In Brief
Economic Capsules

Financial Consequences of Mergers

Recent merger activities have raised some old questions about their possible effects on credit flows in the economy. People ask whether these big deals increase the money supply or otherwise stimulate inflationary pressures. People also frequently ask whether mergers take credit away from other, potentially more productive uses of funds.

First, mergers do raise the money supply, but the effect is small and temporary. When very large shareholders of an acquired company are paid off, the effect on components of narrowly defined (M-1) money, especially checking accounts, is negligible. The reason is that both corporate treasurers and large sophisticated stockholders can move the funds into and out of transactions accounts within a day.

The main effect on M-1 comes when small shareholders of an acquired firm are paid. When payment is sent out to them, the acquiring corporation may have to keep a demand deposit balance for several days to cover the checks. Moreover, some of the balances may sit for several days in the checking accounts of those paid until the funds clear and are shifted into new investments. Whatever bulge in transactions balances does occur, however, will be temporary. Even for a very large transaction, the overall effect on M-1 will rarely exceed a few hundred million dollars in a single week.

The broader money aggregates can also be affected, since parties on both ends of the transaction hold more liquid assets. These effects are transitory, too, and are minor compared to the huge size of M-2 or M-3. To the extent that the effects of mergers on money cannot be identified down to the last nickel, however, they do add a bit of uncertainty to the interpretation of short-run changes in the aggregates.

Perhaps the more fundamental point to note is that any effect on the money supply is not inflationary in the usual sense. The transactions mainly represent transitory reshufflings of asset portfolios. Increases in money balances resulting from such transactions do not contribute directly to aggregate demand and so do not push up wages or the price level. As discussed below, mergers could stimulate the economy slightly due to their effect on stock prices.

While the effects of mergers on the money supply give little reason for concern, the question remains whether these large mergers siphon credit away from other, more productive uses of funds. For example, does the rise in syndicated bank credits during an acquisition limit the availability of financing for firms particularly reliant on bank loans? Probably not.[1] The very willingness of banks to provide big low-margin chunks of credit for mergers itself may be a manifestation of generally weak demand for bank loans. Alternatively, in a situation where bank loan demand is otherwise strong, a rise in demand for bank financing for mergers could provide an opportunity for banks to raise their markups over the cost of funds. In theory this could discourage or "crowd out" certain potential borrowers. More realistically, however, many bank customers would turn to alternative means of financing, such as the commercial paper market or borrowing from foreign banks. With even a

[1] In the very short run the volume of bank lending to support a particular takeover might approximate that merger's impact on aggregate bank credit. Beyond the very short-run, however, the acquiring firm may issue more stock, sell assets, or issue other debt instruments to repay the bank loan. Moreover, other firms might also shift some financing away from banks. Thus, the initial effect of that particular merger on bank loans soon would start to wear off.

very slight tilt in relative pricing, big borrowers could shift out of bank loans, leaving room for the smaller borrowers with fewer options.

The credit issue can also be viewed from a broader perspective. After a merger financed by debt the newly combined firms' debt-equity ratio is greater than the pre-merger leverage of the individual companies. Does this rise in the overall debt-equity ratio steal away potential financing from other firms? The answer really depends on what other firms' financing requirements are. One possibility is that they could actually be helped, if they want to reduce their own debt burdens. The stockholders bought out in the merger deal represent a natural market for other equity issues. So the rise in the newly merged firm's debt-equity ratio might be at least partly offset in the aggregate by other firms being able to reduce their debt-equity ratios.

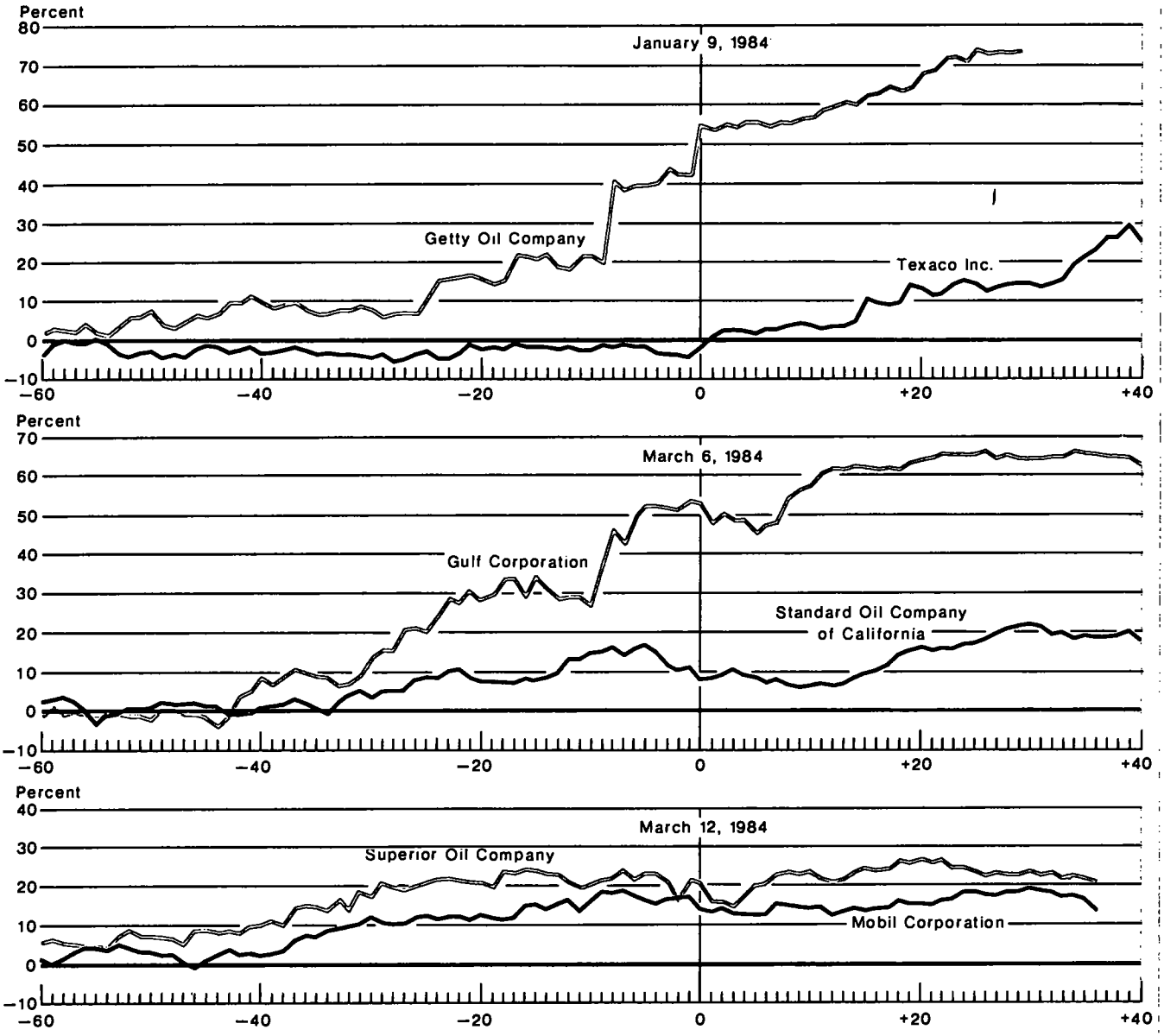
Thus, if mergers only represented complicated refinancings, with no change in the underlying value of the firms' assets, their financial effects would surely be innocuous. After all, the separate companies involved would have had to be financed somehow in any case.

Recent Major Acquisitions, Completed and Pending Transactions, 1983-1984*

Acquirer (business and/or product line)	Acquired (business and/or product line)	Date of Announcement†	Approximate Price Paid (In millions of dollars)
Standard Oil Co. of California (Integrated oil company)	Gulf Corp. (Integrated oil company)	March 6, 1984	13,200
Texaco Inc. (Integrated oil company)	Getty Oil Co. (Integrated oil company)	January 9, 1984	10,130
Mobil Corp. (Diversified: Oil-chemicals-retail merchandising-paperboard packaging)	Superior Oil Co. (Integrated oil company)	March 12, 1984	5,700
Kohlberg, Kravis, Roberts & Co.‡ (Investment group led by Kohlberg, Kravis, Roberts & Co.)	Esmark Inc. (Diversified: foods-chemicals-personal products-auto leasing)	May 7, 1984	2,400
Broken Hill Proprietary Co. —Australia (Natural resources)	Utah International Inc. —unit of General Electric Co. (Leading producer of metallurgical coal in Australia)	January 28, 1983	2,400
Manufacturers Hanover Corp. (Multiple bank holding company)	C.I.T Financial Corp. —unit of RCA Corp. (Major finance corporation)	September 26, 1983	1,510
Private Group‡ (Top executives of Metromedia, led by John W. Kluge, Chairman)	Metromedia, Inc. (Television and radio stations)	December 7, 1983	1,468
Diamond Shamrock Corp. (Oil/gas-chemicals-coal)	Natomas Co. (Oil exploration, development and production)	May 23, 1983	1,355
American Medical International, Inc. (Third largest hospital management company)	Lifemark Corp. (Fifth largest hospital management company)	October 24, 1983	1,145
Phillips Petroleum Co. (Domestic integrated oil company)	General American Oil Co. (Exploration and production of oil/natural gas)	January 10, 1983	1,140

*Based on information available as of mid-May.
†Announcement date is defined as the day the merger was announced in the *The Wall Street Journal*.
‡Leveraged Buyout—deals which were publicly announced to be leveraged.
Sources: *The W.T. Grimm & Co. Mergerstat Review*, 1983 and *The Wall Street Journal*.

Stock Price Reactions to Merger Activity*



*Cumulative excess returns to the shares of acquiring and target companies. Excess returns represent the adjustment of stock prices to new information – in this case the announcement of a merger.

Announcement data is designated as day 0 and is defined as the day the merger was announced in The Wall Street Journal.

See box for procedure for estimating excess returns.

Estimating Excess Returns

The Capital Asset Pricing Model (CAPM) is a theoretical representation of stock price returns with much empirical support. Simply put, the CAPM says that the expected return on a security is equal to the rate of return on a riskless asset plus a coefficient, called beta, times the difference between the return on the market portfolio and the return on the riskless asset. This is written as:

$$R_{i,t} = R_{f,t} + \beta_{i,t}(R_{m,t} - R_{f,t}) \quad (1)$$

where $R_{i,t}$ is the return on the ith security at time t, defined as the percentage change in security i's price:
$R_{f,t}$ is the return on the riskless asset at time t, generally taken to be the Treasury bill rate;
$R_{m,t}$ is the return on the market portfolio at time t, defined as the percentage change in the market portfolio's index; and
$\beta_{i,t}$ is the beta coefficient of security i at time t. The beta coefficient is simply a measure of the sensitivity of a stock's price to market movements.

This model says that on average, one should not expect a return greater (or less) than the sum of the two components of this equation. Statistically this means that if a regression equation was estimated the residuals would have an expected value of zero.

In order to test for "unexpected" movements in a stock's price after an announcement, we estimated an empirical analog of the conceptual model described above for five years prior to the three months immediately before the announcement. Our estimation period excludes price observations for the three months preceeding the announcement date since there may have been abnormal price behavior just prior to the announcement as a result of information leaks or speculation. (Our analysis was alternatively performed excluding seven months prior to the announcement which gave us results that were qualitatively the same.) Using our estimated regression coefficients we then examine predicted residuals for the time surrounding the announcement date in order to determine if there were any unexpected returns as a result of the announcement.

Specifically, using daily stock returns we estimated:

$$R_{i,t} = a_i + b_i R_{m,t} + e_{i,t} \quad (2)$$

where $R_{i,t}$ is the daily return on security i, defined as the percentage change in security i's price adjusted for stock splits and dividends;
$a_i = R_{f,t}(1 - \beta_{i,t})$;
$R_{m,t}$ is the daily return on the market portfolio, defined as the percentage change in the S&P 500 index; and
$e_{i,t}$ is a normally distributed zero mean random disturbance term.

If the market failed to anticipate the forthcoming appreciation in the security price after the merger announcement, there should be returns in excess of those specified by equation (1) after the announcement date. That is, on average there should be nonzero residual terms in equation (2) in the post-announcement period.

To test for this, we estimate the residuals or "excess" returns around the day of the announcement. The residuals are calculated as:

$$\acute{e}_{i,t} = R_{i,t} - (\acute{a}_i + \acute{b}_i R_{m,t}) \quad (3)$$

where $\acute{a}_i$ and $\acute{b}_i$ are the estimated values from equation (2).

Finally, by cumulating these "excess" returns we can observe the adjustment of the stock's price to the merger announcement. Cumulative excess returns at time T are defined as:

$$\sum_{t=-60}^{T} \acute{e}_{i,t}.$$

Our empirical results are presented below with t statistics in parentheses.

Empirical Results

Regression equations:	Acquirer Texaco Inc.	Acquired Getty Oil Co.	Acquirer Mobil Corp.	Acquired Superior Oil Co.	Acquirer Standard Oil Co. of Ca.	Acquired Gulf Corp.
$\hat{a}_i$	−.0002	−.0002	−.0001	.0003	−.0001	−.0001
	(−.57)	(−.46)	(−.24)	(.50)	(−.29)	(−.27)
$\hat{b}_i$	1.0577	1.3258	1.2883	1.4271	1.3242	1.1921
	(27.90)	(28.35)	(28.84)	(23.42)	(31.83)	(26.69)
$\bar{R}^2$	.34	.35	.35	.26	.40	.32
D.W.	2.08	1.80	1.98	1.98	1.75	1.93
Estimation period:	Jan. 1, 1978	to Sept. 1, 1983	Jan. 1, 1978	to Dec. 1, 1983	Jan. 1, 1978	to Dec. 1, 1983
Prediction period for excess return calculations used in chart:	Sept. 1, 1978	to May 1, 1984	Dec. 1, 1983	to May 1, 1984	Dec. 1, 1983	to May 1, 1984
Announcement Date*	Jan. 9, 1984		Mar. 12, 1984		Mar. 6, 1984	

*Defined as the day the announcement appeared in the *The Wall Street Journal*

Bank loans, commercial paper, bonds, and equities are all substitutes along the spectrum of financing arrangements. Increased reliance on one particular mode by partners in a merger stimulates at least partially offsetting shifts by other firms and could even be helpful to some.

But as a practical matter the market value of the combined firms does quite often rise after a merger and in theory this may affect availability of credit to other borrowers. Empirical evidence indicates that the value of pre-merger holdings of stock in the involved companies rises significantly as a result of the combination.[2] Recent large mergers in the oil industry are cases in point (chart). Around the time of these recent merger announcements the stock prices (adjusted to eliminate overall market movements) of both the acquiring firms and the takeover targets tended to rise noticeably.

One explanation is that this rise in stock values represents purely irrational speculative activity in the stock being taken over. The trouble with such reasoning is that if market participants thought that the acquiring firm paid too much for its takeover target, then the value of the acquiring firm's stock should fall to offset any excessive rise in the acquired firm's stock. But the available evidence shows that the acquiring firm's stock either rises or, at worst, falls only enough to partially offset the acquired stock's rise. Therefore, the question remains whether the incremental financing needed to support the new higher value of the company detracts from the aggregate availability of funds to other firms.

The answer depends on the underlying source of the appreciation in asset values. If the combined firm indeed promised to be more productive, for example because of economies of scale or technological synergy, then the merger would represent a type of "real" productive investment. If this "crowded out" other investments, that would be part of the necessary allocation of real resources being mirrored in the credit markets.

But what if the rise in asset values reflects socially nonproductive reasons, such as more efficient use of tax benefits? For example, repurchase of recently appreciated assets can lead to higher depreciation charges. This benefits the firms themselves but not necessarily society at large.

What effects this will have on aggregate investment activity is an unresolved theoretical problem in economics. One admittedly extreme view would argue that taxpayers clearly recognize that this is a tax benefit going to the companies. As such, consumers will recognize that there is no aggregate rise in overall wealth because the rise in the company's value is offset exactly by the increase in future tax liabilities needed to finance the rise in the government's budget deficit. If some consumers spend more as their stock wealth goes up, others will save even more, which on balance will finance the tax revenue short-fall and keep unchanged the share of consumption out of aggregate income. Thus, according to this extreme rationality view, interest rates and real investment would be completely unaffected.

It may be more realistic to assume that neither the average citizen nor the sophisticated investor will analyze the rise in stockholders' wealth so precisely. If the direct beneficiaries of mergers spend some of their new wealth but others do not save more, overall consumption would increase. From a short-run macroeconomic perspective, the dampening effect on investment of lower savings rates and higher interest rates would compete with the stimulus to investment of expanded final demand. In time the negative impact of interest rates on investment might predominate.

Quantitatively, however, the macroeconomic impacts of even a huge merger would be practically negligible. For example, take a hypothetical case where a $10 billion appreciation in stock values is realized by the stockholders of an acquired firm. Econometric estimates from the FRB-MIT-PENN (FMP) econometric model which is based on historical evidence indicate that each $1 sustained rise in equity values generates about 4¢ extra of consumer spending within about two years. Using this rule of thumb, the $10 billion gain would raise consumer spending by about $400 million, equal to two one-hundredths of one percent of total consumption. This is tiny compared to the increase in consumption of about nine percent during 1983.

It could be argued that the effect of mergers would exceed these econometric estimates because in a merger the capital gains may be realized, thereby raising shareholders' income, in contrast to unrealized ups and downs in market values. Even if the effect were several times greater, however, the effect of even a massive merger deal would still be essentially imperceptible.

In conclusion, while mergers have some impact on monetary and credit aggregates, their effects mainly represent transitory shifting of portfolios and rearrangements of financing for corporate assets. To the extent that real changes in company value occur, they can influence real economic variables. Real improvements in productivity raise financing requirements but so does tax avoidance. Notwithstanding the source of the asset appreciation, any impact mergers may have on overall credit demands and spending are likely to be negligible in practice.

Madelyn Antoncic and Paul Bennett

[2]For a review of the evidence, see Michael C. Jensen and Richard S. Ruback, "The Market for Corporate Control—The Scientific Evidence," *Journal of Financial Economics*, Vol. 11, April 1983, page 5.