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## Government and the Stock Market: The Effects of Antitrust

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GOVERNMENT AND THE STOCK MARKET:

THE EFFECTS OF ANTITRUST

George Bittlingmayer

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## **Government and the Stock Market: The Effects of Antitrust**

George Bittlingmayer\*

### **ABSTRACT**

Antitrust is one sort of government policy that may move stock prices. It regulates merger and other corporate activities, and its long and volatile record of enforcement with lawsuits makes it easy to study. I find that an extra federal antitrust suit against an exchange-listed firm implies a decline of the S&P index of about one-half percent, an extra unexpected filing a decline of about one percent. Suits against unlisted firms have variable positive effects. Antitrust explains ten to twenty percent of annual stock returns. An event study of excess returns to individual firms confirms and extends earlier results: a case filing follows a decline of 4 percent against the market.

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Casual observation and some research tell us that politics and government influence the stock market. For example, the stock market appears to respond to inflation, which in turn depends on monetary policy. Other government policies have gotten less systematic attention, though environmental, financial or labor regulation, for example, could conceivably lower expected earnings and depress the market as a whole.

The neglect of so much government policy no doubt stems from the difficulty of measuring what government does. The familiar metrics -- the money supply, the government deficit or federal expenditures -- don't speak to the point. Nor does the playful notion of counting pages in the *Federal Register*. Empirical work also faces a challenge because stock prices move in response to expectations rather than recorded fact.

One government policy may leave enough traces to provide a useful explanatory variable. Antitrust, now over a hundred years old, has been carried out with lawsuits, which we can count. Enforcement has also varied greatly over time, which imparts variability to the data. Finally, antitrust regulates merger and other important aspects of business policy. In fact, in the early part of this century, the "trust and corporation problem" was precisely that, one problem. Antitrust is a good place to ask whether the deals made on Pennsylvania Avenue affect the deals made on Wall Street.

Two federal agencies, the Department of Justice and the Federal Trade Commission, enforce the antitrust laws. They regulate mergers, as well as other corporate activities, and mergers have strong stock

market repercussions. This certainly holds at the level of individual firms. More importantly, it also holds in the aggregate. Time series work shows that merger activity and stock prices are strongly correlated. Consequently, a policy that unexpectedly stops mergers may very likely lower stock prices, and a policy that unexpectedly promotes them is likely to raise stock prices.

Antitrust can influence stock prices through various channels. Most directly, antitrust actions result in out-of-pocket legal costs, diverted managerial resources, and, if successful, divestitures, canceled acquisitions, altered contracts with suppliers and customers, and, in the extreme case, criminal convictions for key personnel. Federal actions also often stimulate private piggyback suits.

More generally, stepped-up federal enforcement will also depress prices of firms who merely stand some chance of being sued. Companies may try to avoid lawsuits by changing what they do, but many of the government's cases attack mergers, for example, that took place years ago. When firms can in fact reduce their legal exposure by canceling plans for mergers, joint ventures and new investment, the value of their traded shares is still likely to suffer.

A little history adds to the suspicion that antitrust has had economic and financial consequences. At the turn of the century, the courts held that the Sherman Act prohibits all cartels, but they also said that it could not touch merger. This unusual legal position laid the basis for the Great Merger Wave of 1898-1902 and the formation of the Standard Oil holding company, U.S. Steel and other large, modern corporations. Theodore Roosevelt's celebrated "trust-busting," itself a response to these mergers, followed. He brought the

suit in *Northern Securities*, which led the Supreme Court to reverse itself in 1904 and hold that merger did fall under the antitrust laws. His pursuit of Standard Oil and several other firms on the basis of that decision coincided with the Panic of 1907.

After several twists and turns, antitrust became mild under Calvin Coolidge. A second merger wave and a booming stock market occurred at the same time. Hoover took a more aggressive stance in 1929, and that shift offers a new explanation for the October 1929 crash, one consistent with what seems to have happened at other times. Hoover's shift also stimulated a debate over antitrust reform that plagued the remainder of his term in office, as well as Roosevelt's New Deal. In fact, the centerpiece of Roosevelt's "first hundred days" was antitrust relief in form of the National Industrial Recovery Act. After the NIRA was declared unconstitutional, Roosevelt shifted course and adopted aggressive rhetoric and policy against business starting in late 1937. The famous suit charging Alcoa with monopolization on simple market share grounds was an early salvo. The legendary reign of Thurman Arnold as Roosevelt's antitrust chief followed, as did the hearings and reports on big business and the monopoly question by the Temporary National Economic Committee. During World War II, the government trimmed back its antitrust attacks, apparently to help the war effort.

This early history of antitrust hints at the political, if not economic and financial, resonance of the monopoly issue. The events I've just summarized are the prelude to this study, which covers the years since 1945. Antitrust was restrained for most of the 1980s, but

it enjoyed controversy in the 1950s, sixties and seventies that would be hard to overestimate.

Political agitation over the "rising tide of concentration" marked the late 1940s and led to a number of large-firm cases and the passage of the 1950 Celler-Kefauver amendment to the Clayton Act. The Eisenhower administration at first waffled and studied antitrust, but then filed suits against GM, DuPont and Bethlehem Steel, for example. Here and later, unrelated controversies over specific industries often precipitated antitrust suits. For example, the FTC sued drug companies in 1958 for monopolization, and the Department of Justice sued auto companies in 1969 for conspiring to suppress research and the introduction of smog control equipment. Rising inflation led to Kennedy's celebrated confrontation with the steel companies over steel price increases. The Johnson, Nixon and Ford administrations filed largely ill-fated lawsuits against IBM, major oil firms, ready-to-eat cereal companies, tire producers and AT&T (a notable legal success). Antitrust policy shifted in the 1980s, arguably laying the groundwork for the 1980s merger wave. The Justice Department dropped the IBM suit, and it took few actions against major corporations. Rather, the focus of DOJ enforcement shifted to bid rigging among roadpavers. Proposed antitakeover legislation, something akin to antitrust, did play a role in the October 1987 crash. Arguably, some of the political pressure for antitrust found an outlet during the 1980s in private antitrust suits and in antitakeover laws and lawsuits.<sup>1</sup>

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<sup>1</sup> Hawley (1966) and Himmelberg (1976) offer classic histories of antitrust for the 1920s and 1930s. Kovaleff (1980) treats the Eisenhower years, and Kovacic (1989) surveys large-firm deconcentration cases since the turn of the

I think this brief history puts antitrust on the list of potential market movers. The next step calls for formal methods. In my work to date, Bittlingmayer (1992, 1993a, 1993b), I looked at the first half of this century, including the Panic of 1907 and the Crash of '29. This paper moves to more recent times. I also extend the inquiry to include antitrust cases filed by the Federal Trade Commission and not merely the Department of Justice, and I distinguish between cases filed against defendants listed and not listed on the New York or American Stock Exchanges.

The idea that attacks on business may depress the value of business seems novel, but it's a natural complement to some other recent work, particularly on inflation, itself the consequence of government policy. Naive theory predicts that stock shares -- claims on real assets -- should not decline in real terms when inflation increases. But the opposite apparently happens, and the anomaly generated a lively debate. Fama (1981) proposed that higher inflation reduces real output, and Geske and Roll (1983) argued instead that exogenous shocks cause stock returns to fall and to generate simultaneous expectations of future federal deficits and monetization by the Federal Reserve. (Based on Kennedy's 1962 tussle with the steel companies, it also seems possible that rising inflation leads to more anti-big-business rhetoric and policy. That

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century. Bittlingmayer (1985, 1992, 1993a, 1993b) covers the role of antitrust in the Great Merger Wave, in broad stock market developments during the first half of this century, in the 1920s boom the Great Crash, and during the National Recovery Administration. Mitchell and Netter (1989) offer evidence on the role of proposed antitakeover legislation in the 1987 crash. Surprisingly, systematic empirical studies of the effects of antitrust have been rare. Stigler's (1966) study of the effects of antitrust on concentration is the notable exception.



was certainly also the pattern at the end of World War I and in the debates over concentration and inflation of the late 1960s.) More recently, Kaul and Seyhun (1990) offer evidence that higher inflation means more relative price variability and this in turn implies lower real output. Relative price variability has a strong negative effect on stock returns, especially in the mid-1970s and apparently accounts for some of the negative effect of unexpected inflation. Though the exact mechanism remains fair game for debate, the fact of a relationship between inflation and stock prices is well established.

Other broad economic factors have also gotten attention, though often for their ability to predict returns, rather than for their ability to explain them after the fact. Chen, Roll and Ross (1986) look at the effect of a series of "macroeconomic variables" in the context of the Fama-MacBeth (1973) technique. They find that sensitivity to some of those factors predicts portfolio returns. The spread between long and short interest rates, the spread between Baa and government bonds, inflation, and industrial production do particularly well. Much of the literature on aggregate returns has similarly focused on predictive -- rather than explanatory -- factors for aggregate returns, though some of that apparent predictability seems to be a business cycle phenomenon. Stock returns and changes in industrial production are highly correlated, but returns appear to be systematically lower at business cycle peaks.<sup>2</sup>

My aim here is less ambitious than stock market prediction. After the fact, and using two familiar economic variables to control

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<sup>2</sup> Fama and French (1989), Fama (1990), Schwert (1990), Cochrane (1991), and Daniel and Torous (1991).

for other plausible forces, does a particular, easily measured, arguably important, but neglected government policy influence the stock market?

My two conventional variables are changes in output and changes in long-term bond prices. Both have poor claims to exogeneity and probably reflect, in various proportions, a longer list of ultimate causal factors. Production reflects actual and expected monetary policy, as well as other forces about which there is little agreement. Bond prices are influenced by expected inflation, expected real interest rates, plus any risk premium associated with long-term rates under varying business conditions. Clearly, expected inflation, expected real rates and risk premia themselves have other ultimate causes, and these overlap with the forces that control industrial production.

My unconventional variable is the number of antitrust filings. This measure reflects current enforcement, though admittedly in a crude way. Statistically, it is a count-variable and suffers from an errors-in-variables problem over short intervals because the number of cases may be low or high by mere chance in a given week, month or quarter. A case filing also doesn't map one-to-one to a single piece of "information." Rather, it's the last in a series of events that may have included pressure from Congress, rumors, investigations, bureaucratic wrangling, leaks and newspaper reports. Still, the number of cases offers an objective yardstick for the vigor of enforcement. It also has a better claim to exogeneity than most of the other regressors used to explain aggregate stock returns.

Section I reviews the data and presents simple correlations between stock returns and enforcement measures. Section II attempts to explain observed quarterly and annual returns of the S&P index as a function of changes in industrial production, changes in the price of long-term government bonds, and antitrust enforcement. The effect of unexpected case filings gets special attention. Section III undertakes an event study of case filings with the aim of establishing whether investors anticipate case filings months in advance. Newspaper accounts and the evidence for the S&P index suggest that case filings are anticipated by at least several months, and the event study offers extra evidence. My conclusions follow.

## **I. Overview**

Table 1 defines my variables, and the two panels of Figure 1 represent some of the key data. Panel A of Figure 1 shows the detrended value of the natural log of the S&P stock index (including dividends) for January 1946 through December 1990, as well as the detrended value of the natural log of the Ibbotson index of long-term government bond capital values. A twelve-month moving sum of the number of DOJ cases filed against NYSE- and American Stock Exchange-listed firms,  $DOJLIS(t-12,t)$  appears at the bottom of Panel A.

Bond prices reflect expected inflation, expected real rates of return, and possibly a risk premium. They were fairly stable until the mid-1960s, declined and remained unstable through the 1970s, reaching their lowest detrended point in the early 1980s, and then recovered. Arguably, expected inflation induced most of the larger

movements. Note that the comovement with stock prices is strongest since the mid-1960s.

Panel A also shows successive DOJ antitrust initiatives, first in the late 1940s, then again in the late 1950s and early 1960s, and then again in the late 1960s and early 1970s. The occasional spikes that punctuate the series seem to occur at the same time as dips in the stock market. Prominent examples include 1947 and 1962. President Kennedy's forced rollback of steel prices in May 1962 -- and the perception of an anti-big-business administration -- explains part of the decline. However, his attorney general and brother, Robert Kennedy, also filed a number of suits against major firms in middle of that year.<sup>3</sup>

Panel B repeats the stock and bond data but now includes the twelve-month moving sum of FTC cases against exchange-listed firms,  $FTCLIS(t-12,t)$ . Here again, periodic spikes, more pronounced than in the case of  $DOJLIS(t-k,t)$ , appear to coincide with bear markets. The years 1949, 1957 and 1960 stand out.

Correlograms based on three-month returns of the S&P index,  $SP(t-3, t)$ , against three-month moving sums of DOJ and FTC cases against listed firms,  $DOJLIS(t-3-K, t-K)$  and  $FTCLIS(t-3-K,t-K)$ ,  $K = -48$  to 48, appear in Panel A of Table 2. (Correlations of returns with leading values of case filings appear on the left half, lagging values on the right half.) The plots offer some statistical support for the

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<sup>3</sup> The Department of Justice sued Bethlehem Steel (April 1962), Johns-Manville, Hebrew-National Kosher Foods, Standard Pressed Steel, Revlon, Roehr Products, and in one case: Armour, Cudahy Packing, Glidden, Lever Brothers, Proctor and Gamble, Swift and Wesson Oil; and in another case at least twelve exchange-listed manufacturers of pulp, paper and paperboard (all in June). Sixteen more cases involving no less than 35 exchange listed defendants followed in July through October.

notion that stock prices and antitrust are negatively related. Increases in both DOJ and FTC case filings against listed firms in a given three-month period occur at the same time as declines in the S&P.

The plots also hint that past and future case filings, especially for the Department of Justice, are negatively related to current returns. The largely negative correlations for  $K > 0$  are troubling. Why should past filings affect current returns? Perhaps for this particular example more bad news followed upsurges in antitrust activity, and more good news followed declines of activity. The negative correlations for  $-9 < K < 0$  are less troubling, and probably reflect anticipated filings. News of investigations leaks out months in advance, although the gap will vary from case to case.

An errors-in-variables problem also plagues count data like these since the counted events are heterogeneous and have low means. This and the variable gap between news of a filing and the filing itself argue for cross-correlations based on returns and case filings calculated over longer intervals. Panel B of Figure 2 repeats the exercise in Panel A with twelve- instead of three-month returns and filing intervals, that is, with  $SP(t-12,t)$ ,  $DOJLIS(t-12-K,t-K)$  and  $FTCLIS(t-12-K,t-K)$ . Though the graph includes a maximum of nine non-overlapping correlations (at  $K = -48, -36, -24, \dots, 48$ ), the plots are still informative. The correlation of returns ending at month  $t$  with summed DOJ filings through month  $t$  is roughly double, nearly .30 instead of .14. That for FTC is more or less unchanged, but still larger than at any other lead or lag.

The statistics and the economics of enforcement deserve more attention. Case filings are not homogenous. Cases vary by charge (merger, price fixing, vertical restraint, boycott), by size of the firm involved, by industry of the defendant and by outcome. I break the data down in only two ways in this study: by antitrust agency and by whether one or more defendants were listed on the New York or American stock exchanges.

A comparison of the two agencies requires little defense. The DOJ's antitrust division is part of the executive branch, it deals only with antitrust, its enforcement appears more stable over time, and it only files and prosecutes cases. In contrast, the FTC is nominally independent of the executive, it has consumer protection duties as well as antitrust, its activities appear volatile, and it files, prosecutes and adjudicates the cases it brings.

A breakdown of cases based on listing status is easy to implement, easier than, say, collecting data on firm size for several thousand defendants. It also distinguishes between cases against large, publicly traded firms and cases against local paving companies, professional associations and non-profits, for example.

Table 2 shows means and the decomposition of variances for case filings. The Department of Justice initiated 45.1 antitrust cases per year compared to 10.9 per year for the Federal Trade Commission, a ratio of roughly four-to-one. About 25 percent of DOJ's cases and 51 percent of the FTC's cases involved listed firms.

Suppress the suffix "(t-12,t)" for DOJLIS(t-12,t) and the other enforcement variables defined over twelve months in Table 1, and calculate:

$$\text{DOJ} = \text{DOJLIS} + \text{DOJNON}$$

$$\text{FTC} = \text{FTCLIS} + \text{FTCNON}$$

$$\text{LIS} = \text{DOJLIS} + \text{FTCLIS}$$

$$\text{NON} = \text{DOJNON} + \text{FTCNON}$$

$$\text{CAS} = \text{DOJ} + \text{FTC} = \text{LIS} + \text{NON}.$$

The variance of total case filings has a well known decomposition:

$$\text{var}(\text{CAS}) = \text{var}(\text{DOJ}) + \text{var}(\text{FTC}) + 2 \text{cov}(\text{DOJ}, \text{FTC}).$$

The other sums yield similar breakdowns of total variance into the variance of the components and a residual involving covariance terms.

The two agencies tended to offset their case filings:  $\text{var}(\text{CAS})$  is only 76.5 percent of  $\text{var}(\text{DOJ}) + \text{var}(\text{FTC})$ . This came about largely because cases against nonlisted firms were negatively correlated across the two agencies. This more than offset the positive correlation of cases against listed firms at the two agencies, evident here and in Figure 1. Similarly, cases against listed and non-listed firms offset each other, with  $\text{var}(\text{CAS})$  amounting to only 63.2 percent of  $\text{var}(\text{LIS}) + \text{var}(\text{NON})$ . Here the bulk of the offset came at the Department of Justice, especially in the 1980s. Since DOJ only deals with antitrust, while the FTC has substantial consumer protection duties, this is not surprising. Finally,  $\text{var}(\text{CAS})$  amounts to only 58.5 percent of the sum of the variances of the four case types -- DOJ and FTC listed and non-listed;  $341.3 \div 583.7 = .585$ . Overall, the four different types of cases appear to be substitutes for one

another. This means that more cases against non-listed firms may offer some clue about what will happen to cases against listed firms.<sup>4</sup>

## II. Stocks, Bonds, Production and Antitrust

Two great commonplaces, the correlation of stock prices with the business cycle and the sensitivity of stock prices to inflation dictate the starting point for any effort to explain stock prices.<sup>5</sup> Table 2 shows regressions of  $SP(t-3,t)$  on  $PROD(t-3,t)$ ,  $TBOND(t-3,t)$  and the antitrust enforcement variables: DOJ and FTC cases against listed and unlisted firms. I include lagged and leading variables as described below. With some abuse of notation, I report the sums of the lagged (or leading) coefficients in the rows labeled  $\Sigma PROD$  and so on.

I include the percent change in industrial production in the current quarter,  $PROD(t-3,t)$ , as well as in the two leading quarters ending months  $t+3$  and  $t+6$ . The use of leading values has its defense in the fact that current production reflects decisions and business

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<sup>4</sup> Admittedly, the number of lawsuits filed misses some of the news that may affect stocks. For example, rumors of a planned but never filed monopolization case against GM circulated in the 1960s. Major cases that were filed, like the those against IBM and AT&T, suffered a number of twists and turns. I have also neglected new legislation. The Antitrust Procedures Act of 1974, whose effects on firm and court behavior are analyzed by Snyder (1993), increased antitrust penalties from the misdemeanor level to the felony level, from a maximum of \$50,000 and one year in jail to \$1 million and three years. Since 1978, merging firms have had to file Hart-Scott-Rodino pre-merger notices with the government, pushing a good deal of merger policy underground. The Department of Justice also issued influential "merger guidelines" in 1968, revised versions in 1982 and again in 1984, and yet another revision in 1992. I have also neglected major court decisions, such as the 1962 Brown Shoe case. Hay and Werden (1993) summarize some of the recent history. Despite the overhang of these other aspects of antitrust, lawsuits were the ultimate threat and represented the instrument by which it was largely carried out.

<sup>5</sup> Fama (1990), Schwert (1990), Daniel and Torous (1991) and Bittlingmayer (1992, 1993a) offer recent evidence, jointly covering the last century, on the correlation between industrial production and stock prices. Nelson (1976), Fama (1981), Kaul (1990) and Kaul and Sehun (1990) examine the stock-price consequences of inflation.



sentiment with a lag. In line with work by others, the estimated coefficients here show that a 1 percent increase in production over the current and two leading quarters accompanies a 1.07 to 1.21 percent increase in stock prices.<sup>6</sup>

Percent changes in long-term government bond prices,  $TBOND(t-3,t)$  reflect changed inflationary expectations, changed expected real rates and changed risk premia. I use bond prices because they reflect expectations quickly and incorporate more information than the CPI or the stock of money. The data revealed that past bond-price movements "predicted" current stock price changes, for the period as whole and for the subperiods 1946-1969 and 1970-1989. The phenomenon demands more attention. I'll take it as given here because I want a limited number of non-antitrust factors to explain as much of the variation of returns as possible. A 1 percent increase in bond prices implied a cumulative increase in the S&P of between .83 and .91 percent.

The four antitrust variables, DOJ and FTC case filings against listed and unlisted firms, round out the model. Listed DOJ cases at a one quarter lead seem to have the strongest negative effect on stock prices, -.49 percent, although current cases also depress stocks by an additional -.32 percent. Unlisted DOJ cases, at least at this frequency, have no detectable effect. Listed FTC cases seem to have their negative effect immediately, in the same quarter. Coefficients

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<sup>6</sup> Fama (1990, Table III) regresses quarterly NYSE real returns for 1953 to 1987 on current and future production. The sum of coefficients for the current and two nearest future quarters is 1.51. Schwert (1990, Table III) reports 1.44 for 1953-1988, and .60 for 1926-1952. Their results are not strictly comparable with mine since I use nominal rather than real returns and only two rather than four leading quarters.

summed over three months are statistically negative (twice the standard error) only in the case of listed DOJ cases, with the effect amounting to  $-.68$  or  $-.66$  percent. While the summed effect of listed FTC cases amounts to between  $-.29$  and  $-.68$ , the standard errors are large.

The plots of stock prices and cases in Figure 1, as well as the correlograms based on three- and twelve-month returns and case filings in Figure 2, reveal that stock prices react more strongly to a sustained push at the Department of Justice than to short term fluctuations in enforcement. Table 4 repeats the exercise in Table 3 with the same variables now calculated over twelve- instead of three-month periods. I estimated the regressions at overlapping quarterly intervals, with standard errors based on White's method and using three lags, and at annual intervals, with OLS standard errors. The trade-off is straightforward. The regressions using quarterly intervals probably yield more accurate coefficients, but the OLS standard errors from the annual intervals are less controversial.

The elasticity of stock price changes with respect to production is less than one here, especially for overlapping quarterly intervals, probably because I no longer include future production. The elasticity with respect to changes in government bonds is also slightly lower, in this case because I no longer include past changes.

The results for the DOJ filings confirm what I found with quarterly data: negative effects of between  $-.49$  and  $-.66$  percent per case involving listed firms and a slightly positive, insignificant effect for DOJ cases involving only unlisted firms. FTC filings against listed firms are now large and negative, between  $-.78$  and  $-1.22$ , but have

comparatively large standard errors. FTC filings against unlisted firms, in contrast, show strong, significant positive effects, between 1.11 and 1.47 percent.

Table 3 also reports the results of an exclusion test for cases against listed firms, "DOJLIS, FTCLIS," and unlisted firms, "DOJLIS, DOJLIS." The negative effects of cases against listed firms are statistically significant using both overlapping quarterly intervals and non-overlapping annual intervals. Whether I include changes in production and changes in bond prices seems hardly to influence the parameter estimates and significance levels. Finally, the antitrust variables alone explain between 15 and 20 percent of the total variation in returns. Adding concurrent changes in production and long-term bond prices raises that fraction to 27 and 34 percent. Remarkably, these very crude measures of antitrust enforcement, namely counts of case filings, do as well in explaining annual stock price movements as changes in long-term bond prices and industrial production.

Table 4 used contemporaneous changes in production and bond prices. This may not make the best use of the information in these series. Cross-correlations of 12-month changes in the S&P index and 12-month changes in production and bond prices revealed that the highest correlation occurred at a 9-month lead for production and a 5-month lag for bond prices. Table 5 repeats the first two columns of Table 4 using these lags. Recall that the cross-correlation between listed cases and stock prices was largest in absolute value at lag zero. Hence, I left them at lag zero. The last two columns use only production and bond prices, and no antitrust cases, as a base case.

It turns out that production and bond prices at the "optimized" lags together explain 29 to 34 percent of the variation in the S&P on an annual basis. The antitrust variables explain an extra 12 to 15 percentage points of the total variation, or about one-third of the total variation explained by all variables together. The exclusion statistics for cases against listed firms are now substantially higher, those for cases against unlisted firms substantially lower. Estimated coefficients for the antitrust variables change slightly. DOJ cases against listed firms have a larger negative effect, -.71 and -.67 percent per case. FTC cases against listed firms a smaller negative effect, -.40 to -.81 per case. The standard errors are uniformly lower.

Figure 1 showed periodic surges of the twelve-month sum of case filings at both agencies of about ten cases. Based on these regressions, that sort of increase implies a decline of the S&P index of 4 to 8 percent. In other words, the estimated coefficients imply that sporadic bouts of antitrust offer a rationale for major stock market movements, as does inspection of Figure 1 itself.

Logic would dictate that only unexpected enforcement should matter for stock prices. I address the stock market's response to unexpected filings in Table 6. Define  $\Delta\text{DOJLIS}(t-12,t)$  as  $\text{DOJLIS}(t-12,t)$  minus the seven-year average annual rate of filings centered on the year ending in month  $t$ . Define  $\Delta\text{FTCLIS}(t-12,t)$  the same way. This postulates that the long-run number of cases is largely expected in annual returns, but one-year deviations are not. Note that I lose two years at both ends of the sample.

In the regressions in Table 6,  $\Delta\text{DOJLIS}(t-12,t)$  and  $\Delta\text{FTCLIS}(t-12,t)$  yield coefficients that are substantially greater than  $\text{DOJLIS}(t-$

12,t) and FTCLIS(t-12,t). For estimates based on overlapping quarterly intervals, the DOJ coefficient increases from -.69 percent per case to -1.03 per "unexpected" case. The coefficient for the FTC increases from -.24 to -.99 percent. Regressions based only on annual returns, the right half of Table 5, show a rough doubling for DOJ filings and a tripling for FTC filings, from -.54 to -1.08 (DOJ) and from -.39 to -1.47 (FTC). The quarterly results are probably more accurate, but the results overall are consistent.<sup>7</sup>

### III. Antitrust Suits and the Stock Value of Defendants

The effect of antitrust enforcement on individual firms is well documented. Using monthly returns, Ellert (1976) found a 1.83 percent decline in the month of a suit for defendants in 205 merger cases.<sup>8</sup> Eckbo (1983) records a 0.73 percent drop on the day of the filing for 49 challenged bidders and a 9.27 percent drop over days [-1, 1] for 17 targets on the day of the challenge. Wier (1983) finds cumulative losses on days [-20, 20] around an antimerger complaint of 1.89 percent for 24 convicted firms, 2.05 percent for 24 firms against whom charges were later dismissed, and 3.40 percent for 63 firms who later settle. Bosch and Eckard (1991) record an average one day decline of 1.08 percent for 127 announcements of price fixing indictments.

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<sup>7</sup> In unreported regressions I also included similar deviations from seven-year averages for DOJ and FTC cases against firms not listed on an exchange. Those cases had weak positive estimated effects and did not greatly influence the coefficients or test statistics of the case filings against listed firms.

<sup>8</sup> Schwert's (1981, pp.138-140) piece on the use of financial data to measure the effects of regulation highlighted Ellert's work and suggested that future work investigate "whether such [regulatory] actions cause a revision of expectations about future regulatory events for other firms." The answer seems to be that they do.

Happily, I can confirm these results. But I will go further and suggest that case filings are anticipated by at least several months, and that the cumulative effects per antitrust case are larger than reported in these studies. A case filing is preceded by an investigation, which typically takes months, if not years. Some examples will support the point. The federal government filed its case against IBM in January of 1969, but the *Wall Street Journal* reported the investigation three years earlier, on January 16, 1966. Reports of a "low-priority" FTC investigation of the cereal companies surfaced in early 1970 (*WSJ*, April 22), the resulting case was filed April 26, 1972. A big case may gestate for two years or more.

Advance notice of several months is common for the run-of-the-mill action. A merger suit against Hart Schaffner & Marx was filed on November 13, 1968; the *Wall Street Journal* reported the possibility of an antitrust challenge on September 13, two months earlier. The suit against Northwest's acquisition of Goodrich was filed June 16, 1969 but the *Wall Street Journal* reported antitrust concerns on April 29. These are lags for public information, not for market information.

Table 7 reports the results of a large, but otherwise garden-variety event study. The size results from my desire to establish that cases are in fact anticipated months in advance. The sample includes all first-named antitrust defendants in cases filed from January 1964 through December 1979 with stock traded on the NYSE or AMEX over days [-200, 200]. The choice of dates is dictated by the fact that CRSP's daily returns begin July 1962. I stop at the 1970's because merger filings turned to trickle by the 1980s, partly because merger

activity was regulated administratively after Hart-Scott-Rodino pre-merger notification went into effect in 1978.

I focus on only one defendant per case, the first-named defendant, to avoid technical problems when two or more events fall on the same calendar date, to keep the results across agencies comparable because my source for FTC cases listed only the first-named defendant, and to avoid giving more weight to some cases. In cases filed against pending mergers, the named defendant is typically the bidder. Since share prices of targets decline more than those of a bidder when a suit is filed, my findings will understate the stock-market losses for the cases filed against pending mergers.

For the full sample of 345 cases, defendant firms lose .38 percent of their value on the day of the filing and .45 percent on the following day. Since some filings probably occur late enough to miss the closing bell, the one-day lag is not surprising. Results for the median return by event day confirm that this result is not due to a few large negative returns, though they do seem to be skewed to the left. The median return is -.34 percent on the filing date and -.26 the day after.

The pattern over longer periods confirms what we saw earlier from news reports. Antitrust filings are not pure surprises. The cumulative decline over days [-5, 5] is 1.66 percent. But that short-term drop is only half the story. Over the period [-100, 40], defendants' stock prices dropped 3.68 percent relative to the market. With roughly twenty trading days per month, this corresponds to months [-5, 2].

These results are consistent with experience with my findings for the contentious "trust-busting" era eighty years ago. For 19 antitrust suits filed against listed firms between 1904-1914, returns of common and preferred stock turned negative between four and six months ahead of the filing. Their common stock declined 11.32 percent in months [-4,1].<sup>9</sup>

Economists often condemn the federal government's merger and single-firm monopolization cases, but approve of actions against cartelization, price-fixing and bid rigging. A quick look at the prosecution of relatively, if not absolutely, innocent practices is instructive. The right half of Table 7 shows that the losses of the 246 firms involved in merger and monopolization cases are essentially identical to those suffered by the sample as a whole.

These losses seem large, especially when one compares them to identifiable costs borne by defendants. Bosch and Eckard (1991) calculate that identifiable legal costs account for only 13 percent of the (small) one-day loss of 1.08 percent for their sample of firms charged with fixing prices. Other studies of government actions offer similar puzzles. Peltzman (1981) reports stock price declines for 23 FTC advertising complaints of roughly 2 percent for days [-3, 1], typically greater than the capital value of the challenged advertising. Mathios and Plummer (1989) likewise find declines of 2.5 percent for 12 uncontested cases and 1.7 percent for 39 contested cases over days [-2, 2]. Those declines are puzzling because the FTC's first line of sanctions is a mild remedy: the cease and desist order. The courts will impose no penalties unless a cease and desist order is violated.

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<sup>9</sup> Bittlingmayer (1993a).



Why was the forced revision of an advertising campaign, often for only one item in a much larger product line, so costly? Jarrell and Peltzman uncover similarly large and strange effects from drug recalls. These are linked with declines of 6.13 percent over days [-4, 5], which Jarrell and Peltzman estimate to be 12 times the direct cost.

Jarrell and Peltzman's study also offers evidence related to the finding here that antitrust depresses the stock market as a whole. They find that other drug companies, not targets of government action, numbering roughly 50, also suffer losses when a competitors' product is recalled. Their stocks decline 1.17 percent over days [-4, 5]. On the assumption that those 50 companies subject to drug recalls are representative of the industry, the dollar value of the other-firm effect swamps the own-firm effect.

Overall, the estimates from my own and other event studies show that federal legal action against corporations can have serious financial consequences. By using an unusually large sample, I find, however, that antitrust filings are anticipated by several months, consistent with the relationship in the aggregate between case filings and stock returns. This may not hold for, say, drug recalls if the FDA carries them out more speedily and in greater secrecy.

Although the event studies offer some comfort for the time series results, they also raise two issues. First, why is a federal suit so costly to the defendants? I can only offer some speculation. The stock price declines may reflect possible future action by the federal government, states or private parties on the same or derivative issues. They may reflect the effects of diverted managerial talent,

more cautious business strategies designed to avoid future suits, or over-reaction that the stock market corrects only slowly.

The other issue concerns the role that policies besides antitrust may have in moving the market as a whole. Peltzman's (1981) finding suggests to me at least that other FTC advertising regulation may have had measurable aggregate effects. His short-term declines are as large as those I and others have found for antitrust cases. There may be little practical difference in having the FTC pursue an antitrust case and having it pursue some other charge. The takeover regulations and takeover battles of the 1980s, which supplanted antitrust to some extent, are also promising candidates, in my view.

#### **IV. Concluding Comments**

Judging by experience in the early part of this century, periodic bouts of "trustbusting" lowered stock prices. The evidence here, taken from more recent times, supports the same conclusion. The typical case filing lowered stock prices by as much as 1 percent, and antitrust as a whole explains in excess of 10 percent -- and perhaps as much as 20 percent -- of the total annual variation in S&P returns over the years 1946 through 1989. Effects of that magnitude may seem far-fetched, but the notion that antitrust policy influences merger activity and, ultimately, stock prices seems plausible.

Antitrust today is clearly not what it used to be. But research on stock prices has to make do with historical data, and that research will benefit, I think, from a sharper focus on the causes of past stock market fluctuations. The political and legal environment of business

is clearly one place to look. For most of this century, antitrust and the monopoly problem had center stage. The challenge for future work, especially when it looks at the last ten to twenty years, is to find serviceable yardsticks for other types of political, policy and legal developments that had major consequences for the publicly traded corporation.

## Data Appendix

*Antitrust Cases.* Commerce Clearing House (CCH) chronicles the antitrust case filings of the federal government. One series, beginning with the "bluebook," covers cases filed by the Antitrust Division of the Justice Department: *The Federal Antitrust Laws with Summary of Cases Instituted by the U.S., 1890-1951* (1952); *Trade Regulation Reporter: Transfer Binder, New U.S. Antitrust Cases, Complaints, Indictments, Developments, 1961-1970*, (11th edition;1970);*Trade Regulation Reporter: Transfer Binder, New U.S. Antitrust Cases, Complaints, Indictments, Developments, 1970-1979*, (12th edition, 1980), etc. The other CCH series lists cases filed by the Federal Trade Commission: Commerce Clearing House, *Trade Regulation Reports: FTC Dockets of Complaints* (1988) and subsequent looseleaf inserts. Coverage of DOJ cases typically extends several paragraphs and lists all defendants. Coverage of FTC cases is abbreviated and lists only the first-named defendant. Both provide filing dates.

In conjunction with the securities database developed by CRSP (Center for Research in Securities Prices), I constructed four monthly series for antitrust filings:

- 1) Number of DOJ antitrust cases involving defendants never traded on the NYSE or AMEX.
- 2 The same for FTC cases.
- 3) Number of DOJ antitrust defendants who were at some time traded on the NYSE and AMEX.
- 4) The same for FTC cases.

I counted criminal and civil cases on the same charges filed against the same defendant and in the same month as one case. I also

collapsed cases involving the same charge, filed in the same month and in the same district court even if the defendants differed. AMEX issues are included with CRSP beginning July 1962, which implies that I may have missed some (hopefully small) number of listed firms who disappeared from the AMEX before that date. My intention was not to get a list of defendants who were listed at the time the suit was filed, but rather a list of defendants who were at one time or another listed.

*Stocks and Bonds.* I pulled the S&P index and the bond index from CRSP's SBBI file provided by Ibbotson and Associates. The S&P series includes capital appreciation and dividends. The bond series includes only capital appreciation. It uses bonds with a term of roughly 20 years.

*Industrial Production.* Seasonally adjusted industrial production from Board of Governors, Federal Reserve Board, *Industrial Production*: 1986 edition and *Federal Reserve Bulletin*, various editions.

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Table 1

Definitions of variables. The notation (t-s,t) means from end of month t-s through the end of month t.

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SP(t-s,t)	Return of S&P index, including dividends
PROD(t-s,t)	Percent change of industrial production
TBOND(t-s,t)	Percent change of long-term government bond prices
DOJLIS(t-s,t)	Number of DOJ cases against exchange-listed firms
DOJNON(t-s,t)	Number of DOJ cases against firms not listed
FTCLIS(t-s,t)	Number of FTC cases against exchange-listed firms
FTCNON(t-s,t)	Number of FTC cases against firms not listed
$\Delta\text{DOJLIS}(t-12,t)$	$\text{DOJLIS}(t-12,t) - \text{DOJLIS}(t-48,t+36)/7$
$\Delta\text{FTCLIS}(t-12,t)$	$\text{FTCLIS}(t-12,t) - \text{FTCLIS}(t-48,t+36)/7$

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Table 2

Mean number of cases over twelve months and decomposition of variance. Total antitrust cases initiated by the federal government broken down by antitrust agency and listing status of defendants, January 1945 through December 1990.

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	<u>Means by Status of Defendants:</u>		
	<u>All</u>	<u>Listed</u>	<u>Not Listed</u>
All	56.0	16.8	39.3
DOJ Cases	45.1	11.2	33.9
FTC Cases	10.9	5.6	5.4

	<u>Variances by Status of Defendants:</u>			
	<u>All</u>	<u>Listed</u>	<u>Not Listed</u>	<u>Residual</u>
All	341.3	94.5	444.8	-198.0
DOJ Cases	379.5	47.4	494.7	-162.6
FTC Cases	66.6	21.7	19.9	25.0
Residual	-104.8	25.4	-69.8	

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Table 3

Regressions of quarterly returns of S&P index,  $SP(t-3,t)$ , on percentage changes in industrial production, returns of long-term government bonds, and DOJ and FTC cases against listed and nonlisted firms, 1946:I through 1989:IV. The columns marked  $\beta_i$  and  $SE_i(\beta_i)$  represent the coefficient estimates and standard errors. I multiplied the antitrust enforcement entries by 100.

Variable	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$
Constant	.05	.01	.02	.01	.04	.02
PROD(t-3,t)	-.14	.23	-.09	.24	-.11	.23
PROD(t,+3,t)	.68	.23	.51	.24	.61	.24
PROD(t+6,t+3)	.64	.23	.66	.23	.70	.23
TBOND(t-3,t)	.10	.11	.16	.11	.11	.11
TBOND(t-6,t-3)	.26	.11	.27	.11	.26	.11
TBOND(t-6,t-9)	.46	.12	.48	.12	.48	.12
DOJLIS(t-3,t) <sub>t</sub>	-.32	.21	.-.		-.29	.21
DOJLIS(t+3,t+6)	-.49	.21	.-.		-.55	.21
DOJLIS(t+6,t+9)	.14	.21	.-.		.18	.21
DOJNON(t-3,t) <sub>t</sub>	-.03	.10	.-.		-.04	.11
DOJNON(t+3,t+6)	.07	.10	.-.		.10	.10
DOJNON(t+6,t+9)	-.05	.10	.-.		-.06	.10
FTCLIS(t-3,t)	.-.		-.79	.37	-.61	.37
FTCLIS(t+3,t+6)	.-.		.29	.38	.37	.38
FTCLIS(t+6,t+9)	.-.		-.18	.36	-.05	.36
FTCNON(t-3,t)	.-.		.46	.33	.51	.32
FTCNON(t+3,t+6)	.-.		-.33	.33	-.44	.33
FTCNON(t+6,t+9)	.-.		.42	.36	.48	.33
$\Sigma$ PROD	1.19	.29	1.07	.30	1.21	.30
$\Sigma$ TBOND	.83	.22	.91	.22	.86	.22
$\Sigma$ DOJLIS	-.68	.27	.-.		-.66	.28
$\Sigma$ DOJNON	-.01	.10	.-.		.00	.10
$\Sigma$ FTCLIS	.-.		-.68	.52	-.29	.53
$\Sigma$ FTCNON	.-.		.55	.51	.55	.50
R <sup>2</sup>	.24		.28		.33	
D-W	1.99		1.95		2.02	

Note: The Ljung-Box Q-statistics showed no general autocorrelation of residuals.

Table 4

Regression of annual returns of the S&P index,  $SP(t-12,t)$ , on percentage change in industrial production, returns of long-term government bonds, and sum of DOJ and FTC cases against listed and non-listed firms; quarterly and annual intervals, 1946:I through 1989:IV.

Interval:	<u>Quarterly</u>		<u>Annual</u>		<u>Quarterly</u>		<u>Annual</u>	
	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$
Constant	.16	.06	.12	.09	.15	.07	.15	.09
PROD(t-12,t)	.55	.30	.97	.36	..		..	
TBOND(t-12,t)	.63	.19	.45	.29	..		..	
DOJLIS(t-12,t)	-.66	.26	-.56	.36	-.58	.28	-.49	.38
DOJNON(t-12,t)	.04	.11	.06	.12	.09	.10	.07	.13
FTCLIS(t-12,t)	-.68	.49	-.95	.66	-.78	.56	-1.22	.70
FTCNON(t-12,t)	1.11	.46	1.41	.64	1.14	.53	1.47	.69
Exclusion tests:								
DOJLIS, FTCLIS:								
$\chi^2$ /F-statistic	10.58		2.78		7.44		2.85	
Sig. level	.01		.07		.02		.07	
DOJNON, FTCNON:								
$\chi^2$ /F-statistic	5.82		2.41		5.41		2.30	
Sig. level	.05		.10		.07		.11	
$R^2$	.27		.34		.15		.20	
D-W	.62		2.26		.55		2.36	
n	176		44		176		44	

Note: White's (1980) method using three lags generated the standard errors for regressions based on overlapping quarterly intervals. Since this is an asymptotic method, I report the  $\chi^2$ -statistic (d.f. 2) for the exclusion tests in the "quarterly" columns. I show the F-statistic (d.f. 3, 37) in the "annual" columns based on OLS and non-overlapping data.

Table 5

Regression of annual returns of the S&P index,  $SP(t-12,t)$ , on change in industrial production, returns of long-term government bonds, and sum of DOJ and FTC cases against listed and non-listed firms; quarterly and annual intervals, 1946:I through 1989:IV.

Interval:	<u>Quarterly</u>		<u>Annual</u>		<u>Quarterly</u>		<u>Annual</u>	
	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$	$\beta_i$	$SE_i(\beta_i)$
Constant	.15	.05	.15	.07	.11	.02	.09	.03
PROD(t-3,t+9)	.85	.22	1.26	.38	.77	.24	1.12	.40
TBOND(t-17,t-5)	.58	.19	.33	.28	.68	.19	.54	.29
DOJLIS(t-12,t)	-.71	.20	-.67	.32	.-.		.-.	
DOJNON(t-12,t)	.05	.10	.02	.11	.-.		.-.	
FTCLIS(t-12,t)	-.40	.46	-.81	.58	.-.		.-.	
FTCNON(t-12,t)	.72	.43	1.01	.57	.-.		.-.	
Exclusion tests:								
DOJLIS <sub>t</sub> , FTCLIS <sub>t</sub> :								
$\chi^2/F$ -statistic	16.8		3.89		.-.		.-.	
Sig. level	.01		.03					
DOJNON <sub>t</sub> , FTCNON <sub>t</sub> :								
$\chi^2/F$ -statistic	3.07		1.57		.-.		.-.	
Sig. level	.22		.22					
R <sup>2</sup>	.41		.49		.29		.34	
D-W	.74		2.13		.65		1.87	
n	175		44		175		44	

Note: The quarterly estimates drop one quarter, 1946:I (n = 175), because using lagged T-bond rates eliminated one quarter. The notes from Table 4 also apply.

Table 6

Estimates of *unexpected* case filings against listed firms. Regression of annual returns of the S&P index,  $SP(t-12,t)$  on the change in industrial production, returns of long-term government bonds, and deviation of the one-year moving sum of DOJ and FTC cases from the seven-year average against listed firms; quarterly and annual intervals, returns ending 1948:IV through 1987:IV

Interval:	Quarterly				Annual			
	( $\beta_i$ )	(SE $_i$ )	( $\beta_i$ )	(SE $_i$ )	( $\beta_i$ )	(SE $_i$ )	( $\beta_i$ )	(SE $_i$ )
Constant	.20	.03	.11	.02	.17	.04	.90	.03
PROD(t-3,t+9)	1.01	.26	.89	.25	1.34	.39	1.20	.38
TBOND(t-17,t-5)	.52	.17	.66	.19	.37	.30	.48	.28
DOJLIS(t-12,t)	-.69	.20	.-		-.54	.31	.-	
$\Delta$ DOJLIS(t-12,t)	.-		-1.03	.39	.-		-1.08	.51
FTCLIS(t-12,t)	-.24	.29	.-		-.39	.49	.-	
$\Delta$ FTCLIS(t-12,t)	.-		-.99	.52	.-		-1.47	.66
Exclusion test:*								
$\chi^2/F$ -statistic	18.8		11.6		2.66		4.30	
Sig. level	.01		.01		.08		.02	
R <sup>2</sup>	.42		.42		.46		.50	
D-W	.76		.74		2.06		1.89	
n	157		157		40		40	

Note: The note for Table 4 applies.

\* Exclusion test for DOJLIS(t-12,t) and FTCLIS(t-12,t), or  $\Delta$ DOJLIS(t-12,t) and  $\Delta$ FTCLIS(t-12,t)

Table 7

## Stock Price Movements Around Antitrust Filing Dates, 1964-1979

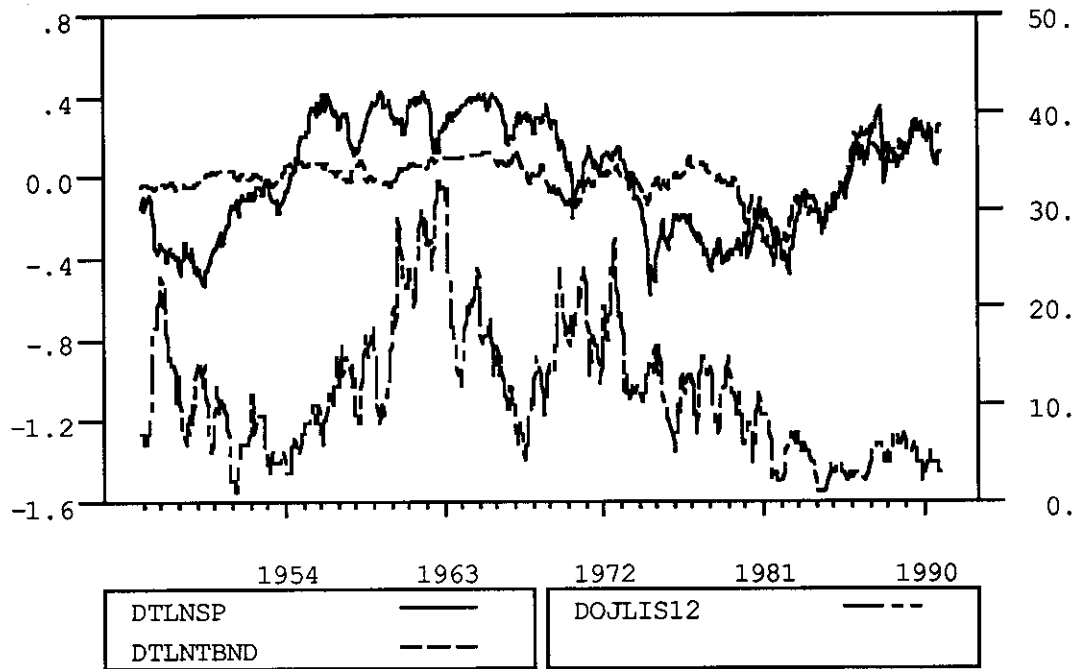
Day	<u>All Cases (n=345)</u>			<u>Merger &amp; Monopolization (n=246)</u>		
	Mean	t-value	Median	Mean	t-value	Median
-5	-0.06	-0.59	-0.03	-0.13	-1.12	-0.11
-4	-0.05	-0.51	-0.17	-0.04	-0.33	-0.15
-3	0.02	0.22	-0.02	0.06	0.53	0.04
-2	-0.17	-1.76	-0.18	-0.07	-0.58	-0.13
-1	-0.09	-0.98	-0.14	-0.10	-0.81	-0.14
0	-0.38	-3.87	-0.34	-0.44	-3.64	-0.32
+1	-0.44	-4.50	-0.26	-0.48	-4.03	-0.27
+2	-0.03	-2.69	-0.17	-0.32	-2.68	-0.20
+3	-0.12	-1.24	-0.06	-0.10	-0.81	-0.04
+4	-0.05	-0.56	-0.07	-0.02	-0.13	-0.01
+5	-0.06	-0.64	-0.05	0.01	0.08	0.03
Sum over days:						
[-5, 5]	-1.66	-5.16		-1.62	-4.08	
[-25, 25]	-2.23	-3.22		-2.61	-3.05	
[-75, 25]	-3.44	-3.56		-3.19	-2.67	
[-100, 40]	-3.68	-3.22		-4.17	-2.26	

Note: Firm returns were regressed on the value-weighted NYSE/AMEX index over days [-200, -101] and [41,200]. The resulting residuals averaged across firms are reported in the top panel, cumulated residuals below. The t-value for n firms and a window of length T is calculated as  $t = (AR\sqrt{nT})/SE$ , where AR is the average daily residual over T days, and SE is the average standard deviation of the residuals from the "market model" regressions.

Figure 1

Detrended natural log of the S&P stock index and government bond index, and twelve-month moving sum of DOJ and FTC antitrust cases filed against firms listed on NYSE and American Stock Exchanges, monthly intervals, December 1945 through December 1990

A. DOJ Cases



B. FTC Cases

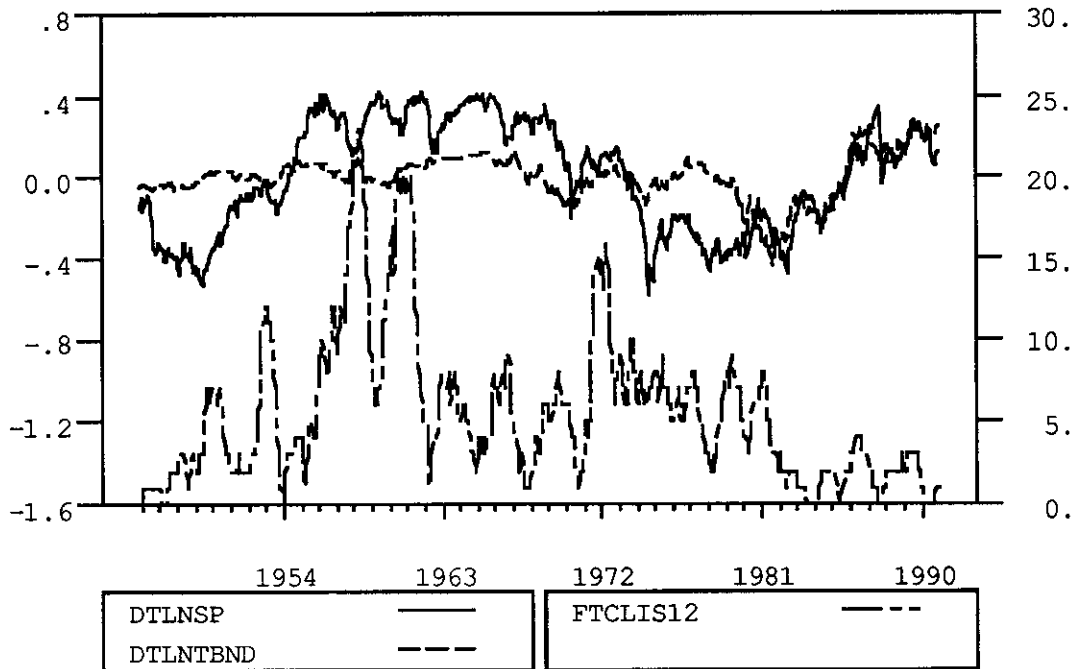
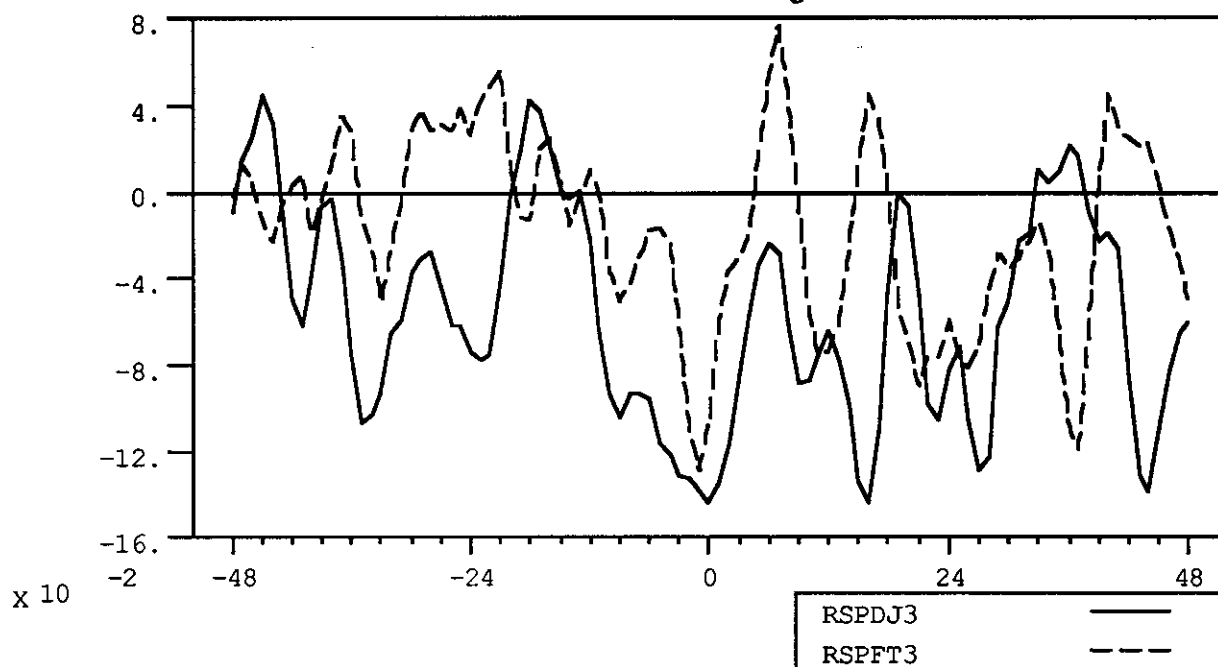




Figure 2

Correlogram of three- or twelve-month return of S&P ending month  $t$ , and three- or twelve-month moving sum of DOJ and sum of FTC antitrust cases against listed firms, month  $t-K$ , overlapping monthly intervals, January 1946 through December 1989

A. Three-month returns and moving sums



B. Twelve-month returns and moving sums

