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Chapter Title: Why Velocities Differ at Any Point in Time

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dustry as a determinant of business velocity. However, these differences among size classes exist even within particular industries, as Table A-12 indicates.[24] Within each of four industries, smaller firms have tended to maintain higher velocities than larger firms. This finding strongly supports the view that the velocity differences shown in Chart 6 for all non-financial corporations are genuinely the result of firm size and not merely a reflection of varying industrial composition among size classes. In chemicals and motor vehicles (Table A-12) velocity behaved much the same as for all non-financial corporations; in particular, it rose more in the largest size class than in any other, and most markedly since 1950. Transportation and retail food trade, however, provide contrasts to the general pattern. In the former the sharpest velocity rises occurred in the intermediate classes; only moderate rises in the largest classes, and little change since 1948 in the smallest classes. Retail food trade velocity declined in all size classes during 1950–55—somewhat more for large, than for small, firms.

At the end of 1957, firms in the largest size class held about one-third of all non-financial corporate cash (Table A-11). This proportion has grown slowly since 1946, exerting moderate downward pressure on aggregate corporate velocity. However, there were declines in the shares of the $5,000,000–$10,000,000 and $10,000,000–$50,000,000 groups. As a result, the net impact of weight shifts on the trend of corporate velocity has been very minor: the aggregate figure is virtually the same whether 1946 or 1957 weights are applied to the 1957 size-class velocities.

IV. Why Velocities Differ at Any Point in Time

In Section III we noted persistent differences in velocity from sector to sector, those among corporate size classes being particularly striking. There appear to be several reasons for these differences.

DIFFERENCES AMONG CORPORATE SIZE CLASSES

1. *Inadequate velocity measures.*—Our measures of corporate velocity include neither capital expenditures nor financial payments. Both give rise to a demand for money, and their omission results in an understatement of corporate velocity. Insofar as large firms en-

24. The industries included in these tables are chemicals, motor vehicles, transportation, and retail food trade. They were selected for their quantitative importance, adequacy of representation in all size classes, and absence of major reclassifications during 1946–57.

gage in these types of payments more than small firms, the true relation between small- and large-firm velocities is obscured. While such is undoubtedly the case, it is difficult to judge its importance. We do know, as was already mentioned, that aggregate corporate velocities from *Flow-of-Funds*, which include capital outlays, closely resemble those from *Statistics of Income*. This suggests that size-class differentials are not greatly influenced by the omission of these expenditures.

Velocity differences among size classes are understated, though not appreciably, by a further statistical shortcoming. Our measures fail to exclude depreciation, amortization, and depletion allowances from the velocity numerator, even though they are not cash outlays. In recent years these items have been larger in relation to total costs for large firms than for small firms.[25] Even for large firms, however, they are a minor part of total costs.

Perhaps the major statistical distortion of our size-class velocities results from the common practice of "window-dressing" financial statements. It may well be that large corporations, nearly all of whom publish annual reports and conduct their affairs under close public scrutiny, indulge in this practice to a greater extent than do smaller firms. Since one goal of window-dressing is to exaggerate corporate liquidity, the effect clearly is to lower velocity, as computed from end-of-year cash. There seems to be no feasible way of eliminating this distortion from our data. However, it is interesting to note that quarterly size-class velocities for manufacturing corporations, computed from the FTC-SEC reports, reveal virtually the same differentials in the first three quarters of the year as in the final quarter. Presumably window-dressing is most important in end-of-year data.

2. *Analysis of velocity components.*—Velocity, which is the ratio of spending to cash, can be expressed as the product of two component ratios: spending to total assets and total assets to cash. Table 2 presents these component ratios for all ten size classes in two postwar years, 1947 and 1957. Taken at face value, the pattern of variability depicted in this table is highly interesting. As firm size grows, cash becomes a lesser part of total assets; at the same time, the ratio of spending to assets falls even more sharply. Thus the tendency for large firms to maintain relatively low velocities appears to result solely from low ratios of spending to assets in general—

25. Based on figures from the Federal Trade Commission–Securities and Exchange Commission, *Quarterly Financial Report for Manufacturing Corporations.*

i.e., from their relatively heavy use of capital in the production process.

Unfortunately, the data in Table 2 are influenced in some degree by a "regression effect." Inasmuch as the basis of classification of firms is size of total assets, one would expect ratios with total assets as a component to vary with size merely because of random variations in these assets. At any time, assets of some firms will be abnormally high or low; assuming that cash is not similarly affected, the ratio of assets to cash will therefore be abnormally high or low.

TABLE 2

VELOCITIES AND VELOCITY COMPONENTS FOR ALL NON-FINANCIAL CORPORATIONS, BY SIZE CLASSES, 1947 AND 1957

SIZE CLASSES*	1947			1957		
	Velocity	Ratio of Spending to Assets	Ratio of Assets to Cash	Velocity	Ratio of Spending to Assets	Ratio of Assets to Cash
1.....	20.05	3.351	5.985	26.12	3.512	7.438
2.....	19.33	2.888	6.695	24.34	2.806	8.675
3.....	19.55	2.748	7.115	25.12	2.681	9.370
4.....	19.39	2.566	7.556	25.97	2.606	9.965
5.....	18.76	2.393	7.840	24.13	2.422	9.962
6.....	16.92	2.010	8.417	21.60	2.053	10.521
7.....	14.90	1.678	8.878	19.06	1.711	11.135
8.....	14.29	1.445	9.886	18.14	1.431	12.674
9.....	13.14	1.167	11.262	20.86	1.383	15.090
10.....	13.22	0.833	15.861	23.19	0.932	24.889

* See note to Chart 6 for identity of size classes.

Small size classes are likely to include more firms with abnormally low than abnormally high assets; hence ratios of assets to cash will tend to be understated for small firms, while the opposite bias exists for large firms. In addition, the bias works in the opposite direction for ratios of spending to assets.

This objection is technically correct, but its importance is doubtful. Random variability in asset size would have to be very substantial to explain the differences revealed in Table 2. Furthermore, these differences make sense in terms of conventional monetary theory. The declining ratio of cash to assets as firm size increases is explained to a large extent by the rising ratio of government securities holdings to assets and to cash (Table 3). In other words, large firms tend to substitute government securities for cash much more

than do small firms.[26] The ratio of assets to cash plus government securities is much less a function of firm size than is the ratio of assets to cash alone. Possibly the ratio of assets to all liquid assets, including commercial paper and a few other items as well as government securities, would show no relation to firm size whatever. The declining ratio of spending to assets as firm size increases can also be readily explained, as we shall see below.

3. *The influence of deficit firms.*—One reason for the lower velocity ratios of large firms is that firms without net income hold a larger

TABLE 3

ANALYSIS OF GOVERNMENT SECURITIES HOLDINGS OF ALL NON-FINANCIAL CORPORATIONS, BY SIZE CLASSES, 1947 AND 1957

SIZE CLASSES*	1947			1957		
	Ratio of Government Securities to Cash	Ratio of Assets to Government Securities Plus Cash	Ratio of Spending to Government Securities Plus Cash	Ratio of Government Securities to Cash	Ratio of Assets to Government Securities Plus Cash	Ratio of Spending to Government Securities Plus Cash
1.....	0.054	5.675	19.02	0.045	7.118	25.00
2.....	.114	6.010	17.36	0.052	8.249	23.15
3.....	.184	6.007	16.51	0.078	8.691	23.30
4.....	.269	5.956	15.28	0.133	8.794	22.92
5.....	.325	5.918	14.16	0.201	8.292	20.09
6.....	.427	4.897	11.85	0.279	8.226	16.89
7.....	.549	5.730	9.62	0.405	7.924	13.56
8.....	.546	6.397	9.24	0.481	8.554	12.24
9.....	.451	7.761	9.06	0.631	9.252	12.79
10.....	0.677	9.459	7.88	1.107	11.814	11.01

* See footnote to Chart 6 for identity of size classes.

share of cash in small size classes than in large classes. In general, small firms with no net income tend to have higher velocity ratios than do small firms with net income.[27] Table 4 illustrates these relationships for 1946 and 1957. In the former year, 19 per cent of the velocity difference between the smallest and largest size classes disappears when firms without net income are excluded from the computations. In 1939 the same statistic was 21 per cent. Because of

26. The concept of money substitutes, which has been emphasized so much in recent monetary literature, contributes little, if anything, to the analysis of size-class velocity differences. From Table 3 it can be seen that ratios of corporate spending to holdings of cash plus government securities differ much more between large and small firms than do ratios of spending to cash alone (i.e., velocity).

27. Moreover, in the early years covered by this study the opposite tended to be true of large firms. See Table 4, 1946, for an example.

the substantial convergence of small- and large-firm velocities in the postwar period, the importance of deficit firms had become even greater by 1957: for firms with net income in that year, velocity was higher in the largest class than in any of the three smallest classes—a sharp contrast with the figures based on all firms.

4. *The cost of holding money.*—Apparently the major explanation of size-class differences in spending-asset ratios and therefore in velocity ratios is that the cost of holding money is much less for

TABLE 4

CORPORATE SIZE-CLASS VELOCITIES FOR ALL FIRMS AND FIRMS WITH NET INCOME AND PER CENT OF SIZE-CLASS MONEY HELD BY FIRMS WITH NET INCOME, SELECTED SIZE CLASSES, 1946 AND 1957

SIZE CLASSES*	Velocity, All Firms	Velocity, Firms with Net Income	Per Cent of Money, Firms with Net Income
A. 1946			
1	17.34	16.26	82.1
2	17.09	16.67	91.1
3	17.60	17.31	93.7
9	11.28	11.57	89.1
10	10.60	10.81	85.3
Aggregate, all classes	13.73	−13.84	90.2
B. 1957			
1	26.12	22.16	74.0
2	24.34	21.21	88.1
3	25.12	22.76	92.6
9	20.86	20.67	93.7
10	23.19	23.03	93.0
Aggregate, all classes	22.34	−21.44	89.9

* See note to Chart 6 for identity of size classes.

large firms than for small firms. This cost is a complex variable.[28] From one point of view it is the foregone yield that could be earned on securities; in this sense the cost of holding money is more or less the same regardless of firm size. It is also measured by the internal rate of return on capital to the firm and by the cost of borrowed funds, which would be the same as the rate of return in equilibrium.

For a variety of reasons the cost of funds is much higher for small

28. I have discussed some aspects of the cost of holding money at greater length in "Monetary Velocity in the United States," in *Studies in the Quantity Theory of Money*, pp. 195–205.

firms.[29] Table 5 contains a rough indication of this fact: the ratio of interest payments to interest-bearing debt, computed from *Statistics of Income,* was decidedly lower for large firms in each of the four years shown. It is clear that small firms have a strong incentive to substitute labor for relatively expensive capital. The result is larger current spending in relation to total assets and therefore to cash.

Perhaps the principal respect in which funds are more costly for small firms is related to their greater reliance on trade credit. Table 6 illustrates this strikingly for 1939, 1943, 1946, and 1957. Without exception, the ratio of accounts payable to total assets falls as firm size increases.[30] An even stronger decline shows up in the ratio of payables to long-term debt.

TABLE 5

RATIOS OF INTEREST PAID TO INTEREST-BEARING DEBT, NON-FINANCIAL CORPORATIONS WITH NET INCOME, BY SIZE CLASSES, SELECTED YEARS

Size Classes*	1939	1943	1946	1957
1	0.059	0.062	0.047	0.052
2	.060	.063	.044	.050
3	.058	.058	.043	.052
4	.054	.054	.043	.052
5	.052	.049	.041	.054
6	.046	.042	.036	.051
7	.048	.039	.036	.046
8	.045	.041	.033	.044
9	.044	.041	.031	.039
10	0.045	0.045	0.034	0.036

* See note to Chart 6 for identity of size classes.

For some users, trade credit is mainly a convenience that arises as part of normal business routines; for others, particularly small firms, it is viewed explicitly as a source of funds. Trade credit is not costless to the user, of course. For example, terms of "2/10 net 30" imply an annual interest charge of 36 per cent if the account is paid in 30 days. But small firms often have no better source of funds.

29. One of the largest and most recent bodies of evidence supporting this contention is contained in U.S. Board of Governors of the Federal Reserve System, *Financing Small Business,* Parts 1 and 2 (*Report to the Committees on Banking and Currency and the Select Committees on Small Business, April 11, 1958*). See particularly the chapters prepared by James B. Eckert, "Member Bank Lending to Small Business, 1955–57," pp. 371–95, and Geoffrey H. Moore, Thomas R. Atkinson, and Edward J. Kilberg, "Risks and Returns in Small Business Financing," pp. 40–106.

30. In part, these results may reflect a regression effect of the sort discussed above. However, the fact that the ratio of payables to long-term debt behaves in similar fashion casts doubt on the importance of this source of bias.

Long-term debt may be even more expensive or totally unavailable; Table 6 demonstrates that such debt is of minor importance for small firms, in contrast to large firms. Bank credit, though used heavily by small firms, is subject to close rationing by bankers through both price and non-price mechanisms. Because of these facts, the typical small firm manages its cash on a hand-to-mouth basis.

There is a final instance in which the cost of holding money may be a determinant of corporate velocity. Earlier it was noted that small firms without net income have higher velocities than profitable

TABLE 6

RATIOS OF ACCOUNTS PAYABLE TO ASSETS AND LONG-TERM DEBT, NON-FINANCIAL FIRMS WITH NET INCOME, BY SIZE CLASSES, SELECTED YEARS

SIZE CLASSES*	RATIOS OF ACCOUNTS PAYABLE TO ASSETS				RATIOS OF ACCOUNTS PAYABLE TO LONG-TERM DEBT			
	1939	1943	1946	1957	1939	1943	1946	1957
1.....	0.224	0.182	0.195	0.195	3.12	2.55	3.19	2.09
2.....	.184	.144	.177	.178	2.47	2.19	2.74	1.82
3.....	.158	.126	.171	.172	2.01	1.95	2.46	1.86
4.....	.127	.114	.159	.171	1.63	1.84	2.28	1.86
5.....	.118	.106	.142	.156	1.39	1.58	2.00	1.82
6.....	.097	.096	.122	.132	1.03	1.30	1.59	1.58
7.....	.081	.084	.102	.111	0.73	0.96	1.12	1.01
8.....	.066	.080	.087	.085	0.41	0.73	0.72	0.65
9.....	.051	.072	.076	.081	0.21	0.38	0.45	0.47
10.....	0.049	0.066	0.061	0.061	0.22	0.29	0.30	0.25

* See note to Chart 6 for identity of size classes.

small firms. It seems likely that these velocity differences result mainly from differences in the cost of holding money. In general, unprofitable firms have higher interest costs and rely heavily on costly trade credit. Cash balances are real luxuries for such firms, and their velocities are therefore high.

5. *Compensating balance requirements.*—At least one investigator, George Garvy, has held that compensating balance requirements tend to reduce velocity; in fact, Garvy argues that the increased prevalence of these requirements "is an important and perhaps even one of the major reasons why the transactions velocity of demand deposits in the fifties is considerably lower than in the twenties."[31] Inasmuch as compensating balances are required more commonly

31. George Garvy, *Deposit Velocity and Its Significance* (New York, 1959), p. 32.

of larger borrowers and by large banks,[32] Garvy's hypothesis, if correct, might help explain velocity differences among corporate size classes.

The corporate velocity pattern we have observed certainly is consistent with Garvy's hypothesis. Nevertheless, I am not persuaded that the differential incidence of compensating balance requirements has any substantial impact on business velocity; nor do I believe that velocity trends or differences in levels over time can be explained in this manner. On the contrary, one might argue that the main impact of these requirements, insofar as they have any effect at all, is to make bank services more expensive and thus increase the cost of holding money. I would expect firms that face burdensome balance requirements to substitute open-market borrowing or non-bank private placements for bank loans, so that spending per dollar of deposits would *rise,* not fall. Whether, in fact, such substitutions are actually made is a question for further investigation. However, it is significant that, during the postwar period, deposit turnover has risen substantially more in large cities, where balances are more commonly required, than in other centers and that corporate velocity has risen much more among large firms than among small firms.

INDUSTRY DIFFERENCES

The preceding explanation of velocity differences among size classes appears to be adequate for a given industry. However, the size-class differences shown in Chart 6 relate to *all* non-financial corporations. In some degree they reflect industry differences in velocity among firms of any size class, combined with non-proportional representation of all industries in each class.[33] By the same token, the industry differences shown in Charts 4, 5*A*, and 5*B* reflect, to some extent, differences in the size structure of the various industries.

A rough idea of the importance of differential size structure as a source of velocity differences among industries can be gained by comparing velocity with distribution of cash among size classes for several industries. Table 7 does this for major industry divisions in 1947. In the trade division, which had the highest velocity, firms with $50,000,000 or more total assets accounted for only 13.0 per cent of industry cash. Public utility firms, on the other hand, had

32. See "Credit Lines and Minimum Balance Requirements," *Federal Reserve Bulletin,* June, 1956.

33. As we have already noted, distortion from this source cannot be great (see Table A-12).

the next to lowest velocity and the highest per cent of industry cash held by large firms. Aside from these two cases, however, the relationship is weak. It does not appear that differential size structure is an important reason for industry differences in velocity.

In order to avoid differential size structure and profitability as a source of velocity variations by industry, I have computed velocity and component ratios for firms with net incomes in the $1- to $5-million size class, by major industry divisions for the year 1947 (Table 8). The variation in velocities is substantial—nearly the same as that for all firms shown in Table 7. Nevertheless, the ratios of assets to cash are all within the narrow limits of 7.8–8.5, except

TABLE 7

RELATION BETWEEN VELOCITY AND DISTRIBUTION OF MONEY AMONG SIZE CLASSES, MAJOR INDUSTRY DIVISIONS, 1947

Major Industry Division	Velocity	Per Cent of Industry Cash Held by Firms with $50,000,000 or More Total Assets
Trade	23.70	13.0
Construction	16.46	0.0
Manufacturing	14.59	42.1
Agriculture, etc.	10.54	13.0
Service	9.68	11.9
Public utility	8.38	66.2
Mining and quarrying	6.62	31.1

for the agriculture, forestry, and fishery industries. It is variations in the ratio of spending to assets that account for most of the observed differences in velocity. This agrees broadly with the picture we found above in our treatment of size-class differences.

Another similarity between industrial and size-class variations in velocity is the apparent relation in both cases to degree of reliance on trade credit. Table 8 shows two indexes of the importance of trade credit, again for fairly standardized groups of firms in each of the seven non-financial industry divisions. The ratio of accounts payable to assets is correlated loosely with velocity; a stronger relationship exists between velocity and the ratio of payables to long-term debt.

At least two interpretations can be placed on these facts. The first view advanced earlier in connection with our size-class analysis,

that heavy use of trade credit implies a high cost of holding money, undoubtedly has some validity. The other view is that heavy use of trade credit is associated with a high degree of coincidence between receipts and expenditures, which, in turn, means high velocity. I say "associated with" because the line of causality may run in either direction. In some instances use of trade credit tends to shorten the payments interval, thereby raising velocity; in others, use of trade credit is largely symptomatic of a payments interval that is short because of more basic aspects of production functions. In the latter case trade credit cannot be regarded as a significant velocity determinant.

TABLE 8

VELOCITIES, VELOCITY COMPONENTS, AND RATIOS OF ACCOUNTS PAYABLE TO ASSETS AND TO LONG-TERM DEBT, NON-FINANCIAL CORPORATIONS WITH NET INCOME AND WITH $1–$5 MILLION TOTAL ASSETS, BY MAJOR INDUSTRY DIVISIONS, 1947

Major Industry Division	Velocity	Ratio of Spending to Assets	Ratio of Assets to Cash	Ratio of Accounts Payable to Assets	Ratio of Accounts Payable to Long-Term Debt
Trade	25.08	3.196	7.848	0.182	3.187
Construction	15.11	1.788	8.449	.170	3.765
Manufacturing	9.85	1.240	7.941	.094	1.766
Agriculture, etc.	9.42	0.702	13.423	.092	0.970
Mining and quarrying	9.01	1.068	8.432	.069	0.811
Service	8.33	1.030	8.090	.092	0.398
Public utility	7.04	0.825	8.532	0.101	0.436

Considering the general nature of the various industry divisions, it becomes clear that the second view of trade credit and its relation to velocity has much merit. Trade, for example, is characterized by relatively low fixed costs and a high asset-turnover rate; the average interval between receipts and expenditures would tend to be short, and velocity would tend to be high, even if short-term debt were totally absent. To some extent, however, heavy use of trade credit probably has produced a further shortening of the payments interval. Construction—the other high-velocity industry—appears to have broadly similar characteristics. The mining and public utility industries, on the other hand, are clear examples of opposite tendencies: fixed costs are relatively high, and a substantial portion of outlays consists of lumpy capital expenditures. The same is true of agriculture and, less obviously, the service industry. Manufacturing

appears to fall in an intermediate category. Thus there seems to be a strong correlation between industry velocity and degree of coincidence between receipts and expenditures.

Industry differences in velocity probably are caused in part by factors other than those mentioned above. However, the role of such factors appears to be minor, and their analysis will not be pursued here.

DIFFERENCES BETWEEN THE CORPORATE AND NON-CORPORATE SECTORS

We saw in Chart 3 that non-corporate velocity was substantially lower than corporate velocity throughout 1939–56. One obvious reason for this persistent difference is the heavy representation of agriculture in the non-corporate sector. In 1955, for instance, 32.1 per cent of non-corporate cash was held by the farm subsector. Although non-corporate velocity in that year was 12.6, farm velocity was only 4.7, while velocity of unincorporated businesses was 15.8. Corporate velocity in 1955 was 18.6; hence about half the differential between corporate and non-corporate velocities would disappear if agriculture were excluded from the calculations.

On the other hand, the unincorporated and incorporated business sectors differ in industrial composition. Trading firms, which usually have high velocity, are much more important in the former sector. Furthermore, unincorporated firms within any industry are probably smaller, on the average, than corporations. One would therefore expect the velocity of unincorporated firms to exceed that of corporations. Why such is not the case is a problem that cannot be examined here.

V. Why Velocity Has Risen since the End of the War

Earlier we considered and rejected two possible explanations of the postwar velocity rise. In Section II we saw that the similar behavior of three aggregate velocity measures since 1946 argues against hypotheses that imply differential behavior of velocities. In Section III we saw that the postwar velocity rise cannot be explained by weight shifts in favor of low-hoarding sectors. Insofar as weight shifts have had any effect at all, they have been velocity-reducing. We turn now to other explanations of postwar velocity behavior.

A strong case can be made for the view that much of the postwar velocity rise has been simply a recovery from abnormally low wartime values. The important question is *how much* of the rise has resulted from war-related factors, how much from more fundamental