John Maynard Keynes, The General Theory of Employment, Interest and Money* (New York: Harcourt, Brace and Company, 1936), pp. 170-171, and pp. 195-197.

² *Frazer, "The Financial Structure..."*, *op. cit.*

³ To provide empirical support for the assumed relationship between sales and total assets, a linear approximation was made to data for the sales and total assets of 500 corporations. (See "The Fortune Directory: The 500 Largest U.S. Industrial Corporations", *Fortune*, July 1963, pp. 177-196.) The results of the approximation were a linear regression equation with a slope parameter of 1.02 and a coefficient of determination of 0.86. This, of course, is strong evidence that as assets increase sales increase by a similar amount for the corporations in the sample.

are released via the precautionary motive, and the latter balances are in effect transferred to non-cash liquid assets, all relative to asset size. As we wish to show in the reporting of empirical findings below, the effect of all of these developments is for velocity (sales/cash) and the ratio of government securities to bank loans to rise as firms increase in size.

The elementary model. An earlier model that was presented as an explanation of velocity changes is as follows¹:

$$M_d = \alpha Y + \beta, \quad \alpha > 0 \quad (1)$$

$$M_s = \gamma, \quad (2)$$

where M_d and $M_s (= \gamma)$ are the demand for and supply of the stock of money, respectively,

α is the rate of change in the demand for money with respect to changes in income and presumably assets as a means of satisfying the motives for holding money, and

Y is the flow variable for income (or GNP). Since the demand for money is an increasing function of income and the money supply is positive, a solution exists. That is, $M_s = M_d$ and, therefore, in terms of the parameters, $Y = (\gamma - \beta)/\alpha$. Further, since changes in β are viewed as corresponding to shifts in the speculative demand for money as may occur over time, we may consider it as zero at some initial time. At this time,

$$Y = \gamma/\alpha \text{ or } \alpha = \gamma/Y \text{ or } \alpha = M/Y,$$

i. e., as an empirical matter, α is nothing more than the reciprocal of the income velocity of money, or vice versa, at the initial time (i. e., $V_y = 1/\alpha$).

Let us, now, recognize some additional features of the model. As asset size for the individual firm (therefore income or sales) in general increases, the strength of the precautionary motive (type 2) relative to other motive declines (i. e., α decreases). Also, the precautionary motive of (type 1) enters into the model on the same terms as the speculative motive. It pertains to the precautionary motive as emphasized by *Friedman and Schwartz*²:

“After all, the major virtue of cash as an asset is its versatility. It involves a minimum of commitment and provides a maximum of flexibility to meet emergencies and to take advantages of opportunities. The more uncertain the future, the greater the value of such flexibility and hence the greater the demand for money is likely to be.”

Let us, next, in the broader terms of the above model, examine the definition of velocity³,

¹ *Frazer*, “Some Comments...”, *op. cit.*, pp. 76–78.

² *Friedman and Schwartz*, *op. cit.*, pp. 673–675.

³ *Frazer*, “Some Comments...”, *op. cit.*, p. 78.

$$V_y = \frac{1 - \beta/\gamma}{\alpha} \quad (3)$$

Here we note several things in terms of the above discussion:

α is some decreasing function of a weakening of the precautionary motive for holding assets relative to other assets as the motive relates to the second part of that definition.

β reveals a secular decline (i.e., $d\beta/dt < 0$) in the precautionary motive over the postwar years as implied by the *Friedman-Schwartz* emphasis on secular trends (section II) and the first part of the definition of the motive.

$\left| \frac{d\beta}{dt} \right| \left/ \left| \frac{d\gamma}{dt} \right| \right.$ is usually, as a cyclical matter, greater than zero and shifts in the strength of the speculative motive over time (t) give rise to a cyclical increase in velocity in the expansion phase (i.e., $d\beta/dt < 0$) and cyclical decrease in the contraction phase (i.e., $d\beta/dt > 0$)¹.

In terms of the above, the major emphasis in the *Friedman-Schwartz* explanation of the postwar rise in velocity is upon a secular decline in β . This is contrary to the earlier *Ritter* explanation in terms of government securities and the growth of a highly developed money market². Their study, nevertheless, fails entirely to deal with changes in velocity of the type that may operate via α in the above model and the second aspect of the precautionary motive as set forth by *Keynes*.

Friedman and *Schwartz*, of course, are concerned with the behaviour of velocity for the entire economy, whereas both *Ritter* and I have emphasized government securities and the non-financial business sector. Even so, they extend their conclusions to the non-financial business sector as well, and they refer to institutional changes concerning corporate cash management³. They also emphasize secular trends but, in the tests reported below, I use cross-section data. Again, even so, this use of cross-section data should cause no serious difficulty for two reasons: (1) I am mainly considering the presence of a previously neglected factor and (2) conceptually at least, both cross-section and time-series data may be used in studying behavioral functions of the money-demand or consumer-demand type⁴.

¹ This is a common feature of the cycle as outlined earlier (*Frazer*, "Some Comments...", *op. cit.*, p.78), and as reported elsewhere (see *Friedman and Schwartz*, *op. cit.*, p.643).

² *Ritter*, "The Structure of Financial Markets...", *op. cit.*

³ See *Friedman and Schwartz*, *op. cit.*, p.656, and pp.659-672.

⁴ See *Stefan Valavanis*, *Econometrics: An Introduction to Maximum Likelihood Methods* (New York; The McGraw-Hill Book Co., Inc. 1959), pp.192-196.

IV. The Precautionary Motive and Some Results from Cross-Section Data

According to equation (3) velocity varies inversely with α . Changes in α , moreover, have been related to the second aspect of the precautionary motive, as defined above, and the definition has been shown to relate to the ratio of government securities to bank loans. Thus, in order to provide empirical support for our principal notion (section III) as it operates in terms of the above framework, linear approximations were made to data concerning three statements about relationships between variables¹:

1. Velocity (sales/cash) varies directly with asset size. As asset size increases, earlier findings lead us to expect a decline in α , via the second part of the definition of the precautionary motive, and the decline in α leads us to expect a rise in velocity.
2. The ratio of government securities to bank borrowing varies directly with asset size. Earlier empirical findings lead one to expect this relationship. But it also follows from the second part of the definition of the precautionary motive and from what has been said about financial managers effecting an increasing portion of the adjustments in the cash account through the money market, all as firms increase in size.
3. Velocity varies directly with the ratio of government securities to bank loans. Since velocity and the ratio of government securities to bank loans both vary directly with asset size in statements 1 and 2, we also expect the two to vary directly. Nevertheless, a linear approximation is made to this distinct relationship.

The linear regression lines were used to approximate the relationships described in statements 1, 2, and 3 for firms with assets in excess of 10.0 million dollars, in view of what has been said about asset size and economies in the specialization of financial management. As in earlier tests², the regression coefficients were tested as to their significant difference from zero and, in the present instances, one-tail tests were appropriate³.

¹ Note that all of the dependent variables in the statements are independent of size per se. That is, if we simply double the scale of operation, the measures such as velocity and the ratio of government securities to bank loans do not change. Thus, when we view the measures as functions of asset size we are looking for the results of structural changes that take place as firms increase in size.

² *Frazer, "The Financial Structure . . .", op. cit.*

³ Also, in the present instance, there were only four degrees of freedom, since the data concerned only six class sizes in dollar amounts: 10 to 25 million, 25 to 50 million, 50 to 100 million, 100 to 250 million, 250 to 1,000 million, and over 1,000 million.

Further, since there is the need to set an upper bound in running the regressions for the first two relationships, 2,000 million dollars was chosen as such a bound. The idea was to select a bound so that a fairly normal distribution of firms would fall in the class internal 1,000 to 2,000 million. Some firms, notably General Motors, fall far outside of this bound, but most firms assets over 1,000 million are within it. Apparently, no particular bias was introduced by this choice, as revealed by the difference in regression coefficients when alternative upper bounds were used. In selecting the input values for

The results of the tests of data corresponding to the three statements are shown in tables 1, 2, and 3, respectively. In addition to the regression coefficients (i.e., b 's), coefficients of determination (i.e., r^2 's) are presented to show the extent to which changes in the dependent variable are explained by the changes in the independent variable. An asterisk appears by each regression coefficient that is significantly different from zero, and the prevalence of these asterisks provide strong evidence that statements 1 and 2 are true. To the extent that state-

Table 1
*Velocity (sales/cash) with Respect to Asset Size. Results from Cross-section
Data for Firms with over 10 Million Dollars in Assets
(seasonally adjusted)¹*

Coefficients			Coefficients		
Year and Quarter ²	Regression (b)	Determination (r^2)	Year and Quarter ²	Regression (b)	Determination (r^2)
1958:			1961:		
			1 (trough)	0.0006*	0.44
2 (trough)	0.0006*	0.51	2	0.0008*	0.63
3	0.0007*	0.61	3	0.0010*	0.75
4	0.0010*	0.61	4	0.0011*	0.83
1959:			1962:		
1	0.0010*	0.58	1	0.0013*	0.81
2	0.0008*	0.51	2	0.0015*	0.79
3	0.0008*	0.54	3	0.0013*	0.83
4	0.0009*	0.60	4	0.0014*	0.84
1960:			1963:		
1	0.0009*	0.61	1	0.0016*	0.84
2 (peak)	0.0009*	0.65			
3	0.0008*	0.39			
4	0.0005*	0.41			

* Significantly different from zero at the 10 per cent level of significance.

¹ The seasonal adjustment was effected by applying a four quarter moving average to the underlying data.

² The terms "peak" and "trough" refer to cyclical turning points in the national business cycle as reported by the National Bureau of Economic Research.

Sources of data: U.S. Federal Trade Commission and Securities and Exchange Commission.

firm size X , the mid-points of the class intervals were selected. These were $X = 17.5$, $X = 37.5$, $X = 75.0$, $X = 175.0$, $X = 625.0$, and $X = 1,500.0$, all in million of dollars. In earlier regressions, the upper bound of each class interval was selected rather than the mid-point but, here again, the effect on the regression coefficients was nominal.

There is no problem similar to this latter one in the case of relationship 3. There the input (or X) values are the ratios for the six classes, even without the upper bound, and the output (or Y) values are simply those corresponding to the appropriate input values.

ments 1 and 2 are true, they support statement 3. The positive regression coefficients in table 3, however, do not become significantly different from zero until the 3rd quarter of 1961. This lack of significance in the early years would appear to be due to an unusually large ratio of government securities to bank loans for firms with assets over 1,000 million dollars. The postwar trends of a rise in velocity and a decline in the ratio apparently combine to make the slopes in table 3 more significant in the later years.

Limiting the tests to firms with assets over 10.0 million dollars excludes all firms of asset size less than 0.5 per cent of the 2.0 billion dollar upper bound for the domain of definition. This exclusion was effected because no special reason could be found for expecting the smaller firms to be actively engaged in the

Table 2

The Ratio of Government Securities to Bank Borrowing with Respect to Asset Size: Results from Cross-section Data for Firms with over 10 Million Dollars in Assets (seasonally adjusted)¹

Coefficients			Coefficients		
Year and Quarter ²	Regression (b)	Determination (r ²)	Year and Quarter ²	Regression (b)	Determination (r ²)
1958:			1961:		
2 (trough)	0.0025*	0.77	1 (trough)	0.0026*	0.88
3	0.0033*	0.79	2	0.0025*	0.88
4	0.0041*	0.81	3	0.0025*	0.87
			4	0.0026*	0.87
1959:			1962:		
1	0.0050*	0.87	1	0.0026*	0.86
2	0.0053*	0.87	2	0.0027*	0.85
3	0.0048*	0.87	3	0.0027*	0.85
4	0.0042*	0.87	4	0.0026*	0.86
1960:			1963:		
1	0.0037*	0.87	1	0.0026*	0.86
2 (peak)	0.0032*	0.87			
3	0.0030*	0.87			
4	0.0027*	0.87			

* Significantly different from zero at the 10 per cent level of significance.

¹ The seasonal adjustment was effected by applying a four quarter moving average to the underlying data.

² The terms "peak" and "trough" refer to cyclical turning points in the national business cycle as reported by the National Bureau of Economic Research.

Sources of data: U. S. Federal Trade Commission and Securities and Exchange Commission.

practice of adjusting cash needs through the money market. And, indeed, one might reason that the smaller firms, with a narrower range of access to liquid balances, utilize their balances as best they can and probably operate with less balances than they would like in relation to their size and under different conditions. As the smaller firms increase in size, possibly they indulge the luxury of holding more balances relative to asset size (and, therefore, sales), but beyond some size (approximately 17.5 million) economies in the management of cash set in and velocity rises for the reasons given.

The tests provide empirical support for the principal notion (section III). They do not, however, deal with secular changes as such. The principal notion

Table 3
Velocity (sales/cash) with Respect to the Ratio of Government Securities to Bank Borrowing: Results from Cross-Section Data for Manufacturing Corporations with over 10 Million Dollars in Assets
(seasonally adjusted)¹

Coefficients			Coefficients		
Year and Quarter ²	Regression (b)	Determination (r ²)	Year and Quarter ²	Regression (b)	Determination (r ²)
1958:			1961:		
2 (trough)	0.09	0.09	1 (trough)	0.16	0.13
3	0.12	0.20	2	0.25	0.28
4	0.12	0.19	3	0.30*	0.41
			4	0.38*	0.49
1959:			1962:		
1	0.12	0.25	1	0.42*	0.48
2	0.09	0.19	2	0.33*	0.42
3	0.10	0.21	3	0.35*	0.47
4	0.13	0.27	4	0.39*	0.49
1960:			1963:		
1	0.17	0.28	1	0.44*	0.51
2 (peak)	0.16	0.30			
3	0.09	0.12			
4	0.12	0.11			

* Significantly different from zero at the 10 per cent level of significance.

¹ The seasonal adjustment was effected by applying a four quarter moving average to the underlying data.

² The terms "peak" and "trough" refer to cyclical turning points in the national business cycle as reported by the National Bureau of Economic Research.

Sources of data: U.S. Federal Trade Commission and Securities and Exchange Commission.

(section III) and the secular changes in key variables set forth earlier (section II), both taken together, indicate that the type-2 part of the precautionary motive absorbed active balances over the postwar years. This result would follow from the analysis and the secular decline in the ratio of government securities to bank loans. It is, moreover, contrary to *Ritter's* earlier views about the postwar rise in velocity in the United States. In addition, the principal notion and the results of empirical tests of cross-section data support the view that the second part of the definition of the precautionary motive is relevant to analyses of velocity changes¹.

Due to our reasoning about the demand for money as a function of asset size (and, therefore, sales or income), we expect some developments over time, even when nothing else changes but the average size of firms. When the average asset size increases for firms with assets in excess of 10 million dollars, then the increase contributes to a rise in the velocity of money. This occurs via the second part of the definition of the precautionary motive and given the other factors affecting velocity. Conversely, a decline in the average asset size for firms with assets over 10 million dollars contributes to a decline in the velocity of money and so on.

V. Summary

The velocity of money is shown to be an increasing function of firm by asset size for firms in excess of 10.0 million dollars in assets. As firms increase in size beyond 10 million in asset size, then they are thought to be large enough to begin effecting economies in the management of cash through money market transactions under the conditions of the period 1958–1963, in the United States. This group of firms with assets in excess of 10 million dollars, consequently, is thought to contain those firms that may have contributed to a postwar rise in velocity in the United States. At least they may have done so to the extent that business expenditures were accelerated by the presence of a highly developed money market.

The ratio of government securities to bank loans is selected as a good indicator of near moneyiness as it may relate to income velocity (or sales/cash, in the case of manufacturing corporations). It was selected since a reduction in indebtedness at the bank is a potential source of funds for adjusting cash needs as well as an increase in the supply of non-cash liquid assets. Also, the ratio was shown to relate to the second part of the definition of the precautionary motive for holding money, and velocity was then shown to be an increasing function of the ratio. Tests of cross-section data supported the notion that funds are released from the less active precautionary sphere to the more active transactions sphere as the

¹ *Ritter*, "The Structure of Financial Markets . . .", *op. cit.*

firms in question increase in size. This release occurs via a relative weakening of the precautionary motive (type 2).

The ratio of government securities to bank loans was shown to decrease by approximately 23 per cent from 1959 to 1960 – a period over which velocity increased about 53 per cent. Thus, it would seem that the development of the United States money market and the absolute amount of holdings of non-cash liquid assets by large firms did not contribute to a postwar rise in the velocity of money in the United States. This conclusion is contrary to the earlier conclusion publicized by *Ritter* in this journal.

Contrary to the earlier *Ritter* conclusion, too, *Milton Friedman* and *Anna Jacobson Schwartz* conclude that the major factor contributing to the postwar rise in velocity was a relative weakening of the precautionary motive as it pertained to a change in the expectations “about the likely degree of future economic stability”. Considering the definition of income velocity and a simple model consisting of (1) the demand for money as a linear function of income and (2) the supply as some variable constant, the *Friedman-Schwartz* explanation is shown to operate via a downward shift in the intercept parameter underlying the demand. This emphasis on a declining intercept parameter is in accord with my earlier speculations in this journal. Even so, the *Friedman-Schwartz* study fails to allow for the possible effect on the velocity of cash of the postwar decline in the ratio of government securities to bank loans.

The model consisting of equations (1) and (2), and the definitional equation (3) would appear to present the relevant variables affecting the demand for money in a useful way. Much of the discussions concerning the velocity of money is often said to be of a tautological nature but, in the present framework, the demand for money is viewed as a schedule and velocity is defined in terms of the supply of money and parameters underlying the demand.