



CHICAGO JOURNALS

The University of Chicago

The Booth School of Business of the University of Chicago

The University of Chicago Law School

Economics and Politics: The Case of Sugar Tariff Reform

Author(s): Sara Fisher Ellison and Wallace P. Mullin

Source: *Journal of Law and Economics*, Vol. 38, No. 2 (Oct., 1995), pp. 335-366

Published by: [The University of Chicago Press](#) for [The Booth School of Business of the University of Chicago](#) and [The University of Chicago Law School](#)

Stable URL: <http://www.jstor.org/stable/725689>

Accessed: 25/10/2011 15:14

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



The University of Chicago Press, The University of Chicago, The Booth School of Business of the University of Chicago, The University of Chicago Law School are collaborating with JSTOR to digitize, preserve and extend access to *Journal of Law and Economics*.

<http://www.jstor.org>

ECONOMICS AND POLITICS: THE CASE OF SUGAR TARIFF REFORM*

SARA FISHER ELLISON
*National Bureau of
Economic Research*

and

WALLACE P. MULLIN
Michigan State University

ABSTRACT

We study Congressional voting on sugar tariff reform in 1912 to investigate theories of constituent influence on trade policy. In this setting, consumer interests enjoyed substantial political efficacy. Moreover, since a variety of producer interests competed in the political marketplace, we can evaluate which producer interests were most effective. We explore these issues by integrating two techniques drawn from economics and political science, overcoming some common problems encountered in political economy research. We first conduct an event study to ascertain the relative incidence and importance of legislative events. We then conduct a roll call regression on congressional votes to determine legislator responsiveness to different interest groups. We find that wealthy and concentrated groups, especially shareholders, were not influential. Large, unconcentrated groups, in particular beet sugar laborers and sugar beet and sugarcane farmers, were the most influential producer groups. Strikingly, these latter groups were created by prior protective tariffs.

I. INTRODUCTION

THE year 1909 saw the passage of the Payne-Aldrich Tariff Act, the latest in a succession of protectionist tariff acts. By early in the second decade of the twentieth century, there was already considerable popular sentiment to lower tariffs. By the summer of 1912, attention had focused on the tariff on sugar. Much like the debates over the North American Free Trade Agreement (NAFTA) in the fall of 1993, the public had become transfixed with the debate over a particular trade issue, treating it as symbolic perhaps of greater struggles between competing economic forces in the country. In the debate over NAFTA, one of the most fascinating issues was not the legislation itself or its likely effect, but observing generally the political economy of trade policy reform and specifically the determinants of legislator voting. These political economy issues are the central focus of this article, which examines congressional voting on

* We would like to thank Glenn Ellison, Sam Peltzman, Peter Temin, and an anonymous referee for helpful comments.

[*Journal of Law and Economics*, vol. XXXVIII (October 1995)]

© 1995 by The University of Chicago. All rights reserved. 0022-2186/95/3802-0005\$01.50

sugar tariff legislation in 1912 in order to investigate various theories of constituent influence on trade policy.

We adopt the standard assumption of public choice, that elected officials are goal-maximizing, rational actors. Whether they are David Mayhew's "single-minded seekers of reelection," or they pursue a more diverse set of goals, the satisfaction of these goals depends on pleasing politically powerful groups in their constituencies.¹ Different interest groups may be able to provide the legislator with different inputs into his reelection campaign. For example, some constituents may directly provide a large number of votes. Other, smaller but better-organized, groups may provide volunteers and money for reelection. Congressional votes may then be determined by the interest of these important groups. We use the developments involving the sugar tariff as a natural experiment to evaluate which constituent interests were most influential.

Several features make this an attractive empirical setting. First, tariff reduction was a highly visible national issue with widespread popular support. This was manifested in the Congressional elections of 1910 with the decisive victory of free-trade Democrats. As Frank W. Taussig explained, "There was virtually no other question than the tariff on which the parties differed; and it would seem to have been shown once more that when this issue presented itself without complication from others, the popular verdict was against the stubborn maintenance of a rigid protective policy."² We would therefore expect consumer interest in a lower tariff to have considerable political efficacy in Congress. This is in sharp contrast to many modern political episodes in which consumer interests are only weakly represented or are absent entirely and in which political outcomes mirror the "producer protection" or "capture" predictions of George Stigler or Mancur Olson.³ It is therefore particularly instructive to examine the impact of producer interests in this situation.

Second, the structure of the sugar industry and the sugar tariff gave rise to a variety of competing producer interests. Moreover, we possess data on the geographic distribution of not only interested farmers and laborers but, most unusually, shareholders as well. We can therefore ascertain which producer interest was most effective. Colloquially, if a legislator votes in favor of protection, did he act to protect farmers, jobs, or profits? The answer is important, since it suggests the particular

¹ David Mayhew, *Congress: The Electoral Connection* (1974).

² Frank W. Taussig, *The Tariff History of the United States* 409 (8th ed. 1931, reprinted 1964).

³ George J. Stigler, *The Economic Theory of Regulation*, 2 *Bell J. Econ.* 3 (1971); Mancur Olson, *The Logic of Collective Action* (1965).

systematic biases that are likely to arise within U.S. trade policy as a result of characteristics of the political system. A final motivation for this study is that trade policy toward sugar has persisted as a contemporary policy issue, and it is worthwhile to understand the origins and evolution of this program.

In testing constituent interest theories of legislative voting, however, a researcher faces two common problems. First, the researcher must correctly characterize the likely incidence of proposed legislation. In some settings, such as appropriations, the incidence is clear. In other areas of public policy, such as taxation, regulation, and tariff policy, the winners and losers are not so clear-cut. Second, the researcher must identify the legislative agents which are pivotal. Several features make this latter task difficult. First, the bicameral structure of Congress, the committee structure within each house, and the check on legislation provided by presidential veto each provide a subset of political actors with the opportunity to veto legislative change. As a result, the pivotal vote often belongs to the group or house which is most likely to exercise its veto. Additionally, appearances may be deceiving if there is "strategic voting" by legislators. For example, a legislator may vote to reduce the sugar tariff only to forestall the abolition of the sugar tariff. In fact, "strategic voting" can obscure the relative incidence of, and therefore preferences of various groups over, proposed legislation in addition to obscuring the importance of the legislation.⁴

We provide what we believe to be a modest methodological contribution toward dealing with these two problems. Just as our substantive concerns involve the interface between economics and politics, this article offers a methodological contribution which integrates two common techniques drawn from economics and political science, respectively. We pair a standard economics methodology used to explore incidence and importance of events, the event study, with a standard political economics methodology used to explore determinants of legislator voting, the roll call regression. Additionally, we augment the standard event study methodology to account for the gradual diffusion of information that is characteristic of legislative events.

The structure of the article is as follows: Section II outlines the history and political economy of tariff reform in the early twentieth century, in particular, the sugar tariff. Section III addresses the methodology of the study, the pairing of the event study with the roll call regression, in

⁴ For a discussion of "strategic" or "sophisticated" voting, see Arthur Denzau, William Riker, & Kenneth Shepsle, Farquharson and Fenno: Sophisticated Voting and Homestyle, 72 *Am. Pol. Sci. Rev.* 1117 (1985).

addition to the methodology of the two components separately. Section IV discusses the data for and results from the event study. Section V then discusses the data for and results from the roll call regression. Section VI concludes.

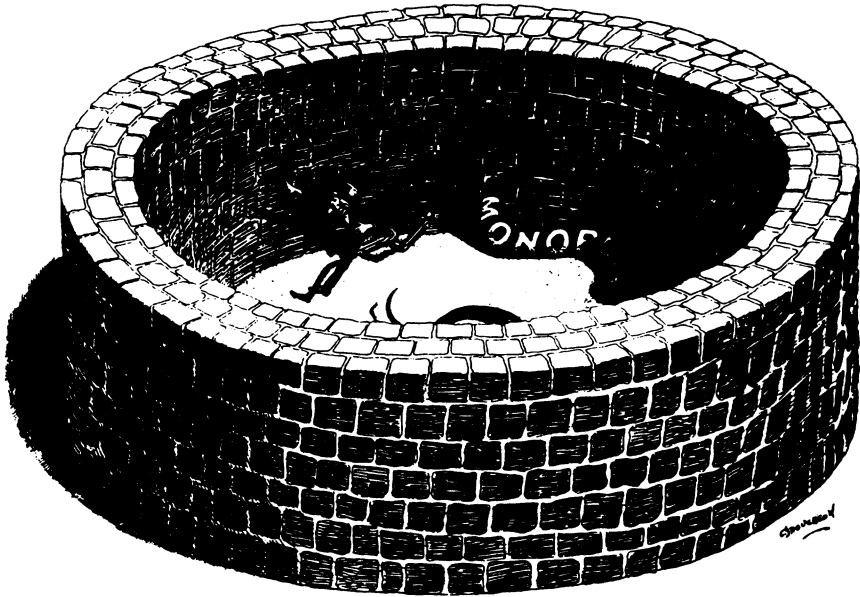
II. HISTORY AND POLITICAL ECONOMY

Tariff reform had become an important issue early in the second decade of the twentieth century. As noted, the 1910 elections took control of the House of Representatives from the Republicans and gave it to the Democrats almost exclusively because of a Democratic platform to lower tariffs. The U.S. economy had been in depression through 1910, and the level of prices worldwide had been increasing for a decade. The Democrats took advantage of this Republican vulnerability in 1910, blaming economic hard times mainly on the Republican tariff policy. While it is doubtful that high tariffs were responsible for worldwide inflation and the depression of 1907, the Democratic argument was largely accepted by the American public.

High tariffs were believed to be the cause of many of the nation's economic ills. A 1912 column in the *New York Times* exemplified how high tariffs were blamed for the high cost of living: "There is a difference of between 2 and 3 cents per pound between the American domestic price and the price of the same sugar in the London markets. The immensity of the amount to the American consumer can be seen by referring to the number of pounds consumed in the United States. . . . Then everybody wants to appoint a great commission . . . to find out why prices are high and 'what is the matter with the cost of living.'"⁵

At this time, the industrial landscape was dominated by the trusts and their monopolistic corporate successors. The public linked the tariff and the trusts, as the contemporary cartoon in Figure 1 demonstrates. "Strenuous Sam and his Tariff Wall" appeared on the cover of *Life* magazine, and it portrayed Uncle Sam's futile attempts to escape the serpent monopoly, hemmed in by the tariff wall. Public antipathy toward monopoly was translated into opposition to the tariff. This sentiment was particularly strong among the citizens of middle America. According to a contemporary account of the politics of the tariff, "The Senators from some of the great agricultural States of the Middle West—Wisconsin, Iowa, Nebraska, Minnesota—stood staunchly for reductions in duties. Their constituencies, more strongly than any other part of the country, felt

⁵ John Jerome Rooney, *Arbitrary Color Test Is Chief Cause of High Sugar*, *N.Y. Times*, August 12, 1912.



STRENUOUS SAM AND HIS TARIFF WALL.

CHARLES BROUGHTON'S CARTOON ON THE TARIFF, 1902.

FIGURE 1

hostility to real and supposed monopolies. They represented the healthy uprising against monied domination."⁶

Sentiment for lowering tariffs was not unanimous. There were, of course, groups that benefited greatly from protective tariffs. Under a reduced tariff, American producers would either go out of business if they could not compete with their foreign counterparts or at least lose rents created by government protection.

Although there was a movement for widespread tariff reduction, we have chosen to focus on the sugar tariff. An important reason for this choice is the variety of producer interests which were involved in sugar policy. These interests were a by-product of the technology of sugar production and previous tariff policy.

Refined sugar, a consumer good, was produced by two techniques. First, refined sugar could be derived from sugarcane. Sugarcane was initially processed into raw sugar, a form which can be transported and

⁶ Taussig, *supra* note 2, at 374.

stored for later refining.⁷ Most of the raw sugar was produced in the tropics, especially Cuba, although Louisiana and some other southern states were also producers. American Sugar Refining Company, the corporate successor to the Sugar Trust, was by far the largest of the cane sugar refiners. Second, refined sugar could be derived from sugar beets. In the United States, this was accomplished through a continuous process in which sugar beets were processed into refined sugar within a single plant.⁸ Beet processing factories were located by necessity close to beet fields; therefore, the U.S. beet sugar industry used domestically grown beets exclusively.⁹ Refined cane sugar and beet sugar were close substitutes.¹⁰

The tariff structure contained two chief components, the duty on raw (cane) sugar and the duty on refined sugar. Under the Payne-Aldrich Tariff of 1909, the tariff was 1.685 cents per pound on raw sugar and 1.9 cents per pound on refined sugar.¹¹ The four producer groups with important stakes in the sugar tariff were domestic sugarcane farmers, cane refiners, beet farmers, and beet refiners. The likely incidence of this tariff structure is summarized in Table 1. The table indicates whether a particular group benefited (+), was harmed (-), or was unaffected (0) by each provision. Where the effect is unclear a priori, two symbols appear.

Consider first the tariff on raw sugar. This tariff partially shielded domestic cane farmers from competition from the tropics. Since it raised the cost of their principal input, it harmed domestic cane sugar refiners. That tariff was also a chief impetus in the development of the American beet sugar industry. Its importance was underscored by the reaction to the proposed reduction of the tariff. As one official of the Western Sugar and Land Company, a beet sugar company, lamented, "There is no doubt in my mind but that our plant will shut down if [the Underwood Bill to eliminate sugar tariffs] becomes a law."¹² A reduced tariff would harm both beet farmers and beet refiners, although not necessarily to the same

⁷ Throughout this article, "raw sugar" refers to 96 degree centrifugals, the standard raw sugar.

⁸ In Europe, beet sugar was produced in a two-stage process similar to that for cane sugar.

⁹ This proximity was required since harvested beets deteriorate rapidly. U.S. Federal Trade Commission, Report on the Beet Sugar Industry in the United States 2 (1917).

¹⁰ If removed of all impurities, the two refined products would be chemically identical. It appears some consumers harbored a prejudice against beet sugar, so it often sold at a slight discount.

¹¹ Roy G. Blakey, *The United States Beet Sugar Industry and the Tariff* 206 (1912).

¹² Effect of the Underwood Tariff Bill on the Sugar Industry, *Wall St. J.*, June 24, 1913.

TABLE I
INCIDENCE OF SUGAR TARIFFS

	Tariff on Raw Sugar	Tariff on Refined Sugar
Cane farmers	+	+ /0
Cane refiners	-	+ /0
Beet farmers	+	+ /0
Beet refiners	+	+ /0

degree. Contemporary economist Philip Wright argued, "Because of the highly specialized character of the plant and machinery in the factory phase of the industry, such factories as could not survive a reduced tariff would be nearly a dead loss. But land has so many alternative uses and the labor employed in both field and factory is such a simple semiskilled character that the abandonment of production would not greatly derange either the agricultural or labor interests."¹³ Wright's assessment indicates that farmers and workers had only a small long-run stake in protection, although of course there could be a considerable dislocation in the short run.

The tariff on refined sugar may have benefited all four of these groups, but probably only to a limited extent. Europe was the center of the world's production of refined beet sugar. Although very little refined sugar was imported into the United States, the threat of imports from Europe affected U.S. prices, at least in some years.¹⁴ There is considerable testimony that in the early years following the formation of the Sugar Trust in 1887, imports were impeded; the threat of imports caused American Sugar Refining to set the price of refined sugar so that no refined sugar would be imported. The president of American Sugar Refining Company acknowledged this strategy in Congressional testimony in 1888 and 1894.¹⁵ In later years, imports of refined sugar may have been blocked by transportation costs. In that case, the tariff on refined sugar would have no effect on U.S. prices. If the U.S. price of refined sugar was set to impede European imports, the tariff on refined sugar raised the U.S. price. It thereby helped cane and beet refiners and indirectly aided cane and beet farmers.

¹³ Philip G. Wright, *Sugar in Relation to the Tariff* 29 (1924).

¹⁴ For import statistics, see Truman Palmer, *Concerning Sugar*, at E-54-B (1929).

¹⁵ Alfred S. Eichner, *The Emergence of Oligopoly: Sugar Refining as a Case Study* 96 (1969). For an alternate viewpoint, see Richard Zerbe, *The American Sugar Refinery Company, 1887-1914: The Story of a Monopoly*, 12 *J. Law & Econ.* 339 (1969).

It is important to note, however, that it is unclear whether sugar refining received *net* protection under this tariff structure. The refined tariff under the Payne-Aldrich law was only slightly above the tariff on raw sugar. A simple calculation yields an effective rate of protection (ERP) of 12.5 percent.¹⁶ This suggests that removing the tariffs on raw and refined sugars would harm U.S. cane refiners. A problem with the ERP calculation, however, is that it assumes sugar refining was perfectly competitive. United States refiners may have possessed domestic market power that was constrained by the threat of refined imports. To illustrate the possible implications, suppose that both domestic and European refiners possessed constant marginal and average costs, and the domestic refined price was set to impede European imports. If the raw and refined tariffs were reduced equally, U.S. refiners could choose to lower the refined price by the amount of the tariff reduction. This would preserve the prior margin over costs but at a higher quantity level due to the lower price. Imports from Europe would continue to be impeded. Therefore, the profits of U.S. cane refiners would be higher under the tariff reductions.¹⁷

An important interest group omitted from Table 1 is sugar consumers, who would seem to have a large but diffuse stake in lowering the sugar tariff and hence sugar prices. In fact, since over 70 percent of U.S. sugar consumption took place directly in the household, there was relatively little opportunity for industrial consumers of sugar to organize and agitate for tariff reduction. Nevertheless, as noted earlier, consumer interests played an important role in tariff reform precisely because it had become a highly visible national issue.

For an interest group to influence policy, it must possess both motive and means. The foregoing discussion has provided motive. Means, or more formally, political efficacy, hinges on a theory of constituent interest. We discuss the competing theories in the next section.

¹⁶ The effective rate of protection is

$$\text{ERP} = \frac{t_{\text{ref}} - a \times t_{\text{raw}}}{1 - a},$$

where t_{ref} is the tariff on refined sugar, t_{raw} is the tariff on raw sugar, and a is the share of raw sugar in the cost of refined sugar. We substitute in the Payne-Aldrich tariff rates and set $a = 0.98$, based on figures in David Genesove & Wallace P. Mullin, *Validating the Conjectural Variation Method: The Sugar Industry, 1890–1914* (unpublished manuscript, Mass. Inst. Tech. 1994). The ERP formula is discussed by Warner Max Corden, *Effective Protection*, in *The New Palgrave: A Dictionary of Economics* 102 (John Eatwell, Murray Milgate, & Peter Newman eds. 1987).

¹⁷ Of course, domestic refiners might choose not to pass through the entire tariff reduction, bringing in European imports. Since this would occur only if it were more profitable for U.S. refiners, the tariff reduction would still benefit U.S. refiners.

III. METHODOLOGY

On a general level, this article is designed to shed light on the political determinants of U.S. trade policy. As Stephen Marks and John McArthur indicate in their survey article, empirical work on this issue has adopted a number of approaches.¹⁸ We adopt the most recent approach, which attempts to identify the determinants of congressional voting on trade policy. One benefit of this focus is that congressional voting is one of the most observable actions in the political system, and the linkage between constituent interest and political outcome is relatively direct.¹⁹ This is especially the case for our example, since the national attention given to tariff reform gave congressional votes on the tariff high visibility and hence high political accountability.²⁰

Roll call regressions are a common tool of political economists and political scientists. Measures of constituent interest, for instance, are used to explain voting patterns of legislators. Their explanatory power and significance are then indicators of the legislator's responsiveness to constituent interest. The research on congressional roll call voting establishes that constituent interest plays an important role in affecting legislative outcomes.²¹ Nevertheless, the precise nature of this constituent influence is less well understood.

Much theoretical and empirical work on the political economy of trade policy has been devoted to explaining the apparent primacy of producer interests over consumer interests in shaping trade policy. In our context, however, consumer interests had a loud voice, as the 1910 elections had reshaped the Congress to reflect the public's interest in tariff reform. Moreover, sugar producer interests were divided, with heterogeneous motives and capabilities. Under the maintained hypotheses about the stakes of the various groups, the different theories of constituent influence make different predictions about which stakes will be given the most

¹⁸ Stephen V. Marks & John McArthur, *Empirical Analyses of the Determinants of Protection: A Survey and Some New Results*, in *International Trade Policies* 105 (John S. Odell & Thomas D. Willett eds. 1990).

¹⁹ Of course, this linkage is not as direct as a citizen referendum on trade policy. For an interesting study of the latter, see Douglas A. Irwin, *The Political Economy of Free Trade: Voting in the British General Election of 1906*, 37 *J. Law & Econ.* 75 (1994).

²⁰ One of the costs of organizing for political change is the cost of becoming informed. In our context, even casual observers of the political process would be informed about these tariff votes.

²¹ See, for example, Sam Peltzman, *Constituent Interest and Congressional Voting*, 27 *J. Law & Econ.* 181 (1984). Some other researchers argue that Congressional voting reflects legislator ideology or the influence of special interests outside the legislator's geographic constituency.

weight in the political process. We can then compare the empirical weights from the roll call regressions to evaluate these theories. We evaluate four particular theories, although in some cases the theories are not mutually exclusive. Each of the four can be cast as a prediction about what determines the political efficacy of an interest group.

First, political efficacy may be shaped by the economic concentration of the interest group. As Olson indicated, the greater the economic concentration of a group, the more easily the group will overcome the free-rider problem in organizing for political action. Under this view, the cane sugar refiners would be the most easily organized, since American Sugar Refining was a near monopoly. More numerous beet sugar refiners would face greater difficulty, and farmers and laborers would face the greatest difficulty in organizing.

Second, political efficacy may be determined by the total wealth and total monetary stake of the interest group. Politicians need both money and votes to secure reelection. As formalized in the case of tariff policy by William Brock and Stephen Magee, politicians support special interests in order to receive money, but they sacrifice votes in the process.²² In equilibrium, politicians balance the marginal contribution of money and votes in their reelection prospects. Applying this view to our setting, the most influential group would be cane refiners—in particular, their stockholders—who were wealthy. Although farmers and laborers were more numerous than stockholders, they should have relatively little effect. If a legislator adopted a pro-tariff position, the votes gained from farmers and laborers would be more than offset by the consumer votes lost as a result of that position. Therefore, farmers and laborers would be influential only if they could contribute money to compensate a legislator for the net votes lost by a pro-tariff position. Lacking considerable wealth, they should be less influential than cane refining shareholders.

Third, political efficacy may be determined by the number of members in, and hence votes from, an interest group. This corresponds most closely with the majoritarian ideal. If the political environment of tariff reform allowed consumers to overcome their free-rider problems and organize effectively, then the less concentrated of the producer groups may have been able to organize effectively as well. In this situation, farmers and laborers should be the most effective of the producer groups. In comparison, other models of the political process predict a different relationship between interest group size and political efficacy. In Stigler's seminal article and in later work by Sam Peltzman, group size is subject

²² William A. Brock & Stephen P. Magee, *The Economics of Special Interest Politics: The Case of Tariffs*, 68 *Am. Econ. Rev.* 246 (1978).

to diminishing and ultimately vanishing returns, since the larger the group, the more diluted are its members' per capita stakes.²³

Fourth, and finally, political efficacy may be influenced by the privileged position of the status quo. W. Max Corden argued that the political system uses trade policy to shield people from income loss and therefore may treat economic gains and losses differently.²⁴ In our context, on any proposal to reduce the sugar tariff, potential gainers, such as cane refining interests, should be less influential than the potential losers, beet sugar interests and domestic cane farmers. In this way, the status quo level of tariffs may play an important role.

As mentioned in the introduction, two issues which can arise in such an analysis are determining the preferences of certain groups over legislative outcomes and determining the important, or pivotal, legislative events. The very nature of our political process, in addition to factors such as "strategic voting," can obscure the answers to these two questions. Obviously, in order to perform an analysis of a roll call vote, we need these answers; we must know on which votes to focus our analysis, the importance of various votes, and whether various constituent or interest groups prefer a certain piece of legislation over likely alternatives (and would therefore prefer a "Yea" vote, say), the "sign" of a vote. Researchers typically deal with these ambiguities by consulting contemporary accounts. Newspaper articles and trade journals, for instance, provide clues to how constituent groups perceive certain legislation and to how important a certain vote on the legislation is.

In this article we provide an additional methodology to help answer these questions. The idea is the following: if the interests of any particular constituent group could be represented by a publicly traded firm, we could observe how the stock price of the publicly traded firm reacted to the legislative vote. Loosely speaking, if the stock price reacted positively, then a vote on the winning side could be interpreted as a positive vote for that firm and consequently for the constituent group whose interests are represented by the firm. If the stock price failed to react, it might have been that the vote failed to contain information or was not "important."²⁵ Of course, not all relevant constituent groups need to be represented by a publicly traded firm for this method to be of use.

²³ Stigler, *supra* note 3, at 3; Sam Peltzman, Toward a More General Theory of Regulation, 19 J. Law & Econ. 211 (1976).

²⁴ Warner Max Corden, Trade Policy and Economic Welfare (1974).

²⁵ Of course, the outcome of an important vote could have been fully anticipated by the market and its effect already incorporated in the stock price. We discuss this possibility later in the section.

The event study is a standard economics methodology for formalizing and testing for such effects on stock prices. It has been applied to examine the effects of government policies, such as regulation, as outlined by G. William Schwert.²⁶ One estimates the following equation for security i :

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \delta_i E_t + \epsilon_{it}, \quad (1)$$

where R_{it} is the return on security i at time t , R_{ft} is the risk-free rate of return, R_{mt} is the return on the market portfolio, and E_t is an indicator variable for the event.²⁷ An estimated positive and significant coefficient on E_t is interpreted as meaning that the event was good news for the stock. This gives us information of two types: whether the event was important—that is, whether it conveyed information—and what effect that information had on the valuation of a particular company.

Applications of this methodology would often be possible when studying the political economy of various economic policies. Many of the actors in such political debates do have interests which could be tied directly to a publicly traded firm, commodity, or other asset. In any case, this methodology does not obviate a careful reading of contemporary accounts. We use it here as a complement to such information in a situation where constituent preferences and importance of votes may have been significantly obscured.

Our application presented an additional problem in performing the event study. In the traditional event study, events must be unanticipated in order for the researcher to estimate their full effect on a firm's value, although partial effects may be estimated if the events are partly unanticipated.²⁸ In our situation, we have legislative events, some of which were not only anticipated but might have even gradually become more of a foregone conclusion as the debates over the legislation wore on. It is

²⁶ G. William Schwert, *Using Financial Data to Measure Effects of Regulation*, 24 *J. Law & Econ.* 121 (1981).

²⁷ Note that we look at returns, a percentage change in price over the previous period, instead of prices. For further details concerning the event study methodology, see Eugene F. Fama, Lawrence Fisher, Michael Jensen, & Richard Roll, *The Adjustment of Stock Prices to New Information*, 10 *Int'l Econ. Rev.* 1 (1969); Schwert, *supra* note 26, at 121. For a related methodology that has been applied to study the sensitivity of capital returns to import competition, see Gene M. Grossman & James A. Levinsohn, *Import Competition and the Stock Market Return to Capital*, 79 *Am. Econ. Rev.* 1065 (1989).

²⁸ More precisely, the market can anticipate the event, but the information must be disseminated to the market all at once. Knowing when this information dissemination occurred is not necessary but quite helpful in performing an event study. See Clifford A. Ball & Walter N. Torous, *Investigating Security-Price Performance in the Presence of Event-Date Uncertainty*, 22 *J. Fin. Econ.* 123 (1988).

quite possible that very little information was revealed at the actual time of the vote because very little uncertainty about the outcome of the vote remained, the uncertainty having largely been resolved through a series of many small events—senators' announcements, newspaper reports, and so forth—in the weeks or even months preceding the vote. In order to take account of the possibility of gradually leaking information, we devise and implement a technique which is tailored specifically to that situation. We explicitly model the effect of gradual information leakage on excess returns. This nontraditional event study is discussed following the results from the standard event study.

IV. THE EVENT STUDY

A. *The Data*

The data set for the event study consists of weekly stock prices from January 1910 through July 1914 for 50 firms traded on the New York Stock Exchange. We construct a market index from these data.²⁹ As a proxy for risk-free rate of return, we employ the rate on time loans.³⁰

In terms of individual firms, our primary focus is on the excess returns of American Beet Sugar (ABS) and American Sugar Refining (ASR). Note that, although they are both sugar refiners, they could be affected very differently by tariff legislation. In particular, ABS produced beet sugar, therefore using a technology which required them to grow or purchase sugar beets domestically, while ASR refined cane sugar and so was free to purchase raw cane sugar from domestic or foreign producers. ABS, therefore, benefited from tariffs on raw cane sugar, while ASR was harmed. We will sometimes call the two sugar producing companies the "direct" group, since we would expect legislation on the sugar tariff to have a direct effect on them. Ideally, we would supplement the reactions of these two stocks with that of food processors that used sugar as an input. Unfortunately, no such firms were traded on the New York Stock Exchange during this time.

Additional information is available, however, from a less direct source. Companies with no direct ties to the sugar industry could be affected by sugar tariff developments to the extent that these developments signaled

²⁹ The 50 stocks consist of 25 industrial and 25 railroad stocks from the *New York Times* market index. This was a broader market index than the Dow Jones Averages. For a full description of the market index, see George L. Mullin, Joseph C. Mullin, & Wallace P. Mullin, *The Competitive Effects of Mergers: Stock Market Evidence from the U.S. Steel Dissolution Suit*, 26 *RAND J. Econ.* 314–30, 318 (1995).

³⁰ For a description, consult *id.* at 318.

possible changes in other tariffs directly affecting those companies. There are two possible, countervailing linkages. A lowering of the sugar tariff might indicate that Congress was inclined to lower the tariff on other goods. However, since tariffs were an important source of revenue for the federal government at the time, a lowering of one tariff might necessitate a raising of another to maintain revenue.³¹ Although the results from this indirect or signaling group of companies will be less useful for the roll call regression analysis than results from the direct group, they may be useful in confirming the importance of various events.

For the signaling group, we use the stocks of one rubber and two chemical companies, since tariff legislation on those products was to be considered after the debate on the sugar tariff. Moreover, contemporary accounts suggested the possible linkage between the sugar tariff and the tariff on those products. See Table 2 for the list of companies. In interpreting the results from the signaling group, one should note that the chemical companies benefited from the tariff on their outputs, while U.S. Rubber suffered from the tariff on its chief input, raw rubber.

The event study employs four events: COMMITTEE, HOUSE, SENATE, and TAFT. Each of these four events corresponds to a different "veto point" in the legislative process. The event study can therefore help reveal which political actors were pivotal in restraining tariff reduction. We will describe in detail each event and its predicted effect on stock prices.

First, we describe COMMITTEE. On March 2, 1912, Mr. Underwood, chairman of the House Ways and Means Committee, made public a proposal to place sugar on the free list, that is, to eliminate the protective tariff. According to the *New York Times*, on March 1, 1912, the text of the sugar revision bill was known to only 14 members of the House prior to March 2, and steps were taken by Mr. Underwood to prevent a leak. Evidence of the secrecy is conveyed in an erroneous report in the *New York Times* article just 1 day before the March 2 vote: "The impression is strong that the bill to be considered by the caucus would provide for a flat rate of either 80 cents or \$1 a hundredweight on raw sugar."³² Not only did the public not know with certainty the contents of the bill, but the public also anticipated that a less dramatic reduction would be proposed. The bill eliminated the tariff on both raw and refined sugar. Such an event would have a negative effect on the stock price of ABS. As our discussion of the net protection of cane sugar refining indicated, the effect

³¹ Revision in the sugar tariff in the 1890s was linked to offsetting tariff revisions on other goods. Eichner, *supra* note 15, at 181.

³² Secret Sugar Bill Starts Caucus Row, *N.Y. Times*, March 1, 1912.

TABLE 2
COMPANIES USED IN THE EVENT STUDY, 1910-14

Company	Line of Business
Direct group:	
American Beet Sugar	Beet sugar production and refining
American Sugar Refining	Cane sugar refining
Signaling group:	
American Agricultural Chemical	Fertilizer, glue, gelatin
U.S. Rubber	Rubber products
Virginia-Carolina Chemical	Acids, chemicals, fertilizers

SOURCE.—John Moody, *Moody's Analyses of Investments, Part II: Industrials* (1915).

of the event on ASR is arguably ambiguous. Our prediction, however, is for a (net) positive effect on ASR. We also predict a negative effect on the two chemical stocks because such an announcement might signal that the House of Representatives was intending to lower tariffs more than previously expected, and chemical tariffs were indeed to be discussed in the future. We also predict a negative effect on the rubber stock. Again in the March 1 article, the *New York Times* reported speculation that a tariff would be imposed on raw rubber to replace revenue lost by a reduction in the sugar duty. Under this logic, a larger-than-anticipated reduction in the sugar tariff would lead to a larger-than-anticipated increase in the raw rubber tariff, thereby hurting U.S. Rubber. In other words, our expectation is that the chemical and rubber stocks will react similarly but for different reasons.

Second, on March 15, 1912, the House of Representatives voted, 199 to 104, to pass the bill calling for the elimination of the sugar tariff. Conditional on the announcement made 2 weeks earlier, this event, HOUSE, might have been largely anticipated. If the outcome had been somewhat unanticipated, we expect the vote to have a negative effect on the stock price of ABS, a positive effect on ASR, and negative effects on the chemical and rubber stocks for much the same reasons as above.

In the third event, SENATE, the upper house acted, passing a sugar tariff reduction bill on July 27, 1912 by a margin of 37 to 25. The Senate's bill, however, was much less drastic than the House's, containing only an 11 percent reduction in the tariff on raw sugar and a 15 percent reduction in the tariff on refined sugar.³³ In fact, it seems reasonable to believe

³³ The tariff was reduced from 1.685 to 1.496 cents on raw sugar, and from 1.9 to 1.6 cents on refined sugar. *Weekly Stat. Sugar Trade J.*, August 1, 1912, at 304.

that the tariff reduction in the Senate bill was as small as was likely to occur, given the fact that the industry had been facing the possibility of eliminating the tariff just a few months earlier. This event might also have been largely anticipated given the bill's margin of victory. We expect the event to have a positive effect on ABS stock prices, although a negative effect would not be too surprising in light of the market's possible expectations. Again, ASR should experience an effect opposite that of ABS, while the signaling group should experience an effect in the same direction as ABS.

Finally, in event 4, TAFT, President Taft vowed on August 1, 1912, to veto any tariff legislation reaching his desk, with the possible exception of the sugar tariff bill. Taft believed the sugar bill, if it reached him in a form similar to the one the Senate passed, did not excessively lower tariffs like the other proposals. If the sugar bill reached him in a form more similar to the House version, he would surely veto it. One would assume that such an announcement by President Taft, committing himself to fight for sustained tariffs, would be good news for ABS but especially good news for the chemical and rubber companies. It would be bad news for ASR given our assessment of the net protection of cane sugar refining.

All of these events were decided on based on the data set of Congressional votes and contemporary newspaper accounts, especially the *New York Times*.

B. Event Study Results

We first estimate

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \epsilon_{it} \quad (2)$$

for each of the five stocks, obtaining $\hat{\beta}_1, \dots, \hat{\beta}_5$. We use the whole time series of data for each stock except the 50 weeks surrounding the legislative activity studied in this article. These 50 weeks correspond roughly to the year 1912.³⁴ Excess returns for the period of interest, then, are computed

³⁴ In addition, we omit the week containing November 28, 1910, because a suit to break up ASR was filed on that day. The antitrust action against American Sugar would complicate our interpretation of ASR's stock returns were it not for the significant delays in prosecuting that case. After filing suit, the Department of Justice did not proceed until the Supreme Court decisions in the *Standard Oil* and *American Tobacco* cases. Pretrial testimony did not begin until April 1912 and lasted more than a year. Later, World War I interrupted the case, and a final resolution was not achieved until a 1922 consent decree. The progress of the suit is discussed by Eichner, *supra* note 15, at 304-7. We therefore also omit the weeks containing May 16 and May 29, 1911, the dates of, respectively, the *Standard Oil* and *American Tobacco* decisions. (The estimated betas, in any case, are quite robust to changes in the above omissions.)

$$A_{it} \equiv (R_{it} - R_{ft}) - \hat{\alpha}_i - \hat{\beta}_i(R_{mt} - R_{ft}). \quad (3)$$

The traditional event study was then performed by regressing the excess returns on indicator variables for the event windows.³⁵ Here we used 1-week windows for all of the events. See Table 3 for the results. This detects no reaction by either the direct or signaling group to any of the events.

Our choice of a 1-week event window could be called into question. When the precise timing of an event is uncertain, there is a trade-off in the choice of event window. Two issues arise. The shorter the window, the more precise will be the estimates of the event response. However, the shorter the window, the more likely that the news, and hence the stock market's response, will fall outside the event window.

In this empirical setting, our primary concern was with the latter issue because of the gradual leakage of information characteristic of legislative events. Even in the aftermath of a congressional vote, there may be additional information released as the president and the members of the other legislative body revise their positions. Too narrow a window could omit much of this information. The use of a weekly, rather than a daily, event window helps address this, to a limited extent. Two-week windows did not qualitatively change the results.

Within the standard event study methodology, we could impose an even wider window, such as 4 or more weeks. At this point, however, the loss of statistical power would be substantial. As an alternative, we devise and implement a nontraditional event study. In essence, we estimate the window width simultaneously with the event response. Since we do not constrain the window width, this procedure does incur a loss of power relative to the standard event study with a fixed and known window width. In this context, the expected benefits justify that loss.

The following intuition underlies our approach. Recall that for unanticipated announcements which affect a stock's price, we would observe a discrete jump in price in the period in which the information was revealed. Suppose, however, information leaked out slowly, or diffused, about the event. Then, instead of all of the information being incorporated into the stock price at one time and causing a discrete jump, it would do so gradually over time. We do not know a priori the shape of this gradual incorporation, but an "S-shaped" curve or normal cumulative distribution function (c.d.f.) shape does not seem an unreasonable parameteriza-

³⁵ We have constrained parameters within the direct group to be opposite of each other, so the response by American Beet Sugar to an event is constrained to be equal to the negative of the response of American Sugar Refining. We also constrained parameters within the signaling group to be equal.

TABLE 3
TRADITIONAL EVENT STUDY

	Estimate	Standard Error	<i>t</i> -Statistic
Signaling group:			
Reaction to COMMITTEE	-.010	.018	-.553
Reaction to HOUSE	.006	.018	.350
Reaction to SENATE	-.011	.018	-.587
Reaction to TAFT	-.004	.018	-.229
Direct group:			
Reaction to COMMITTEE	.003	.018	.194
Reaction to HOUSE	-.011	.018	-.594
Reaction to SENATE	.005	.018	.283
Reaction to TAFT	-.011	.018	-.621

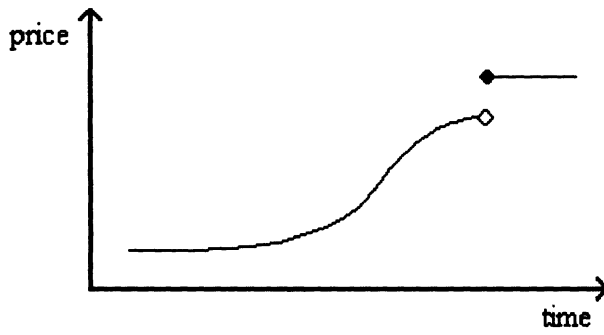
NOTE.—See Table 2 for a listing of the companies used in this event study.

tion. We note that not *all* information would be diffused by the time the announcement was made, so a small discrete jump might be observed on the date of the event. See Figure 2*a*. Finally, since we operationalize the ideas behind the event study by looking at excess returns rather than prices, Figure 2*b* presents the corresponding picture for excess returns. Obviously, attempting to detect such a pattern with a traditional event study methodology would severely underestimate the effect of the announcement if not miss it altogether.

Formally, our model of excess returns conditional on X_t , the vector of explanatory variables, is

$$E(A_{it}|X_t) = \begin{cases} \gamma_{1i}, & t = d_1, \\ \gamma_{2i} \left\{ \Phi\left(\frac{t - \mu}{\eta}\right) - \Phi\left(\frac{t - 1 - \mu}{\eta}\right) \right\}, & t \in (d_1, d_2), \\ \gamma_{2i} \left\{ 1 - \Phi\left(\frac{t - \mu}{\eta}\right) \right\}, & t = d_2, \\ 0 & \text{otherwise,} \end{cases} \quad (4)$$

where t is time in weeks, d_1 is the time window for COMMITTEE and HOUSE, d_2 is the time window for SENATE and TAFT, and $\Phi(\cdot)$ is the standard normal c.d.f. See also Figure 3, a continuous time picture of $E(A_{it}|X_t)$. We assume normally distributed errors and estimate the parameters γ_1 , γ_2 , μ , and η , in addition to σ , the error standard deviation. Note with this particular conditional mean, we are estimating a bump for gradual diffusion of information before the third and fourth events but not the first and second events. The first and second events, we are fairly

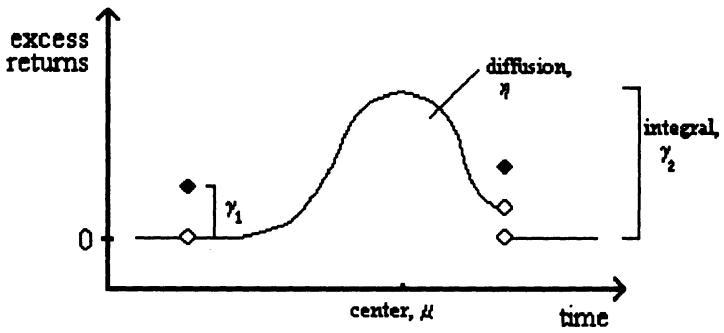


a



b

FIGURE 2



standard deviation of error about conditional mean, σ

FIGURE 3.—Conditional mean of excess returns

confident, were not anticipated, so we just estimate a jump up (down) and back in the conditional mean for those two. We use an event window which contains both events and only estimate one reaction for them, γ_1 . The reaction to the third and fourth events together, essentially the integral of the bump before them, is γ_2 . The bump is centered at time μ . The parameter η describes how diffuse the bump is. If in fact all the information is released in week μ , this method will detect and estimate that (with η close to 0), although the method will also accommodate a more diffuse pattern of information revelation.

Table 4 contains the parameter estimates for this event study. Note that we have constrained the timing parameters, μ and η , and the error standard deviation σ to be equal within the signaling and direct groups but that we have allowed for free estimation of the reaction parameters, γ_1 and γ_2 , for chemicals and rubber within the signaling group and for beet sugar and sugar refining within the direct group. Look first at the signaling group. In contrast to the traditional event study, the rubber stock has a positive and significant reaction to the second two events, SENATE and TAFT. This reaction is as predicted given the revenue maintenance effect. (The chemical stocks' reaction to both COMMITTEE and HOUSE and to SENATE and TAFT is negative and marginally significant at the 10 percent level. While it is surprising that they should react the same way to both sets of events, we will not place much weight on the estimates because of their marginal significance.) In the case of the rubber stock, at least, this event study has suggested the importance of SENATE and TAFT relative to the first two events.

The timing parameters for the signaling and direct groups, although significantly different, are all reasonable estimates. For the signaling group, the estimates imply a centering of the diffusion bump in the 23d week of the sample, around May 15, 1912, 2 months after the House vote, with 90 percent of the information being diffused between the beginning of April and the end of June. For the direct group, the estimates imply an earlier but tighter period of diffusion: 90 percent occurred between approximately the 13th of April and the 3d of May.

Look now at the reaction parameters for the direct group. The reactions to the first two events are not significant, again suggesting their relative lack of importance. The reactions of beet and refining to the second two events, however, are of the expected signs, with beet being significant at any reasonable level and refining being significant at approximately the 6 percent level. Moreover, the economic magnitude of the latter reactions is large, equal to a nearly 15 percent excess return. It is interesting to note that magnitudes of reactions of beet and refining to these and other events are practically identical but in opposite directions.

TABLE 4
NONTRADITIONAL EVENT STUDY

A. SIGNALING GROUP		
	Chemical	Rubber
Reaction to COMMITTEE and HOUSE, γ_1	-.017 (.010)	.024 (.019)
Reaction to SENATE and TAFT, γ_2	-.148 (.088)	.394 (.142)
Timing for SENATE and TAFT:		
Center, μ	22.5 (3.1)	
Diffusion, η	6.14 (1.71)	
Error standard deviation, σ	.023 (.001)	
B. DIRECT GROUP		
	Beet	Cane
Reaction to COMMITTEE and HOUSE, γ_1	-.012 (.013)	.013 (.019)
Reaction to SENATE and TAFT, γ_2	.149 (.061)	-.149 (.082)
Timing for SENATE and TAFT:		
Center, μ	19.4 (.9)	
Diffusion, η	1.63 (.56)	
Error standard deviation, σ	.023 (.002)	

NOTE.—Standard errors are in parentheses.

These results support our intuition, gained from economic knowledge and contemporary accounts, that the events SENATE and TAFT seem to be the important, or pivotal, events and that beet sugar production interests reacted positively to these events while cane sugar refining interests reacted negatively.

V. THE ROLL CALL REGRESSION

A. *The Data*

If we are interested in determining how constituent interests influence legislative outcomes, we should study the determinants of roll call voting in the pivotal legislative body. For our roll call analysis, we therefore initially focus on the U.S. Senate roll call vote on sugar tariff legislation,

which took place on July 27, 1912. This constituted the SENATE event in the event study.

Both the event study results and contemporary reports support the conclusion that the Senate and President Taft were the political agents which restrained dramatic reduction in the sugar tariff. In the event study, stocks did not react to the first two events, the COMMITTEE proposal and the HOUSE vote, signifying that those actions were unlikely to affect policy or were well anticipated. In contrast, there was a gradual response as information about the Senate's likely action was slowly diffused. The voting in the House was to some extent merely symbolic since, absent changes in the Senate, the House bill would not become law.³⁶

Returning to the Senate vote, the event study and our examination of the historical record allow us to ascertain the "sign" of the legislator's vote. In particular, although the Senate bill reduced sugar tariffs, it was a *pro-tariff* bill, since the alternative was not the status quo but rather a more drastic tariff reduction exemplified by the House bill. This understanding is crucial to interpreting the influence of constituent interest on the Senate vote.

Earlier in the article, we outlined the likely incidence of tariff changes on a variety of interest groups. Now we determine how to measure the importance of those interest groups within a given geographic constituency.

First, for beet sugar interests, we use the per capita sugar beet production in each state, the variable BEET (see Table 5). Recall that beet farming and beet sugar production took place in close proximity to each other. As a result, this production variable is an excellent proxy for the *combined* importance of beet farmers and production workers. Of course, due to their geographic coincidence, we will be unable to estimate the separate influence of beet farmers and beet sugar manufacturers.

For cane sugar interests, we are able to measure the influence of each of the important groups separately. First, we use the production of sugar cane per capita, CANE, to represent sugarcane farmers (see Table 6). Second, the importance of sugar refinery workers is measured by a dummy variable, REFINING CENTERS, for those states which contained a cane sugar refinery.³⁷ Variables measuring the geographic distri-

³⁶ There are also practical difficulties in trying to explain the House vote. The House Democrat Caucus had considerable influence at the time. Democrats voted in the caucus first and then voted as a bloc on the floor according to the majority vote in the caucus. Such a two-stage voting process obscures the representatives' actual voting preferences. These true preferences were revealed only in the caucus vote.

³⁷ Refineries were located in California, Louisiana, Massachusetts, New Jersey, New York, Pennsylvania, and Texas. See U.S. Bureau of Foreign and Domestic Commerce, Statistical Abstract of the United States, 1915 (1916).

TABLE 5
PER CAPITA SUGAR BEET PRODUCTION

State	Amount (Tons/Person)	State	Amount (Tons/Person)
Arizona	.2429	Montana	.2910
California	.3555	Nebraska	.0334
Colorado	1.5415	New Mexico	.0007
Idaho	.5518	New York	.0012
Illinois	.0027	Ohio	.0134
Indiana	.0027	Oregon	.0232
Iowa	.0032	Utah	1.1087
Kansas	.0300	Washington	.0121
Michigan	.2518	Wisconsin	.0546
Minnesota	.0116	Wyoming	.0919

SOURCE.—U.S. Bureau of Foreign and Domestic Commerce, Statistical Abstract of the United States, 1915 (1916).

TABLE 6
PER CAPITA SUGAR CANE PRODUCTION

State	Amount (Tons/Person)	State	Amount (Tons/Person)
Alabama	.1060	Mississippi	.1239
Arkansas	.0126	North Carolina	.0001
Florida	.1894	South Carolina	.0395
Georgia	.1217	Texas	.0789
Louisiana	2.9836		

SOURCE.—U.S. Bureau of Foreign and Domestic Commerce, Statistical Abstract of the United States, 1915 (1916).

bution of farmers and laborers are commonly employed in empirical studies of political economy. An important interest group that is usually omitted from these studies due to data limitations is shareholders. We, however, are fortunate to be able to include a measure of shareholder interest, SHARES, the number of shares of American Sugar Refining stock owned per capita in each state (see Table 7).³⁸ Recall that ASR was the dominant cane refiner.

Our constituency interest variables, except for REFINING CENTERS, are measured on a per capita basis. A reasonable alternate speci-

³⁸ This was reported in the Hardwick Committee Hearings. There seems to have been relatively little stockholder turnover, so the geographic distribution of shareholders should not have changed appreciably from the 1911 Hardwick Hearings to the 1912 roll call vote. U.S. Congress, House of Representatives, Special Committee on the Investigation of the American Sugar Refining Company and Others, 1 Hearings, at 45 (1911–12).

TABLE 7
PER CAPITA SHARES OF AMERICAN SUGAR REFINING

State	Number (Shares/Person)	State	Number (Shares/Person)
Alabama	.000000	Nevada	.000000
Arizona	.000000	New Hampshire	.063908
Arkansas	.000019	New Jersey	.005000
California	.000947	New Mexico	.000031
Colorado	.000931	New York	.024973
Connecticut	.013859	North Carolina	.000385
Delaware	.001987	North Dakota	.000000
Florida	.000302	Ohio	.001622
Georgia	.000077	Oklahoma	.000000
Idaho	.000000	Oregon	.000027
Illinois	.000582	Pennsylvania	.006329
Indiana	.000163	Rhode Island	.022711
Iowa	.000227	South Carolina	.000003
Kansas	.000007	South Dakota	.000031
Kentucky	.000507	Tennessee	.000054
Louisiana	.003310	Texas	.000006
Maine	.022104	Utah	.000171
Maryland	.003947	Vermont	.020879
Massachusetts	.145533	Virginia	.000495
Michigan	.000379	Washington	.000037
Minnesota	.000114	Washington, D.C.	.006959
Mississippi	.000033	West Virginia	.000029
Missouri	.001001	Wisconsin	.000251
Montana	.000053	Wyoming	.000137
Nebraska	.000237		

SOURCE.—U.S. Congress, House of Representatives, Special Committee on the Investigation of the American Sugar Refining Company and Others, 1 Hearings, 62d Cong., 2d Sess. 45 (1911–12).

fication would measure the variables on an absolute basis. For example, per capita beet production might be low in a populous state, but the beet farmers might still exercise considerable influence because of their large total stake in the issue. In this circumstance, total beet production in a state would be the appropriate measure of constituent interest. In our empirical setting, however, we cannot distinguish between these two specifications. Since sugar and beet production were concentrated in a few states, the per capita and absolute production measures are highly correlated. The roll call regression results are therefore insensitive to which measure we employ.

We include no measure to represent consumer interests. Since there was a national movement for tariff reduction, consumer interests weighed heavily on legislators' minds. There is no reason to believe that consumer interest or sugar consumption varied between states. In that case, each

legislator would weigh consumer interests equally, unless that legislator faced countervailing pressure from producer interests from his state.

B. Roll Call Results

We considered specifications both with and without political party as an explanatory variable. Considerable research on roll call voting has addressed the treatment and interpretation of political party. Some interpret the predictive power of the party variable to indicate the importance of "party discipline" or partywide logrolling on votes. Others view party as a proxy for legislator ideology. In our context, political party may be correlated with omitted constituent interest variables. In particular, a state strongly opposed to lowering the tariff would have anticipated that such votes would come up and would have elected a senator from the party with a pro-tariff platform, the Republican Party.

The Senate vote was almost strictly along party lines, with Republicans voting "Yea" and Democrats "Nay." In a statistical sense, political party has very strong explanatory power. But a closer examination reveals the importance of constituency interest. Paradoxically, if "party discipline" is an important factor in determining voting patterns, then departures from that discipline become all the more striking. In this case, only two senators crossed party lines. Both senators from Louisiana, Democrats, voted "Yea," the pro-tariff position, undoubtedly due to the importance of sugarcane farming in that state (see Table 6). In another noteworthy action, the Democratic senator from Colorado, a major beet producing state, abstained, balancing his constituency and party interests.³⁹

The high predictive power of political party can be reconciled with a model of constituency interest. As Richard Fenno has noted, a senator's constituency is not his (entire) state but a particular majority coalition within that state.⁴⁰ If Democrats and Republicans systematically rely on different support groups, then political party may appear to have a great deal of explanatory power, even though it simply proxies for "support group" characteristics. Sam Peltzman and Thomas Stratmann each provide evidence supporting this view.⁴¹ Even if party affiliation plays an independent role, one should keep in mind the ideological divisions, with

³⁹ The Republican senator from Colorado was "Paired Yes," which means that he was recorded as supporting the bill, although he did not vote.

⁴⁰ Richard Fenno, *Home Style: House Members in Their Districts* (1978).

⁴¹ Peltzman, *supra* note 21, at 181; Thomas Stratmann, *How Reelection Constituencies Matter: Evidence from Political Action Committees' Contributions and Congressional Voting* (unpublished manuscript, Univ. Chicago 1994).

Republicans supporting protective tariffs and Democrats opposing them.⁴² In order to assess the total effect of constituent interest on legislator action, we performed a logit regression of senators' votes on our constituency variables.

Formally, if y_i is a binary variable representing senator i 's vote, then the probability of a "Yea" vote ($y_i = 1$) when faced with the constituency variables x_i , is given by

$$P(y_i = 1|x_i) = \frac{\exp(x_i'\theta)}{1 + \exp(x_i'\theta)} = \frac{1}{1 + \exp(-x_i'\theta)}. \quad (5)$$

We estimated the coefficients θ from a logit regression.

Table 8 contains the parameter estimates for the logit regression. Since a "Yea" was coded as 1 and "Nay" as 0, positive coefficients indicate that an increase in that particular variable would increase the probability that the senator would vote "Yea," the pro-tariff position. To aid in interpretation, the last column of Table 8 reports the "marginal effect," the effect on the probability of voting "Yea" from increasing the independent variable by one unit, evaluated at the means of all the regressors.

The coefficient estimates on both per capita sugar beet production and per capita sugar cane production are positive and significant at the 5 and 10 percent levels, respectively. This is in the expected direction, since both interests would lose from a reduced tariff. We are interested in not only the signs of the coefficients but their economic magnitude as well. This magnitude is large, as evidenced by the marginal effects. Increasing sugarcane production by 1 ton per person would raise the probability of a pro-tariff vote by over 15 percentage points. Raising beet sugar production would have a much larger effect, although that is not surprising, since BEET measures the political influence of *both* beet farmers and beet laborers, whereas CANE measures the influence of farmers alone. (One might also wish to compare the effects on the probability of voting "Yea" from increasing these independent variables by one standard deviation. For CANE, this would raise the probability by 8 percentage points, while for BEET, it would raise the probability by 20 percentage points.)

The coefficient estimates on both REFINING CENTERS and SHARES were not different from zero at conventional levels of significance. In addition, the economic effect of REFINING CENTERS, at least, is very small. Holding all other variables at their means, making a

⁴² Peltzman finds that from the 61st through the 74th Congress, Northern Democrats displayed a clear preference for lowering tariffs on manufactured goods. Sam Peltzman, *An Economic Interpretation of the History of Congressional Voting in the Twentieth Century*, 75 *Am. Econ. Rev.* 656 (1985).

TABLE 8
SENATE ROLL CALL REGRESSION

	Estimate	Standard Error	t-Statistic	Marginal
Constant	-.2759	.3339	-.8264	. . .
BEET	4.3488	2.0791	2.0917	.8749
CANE	.7557	.4061	1.8609	.1520
REFINING CENTERS	.1240	.9141	.1356	.0249
SHARES	88.7362	63.6528	1.3941	17.8515

state a cane refining center would change the probability of a "Yea" vote by only 2.5 percentage points.

As an additional source of information about the legislative process, we also examine the determinants of legislator voting on the House vote to eliminate the sugar tariff. Recall from the event study that this vote appeared to be less important than the Senate vote. A further caveat in interpreting the results is that our constituency interest variables are measured on the state, rather than the Congressional district level, which could induce a bias in the results. Nevertheless, it is still instructive to examine the House.

As with the Senate, we considered specifications both with and without party affiliation. The House vote displayed significant but not strict party line voting. Democrats voted 173 to 8 in favor of the tariff abolition, with Republicans voting 95 to 22 against. Of the eight Democrats who crossed party lines, five were from the cane sugar state of Louisiana, and two were from the beet sugar state of Colorado. Of the 22 Republicans who voted for tariff abolition, 19 were from the Midwest, which was a center of opposition to tariffs and trusts. In the logit estimation, political party has significant explanatory power, but the constituency interest variables are also influential. We therefore focus on the logit regression of representatives' votes on our constituency variables. These results are reported in Table 9.

TABLE 9
HOUSE ROLL CALL REGRESSION

	Estimate	Standard Error	t-Statistic	Marginal
Constant	-1.2650	.1674	-7.5551	. . .
BEET	8.5310	2.5399	3.3588	1.9569
CANE	.5899	.3081	1.9149	.1353
REFINING CENTERS	.6675	.3399	1.9639	.1531
SHARES	12.8211	6.8315	1.8768	2.9409

To aid in comparison with the Senate, a "Yea" vote, the vote for tariff reduction, was coded so that a positive coefficient on a constituency variable indicates that an increase in the variable would make a representative more likely to adopt the pro-tariff position. As with the Senate vote, the coefficients on both per capita sugar beet production and per capita sugar cane production are positive and significant at the 5 percent level. The economic magnitude of the effects is also quite large. In contrast with the Senate vote, the coefficients estimates for REFINING CENTERS and SHARES are large and statistically significant. The most surprising result is that for SHARES, since it suggests either that cane shareholders benefited from the tariff structure or that representatives voted against the interests of these constituents. This is not overly troubling, however, since the effect of the tariff structure on cane sugar refiners was acknowledged to be ambiguous.

We can now apply these empirical results to evaluate the four theories of constituent influence, placing primary emphasis on the Senate vote. These conclusions must be tempered, however, by the possibility that congressional voting on the sugar bills was part of a larger logroll within the political parties.

First, economic concentration did not play a preeminent role, unlike Olson's theory of collective action. Shareholders, although a concentrated and well-organized interest, did not have a statistically significant influence in the Senate. The minimal importance of this interest group also conflicts with the second theory, in which money plays an important role in reelections and hence in legislator voting. The high effectiveness of beet interests and cane farmers further suggests that interest groups overcame the problem of collective action and so lends support to the third theory, that political efficacy paralleled the majoritarian ideal.

One must be careful in the conclusion one draws from these results, however. A salient feature of this empirical setting is that information and organizational costs were unusually low due to the national movement for tariff reform. Concentrated interests may therefore have greater influence in the more common situations in which collective political action is difficult to undertake. If one wishes to contrast the outcome in this setting with the more usual situation, these results indicate that raising the visibility and political accountability of tariff policy can strengthen not only consumer interests but less concentrated producer interests as well.

Sugarcane refining interests, whether laborers or stockholders, did not have strong influence in seeking dramatic tariff reductions. Perhaps their influence was diminished precisely because there was such widespread popular support for reduction. The small political wave they might have generated was swept up in a great popular tide. Another possible explana-

tion for the limited influence of cane refining interests is that the political system places greater weight on preventing economic losses than on generating economic gains, as indicated in Corden's theory of a conservative social welfare function.⁴³

This fourth theory, that the political system places great weight on preservation of the status quo, has interesting implications for the political dynamics of trade policy. We found that sugarcane farmers and beet farmers and producers were the most influential of the producer interests in both legislative chambers, despite their relatively low (long-run) stakes. Yet, as Anne Krueger has argued, these very interests would not have existed absent previous protective tariffs.⁴⁴ Those interests therefore cannot be accountable for the origins of the tariff. But once the protective tariff was established, it engendered economic forces which in turn became political forces for the perpetuation of the tariff. This example suggests a possible systematic bias in trade policy and highlights the need for further study of policy evolution.

VI. CONCLUSION

This article had two broad goals, one methodological and the other substantive, both involving economics and politics. Methodologically, we integrated two techniques, the event study and the roll call regression, in order to overcome some problems commonly encountered in work on political economy. In particular, we used the event study to ascertain the relative incidence and importance of congressional votes on tariff policy. With this information, we then employed roll call regressions to shed light on the political determinants of U.S. trade policy.

Substantively, we explored constituent influence in an unusual but informative empirical setting. Congressional voting on sugar tariff reform in 1912 took place against the backdrop of a national movement for tariff reform. As a result, legislator votes had a high level of visibility and political accountability. Moreover, the nature of the sugar industry and the sugar tariff gave rise to a variety of competing producer groups. In evaluating the effective power of these groups, we found that economic concentration and wealth were relatively unimportant. Strikingly, the most effective interest groups were those that had arisen as a consequence of the tariff, suggesting that government policy can form constituent groups as well as being formed by them.

⁴³ Corden, *supra* note 24.

⁴⁴ Anne O. Krueger, *The Political Economy of Controls: American Sugar*, in *Public Policy and Economic Development* 170, 178 (Maurice Scott & Deepak Lal eds. 1990).

VII. EPILOGUE

What became of the sugar tariff bill? Like many other legislative proposals, it died in conference committee, since no acceptable compromise could be reached which bridged the differences between the House and Senate versions.⁴⁵ This stalemate was broken by the 1912 elections, which brought both houses of Congress as well as the presidency under Democratic control. These developments "assured . . . the reduction of sugar and other duties and the passing of an income tax bill to offset the revenue deficiencies made by the reduced duties."⁴⁶

This reduction was enacted in the Underwood-Simmons Bill of October 3, 1913. This reduced the duty on all sugar "25 percent from and after March 1, 1914."⁴⁷ The Underwood-Simmons Bill also provided that all sugar be placed on the free list May 1, 1916, but this provision was repealed on April 27, 1916.⁴⁸

The action of 1916 was intended to "postpone" free trade in sugar until after World War I was resolved and "normal" conditions returned to the sugar market. Normalcy never returned. Government intervention into the sugar market continued, and in 1934 a system of domestic production and foreign import quotas was established. Although the quota system has generated even higher economic costs than the tariff, it has also displayed remarkable political endurance. Sugar economics and sugar politics have thus been intertwined from the second decade of the twentieth century to the present day.

BIBLIOGRAPHY

- Ball, Clifford A., and Torous, Walter N. "Investigating Security-Price Performance in the Presence of Event-Date Uncertainty." *Journal of Financial Economics* 22 (1988): 123-53.
- Blakey, Roy G. *The United States Beet Sugar Industry and the Tariff*. New York: Columbia University Press, 1912.
- Brock, William A., and Magee, Stephen P. "The Economics of Special Interest Politics: The Case of Tariffs." *American Economic Review* 68 (1978): 246-50.
- Corden, Warner Max. "Effective Protection." In *The New Palgrave: A Dictionary of Economics*, edited by John Eatwell, Murray Milgate, and Peter Newman. London: Macmillan Press, 1987.
- Corden, Warner Max. *Trade Policy and Economic Welfare*. Oxford: Clarendon Press, 1974.

⁴⁵ Weekly Stat. Sugar Trade J., August 22, 1912, at 334.

⁴⁶ Weekly Stat. Sugar Trade J., November 14, 1912, at 452.

⁴⁷ Palmer, *supra* note 14, at E-17.

⁴⁸ *Id.*

- Denzau, Arthur; Riker, William; and Shepsle, Kenneth. "Farquharson and Fenno: Sophisticated Voting and Homestyle." *American Political Science Review* 72 (1985): 1117-34.
- Eichner, Alfred S. *The Emergence of Oligopoly: Sugar Refining as a Case Study*. Baltimore: Johns Hopkins Press, 1969.
- Fama, Eugene F.; Fisher, Lawrence; Jensen, Michael; and Roll, Richard. "The Adjustment of Stock Prices to New Information." *International Economic Review* 10 (1969): 1-21.
- Fenno, Richard. *Home Style: House Members in Their Districts*. Boston: Little, Brown, 1978.
- Genesove, David, and Mullin, Wallace P. "Validating the Conjectural Variation Method: The Sugar Industry, 1890-1914." Unpublished manuscript. Cambridge: Massachusetts Institute of Technology, 1994.
- Grossman, Gene M., and Levinsohn, James A. "Import Competition and the Stock Market Return to Capital." *American Economic Review* 79 (1989): 1065-87.
- Hicks, John D. *The American Nation: A History of the United States from 1865 to the Present*. Boston: Houghton Mifflin Company, 1945.
- Irwin, Douglas A. "The Political Economy of Free Trade: Voting in the British General Election of 1906." *Journal of Law and Economics* 37 (1994): 75-108.
- Krueger, Anne O. "The Political Economy of Controls: American Sugar." In *Public Policy and Economic Development*, edited by Maurice Scott and Deepak Lal. New York: Oxford University Press, 1990.
- Marks, Stephen V., and McArthur, John. "Empirical Analyses of the Determinants of Protection: A Survey and Some New Results." In *International Trade Policies*, edited by John S. Odell and Thomas D. Willett. Ann Arbor: University of Michigan Press, 1990.
- Mayhew, David. *Congress: The Electoral Connection*. New Haven, Conn.: Yale University Press, 1974.
- Moody, John. *Moody's Analyses of Investments, Part II: Industrials*. New York: Moody's Investor Service, 1915.
- Mullin, George L.; Mullin, Joseph C.; and Mullin, Wallace P. "The Competitive Effects of Mergers: Stock Market Evidence from the U.S. Steel Dissolution Suit." *RAND Journal of Economics* 26 (1995): 314-30.
- Olson, Mancur. *The Logic of Collective Action*. Cambridge, Mass.: Harvard University Press, 1965.
- Palmer, Truman. *Concerning Sugar*. Washington, D.C.: Looseleaf Service, 1929.
- Peltzman, Sam. "Toward a More General Theory of Regulation." *Journal of Law and Economics* 19 (1976): 211-40.
- Peltzman, Sam. "Constituent Interest and Congressional Voting." *Journal of Law and Economics* 27 (1984): 181-210.
- Peltzman, Sam. "An Economic Interpretation of the History of Congressional Voting in the Twentieth Century." *American Economic Review* 75 (1985): 656-75.
- Schwert, G. William. "Using Financial Data to Measure Effects of Regulation." *Journal of Law and Economics* 24 (1981): 121-58.

- Stigler, George J. "The Economic Theory of Regulation." *Bell Journal of Economics* 2 (1971): 3-21.
- Stratmann, Thomas. "How Reelection Constituencies Matter: Evidence from Political Action Committees' Contributions and Congressional Voting." Unpublished manuscript. Chicago: University of Chicago, 1994.
- Taussig, Frank W. *The Tariff History of the United States*. 8th ed. 1931. Reprint, New York: Capricorn Books, 1964.
- U.S. Bureau of Foreign and Domestic Commerce. *Statistical Abstract of the United States, 1915*. Washington, D.C.: U.S. Bureau of Foreign and Domestic Commerce, 1916.
- U.S. Congress. House of Representatives. Special Committee on the Investigation of the American Sugar Refining Company and Others. *Hearings*. 4 Vols. 62d Cong., 2d Sess. (1911-12).
- U.S. Federal Trade Commission. *Report on the Beet Sugar Industry in the United States*. Washington, D.C.: U.S. Federal Trade Commission, 1917.
- Wright, Philip G. *Sugar in Relation to the Tariff*. New York: McGraw-Hill, 1924.
- Zerbe, Richard. "The American Sugar Refinery Company, 1887-1914: The Story of a Monopoly." *Journal of Law and Economics* 12 (1969): 339-75.