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The effect of distance from central cities on partisan outcomes in elections

Elizabeth A. Stiles, *John Carroll University*

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The *Journal of Economics and Politics* is a scholarly journal directed to a broad audience of economists and political scientists. It is sponsored by the **Ohio Association of Economists and Political Scientists, OAEPS**, but is open to contributions from non-members as well as from members. It has a particular interest in the publication of articles dealing with Ohio and with the region, but it is a general journal. No particular method or approach is favored over another.

Instructions for the Submission of Manuscripts

Four copies of the manuscript should be submitted to the managing editor. The manuscript should be clean copy, double-spaced print, using MS Word for Windows. Complete manuscript preparation instructions are available from the Editor-in-Chief upon request. The *Journal of Economics and Politics* is a refereed journal. Refereeing is double-blind; therefore, the name(s), affiliation(s), and address(s) of the author(s), title of the paper, and other identifying statements should be on a separate page. This page will be removed before sending the manuscript to the referees. The first page of the paper should contain the title and text, but no reference to the author(s) that would allow the referees to identify the author(s) or affiliation(s). As a general rule, the paper should be approximately twenty pages long. Under special circumstances, substantially longer papers may be considered for publication in more than one part. Short research notes of two or three pages are encouraged. Mathematical notation, figures, and tables should be held to the minimum required for the presentation of the material. Author(s) of papers accepted for publication must provide the entire manuscripts, including figures, charts, and tables, on one file accessible by MS Word for Windows. This can be e-mailed to the Editor-in-Chief at *mbenedi@bgsu.edu*. Notes and references should be at the end of the manuscript rather than in the text. Attribution extent and style vary by profession and custom. Consult this issue of the *Journal of Economics and Politics* for the style used in attributions.

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LETTER FROM THE EDITOR

It has been over four years since the last issue of the *Journal of Economics and Politics (JEP)* was published. Several changes have occurred since that time. First, the long-time editor, Henry Rennie, decided to leave the editorship for other opportunities. Second, the Ohio Association of Economists and Political Scientists decided to embark on a search for a long-term relationship with a publisher that will serve the needs of our organization and the membership. We are lucky to have found such a relationship with the University of Akron Press. In January, 2011, we came into an agreement with Akron to publish our journal annually. Our hope is to develop a strong journal that will attract academic research on issues of economics, political science, and policy. Papers that examine Ohio issues are especially welcome. We ask that you consider sending a research paper for review for the *JEP* for the next issue.

If you have any questions, please feel free to contact me. I welcome your submissions and will work with you as you navigate the review process.

Sincerely,

Mary Ellen Benedict
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**PATERNALISM, INDUSTRIAL DEMOCRACY, AND UNIONIZATION
IN THE CLEVELAND GARMENT INDUSTRY: 1900–1935:
THE CASE OF THE PRINTZ-BIEDERMAN AND JOSEPH AND FEISS COMPANIES**

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ABSTRACT

Two models used to avoid unionization efforts associated with the bilateral monopoly collective bargaining model in the Cleveland garment industry during the latter Nineteenth and early Twentieth Century were Frederick Taylor's "Scientific management," employed by the Joseph and Feiss Company and John Leitch's "Industrial Democracy," utilized by the Printz-Biederman Company. At the Printz-Biederman Company, a maker of upscale women's garments, Industrial Democracy provided a collaborative decision-making body for the workers and featured a Cabinet of officers of the company, a Senate of managerial level employees, and a House of Representatives elected directly by fellow workers. At the Joseph and Feiss Company, a manufacturer of men's wear, Scientific management, with its focus on time-and-motion studies and paternalism, became the model for establishment of wages, shorter work weeks, increased production, provision of health care, and the granting of equal opportunity for advancement to women. Ultimately, however, neither the Scientific management nor Industrial Democracy were sufficiently robust to resist the pressures of aggressive labor unions during the Depression of the early 1930s.

Key words: Industrial Democracy; Taylorism; Scientific Management; Cleveland Garment Industry; Printz-Biederman Company; Joseph and Feiss Company; International Ladies Garment Workers Union (ILGWU); Amalgamated Clothing Workers of America (ACWA).

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I. INTRODUCTION

During the latter part of the Nineteenth Century and early part of the Twentieth Century, four movements converged in Cleveland, Ohio that had a significant impact on the city's development as one of the principal garment manufacturing centers of the United States. Those movements were: (1) evolution of the United States garment industry into a significant industrial force; (2) the popularity of "Taylorism" or "Scientific management" after the ideas of Frederick Winslow Taylor; (3) the development of an "Industrial Democracy" movement in the relationship of labor and management; and (4) growth of the unionization movement in the United States.

How the convergence of the four movements affected labor-management relations in the Cleveland garment industry in the early part of the Twentieth Century is examined here. Specific focus is placed on the evolution of labor-management relations at two companies which used significantly different approaches to their relationships with employees. The use of scientific management and a relatively paternalistic model of labor-management relations was followed by Joseph and Feiss and the Industrial Democracy model was adopted at the Printz-Biederman Company.

The study presented here examines these experiments in labor-management relations as alternatives to the more traditional collective bargaining approach. Collective bargaining typically involves some degree of adversarial relations and countervailing power in a bilateral monopoly environment where the outcome of, for example, wage negotiations initially is indeterminate and dependent on the negotiating skills of the two bargaining parties of labor and management (McConnell, Brue, & McPherson, 2006). The evolution of the Printz-Biederman and Joseph and Feiss labor relations regimes into a standard union-management adversarial model in the 1930s provides insights into both the challenges firms that desire to remain nonunion confront and into the attractiveness to workers of the traditional collective bargaining model.

II. LITERATURE REVIEW

The garment industry in Cleveland developed in the last half of the nineteenth and early twentieth centuries to become one of the city's leading industries. For nearly a half century over 10,000 Cleveland workers, accounting for 7% of the city's work force, were employed in the garment industry. By the 1920s, Cleveland was a close second to New York as a leading center for garment production in the United States (Garfinkel).

National labor unions, including the International Ladies Garment Workers Union (ILGWU), founded in 1900, and the Amalgamated Clothing Workers of America (ACWA), founded in 1914, both of which were originally part of the American Federation of Labor, were aggressive in the first quarter of the twentieth century in trying to organize workers in the Cleveland garment industry. The ACWA tried organizing the Joseph and Feiss Company in the World War I era and the ILGWU was aggressive in trying to organize the Printz-Biederman Company resulting in a bitter strike in 1904. Later, in 1911, five thousand workers at 33 Cleveland firms, under ILGWU leadership, went on strike over union recognition issues (ILGWU).

The theories of Frederick W. Taylor (1911), often referred to as "Taylorism" or "Scientific management," held that increased production efficiency could be obtained by replacing the judgment of individual workers with rules, laws, and mathematical formulas developed by managers. One of the main tools Taylor advocated was that management employ time-and-motion studies which involved the careful timing and recording of the actions taken to perform a particular task. As noted by Jones, George, & Hill (2000) the fundamental objective of Taylorism was to improve efficiency by finding ways to improve each worker's ability to perform a particular task.

According to Garfinkel, the threat of unionization and the influence of "Scientific Management" caused the Joseph and Feiss Company to integrate "Scientific Management" with a form of paternalism. In order to have a form of control over the workers, keep turnover rates low, and allow them to work at high levels

of efficiency, Joseph and Feiss managers closely supervised the actions of their employees. In return, the company provided benefits including recreational activities for its employees by having hour long “recesses” where males and females were split up into different sports and having employees share in a bonuses program and opportunities for advancement (Haake, 1921).

Another way firms dealt with the threat of unionization was to embrace the concept of Industrial Democracy which was described and advocated by the labor theorist John Leitch (1919) and adopted by the Printz-Biederman Company. Industrial Democracy was the organizing of a factory into a little democratic state with representative government having both legislative and executive components. A “Cabinet” would consist of the executive officers of the company. A “Senate” would be a non-elected body of the lower-level executives, department heads, and foremen; i.e., all those who have authority over the workers. The “House of Representatives” would be the popular body of the government elected by all the workers. Wage adjustments, for example, would first be considered by the House of Representatives, then the Senate, and then passed to the Cabinet for final approval. The objective was to achieve justice in the work place which, according to Leitch, encompassed cooperation, economy, energy, and service or, what he called the “Square Deal.”

The question raised here is, why did the bilateral monopoly bargaining model prove to be more robust and more consistent with worker interests than the Scientific Management/Paternalistic model, referred to as the Industrial Psychology model by Alfred Haake (1921), and the Industrial Democracy model? For nearly two decades these labor relations models appeared to address the needs of their constituencies. However, the pressures of the Great Depression and labor unions led to abandonment of these two experiments and ushered in a new era of traditional bilateral bargaining at both companies. The pedagogical approach we follow to examine this question is a descriptive analysis of the labor relations in the Cleveland garment industry in the early 20th Century, particularly at the Printz-Biederman and Joseph and Feiss firms.

Garment Industry Labor Organizing Pre World War I

The approaches to labor relations that evolved in the Cleveland garment industry through both Industrial Democracy and paternalism occurred in the aftermath of significant labor strife in the needle trades in 1909, 1910 and 1911. Strikes by garment workers in New York, Chicago, and Cleveland established an environment that emboldened workers but at the same time caused employers in the garment industry to seek alternative labor relations models to what was experienced in the 1909 to 1911 period.

Shirtwaist makers were involved in a New York City strike often referred to as the “Uprising of the 20,000” in November 1909 (“Facing Starvation,” 1909; “Girl Strikers,” 1909). Most of the strikers (actually closer to 30,000) were women garment workers who ultimately did win some concessions from garment industry firms including a reduction in the work week to 53 hours (“Shirtwaist Girls,” 1910). However, Schofield (1984) notes that in large part the strike was not successful because the ILGWU called off the strike on February 13, 1910, when most of the New York Industry was operating at full capacity in spite of the strike.

In the summer of 1910, nearly 60,000 members of the ILGWU, and Shirtwaist Makers Union struck the firms belonging to the New York Cloak, Suit, and Shirt Manufacturers’ Protective Association (Levey, 1960). This strike resulted in the Protocol of Peace which was the first collective agreement in the garment industry. The Protocol called for a wage settlement and assurance that hiring would be on a preferential basis for union members (Scharf, 1984).

Following the strikes in New York, 40,000 garment workers struck Chicago men’s garment firms for four and a half months beginning September 22, 1910 (Weiler, 1984). The Chicago strike, which was over wages related to piece rates, marked the start for the Amalgamated Clothing Workers of America (ACWA) and also showcased the organizational talents of its leader, Sidney Hillman, the first president of the ACWA.

The Hart, Schaffner, and Marx Company became one of the first firms to settle with workers when they signed what was, one of the most comprehensive bargaining agreements in the clothing industry at the time ("Chicago Garment Workers' Strike"). Further, by 1915, the majority of Hart, Schaffner, and Marx employees became members of the ACWA, the union whose founding was an outgrowth of the Chicago strike.

The Cleveland 1911 Garment Workers Strike

On June 6, 1911, 4,000 garment workers struck Cleveland garment manufacturers to improve working conditions. Worker demands included: a 50 hour work week with Saturday afternoons and Sundays off; that no more than two hours of overtime per day be allowed; double pay for overtime; there be no charges for use of machines, silk or cotton; and a closed shop ("Strike to Go On," 1911). The employers rejected all of the workers' requests ("The Garment Workers Strike of 1911").

The Cleveland Cloak Manufacturers Association, including The John Anisfield Company, The H. Black Company, The Cohen Goodman Company, The Greenhut Cloak Company, The Printz-Biederman Company, Schwarz, Huebschman & Forney, M.T. Silver & Company, and The Sunshine Cloak and Shirt Company, ran an advertisement in the June 10, 1911, *Cleveland Plain Dealer* refuting charges that sweatshop conditions existed in the Cleveland garment shops. The Cleveland manufacturers claimed they had led the movement for better conditions in the industry including 54 hours per week working hours and Saturdays as half-holidays. The manufacturers also noted that Cleveland wages on a yearly basis were better than any other city, including New York. They stated Cleveland workers were kept busy nine to eleven months per year whereas New York workers had employment for only six months per year.

The 1911 strike in Cleveland was characterized by considerable violence. *Cleveland Plain Dealer* articles on June 10, June 11, June 13, June 28, July 20, July 25, and August 17, 1911, described riots and other acts of violence associated with the strike including the death of a worker and the shooting of an 11 year old girl whose father was a garment company guard. As the strike entered a fourth month in September, the workers were asked by secret ballot whether they wanted to continue the strike. On September 11, 1911, by a ratio of 27 to 1, workers voted to continue the strike. However, the manufacturers claimed they had beaten the strike by using strikebreakers, some of whom came in from New York, and that output for the season was running at 60 to 90 percent of prior years ("Strike to Go On," 1911).

The Cleveland Garment Workers strike of 1911 ended, at best, in disappointment for the workers. The ILGWU convention on October 15th noted that union rules placed a limit on how long a strike could be funded and that after nineteen weeks the Cleveland workers had exceeded the limit. On October 21st, 1911, without taking a vote, for all practical purposes the Cleveland garment workers strike came to an end. Although the ILGWU never officially called the strike off, officers of the union advised strikers to use their discretion about returning to work ("No Decision," 1911; "Strike Ended," 1911). Other than a few workers who worked for small independent shops that had settled early in the strike, the garment workers went back to the factories without any of their demands being fulfilled (Christman, 1992).

One of the interesting dimensions of the Cleveland Garment Workers Strike of 1911 was the role of women—a topic explored in some depth by Scharf (1984) and Christman (1992). About a third of the striking garment workers in Cleveland were women who were employed in 33 shops of varying size. During the strike, women were highly visible and took their place alongside the men on picket lines and in demonstrations (Scharf, 1984).

The 1911 strike in Cleveland was considered a failure by many historians. Christman (1992), however, concludes its lasting legacy is evident in the role that women played in the strike. Specifically, Christman concludes that the strikers, male and female, achieved victories that are perhaps less tangible than union recognition and pay increases. Those victories included the development of a fighting spirit among the workers. That fighting spirit could be evidenced in both the men and women and especially in the commitment made by women to the ideals of the strike.

The Cleveland Garment Workers Strike of 1911, in spite of its apparent failure, apparently alerted at least some Cleveland garment firms to the pressures developing within the labor movement. Here we examine how two Cleveland firms, one in the women's cloak and suit business, The Printz-Biederman Company, and one in the men's suit business, The Joseph and Feiss Company, responded in unique but quite different ways to the evolving labor environment.

Company Profiles:

The Printz-Biederman Company

The Printz-Biederman Company was founded in 1893 by Moritz Printz, a native of Austria who had been head designer of the women's cloak manufacturer D. Black & Company, his sons Michael and Alexander, and his son-in-law Joseph Biederman. The original location of the firm was in a loft at 102 St. Clair Avenue in Cleveland, Ohio. Originally called Printz-Biederman & Company, the firm later changed its name to The Printz-Biederman Company (Printz-Biederman Co., 1933).

As it expanded, the company moved to larger facilities on St. Clair Avenue and then in 1904 to the corner of Lakeside Avenue and West 6th Street. In 1934, Printz-Biederman took a long-term lease on and renovated a building owned by what was then known as the Case School of Applied Science at 1800–1900 East 61st Street in Cleveland. At the time, the firm employed over 1,000 men and women (“Observes 41st Birthday,” 1934). In addition to the Cleveland plant, a branch factory was operated in Lorain, Ohio (Printz-Biederman Co., 1933).

In 1954 control passed from the Printz family when Max Reiter took over the company. Reiter had been co-founder of Ritmore Sportswear Company until 1953 when his partner, Maurice Saltzman, bought him out and the firm became Bobbie Brooks, Inc. At the time of Reiter's purchase of Printz-Biederman, the company had 1,000 employees and annual sales of \$8 million. Business declined during the 1960s and 1970s and when Printz-Biederman closed in 1978 it employed only 40 Cleveland workers (Printz-Biederman Co., Encyclopedia of Cleveland History).

The Joseph and Feiss Company

The Joseph and Feiss Company began as a small general store, Koch and Loeb, in Meadville, Pennsylvania. In 1845 founder Kaufman Koch moved the store to 82 Superior Street in Cleveland, Ohio, and sold a general line of men's and boys' clothing (Berman & Harrison, 1977). Over the course of the next six decades, the company changed names and partners a number of times, yet continued to produce men's garments. After numerous name changes, the company stabilized as Joseph and Feiss in 1907, under the leadership of Isaac and Moritz Joseph and Julius Feiss (Berman & Harrison, 1977).

The business was moved to a new location in Cleveland at 2149 West 53rd Street in 1920, the year when the company formally adopted the “Clothcraft” brand name. Under the Clothcraft name, the Joseph and Feiss Company generated a steady base of sales by introducing a low priced attractive men's product, the \$15 blue serge suit (“Joseph and Feiss”).

In 1966, the Joseph and Feiss Company merged with the Phillips-Van Heusen Corp. at which time it employed close to 1,200 workers (Hoven, 2007). Because of this merger, the Joseph and Feiss Company produced under the Cricketeer and Country Britches label and expanded its line by producing women's clothing in the 1980s. (“Joseph and Feiss”).

In 1989, the Joseph and Feiss Company was acquired by the West German company, Hugo Boss AG, in a deal worth close to \$150 million (“Company News,” 1989). In 1997, the Joseph and Feiss Company, along with nearly 450 employees, moved from their West 53rd Street location to their distribution center on Tiedeman Road in Brooklyn, Ohio (“Joseph and Feiss”). At present, the company still produces suits, sports coats, and slacks under the Hugo Boss brand.

III. INDUSTRIAL DEMOCRACY AND PATERNALISM: STRUCTURE AND GOALS

Printz-Biederman and Joseph and Feiss, although in different segments of the garment industry, were similar in that they were closely-held and managed, family-owned, entrepreneurial firms. While the two garment firms sought to avoid union organization of their work force, they took quite different approaches to deal with that challenge.

Industrial Democracy and the Printz-Biederman Company

In 1914, John Leitch sold his ideas on Industrial Democracy to the Printz-Biederman Company (Carpenter, 1921). Either the Senate or the House could initiate any measure it wished. When a measure was passed by one house, it went to the other for approval, rejection, or amendment. If there were amendments, a conference committee considered the issue and made a recommendation to both houses. The Cabinet retained the right to veto the measure, but five years after adoption of the Industrial Democracy model of labor-management relations, Alexander Printz was able to boast that the veto had never been exercised (Printz, 1919).

Scientific Management, Paternalism and the Joseph And Feiss Company

When Richard A. Feiss became Vice President in 1905, the Joseph and Feiss Company changed its organizational structure and manufacturing operations. Richard Feiss, a devotee of the theories of scientific management and a president of the Taylor Society, set out to demonstrate how to apply Taylor's theories to the seasonal and changeable clothing industry (Goldberg, 1992).

Although the implementation of scientific management was later, the company's initial efforts to use the system brought about numerous problems. In 1909, Joseph and Feiss suffered one of the earliest walkouts involving scientific management; workers protested wage cuts and work rules (Goldberg, 1992). Although this walkout was quickly resolved, it was understood that the firm would have to change their system of scientific management.

Feiss understood that along with scientific management, welfare practices (paternalism) must be adopted to make the workforce more productive. To ensure that welfare practices were an integral part of the new management philosophy, Feiss created the Employment and Service Department in 1913 and hired Mary Barnett Gilson, a graduate from Wellesley College, and a fellow pioneer of the scientific management field, to head the department (Goldberg, 1992).

The Industrial Democracy and Scientific Management/Industrial Psychology models, therefore, represented distinctly different methods of handling labor-management relations. The Printz-Biederman Industrial Democracy structure dealt primarily with the day-to-day issues workers and management confronted in the plant. The Joseph and Feiss Scientific Management /Industrial Psychology structure was designed to manage not only the work place environment but the general life-styles of the workers as well.

IV. INDUSTRIAL DEMOCRACY AND PATERNALISM: IMPLEMENTATION AND RESULTS

Although the Industrial Democracy and Scientific Management/Industrial Psychology experiments lasted about 20 years, there were problems implementing and administering the two programs. Likewise, the issue of union organizing attempts never completely disappeared as the Cleveland garment industry confronted periodic episodes of labor strife.

At Printz-Biederman Senate operations became problematic relatively early in the company's experience with Industrial Democracy. In a May 11, 1915 message to the Senate, its Chairman, I. K. Heller, reported Senate work had been carried on with difficulty. Heller stated that lack of attendance and interest in Senate meetings by department heads shirking their Senate responsibilities was impeding the work of the Senate and company. In November 1918, the Senate was replaced by a Planning Board consisting of six members (Carpenter, 1921). The Planning Board consisted of six management personnel from several departments (Printz, 1919).

John Leitch, the originator of the Industrial Democracy idea, was made an honorary member of the Printz-Biederman House of Representatives. At the October 22, 1914 meeting of the House, Leitch made a plea to the members to be leaders of the workers but to be prepared to take criticism for their actions as well. Building on the four cornerstones of Justice, Energy, Economy, and Service, Leitch told the House that they will build steadier work, better wages, and better business for the whole institution.

The issue of unionization of the workers became obvious in remarks by both Leitch and company president, Alexander Printz, at November 1914 meetings of the House. Leitch believed strikes could be avoided if conditions were made so good that the workers would not want to go on strike (House Minutes, November 31, 1914).

In addressing the House on November 22, 1914, Alexander Printz claimed ILGWU representatives were saying the company's Industrial Democracy plan was an attempt of the management to deceive the workers. Printz stressed the importance of the House gaining the confidence of the workers to make their plan work. Specifically, he stated that the Industrial Democracy organization was a method by which representatives of the workers could reach company officials and that anything of a square deal nature will get square deal consideration. His views on the union were clear in the following statement:

Just bear in mind that we want to run our affairs and shall run this organization without any outside influence whatever (House Minutes, November 25, 1914).

Printz also recommended the creation of a Betterment Committee of members of the House and Senate to handle suggestions and complaints of the workers. The Betterment Committee could then take those issues up with the Cabinet. At Printz's suggestion, a Betterment Committee was formed consisting of three Senators and three Representatives (House Minutes, November 25, 1914). The Betterment Committee became an institution that remained in existence for about twenty years when it was replaced by a union collective bargaining agreement.

Another committee created by the House was the Wage-Rate Committee consisting of one member from each of the large factory departments and one member representing the company. Its functions were to recommend and pass upon general changes in wages; set standards for wage ranges in the various operations based on skill, length of service, and attendance; sit with the Planning Board to pass on individual increases; hear complaints of workers; review cases referred by superintendents; and recommend changes in operations and positions (Printz, 1919).

A major issue that arose in 1915 was a recommendation initiated by the cutters that the work week be reduced from 49 $\frac{3}{4}$ to 48 hours. The request, which resulted in the formation of a 48 Hour Week Committee, received considerable attention by the House, according to its May 20, 1915 and June 10, 1915 minutes, and was adopted that summer. On June 1, 1915, the 48 Hour Week Committee laid out a set of rules that would eliminate shirking and make the 48 hour week a workable concept (Leitch, 1919).

In promoting the virtues of his Industrial Democracy concept, Leitch illustrated an incident that occurred in 1915 that demonstrated the commitment of the company and its employees to the Industrial Democracy experiment. In September 1915, the ILGWU decided to unionize Cleveland and to start with Printz-Biederman. The employees heard of the ILGWU's plan through the newspapers. The Senate and House then passed a resolution that was ratified by a mass meeting of the employees (Leitch, 1919). The resolution included the following:

Resolved that we, the employees of The Printz Biederman Company, hereby express our strong disapproval of the action taken by an outside organization as shown in the proposed demand referred to in [a] newspaper article, and be it further received that we tender to our Company our most earnest and sincere support for the present most fair methods of conducting the business. If we knew any stronger language of expressing our full satisfaction we would use it.

According to Leitch, the ILGWU organizers left town that night. They did not present any demands to the management (Leitch, 1919). However, the ILGWU had not given up on Cleveland and the next several years proved to be a major challenge for Leitch's concept of Industrial Democracy.

The ILGWU called a general strike against the Cleveland garment manufacturers on July 23, 1918 ("Two Strikes," 1918). The union demanded union recognition and a wage increase.

In response to inflationary pressures during World War I, the management of Printz-Biederman introduced a complex high-cost-of-living bonus system. The amount of this bonus was to vary from month to month based on a price index published by the Bradstreet organization. The bonus was put into a separate envelope so that employees would not confuse it with their regular pay. This was separate from a production bonus system, which paid a bonus for production in excess of a bonus. However, the cost-of-living bonus complicated workers' understanding of the pay system and caused them to request the bonus be converted into a wage increase (Carpenter, 1921). Subsequently, on July 30, 1918, the company's Wage Rate Committee offered a plan for revision of the bonus system ("The Wage Rate Committee," 1919). The proposal to the House was that a 12 percent wage increase be instituted instead of the high-cost-of-living bonus. The House agreed and accompanied this bill with a statement of intent to ask for wage increases from time to time to correspond to the rate of inflation (Carpenter, 1921).

During this period, though, the ILGWU was active in Cleveland and exploited the confusion of Printz-Biederman employees over the bonus system by criticizing the Industrial Democracy system. The House held a discussion on the situation and reminded management of the problem the rising cost of living posed for workers and their families. It also was pointed out to management that wages in the garment industry in New York were higher than in Cleveland. The management counter argument was that the industry in New York was seasonal and that with careful planning and the cooperation of the employees in the Industrial Democracy system, seasonal unemployment had been avoided. Over the year, management argued that the employees made more money than their New York counterparts because unemployment was avoided (Carpenter, 1921).

The result of these deliberations in the House was the issuing of a statement listing the achievements of the Industrial Democracy system including the reducing of working hours to 48 hours per week and achieving four wage increases in two years. The House statement then included the following:

By threatening to call a strike without our approval you are trying to change our conditions which we repeat are entirely satisfactory. Certainly, if your union is sincere in the claim that it is trying to assist the workers, it can prove it by leaving us alone (Printz, 1919).

The workers backed up their statement by staying on the job while most of the 39 garment factories in Cleveland had to curtail operations because of the strike. At Printz-Biederman, all but seven of 950 employees remained at work (Printz, 1919).

The Cleveland garment workers strike was settled on August 12, 1918, through the arbitration efforts of Newton D. Baker, a former Cleveland mayor who was then United States Secretary of War ("Arbitration of Strike," 1918). Baker requested both sides to submit reports to a board of three referees because the large Cleveland firms were involved in making garments for the war effort and he did not want a prolonged work stoppage. The referees met with union and management including a representative from Printz-Biederman at Hanover, New Hampshire. The decision of the referees was to be known as the Hanover Decision and involved a wage increase, established the principle of collective bargaining in the Cleveland garment industry, applied the general principles of the War Labor Board which recognized the workers' right to organize and announced that piece rates were to be settled by the employers ("The International Ladies' Garment Workers Union," 2008).

The Printz-Biederman representative at the meeting was given instructions to request that its plant be excluded from the arbitration. Although the Printz-Biederman Company was not originally awarded

exclusion, the House appealed and obtained a written statement that the plant was not included (Printz, 1919).

The issue of the 1918 strike became a problem for Printz-Biederman even though only a very small number of workers walked off the job. Following the strike, the House expelled the union sympathizers and the company discharged them. As a result, the company was brought before the War Labor Board on charges of discriminating against trade unionists. The company had a narrow escape when its defense was accepted that the workers were dismissed for disloyalty to the existing organization of the shop and not for their trade union activities.

Another issue with which the company had to contend was renewed attacks by the union on the concept of Industrial Democracy and the bonus system. The union claimed the company used the bonus system as a speed-up tool that would lead to premature old age and shortened lives for the workers. To investigate this accusation, the House and management engaged a physiologist from Johns Hopkins University who determined that the accusations were without merit (Carpenter, 1921).

During this period the bonus system continued to be a source of tension and the Wage Rate Committee decided to work with the Planning Board to devise a more satisfactory bonus system. After some deliberation, the Wage Rate Committee and management agreed on a bonus system that had two levels—a production bonus and a year of continuous service bonus. That system was effective July 23, 1919 (Carpenter, 1921). The union persisted in pressuring Printz-Biederman in 1920. In a March 29, 1920 letter to the House by M. Perlstein, Manager of the Cleveland Ladies Garment Workers' Union, the union pointed out it had reached a treaty of peace with the Cleveland Garment Manufacturers' Association and that Printz-Biederman was the only company not part of the agreement. Perlstein suggested that the House meet with representatives of the union to have a discussion to “work out relations based on sound principles whereby capital and labor should really begin to understand each other [and] work together for the mutual benefit.” Perlstein went on to accuse the House and the company of being selfish and trying to profit from being isolated. The House responded with a letter to Perlstein stating the Printz-Biederman collective bargaining arrangement was satisfactory, that working conditions and earnings at the company had constantly improved and asked that the ILGWU not try again to organize the company's workers (Perlstein, 1920).

Although there is an absence of detailed information on labor relations at the company during the 1920s, wording in the employment contracts that its employees had to sign during the 1920s suggests the company was striving to preclude any union activity. The company's “Contract of Employment” read in part:

Since both parties to this Contract believe that the Constitution of the House of Representatives, its By-Laws and Working Rules provide ample means for adjusting any differences that may arise between them, they agree that neither has nor will make any contract that will interfere with the operation of the Constitution, said By-Laws or working Rules or any employment contract . . . (Contract of Employment).

Traditional collective bargaining between unions and management typically results in a contract. Therefore, the wording in this Printz-Biederman “Contract of Employment” could be interpreted as putting an employee who attempts to institute a union contract in violation of his or her employment agreement with the company.

Printz-Biederman appears to have faced continual pressure from the ILGWU as it experimented with Industrial Democracy. By contrast, for a period of time, the implementation of the Scientific Management/Industrial Psychology model at Joseph and Feiss during the second decade of the twentieth century appears to have been pressured by fewer outside forces.

In 1916, a study was conducted to examine the role scientific management had on Joseph and Feiss between 1910 and 1915. The study concluded the overall cost of production had decreased, as had the

turnover rates in the company's labor force. Between 1910 and 1914, the percentage of labor turnovers at Joseph and Feiss had dramatically decreased from 150.3% to 33.5% ("Anti-Time Study Legislation," 1916). Lay-off rates became progressively lower by using scientific management, and by standardizing the style of men's suits so that there was a constant demand. Correspondingly, standardizing the style of the suit cut down on the costs of production, allowed for direct sales (instead of taking orders), and also allowed for a year-round market (Commons, 1920).

Once the ideas of scientific management were known to the employees and implemented, the management applied a piece-rate work system with bonuses to further encourage efficiency in the workplace. According to the article, "Scientific management in Action" (1921), during an employee's first week, wages started at \$.35 an hour. The lower wage, known as a "retainer," was applied to cover the production that would be lost due to job training. The second week's wages would increase to \$.45 an hour and the maximum standard rate during the early 1920s was \$.55.

In addition, the \$.55 per hour wage could increase through bonuses by completing quality work and reaching the production goals. Both bonuses were an additional 15 percent of the hourly wage (a total of a 30 percent bonus in addition to the \$.55 wage). Another \$.50 could be added daily for regular attendance. In total, an employee could earn up to \$.715 an hour, or \$6.72 per day, including the attendance bonus ("Scientific Management in Action," 1921).

The company continually updated its employees on the goals of scientific management in order to keep the company one of the most efficient clothing shops in the region. In a memo to all foremen and apprentices, a tentative outline of "What a Clothcraft Guide Ought to Know" (1921) was issued, and included sections on the general policies of scientific management, labor policies, and manufacturing organizations. These policies included Joseph and Feiss becoming one of the firms to establish the five-day work week in 1917. In an article in the *New York Times*, Richard Feiss described four of the advantages of running a five-day work week. These advantages included: saving power; reducing absenteeism and labor turnover; gaining new sources of labor (due to the 5 day week), and having a more balanced production with definite quotas ("Ford's 5-Day Week," 1922).

Alongside scientific management, Joseph and Feiss also understood that welfare practices, or paternalism, must be utilized to make the workplace more efficient. Under the practices of paternalism, employees worked under conditions that encouraged greater collaboration and a higher morale.

All matters of employee welfare were handled by Mary Gilson, head of the Employment and Service Department (known in short as the Service Department). The Service Department was in charge of all hiring and firing matters which differed from prevailing practice at other companies which often left such matters in the hands of foremen or supervisors. Absentee or tardy employees were personally investigated by the Service Department and the investigations would sometimes be carried on in the home. All other matters including recreation, libraries, and sanitary conditions were also taken care of by the Service Department (The Clothcraft Shops).

In its report for 1914, the Service Department stated its personal standards for workers. Those standards noted that truly efficient persons would prefer a "clean, healthy body and plain, businesslike clothes to untidiness, powder, jewelry . . . and other evidence of false ideals." However, in time the cleanliness standards for workers became the basis for authoritarian work practices and intrusion into personal matters.

Aside from the sanitation and appearance of workers, the Service Department's 1914 Report also included items beneficial to the workers such as \$.10 boxed lunches for the workers to maintain an affordable and healthy diet. Clean and attractive lunchrooms, large enough to fit the entire work-force at one time, were also available separately for men and women (The Clothcraft Shops).

Exercise and games, as pointed out in the report in 1914, were a pivotal part of the work day for the employees. Noon games were conducted such as baseball, tag, crack the whip, cards, and many others.

This “play hour” was kept separate for the males and females, and sports teams (such as women’s baseball) were often held in high regard.

On Wednesdays at noon, an orchestra would play and a dance was held for the employees. Management believed that an hour a day of exercise and games would only continue to increase the cooperation and team spirit among employees. On Wednesday evenings, all employees were invited to a “party,” along with their friends and family. There also was a company choir which would sing at these parties (Service Department of the Joseph and Feiss Company’s Report, 1914).

Medical services were another priority because the executives believed attendance was vital; therefore, spending more money in this area paid off in having fewer sick days taken by the employees. For example, there was an operating room used jointly by the oculist, physician, and dentist. The oculist and surgeon would spend one day a week at the office and the physician would be at the office two days a week (The Clothcraft Shops).

Vacations were also important. For the first week in September, factory work would be suspended, allowing workers to enjoy themselves and become refreshed and ready to work hard again. Corresponding with the paid week of vacation, the Service Department would investigate vacation spots and would then post bulletins advertising and picturing the pleasures of various places (Clothcraft Shop).

Among the company’s paternalistic activities was the promotion of the use of a company bank, the Penny Savings Bank, which served as an encouragement to thrift (The Clothcraft Shops). Along with the Penny Savings Bank, workers enjoyed a pension plan. The pension plan was implemented after an individual’s first year at the company. Employees were given \$.05 per day that was applied to a pension fund and this amount increased every year up to \$1.50 per day. In total, the maximum amount of money attained at the end of thirty years’ service with the company was approximately \$8,000 (“Clothing Company Uses,” 1928).

In order to encourage education, the company hired five public school teachers to come on Thursdays after work to teach English to foreign employees. The Cleveland Board of Education paid these costs, making sure there would be no additional monetary burdens for the workers (The Clothcraft Shops).

Although the control exercised by the executives became “authoritative” in their attempts to improve the workplace, the overall ideas of paternalism were revolutionary at the time (Goldberg, 1992). Implementing paternalism in the workplace improved cooperation, morale, and gave the employees a sense of “team spirit,” which all helped to improve the quality of product from the Joseph and Feiss Company.

The paternalistic approach to employee relations extended to the treatment of female employees. From its early years, Joseph and Feiss held women employees in relatively high regard. The management found that inequalities in pay led women to become disinterested and dissatisfied with their jobs; as a result, production and the overall morale of the shop would decrease. Instead, “it was recognized that work must be paid for in accordance with the difficulty involved, the skill required, the degree of agreeableness or disagreeableness and the importance” (Commons, 1920).

According to an article by John R. Commons, “Lizzie Likes her Job” (1920), research was conducted to determine fair and proper wages for different types of work. Although the study showed there was still a wage disparity, these salaries were thought to be fair and in accordance with the difficulty of the work. Women found such wages high enough to keep them at the firm, and to maintain a high morale.

Women, like men, were able to attain executive positions as well. The company did not take gender or experience into consideration as much as a college degree. Women with college degrees, consequently, were able to move up the ranks as quickly as men. By 1920, twenty-one of the firm’s forty-six supervisors were women—a remarkable feat for any American industry in that era (Goldberg, 1992).

Although the Industrial Democracy and Scientific Management/Paternalism models differed in their structure and implementation, they both appear to have met with significant employee approval through the early 1920s. Printz-Biederman employees resisted aggressively ILGWU attempts to organize them. The Joseph and Feiss paternalism provided a relatively protected and comfortable work environment for its workers. However, a combination of national economic trends and changing conditions created an environment in the late 1920s and early 1930s that made both firms vulnerable to union organization.

V. UNION RECOGNITION

Unions representing the needle trades became particularly aggressive in Cleveland in the early 1930s as general economic conditions deteriorated. For example, in early 1933, relations between the ILGWU and Cleveland garment manufacturers were particularly tense. The employers association, which had up until then dealt collectively with the union, disbanded and the employers were not inclined to sign new union agreements (“Garment Union Head,” 1933).

David Dubinsky, president of the ILGWU, visited Cleveland on several occasions and alleged sweat-shop conditions existed in the Cleveland plants (“Postpones Strike,” 1933). The ILGWU threatened to strike the non-union Cleveland garment firms in 1933 over working conditions, wages, adherence to the closed shop, and the farming-out of work to other shops (“Two Strikes In Cleveland,” 1933). After some postponements, the ILGWU voted to have a general strike in January 1934 on the grounds that efforts to secure an agreement with the manufacturers had failed (Lavelle, 1934a). In the end, the strike was called off because an agreement was reached through the arbitration efforts of Newton D. Baker. In the settlement, the manufacturers agreed to a wage increase, absorption of unemployed members of the union, and the closed shop (“Garment Workers Sign,” 1934).

It was in this environment of increased tension between the ILGWU and the Cleveland garment manufacturers that Printz-Biederman found itself the target of aggressive organizing attempts by the ILGWU after nearly twenty years of operations under the Leitch Industrial Democracy model. In July 1934, the cutters at Printz-Biederman joined the ILGWU (“Cutters Join Union,” 1934). Then, on August 25, 1934, Abraham Katovsky, Vice President of the ILGWU for the Cleveland area wrote a letter to Alexander Printz requesting that the cutters be paid union wage scales and be given back pay to January 17, 1934 when the scales went into effect. Katovsky also accused the company of deliberately tightening work standards in order to reduce wages and on infringing upon the rights of workers under Section 7A of the National Industrial Recovery Act (NIRA) which gave employees the right to organize and bargain collectively.

On September 7, 1934, Printz responded to Katovsky stating the company was living up to its requirements under the NIRA and the Code of the Cloak and Suit Industry which had been enacted under the law. On the matter of a tightening of standards, Printz stated the piece-rates being paid were based on time studies ratified by collective agreement under the Industrial Democracy framework. In a September 28, 1934, letter to the union, Printz pointed out that the company’s employees had entered into a collective agreement through the Betterment Committee on July 10, 1934, and were bound by that agreement.

Several months later, on January 25, 1935, a meeting was held between Alexander Printz and Abraham Katovsky to discuss the issues of mutual concern. The minutes of that January 25, 1935, meeting reveal that for the first time Printz began to realize that the fundamental relationships between labor and management were in the process of changing. At one point in the meeting he stated, “The only agreement I will make with you is that when my agreement expires in July [1935], the employees will be free to vote for yours.”

Katovsky held that giving the workers the right to vote on joining the union after July 10, 1935, would not work because their minds had been poisoned against the union by the company. What Katovsky wanted from Printz was an agreement that as of July 10, 1935, the union would be the bargaining agent for all

workers—whether union or non-union—and that the issue of a closed shop be part of a board of arbitration. The first steps toward such an agreement began with a series of meetings between Alexander Printz and David Dubinsky, President of the ILGWU.

Before the meetings with Dubinsky, Printz contacted Frances Perkins, the Roosevelt Administration's Secretary of Labor, to request assistance in resolving major issues between the company and the ILGWU. Perkins assigned A.L. Faulkner, a Department of Labor conciliator, to the case. A strike at Printz-Biederman was averted when Printz and Dubinsky agreed to meet in Washington, D.C., accompanied by Katovsky and Faulkner ("Threatened Strike," 1935).

Following the meeting with Dubinsky, Printz addressed his employees in the morning of February 4, 1935. Printz expressed confidence in the loyalty and sense of justice of the employees. He reviewed for the employees the meetings he had with Katovsky, Dubinsky, and Faulkner in Washington on February 2 and 3, 1935. He then proposed a possible union organization scheme. Printz offered to present a proposition to Dubinsky that the Printz-Biederman Company be given a charter by the AF of L and "that the president and officers be elected by your votes . . . and that it have no connection with Mr. Katovsky and his local union." (All of the other ladies garment firms in Cleveland at that time were organized under a single local of the ILGWU.) Printz noted he had no idea whether this plan would be acceptable to Dubinsky. However, he also proposed that the drafting of the plan be put in the hands of Dr. Arthur Rubin of the University of Chicago's Economics Department. He (Printz) was willing to trust Rubin if Dubinsky would do so as well.

Printz recognized that action to avoid a strike was necessary and that he had to give the proposed plan to Dubinsky that day (February 4, 1935). Therefore, he asked the workers to vote on it. In a secret ballot vote, 206 people favored the plan suggested by Printz and only eight were against it.

The meeting with employees adjourned at 12:30 pm on February 4, 1935, and at 1:45 pm that day, Printz telegraphed Dubinsky with the proposal. After a series of telegram exchanges, Dubinsky and Printz agreed to meet in New York on February 6, 1935, along with Dr. Rubin, A.L. Faulkner, and Hugh L. Kerwin, Director of the U.S. Conciliation Service. The result of this meeting included an ILGWU agreement:

to establish in the City of Cleveland a separate local Union to be under the sole supervision of the General Executive Board of the said International Union for the workers employed in the shops of Printz, Biederman Co. (Agreement, 1935).

After nearly a third of a century of trying, the International Ladies Garment Workers Union had organized the workers at the Printz-Biederman Company. In so doing, the Industrial Democracy experiment of 1914 had given way to another, unique at the time, experiment of a separate local of the ILGWU for the Printz-Biederman shops.

Whereas Printz-Biederman had felt pressure from the ILGWU from the early 1900s, under the "open shop" of Joseph and Feiss, pressure from organized labor had been minimal for many years. However, during the 1920s, problems arose within the company and in the management. By 1925, net earnings had plummeted by nearly half. In turn, the Joseph and Feiss Company was unable to pay its preferred dividends for the first time. For these reasons, dissention among the executives regarding the high costs of the Employment and Service department began. Gilson, head of the department, resigned in 1924 after facing severe cuts in the welfare programs and a reduction in her influence. Additionally, Richard Feiss was under attack by the other executives of the company, specifically his father Julius and brother Paul, who argued that scientific management had run its course in the company. He resigned in 1925. Although the Joseph and Feiss Company recovered quickly from these mid-1920s problems, and enjoyed renewed growth with most of its managerial infrastructure and many of its welfare programs intact, the executive reorganization was a blow to the application of scientific management (Goldberg, 1992).

The atmosphere between employee and employer became progressively more hostile and in August of 1933, more than 1,000 Joseph and Feiss and Richmond Brothers (another Cleveland firm) employees were urged to join clothing workers unions ("Urge 1,000," 1933). The union movement at Joseph and Feiss began in earnest in March 1934 when an employee, John Melda, claimed at an Amalgamated Clothing Workers meeting that he was discharged for his union activities. The meeting unanimously voted for a committee to call on the management of Joseph and Feiss to demand the reinstatement of Melda. Further, the ACWA agreed decisive action would be taken if any other workers were fired for union activities ("Says He Was Fired," 1934).

On March 14, the ACWA led the Joseph and Feiss employees on a walkout ("Peaceful Plan," 1934). Among the demands of the 1,800 Joseph and Feiss strikers were a 25 per cent wage increase, recognition of the union, and the reinstatement of Melda (Lavelle, 1934b). Although only lasting a few days, the workers maintained a sturdy picket line while a payroll loss at the weekly rate of \$35,000 was endured ("Garment Strike Near Settlement," 1934).

In its attempts to settle the strike, Joseph and Feiss became one of the first firms to ask the Cleveland Regional Labor Board to step in and help settle the dispute and reach an agreement. With the help of the Labor Board, the drafted proposals included several key provisions that would need to be implemented for the strike to end. As noted in the *Plain Dealer*, the major points of the proposal were that strikers return to work immediately and an election be held to decide who would represent the employees (Lavelle, 1934b).

By March 19, 1934, an agreement had been struck and promptly ended the strike ("Reason Wins," 1934). The strike came to a relatively quick end due to negotiations involving Paul Feiss, Sidney Hillman President of the ACWA, and Ralph Lind, executive secretary of the Cleveland Regional Labor Board. A pivotal part to the agreement was the provision to allow the employees to vote for either a company union or the ACWA to represent them. The vote was taken following the end of the strike on March 19; the results were 1,216 to 402 in favor of ACWA representation ("Union Wins," 1934).

The most significant change at Joseph and Feiss that resulted from the strike and the vote in favor of the ACWA representation was the transition from an open shop to a "preferential" shop. This "preferential" shop required the company to hire and fire workers according to union membership (union members having preferential treatment) ("Union Wins," 1934). To further solidify the agreement, the *Cleveland Plain Dealer* noted a ten percent wage increase to the employees was granted, thus assisting in the maintenance of a harmonious relationship (Lavelle, 1934c).

VI. CONCLUSION

Examined here has been the question of whether the experiments in Industrial Psychology/Paternalism and Industrial Democracy in the Cleveland garment industry in the first third of the 20th century improved working conditions and the effectiveness of labor-management relations. The cases of two firms were examined. The Printz-Biederman Company adopted the Industrial Democracy model and the Joseph and Feiss Company adopted the Industrial Psychology model. However, both firms had their labor forces organized by unions by 1935. The question can be raised, then, of whether these experiments in Industrial Democracy and Industrial Psychology were a failure or were evolutionary developments that made union organization more acceptable to the workers and management of these firms.

The evidence suggests that the adoption of the Industrial Democracy model was undertaken at the initiative of the Printz-Biederman management. As such, it must be viewed as an attempt by the management to avoid the adversarial labor-management relations usually associated with the bilateral monopoly labor relations model.

In the ordinary adversarial union-management model, labor and management individually and separately prepare their positions prior to negotiations over wages, hours, and working conditions. In the Printz-

Biederman case, though, there was what might be called a collaborative decision-making structure in the guise of Industrial Democracy.

Detailed data on wages are not available for the twenty year period that Industrial Democracy was operative at Printz-Biederman. However, the resistance of the work force to attempts by the International Ladies Garment Workers Union (ILGWU) to organize employees of the company suggests that there was active support for the institutions of Industrial Democracy at Printz-Biederman for nearly two decades. Therefore, it can be concluded that the fundamental needs and expectations of the workers were being addressed successfully during that time by the implementation of Industrial Democracy.

During the 1930s, in an environment of economic and employment uncertainty, the ILGWU intensified its attempt to organize the Printz-Biederman workers. Those efforts ultimately were successful, but in that success the ILGWU had to accept what was at the time unique for it in bilateral bargaining arrangements; i.e., a separate local for the union at the company. In turn, by acquiescing to this demand, the ILGWU demonstrated flexibility as it recognized worker loyalty to Printz-Biederman that twenty years of Industrial Democracy had brought to the firm.

The adoption of paternalism at the Joseph and Feiss Company represented still a third model of labor-management relations compared to the usual union-management adversarial model and the Industrial Democracy model. Joseph and Feiss integrated a form of paternalism, or social welfare, into the company. The adaptations of Taylorism and paternalism were successful in that the company remained free of labor unrest from 1909 until 1934.

During the 1909–1934 period, Joseph and Feiss made advances in areas such as higher wages, shorter work weeks, increasing production, allowing women to advance in the company, and providing health care. However, the company's control over the lives of its employees became somewhat authoritarian; loyalty was demanded, lockers were checked, and visits could be made to the homes of absent workers. These concerns led to the organization of the workforce by the ACWA in 1934. The “authoritative” leadership structure of scientific management and paternalism was changed. The workers had decided that the once revolutionary ideas of Joseph and Feiss would be replaced by the traditional bilateral monopoly adversarial labor relations model.

Our conclusions, then, are that both the Printz-Biederman Industrial Democracy and the Joseph and Feiss Industrial Psychology/paternalism models served their constituencies adequately for a period of nearly two decades. In time, though, those institutions were not sufficiently robust to resist the allure to workers of the organizing attempts of labor unions. Those pressures were magnified by the exigencies of an economy and industry struggling through the Great Depression of the 1930s. By the mid-1930s, both firms surrendered their experiments in labor-management relations to the prevailing bilateral monopoly adversarial model that had become dominant in the garment industry.

Future research on the topic of labor relations in the Cleveland garment industry might well consider the post 1935 and post-World War II role of the Amalgamated Clothing Workers of America and the International Ladies Garment Workers Union within the Cleveland firms as those firms declined and, in some cases, exited the industry.

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**THE PROBLEMS US DUMPING AND SUBSIDY REGULATIONS POSE FOR THAILAND:
EVIDENCE FROM THE STEEL AND PINEAPPLE SECTORS**

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ABSTRACT

This research examines the problems unfair trade laws create for the developing and newly industrialized countries of Asia by investigating the difficulties US antidumping (AD) and countervailing duty (CVD) regulations create for Thailand. AD regulations restrict imports sold at abnormally low prices. CVD laws eliminate the advantages conferred when governments give exporters subsidies. American AD and CVD laws are a potent means for protecting US producers because Congress has extended their reach and because they can be employed by American corporations to harass foreign competitors. Interviews with Thai government officials and representatives from the steel and pineapple industries indicate that these American laws pose many problems for Thai exporters. Among these problems are the complexity of US regulations, the cost of hiring US attorneys to respond to American investigations, the limited time allowed for responding to requests for information, the business lost when contracts are canceled because a Thai firm faces an AD or CVD investigation, and the excessive reliance of the Thais on US attorneys for training.

I. INTRODUCTION

In recent decades, an important international trend has involved the continuing negotiations under the auspices of the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO) that have lowered tariffs and expanded markets the world over.¹ This increasingly open international trading arena has allowed many developing and newly industrialized countries in Asia to employ a strategy that relies on exports as a means for promoting economic growth and development. As a result, several Asian countries have experienced rapid increases in their standards of living and in the size and sophistication of their manufacturing sectors.

While an exporting-for-growth strategy has had economic benefits for some developing countries, it has created political problems in many of the advanced societies that receive those exports because it means more competition for local producers. These local producers in turn often pressure their governments for protection. Even though GATT and WTO agreements now restrict many forms of protection employed in the past, governments are still able to shield domestic producers from foreign competition by using unfair trade procedures that have been only modestly affected by international negotiations. Unfair trade involves an attempt by a “producer or its government . . . to manipulate normal market mechanisms to its advantage and to the detriment” of foreign competitors (Rothgeb, 2001, p. 95). International norms treat dumping and subsidies as prime examples of unfair trade.² Dumping refers to selling goods in export markets at abnormally low prices. Subsidies are payments governments make to domestic producers that enable those producers to export more easily.

Since the WTO and governments worldwide regard dumping and subsidies as unfair trade, national laws to protect local producers from these practices have survived the trade liberalization of the post-World War II period (Goldstein, 1986, pp. 186–87; Jackson, 1997, pp. 177–78). Indeed, in many cases national unfair trade laws have been extended to cover an expanding assortment of behaviors and have become so complex that one trade analyst has labeled them the “preferred protectionist devices” for those seeking to limit imports (Srinivasan, 1999, p. 1062).

An examination of the use of unfair trade laws reveals how often they restrict the exports of developing and newly industrialized states in Asia. According to the WTO, between 2000 and 2005 there were a total of 1614 dumping investigations worldwide, 53 percent of which were aimed at Asian exports. The picture is similar for anti-dumping (AD) duty penalties, for 52 percent of the 1113 measures were placed on Asian exports. The anti-subsidy investigations and duties (known as countervailing duties, or CVDs) follow the same pattern, for 55 percent of the 83 investigations and 59 percent of the 65 penalties worldwide were against Asian products.³

Data for the United States and the European Union, the world’s largest export markets, follow the same pattern. In the United States, between 2000 and 2005, 41 percent of the 283 AD and CVD investigations and 44 percent of the 332 AD and CVD duties were placed on Asian goods. The figures for the European Union are even higher, for 61 percent of the 150 AD and CVD investigations and 62 percent of the 126 duty orders were levied against imports from Asia. When considering these figures, it is important to note that Asian countries accounted for an average of 19.6 percent of the world’s exports between 2000 and 2005. In the United States, during the years 2000–2005, 26 percent of imports were from Asia, and in the European Union during the same time period 29 percent of imports came from Asia.⁴

While unfair trade rules worldwide and in the United States and the European Union may not be specifically designed to target Asian exports, the above data indicate that their application disproportionately affects goods from Asian societies. Given the degree to which the AD and CVD investigations and duties around the world focus on Asian exports and considering the emphasis many analysts place on the exporting-for-growth strategy, research regarding how this affects Asian governments and producers is in order. In particular, interviews with government officials and private industry representatives might prove useful for determining exactly how much damage unfair trade laws

do to Asian trade. Interestingly, while such interview-based research could be illuminating, to date the scholarly work on unfair trade regulations has centered primarily on assessing WTO unfair trade negotiations, on the logical implications for developing societies of WTO agreements, and on examining aggregate trade flow data.⁵

This research has two purposes. The first is to conduct a case study to identify some of the problems government officials and industry representatives from an Asian country confront due to the anti-dumping and anti-subsidy rules found in their largest export market. The second is to offer policy recommendations to help alleviate those problems. The developing country examined is Thailand. Thailand's largest export market is the United States. Thailand was selected because it is among the developing world's most active traders, its government and industry have experience with anti-dumping and anti-subsidy investigations, and it has both a well-organized government trade bureaucracy and established industry groups that handle trade issues. Furthermore, WTO data regarding the developing countries that have faced the most AD and CVD investigations and have had the most duties imposed reveal that Thailand ranks among the top ten in each area.⁶ One might therefore conclude that the Thai government and Thai businesses have substantial experience with unfair trade and that if Thailand faces problems due to AD and CVD actions, then the same difficulties probably plague other Asian societies. Hence, investigating the Thai case should provide valuable clues as to how Asian countries in general are affected by unfair trade regulations.⁷

The following pages contain three sections. The first provides an overview of the evolution of American AD and CVD laws to illustrate their complexity. The second summarizes results from interviews of Thai government officials and industry representatives. Finally, the implications of this analysis are considered.

II. AMERICAN ANTIDUMPING AND COUNTERVAILING DUTY LAWS

A. The Origins of American Regulations

United States unfair trade legislation originated a century ago when attempts were made to prevent foreigners from manipulating markets to the detriment of American businesses (Rothgeb, 2001, p. 95). At the time, dumping was seen as selling foreign goods in the United States at abnormally low prices that could not be matched by American producers. As Congress saw it, such behavior was predatory because it might bankrupt American firms. Another Congressional concern related to the payments, or subsidies, foreign governments sometimes gave to exporters that allowed foreign corporations to sell goods at prices American companies could not match. Once again, the possible result for American firms was bankruptcy.⁸

To counter these practices, Congress passed the first US anti-subsidy law in 1890 to offset the payments some European countries granted to sugar exporters (Viner, 1966, pp. 168–69). This law was extended to cover other subsidized goods in 1894, 1897, 1909, and 1913 as Congress sought to revise American anti-subsidy laws to protect US companies from what it viewed as unfair trade. By 1913, American CVD regulations were widely regarded as the most stringent in the world, for they required the imposition of duties to offset a variety of foreign payments and tax rebates. In 1922 and 1930 Congress passed additional legislation that increased the scope of American CVD regulations by expanding the definition of a subsidy to include payments by provincial and local governments (Viner, 1966, pp. 173–74; Bryan, 1980, p. 251).

The first American anti-dumping legislation in 1894 was designed to prevent foreign monopolies from restraining US domestic commerce (Viner 1966, pp. 240–41; Congressional Budget Office (CBO), 1994, pp. 19–20). In 1916, the Anti-Dumping Act introduced criminal penalties for predatory pricing, which was defined as selling foreign goods in the US at prices below those charged in the exporting country (Finger, 1993, p. 19; CBO, 1994, p. 20; Lash, 1998, p. 25). Another method for dealing with dumping was contained in the Anti-Dumping Act of 1921. This legislation, which has served as the foundation for the way the United States has handled dumping ever since, used anti-dumping duties to eliminate the

pricing advantages created by dumping (CBO, 1994, p. 21; Mastel, 1998, p. 19; Eckes, 1999, p. 67). In addition, a new procedure was set up to measure dumping. Normally, a dumping investigation compared the selling price in the United States with the price charged in the exporting country, referred to as the home country. A lower American price was defined as dumping. The new method permitted the Treasury Department to estimate a cost of production if data for home country sales were not available, thereby making it easier for an American complainant to obtain a favorable ruling.⁹

B. More Recent AD Legislation

As mentioned above, the trade agreements negotiated since World War II have lowered American tariffs, and many companies have looked to AD and CVD regulations for protection. In response, Congress began toughening US regulations in 1954 when it set strict time limits for AD investigations. In 1958, Congress again acted by requiring that tie votes in AD investigations be recorded in favor of American complainants and that the price comparisons in AD cases need not be based on identical goods. In addition, the 1958 law allowed the Treasury Department to measure dumping by comparing the US price with sales in third country markets when home country sales were negligible. If prices in the United States were lower than in third markets, dumping would be presumed. The 1954 move favored American complainants by ensuring quick responses when dumping was alleged, while the other changes made it easier to reach positive findings in AD cases (Bryan, 1980, pp. 8–9; Mastel, 1998, p. 12).¹⁰

In 1974 and 1979 even more protection was given to American producers when Congress altered AD procedures in four ways. The first two came in the Trade Act of 1974. One set strict time limits for foreign firms when they filled out the complex questionnaires associated with AD investigations. Another redefined dumping as any sales at a price below the cost of production, even if there was no difference in price between the United States and foreign markets (CBO, 1994, pp. 25–26; Nivola, 1993, pp. 92–93). The other two changes were in the Trade Agreements Act of 1979. This law moved the authority for conducting AD investigations from the Treasury Department to the Commerce Department, which Congress saw as more sympathetic to requests for protection. In addition, the Commerce Department was authorized to use the “best information available” (BIA) to calculate AD price comparisons (Nivola, 1993, pp. 94–95; CBO, 1994, pp. 27–28; House of Representatives (HOR), 2001, p. 91; U.S. Congress (Congress), 1979, pp. 1, 4).

The net result of the 1974 and 1979 changes was increased pressure on foreign firms. For one thing, these companies were compelled to move quickly when completing AD questionnaires. For another, the failure to provide data in a timely fashion could result in the use of BIA, which almost always worked to the disadvantage of foreigners because the data used on occasion comes from the American firm filing the complaint. Naturally, data coming from an American company usually cast an unfavorable light on foreign pricing practices.

It should be noted that the Trade Agreements Act of 1979 included one provision that worked to the advantage of foreigners for it henceforth required an injury test before AD duties could be imposed. That is, AD investigations now involved a three step process. The first step required any party that felt it was a victim of dumping to file a complaint with the Commerce Department requesting an investigation. The second step focused on a price comparison to determine if dumping existed, and the third step called for the US International Trade Commission to evaluate whether the dumping was adversely affecting, or injuring, American producers. If dumping existed and an injury was found, then AD duties would be imposed. Otherwise, the case would be dismissed. This change brought American law into conformity with new rules created during the Tokyo Round of GATT negotiations (CBO, 1994, pp. 24, 26, 27; HOR, 2001, pp. 90–91).

Additional changes to American AD rules came in the Trade and Tariff Act of 1984 and the Omnibus Trade and Competitiveness Act of 1988. The most important change in 1984 involved “cumulation.” Under the new cumulation rule, the injury part of an AD investigation now examined all dumped imports of a particular good. Previously, decisions were made on a case-by-case basis, and dumping by small

foreign firms often was not seen as injuring American producers (Nivola, 1993, p. 105; Lande & VanGrasstek, 1986, pp. 121–122; Congress, 1984, p. 10). This change made it far easier to obtain the positive injury finding required before AD duties could be imposed.

The major changes in 1988 pertained to “circumvention” and dumping in third countries. The circumvention rule attempted to restrict a foreign producer’s ability to side-step American AD laws by assembling goods in another country and then exporting to the United States (Nivola, 1993, p. 105; HOR, 2001, pp. 102–103; Congress, 1988, pp. 5–6). The third country dumping rule was meant to combat dumping in markets where US companies engaged in export activity. Such third country dumping was viewed by Congress as robbing American producers of foreign sales.¹¹

C. The Uruguay Round Agreements Act

While the revisions to US AD rules described above tended to increase protection for US producers, the changes in the Uruguay Round Agreements Act (URAA) of 1994 limited that protection. These alterations responded to the bargains struck during the Uruguay Round of GATT negotiations. Three modifications to US law deserve special mention. The first pertained to the minimum price difference (technically known as the “de minimis” margin) in an AD investigation that would result in the imposition of duties. The URAA set this price difference at 2 percent. Henceforth, dumping was defined as a US selling price that was more than 2 percent lower than the comparison price used in an AD investigation. Prior to the URAA, the US had employed a 0.5 percent de minimis. Thus, this change reduced the likelihood that AD investigations would favor American complainants (WTO, 1994a, p. 152; ITA, 1994a, pp. 28, 37, 77; ITA, 1994b, p. 22).¹²

A second change related to cumulation. The new URAA rule specified that cumulation would not be applied if the imports from a country accounted for less than 3 percent of the total imports of a particular good. An exception to this rule could be made if the total imports from all countries meeting the 3 percent rule collectively accounted for 7 percent or more of the imports of the good (WTO, 1994a, p. 152; ITA, 1994a, p. 28; ITA, 1994b, p. 76).

The last major change in the URAA had to do with “sunset reviews.” Such reviews determine whether dumping would continue or resume if AD duties are terminated. The URAA required sunset reviews within five years of the initial imposition of AD duties. Previously, there were no provisions for specifying when AD duties would be lifted once they were in place (Rothgeb & Chinapandhu, 2007, p. 30).

D. Recent Anti-Subsidy Legislation

Post-World War II alterations in American CVD regulations have paralleled those for AD rules. Seven major changes have expanded the reach of CVD investigations and led to greater protection for US producers. The first two modifications were included in the Trade Act of 1974 where strict time limits were set for conducting US CVD investigations and American firms were given the right to appeal unfavorable CVD decisions (Bryan, 1980, p. 252; Congress, 1978, pp. 2374–75). Both rules favored American corporations at the expense of foreign competitors.

Two more revisions are found in the Trade Agreements Act of 1979, where the authority for conducting CVD investigations was transferred from the Treasury Department to the Commerce Department, and the use of best information available (BIA) was permitted when US investigators were unable to acquire the appropriate data (Nivola, 1993, pp. 94–95; HOR, 2001, p. 85; Congress, 1979, pp. 152–153). As mentioned above, the Commerce Department was regarded as more likely to favor American producers, and BIA was designed to ensure that US investigations would not be thwarted by foreign attempts to withhold information.

The Trade and Tariff Act of 1984 also introduced two changes to US CVD rules. One applied cumulation rules to CVD investigations. Henceforth, as was the case for AD cases, the injury test in CVD cases would be based on the effects of all subsidized imports of a good (Congress, 1984, p. 3033). The second

revision expanded the definition of subsidies to include “upstream” subsidies. Upstream subsidies are defined as payments from a government or customs union that gives merchandise subject to a CVD a competitive advantage by lowering the cost of inputs used to produce the good (Congress, 1984, p. 3035). These changes increased the reach of American CVD rules by expanding the definition of unacceptable government assistance.

Finally, the Omnibus Trade and Competitiveness Act of 1988 introduced the concept of a “domestic” subsidy into US trade law. Previously, subsidies were regarded as government payments that allowed foreign producers to expand their exports. The 1988 law altered this definition to include any benefit a foreign government provided to its producers that reduced the cost of production, even if obtaining the benefit did not depend on export performance (Congress, 1988, p. 1184; Horlick & Oliver, 1989, pp. 7, 9). An example would be the reduced utility rates governments often charge industrial users. Once again, this change extended the scope of US regulations.

Recent changes in American anti-subsidy rules have not always resulted in a tougher stance toward imports, however, for, as was the case with AD regulations, the outcomes of GATT and WTO negotiations have introduced modifications favoring foreigners. One such change came in 1979 when the Trade Agreements Act required the same injury test in CVD cases as it did for AD investigations. As a result, CVD cases now followed the same three step procedure described above for AD investigations.

Other alterations benefitting foreigners were included in the Uruguay Round Agreements Act of 1994 that incorporated the WTO Subsidies Agreement into American trade law. This law added the WTO “traffic light” approach to American CVD procedures, afforded special treatment to imports from developing countries, and required the same type of sunset reviews for CVD duties as it did for AD levies (see above). The special rules for developing countries focused on setting higher cumulation and de minimis standards, thereby making it more difficult for American investigators to conclude that developing country subsidies merited US anti-subsidy duties. The traffic light feature was designed to differentiate between categories of subsidies, ranging from “red” light subsidies that were forbidden at all times to “green” light subsidies that were to be treated as nonactionable. In essence, the WTO meant for this approach to ease some of the frictions surrounding government subsidies by trying to make it clear what subsidies were unacceptable at all times and which subsidies were permissible. An example of a red light subsidy is one that is contingent on the export of a good, while an illustration of a green light subsidy is one that is meant to promote employment in a depressed region within a country (WTO, 1994b, pp. 231, 262; ITA, 1994b, pp. 49, 63; HOR, 2001, pp. 86, 106).¹³

E. The Byrd Amendment

A final US law pertaining to dumping and subsidies is the Continued Dumping and Subsidies Offset Act of 2000, also known as the Byrd Amendment (named for the Democratic Senator from West Virginia). This legislation allowed the proceeds from AD and CVD cases to be distributed among the American producers affected by foreign dumping and/or subsidies. Prior to this law, the revenue from AD and CVD penalties was paid to the US Treasury. This law gave US companies additional incentives to file unfair trade cases since they could be a source of both revenue and protection. Shortly after its passage, several WTO members asked a WTO panel to consider whether this law violated WTO rules. The panel ruled against the US, and the law was allowed to expire in October 2007 (HOR, 2001, p. 104; *New York Times*, 2002, p. C2; *Wall Street Journal*, 2002, p. A2; *Wall Street Journal*, 2003, p. A8).

III. SUMMARY

In the years since they were first created, American AD and CVD regulations have become increasingly complex instruments for protecting American firms from an expanding set of foreign pricing practices and forms of governmental assistance. Both types of rules have continually enlarged the definitions of dumping and/or subsidies, set severe time limits for investigations, confronted foreigners with complex requests for information that must be provided within a short time period, threatened the use of best

information available when foreigners do not provide data quickly enough, based injury determinations on the cumulated value of imports, and set such low de minimis levels that findings favoring American complainants were relatively easy to obtain. In addition, American AD investigating authorities were encouraged by law to monitor foreign sales and production in third markets to guard against circumvention and dumping in other countries, while CVD rules stretched the definition of foreign subsidies to include upstream and domestic activities. While GATT and WTO negotiations and panel rulings have reined in some of the more extreme regulations, as they now stand American laws present foreigners wishing to export to the United States with some daunting challenges.

In the following pages, the types of problems that these American rules have created for Thai businesses and governmental officials are explored.

A. Interview Results

The analysis of the problems American AD and CVD regulations pose for Thailand is based on interviews conducted with Thai government officials and with representatives of the Thai steel and canned pineapple industries. The steel industry was selected for three reasons: (1) worldwide it is targeted for more dumping and subsidy complaints than any other industry, (2) it is one of Thailand's largest exporting industries, and (3) it has had extensive experience with US AD and CVD complaints. In fact, Thai steel exporters have been the target of more US dumping and subsidy complaints and penalties than all other Thai exporters combined. The pineapple industry has faced far fewer AD and CVD cases and can help evaluate how the frequency of complaints affects perceptions.¹⁴

The government officials interviewed came from the Bureau of Trade Interests and Remedies (BTIR), the Bureau of Multilateral Trade Negotiations (BMTN), and the Office of the Board of Investment (BOI). The BTIR and the BMTN are the key agencies within the Thai Ministry of Commerce that handle AD and CVD issues, while the BOI aids Thai corporations that face foreign CVD investigations.¹⁵

From the private sector, interviews were conducted with representatives of the Federation of Thai Industries (FTI), the Thai Iron and Steel Industry Club (TISIC), the Thai Food Processors' Association (TFPA), the Thai Pineapple Packers Group (TPPG), and the Joint WTO Committee (JWTO). The FTI is an umbrella organization that includes TISIC and TFPA as members. The TPPG forms one of the divisions within the TFPA. Each of these organizations assists Thai corporations facing foreign AD and CVD actions. The Joint WTO Committee includes as members the Board of Trade of Thailand, the FTI, and the Thai Bankers' Association. In the area of ADs and CVDs, the JWTO is one of the primary vehicles for informing the Thai government of the problems foreign AD and CVD complaints pose for Thai firms.¹⁶

To assess the types of problems US AD and CVD regulations create for Thailand, the respondents from the government and the private sector were asked to discuss issues relating to four areas: (1) their knowledge of US rules, (2) the procedures associated with US investigations, (3) the burdens US AD and CVD investigations create for Thailand, and (4) whether Thai actors seek settlements to terminate or suspend US investigations. The interviews focused on the respondents' experiences in the period since the WTO Antidumping Agreement and the Subsidies and Countervailing Measures Agreement went into effect in 1995. The questions are in Appendix 1.

The interviews took place in June and July of 2000 at the appropriate office in Bangkok. Follow up interviews were held between May and June of 2005 to determine if there were any changes in respondent perceptions and whether any problems found were temporary or more permanent. The interviews were conducted in Thai, the native language for one of the authors.

From the outset, it should be noted that some respondents hesitated to answer questions, arguing that trade is one of the most important of Thailand's national interests. To overcome this problem, all interviewees were guaranteed anonymity and were allowed to answer only those questions they felt comfortable with.¹⁷

B. Knowledge Issues

This group of questions examined whether the Thai government and Thai corporations employ enough specialists who understand US and WTO AD and CVD rules and where those specialists are educated. Among government officials, only those from the BTIR answered these questions. From the private sector, only the representative from TISIC responded to all questions, while the interviewees from TFPA, FTI, and JWTO addressed selected questions.

Beginning with the government, the BTIR respondents said that their agency does not have the expertise needed to deal with US and WTO AD and CVD cases and that the government and private companies rely heavily on the advice they receive from the American attorneys they hire to handle their cases. As far as education is concerned, the BTIR officials indicated that training is difficult to obtain in Thailand and that the Thai government depends on US trade lawyers to educate government personnel regarding US AD and CVD regulations.

Among industry respondents, the TISIC representative agreed with the comments from the BTIR, stating that Thai firms do not employ enough specialists who understand US and WTO AD and CVD regulations and that most Thai steel companies rely on US attorneys to educate their employees. The respondents from the FTI and the JWTO agreed with these views. The TISIC respondent also noted that the US International Trade Commission (ITC) and the WTO often hold training seminars in Bangkok for corporate leaders.

Interestingly, the representatives from the pineapple industry had a different view, indicating that information about US and WTO AD and CVD rules was not important and could be obtained from trade lawyers if it was needed. This difference of opinion between the pineapple and steel interviewees might be traced to the difference noted above regarding their experience with AD and CVD cases. While 9 AD and 8 CVD cases have been filed in the United States against the steel industry over the years, only one AD case has been filed against pineapples (ITC, 2005; ITA, 2000). In addition, the TPPG interviewee stated in 2005 that while US attorneys usually did a good job safeguarding Thai interests, on at least one occasion it was necessary to terminate relations with a firm for improperly handling a case, indicating that the dependence on US lawyers can have negative effects.

C. Procedural Issues

The procedural questions sought to determine how well respondents understood the methods used in US AD and CVD investigations and whether they considered those procedures appropriate. Those responding to this part of the survey included the BTIR officials and the representatives from TISIC, TFPA, and TPPG.

The BTIR respondents said that an important issue regarding US AD and CVD investigations involves Thai confidentiality laws, noting that American investigators frequently request information from the Thai government even when Thai laws make it illegal to make disclosures. The TISIC and TFPA interviewees described another problem, arguing that the questions included in US AD surveys often were meant to uncover Thai business secrets.

Another controversial procedural issue mentioned by the TISIC and TFPA representatives concerned the brief amounts of time the United States allows for filling out the lengthy AD investigation questionnaires. The TPPG respondent maintained these time limits put small Thai companies, corporations unfamiliar with US AD procedures, and firms with foreign partners at a disadvantage because these businesses usually needed more time to respond. In addition, all of the interviewees from the government and from private industry expressed the opinion that it was inappropriate for US investigators to use the best information available when Thai respondents in an AD case were unable to provide adequate answers. Smaller firms were seen as especially disadvantaged due to a lack of awareness as to when BIA is used. Indeed, the interviewees uniformly agreed that US AD and CVD questionnaires are so complex that it is nearly impossible to provide the information requested in a timely manner. In the 2005 interviews, the BTIR officials stated that meeting US timetables has necessitated retaining attorneys in Washington to

warn of imminent investigations, a practice the Thais found expensive. Hence, there was a general consensus that US procedures are designed to work to the disadvantage of foreigners and constitute a form of harassment.

D. Burden Issues

These questions examined the costs Thai companies incur due to US AD and CVD investigations. Beginning with the nature of the costs, the BTIR, BMTN, TISIC, and TFPA interviewees all stated that the primary burdens were the immense time required for handling US investigations, the large number of personnel needed to deal with the cases, and the expense associated with hiring US attorneys to represent Thai interests. BTIR officials estimated the average initial cost of an attorney for CVD cases at \$150,000, while private industry respondents said that lawyers for AD cases cost \$250,000 on average. The TISIC and TFPA representatives noted that these attorney fees often exceeded what smaller Thai companies could pay and that these firms sometimes did not contest cases.

Another burden was lost business. All respondents, both government and private, claimed that AD and CVD investigations led to lost sales. The BTIR interviewees stated that smaller Thai companies often lose sales in the United States because they abandon the American market if they receive adverse AD rulings. The TISIC and TFPA representatives agreed and added that American importers frequently terminate their contracts with Thai firms that are undergoing US AD and /or CVD investigations. As a result, the private industry respondents argued that the burdens associated with US AD and CVD cases are immense.

E. Settlement Issues

This part of the survey sought to determine if Thai companies were willing to limit their exports to the US in exchange for the termination of their AD and CVD cases and whether Thai firms felt that American companies use AD and CVD investigations to harass their Thai competitors. Regarding the termination of investigations, officials from the BTIR and BOI stated that in CVD cases the government hesitated to negotiate for the suspension or termination of US investigations due to the fear that any deals made might be less favorable for Thai firms than an adverse US finding. The BOI respondents added that Thai law made it difficult for the government to reach suspension deals on subsidies because it states that only recipient companies can request that subsidies be ended. Industry representatives from TISIC and TFPA voiced similar concerns about suspension agreements.

As for harassment, the TISIC and TFPA representatives strongly agreed with the contention that US corporations use AD and CVD cases as a way to make life difficult for their Thai competitors. The TFPA respondent was particularly vehement about this point, noting that the complexities associated with US AD and CVD regulations often interact with the uncertainties in international agricultural markets to make it difficult for Thai firms to price their products. Proper pricing was described as a key to AD allegations, but was portrayed as difficult for it required careful monitoring of American and world markets, which was depicted as very costly. Additionally, all respondents noted that such features of US laws as the Byrd Amendment (now expired), relatively low de minimis levels, cumulation, and the possible use of BIA served as incentives for American producers to file unfair trade cases to torment the Thais. Beyond this, it was noted that the tendency American importers had for canceling contracts when a Thai firm faced an unfair trade investigation also served to encourage US companies to file cases. Hence, the Thai respondents clearly felt that US AD and CVD rules are unfair and are used by US firms to bedevil foreigners.

IV. CONCLUSIONS

As was illustrated in the preceding discussion, American AD and CVD regulations have become increasingly protective of American businesses in recent years. This protection takes at least two forms. The first is the expanded reach of American rules that promotes outcomes in AD and CVD cases that favor American complainants. The second pertains to the greater complexity built into US regulations, for this complexity often renders American rules and procedures so arcane that foreigners wishing to export

to the US market find it extremely difficult to avoid violating some part of the US laws that regulate foreign dumping and subsidies.

The results from this study show just how troublesome American AD and CVD rules are for Thailand. At the most basic level, Thai government and corporate respondents felt there are inadequate numbers of Thai specialists with the expertise to navigate American unfair trade laws. In the area of education, there was a widespread feeling that it is difficult to obtain the appropriate training in Thailand, which in turn leads to an excessive reliance on American attorneys for advice and training. Thus, in an area that the Thais assert is a key national interest (that is, using exports to promote economic development), one finds a high degree of Thai vulnerability.

Another elemental problem relating to US AD and CVD regulations has to do with the expenses incurred by firms facing US investigations. These expenses take at least three forms: (1) the cost of hiring American attorneys, (2) the time and personnel that must be allocated to responding to unfair trade cases, and (3) the business lost by Thai companies that are under the cloud of investigation. These costs directly reduce the ability of Thai firms to operate in the United States and indirectly do harm by raising the overhead for Thai firms, which means higher prices that make Thai products less attractive in export markets.

A final problem associated with US AD and CVD cases pertains to the complexity of US procedures and the tendency of US firms to employ AD and CVD complaints to harass foreigners. With regard to procedures, the Thai interviewees uniformly complained that the time limits in US investigations and the excessive ambiguity and demands for information found in US questionnaires make it almost impossible for Thai respondents to satisfy American authorities. Moreover, the Thais displayed a considerable suspicion that US investigators employ unfair trade cases to undermine Thai competitive advantages. The Thais also saw the use of the best information available as tilting the outcome of investigations against Thailand and believed that this investigatory practice simply encouraged US firms to file cases.

In light of these findings, it is important to make two recommendations for Thai governmental and educational officials to consider. The first is to encourage educators to set up courses of study to train the trade specialists needed by the government and private corporations. One of Thailand's most pronounced deficiencies is the dearth of such specialists. This has resulted in a dependence on foreign educational efforts that should be reversed.

A second recommendation is that the Thai government use WTO negotiations to try to revise international rules regarding dumping and subsidies. The current analysis points to two areas where change might benefit Thailand. The first would limit the circumstances under which the best information available could be used during unfair trade investigations. The second would provide more time for respondents to fill out the questionnaires and provide data in AD and CVD cases. Greater restraints on the use of BIA and longer amounts of time for providing information would not only help Thai respondents get a better hearing in the United States, but it would also discourage American producers from using AD and CVD complaints to harass foreigners. Another form of assistance the WTO could provide to all developing countries would be to maintain a system rating the attorneys that handle unfair trade cases. Given the extreme reliance developing countries have on foreign lawyers, such a system could prove valuable.

To conclude, the results herein suggest the need for additional research to determine if the problems Thailand confronts due to US AD and CVD rules also affect other developing countries. Further research might also inquire into whether the unfair trade regulations found in other advanced areas, such as the EU, have similar effects.

APPENDIX 1
QUESTIONS FOR THE THAI AD AND CVD SURVEY

I. Knowledge Questions

A. Knowledge of United States Law

1. Does the Thai government feel that it has a sufficient staff of trained specialists who understand American AD and CVD laws?
2. Is the Thai government forced to rely on experts it hires in the United States to handle its AD and CVD cases?
3. Does the Thai government feel comfortable in relying so heavily on American legal experts to assist it with AD and CVD cases?
4. Does the Thai government feel that it should place a high priority on training Thai scholars and professionals so that it would have a group of Thais with expertise in American trade policy?
5. Do Thai corporations have staffs of trained specialists who understand United States AD and CVD laws?
6. Do Thai corporations place a priority on hiring specialists who understand United States AD and CVD laws?
7. Does the United States government provide any assistance to the Thai government or to Thai corporations to help them understand United States AD and CVD laws?
8. Does the WTO provide any assistance in understanding United States AD and CVD laws?

B. Knowledge of WTO Rules

1. Does the Thai government feel that it has a sufficient staff of trained experts who understand WTO AD and CVD rules?
2. If not, then who does the Thai government rely on for assistance with its WTO AD and CVD cases?
3. Does the Thai government feel comfortable relying on this source for assistance?
4. Does the Thai government feel that it should place a priority on training Thai scholars and professionals so they could handle Thai AD and CVD cases before the WTO?
5. Do Thai corporations have sufficient staffs of trained experts to help them understand WTOAD and CVD rules?
6. If not, then who do Thai corporations rely on for assistance with their WTO AD and CVD cases?
7. Do Thai corporations feel comfortable relying on this source for assistance?
8. Do Thai corporations feel that they should place a priority on training their employees to understand WTO AD and CVD rules?
9. Do the Thais feel the WTO provides sufficient assistance to help countries understand WTOAD and CVD rules?
10. Do the Thais cooperate with other countries to gain assistance in understanding WTO AD and CVD rules? If so, which countries?

II. Procedural Questions

1. Do the Thais feel comfortable with United States AD and CVD procedures?
2. Does the United States give adequate prior public notice of AD investigations as required under Article 12 of the WTO Antidumping Agreement?
3. Do the Thais feel they are given an adequate opportunity for input when the United States conducts AD and CVD investigations?
4. Do United States authorities provide adequate explanations for procedures and details of the cases brought against Thai producers so that the Thais feel they understand the case against them and what is expected of them during the investigation?

5. How well do the Thais understand the time deadlines associated with American AD and CVD cases?
6. Do the Thais understand that the best information available (BIA) will be used if proper information is not provided during an investigation?
7. Do the Thais realize that BIA can be obtained from United States complainants during an investigation?
8. Do the Thais understand the procedures the United States uses during on-the-spot investigations in Thailand? Do the Thais feel that these procedures affect Thai interests negatively?
9. Do the Thais feel that United States procedures are sufficiently transparent so that all parties to AD and CVD cases understand what is going on?
10. How do the Thais feel about the United States law passed in 2000 (the Byrd Amendment) that diverts AD and CVD duties from the United States Treasury to the American companies that are the complainants in a case?
11. Do the Thais consider this diversion of funds an illegal subsidy to United States companies under WTO subsidy rules?
12. Do the Thais feel that the issues raised by this law have been handled properly by the WTO dispute settlement system?
13. Do the Thais plan to seek negotiations about this law during future WTO talks?
14. Do the Thais feel that the United States conforms with WTO AD and CVD rules?
15. Does the United States provide Thailand with the special treatment that developing countries are required to receive under WTO AD and CVD rules?
16. Does the United States adhere to applicable WTO rules when determining the size of any AD and CVD duties?
17. Does the United States adhere to the traffic light approach set up under WTO rules for handling subsidies?

III. Burden Questions

1. Are the costs associated with United States AD and CVD complaints unduly burdensome for the Thai government or for Thai corporations? What are these costs?
2. How much does it cost to hire attorneys in the United States to handle Thai AD and CVD cases?
3. Does the mere initiation of a United States AD or CVD case hinder the ability of Thai firms to continue doing business in the United States?
4. Do importers in the United States shy away from doing business with Thai corporations that are the subject of American AD or CVD investigations or actions?
5. Do the Thais feel that American companies use the filing of AD and CVD cases to harass their Thai competitors?
6. Have American companies altered the way they pursue CVD cases in light of the traffic light approach found in WTO rules?
7. Do the Thais feel that United States AD and CVD laws are designed to discourage foreign firms from doing business in the United States?
8. Do the Thais feel that the Byrd Amendment encourages American corporations to file unfair trade cases so that they can receive the payments provided for under the law?
9. Do the Thais feel that United States firms use the filing of AD and/or CVD cases to keep foreign competitors out of the American market? If so, have the Thais been able to use the WTO to obtain redress for such behavior?

IV. Settlement Questions

1. Does the filing of a dumping complaint in the United States incline Thai corporations to consider

- restricting their exports in exchange for the termination of the complaint?
2. What role does the Thai government play in any process that involves restricting exports in exchange for the termination of an American dumping complaint?
3. Do the Thais feel that American complainants are aiming for deals that restrict Thai exports when they file AD complaints?
4. Do the Thais feel that the WTO plays a role in informally resolving unfair trade cases? If so, what is that role?
5. Under WTO guidelines, a complaint relating to subsidies can be handled either by taking a case to the WTO dispute settlement system or by conducting a domestic investigation and imposing a CVD. Which approach do the Thais prefer to use for handling their subsidized imports? Which procedure does the United States most often use with its imports from Thailand? Why do the Thais prefer one approach over the other? Why do the Thais believe the United States employs one approach instead of the other? Are some cases handled one way, while others are handled another way? Why is this the case?
6. When faced with a negative finding in a foreign subsidy investigation, which way do the Thais prefer to respond:
 - a. Voluntarily raise the price for the good to offset the value of the subsidy
 - b. Volunteer to terminate the subsidy
 - c. Accept the imposition of a CVD by the foreign government
 Why do the Thais prefer one of the above approaches over the others?
7. Has the passage of the Byrd Amendment affected the solution the Thais prefer for American subsidy cases (see the preceding question)?
8. Do the Thais continue to experience “grey area” (for example, VER) demands from the United States as proposed solutions for AD and/or CVD cases even though WTO rules forbid such deals? Do the Thais prefer grey area deals as a means for resolving unfair trade cases? If so, why?

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ENDNOTES

¹One illustration of how much tariffs have declined is the drop in the average US duty from nearly 55 percent in 1934 to approximately 4 percent by the end of the Uruguay Round of negotiations in 1994 (see Cohen, Blecker, & Whitney, 2003, p. 183; Jackson, 1997, p. 141).

²For a discussion of the international norms pertaining to unfair trade, see Jackson (1997, chaps. 10–11) and Cohen, Blecker, and Whitney (2003, pp. 161–72).

³The figures for the WTO are from WTO, *AD Initiations by Affected Country*, *AD Measures by Affected Country*, *CV Initiations by Affected Country*, and *CV Measures by Affected Country*, all obtained from <http://www.wto.org>. It should be noted that these data only relate to Asian developing and newly industrializing countries.

⁴The data for the United States are from United States International Trade Commission (ITC), *Import Injury Investigations Case Statistics, FY 1980–2004*, October 2005 obtained from <http://www.usitc.gov>. The data for the European Union are from European Commission, *Anti-Dumping and Anti-Subsidy Statistics Covering the Year*, obtained from <http://ee.europa.eu/comm/trade>. The share of world trade is from WTO, *Trade by Region, 2005*, obtained from <http://www.wto.org>. The data for the Asian share of US trade are from US International Trade Administration, *National Trade Data*, obtained from <http://www.usita.gov>. The data for the Asian share of EU trade are from European Commission, *Trade Issues: Bilateral Trade Relations*, May 22, 2006, obtained from <http://ee.europa.eu/comm/trade>.

⁵For example, see Gallagher (2000), Kufuor (1998), Kim (2000), Krueger (1999), Nogues (1993), and Qureshi (2000).

⁶For additional information, see Rothgeb and Chinapandhu (2007, pp. 9–10).

⁷It should be noted that the results from a case study are only suggestive. Ideally, research into the type of problem examined in this paper should investigate several countries at multiple points in time. Such work, however, is prohibitively expensive. Even with these practical limitations, the results from this analysis can provide valuable information regarding the difficulties created by unfair trade regulations and the direction future research should take.

⁸For more complete discussions of the origins of US AD and CVD laws, see Congressional Budget Office (CBO) (1994), Viner (1966), and Mastel (1998).

⁹For details, see U.S. House of Representatives (HOR) (2001, p. 92) and CBO (1994, p. 21).

¹⁰To consult the relevant documents, see HOR (1957, p. 14) and HOR (2001, p. 90).

¹¹The US semiconductor industry was especially vocal in calling for rules to combat third country dumping (see Rothgeb, 2001, pp. 187–90).

¹²Due to a lack of clarity in the Uruguay Round Antidumping Agreement, the US continues to use a less than 0.5 percent de minimis during its annual reviews of AD decisions.

¹³For a discussion of special treatment for developing countries, see Gallagher (2000, pp. 169–72) and Benitah (pp. 37).

¹⁴For details, see ITC (2005), ITA (2000), Low (1993, pp. 101–106), and Rothgeb and Chinapandhu

(2007, chap. 3).

¹⁵The interviewed officials were: (1) from the BTIR, the Director and the Assistant Director in the US and EU AD and CVD Section; (2) from the BMTN, a Senior Expert on Multilateral Trade; and (3) from the BOI, two senior members of the International Affairs Division.

¹⁶The industry representatives interviewed were: (1) from the FTI, a member of the Executive Committee; (2) from the TISIC, the Deputy Secretary General; (3) from the TFPA, the Vice Chairman for International Trade and the Deputy Manager for International Trade; (4) from the TPPG, the Chairwoman for the Group; and (5) from the JWTO, the Chairman of the Subcommittee on Law and Investment.

¹⁷This research has been approved by the Institutional Review Board (IRB) for Human Subjects Research at Miami University in Oxford, Ohio. It should be noted that IRB approval was in part conditioned on respecting the interviewees' right to decline to answer questions without being pressed for an explanation. In addition to anonymity, most respondents requested that they not be quoted directly.

METROPOLITAN-RURAL VOTING PATTERNS IN U.S. LEGISLATIVE ELECTIONS

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ABSTRACT

This paper examines the relationship between partisan political success, in both the United States House of Representatives and in the lower houses of U.S. state legislatures, and distance from the central city. The increasing Republican success over time, first in suburbs generally, and then in outer suburbs, is illustrated. Correspondingly, the paper shows that Democrats have retained their advantage in the central city, lost advantage in the rural areas and compete most effectively in inner ring suburbs. Also, different measures of distance from the central city (distance in miles, in types of living arrangements (e.g. urban, suburban, and rural) and in terms of how much of the district is urban) are considered, measured and then incorporated into causal models. The models show that both the number of miles from the central city and the types of living arrangements has a statistically significant impact on party electoral fortunes. The models also show the impact of region and of several demographic factors, including race, income and the percentage of citizens in the district who receive social services.

Key words: distance, urban, suburban, political parties, United States House of Representatives, state legislatures.

I. INTRODUCTION

Poll results indicated a clear metropolitan-rural voting pattern in the 2000 U.S. presidential election. Al Gore dominated the cities and split the suburbs with George W. Bush, while Bush won the rural areas by a wide margin. This outcome supports what always had been accepted about voting in the cities, but differs from what many had assumed in recent decades about voting in the suburbs and rural areas. The conventional view for years was that the Republicans dominated the suburbs, while the parties were competitive in the countryside (Democratic strength in the rural South versus Republican strength in the rural North).

In this study, we examine what appears to be a significant change in the metropolitan-rural voting behavior in the United States. We focus on whether the voting patterns shifted from the Republicans dominating the suburbs and the parties splitting the rural areas to the parties splitting the suburbs (Democratic inner suburbs and Republican outer suburbs) and the Republicans dominating the rural areas.

II. PAST RESEARCH ON VOTING

A. Cities and Rural Areas

Before the 1950s, most of the metropolitan-rural voting analysis for the United States concentrated on the cities and rural areas. The conventional view was that outside the South the Democrats dominated the cities, and the Republicans won in the countryside. Key (1964), for instance, concludes that the metropolitan-rural cleavage is “one of the most common foundations for two-party competition within individual states” (295). He gives the examples of New York, Illinois, Massachusetts, and Michigan where the Democrats are based in New York City, Chicago, Boston, and Detroit and the Republicans are based in areas outside these cities.

Since the Democrats dominated the South during this period, they were strong in both southern urban and rural areas. This meant from a national perspective the urban vote was heavily Democratic and the rural vote was competitive with the Republicans winning in the rural North and the Democrats controlling most of the rural South.

For the period from the 1950s to the 1990s, analysts continued to conclude that the Democrats dominated the cities (see Giroux 2005). In the rural vote, they either found that the rural areas were competitive or that the Democrats had the majority. On the latter point, Giroux (2005) states, “Rural America was integral to the huge congressional majorities that Democrats enjoyed in dominating the House for much of the past century” (1722).

B. Suburbs

With the growth of the suburbs after World War II, political commentators and analysts began to pay more attention to suburban politics. The Republicans dominated the suburbs in the 1940s and 1950s, and some commentators portrayed the suburban residents as a fairly homogeneous group of affluent Republicans. In the research from the 1950s to the 1990s, some analysts questioned these assumptions as they found that the suburbs are a heterogeneous mixture of Democratic and Republican suburbs (e.g., Janosik 1956; Wood 1959; Wirt et al. 1972), the Democrats made gains in the suburbs (e.g., Lazerwitz 1960; Hirsch 1968; Zikmund 1968), and the suburban vote is not consistently Republican but follows national trends (e.g., Wirt et al., 1972). However, other research on this period supports the prevailing view that the Republicans have the advantage in the suburbs. Gainsborough (2001), for example, examines the National Election Study data from 1952 to 1992 and concludes that “living in a suburb was significantly associated with” identifying as a Republican and supporting congressional candidates during this 40 year period, and with voting for a Republican presidential candidate in the 1980s (69).

C. Research Since 2000

With the data on the 2000 presidential election showing a new pattern of metropolitan-rural voting, research began to focus on the strong party competition in the suburbs, the Republican dominance in the rural areas, and the thesis that Republican support is correlated with the distance that Americans lived from central cities.

Giroux (2005) analyzes the 2004 vote for president and Representatives in the 435 House districts and discovers that the Democrats continued to dominate the cities, the competition in the suburbs was primarily based on Democratic support in the inner suburbs and Republican strength in the outer suburbs, and the Republicans won the majority of the rural areas. Also, Giroux finds a strong relationship between the Republican presidential and House vote and greater land area in the district. This supports the hypothesis that Republican support is related to the distance from cities. In addition, the findings show a relationship between Republican support and population density.

Lang and Sanchez (2006) analyze the voting results in metropolitan counties for the 2000 and 2004 presidential elections. They classify “417 counties in the biggest 50 US metropolitan areas based on where they lie in a metropolitan continuum from urban to exurban” (2). The counties are divided into cores, inner suburbs, mature suburbs, emerging suburbs, and exurbs. They find a strong relationship between the location of the counties in the metropolitan areas and the party vote: “Democrats win in the metropolitan center, Republicans the fringe” (7). In the five types of metropolitan counties from cores to exurb, Bush won 24%, 41%, 45%, 53% and 58% in 2000 and 31%, 41%, 48%, 57% and 62% in 2004.

Lang and Dhavale (2005) report similar results in a study of the 2005 Virginia Governor’s race. In their analysis of the metropolitan counties in Northern Virginia, they discover a strong correlation between the urban nature of the counties and the votes for the Democratic candidate.

III. RESEARCH QUESTION

We test the hypothesis that Republican support increases (and thus Democratic support decreases) as the distance from the central city increases. To test the hypothesis, we use several measures of distance from the central city. One measure is the distance in miles from the center of the legislative district to the nearest border of the closest central city (listed as distance in the tables), a second is in type of living arrangement (urban, suburban, etc.), and a third is in the percent of the district that is metropolitan. In using these three measures, we investigate what type or types of distance from the city matter. Distance could matter for several different reasons, each of which would require the use of different measures to capture the effect.

It could be that the physical distance is causing a Republican advantage. Although empirical results do not permit us to understand why the effect is occurring, one reason could be that cities have a liberalizing effect on people because of exposure to diverse lifestyles and points of view. If that is the case, then a simple distance indicator in terms of the number of miles one lives from a central city would be appropriate. *Ceteris paribus*, the farther one lives from a central city, the less exposed one would be to urban liberalizing influences.

It is possible that distance causes a Republican advantage not because of miles from the central city but because the district is some mix of urban, suburban or rural. Again, causal attribution is not possible but one reason for the effect could result from different types of living patterns common to certain distances from the central city’s core. Living patterns may influence people’s social and political perceptions. People who live farther apart in bigger homes in distant suburbs or rural areas may have more conservative or Republican leaning impulses because, among other reasons, it is easier for them to see

things in individualistic terms. Conversely, people who live in or near the central cities are in more densely populated areas and thus have a world view that is more social or communal. Doubtless there may also be a selection effect for some residents as well. People may choose the type of living patterns that they do because they may believe that there are people around them who are more similar in their economic positions and their social and political viewpoints.

Finally, another measure of distance from the cities that captures a different dimension is percent of the district that is metropolitan. While the other measures capture how far away (in miles or living patterns) a district is from the central city, this measure captures how much of the district itself is actually metropolitan. This variable could be important if it is metropolitanism that is driving more liberal political leanings and not urbaneness per se.

Using the above mentioned geographical measures and then controlling for various demographic factors, we analyze the elections for the U.S. House of Representatives and the lower house of the state legislatures. Data from the Bureau of the Census (1963, 1971, 1973, 1983, 2006), Congressional Quarterly (1964, 1973, 1983, 1993, 2003, 2005), and *State Legislative Elections* (Barone, Lilly and DeFranco, 1998) are used in the analysis.

This study is useful for several reasons beyond the investigation of the geographic (distance) measures mentioned above. First, most of the discussion about the new metropolitan-rural voting patterns focuses on the results of the 2000 and 2004 presidential elections. Consequently, more analysis is needed on additional elections beyond presidential elections. Second, more analysis is needed on the voting patterns of inner suburbs and outer suburbs. Most studies on metropolitan-rural voting concentrate on suburban voters as one overall group rather than two or more groups based on their distance from the central city.

The House and state legislative districts are divided into urban (55 percent or more of the residents live in central cities), suburban (55 percent or more of the residents live outside the central city of a metropolitan area), urban-suburban (about half central city, half suburban), rural (55 percent or more of the residents live outside metropolitan areas), and mixed (the remaining districts—a mixture of metropolitan and rural). In addition, the suburban districts are further divided into inner suburban (suburban areas adjacent to the central city), outer suburban (suburban areas adjacent to inner suburbs), and inner-outer suburban (both inner suburban and outer suburban areas).

The cut-off point of 55 percent is used rather than the majority because it produces more accurate categories. In metropolitan areas, for example, districts that are about evenly divided between central city and suburban residents are classified as urban-suburban with the 55 percent cut-off. However, if a majority of the population is used as the cut-off, these districts would be classified as either urban or suburban even though there would be only a small difference between the central city and suburban populations.

IV. EMPIRICAL RESULTS

The results are presented in two parts. The first part discusses the House of Representatives, and the second part is focused on the lower houses of the state legislatures.

A. House of Representatives

Tables 1–3 present data on the House of Representatives for 1962 to 2008. Tables 1 and 2 show that in 1962 the Democrats were strong in the urban, urban-suburban and rural districts, the Republicans dominated the suburban districts (inner, inner-outer and outer), and the mixed districts were about evenly split. In the following decades, the Democrats maintained their lead in urban and urban-suburban districts.

The Republicans gained in the mixed and rural districts after the early 1990s. The suburban districts became competitive in the 1970s as each party usually won the majority of suburban seats when it won the majority of House seats. An important part of the changes in the suburbs was that the Democrats became much more successful in the inner suburbs as compared to the outer suburbs.

The big change in the rural and mixed districts came in the 1994 election when the Republicans won the majority of House seats for the first time in almost 40 years (Table 1). House Democrats averaged 55 percent of the rural seats in the 1980s, increasing to 62 and 66 percent of the rural seats in the 1990 and 1992 elections. The parties split the mixed districts in the 1980–1994 period as the Republicans averaged 51 percent of the mixed districts in the 1980s and 48 and 51 percent of the mixed districts in the 1990 and 1992 elections. Then in the 1994 election, Republicans won 55 percent of the rural districts and 67 percent of the mixed districts. The Republicans maintained their advantage in these districts for the following six elections.

The shift in the suburbs started with the 1974 election. Before 1974 Republicans usually won over 60 percent of the suburban seats. However, Democrats won 56 percent of the suburban districts in the 1974 election and averaged 54 percent from 1976 to 1990. The Republicans came back and won the majority of suburban districts from the 1992 to 2004 elections. And then the Democrats won the majority of House seats and suburban seats in the 2006 and 2008 elections.

The data in Table 3 indicate that the changes in the suburban, mixed and rural districts (i.e., the suburban districts becoming more competitive and the mixed and rural districts becoming more Republican) developed from shifts in the metropolitan and rural populations and in regional voting patterns.

The Democrats' dominance in the rural South was the main reason why they won the majority of rural districts nationwide in 1962. Whereas Republicans won 57 of the 70 rural seats in the Northeast and Midwest in 1962, Democrats won 68 of the 72 rural seats in the South (Table 3). Then the Democrats lost their overall lead in rural areas because they lost an enormous number of rural southern districts. There were, for example, only 16 rural southern Democrats in 2002. This decline occurred because many southern rural districts were transferred to the faster-growing metropolitan districts, and Republicans significantly increased their strength in the South. Outside the South, the Republicans maintained their lead in the rural Northeast and Midwest and began winning most of the rural seats in the West.

Changes in the South were also important in the Republicans' success in mixed districts. Their largest regional gain came in the South. Many southern rural districts became part of mixed districts, and the Republicans won most of them. From 1962 to 2002, the number of southern mixed districts held by Republicans increased from 6 to 34.

Regional and metropolitan-rural changes also affected the shift in the suburbs. For many years, the Democratic Party had its greatest regional strength in the South. Now, however, the base of the Democratic Party is the Northeast and West Coast. With this change, Democrats shifted from having their greatest strength in a region that had been, until recent decades, heavily rural to areas that are now predominately suburban. The Northeast and the West Coast are the most suburban parts of the country. Also, the population shifts into and within metropolitan areas produced the Democratic growth in the inner suburbs. The movement of people from the central city to the inner suburbs and then from the inner suburbs to the outer suburbs left many inner suburbs with a Democratic majority and many outer suburbs with a Republican majority.

Now that we have determined that significant changes have occurred, the next step is to examine whether these changes support the hypothesis. The results in Tables 1–3 support the overall direction of the hypothesis. As expected, the Democrats dominated the central cities and the inner suburbs in 2004, 2006

and 2008. And the Democrats were a little stronger in the central cities than in the inner suburbs. In addition, the suburbs became competitive during the past 35 years as each party usually won the majority of suburban districts when it held the overall majority. Furthermore, the Republicans were more successful in recent years in the outer suburban districts and the districts with the rural population (i.e., rural and mixed) than in the central cities and inner suburbs.

However, one aspect of the hypothesis was not supported. Republican support did not gradually increase from the inner suburban districts to inner-outer suburban, outer suburban, mixed and rural districts. In 2004 and 2006, for instance, Republicans won a higher percentage of the outer suburban and mixed districts than the rural districts. And in 2008, Republican strength was about the same in the outer suburban, mixed, and rural districts.

Although the findings to date show some support for the hypotheses, there remains a need for a multivariate model that will capture the independent effect of each explanatory variable and allow for the investigation of the relative effects of the different distance variables. Is it the urban/suburban/rural classification that affects these districts' partisan political preferences or is it distance from the central city? And what about the effects of other demographic factors such as race, income and region?

Table 4 shows the effects of the distance variables as well as various demographic variables on Republicans' chances of winning a seat in the U.S. House in 2000. The dependent variable is a dichotomous variable, whether Republicans won a House seat or not, and so a logit regression is appropriate. Because of the likelihood of spatial autocorrelation, robust standard errors are used to control for its effects. The overall model is statistically significant and 70% of cases are correctly predicted by the model (whereas predicting using the mode yields a 53% correct prediction rate).

The distance variable is statistically significant and in the predicted direction. As the number of miles from the nearest central city increases, Republicans' chances of winning a U.S. House seat significantly improve. Holding the other variables constant at their mean and varying the distance variable from one standard deviation below the mean (1 mile) to one standard deviation above the mean (87 miles) increases the probability of a Republican winning a House seat by 19 percentage points.

Somewhat surprisingly, the urban/suburban/rural classification variable is not significant at the standard .05 level. However, we hesitate to conclude much from this lack of statistical significance because the variable is significant at .09. With only 435 cases in the House dataset, it is possible that the dataset is simply too small to be sensitive to finer grains of significance and that a larger data set such as the states data set (to be examined next) will reveal different results with this variable. The metropolitan variable is also not statistically significant.

Several of the demographic variables are also statistically significant, all in the expected direction. As average income for the district increases, Republicans' chances of electoral victory are higher and the change in probability from varying income from one standard deviation below the mean to one standard deviation above is 16 percentage points. An increasing percentage of African Americans in a district reduces the Republicans' chances of winning districts and the effect from a -1 to +1 standard deviation change is 38 percentage points. Finally, Republicans' chances of winning a seat are greater in the South. Holding all other variables constant, Republicans have an average probability of winning a seat located in the South that is 42 percentage points higher than if the seat is located elsewhere. The education variables and the percentage of district citizens under the poverty line were not significant.

The African-American and South variables all share large effects, even larger than the distance variables. This result is not unexpected as the effects of these variables have been given a great deal of attention in

the literature. What we find interesting is that even while controlling for these well-established variables, the distance variable still shows an effect.

B. State Legislatures

Table 5 presents the results of the 1992, 1996, and 2000 elections in the state legislative districts by party and metropolitan-rural location. The percentages are shown only in the categories in which there are at least five districts. Since a few states did not hold elections for their legislatures in the 1992, 1996, and 2000, the elections closest to those years were used in those states.

The data show some, but not complete, support for the hypothesis. There are several reasons for this conclusion. First, several states (e.g., Minnesota) closely followed the pattern except that the Republicans were more successful in the outer suburbs than in the rural areas. It appears that in these states the Democrats have had better success at retaining parts of the rural population than in competing in the ever-expanding outer suburbs.

Second, Democrats held the majority of rural districts in several states. In the 2000 election, for example, Democrats won the majority of rural districts in 19 states. Several of these states were in the South. However, the data indicate that the Republicans made gains in southern rural districts during the 1990s. Thus, the southern legislatures are moving closer to the pattern in the hypothesis as the Republicans continue to win more southern districts.

Finally, the hypothesis cannot be adequately tested in most of the small states (e.g., the Dakotas, Idaho, and Wyoming) because these states only have a few suburban districts. So the only analysis that can be done in these states is to compare the voting in the cities, which are always small cities, with that in the rural areas. And surprisingly, there is a mixed pattern here. While some small states (e.g., Vermont) follow the pattern of the Democrats doing better in the cities than in the countryside, several others do not follow the pattern (e.g., South Dakota).

Consequently, an overall examination of the data on the individual state legislatures indicates that there is support for the hypothesis in many states, but also a few exceptions. The most important exceptions are that the Republicans often had greater success in outer suburbs than in the rural areas, and the Democrats still held the majority of rural districts in several states.

Next we tested the hypotheses with a causal model predicting whether or not a Republican candidate for the lower chamber in the states is elected (our data are from 2000). Similar to the model used to predict House elections earlier, this causal model allows us to test for several geographical measures (distance from central city, urban/suburban/rural classification, and percent of the district that is metropolitan) as well as some demographic variables. Table 6 shows that the model fit is statistically significant and correctly classifies 68% of all cases.

As in the U.S. House model, the distance measure is statistically significant in the states model. Holding the other variables constant and varying the distance variable from one standard deviation below the mean to one standard deviation above results in a 8 percentage point higher probability of Republicans holding the seat. We also see that the urban/suburban/rural classification is statistically significant in the states model (recall that in earlier logit, that variable was only statistically significant at the .09 level). Holding the other variables at their means and varying the urban/suburban/rural variable from one standard deviation below the mean to one standard deviation above results in a 15 percentage point increase in the probability that a Republican will win the seat. Thus, Republicans are more likely to win seats in districts that are increasingly rural.

Because count findings in this paper suggest that Republicans are doing equally well in farther suburbs and rural areas (rather than better in rural areas than all areas), we then recoded the urban/suburban/rural variable so as not to distinguish between state districts located in far suburbs and those in rural districts. The results for the overall strength of the model and for the urban/suburban/rural variable did not change. This finding further strengthens the earlier results suggesting that, although Republicans tend to do better in the suburbs than in urban areas and better in suburbs farther from the central city, the Republican advantage does not increase from distant suburbs to rural areas.

Many of the demographic variables were also statistically significant and in the expected direction. As average income for the district increases, Republicans' chances of electoral victory are higher and the change in probability from varying income from one standard deviation below the mean to one standard deviation above is 10 percentage points. Districts in the South are also more likely to select Republican candidates though the variable shows a weaker effect (18 percentage points) in the states model than it did in the U.S. House model. As expected, the percent of the district that uses social services and the percent of the district that is African-American had a statistically significant and negative effect on the likelihood of Republicans winning the seat. In this model, the effect of African-Americans is also less (16 percentage points) than in the U.S. House model.

V. CONCLUSION

The metropolitan–rural voting patterns shifted in the House of Representatives and many state legislatures during the past 50 years. While the Republicans increased their strength in the rural areas, the Democrats maintained their advantage in the cities and gained in the suburbs. Now, from a national perspective, the suburbs are competitive with the Democrats dominating in the inner suburbs and the Republicans dominating in the outer suburbs. And the Republicans usually win the majority of the rural districts.

There are indications that during the past 40 years both parties have become more unified. The new metropolitan-rural voting pattern contributed to this rise in unity by creating a more unified base for both parties, especially the Democrats.

In the older pattern, the main ideological conflict among Democrats was the ideological split between the more moderate-to-conservative rural Democrats and the more liberal metropolitan Democrats. Now with the Democrats' base in the central cities and inner suburbs, there is less ideological conflict among Democratic legislators. The urban nature of the inner suburbs means that the interests and policy views of inner-suburban and central-city Democrats are closer together than those of rural and central-city Democrats.

While the changes in the party base were not as great for the Republicans, the new metropolitan-rural voting patterns did help to increase unity. In the new pattern, the Republicans remain primarily a rural and suburban party. However, the new pattern of Republican strength from the outer suburbs into the rural areas creates a more conservative and unified base for the party.

Methodologically, this paper also contributes to the literature by testing the effects of several geographical measures on partisan electoral fortunes. Support was found for both increased distance from the central city and for urban to rural classification measures on the likelihood of Republicans winning districts. These findings suggest first, that there may be both an urban Democratizing effect which diminishes over distance. Second, the type of living environment may also have an effect on partisan preferences.

TABLE 1. PERCENT OF HOUSE REPUBLICAN VICTORIES IN EACH METROPOLITAN-RURAL CLASSIFICATION: 1962–2008 ELECTIONS

Year	Urban	Urb-Sub	Suburban	Mixed	Rural
1962	17	42	70	51	41
1964	15	19	58	67	36
1966	22	36	68	48	46
1968	18	42	67	52	51
1970	11	39	62	42	43
1972	18	46	58	44	51
1974	11	30	44	38	38
1976	9	30	41	39	39
1978	10	30	44	42	44
1980	18	50	53	52	48
1982	15	39	43	47	42
1984	15	37	48	53	45
1986	16	32	49	51	44
1988	18	34	47	50	41
1990	18	31	45	48	38
1992	9	37	52	51	34
1994	14	50	61	67	55
1996	13	50	56	68	60
1998	14	50	55	64	60
2000	14	43	54	65	60
2002	21	22	57	72	58
2004	21	33	56	72	60
2006	21	33	49	61	52
2008	16	33	44	52	48

TABLE 2. HOUSE DISTRICTS BY PARTY AND METROPOLITAN-RURAL CLASSIFICATION: 1962, 2004, 2006 AND 2008

Year		Urban	Sub.	Inner Sub.	I-O Sub.	Outer Sub.	Mixed	Rural
1962	D	77	15	8	7	5	37	92
	R	16	11	12	22	13	38	65
2004	D	53	18	32	28	19	27	25
	R	14	9	12	47	43	69	38
2006	D	53	18	34	33	25	37	31
	R	14	9	10	42	37	59	33
2008	D	56	18	35	35	32	46	34
	R	11	9	9	40	30	49	31

**TABLE 3. HOUSE DISTRICTS BY PARTY, REGION AND
METROPOLITAN-RURAL CLASSIFICATION: 1962 AND 2002**

1962										
	Urban		Urb.-Sub.		Suburban		Mixed		Rural	
	D	R	D	R	D	R	D	R	D	R
S	10	3	5	1	1	1	16	6	68	4
NE	30	3	7	3	10	23	8	11	4	16
MW	25	5	1	4	3	11	8	16	9	41
W	12	5	2	3	6	10	5	4	11	7

2002										
	Urban		Urb.-Sub.		Suburban		Mixed		Rural	
	D	R	D	R	D	R	D	R	D	R
S	14	8	5	3	12	28	12	34	16	13
NE	15	1	5	0	28	24	5	8	2	3
MW	9	2	6	1	12	28	5	18	7	12
W	15	3	5	2	25	24	5	8	2	9

**TABLE 4. EFFECT OF DISTANCE INDICATORS ON REPUBLICANS' CHANCES
OF WINNING A US HOUSE CONGRESSIONAL SEAT, 2000**

Variable	Coefficient	(Robust Std Error)	-1 to +1 sd
Distance	.010	(.005)**	.19
Urban/Suburban/Rural	.153	(.094)	.15
Metropolitan	-.001	(.006)	
Income	.082	(.025)**	.16
% College Degrees	-.025	(.022)	
% Under Poverty Line	-.0004	(.016)	
% African-American	-.052	(.010)**	-.38
South Dummy	1.386	(.287)**	.42
N=435			
LR chi2(8)=71.5			
Probability >chi2=.000			
Log PseudoLikelihood=-248.59517			*p<=.05 **p<=.01
Correctly Classified: 70%			

TABLE 5. PERCENT OF DEMOCRATIC VICTORIES IN METROPOLITAN—RURAL SEATS IN THE LOWER HOUSE OF STATE LEGISLATURES IN 2000 (WITH PERCENT CHANGE FROM 1992)

South							
	Urban	Urb.-Sub.	Inner Sub.	I-O Sub.	Outer Sub.	Mixed	Rural
AL	72 (-7)	—	—	47 (-6)	—	38 (-12)	83 (-10)
AR	86 (-5)	—	—	—	—	86 (+15)	83 (-8)
FL	40 (-16)	38 (-37)	63 (-6)	25 (-19)	42 (-12)	25 (-25)	22 (-48)
KY	83 (-6)	—	60 (0)	50 (-17)	50 (+17)	—	62 (-10)
LA*	83 (+4)	40 (-20)	25 (+11)	75 (+8)	22 (0)	—	87 (-8)
MS	64 (0)	—	17 (0)	40 (0)	25 (-35)	—	78 (-9)
NC	74 (-4)	—	33 (-17)	25 (-25)	—	70 (-20)	53 (-10)
OK	41 (-9)	—	11 (-33)	—	—	60 (-40)	75 (-8)
SC	46 (-23)	—	42 (+9)	44 (-12)	12 (0)	—	57 (-19)
TN	82 (+3)	—	17 (+17)	17 (-25)	—	—	66 (-8)
TX	64 (-5)	33 (-17)	29 (0)	27 (0)	0 (0)	25 (-25)	59 (-32)
VA	67 (-9)	—	55 (0)	36 (-10)	11 (-11)	—	46 (+3)
WV	67 (0)	—	80 (0)	69 (+6)	—	40 (-40)	80 (-5)

*1992 data not available. Percent change is from 1996 election data.

Northeast							
	Urban	Urb.-Sub.	Inner Sub.	I-O Sub.	Outer Sub.	Mixed	Rural
CT	89 (+6)	—	67 (-16)	38 (+9)	53 (+10)	—	77 (+31)
DE	—	—	38 (-12)	—	25 (+12)	—	24 (-29)
ME	90 (+15)	—	67 (-33)	33 (-17)	50 (0)	—	59 (+2)
MD	100 (0)	—	91 (0)	71 (-10)	64 (+22)	—	44 (0)
MA	97 (+4)	—	72 (-11)	72 (+5)	81 (+13)	—	73 (+13)
NH	59 (-2)	—	38 (-6)	7 (+7)	12 (+4)	—	35 (-3)
NJ	100 (+12)	100 (0)	64 (+18)	—	50 (+42)	33 (0)	22 (+22)
NY	94 (-2)	—	64 (-7)	38 (0)	43 (-9)	40 (0)	23 (-4)
PA	81 (+2)	—	30 (-10)	48 (+4)	27 (-4)	33 (-11)	39 (-9)
RI	100 (+4)	—	100 (+13)	100 (0)	69 (-10)	—	75 (+6)
VT	73 (-27)	—	86 (+15)	—	20 (-27)	—	40 (-20)

TABLE 5 CONTINUED

Midwest							
	Urban	Urb.-Sub.	Inner Sub.	I-O Sub.	Outer Sub.	Mixed	Rural
IL	87 (-5)	100 (+67)	100 (+42)	—	44 (+20)	44 (-12)	58 (+16)
IN	71 (+2)	—	60 (-20)	15 (+7)	—	—	42 (-19)
IA	69 (-4)	—	—	60 (-20)	—	—	36 (-3)
KA	65 (-8)	—	13 (0)	—	0 (-11)	—	31 (-9)
MI	92 (0)	67 (-16)	85 (+8)	18 (0)	22 (0)	—	26 (-10)
MN	86 (+3)	—	75 (-6)	33 (-17)	14 (-18)	—	39 (-29)
MO	79 (0)	—	81 (-13)	50 (+10)	54 (+15)	40 (-20)	35 (-22)
ND	31 (+8)	—	—	—	—	—	41 (+6)
OH	80 (-4)	40 (-20)	50 (0)	37 (0)	33 (0)	20 (-40)	23 (-23)
SD	13 (-18)	—	—	—	—	0 (0)	37 (-12)
WI	79 (-6)	—	50 (+17)	10 (-40)	20 (0)	—	24 (-12)

West							
	Urban	Urb.-Sub.	Inner Sub.	I-O Sub.	Outer Sub.	Mixed	Rural
AK	31 (0)	—	—	—	—	—	29 (-42)
AZ	36 (-3)	—	—	—	—	50 (0)	50 (-17)
CA	85 (+11)	—	91 (-9)	30 (0)	36 (+7)	40 (-20)	29 (-14)
CO	58 (-9)	—	54 (+8)	40 (0)	29 (+15)	—	8 (-25)
HI	77 (-5)	—	33 (-67)	—	71 (-12)	—	79 (-14)
ID	50 (+25)	—	—	—	—	—	11 (-21)
MT	53 (+16)	—	—	—	—	—	38 (-10)
NV	67 (-8)	—	100 (+12)	—	67 (-16)	—	50 (0)
NM	55 (0)	—	—	—	—	—	55 (-24)
OR	80 (-7)	—	56 (+23)	—	—	—	22 (-13)
UT	50 (-6)	—	31 (-15)	9 (-9)	13 (-14)	—	24 (+6)
WA	77 (-9)	—	63 (0)	24 (-35)	25 (-11)	—	33 (-25)
WY	31 (0)	—	—	—	—	—	19 (-12)

TABLE 6. EFFECT OF DISTANCE INDICATORS ON REPUBLICANS' CHANCES OF WINNING A STATE LEGISLATIVE DISTRICT, 2000

Variable	Coefficient	(Robust Std Error)	-1 to +1 sd
Distance	.003	(.0008)***	.08
Urban/Suburban/Rural	.152	(.042)***	.15
Metropolitan	-.001	(.001)	
Income	.016	(.004)***	.10
% College Degrees	.004	(.005)	
% Social Services	-.042	(.005)***	-.15
% African-American	-.021	(.002)***	-.16
South dummy	1.005	(.089)***	.18
N=5151			
Wald chi2(8)=412.91			
Probability >chi2=.000			
Log Likelihood=-3140.6495			*=p<=.05 **p<=.01
Correctly Classified: 68%			***p<-.001 (1-tailed)

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AN ECONOMIC ANALYSIS OF A PROPOSED BGSU-FIRELANDS WIND TURBINE

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ABSTRACT

This paper examines the costs and benefits of a proposed wind turbine on the BGSU-Firelands campus. It does so from two perspectives: One is from BGSU-Fireland's narrow perspective, which accounts for Federal matching funds and the idiosyncratic way that Firelands is charged for electricity; and the second is from society's perspective, which includes the valuation of the reduction in external costs and uses a market price for generated electricity. The analysis concludes that from either standpoint the project is not justifiable: When taking the narrow perspective, the project is estimated to have a net present value of *negative* 285 thousand dollars. When taking the social perspective, the project looks even worse, having a net present value of negative 636 thousand dollars. Thus, this analysis does not recommend that the project be undertaken. The overall result is largely insensitive to reasonable changes in assumptions regarding the model of wind turbine, average wind speed, the rate of change in electricity price, the discount rate, salvage values, and a number of other parameters.

I. BACKGROUND AND PROJECT DESCRIPTION

Recent increases in energy prices and concerns over anthropogenic climate change have led to increased efforts by government to explore alternative sources of energy. In Northwest Ohio, one manifestation of this effort is a \$792,853 grant to Bowling Green State University (BGSU) from the Department of Energy (DOE) to finance the construction of a wind turbine and perform associated research activities on the campus of BGSU-Firelands. The project would require a significant matching expenditure by BGSU, would provide a venue for wind turbine research of interest to the DOE, and would provide a portion of the electrical power required by the Firelands campus.

The proposed wind turbine project is envisioned to be located on or near the campus of BGSU-Firelands, in Huron, Ohio. This location may have potential for wind energy development, as it is thought to have reasonably strong winds due to its proximity to Lake Erie (about 1 mile away), it contains a fair amount of undeveloped land, and it is quite close to a sufficiently large electrical distribution line, which runs just south of the campus. The site was one of four selected for an advanced site screening by AWS Truewind,¹ which suggested that the site was a viable choice for utility-scale wind turbines.

The proposed size of the project is that of a single “medium-sized” turbine, smaller than utility-scale wind turbines (about 2MW maximum output), but larger than a “small wind” (less than 100kW maximum output) project. Originally, a 250 kW model produced by the German company Fuhrlander² (FL 250) was thought to be appropriate. However discussions with Fuhrlander’s North American distributor (Lorax Energy Systems³) revealed that orders for the FL 250 are only accepted if 30 or more are ordered. That firm’s next biggest model, the FL 600, is available in single units, but requires a taller tower and more setback space, which causes problems for placement on the Firelands campus in part because it is close to a small airport. Most recently attention has turned to a different manufacturer, Wind Energy Solutions (WES) of the Netherlands, which produces a 250 kW model (WES30).⁴ This model has a two-bladed design, with a 30 meter rotor diameter. It is designed to be mounted on towers between 30 and 50 meters in height, with the latter height used in this analysis. Several hundred units of this type have been installed around the world, and the best performing of these have produced in excess of 500,000 kWh/year. Their life expectancy is at least 20 years, and a useful life of 30 years is used in this analysis.

II. COSTS AND BENEFITS: THE BGSU-FIRELANDS PERSPECTIVE

In this section the wind turbine project is evaluated from the narrow perspective of the Firelands campus of BGSU. Specifically, the analysis accounts only for the monetary costs and benefits that accrue to that organization, and ignores any costs and benefits that accrue to external parties. Also, the costs and benefits that occur due to the research activities made possible by this project are not evaluated. This is not to suggest that these costs and (hard to monetarily quantify) benefits are not important, merely that they are not considered here. Moreover, the government grant that helps fund the project is treated as a defrayment of the costs to BGSU-Firelands, rather than a transfer between entities.

Costs

The costs of this project are very straightforward. They consist of the initial capital cost of the wind turbine, blades, tower, electrical connection, and foundation; installation of these components, and the recurring operating and maintenance costs over the assumed 30-year life of the project. According to an analysis performed by Engineered Process Systems (EPS), the estimated initial costs are as follows:

Equipment Cost	\$664,000
Foundation	129,000
Electrical	123,000

Engineering and Management	90,000
Turbine Erection	43,000
Start Up and Warranty	21,000

for a total of \$1,070,000.⁵ Note that the cost of land acquisition is ignored, as the land to be used is currently owned by BGSU-Firelands and is unused.

According to the EPS document, maintenance is estimated to cost \$3,000 per year. This is somewhat higher than assumed in projects using other brands of turbines (usually 2%-3% of the turbine), but may be more accurate for this particular brand and model. Using a 3% discount rate,⁶ this adds an additional \$58,801.32 to the present value of the costs of the project. Thus the total present value of costs for this project is \$1,128,801.32. Note that for the time being we are assuming that BGSU-Firelands ignores any external costs of the project, and that there are no decommissioning costs.

Benefits

The monetary benefits of this project are conceptually straightforward, but complicated to accurately estimate. They consist almost entirely of the potential reduction in the electrical bill for BGSU-Firelands, payable to FirstEnergy. This reduction is possible through the “net metering” provisions⁷ of the Public Utilities Commission of Ohio (PUCO). Under these provisions, an electrical customer that produces some of their own electricity is only billed on usage net of on-site production. This is potentially advantageous for the customer, because typically producers might only receive 3 to 5 cents per kilowatt hour for what they produce, while retail customers may pay 10 to 15 cents per kilowatt hour for what they consume. Under net metering, customers that produce some of their own electricity essentially get credit for the production at the retail rate.

Billing Procedure

The complications that arise in calculating the potential benefits due to net metering occur because of the somewhat unusual procedure used to determine BGSU-Firelands electrical bill. Unlike residential customers, BGSU-Firelands is billed in a way that is heavily dependent on their maximum usage during the month. This billing approach is designed to charge more to customers who use a great deal of electricity during times of peak demand, which is when the highest cost generators are called into service. The actual formula used to calculate the bill for BGSU-Firelands (Rate Sheet 21)⁸ is somewhat complicated, and depends both on the kilowatt hours used during the month, and the peak usage attained over the course of the month. For the typical usage levels experienced by the facility, the formula can be written as follows:

$$P = 500 \times 0.165 + [(165 \times B) - 500] \times 0.179 + (85 \times B) \times 0.05 + [K - (250 \times B)] \times 0.034 \quad (1)$$

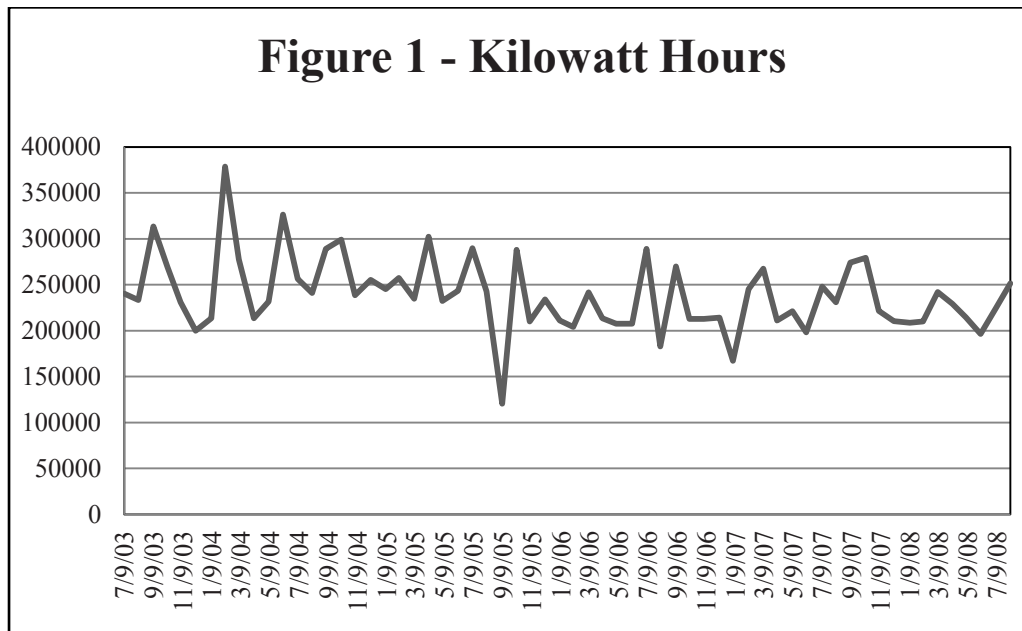
where P is the monthly payment due to First Energy, B is the “billing demand” or peak rate of usage in kilowatts for the month, and K is the total kilowatt hours used in the month. A typical month might have a peak load of 750 kW, and usage of 240,000 kWh, for a monthly payment of \$27,117. The formula causes the payment amount to be much more sensitive to changes in the billing demand than to the kWh usage. For instance, a 10% increase in the peak load would increase the monthly payment by \$1,896 (about 7%) while a 10% increase in kilowatt hours would only increase the bill by \$816 (about 3%).

Given the complicated nature of the billing arrangement, it is important to get an accurate picture of both the usage of electricity and the likely production levels of the proposed wind turbine, if we wish to estimate the likely impacts of the turbine on Firelands’ monthly electrical bill. The next sections of the paper attempt to do these things.

A Model of Electricity Usage at BGSU-Firelands

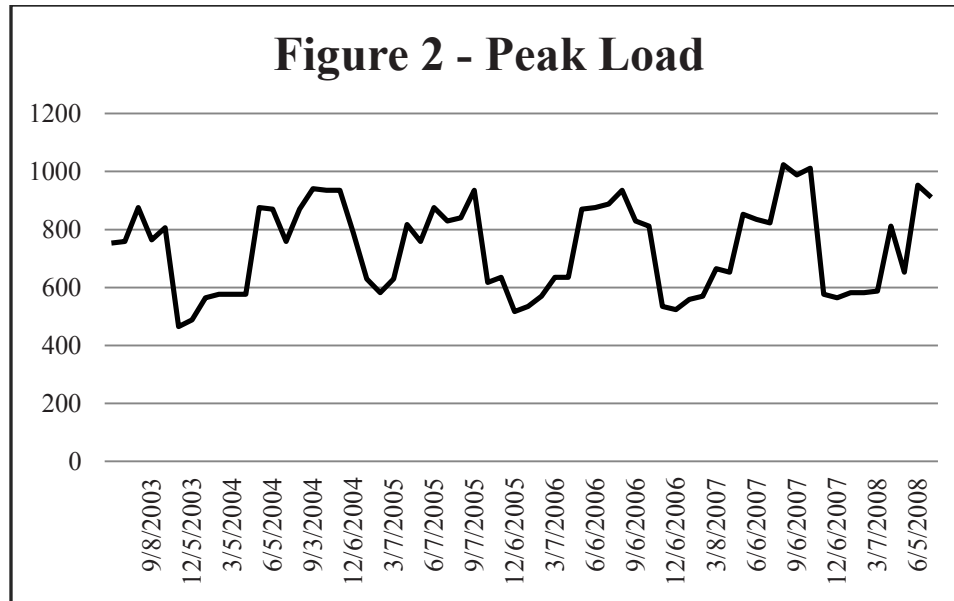
The first step in evaluating the savings generated by the proposed turbine is to accurately model electrical usage by the Firelands campus, and then use the model to create a baseline prediction for usage over the life of the turbine. To do so, we examine past data on both kilowatt hours and peak load from June 2003 through July 2008. Although data is available for years previous to this period, we restrict the analysis in this way because a significant building was added to the campus in June 2003, and this notably changed electrical usage. Firelands' electrical meters are read once a month, within a few days of the seventh of the month. For the analysis below we redefine a "month" as the period between 2 readings of the meters. Figures 1 and 2 display kilowatt hours and peak load respectively for the period considered.

A slight downward trend in kilowatt hours is noticeable in Figure 1, which a statistical trend analysis confirms. However, the trend appears to level out during the last 3 years, and a formal trend analysis limited to that period suggests a small positive and statistically insignificant trend. Moreover, using the trend for the entire period would actually suggest that usage would be near zero at the end of the wind turbine project. Rather than adopt this unrealistic assumption, we simply assume that there is no trend in kilowatt hours during the life of the proposed project.



Curiously, there appears to be no seasonality in kilowatt hours. Standard tests for seasonality (F-test, Kruskal-Wallis) reveal that there is none. Given the assumption of no trend and the lack of seasonality, the mean of the kilowatt hour variable (239,173) is selected to represent the typical value that occurs over the life of the proposed project.

Figure 2 displays the behavior of monthly peak load for BGSU-Firelands. No trend is apparent, and this is confirmed by a regression analysis that finds a small and statistically insignificant trend coefficient. However, a strong pattern of seasonality is evident, and this is confirmed at the 1% level by both the Kruskal-Wallis and F-Tests for seasonality. The highest peak loads happen during the warmest months, which suggest that high temperatures are correlated with peak loads.

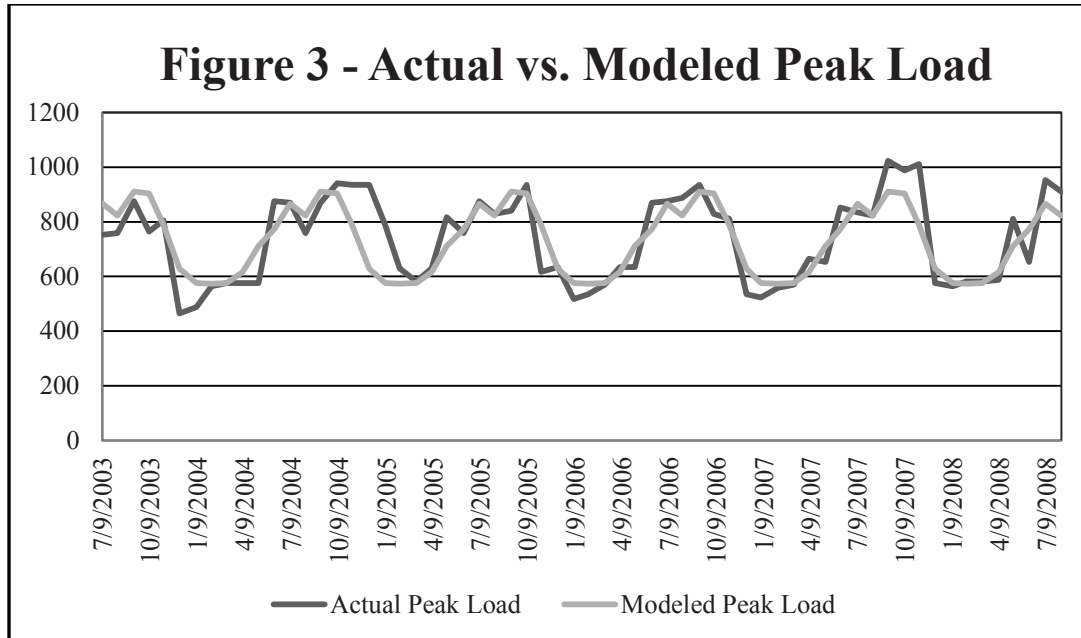


Ideally one would want to regress the peak load variable on temperature data for Huron to derive the relevant relationship. Unfortunately, historical temperature data for Huron are not readily available for the period considered. The closest city with the required data is Lorraine, which is reasonably close and is similarly situated on the shores of Lake Erie, and so this data is used as a proxy.⁹ Using the monthly definitions implied by Firelands' electric bill, the Lorraine data was examined for the high temperature in each "month."

The regression below is specified to capture the relevant relationships: Peak load for each month is the dependent variable, which is regressed on a constant, 11 monthly dummy variables, and a threshold-style temperature variable equal to the maximum of 0 and (monthly high -79).¹⁰ Thus high temperatures are modeled to have an effect on peak load only when they exceed 79 degrees. The result of this regression is as follows:

TABLE 1: PEAK LOAD REGRESSION RESULTS		
Variable	Coefficient	t-statistic
Constant	573.90	14.59
February	2.34	0.04
March	41.28	0.74
April	107.74	1.93
May	89.67	1.31
June	72.67	0.89
July	54.40	0.69
August	152.77	2.00
September	219.57	3.52
October	214.96	3.75
November	55.24	0.99
December	2.32	0.04
Temp-79	16.88	3.48
R ² =0.74 Adjusted R ² =0.68		

Figure 3 displays the modeled peak load based on these results (and monthly averages of Lorraine high temperatures), alongside the actual data. The similarity of the two, combined with the relatively large R-squared, suggests that this provides a reasonably good model of the monthly peak load. The monthly numbers implied by this model are therefore used as the baseline peak load values.



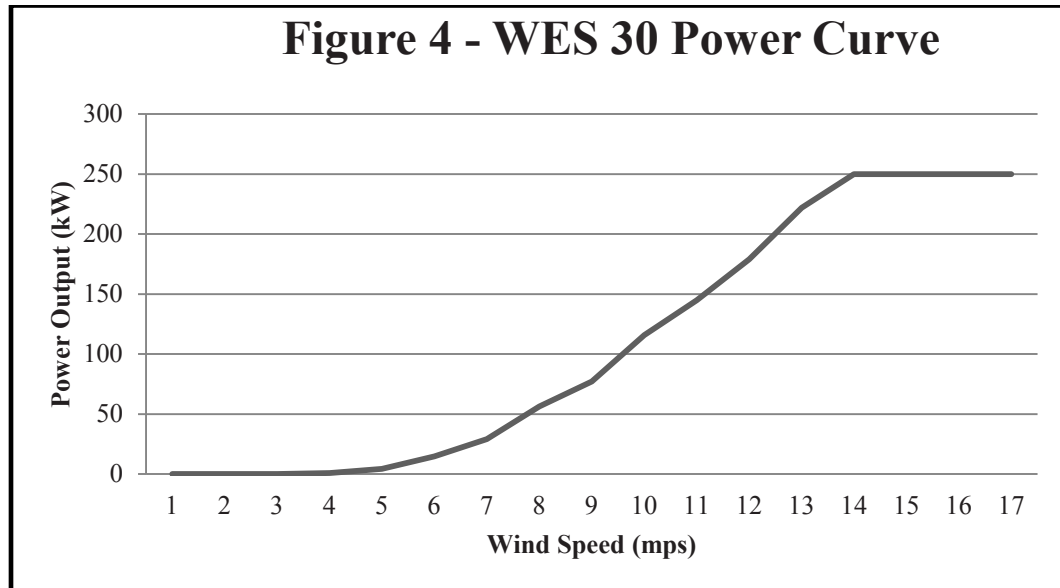
Estimated Electricity Production

A simple estimate of the electricity produced by the proposed wind turbine could be achieved by taking the annual average wind speed for the site, and finding the corresponding kilowatts produced using the turbine's power curve. Multiplying this number by the number of hours in a year would then provide an estimate of the kilowatt hours produced in that year. There are a number of reasons to suspect that this procedure would generate significant errors:

1. The power curve for any wind turbine is non-linear, and in particular has a "cut-in" level below which no power is produced. Thus simply using an average wind speed may misstate the power produced.
2. Wind speed is likely to vary across months. Because the electrical bill also varies significantly by month, the monthly timing of the electrical production may be relevant.
3. Wind speed is likely to vary by time of day, and is perhaps correlated with temperature. Because the peak load almost certainly occurs near midafternoon near the time of peak temperature, the wind speed at this time of day is more relevant than the average.

These potential problems suggest the need for extremely detailed wind data. Fortunately, the results of a wind monitoring project at the NASA Plum Brook Station (located only about 4 miles from BGSU-Firelands) have recently become available through the efforts of Green Energy Ohio. One year's worth of data is available for the site, and includes wind speeds at a variety of heights (the maximum of which is the 50-meter height of the proposed project) and ground-level temperature, all recorded at ten-minute intervals. While this is by far the best wind data available to evaluate this proposed project, there are a few things to note. First, Plum Brook Station is at a somewhat higher elevation than BGSU-Firelands, which could mean that the wind speeds are higher there than at Firelands. Secondly, Plum Brook Station is farther from Lake Erie than is Firelands, which could mean that the winds are weaker at Plum Brook Station. While it is not possible to know exactly the

discrepancy created by these differences, the proximity of the two sites and the countervailing nature of the issues suggest that data can be validly utilized.



The first step in estimating the electricity produced is to apply the wind turbine's power curve to the wind speeds from the Plum Brook Station data. The power curve for the WES 30 wind turbine is displayed in Figure 4. Note that the cut-in wind speed is about 3 mps, and that the rest of the power curve is somewhat non-linear, with a 250 kW plateau occurring after 13 mps. The maximum wind speed recorded during the year was 19.2 mps, which is well below the WES 30's survival wind speed of 60 mps. The wind speed at each 10-minute interval in the Plum Brook Station data is combined with this power curve to calculate the kilowatts that would have been produced had the turbine been operating over the year that these wind speeds were recorded. Summing all of these values and dividing by 6 (once for each of the 10-minute intervals in an hour) generates an estimate of 168,658 kilowatt hours of production for the year. The second column of Table 2 shows how this output varies by month, as defined by electrical billing dates.¹¹

TABLE 2—PREDICTED WIND TURBINE PRODUCTION AND SAVINGS			
Month	kWh	Load Reduction	\$ Savings
Sept 2007	4974	0.61	184.48
Oct 2007	12494	2.55	489.36
Nov 2007	20641	0	701.79
Dec 2007	25010	0	850.35
Jan 2008	19798	0	673.14
Feb 2008	22158	0	753.39
Mar 2008	19324	0	657.02
Apr 2008	13533	18.00	915.04
May 2008	12302	13.63	762.94
June 2008	8801	41.73	1354.37
July 2008	3941	3.61	225.36
Aug 2008	5681	12.38	506.26
Total	168658	-	8073.61

It is also possible, though complicated, to estimate the effect that the proposed wind turbine would have on Firelands' peak load. The strategy employed here is to estimate what the peak load would have been both with and without the proposed wind turbine, and use this difference to calculate savings on the electrical bill. The first step in this process is to use the regression described in Table 1, combined with temperature and month information, to impute what the load is likely to be at each of the 10-minute intervals in the Plum Brook Station data.¹² As the load undoubtedly is dictated by cooling requirements, and these will be greater during the week when doors are open more often, our attention is restricted to weekdays. Based on discussions with an electrical utility official, it is assumed that there is some lag between temperature and cooling requirements, so that the load is assumed to be determined by what the temperature was one hour previous. Thus for every 10-minute interval in the Plum Brook data, data on month and 1-hour lagged temperature are used to construct an estimate of load. Because measured peak load is determined by looking at 30-minute averages of load, our attention is further restricted to what occurs on the hour and the half hour. The highest value of these during the month is then defined as the imputed peak load for that month.

The next step is to take the wind turbine kilowatt production figures for each 10-minute interval, average them for every half hour, and subtract them from each of the corresponding 30-minute interval estimates of load described above. This provides values that describe the net load that would occur in the presence of the wind turbine. The highest of these values during the month can then be defined as the imputed peak load that would occur with the wind turbine, for that month.

Note that the imputed peak loads with and without the wind turbine will not typically occur at the same time. For example, in the June data the peak load without the turbine was imputed to be 850.87, at 4:30PM on 6/9/08. However the wind was blowing stiffly at that time (6–8 mps), which would produce 47.84 kW, which would bring the imputed net load down to 803.03 kW. This figure is somewhat lower than what the imputed load with the wind turbine at other (less breezy) times. The highest of these for June was 809.14, which occurred at 3:30PM on 6/12/08, when the wind was less than 3 mps. The reductions in peak load for each month, calculated in this way, appear as the third column of Table 2.¹³

One potentially confusing aspect of Table 2 is that there are no imputed reductions in peak load for November through March. This is curious, because those are the months of highest potential kWh production. This strange result is a consequence of the way in which peak load is determined for each month. Recall that each time period's imputed load depends both on a fixed value for the month and on the temperature above 79 degrees that occurs during that time period. (See Table 1.) Because November through March are unlikely to experience temperatures in excess of 79 degrees, every time period in those months will have the same imputed load. There are at least a few hours each month in which there is no wind, so there are some time intervals in which the net load is not reduced. These time periods will have the same imputed load with or without the turbine. Thus in these months the wind turbine is not predicted to have any effect on the peak load for the month.

Computation of Electrical Bill Reduction

The final step is to compute the electrical bill savings that would occur due to the wind turbine. A baseline bill is constructed for each month, assuming that 239,174 kWh are used each month and that the imputed peak load in each month is described by the regression results seen in Table 1. An alternative bill for each month is then computed, using a kilowatt hour figure equal to the baseline minus the projected production (column 2 of Table 2), and using an imputed peak load equal to the baseline amount minus the projected load reduction (column 3 of Table 2).¹⁴ Both of these computations use the billing formula described in equation (1).¹⁵ The fourth column of Table 2 reports the difference between the projected electrical bills, with and without the proposed wind turbine. The savings are not evenly distributed throughout the year.

Savings are estimated to be the greatest in the spring months when moderately strong winds help reduce the peak load caused by warm weather, and in late fall and winter when strong winds generate significant kilowatt hours. Lower savings occur in the summer months when the winds are light. Summing the savings for each of the months results in a projected annual savings of \$8,073.61.

Present Value of Savings, and Other “Benefits”

To compute the benefits of the project, the present value of the annual savings for the projected life of the wind turbine (30 years) is computed. As with the cost figures, a rather low discount rate of 3% is used for this calculation. The 3% figure may be justified by the fact that subsidized loans may be available for wind projects at below market rates.¹⁶ The present value of 30 years’ worth of projected annual savings (\$8,073.61) discounted at a 3% rate is \$158,246.32.

Three other things are included in the measure of benefits of the project.

1. At the end of the project the foundation and tower are likely to still be in good shape, and could be reused for another wind project. No separate estimate of tower expense is provided by EPS, so we use the 15% of installed cost (\$160,500) suggested by AWS Truewind, along with the \$129,000 for the foundation. No depreciation is assumed, but the values are discounted at 3% per year to reflect opportunity cost. This provides a figure of \$115,796.28.
2. The wind turbine itself is also likely to have some scrap value, net of decommissioning costs. There is not much experience on which to base this scrap value. 20% is simply chosen with little justification. Using a \$503,500 value for the turbine (EPS’s “equipment cost” minus our estimate of the tower expense), applying the 20% rate, and discounting as above, yields a figure of \$40,278.71
3. Finally, we also include the funds that BGSU-Firelands is to receive for the construction of the project as a benefit. While from society’s perspective this is merely a transfer from one governmental agency to another, BGSU-Firelands may appropriately view it as a benefit from their own narrow perspective. The DOE grant for the wind turbine project includes \$443,455 for the turbine, \$30,000 for connection materials, and \$45,510 for engineering. Combined, this amount is \$528,965.00.

TABLE 3: SUMMARY OF FIRELANDS’ COSTS AND BENEFITS			
Costs		Benefits	
Initial Construction	\$1,070,000	PV of Electricity Bill Savings	\$158,246
PV of Maintenance	58,801	Foundation/Tower Resid. Value	115,796
		Turbine Scrap Value	40,279
		DOE Grant	528,965
Totals	\$1,128,801		\$843,286
Net Present Value = -\$285,515			

Net Present Value of the Project, and Other Criteria

A summary of the costs and benefits described above is displayed in Table 3. If we combine the figures for the four types of benefits, and then subtract the cost figures, from a net present value for the project of -\$285,515.02 is calculated. The negative value suggests that this is not a good project. Other common evaluation criteria include the benefit cost ratio (0.747), and the internal rate of return (-5.2%). All of these suggest that this proposed wind turbine project is not a good one from the perspective of BGSU-Firelands.

Alternative Assumptions and Project Modifications

Alternative Assumptions

It is reasonable to ask whether changing some of the assumed parameters would change the conclusions of this analysis:

1. It is possible that using the Plum Brook Station wind data understates the wind power potential at the Firelands site. Assuming a 20% understatement of the kilowatt hours produced would increase the annual electrical bill savings to \$9,220.48. However this would only increase the net benefit by \$22,479.19, not nearly enough to tip the balance.
2. Benefit cost analyses are often sensitive to the discount rate chosen, and this one is not an exception. If we use the 7% rate advocated by the OMB¹⁷ the present value of net benefits falls to -\$430,170, and if we use the 5.5% rate used by Engineered Process Systems the NPV is -\$393,087. Some authors¹⁸ argue that projects that have intergenerational environmental effects should be analyzed with a very low rate. If we use a 1% discount rate, the NPV rises to -\$123,465. Only with a largely indefensible 0% rate does the NPV become positive, at a mere +\$1,373.
3. The salvage rate chosen is arbitrary, so we explored increasing it to 50%. This only improves the NPV to -\$225,096.96.
4. It is also possible that increases in electrical billing rates will outstrip ordinary inflation. It is complicated and speculative to make assumptions regarding how equation (1) will change over time, but some crude calculations suggest that reasonably-sized increases in that formula above ordinary inflation would not come close to changing the negative value decision.

Other assumptions regarding the operating costs, capital costs, terminal value of the foundation and tower, and other factors were also changed, and none came close to changing the conclusion that this project has a large negative net present value.

Project Modifications

It may be possible to modify the proposed project in some way to achieve a positive net present value. One possibility is to use a larger turbine (such as the FL 600) on a higher (50-meter) tower. Applying the power curve for this alternative model to the Plum Brook Station wind data reveals approximately a 5-fold increase in power generation. However, the added cost of the larger turbine makes this modification even less cost effective than the one discussed above. Moreover, it is unclear whether the taller tower would pass muster with the FAA given the proximity of the small airport near campus.¹⁹

Smaller-sized turbines may also be a possibility worth exploring. Small turbines (such as the Northwind 100)²⁰ have the advantage of lower capital cost and lower cut-in speed, but will not produce as much power at typical wind speeds. However it is unclear whether the DOE grant (which specifies at least a 250kW turbine) would still be applicable with a smaller turbine.

III. COSTS AND BENEFITS: SOCIETY'S PERSPECTIVE

The preceding section examined the proposed wind turbine project from the narrow perspective of BGSU-Firelands, counting only the costs and benefits that accrued to them directly. Arguably a broader perspective is more appropriate, one in which the benefits and costs to all affected parties are counted. Additionally, the price paid by Firelands for their electricity is not necessarily its undistorted social value, but rather may be distorted by monopoly power and may also include implicit distributional charges. This section modifies the analysis to include these considerations.

With respect to the benefits of the project, there are two significant changes in what is included as a benefit in this broader-perspective analysis compared to what is seen above. First, the proceeds of the

grant should not be counted as a benefit to society, as it is merely a transfer of wealth between two governmental agencies: the benefit to one party is exactly offset by the cost to the other. This reduces the benefit number by \$528,965.00. Secondly, the analysis above ignores benefits to third parties from the reduction of pollution because the energy produced by the wind turbine will displace “dirty” energy created from coal. This benefit is the subject of the section that follows.

The Displacement of Dirty Energy

Every kilowatt hour produced by the proposed turbine is one that does not have to be produced by another source. In Ohio, it is quite likely that it is coal plants that would reduce their output in response.²¹ While there are hydroelectric and nuclear power plants in the region, these sources are likely to run at capacity due to their low marginal cost. Small natural gas plants are also utilized in the region, but they are typically only used during times of peak electrical demand, when turbine production is usually low. Thus it is reasonable to assume that nearly all electricity produced by the proposed wind turbines would displace electricity produced by coal plants. If the production of these plants is lower, so are their harmful emissions. The reduction of these emissions is appropriately counted as a benefit of the turbines from society’s perspective.

It is convenient to divide the averted damages into ones affecting climate (CO₂ emissions) from ones affecting local and regional health and environment (SO₂, NO_x, particulate matter). While CO₂ is believed to cause widely dispersed and long-lasting damage on a global scale, the damage from non-climate pollutants tend to be short-lived, more localized, and more acute.

We can estimate the damage averted from CO₂ emissions by calculating the amount of CO₂ prevented by the wind turbine production and then multiplying that by a dollar value for each unit of emissions averted. The Carbon Dioxide Information Analysis Center estimates that 2.3 pounds of CO₂ are emitted for every kWh of power produced by a coal plant. This is quite close to the weighted average of emissions per kWh from the five closest coal plants to Firelands.²² With the yearly production of the proposed turbine being 168,658 kWh, this results in an estimate of 194 tons of CO₂ prevented each year. The Intergovernmental Panel on Climate Change (IPCC) finds that the average value of damage from CO₂ emissions across several peer-reviewed studies is \$12 per ton. The present value of the \$2,328 yearly benefit from these figures is \$45,629.83 over the thirty year life of the project.

Estimating the value of the averted non-climate pollutants is more simple, due to the work of the National Research Council. In a wide-ranging study, the council found the direct and indirect effects of the major non-climate pollutants from coal (SO₂, NO_x, particulate matter) to average 3.2 cents for every kilowatt hour. Combining this figure with the output amount yields a yearly figure of \$5,397.06. The present value of this over the life of the project is \$105,784.76.

The Market Value of Electricity

As mentioned above, the particular way that BGSU-Firelands is billed for its electricity is likely to be significantly different from an undistorted value of the electricity that the proposed wind turbine would generate. Specifically, the rate includes the costs of distribution, and may be distorted both by the monopoly power of FirstEnergy and the regulatory actions of the Public Utility Commission of Ohio.

Fortunately, a liquid and relatively undistorted market exists for wholesale electricity, and the prices in this market are probably much closer to the social value of the electricity (apart from external costs) that would be generated by the proposed turbines. The most recent data available from the Federal Energy Regulatory Commission (FERC) puts the value of wholesale electricity for the Midwest (MISO) region at 4.6 cents per kWh. More recent and more locally-refined figures from the Northwest Area Service Group (a subgroup of AMP-Ohio that purchases electricity for municipalities) put this price at 5.6 cents per

kWh.²³ This latter figure is more recent and more specific to the area, so we select it instead of the FERC value. Note that no attempt is made to use rates that differ across season or time of day, as data with that level of detail are simply unavailable.

The predicted 168,658 kWh per year produced by the proposed turbines valued at 5.6 cents per kWh would therefore be worth \$9,444.85 per year. The present value of this over the span of the project is \$185,123.23. Note that this is somewhat greater than the \$158,246.32 figure derived from the BGSU-Firelands billing formula.

TABLE 4: SUMMARY OF SOCIETY'S COSTS AND BENEFITS			
Costs		Benefits	
Initial Construction	\$1,070,000	PV of Electricity	\$185,123
PV of Maintenance	58,801	Foundation/Tower Resid Value	115,796
		Turbine Scrap Value	40,279
		PV of Averted Externalities	151,415
Totals	\$1,128,801		\$492,613
Net Present Value = -\$636,188			

Net Present Value of the Project from Society's Perspective

These costs and benefits are summarized in Table 4. Note that the 3% discount rate, and all of the cost figures are assumed to remain as above when considering society's perspective. With the modifications to the benefit figures described in this section, the net present value of the proposed project from society's perspective is -\$636,188.53. This number is much lower than the result from the narrow perspective. Not counting the government grant as a benefit has a very negative effect on the bottom line that is simply not made up by the modest benefits that come from counting prevented externalities.

It is reasonable to ask whether this figure can be overturned with rational alternative assumptions. Doubling the value of the non-climate externalities prevented, adding a reasonable growth factor to the CO₂ value (as some IPCC climate analysts suggest), and including a growth rate of electricity prices 5% above inflation all fail to overturn the negative result. Even combining all of these generous alternative assumptions results in a net present value of -\$278,699. Similarly, alternative assumptions regarding the discount rate do not overturn the result: Using a 7% discount rate results in a NPV of -\$846,259 while a 0% rate results in a NPV of -\$254,702.

IV. DISCUSSION

The results presented here suggest that the proposed wind turbine project is not a good project. Whether one takes the narrow perspective of BGSU-Firelands, or the broader societal perspective, the net present value of the project is quite negative. Furthermore, the result is insensitive to reasonable assumptions regarding wind speed, turbine model, discount rate, value of electricity, value of externalities averted, and other factors. It simply appears that the project as currently envisioned is not a good idea.

These results may have broader implications for energy policy in Ohio and the nation. While our country transitions to greener sources of energy, it is important to bear in mind that not all green energy projects have benefits that outweigh their costs. Given that funds for such projects are limited, and the generally perceived importance of the transition, using funds to facilitate projects such as the one considered here is particularly ill-advised. Instead, the funds should find their way to projects that provide the maximum net benefits for society.

One should not be tempted to apply the results of this paper to all wind projects in Ohio. Indeed, preliminary results from a study of the utility-scale wind turbines near Bowling Green, Ohio suggest that turbines provide positive net benefits from both society's and a more local perspective.²⁴ Combined, these results suggest that wind power can be a viable alternative energy source even in modest wind states such as Ohio, but one must be careful to pursue beneficial projects, and not ones like the project examined here.

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Disclaimer

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ENDNOTES

¹Report available at www.greenenergy.com.

²See www.fuhrlander.de for a description.

³See www.lorax-energy.com.

⁴Details regarding this wind turbine can be found at www.wes30.com.

⁵Note that using this number assumes that the project is self-financed. If external financing is necessary, using the present value of the loan payments made to finance the project is more appropriate as a measure of this cost. To the extent that the external financing rate exceeds the 3% discount rate described below, this figure may be an understatement of the actual capital cost.

⁶The 3% rate is used as the baseline discount rate throughout the analysis, and is chosen because it is the rate recommended by the EPA (*Economic Analysis Resource Document*, Section 8.3, 2007; www.epa.gov/ttnecas1/econdata/Rmanual2/8.3.html) and because it is close to the 3.43% financing rate used by a nearby utility-scale wind project (American Municipal Power's OMEGA JV6 Project in Bowling Green, Ohio) prior to the financial market disruptions. While this rate is somewhat higher than the rate that may be ordinarily available in the private sector, rates this low may be available to BGSU-Firelands for this project through government programs such as Clean Renewable Energy Bonds (www.irs.gov/irb/2007-14_IRB/ar17.html) and the DOE's Loan Guarantee Program (www.lgprogram.energy.gov). The sensitivity of the results to different discount rates is explored in later sections of this paper.

⁷See <http://www.puco.ohio.gov/PUCO/Consumer/Information.cfm?id=8510> for a primer on this topic.

⁸The rate sheet can be found at www.firstenergycorp.com/Residential_and_Business/Customer_Choice/files/Tariff_OH_old/OE-2006_-_PUCO_No._11.pdf.

⁹This was determined using information available at Weather Underground, www.wunderground.com.

¹⁰79 is found to provide the best fit to the data, based on both the R-squared and t-statistics. Also, no such relationship was found regarding monthly low temperatures.

¹¹Because of the difference in timing in the way months are defined, two partial months of wind data are created by the electrical bill timing. Thus the final "month" is synthesized by combining data that ends on 8/31/08 with data that starts on 9/1/07 and ends on 9/6/07.

¹²Using this “peak load” regression to impute load values will likely result in errors for “off-peak” times. However, because we are only using the maximum monthly imputed values as estimates of the peak load, the errors for the off-peak times are inconsequential.

¹³Note that the colder months exhibit no imputed reduction in the peak load. This occurs because there are rarely temperatures above 79 in these months, and so the imputed load is the same nearly every day. Although load will be reduced on windy days, all it takes is one 30-minute period without wind during the month for the peak load to be unchanged for that month.

¹⁴The specific pattern of peak load reduction in this year is likely to be idiosyncratic. Using a more evenly distributed peak load reduction figure of 28.1 (the average of the months in which a reduction occurs) for each month that a reduction occurs yields a slightly lower amount of savings.

¹⁵For some of the months, the net usage is low enough to fall below the third bracket in equation (1), and this is appropriately accounted for.

¹⁶See, for example, Ohio’s Renewable Energy Loan Program, described at www.greenenergyohio.org/page.cfm?pageID=320. Note however that this particular program is limited to loans less than \$500,000, which is smaller than the project considered here.

¹⁷A discussion of the OMB’s preferred rate can be found in the EPA’s *Economic Analysis Resource Document*.

¹⁸See, for example, Nicholas Stern, *The Economics of Climate Change—The Stern Review*.

¹⁹A small airport is located nearby, and there are significant concerns about putting a structure as tall as a wind turbine in the proximity.

²⁰See a description at <http://northernpower.com/wind-power-products/northern-power-100-wind-turbine.php>.

²¹The Federal Energy Regulatory Commission lists coal as the marginal fuel type for the Midwest (MISO) electric power market, which includes BGSU-Firelands.

²²This information can be found at Carbon Monitoring for Action’s website, carma.org/plant/detail/40966.

²³These figures were collected by the author and are available on request.

²⁴“Were the Bowling Green Wind Turbines a Good Idea?” PowerPoint presentation, BGSU. Available from the author on request.

STUDENT RETENTION AT ASHLAND UNIVERSITY: A STATISTICAL STUDY

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ABSTRACT

Ashland University has a retention problem similar to that of many other colleges and universities. This paper estimates a retention model for Ashland that uses not only the variables found in earlier works but also sociological factors that have not been used previously. It confirms the conventional wisdom for some variables but not for others. Students with higher secondary school grades are more likely to graduate from Ashland University, but ACT test scores have a very weak curvilinear relationship with retention. Variables such as economic status, parental education, and family structure have the expected positive results. In contrast, student work experience in high school has an unexpected but not statistically significant negative effect.

I. INTRODUCTION

Student retention has become a major issue in higher education. Universities and colleges not only in the United States, but also in the rest of the world are concerned with this issue.¹ Several theories on why students leave college have been developed. Some scholars emphasize the sociological fit between the student and the college (Tinto, 1993). Others view the college experience as part of a search process by which young people attempt to define their career path. Sometimes, the search leads a student to stay at a given college and sometimes it does not (Manski, 1989).

Special insight into the problem can be obtained by examining the variables affecting retention at Ashland University (AU). Ashland is a middle-sized comprehensive university (roughly 2,100 undergraduates) that focuses on both traditional and non-traditional students with a wide diversity of academic abilities and sociological backgrounds. Retention is perceived as an issue at AU in that only about 50 percent of the new incoming freshman graduate (in five years or less).

Identifying the type of student who will graduate could do much to improve the performance of Ashland and other universities. Even if four-year retention is not necessarily the goal of the college or social policy, determining the characteristics of the students who graduate can help colleges to develop the appropriate admissions, course offering, and student life policies.

This paper develops a statistical model of retention at Ashland University (AU) that focuses on explanation rather than prediction. In addition to guiding student life policies, this analysis can be used to develop prediction models and to focus data collection efforts on the relevant variables.²

There are two reasons why this study may be of interest to people other than AU stakeholders. First, in addition to the commonly used variables, family characteristics such as parental vocation, the number of siblings, alumni connections, and geographic location are analyzed. Furthermore, individual attributes such as high school activities and job experience are included. Earlier analysts have developed theories suggesting these variables (Manski and Wise, 1982, and Willingham and Breland, 1982). Of special interest is a variable showing whether the two parents were living together at the time the student entered Ashland. A large literature suggests that individual success is related to the family structure (Clark, 1983 and Goldscheider and Waite, 1991).

The second reason for interest in this study is the information that it sheds on the ability of the two major college admissions tests, the College Boards (SAT) and the American College Test (ACT), to predict success. Many commentators denounce these tests, and studies of other colleges indicate that they are often poor predictors (Nairn and Associates, 1980). Other studies, however, have demonstrated the ability of the test to predict success in college courses (Watts and Lynch, 1989 and Watts and Bosshardt, 1991).

Ashland's student body has a wide range of ACT scores—from 12 to 33—making it a good sample from which to derive insights. Furthermore, AU uses the ACT test while most of the colleges studied earlier used the SAT test. Thus, an examination of the influence of the ACT test scores on retention rates could contribute to the understanding of this issue.

Consequently, this paper examines how student family and individual characteristics influence college retention. The next section develops the empirical model and explains the variables in the model. The third section describes the results, and a conclusion ends the paper.

II. THE EMPIRICAL MODEL

In this paper, the probability of student retention at Ashland University is modeled. Retention, here, is defined as obtaining a degree from Ashland University. The student's retention decision can be seen as the result of the calculation of the net benefit of graduating from Ashland University compared to the next best alternative. Economists have modeled this decision process, and from this analysis a dichotomous dependent variable model can be derived (Greene, 2000 and Manski and Wise, 1982). Essentially, the net utility or gain from graduating is dependent on a set of variables, X , as follows:

$$\text{Net Utility} = g(X, \beta, u) \quad (1)$$

with β being a set of parameters and u , a residual indicating the variation in utility not accounted for by the model. When this net utility or gain is greater than zero, the student stays and graduates from Ashland, and when it is less than zero, he/she leaves. Thus, the dichotomous variable, RET , equaling one if the student graduates and zero otherwise, can be used as the dependent variable in a rendition of the following model:

$$\text{Prob } RET = 1 = F(g, \beta, u) \quad (2)$$

Essentially, this equation states that the probability of a student graduating from Ashland University depends in some systemic fashion on variable vector, X . The probability part of this relationship can be approximated by a number of distributions. Different statistical techniques assume different distributions. The three most common techniques are Ordinary Least Squares regression (also called the Linear Probability Model or LP), Logit (using the assumption of a logistic probability for the residual, u), and Probit (using the assumption of a normal residual probability distribution).³ Given data on the variables in X , the latter distributions are considered superior for a number of reasons.⁴ This study follows the Manski and Wise work on student behavior by using the Probit model (1982, p. 40).

Before proceeding, this paper examines a potential estimation problem; selection bias. In order for a student to be in the sample, first, she/he must have originally been admitted to AU, and second, he/she must have decided to attend AU. Just as the decision to finish Ashland University arises from a net benefit calculation, so does the decision to attend Ashland University. Consequently, the students who decide to go to Ashland may not be a random sample of the universe of people thinking about college, and the results of a model using only the AU sample may not apply to non-AU students.

Under quite reasonable assumptions, however, this sequential decision process does not create estimation bias. People who do not apply to Ashland University believe that there are no net benefits from attending, let alone graduating from, Ashland. The characteristics that influence the likelihood of benefiting from an Ashland degree, then, are the same as those determining the desirability of applying to and attending the university. Consequently, the sample selection is mainly determined by the variables affecting retention.⁵ If the independent variables for a model determining who is in the sample are not different from those in the model itself, the coefficients estimated by the model would be unbiased.⁶ Thus, the paper proceeds on the assumption that coefficients in the estimation model are unbiased not only for observations within the sample but also those outside it.

Now that an empirical retention model has been posited, the next step is to examine the sample. The original sample consists of the 430 full-time students who matriculated as freshmen in the fall of 1996. On schedule, the bulk of the class would have graduated in 2000. Almost all of these students are

traditional in that they were 18 or 19 years old when they started at Ashland. (Most all of Ashland University's roughly 400 non-traditional students are transfer students.)

Due to missing data on many of the independent variables, the sample used is first limited to 341 observations in the original class. The need to make out-of-sample led us to drop 50 students from the final estimation model. Since for any particular observation there is no systemic reason for any given variables to be missing, the analysis assumes the sample is random, meaning that inferences can be made about the population.

To understand the nature of the dependent variable, one must realize that many students change majors. Thus, a large portion of the traditional students take over four years to graduate. Accordingly, this paper's criterion for retention is whether the student graduated within five years of entering Ashland University.

The independent variables used in the model have been suggested by work on retention by McKnight (1997), Manski and Wise (1982), Willingham and Breland (1982). Table 1 and equation 3 show all of the independent variables that have been considered for use in the model:

$$\text{RET} = F[\text{g(HSGPA, HSGPA}^2, \text{ACT, ACT}^2, \text{INTERACTION, NEED, SIBS, DIS, OHIO, OCC, PDEG, ALU, FAM, GENDER, BLACK, HSL, HSA, WEXP, HRS, HRS25, BUSC, EDC)}]. \quad (3)$$

Table 2 displays the means and standard deviations for these variables for the sample used in the analysis. Economic and sociological theories support using all of these variables, but these same theories could also support omitting many of them from the model. Consequently, extensive specification tests are performed to find the model with the greatest explanatory power.

Once a reasonable starting vector of independent variables is determined, a top-down specification search procedure suggested by Maddala is used to find the most appropriate model (1992, p. 490–504). Experiments are done with the independent variables to see if they contribute to the explanatory power of the equation. If the coefficients are not significantly different from zero and if their *t* values are less than one, one can safely assume that they do not impact on retention at Ashland. In order to prevent omitted variable bias, however, the analysis does include variables that are theoretically required by the underlying economic model, even though the *t* values are less than one.

Here, each possible independent variable is examined to see how it might impact on retention. These variables can be classified into three categories: academic indicators, family characteristics, and non-academic individual attributes. Two academic variables available for AU students are considered important by most experts, the high school grade point average, HSGPA, and the American Test Company score, ACT. HSGPA reflects the actual academic performance of the student in secondary school, while ACT indicates the potential of a student to do college work.⁷

Some observers claim that very good students tend to get bored at Ashland and then transfer to other schools. This idea suggests that relationship between Ashland retention and academic ability is nonlinear. After a certain threshold, increasing academic ability may decrease the likelihood of Ashland University students graduating. To test this hypothesis, two quadratic variables, HSGPA² and ACT² are added to the model.

There may be students at Ashland University who perform much better in the classroom than their ACT scores would indicate—in other words, they are over-achievers. This phenomenon can be accounted for by including an interaction variable, the product of ACT and HSGPA. With this variable, called INTERACTION, one can model the possibility that the student's conscientiousness (as roughly measured

by HSGPA) could change the impact of the ACT score on retention. If HSGPA increases the impact of ACT on retention, then, the INTERACTION coefficient is greater than zero.

The economic and social characteristics of student families can impact on retention at Ashland University. The financial variable most available and likely to impact retention is the difference between the expense of attending Ashland University and the amount a family can afford as determined by the Federal Student Aid Programs need formulas, called here, NEED. This variable indicates the family's capacity to finance the student's education.

More data are available on NEED than on straight income variables. Many families do not report their NEED or income data to the university. Thus, the income variable is unavailable for them, but since they did not see fit to apply for financial aid, one can infer that their NEED is zero.⁸ Unlike income, one would expect the impact of NEED to be negative, greater need lowers the probability of the student graduating.

Another variable that might impact on the family's ability to send an offspring to college is the number of siblings, SIBS. This variable, too, would have a negative impact; a household with several children likely results in less money for any one child to finish college.

A third family characteristic that could affect student retention is geographic location. Willingham and Breland (1982) show that students are more likely to stay at colleges that are closer to their homes. For this influence, the variable, DIS, is used; one would expect it to have a negative impact.

Another aspect of family location is whether they live in the state of Ohio or not (OHIO). For many reasons, one can plausibly assert that students from Ohio are more likely to remain at Ashland University. Students from Ohio are more apt to know their fellow students from past experience. Examples of this experience might be family and parental connections and interscholastic activities, such as Boys' and Girls' State and athletics. Thus, Ohio students may feel more connected to Ashland University than out-of-state students.

It has been hypothesized that students from families with high social prestige are more disposed to finish college (Willingham and Breland, 1982, p. 164). Information available to this researcher on the parental jobs is exploited to set up a dichotomous variable, OCC, to depict whether one or more of the parents have a prestigious job.⁹ One would expect this variable to have a positive impact. Since women from all types of families work as housewives, using a dummy variable for both parents with prestigious jobs may understate the proportion of students from families in such positions.

Experts agree that students whose parents have college degrees are more likely to finish college than others (Manski and Wise, 1982, chapters 4, 6 and 8 and Willingham and Breland, 1982, p. 164). To depict this situation, the dichotomous variable, PDEG, is included. Like OCC, it could be expected to have a positive impact.

Another family characteristic possibly impacting on Ashland University retention is whether one or more of the parents, siblings or close relatives are alumni. Thus, the dichotomous variable, ALU, is added to the model.

For two reasons, coming from a stable family may increase the likelihood of persistence for a student at Ashland University. A large literature posits that stable families will help people to pursue and fulfill their ambitions such as finishing college.¹⁰ Second, anecdotal evidence indicates that people from conservative stable families are more likely to stay at Ashland University given its small town setting and religious orientation.

It is inferred that if both parents were living at the same location at the time of student's application, they were married.¹¹ Thus, a dummy variable, FAM, is created; it is expected to have a positive impact. Given this definition, 84.8 percent of the sample students were from families with both parents living together.

Non-academic characteristics of the individual students can influence retention. One of the most obvious non-academic characteristics of a college is gender. Therefore, the dichotomous variable (GENDER) is included in the model. Theory makes no prediction on the impact of this variable.

The undergraduates at Ashland University are homogenous ethnically. Caucasian Americans account for 92.1 percent of the 430 students in the 1996 class. Students from other countries constitute 2.3 percent of the class, and 2.6 percent of the sample are Black Americans. In this sample, there are no Native Americans, and very few American Hispanics and Asians. Other things equal, the retention rates for different ethnic groups could be quite different, and thus, it is prudent to include a variable reflecting this condition. Since many of the variables are not available for international students, most of them are not in the sample, and thus, no variable reflecting that condition is included. Therefore, only the dummy variable, BLACK, is included; theory does not predict whether this would have a positive or negative effect.¹²

Willingham and Breland (1982) hypothesize that outstanding accomplishments in high school extracurricular activities, athletics, and other non-scholastic endeavors lead to college success and retention. Thus, this paper examines two dichotomous variables: HSL indicating whether the student held a student organization office, and HSA indicating whether the student was a high school athlete. These variables should have a positive impact.

Work experience prior to college could also have a bearing on success in college. Information was collected on two aspects of student high school work experience. The first is whether the jobs held by the student were particularly challenging or responsible, and the second was whether the student had had a full-time job. For the first aspect, a dichotomous variable, WEXP, is included. It is expected to be positive.

For the second aspect of the high school work experience, data on the hours worked at student jobs were collected. Again the information was incomplete and often ambiguous, but enough was collected to consider using the variable. Thus, variables reflecting full-time job experience—for instance, maximum hours worked per week, HRS—are included in the analysis. Additionally, a dichotomous variable, HS25, indicating whether the student had a job with over 25 hours a week, is created. In the models, HRS25 yielded more plausible results, and so it was used.

Finally, two variables are used to indicate the AU College in which the students choose to enroll. Students enrolling in the AU College of Business and Economics and College of Education may have stronger or weaker desires to finish college at Ashland than those enrolling in the College of Arts and Sciences. Therefore, the dummy variables, BUSC, and EDC, are included in the model. Theory does not predict the impact of these variables.

III. THE RESULTS

The final estimates of the Probit model are reported in Table 3. This paper uses a nonlinear model with continuous variables entered as natural logs because this specification picks up relationships between retention and certain independent variables that the linear ones might miss. As stated above, variables not theoretically necessary are deleted from the model, if the *t* values are less than one. This should minimize omitted variable bias. It also allows the reader to examine variables with a possible impact but low statistical significance.

Now, the results for the variables are described starting with the academic ones, and going onto the family characteristics and then finishing the individual attributes. Of the academic variables, high school GPA (HSPGA) is statistically significant. The square of high school grades, however, is not statistically significant. This insignificance indicates that the relationship of the dependent variable to the natural log of HSGPA if not the actual variable itself is linear. The logged specification may very well capture any nonlinearity that exists in the relationship in the model or the sample.

Experiments on different configurations of the ACT variable indicate that the impact of this variable is nonlinear. Using the natural log model allows for a nonlinear impact, but it does not allow the sign of the impact to change; the coefficient for \ln ACT has to be either positive or negative. When the \ln quadratic variable $(\ln \text{ACT})^2$ is added, however, the sign of the impact for ACT changes over different parts of the sample. For the AU sample (Class of 2000), the effect of ACT is positive at its lower levels, and this impact changes to negative in the middle of the sample at 22. However, these two variables are not statistically significant at the 5 percent level, meaning that one cannot have a great deal of confidence in the ACT results. Furthermore, at no ACT value is the level of the total impact significantly different from zero using a level of significance of 5 percent.

While the discussion in section II suggests that the interaction between HSGPA and ACT is appealing as a variable, the statistical results indicate that it is not important in the Ashland University environment. Since its t value is less than one, INTERACTION is not included in the final model.

The next variable, NEED, is included in the model even though it has a low t value, because it is theoretically necessary. With college expenses a large part of most family incomes, it is inconceivable that finances do not play a role in the decision to finish college. Statistically, however, the NEED variable is insignificant with a very small but predicted regression coefficient.

To illuminate this question, the predicted impact of NEED on the likelihood of finishing in five years is examined. With the Probit model, this impact does not equal the regression coefficient; rather it is a multiplicative combination of the coefficient and the normal likelihood function; it can vary with the value of the variables. At the mean of the sample, the Probit model impact of the NEED variable on the probability of graduation is only -0.0000005, thereby lowering a student's need by \$10,000 would only increase the probability of graduating by 0.006 percentage points. This small effect seems counterintuitive. Through scholarships and loans, however, a university may be able to insure that students have the resources to finish, and thus, a large influence for NEED might not be expected.

Theoretical and empirical analysis indicates that the following family variables, \ln DIS, OHIO, OCC, PDEG, ALU and FAM, may impact retention. For \ln DIS, the natural log of the distance of the student=s home from Ashland, the results contradict earlier studies showing that greater distance from a college lowers a student=s likelihood of graduating. At Ashland, the coefficient for \ln DIS is positive but not significant at the 5 percent level. This implies (albeit weakly) that living farther away from Ashland increases the likelihood of a student graduating, but one cannot place a great deal of confidence in the result.

The remaining family variables are dichotomous. OHIO, reflecting geography, is positive and statistically significant indicating that coming from Ohio increases the likelihood of a student graduating from Ashland University. The results are consistent with earlier studies showing that a geographic connection with a college has a positive influence on retention. It may very well be that coming from Ohio gives students a connection with other students that creates a greater desire to stay and graduate. The results for OCC, whether one or both of the student's parents held a prestigious job, is suggestive but inconclusive, being statistically significant at only the 10 percent level. Thus, coming from a family with one member

holding a prestigious job may increase the likelihood of graduation, but not much confidence can be placed in the result. The coefficient for PDEG is positive as predicted and significantly different from zero at the 5 percent level for a one-tail test. This indicates that students at Ashland tend to graduate more often if their parents have finished college. The coefficient for ALU, the dummy variable indicating whether the student has any alumni relative, is positive as predicted and statistically significant at the 10 percent level of significance. The results for the FAM dummy suggest that students from stable families tend to have a higher probability of graduation compared to those who do not. The coefficient is positive as predicted and statistically significant at the 5 percent level of significance. The other family characteristic variable, SIBS, was not statistically significant and excluded from the model.¹³ Apparently the number of the student's siblings has little influence on retention.

Three of the individual characteristics have a substantial impact on AU retention, HR25, a dummy for working over 25 hours at jobs in high school and the two dummies for the AU colleges. HR25 has an unexpected coefficient, negative instead of positive. Since the sign is unexpected, a two-tail test is used to see the coefficient is significantly different from zero. It is statistically significant at the 10 percent level on this test. The expectation is that having worked longer hours at a job during high school would, by making students more responsible, lead to greater likelihood of finishing college. Nonetheless, as the number of work hours on jobs in high school increases, the probability of a student graduating from Ashland is lowered.

One possible explanation for this result is that people who work more in high school do not have the financial resources to finish Ashland. When interaction terms between NEED and hours were added to the model, however, the coefficients are not significantly different from zero. Thus, the negative effect of HR25 does not appear to be connected to financial need.

Another theory consistent with this result would be that greater job experience gives students a better ability to operate in the labor market, and therefore, to obtain better jobs without a college degree. This would increase the perceived opportunity cost of going to college because these students would be giving up a greater income compared to less experienced people. Notwithstanding, this theory obviously needs further testing. For all these interesting speculations, one cannot rely on these findings to draw conclusions without testing the theory with other samples.

Apparently, the students who enroll in either the AU College of Business and Economics or the AU College of Education have higher graduation rates compared to the students starting in the AU College of Arts and Sciences. The coefficients for the Business and Education school dummies, BUSC and EDC, are positive indicating that students in these schools are more likely to graduate than students in the Arts and Sciences.

The following variables depicting individual characteristics were not only statistically insignificant but also have t values below one: GENDER, BLACK, HSL, HSA, and WEXP. Since they are not theoretically necessary, they were not included in the final model. GENDER being insignificant implies that the retention rate, other things equal, does not materially differ between the genders. The results also suggest that other-things-equal, the African-American students have similar graduation rates compared to all other AU students. The insignificant results for HSL and HSA indicate that being a high school leader or athlete does not increase a student's probability of graduating from Ashland University. The last result contradicts earlier findings indicating that extracurricular activities prepare a student for college.

Additionally, the coefficient for the variable for the job quality, WEXP, was not statistically significant and also excluded from the final model. Apparently, people who have had responsible jobs during their high school years are no more prone to graduate from AU than other students.

The overall results of the model indicated that from a probabilistic viewpoint, the model is successful. The Log-likelihood ratio for the probit model is 80.870, which is statistically significant at the 1 percent level. Thus, the probability that the results occurred by chance is extremely low.

A second indicator of the success of the model is its ability to predict whether individual students would graduate. The contingency charts at the bottom of Table 3 show this ability for the in-sample observations and fifty out-of-sample observations. Of the 430 students in the class of 2000, the data necessary for the model are available for only 341. As stated above, fifty observations are excluded from the estimation sample in order to scrutinize the out-of-sample ability of the model to predict. The contingency charts at the bottom of Table 3 show that the model predicted 147 (50.5 percent) of the 291 observation students would graduate as compared to the 144 or 49.5 percent who actually did graduate. More important is the overall accuracy of the model predictions. Within the sample, the model correctly predicts whether or not 208 students graduated, a success rate of 71.5 percent.

The difficulty with this result is that it is within the sample; it may not be relevant to observations outside the sample. Thus, it is important to examine the prediction rates for the students not in the sample. For the 50 observations outside the estimation sample, the model correctly predicts that 15 would graduate and that another 15 would not graduate, for an overall accuracy rate of 60 percent. By merely assuming every student would graduate, however, one would arrive at an accuracy rate of 46 percent because for the fifty students the retention rate is 46 percent. Thus, the improvement wrought by the model is substantial. The purpose of this model, however, is more for explanation than for prediction, but this improvement implies that the variables used here influence retention.

IV. CONCLUSION

The results of this study indicate that students with higher HSGPAs are more likely to graduate from Ashland University. At the lower end of the score distribution, moreover, raising the minimum ACT could increase the graduation rate. Thus, conventional wisdom is supported implying that a mixed strategy raising both HSGPA and ACTs in selecting student applicants may be an efficient way to raise retention.

Of special interest to other colleges is the curvilinear relationship between retention and ACT. It is positive at low levels of the variable, but negative at high levels. There may be an ACT level for which Ashland best fits the student's needs and goals. Students very far below or above this range tend to leave. Possibly this phenomenon exists at other colleges. There may be ACT or test score niches for which given colleges are optimal. This is consistent with the sociological fit theory of Tinto (1995). This clustering of scores may also explain the lack of statistical significance for the relationship between these test scores and retention.

For some of the sociological variables, the study confirms the works of other scholars. Instate students are more likely to graduate from Ashland than others. This result is also consistent with Tinto in that Ohio students may very well fit into Ashland better than out-of-state people.

Students from families with prestigious jobs, college degrees, and alumni connections are also more likely to graduate from AU. For these characteristics, the conventional policy recommendations are appropriate.

For other variables, the results for Ashland are so different from other studies that special attention is warranted. Students who had worked over 25 hours during high school tend not to stay at AU. Another set of students who do not stay at Ashland are those from one-parent families. It is important to examine these issues further.

The final important result from this study is the difference between the retention rates for the AU colleges. The retention rate for the College of Arts and Sciences is below those of the other two colleges. This is consistent with both the fit model of Tinto and the search model of Manski (1989) in that the students in these colleges may have a clearer picture of their goals than the Arts and Sciences students. It would seem incumbent on the AU administration to study the problem in much more detail.

Table 1. The Variables in the Ashland University Retention Model	
Variable	Definition
RET	Equals 1, if the student graduated from Ashland University within five years or less from first entering, and 0, otherwise.
HSGPA	The student's high school grade point average.
HSGPA ²	HSGPA squared.
ACT	American College Test score which measures the aptitude of a student for college work.
ACT ²	ACT squared.
INTERACTION	ACT*HSGPA.
NEED	The difference between the expense of attending AU and the amount a family can afford as estimated by the Federal Student Aid Programs need formulas measured in dollars.
SIBS	The number of siblings.
DIS	The distance between the student's home and Ashland University measured in miles.
OHIO	Equals 1, if the student's home is in Ohio and 0, otherwise.
OCC	Equals 1, if one or another or both parents have prestigious jobs and 0, otherwise.
PDEG	Equals 1 for students one or more of whose parents are graduates of a four year college and 0, otherwise.
ALU	Equals 1, if the student is closely related to an alumnus and 0, otherwise.
FAM	Equals 1 if the parent were together and 0, otherwise.
GENDER	Equals 1 if student is male.
BLACK	Equals 1 if the student is black.
HSL	Equals 1 for students who held a student organization office during high school and 0, otherwise.
HSA	Equals 1 for students who were athletes in high school and 0 otherwise.
WEXP	Equals 1 for students who in this writer's judgment held particularly responsible, interesting and difficult jobs and 0, otherwise.
HRS	The maximum hours worked per week in the high school years.
HRS25	Equals 1 for students who worked over 25 hours a week in the high school years and 0, otherwise.
BUSC	Equals 1 for students who enter the College of Business and Economics and 0, otherwise.
EDC	Equals 1 for students who enter the College of Education and 0, otherwise.
Data collected by the author.	

Table 2. Variables in the Ashland University Retention Model		
Variable	Mean	Std. Deviation
RET	0.51	0.501
HSGPA	3.089	0.565
ACT	21.906	3.679
NEED	11950.72	7055.02
SIBS	1.765	1.214
DIS	106.15	150.127
OHIO	0.88	0.326
OCC	0.757	0.43
PDEG	0.475	0.5
ALU	0.188	0.391
FAM	0.848	0.36
GENDER	0.543	0.499
BLACK	0.026	0.161
HSL	0.531	0.5
HSA	0.692	0.462
WEXP	0.106	0.308
HRS	24.516	12.219
HRS25	0.405	0.492
BUSC	0.202	0.402
EDC	0.182	0.386

TABLE 3.
The Results for the Logarithmic Specification of the
Ashland University Retention Model

Variable	Coefficients	z or t value	p-value two tail	p-value one tail
Intercept	-33.886			
Ln HSGPA	2.553	4.31	0.000	0.000
Ln ACT	19.127	1.33	0.183	0.092
(Ln ACT) ²	-3.121	-1.33	0.183	0.092
Ln NEED	-0.019	-0.79	0.432	0.216
Ln DIS	0.103	1.28	0.200	0.100
OHIO	0.687	2.32	0.021	0.011
OCC	0.319	1.40	0.161	0.081
PDEG	0.327	1.70	0.089	0.045
ALU	0.312	1.34	0.180	0.090
FAM	0.430	1.77	0.076	0.038
HR25	-0.295	-1.70	0.089	0.045
BUSC	0.336	1.53	0.125	0.063
EDC	0.713	3.46	0.001	0.000
Log-Likelihood Ratio	80.870		Not relevant	0.000

The estimation program used is Limdep developed by William H. Greene, Econometrics Software, Inc. Plainview, New York.

Here, both the two and one tail probability values are displayed because some hypotheses involve a two tail and some involve a one tail test.

Frequencies of actual & predicted outcomes predicted by the Probit Model.

Actual versus Predicted Probability of Graduation:

Within the Sample Predictions				Out of Sample Predictions			
	Predicted				Predicted		
Actual	Grad.	No Grad.	Total	Actual	Grad.	No Grad.	Total
Graduated	104(0.357)	40(0.137)	144	Graduated	15(0.300)	8(0.160)	23
Not Graduated	43(0.148)	104(0.357)	147	No Graduated	12(0.240)	15(0.300)	27
Total	147	144	291	Total	27	23	50

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ENDNOTES

¹See Brunello and Winter-Ebmer, 2003, Montmarquette, Mahseredjian, and Houle, 2001, Kerkvliet and Nowell, 2005, and Van Ours and Ridder, 2003.

²For the distinction between models for explanation and prediction, see Greene, 2000, p. 842–844.

³See Pindyck and Rubinfeld, 1998, p. 298–318, Maddala, 1992, p. 322–338, and Greene, 2000 p. 811–895 for good discussions of these estimation techniques.

⁴The results for all three methods have been examined, but little difference between them is found. This is consistent with the literature which concludes that very little difference can be expected (Greene, 2000, p. 815).

⁵See Manski and Wise, 1982, for models of the application, attendance and retention decisions by college students; they use most of the same variables in all three models.

⁶See Wooldridge, 2000, p. 299–300 and p. 558–560.

⁷With these statistics, there are two problems. First, different secondary schools have different standards, and no really adequate way exists to model the secondary school differences in the Ashland University sample. In other samples, perhaps, ways to account for this problem can be developed. Second, some students, 35 in all, took the College SAT Board test; these scores are converted to ACT equivalents using the American Testing Company algorithms.

⁸For models with income included, Manski and Wise (1982) use a dummy variable valued at one when the INCOME is not available and zero, otherwise. Models for this sample with the income and dummy variables have been analyzed, but the models with NEED still seem more plausible, if for no other reason than the greater availability of credible data.

⁹In addition to the usual professional people and executives, this paper defines as prestigious, such jobs as teacher, nurse, sales person in a large company, manager, and business owner.

¹⁰See Clark, 1983 and Goldscheider and Waite, 1991.

¹¹Whether the parents were living together at the time the student applied to Ashland University is the best indicator available on the status of the student's home life. Admittedly it is not perfect.

¹²It should be noted that using ethnic or gender criterion may be illegal for admissions decisions, but including them in an explanatory model is useful because it may point to potential retention problems with particular ethnic groups.

¹³Any coefficient with a t-value less than 1 is excluded from the final model.