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ARE THERE REGIMES OF ANTITRUST ENFORCEMENT?
AN EMPIRICAL ANALYSIS

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Abstract

In this paper, we propose a new index of antitrust enforcement. The index is compiled from quarterly data from the Department of Justice over the period from 1890 to 1989 and is designed to reflect the relative influence of variables that have deterrent effects. We use Hamilton's (1989,1990) regime switching technique to estimate a model in which the enforcement index follows a regime-specific AR(1) process. We find evidence of long-lived regimes. The high enforcement regime, which lasted from about 1910 to the mid-1960s, produced enforcement that was, on average, almost twice as high as the low enforcement regime. In particular, the Reagan years were not a time of transition to low antitrust enforcement, as is commonly claimed. Rather, the transition to a low enforcement regime had taken place some 15 years earlier.

1. Introduction

Noted antitrust scholar Milton Handler has decried the Reagan administration for a policy of "vigorous and effective non-enforcement" of the antitrust laws (Handler (1989)). He is a member of a chorus of critics of Reagan administration antitrust policy, beginning as early as 1981 with Senator Howard Metzenbaum's (D-OH) accusation that the administration wanted to "turn back the clock" on antitrust (Metzenbaum (1981)). Pitofsky (1987) has claimed that the Reagan administration had the most lenient enforcement program in 50 years, and private plaintiffs' attorney Maxwell Blecher claimed that the Reagan administration "has effectively closed its antitrust enforcement agencies." (See Blecher(1985)).

Justice Department officials responded to these attacks early. In 1983, Antitrust Division Chief William Baxter denied critics' claims that cases were confined to the roadbuilding industry, and he asserted that jail sentences and fines were at their highest levels ever. (See Baxter (1983)). In 1988, Baxter's successor, Charles Rule, argued that the division was not only pursuing more criminal violations than ever before but also pursuing a greater variety of violations, against more diverse industries, and obtaining stiffer sentences (Rule, 1988). Pitofsky conceded that many cases were being filed, and that the division was tough on cartels, but he complained that case numbers were invalid because the division "brought the same case against members of the construction industry over and over again."

In a nutshell, the critics accused the Reagan administration of enforcement laxity, and the administration defended itself by citing the very large number of cases the government filed. The critics responded by complaining that the cases were all of the same type and against the same industry, charges the government denied.

Most analysis of antitrust history has been descriptive rather than statistical. Wilcox (1971) discussed qualitative changes in policy, but the changes are illustrated with anecdotes instead of tested by empirical investigation. Similarly, Shepherd (1985) described waves and

2. Previous Literature

This controversy suggests more general questions: Are there regimes of antitrust enforcement? How can they be identified and forecasted? To answer these questions, we have constructed from Department of Justice data a new quarterly index of antitrust enforcement over the years 1890 to 1989. The index is designed to include variables that have deterrent effects and to be objective, thus avoiding the problems inherent in anecdotal or historical analysis. To identify potential regimes, we used Hamilton's (1989,1990) regime switching estimator. Hamilton's method allows us to estimate the probability of being in a high or low enforcement regime. Our empirical finding is that the probability of being in a high enforcement regime was extremely low up until about 1910, when the regime clearly switched to high enforcement. The high enforcement regime lasted until the mid-1960s, at which time enforcement switched back to a low enforcement regime. Thus, there was no change to low enforcement during the Reagan years. Instead, antitrust enforcement had made the switch to low enforcement 15 years earlier.

The paper is organized as follows. In section 2, we review the previous literature. In section 3, we describe the construction of the antitrust enforcement index. In section 4, we discuss the econometric technique. In section 5, we present the empirical evidence obtained from the model. In section 6, we conclude.

lapses of antitrust activity, without defining what constitutes a wave or how it is measured.

The statistical study of antitrust begins with Posner (1970), who compiled a database of all the cases filed by the Antitrust Division of the Department of Justice (henceforth DOJ) and the Federal Trade Commission (FTC). He measured antitrust enforcement by the number of cases filed, and he compared the number of cases to several variables of interest, especially Gross National Product (GNP), and the political party of the president. He concluded that the president's party has little effect on enforcement and that GNP has had little effect since 1940, but he reported no explicit statistical tests.

Much of the subsequent research has attempted to explain the actions of the enforcement agencies, rather than define what constitutes enforcement. Long, Schramm, and Tollison (1973) tried to explain DOJ actions by regressing the number of cases filed on various economic variables. They found a relationship between industry sales and enforcement, but no relationship to profits, concentration, or aggregate welfare losses.

Siegrist (1975) also attempted to infer the objectives of the antitrust agencies from a cross-section analysis of the relationship to economic variables like market concentration, industrial aggregation, and rate of return. He found little influence on the DOJ. He further suggested that case counting may be an inappropriate measure of enforcement because the success rates may also matter for the credibility of the agency and the careers of the staff.

Asch (1975) also regressed the number of cases on economic variables. He focused on firm sales and the number of firms in his cross-section study, concluding that both the number of firms and the average size of firms in an industry are relevant to case-bringing activity, though he could call case-bringing predominantly neither rational nor random.

Lewis-Beck (1979) was the first to use time series regressions. His enforcement variable was the number of cases filed per year, which he regressed on several economic variables, one variable at a time. He found no significant relationship to mergers, aggregate concentration, GNP growth, unemployment, presidential party, or congressional party shares. Lewis-Beck then reversed his regressions, treating cases as an independent variable. He found DOJ cases had no significant effect on mergers. He then expanded his concept of enforcement, adding FTC cases, the budgets of the FTC and Antitrust Division, and a dummy for the Celler-Kefauver amendments of 1950. He also used a business cycle variable, the unemployment rate. None was significant for mergers, singly or jointly.

Lewis-Beck made an important contribution besides the use of time series analysis. He recognized that filings are an imperfect measure of enforcement and that "it would be useful to have a more direct measure of the qualitative side of enforcement" as Posner had also mentioned. Lewis-Beck tried to account for the "qualitative side" by including budgets as an enforcement variable, though the enforcement value is dubious.

Cartwright and Kamerschen (1985) also used time series regressions to explain the enforcement. Neither GNP nor presidential party was found to affect antitrust enforcement, nor could they conclude that the antitrust enforcement agencies act to promote economic efficiency.

3. The Antitrust Enforcement Index

One problem with previous contributions is the lack of a good measure of antitrust enforcement. To obtain better measurements of antitrust activity, we compiled a database of the 3,748 DOJ antitrust cases filed from October 10, 1890, through July 13, 1990. Based primarily

on the case summaries by Commerce Clearing House, the database includes such information as the dates of filing, trial (if any), and conclusion of each case, the statutes and legal theory involved, the industry involved, the outcome whether by verdict or agreement, and the ultimate sentence or relief, if any.

The construction of a new database was necessary because existing data sets were excessively aggregated or failed to note details like industry or relief for each case. It was important to have data that could be screened by date of filing, date of relief, type of case, or type of industry. This database provides the easy retrieval of data for complex conditions; for example, data are arranged by industry, date, statute, and success rate. Without such a database, it would be impossible to quantify the diversity of DOJ litigation.

3.1 The Survey

Becker (1968) provides theoretical support for the notion that rational criminal activity will be deterred by the degree and probability of punishment, but the specification of the deterrence variables is an empirical problem. To compile the index, we need to know which variables have important deterrent effects as well as the relative magnitudes of these effects, in order to ascertain the deterrent effects of antitrust enforcement on the firms and their managers. Since most officers and even corporate counsel spend little of their time on antitrust, they are unlikely to notice enforcement signals. However, one group pays careful attention to antitrust enforcement, the antitrust bar. Because their income depends on their knowledge of the law and administration practices, they pay attention to the actions of the government. When a firm wants to know whether a contemplated act will attract the attention of the antitrust authorities, the managers consult antitrust attorneys. The perceptions of the lawyers are used by the firms, and

the lawyers' beliefs become the subjective probabilities of the firms.

To learn deterrence attitudes, a three-page questionnaire was compiled and sent to 24 prominent antitrust attorneys. The attorneys were asked to rate the deterrence value of several antitrust actions. One lawyer responded that he was not in the sample group, and another sent a letter explaining why he felt the survey was not a good idea. Of the remaining 22 lawyers, 16 filled out the questionnaire, and most supplied comments as well.

Consistent with Beckenstein and Gabel (1983), prison probability had the highest deterrent value; the length of sentences was less important. Fines reverse the relationship; the size of the fine was more important than the probability of being fined. Cases filed in the industry were more important than cases filed in general, and DOJ cases were more effective than FTC cases. Neither case duration nor the number of defendants mattered.

3.2 The Index of Antitrust Enforcement

The lawyers' survey responses identified several variables that have deterrent impact and for which reliable data exist in the DOJ database:

1. the share of criminal cases resulting in jail sentences
2. case filings by industry
3. total DOJ case filings
4. share of civil decrees of constructive relief
5. criminal prosecution success rates
6. civil prosecution success rates.

Some lawyers' comments also indicated that the diversity of legal theories also matters, as Baxter, Rule, and Pitofsky have separately argued.

Each of these variables has some meaning, but none of them exists in isolation. As one of them increases, another may decrease, so looking at one variable alone gives a partial picture at best. It is the net effect that matters. Enforcement is a composite of all of these variables, and any measure of antitrust enforcement needs to account for their joint action, not just the individual series behavior.

Following Rossi and Gilmartin (1980), we used survey evidence to select and weight variables to combine in a composite index of antitrust enforcement. Seven variables were selected both as having relevance to enforcement as reflected in the attorneys' survey responses and having sufficient data available to construct meaningful quarterly time series:

1. the number of cases filed by the Department of Justice, Antitrust Division (CASES)
2. the number of cases resulting in a prison sentence (JAIL)
3. the number of criminal cases with relief granted against any defendant (CRWIN)
4. the number of civil cases in which the government obtained any relief (CVWIN)
5. the share of civil cases resulting in affirmative relief (AFFIRM)
6. the distribution of cases by legal theory (LEGAL)
7. the distribution of cases by industry (INDUS).

The number of cases variable, CASES, is merely the combined number of civil and criminal cases filed by the Antitrust Division each quarter, counted by the date on which the case was filed. JAIL is the number of cases where a jail sentence was imposed, and CRWIN is the number of cases each quarter where the government obtained any relief against any criminal defendant.

On the civil side, CVWIN counts the cases where the government obtained any relief

from any defendant. AFFIRM is the share of those successful civil prosecutions where the relief went beyond mere injunction of illegal practices, i.e., where the defendant was ordered to do something beyond just obey the law. Examples include an order to divest assets or to refrain from making acquisitions.

The attorneys were highly agreed that simply filing a case in any industry was less of a deterrent for a given firm than filing a case in that firm's industry. Therefore, if the government is filing cases in several industries, enforcement is more vigorous than when few industries are sued.

To construct the diversity of industries variable, INDUS, each case was assigned up to three four-digit Standard Industrial Classification (SIC) codes. The industries were sorted quarterly according to two-digit SICs and counted. A Herfindahl-type index was computed, the sum of the squared percentage shares of each of the industries in each quarter. This Herfindahl index is smaller when more industries are involved in antitrust litigation and larger when fewer industries are involved--just the opposite direction of the enforcement value. Therefore, the index value was subtracted from its theoretical limit of 10,000, and INDUS is the difference, a number bounded by zero and 10,000 that grows as the number of industries grows.

Consistent with both the Reagan critics and the defenders, lawyers commented that a case carries more weight when it represents a new legal theory. If the cases all proceed along the same theory (say, price fixing), enforcement signals that all other behavior is permitted. However, when cases are more diverse, filing a new case makes a contribution to the enforcement reputation, because it may be against any one of many activities. Firms must pay attention to many more aspects of their business to avoid running afoul of the law.

Most cases involve price fixing (2,066 out of 3,748 analyzed). Enforcement would be more strict in those quarters when other types of cases are more common than usual. Therefore, the share of price fixing cases was subtracted from unity in each quarter to yield the share of cases that do not involve price fixing, LEGAL. When this number is higher, enforcement will tend to be more strict; when it is lower, enforcement will be more lax.

The lawyers' survey responses demonstrate what is intuitively obvious: not all these variables have equal importance for antitrust enforcement. They must be given weights that reflect their relative importance. The average value of each variable is relevant, but so is the extent of agreement among the experts. Therefore, each variable's average score was divided by its standard deviation. For low variation variables, like JAIL, this procedure increased the weight; for high-variation variables like CRWIN, the procedure lowered the weight.

Some variable weights are composites. INDUS reflects two survey questions: #4 and #7. The weight assigned is the average of the two mean scores, divided by the average of the standard deviations. LEGAL does not appear on the questionnaire, so it was assigned a weight equal to the average of the other six weights.

Each series was divided by its long-run unconditional mean, so the long-run expected value of each variable is one. The sum of the weights is 23.5, so the sum of the weighted transformed variables was divided by 23.5.

Figure 1 shows the index (called RAW). It shows the trust-busting efforts of Taft's and Wilson's first terms, followed by a decline during World War I, contrary to the impression of Posner. Cartwright and Kamerschen also fail to achieve significance for a war dummy, but like Posner they were counting only cases. DOJ enforcement revives slightly in 1920, eventually

sinking to a very low level in Franklin Roosevelt's first term. Wilcox (1971) suggests this was a deliberate policy in conjunction with the business protection of the National Recovery Act.

Roosevelt's second term, however, brought Thurman Arnold to the Antitrust Division. With Arnold, enforcement seems to take a shift up. If we allow for dips during World War II and the Korean conflict, enforcement activity stayed fairly constant for the next four decades, though there was a slight rise during the Nixon administration. After erratic enforcement in the Ford and Carter years, the index leaps in the first year of the Reagan administration. There is some subsequent decline and rise, but overall enforcement remains high. Data from the Bush administration may be unreliable because so many cases were pending when the database was compiled.

The index basically agrees with the descriptions of Wilcox (1971), though he dated the revival of antitrust to 1935, rather than 1938. He believed there was no falloff in antitrust during the Eisenhower, Kennedy, and Johnson administrations, even though such rumors were rife at the time. He did believe that Donald Turner, Johnson's antitrust chief, emphasized quality of cases over quantity, however. The index is at greater variance with the more recent analysis of Shepherd (1985). Though Shepherd dates the antitrust revival at 1938, he describes the 1920s as a lapse, though the index appears nearly as high as under Taft. He also describes the 1950s and 1960s as an era of receding antitrust, but the index shows enforcement activity rising.

Although the RAW index is an improvement over antitrust enforcement measures used in the previous literature, it suffers from a clear defect: It does not correct for the level of real economic activity. If the level of enforcement has risen, but the level of real economic activity

has risen faster, then enforcement, properly measured, may have fallen. Thus the meaningful measure is not the amount of raw enforcement activity, but the amount of enforcement per dollar of real output.

Figure 2 shows PERGNP, the index deflated by the real GNP (1972 dollars). If we use this measure, the qualitative story changes quite a bit. Now the Taft administration's antitrust activity looms very large; enforcement per GNP dollar never reached that height again. Thurman Arnold accounts for the next peak. After a dip during World War II, enforcement held steady through the Truman administration. Enforcement per dollar fell during the Eisenhower administration, and it fell further in the Kennedy-Johnson years, reaching its lowest point in 40 years under Carter. Under this measure, Reagan-era enforcement rises above that of his recent predecessors, but only up to the Eisenhower level, not to the level of Truman.

In our empirical analysis, we use PERGNP as our measure of antitrust enforcement per dollar of real GNP.

4. The Econometric Model

To test for regimes, we follow Hamilton (1989,1990). Hamilton's method offers many advantages over more conventional econometric techniques such as Chow tests or deterministic switches in the underlying process.

One problem with a Chow test analysis is that we do not know when regime shifts take place, if they do at all. We might expect that antitrust enforcement might vary by political party or indeed by presidential administration, but we do not know when an enforcement administration begins and ends. Certainly, a new antitrust enforcement regime would not begin

on inaugural day when presidential power shifts from one party to another. New administrators have to be appointed and approved, pending cases have to be adjudicated, and new procedures have to be formulated and implemented before any change in regime can take place. Thus, if a new regime is to materialize, it must happen sometime after administrations change. Similarly, we cannot tell for sure when a given regime ends, but it certainly does not end on the day power is transferred from one administration to another. An antitrust regime change might also occur during a president's second term, confounding the notion that regime switches are associated with political party.

By using Hamilton's technique, we do not have to impose our priors about when regime changes occur. The data tell us when these changes occur, if they do at all. If antitrust regime changes do occur, it is reasonable to suppose that these switches are the result of a random process rather than a foreseeable deterministic event. Hamilton's technique allows us to estimate the probability that regimes shift as well as the probability that a particular regime is in place during each time period. Thus, we can examine time periods of interest and assess which regime was likely to have been in place. Hamilton's technique also allows us to forecast future regimes given current data, a useful practical tool for antitrust policy analysis.

Let y_t denote the level of antitrust enforcement per dollar of real GNP at time t . We expect that the current level of enforcement will be affected by current random shocks as well as by random shocks occurring in the past. To parsimoniously represent the data, we assume that y_t follows an AR(1) process,

$$y_t = \alpha_i + \beta y_{t-1} + \epsilon^t \quad i = 1, 2 \quad (1)$$

Equation (1) implies that α and β differ by regime, but σ^2 , the variance of the error term, is the same in each regime. When $i = 1$, the enforcement index follows the process

$$y_t = \alpha_1 + \beta_1 y_{t-1} + \epsilon_1^t.$$

In regime 1, the average level of enforcement is

$$E(y_t) = \alpha_1 / (1 - \beta_1) \quad (2)$$

When $i = 2$, the enforcement index follows the process

$$y_t = \alpha_2 + \beta_2 y_{t-1} + \epsilon_2^t$$

and the average level of enforcement is

$$E(y_t) = \alpha_2 / (1 - \beta_2). \quad (3)$$

The transition from enforcement state j to enforcement state i is assumed to be governed by a two-state Markov chain. Define $p_{ji} = \text{prob}(\text{state}_i | \text{state}_j)$. p_{ji} is the probability that the enforcement regime switches from state j to state i . By definition,

$$p_{11} + p_{12} = 1 \quad (4-a)$$

and

$$p_{21} + p_{22} = 1. \quad (4-b)$$

We assume that ϵ_t^i is normally distributed, so that the density function for y_t , given the state and y_{t-1} is

$$f(y_t | \text{state}_t^1, y_{t-1}) = (1/\sqrt{2\pi\sigma}) \exp(-(y_t - \alpha_1 - \beta_1 y_{t-1})^2 / 2\sigma^2) \quad (5-a)$$

and

$$f(y_t | \text{state}_t^2, y_{t-1}) = (1/\sqrt{2\pi\sigma}) \exp(-(y_t - \alpha_2 - \beta_2 y_{t-1})^2 / 2\sigma^2). \quad (5-b)$$

Define I_t to be the information set known at time t . Let $\text{prob}(\text{state}_t^i | I_t)$ be the econometrician's inference about the conditional probability that antitrust enforcement is in state i given information at time t . $\text{Prob}(\text{state}_t^i | I_{t-1})$ is the econometrician's forecast at time $t-1$ of the probability of being in a particular regime at time t , given information obtained at time $t-1$. Using the definition of conditional probability, we can find the joint distribution of y_t and state_t^i as

$$\text{prob}(y_t, \text{state}_t^i | I_{t-1}) = \text{prob}(\text{state}_t^i | I_{t-1}) f(y_t | \text{state}_t^i, y_{t-1}). \quad (6)$$

To find the unconditional density for y_t , we note that we may sum the probability in (6) over both states. Thus,

$$f(y_t | I_{t-1}) = \text{prob}(y_t, \text{state}_t^1 | I_{t-1}) + \text{prob}(y_t, \text{state}_t^2 | I_{t-1}). \quad (7)$$

Using (7), we can write the log-likelihood function for y_t as

$$L = \sum_{t=1}^T \log(f(y_t | I_{t-1})). \quad (8)$$

Our aim is to estimate the parameters of the model by maximizing (8). Before we can do that, we must find an expression for the terms $\text{prob}(\text{state}_t^i | I_{t-1})$ in (6). Now

$$\text{prob}(\text{state}_t^i | I_t) = \text{prob}(y_t, \text{state}_t^i | I_{t-1}) / f(y_t | I_{t-1}), \quad (9)$$

since y_t is in the current information set. The numerator of this expression can be evaluated from (6) whereas the denominator can be found from (7). Thus, given a starting probability value $\text{prob}(\text{state}_0^i | I_{-1}) = \rho_i$, for $i = 1, 2$ where $\rho_1 + \rho_2 = 1$, we can use (9) to find $\text{prob}(\text{state}_1^i | I_0)$. However, to evaluate the likelihood function in (7), we need the values $\text{prob}(\text{state}_1^i | I_{t-1})$, $\text{prob}(\text{state}_2^i | I_{t-1})$, etc. To find these values, we note that because the states follow a Markov chain,

$$\text{prob}(\text{state}_{t+1}^i | I_t) = p_{1i} \text{prob}(\text{state}_t^1 | I_t) + p_{2i} \text{prob}(\text{state}_t^2 | I_t), \quad i = 1, 2. \quad (10)$$

We can now specify an algorithm for evaluating the likelihood function. Given the starting values $\text{prob}(\text{state}_0^i | I_0) = \rho_i$, for $i = 1, 2$ where $\rho_1 + \rho_2 = 1$, and $\rho \geq 0$, we use (5) and (6) to generate $\text{prob}(y_1, \text{state}_1^i | I_0)$. These values may be input into (7) to compute $f(y_1 | I_0)$. Equation (9) can then be used to calculate $\text{prob}(\text{state}_1^i | I_1)$, which can be fed into (10) to obtain

$\text{prob}(\text{state}^2 | I_1)$. This value can then be used to generate $f(y_2 | I_1)$. In this way, we can recursively calculate the likelihood function (8).

The parameters to be estimated are $\alpha_1, \alpha_2, \beta_1, \beta_2, \sigma, p_{11}, p_{12}, p_{21}, p_{22}, \rho_1,$ and ρ_2 , subject to the constraints $p_{11}, p_{22}, p_{21}, p_{12}, \rho_1, \rho_2 \geq 0, p_{11} + p_{12} = 1,$ and $p_{21} + p_{22} = 1$. The standard errors of the coefficients can be obtained from the variance-covariance matrix V , which is estimated by

$$V = (-\partial^2 L / \partial \theta \theta \theta')^{-1} \quad (11)$$

where θ is a column vector of parameters. Thus, the variance-covariance matrix V can be estimated as the inverse of minus the Hessian matrix.

5. Empirical Results

The quarterly antitrust enforcement index per unit of real GNP over the years 1890:Q3-1989:Q3 was used as the variable y_t . Equation (8) was then maximized numerically subject to the constraints on the probabilities. The estimated parameters are reported in the Table.

As can be seen from the Table, the parameters are in general precisely estimated and suggest distinct regimes of high and low enforcement. From equation (2), the average level of enforcement in regime 1 is $1.955298 / (1 - 0.1993121) = 2.442$, while the average level of enforcement in regime 2 can be calculated from (3) as $1.160524 / (1 - 0.113274) = 1.309$. Thus,

regime 1 is the high enforcement regime, whereas regime 2 is the low enforcement regime.*

Notice that p_{11} and p_{22} are very close to one. Recall that p_{11} is the probability that the regime will stay in the high enforcement regime this quarter, given that the regime was in a high enforcement regime last quarter. p_{22} has a similar interpretation for the low regime. Since these probabilities are close to one, regimes must be very long-lived. In fact, the high enforcement regime will last on average $1/(1 - p_{11})$ quarters, or 45 years. The low enforcement regime will last on average $1/(1-p_{22})$, or 65 years. Thus, regimes do not switch with political party in general, consistent with the evidence reviewed earlier. And since ρ_1 is close to zero, antitrust enforcement almost certainly started in the low enforcement regime.

Although regimes are very long-lived, it may well be the case that the antitrust regime switched from high enforcement to low enforcement during the Reagan years. To examine this possibility, we can use equation (9) to calculate $\text{prob}(\text{state}_t^i | I_t)$, the estimated probability of being in state i in quarter t , given the current information set. $\text{Prob}(\text{state}_t^i | I_t)$ can be calculated for every quarter using the maximum likelihood estimates of the parameters. These estimated probabilities are presented in Figure 3.

Figure 3 suggests that antitrust enforcement clearly started out in the low enforcement regime. By about 1910, the probability of being in the high regime began to climb until 1920, when enforcement was clearly in the high regime. Enforcement stayed high until the mid-1930s,

*We did not test a general hypothesis that there is one antitrust regime against the alternative hypothesis that there are two. Under the null hypothesis, the parameters describing the two-regime process are unidentified. Hence, the variance-covariance matrix will be singular, invalidating the likelihood ratio test. Weaker hypotheses can be tested under the standard methodology. For example, if we want to test whether $\alpha_1 = \alpha_2$, we note that $2(L(\text{restricted}) - L(\text{unrestricted}))$ is distributed chi-squared with 1 degree of freedom. This hypothesis can be rejected at the one percent level.

when the probability of being in the high regime fell to about 50 percent. But by 1940, the probability of being in the high enforcement regime had climbed back toward 1.0. By 1960, the probability of being in the high enforcement regime began to fall so that by 1970, the regime was clearly low enforcement, where it stayed until the end of the sample. Notice that the Reagan years were not a time of transition to low antitrust enforcement: the switch to low enforcement had occurred many years earlier, contrary to the claims of the critics mentioned in the introduction.

Our empirical findings are consistent with the results in Posner and Lewis-Beck. We do not find any relationship between political party and antitrust enforcement. The periods of high and low enforcement spanned many Republican and Democratic administrations. Since the regimes are so long, it is not surprising that researchers do not find other variables, such as mergers or unemployment, affecting antitrust.

6. Conclusion

In this paper, we proposed a new measure of antitrust enforcement. Using Hamilton's (1989,1990) regime switching technique, we estimated a model in which the index followed a two-regime AR(1). We found evidence that antitrust enforcement follows a long-lived switching regime process. In the high enforcement regime, which lasted from about 1910 to 1965, enforcement was almost twice as high, on average, as it was in the low enforcement regime. Since the late 1960s, antitrust enforcement has been in the low enforcement regime. In particular, the Reagan years were not a time of low antitrust enforcement, as some critics have alleged.

The results are striking because they are at odds with the historical and anecdotal discussions about antitrust enforcement. What factors produced the high enforcement regime? Why did the regime switch to low enforcement in the 1960s? Our present empirical technique cannot provide any guidance. One way to answer this question is to allow the regime transition probabilities to be time-varying and functions of economic variables as in Diebold, Lee, and Weinbach (1993). We leave the estimation of that model for future research.

Table

Maximum likelihood estimation of the model given by equations (6) - (10). Standard errors calculated from (11) in parenthesis.

α_1	α_2	β_1	β_2	σ	ρ_{11}	ρ_{22}	ρ_{12}
1.955298	1.160524	0.199321	0.113274	1.142385	0.994548	0.996189	0.000039
(0.1944)	(0.1792)	(0.0644)	(0.1109)	(0.0461)	(0.0057)	(0.0070)	(0.00004)

Figure 1

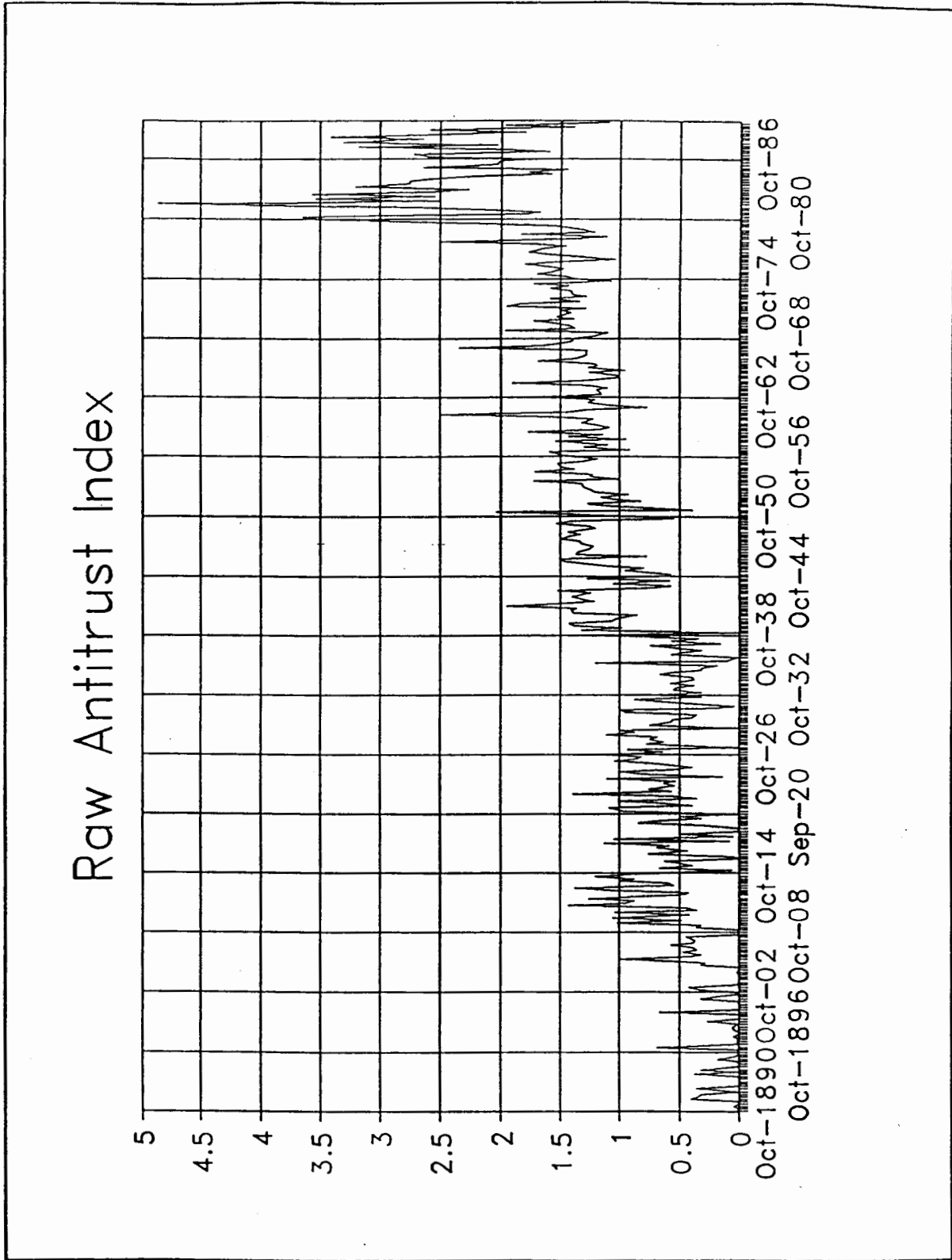
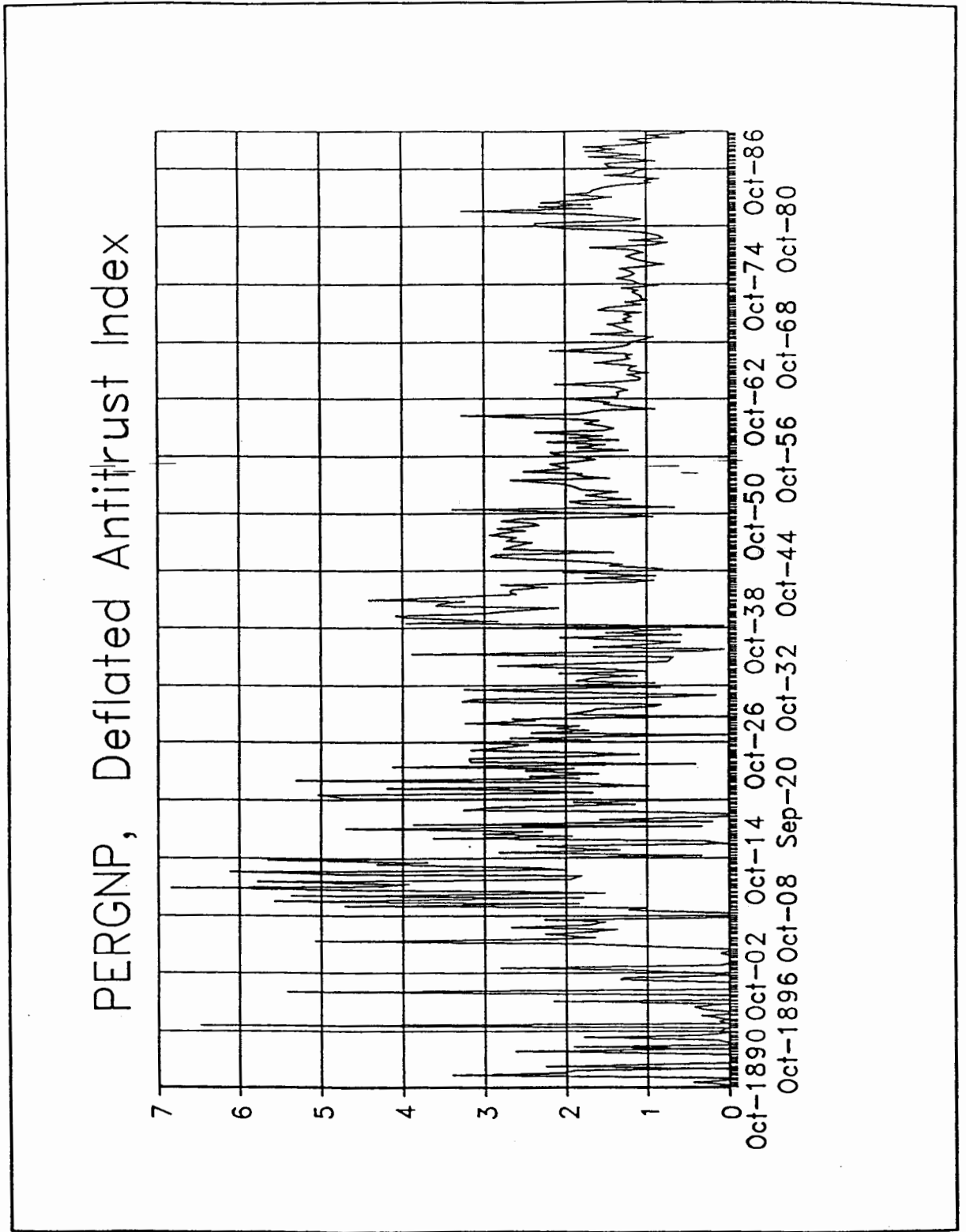
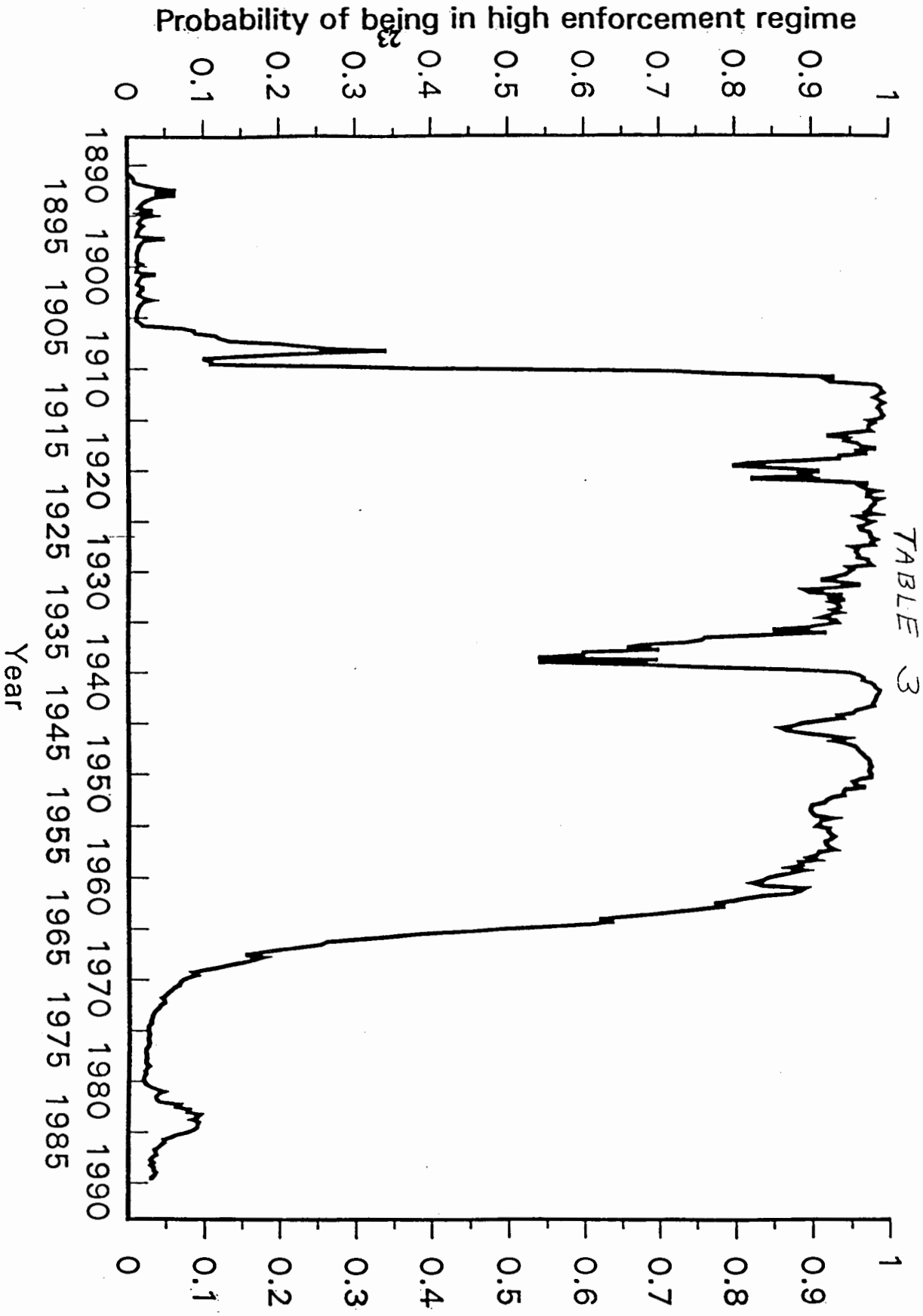


Figure 2





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