

**Bargaining and the effectiveness of economic development incentives:
An evaluation of the Texas Chapter 313 program**

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Abstract:

Existing research has examined how the mobility of capital shapes bargains between firms and governments. The major barriers to examining bargaining behavior include the large number of dimensions to such bargains and differences in capacities and strategies of firms and governments. In this paper, I examine data from a unique economic development incentive program in the State of Texas that holds almost all elements of bargaining constant, leaving only the ability of firms to walk away from a given location during the bargaining process. Using original data on bargaining outcomes as well as elite opinions, I document the extent to which firms that chose to locate in Texas made their decisions independent of its special economic development program. My findings suggest that only 15% of the firms participating in the program would have invested in another state without the incentive. The majority of these projects, and incentive dollars, were allocated to firms already committed to investing in Texas. Case studies of more than 80 projects reveal that in many cases it was an open secret that companies already had committed to their locations prior to receiving the incentive. The results herein imply that the structure of Texas's program encourages the overuse of incentives.

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1. Introduction

A pillar of social science research on the impact on globalization is the mobility of firms. Globalization, by reducing barriers to investment and trade, allows companies to move goods and capital investments more freely. That freedom not only shapes economic outcomes, but also affects the political relations between firms and government. In this paper, I focus on one aspect of mobility, the ability of a firm to “walk away” from a negotiation with one jurisdiction and choose to locate in another. I argue that such ex ante mobility (as opposed to the ability to relocate after the initial investment is made) has a major impact on firm-government bargaining.

While some firms have limited choices on where to locate manufacturing production or mineral processing, many firms have the ability to claim credibly that they can choose a number of potential locations and, thus, bargain for better entry conditions, special regulations, or taxpayer-financed benefits such as grants or low-cost loans in exchange for investments in a given jurisdiction. Firms with more choices in potential investment locations can bargain better deals with governments, potentially challenging the sovereignty of the nation-state (Andrews 1994).

The distinction between mobility and immobility is conceptually hazy. Firms have incentives to misrepresent their potential locational options to maximize their bargaining leverage. In some cases, a firm’s location decision is obvious. Some firms, such as mining companies, need to locate near mineral deposits, but in most cases the mobility of firms hinges on a large number of factors that vary by firm and industry. But firms have private information on which locations best suit their business interests and keeping that information private can increase the firm’s bargaining leverage.

Unfortunately for both governments and researchers, firms rarely reveal their strategies or true location preference even after a location decision has been made. In this article, I gather data from a unique economic development program used by the State of Texas to attract large, capital intensive investments. I then harness these data to measure firm mobility. The Texas Chapter 313 program is a tax limitation program (similar to an abatement) used to attract large businesses to Texas by forgiving a large portion of a potential entrant's property taxes, the main source of revenue for the public schools. Local school districts, along with their paid consultants, have better information than state economic development officials on how necessary the state's Chapter 313 program is for a particular firm's location decision.¹

Owing to the structure of the incentive program as well as the role of local school districts in authorizing incentives—introduced in the next section—Chapter 313 holds constant almost every other aspect of bargaining between firms and governments. The only major factor shaping the final negotiations is the ability of a firm credibly to threaten to walk away from the negotiations and take its investment elsewhere. Using data from Chapter 313 negotiations as well as case studies of 86 negotiations, I find that the majority of the firms would have located in Texas even without support from tax limitation program.

In the case study section of this paper I examine the assumption that local governments as well as the Texas Comptroller's office had knowledge that many of the companies

¹ In many cases, the incentives are for expansions of existing facilities. In other cases, school consultants have interacted with the same firms in previous negotiations. As noted in the case study section, in other cases the companies started construction prior to applying for the incentives. In all cases, local government officials and their consultants have considerable information on the activities of firms in their districts.

involved were coming to Texas even before being authorized to receive the incentives. The evidence is taken from the companies' applications, details on the construction of their facilities, as well as the Texas Comptroller's certification reports. The analysis suggests that the ineffectiveness of the Chapter 313 program is an open secret, not the result of informational asymmetries between firms and governments.

2. Firm-government bargaining

The management and political science literature has examined bargaining relationships between firms and governments, including their credibility (Vernon 1971; Hymer 1976). More recently, Ramamurti (2001) has examined how the existence of third parties (home governments or international organizations) have further tilted bargaining power from firms to governments. Others, such as Luo (2004), have shifted the debate from firm-government bargaining to a more cooperative model of business-government relations.²

Numerous studies have analyzed the bargaining relationship by examining the many factors that figure into the bargaining power of both the firm and government. Superior and unique technologies (Teece et al. 1997) or other specialized resources, such as access to capital or export markets (Fagre and Wells 1982), all provide advantages to firms. Access to large domestic markets or natural resource deposits can strengthen a government's bargaining power (Greico 1982; Luo 2004). As summarized by Eden and Molot (2002, p. 365) in the context of firm entry negotiations with host countries:

In any bargaining situation, the value of each party's resources is measured, not by its owner's evaluation, but by the other party's desire for those resources. The other party's valuation depends on the strength of desire/need for the particular resource and on what other alternatives are available should the negotiation fail.

² Rickard (2018) argues that electoral geography also shapes a state's willingness to offer incentives to firms.

That seemingly obvious point has raised analytical challenges given the multiple dimensions of the negotiations, and the secrecy of many of the bargaining outcomes. In the next section I will introduce a firm-government bargain over tax benefits by looking at Texas’s Chapter 313 tax-limitation program that allows us to hold constant many of the factors that influence relative bargaining strength, letting us identify the firms with the greatest ability to “walk away” from the deal.

The ability of a firm to “walk away” from a deal (cancel a relocation, choose an alternative location, or delay an expansion) is shaped by several factors. Many of those factors are private information to the firms and, unlike democratic governments beholden to the public, the firms are better able to protect any privately held information that could weaken their bargaining position (Markusen and Neese 2007).

In the context of the policy area of this paper—economic development incentives—firms can negotiate discretionary incentives ranging from cash grants to infrastructure improvements to tax abatements that transfer benefits from taxpayers to themselves. Firms can maximize the locational incentives offered to them by claiming they are evaluating numerous potential investment sites that have varying costs and benefits for the firm.

Public bidding wars, such as Boeing’s 22-state competition for building its new 777X aircraft (Jensen and Malesky 2018) as well as Amazon’s 238 location bidding war for its second headquarters (Renn 2018) have led journalists to highlight the prisoner’s dilemma nature of economic development incentives. Scholars have long analyzed such economic development incentives, generally concluding that the programs, in aggregate, have very little

impact on economic activity.³ Central to the criticisms is that many of the firms already have picked an investment location and that they are maximizing incentive packages after they have chosen a location.

3. The bargaining context: The Texas Chapter 313 program

For the study at hand, I focus on a single economic development incentive program in the State of Texas. Economic development incentives targeted to individual firms, ranging from tax holidays to cash grants for worker retraining have become the primary economic development tool of cities and states, with some estimates as high as \$80 billion spent per year on such policies.⁴ Every state, and 95% of cities, offers some form of economic development incentives.

Texas has created more than two dozen incentive programs at the state and local levels.⁵ The flagship state incentive program—the Texas Enterprise Fund—is by far the largest state “deal closing fund”, with an original budget of \$295 million and a 2016-2017 budget exceeding \$100 million.⁶ The structure of Texas’s fund is similar to 38 other state deal-closing funds in that it provides discretionary incentives to firms. Thus, rather than a dollar per job formula available to all firms, the Governor makes decisions as to which firms

³ See Busse (2001) for a summary of 300 studies of the impact of economic development incentives. Jensen (2017) estimates the impact of incentives on Kansas relocation decisions and conducts a survey of firms. Both the statistical estimates and survey indicate most of the firms would have invested independent of the incentives.

⁴ This estimate is based on the *New York Times*’s public incentive database. The database, last updated in 2012, aggregates information on state and local incentives. Thomas (2011) estimates incentives’ costs at \$70 billion in 2005.

⁵ For an overview of these programs see:
<https://texaswideopenforbusiness.com/sites/default/files/06/06/16/incentivessummary.pdf>

⁶ <http://siteselection.com/onlineInsider/sealing-the-deal.cfm>

receive incentives, their dollar values and their terms in order to attract large, job-creating investments.

But the Texas Enterprise Fund pales in comparison to the Chapter 313 program. That program allows local governments to provide tax incentives to firms for purposes of economic development. From 2005 to 2015, the Chapter 313 program provided businesses with over \$1.4 billion in tax benefits (Texas State Auditor 2016). The existing Chapter 313 agreements are estimated to provide more than \$7 billion in tax abatements over the lifetime of the funded projects (Senate Committee on Natural Resources and Economic Development 2016, p. 50). The purpose of the Chapter 313 program, as outlined in Sec. 313.003 of the law, is to:

- (1) encourage large-scale capital investments in this state;
- (2) create new, high-paying jobs in this state;
- (3) attract to this state large-scale businesses that are exploring opportunities to locate in other states or other countries;
- (4) enable state and local government officials and economic development professionals to compete with other states by authorizing economic development incentives that are comparable to incentives being offered to prospective employers by other states and to provide state and local officials with an effective means to attract large-scale investment;
- (5) strengthen and improve the overall performance of the economy of this state;
- (6) expand and enlarge the ad valorem tax base of this state; and
- (7) enhance this state's economic development efforts by providing state and local officials with an effective economic development tool.

Chapter 313's economic development program was passed by the Texas Legislature in 2001 in response to large manufacturers, namely Intel and Boeing, spurning Texas for

locations with lower property taxes.⁷ Thus, the Chapter 313 program is designed to provide targeted tax abatements for a limited number of large, capital-intensive projects.⁸

How does the Chapter 313 program work? On the surface, it looks similar to many other state and local tax abatement programs. Chapter 313 is built around the idea of attracting capital; therefore, the main requirement for participation in the program is the proposed level of investment (as opposed to job creation). The state sets a limit on the minimum amount of capital necessary to participate in the program, usually between \$10 million and \$100 million, depending on the school district's taxable property values and whether the school district is in a rural or urban area. All investments that meet that investment requirement, as well as some additional requirements, can qualify for local property tax relief.⁹

The tax benefits of Chapter 313 for the firm are not open to negotiation, even for companies that may provide a large number of local jobs. State law determines the abatement details based on the amount of capital invested and its location. For example, a

⁷ Senate Committee on Natural Resources and Economic Development (2016) provides additional details on the creation of the Chapter 313 program. One of the motivations for creating the program was based on Texas slipping in national site-selection ratings. It was later discovered that Texas's decline in the rankings was caused by a typo. See Michaels (2016b) for a discussion.

⁸ Although job creation is one of the goals of the program, the size of the incentive isn't scaled to the number of jobs anticipated. Companies must meet a minimum number of jobs to qualify for the incentive, but additional job creation doesn't yield additional incentives through the Chapter 313 program. Companies can petition for waivers of the job thresholds, in some cases qualifying for the program with just one or two jobs. This failure of the program to create jobs has been noted in numerous publications, including Michaels (2016a).

⁹ Requirements have changed over time and they include qualifying industries and wage requirements. For current 313 requirements, see Texas Comptroller of Public Accounts. (2016).

company investing in San Antonio may propose a \$1 billion production facility employing 50 workers that normally would be subject to property taxes but is taxed only on the first \$100 million in investment as opposed to the entire \$1 billion. A company that invests the same amount but employs 500 workers is provided the same benefit: property taxes on a \$100 million tax base rather than \$1 billion. Investments of \$2 billion see even larger benefits, when the firm likewise is taxed only on the first \$100 million.

However, investing firms are subject to a minimum job creation requirement for participating in the program, often 10 (rural areas) to 25 (urban areas) direct or indirect (subcontractor) jobs. That is a minimum qualification: companies that create 25 or 2500 jobs are not differentiated. Supplemental legislation allows some firms to apply for waivers of the minimum jobs requirements. Numerous wind farms in the program propose two jobs attached to hundreds of millions in investment.¹⁰

Such minor job-creation requirements have led to criticisms of the program, but proponents argue that the goal of Chapter 313 is to increase capital investment and the state's tax base. Firms that weren't going to locate in Texas would have paid no property taxes without the program, but now the state will receive taxes based on the limited value of

¹⁰ Chapter 313 has been criticized for leading firms to understate job creation in order to qualify for the program. Firms are required to pay above the (average?) county wage, and by understating total jobs, firms can count the highest paying jobs to meet the job creation and wage standards (Legislative Budget Board 2011).

taxable property of \$10 million to \$100 million per project.¹¹ When the agreement ends in 10 years, the investment will be taxed at assessed value.¹²

Subject to negotiation between local school districts and the firms proposing to locate there are what are called “supplemental payments” to the school districts. To understand that part of the negotiation, further details on the program are in order. The Chapter 313 incentive program, like many abatement programs, affects a locality’s tax base. In the case of Texas, local school districts levy property taxes on homes and businesses to fund the public schools. The tax revenues become part of the Texas school revenue stream and are subject to a “Robin Hood” plan, which allows school districts to raise their own revenues, but revenues above a certain threshold are redistributed to other school districts. Thus, high property valued school districts pay into the system while poorer school districts receive transfers as a method of tax base equalization.¹³

For firms to receive tax relief as part of Chapter 313, they need to negotiate participation agreements with local school districts. Around the country, such property tax abatement

¹¹ Investments are taxed on the first \$10 million of plant, property and equipment in poorer districts and that value increases up to \$100 million in the wealthiest districts. For a list of school districts and limitation amounts in 2017 see:
<https://comptroller.texas.gov/economy/local/ch313/limitation-values-2017.php>

¹² Numerous firms in Texas have sued to lower their property tax assessments on the basis of what is known as the “uniform and equal provision” or “equity provision”, which allows them to challenge assessments exceeding the median assessment of a comparison set of firms. Thus, the assessed value of the investment can drop considerably even in the first year of the firm’s operation.

¹³ What is controversial about the program is that it can discourage local governments from increasing their tax bases owing to “recapture” of taxes. Property rich school districts subject to recapture have even stronger incentives to use the program than property poor districts. Consultants proposing 313s to school districts often pitch the ability to limit recapture as one the main benefits of the program. In addition, supplemental payments are not part of the school funding formula and, thus, are not subject to recapture; nor are they considered part of the school districts’ local property tax bases.

programs are controversial with educators, leading to court cases in California where individual school districts and the California Teacher Association sued the state to shut down some similar programs (Dolan et al 2011) and a recent canceling of many abatement programs in Chicago (Spielman 2015). Education associations such as the American Teacher Federation (2009) and National Education Association (2003) have taken public positions against tax abatements, highlighting the programs' negative effects on school revenues. In particular, tax abatements often are costly for schools and usually require some additional funding schemes to compensate for reduced property tax inflows (Weber 2003).

Texas experienced similar opposition as many school districts resisted offering tax abatements to large companies, viewing the abatements as lost revenue, prior to creation of the current system of "Robin Hood" tax base equalization. Many of the businesses were going to locate in their districts anyway, and an abatement was a direct cost to schools without any offsetting benefits. When the Chapter 313 program was born in 2001, it contained two features aimed at benefitting local school districts.

First, two elements central to Chapter 313 are the school districts' role in authorizing property-tax abatement incentives and compensation from the state for participating in the program. According to Texas Comptroller of Public Accounts (2017),

The Texas Economic Development Act (Chapter 313 of the Tax Code), allows school districts to attract new taxable property development by offering a value limitation on the appraised value of the property for the maintenance and operations portion of the school district property tax. The local tax revenue the school district forgoes in this manner is substantially replaced through the school funding formula.

The institutional design of the Chapter 313 program can lead to the overuse of abatements as Texas's "Robin Hood" school finance system transfers some local tax

revenues from property-tax-rich school districts to property-tax-poor school districts. The state's "substantial" reimbursement of a school district's abatement amount further promotes the program's overuse.

A controversial part of the authorizing legislation is the provision for "supplemental payments" from firms to school districts to incentivize the district to execute a Chapter 313 agreement. As part of the agreement, school districts can negotiate a payment from the company, transferring some of the company's tax benefits, almost always in the form of a cash transfer, to the school district. According to an audit of the program, "Supplemental payments are paid outside of the school funding formula and incentivize the districts to enter into agreements that may not be beneficial to the state" (Texas Comptroller's Office 2010, p. 19). Supplemental payments can shape a local school district's support for a project, essentially allowing a company to receive state-funded tax benefits in exchange for supplemental payments. Thus, school districts are reimbursed not only for offering tax abatements, but they also receive additional revenue streams from companies, ironically making abatements more lucrative for the public schools than regular property tax revenues.

According to data compiled by the Texas State Comptroller's Office, supplemental payments average more than 30% of the firm's tax benefit. Put another way, firms are agreeing to give back 30% of their millions in tax benefits to school districts, in exchange for support of their application. As noted by Texas State Senator Davis in a hearing (Texas Senate Journal 2013, p. 3790):

This is a very generous program, and we know this because virtually every company that receives these abatements offers supplemental payments to school districts that are often equal to 40 to 50 percent of the net tax benefit. If companies are willing to give away half of their tax benefit then, clearly, those benefits are twice as large as they need to be.

For the purposes of this paper, the supplemental payment system provides a unique window into negotiations between school districts and firms. The school districts are not economic development agencies representing broad local interests, weighing job creation, use of local suppliers, or other factors that could shape the negotiations. Rather, they are the gatekeepers for the Chapter 313 program: the school districts can support or reject a company's application and decide whether or not to allow a firm to receive an abatement in return for the supplemental payments allowed by the state-funding formula.

The State of Texas, with some delay, compensates the school districts for any incentives given and supplemental payments thus are additional income for the school district because the school districts themselves bear no cost for endorsing tax incentives. The school districts have an incentive to maximize the supplemental payments from firms, while firms have the incentive to retain as much of their authorized tax benefits as possible by minimizing the supplemental payments. Chapter 313 literally is a divide-the-dollar game wherein firms and school districts negotiate over the distribution of state-funded tax incentives.

Firms have few options as to how to go about winning over school districts. School districts are not economic development agencies and thus the potential spillovers from companies' investments have little impact on schools. Some investments could increase public school enrollments, although the vast majority of Chapter 313 agreements accrue to firms in the energy industry providing fewer than 10 total jobs and, in some cases, the jobs are with local contractors that have no impact on school enrollments. Firms negotiate with school districts, but the main benefit for schools is the additional funding provided by the Chapter 313-qualifying investments.

Negotiations between large multinational firms and local school districts may seem like a pitched battle wherein the firms have considerable in-house resources, along with paid plant-location and incentive consultants. However, a final feature of the program levels the playing field between the negotiating parties. As part of the Chapter 313 application, a large fee is paid to help the school districts hire their own professional consultants.¹⁴ Thus, even the smallest school district can afford to hire a professional economic development expert for help with the company's application and, ultimately, bargaining over the supplemental payment.

School district consultants are concentrated in a very small number of firms. Moak, Casey and Associates—an Austin-based law firm—has been involved in roughly two-thirds of the Chapter 313 agreements. Other law firms, such as Underwood and O'Hanlon and McCollom and Demerath, are active in numerous agreements. Greg Poole, school superintendent for Barbers Hill Independent School District, a jurisdiction that has received many Chapter 313 abatements, founded Jigsaw Consulting as a for-profit consultancy focusing on the program. Because the school districts are all able to hire very capable advisory services to help negotiate such agreements (coupled with the large number of repeat negotiations by Moak, Casey and Associates, in particular), we are able to control for the quality of the negotiator and make the reasonable assumption that variation across agreements is most clearly driven by the potential exit options.

¹⁴ The consulting contracts typically involve lump-sum payments along with fees for the annual filing of Chapter 313 paperwork. I am unaware of any school district consultants that charges fees as a percentage of supplemental payments.

To recap, the unique features of Texas's Chapter 313 program opens a rare window into the bargaining between firms and governments over economic development incentives. In that context, school districts offer property tax incentives to firms, while bearing none of the costs of tax abatements. The school districts bargain with firms, not over details such as job creation or even the size the incentive, but over how much of the company's tax savings will be given back to the school district as a supplemental payment. A firm's main bargaining chip with the school district is the ability to claim credibly that they can relocate in another jurisdiction. Thus, the final outcome of this supplemental payment negotiation is an indicator of a firm's ability to credibly threaten to locate elsewhere.

4. Bargaining outcomes as a proxy for mobility

What do the supplemental payments look like for early Chapter 313 investments? As noted by a proponent of the program, "School districts and their consultants typically target a recovery of 40 percent of the tax savings of the project through supplemental payments" (Texas Taxpayers and Research Association 2017, p. 7). Data from 257 projects suggest that many of the them achieve close to 40% of the company's tax benefits; the mean supplemental payment to school districts is 31%. What is more striking the standard deviation of 18%, suggesting that the payments vary considerably across school districts and projects. Some school districts received supplemental payments of less than 10% of the company's tax benefits (12.5% of the observations), while 10% of school districts received more than 48% of the benefits. In those cases, firms were willing to return roughly half of their tax savings back to school districts.

What explains the variation in benefits? Evidence suggests that the companies ablest to walk away from a proposed investment offered the smallest supplemental payments. While

we cannot be sure which firms had the most outside location options, one of the main consultants revealed some key details in a press interview. By 2007, Lynn Moak—of Moak, Casey and Associates—had negotiated over half of the Chapter 313 agreements. According to the *Austin-American Statesman* (Elder 2007),

“Frankly, I can think of only four that really needed the incentives” to locate in the district, Moak said. He named Toyota, for its truck plant in San Antonio; Texas Instruments, for a chip plant in Richardson; Motiva Enterprises LLC, which is expanding its refinery in Port Arthur; and Samsung, which is building a semiconductor plant in Austin.

In this study, I refer to the four companies just mentioned as the four *swing projects* in that 313 was necessary to induce them to relocate to Texas. By 2007, 35 such agreements had been signed, and all included supplemental payments, with the signatory firms “volunteering” to give school districts 31% of their tax benefits, on average. Those supplemental payments range from less than 1% to 62% of the agreed-upon tax benefit. In contrast, the managers of the four *swing projects* listed above—Motiva, Samsung, Texas Instruments and Toyota—offered school districts cash benefits of between zero and 7% of the company’s tax benefits. Supplemental payments for those four projects are some of the smallest in the sample. Other than the four just-listed companies, only two (out of 35) provided less than 10% of the benefits to the school district. This preliminary evidence suggests that low levels of supplemental payments are an indicator of a firm’s ability to locate elsewhere.

5. Analysis

In this section, I validate the use of supplemental payment bargaining outcomes as a measure of the ability of the firm to relocate elsewhere. The analysis is based on supplemental

payment data, along with information on a total of 257 Chapter 313 projects, from 2002 to 2014, compiled from the Texas Comptroller's Office and coding of the original 313 applications. The majority of those project application documents are located on the Texas Comptroller's website. An additional 82 documents were accessed through an open records request on January 17, 2017. Those data have been archived in PDF form.¹⁵

The use of original applications, as opposed to other potential documents, was a conscious choice to capture the initial bargain between a company and school districts.¹⁶ These documents, prepared by consultants and lawyers, provide information that is authorized for public release by companies, school districts, and the Comptroller's Office.

However, the applications are not without limitations, as firms can "window dress" their true activities. For example, the companies are required to explain why the incentives they seek are necessary to investment in Texas. A few companies admit in their applications that they are considering only a location inside of Texas.¹⁷ Most applications provide vague explanations of their potential to locate elsewhere.

The applications often are prepared jointly by a consultant or in-house counsel for the company and a consulting or law firm representing the school district. As noted earlier, a very small number of consultants are active in negotiations and our own inspection finds that more than half of the applications are attributable to a single consulting group. That evidence provides further support for the conjecture that the majority of Texas school

¹⁵ <https://osf.io/qnw55/>

¹⁶ In all cases school districts submit only one application for a single school district limiting a firm's ability to induce competition across school districts within the State of Texas.

¹⁷ Sabina Petrochemicals indicates Deer Park, Texas, as the alternative location in its initial application. That information is reported in Sadasivam (2017).

districts use professional consultants that are informed about what incentives other districts are offering. For the purposes of this study, we can assume that school districts, aided by paid consultants, are knowledgeable negotiators seeking to maximize their supplemental payments.

Finally, the applications in the dataset include details on the industry (NAICS code), size of proposed investment, projected employment, and other project details. As documented elsewhere, a strikingly large percentage of the projects are wind farms (over 48%). Three industries related to oil and gas account for an additional 26% of the program.¹⁸ With the exception of some large manufacturing investments, such as Samsung, Hewlett Packard and Toyota, the Chapter 313 program largely is taken advantage of by capital intensive energy-related companies. The application data are merged with data from the Texas Comptroller's Office and the Texas Education Agency, which provides information on school district enrollments and the status of the districts in the state's education financing system.

Central to this paper is the adoption of negotiated supplemental payments as a measure of a firm's ability to relocate to another district and, thus, the total investment value that the 313 program is responsible for bringing to Texas. In the first set of regressions (Table 1) the dependent variable, *Supplemental Payment*, is the ratio of the total supplemental payment to the firm's gross tax benefit from the program, both taken directly from the Comptroller's estimates.

¹⁸ The proposed energy-related investments include petroleum refineries (NAICS 324110), petroleum manufacturing (NAICS 325110), and industrial gas manufacturing (NAICS 325120).

My first validity test of that ratio as a measure of a firm's mobility is through an Ordinary Least Squares regression model with the *Supplemental Payment* as the dependent variable for a small sample of bargains. As noted above, a consultant involved in negotiating the majority of the first 35 bargains publicly admitted that Chapter 313 was central in attracting investment in only four of the 35 Chapter 313 agreements, which is coded as 1 for the *313 Necessary* variable. The other 31 agreements were negotiated with firms that already had chosen to locate in Texas (and in some cases, already had broken ground).

$$\text{Supplemental Payment} = a + \beta(313 \text{ Necessary}) + \beta(\text{Industry}) + \varepsilon$$

In Table 1, I present a simple model of bargaining outcomes using only the *313 Necessary* dummy, along with an indicator variable for the recipient firm's industry. The results in the table show a strong correlation between *313 Necessary* and the level of supplemental payments.

<Insert Table 1 here>

The coefficient on *313 Necessary* indicates that the four investments with outside options paid supplemental payments that were between 24 and 28 percentage points lower than the other projects in the sample. This finding validates the 313 measure and shows that four observations, by definition, are driving these results.

As an alternative validation check, I surveyed experts with knowledge of Chapter 313 to review the complete list of 257 projects.¹⁹ Since detailed knowledge of the program is necessary, only experts who had lobbied for or against the program or have been active in

¹⁹ This list included information only on the location company name and year of the application. Respondents were not given additional information on supplemental payments or any other information on the investment.

Texas economic development through a government agency or a consultancy specializing in incentives or economic development analysis were contacted. In total, five individuals provided a total of 106 responses on projects for which they believed Chapter 313 was (24 projects) or wasn't (82 projects) necessary to lure the company to Texas.²⁰

In the second panel of Table 1, I estimate the same OLS regressions, but this time using expert coding on the necessity of Chapter 313. Note that this sample includes only the projects where experts had an opinion on the project. The projects on which no expert weighed in, including numerous wind farm projects, are not included in this analysis. The key to the analysis is to check if the expert opinions map onto the supplemental payment negotiations.

The expert data include any project from 2002 to 2014. Therefore, I include one model with no control variables and an additional model that includes industry dummy variables as well as a dummy variable for projects accepted by the Comptroller's Office after 2010. This dummy variable can capture a reform to supplemental payments in late 2009 that capped the total payments based on the size of the school districts.²¹

²⁰ The University of Texas IRB determined that this was exempt research (IRB 2016-11-0008). Despite the high levels of expertise, a total of 11 projects produced conflicting opinions on whether a Chapter 313 agreement was necessary to attract the company to Texas. As a robustness test, I include only the Chapter 313 projects for which at least two experts expressed the same opinion on the agreement. That is a higher standard since many projects received an opinion by only one expert. Those observations were dropped in this robustness test.

²¹ In my estimates, controlling for factors such as industry and the date of the incentive (reforms in 2009 and 2010 capped supplemental payments to school districts), firms that were rated as having the ability to locate outside of Texas made supplemental payments between 11 and 13 percent points lower than otherwise. Agreements with some school districts are limited by 2009 and 2010 caps on supplemental payments (\$100 per student or \$50,000 in total). Since 2009, many companies and districts have signed agreements that allow supplemental payments to rise automatically to 40% of the company's net tax benefit if

Similar to the first set of results, projects for which experts viewed 313 as being most essential had substantially smaller supplement payments. The magnitude is smaller than in the first set of regressions, but the use of a larger sample size, multiple experts, and a longer time span provides additional confidence when interpreting negotiation outcomes as a measure of Chapter 313's significance to the companies' decisions. Companies with outside options, which could credibly move elsewhere, provided much smaller payments to school districts for supporting their applications.

6. Estimating the effectiveness of the Chapter 313 Program

My research design to estimate the effectiveness of Chapter 313 deviates from a standard empirical analysis aimed at uncovering the causal relationship between supplemental payments and determining if Chapter 313 was necessary for the company to locate or expand in Texas. In this section I use supplemental payments as a *predictor* of mobility, estimating the relationship between the size of supplemental payments and the likelihood that Chapter 313 was necessary. I first use a logit model to estimate the probability that Chapter 313 was necessary (*313 Necessary*) for the observations where we have information from media reports or the expert survey on the importance of Chapter 313 for the firm's location decision. Then I use those estimates to generate out-of-sample predictions for all Chapter 313 incentives and to determine if the incentive was necessary to attract the company to Texas. My baseline model takes the following form:

this cap is lifted legislatively in the future. Thus, the analysis overestimates the number of companies that located to Texas because of the 313 program and underestimates the revenues lost by the state.

$$313 \text{ Necessary} = \alpha + \beta(\text{Supplemental Payment}) + \beta(\text{Post 2010 Dummy}) + \epsilon$$

Thus, the importance of the program is simply estimated as a function of the supplemental payments and a time dummy for the year in which reforms were implemented that capped supplemental payments at a level of \$100 per student in the local school district. Additional robustness tests include additional control variables such as the size of the investment and the number of jobs created, as well as school district attributes including total attendance and if the school district is property rich and subject to “recapture” of these revenues into the state school finance system.²² These additional control variables have very little power in explaining the value of Chapter 313.²³

I present the results from these regressions in Table 2. In Figure 1, I report predicted probabilities for all 257 projects in the database using the first measure of Chapter 313’s effectiveness from Table 2. Four out of 35 projects needed the Chapter 313 program to come to Texas. Thus, I estimated the logit model on those 35 projects and used it to generate predicted probabilities for the additional projects using supplemental payment data and the *313 Necessary* dummy variable. The estimated probabilities indicate that the vast majority of projects were very likely to have come to Texas even without the Chapter 313 program. Over 60% of the projects are estimated as having a 0% to 10% probability of needing a Chapter 313 agreement. Only 12 projects received an estimate of more than 50% in their need for the Chapter 313 program.

<Insert Table 2 here>

<Insert Figure 1 here>

²² These are known as Chapter 41 school districts.

²³ Results available from the author.

The estimates are driven by a very small number of observations. Thus, I turn to the data based on expert opinions about Chapter 313 in Figure 2. Using the 82 observations for which expert opinion data are available, I estimate a logit model to generate predicted probabilities for all 257 projects. That model provides estimates similar to earlier ones and finds only six projects for which the predicted probability of Chapter 313 being pivotal is greater than 50%. For both models, the mean predictive probability is between 10% and 13%.

<Insert Figure 2 here>

These models provide a new way to estimate a program's effectiveness in bringing investments to Texas. Obviously, supplemental payments do not cause a firm to be more or less mobile. Supplemental payments are an indicator of mobility and the relationship between supplemental payments and if Chapter 313 is necessary was estimated using media reports and an elite survey.

Such estimates are useful when potentially reforming incentive programs through better targeting. For example, many incentives to petrochemical investments along the Gulf of Mexico were seen as redundant by experts. These projects also are estimated as being particularly likely to come to Texas absent the incentive program. Non-energy related manufacturing enterprises, such as Samsung and Toyota, are more likely to be affected by the program.

The estimates also provide at least some back-of-the-envelope calculations on the program's direct costs. My estimates find that most of these projects would have come to Texas even without the Chapter 313 program, and in those cases Chapter 313 produces only

costs and no benefits to the state (since the company would have come even without the program). Using the predicted probabilities, I estimate the total revenue lost attributable to 313 for the 257 projects to be \$4.4 billion.

7. Selective case studies: The open secret of ineffectiveness

The statistical analysis relies on the share of supplemental payments to school districts as an indicator of a firm's ability to locate their investment elsewhere. In this section I provide two additional pieces of evidence to identify firms that were very likely to invest in Texas independent of the Chapter 313 incentive program. First, I inspect the 86 original applications for Chapter 313 incentives. Second, I examine the timing of companies' decisions to break ground on their investment or formally announced their locational choice. I discuss these two types of evidence below.

For all projects, companies submit a formal application to the Comptroller's office. The applications include basic information on the project, including the industry involved, the amount of capital invested, and number of jobs projected to be created. Applicants are required to justify that Chapter 313 is a "determining factor" in their investment decision, and this justification is formally certified by the Comptroller.

Surprisingly, some companies openly admit they are not considering locations outside of Texas. For example, Cargill's 2012 application for a new cattle feed facility investment on Bovina, Texas, states that only Texas was being considered as a location.²⁴ While rare, documented cases of companies admitting that only Texas was being considered

²⁴ In their revised application (#249), the company's representative noted that "After an extensive review of various locations in Texas we have selected Bovina as the site for the new manufacturing facility. Bovina's geographic position is centrally located in the heart of our customer's feed yard business."

is the first piece of evidence for Chapter 313 being unnecessary to shape an investor's decision.

Second, in numerous cases, companies broke ground for their investments prior to applying for a 313 incentive. For example, in December 2016, an article in the *Texas Observer* documented a number of cases in which Energy Transfer Partners already had begun construction of a facility prior to applying for the program (Sadasivam 2016). In three cases, the company applied for Chapter 313 without noting that construction was underway. They later amended their applications admitting they had begun construction, yet still were allowed to participate in the program. In another case, Caterpillar announced groundbreaking in a ceremony with then-Texas Governor Perry on January 29, 2009, prior to the school board voting to approve the incentive.²⁵ These projects all ultimately were approved by the Comptroller's office. This is another set of examples for which the effectiveness of Chapter 313 in attracting the company to Texas is questionable.

The foregoing are extreme cases of companies providing evidence for the ineffectiveness of Chapter 313 for their investment location choices. Despite this high bar for finding evidence that the company was committed to invest in Texas with or without the Chapter 313 program, I document a number of additional examples of companies indicating their plans to invest in Texas prior to submitting their applications. I specifically focus on a set of applications that are not publicly available. From 2002 to 2008, 86 company applications were submitted to the Comptroller's Office but were not made available to public. In 2010, HB3676 came into effect requiring the public posting of applications. I

²⁵ A full video of this groundbreaking can be found here:
<https://www.youtube.com/watch?v=VxSjmq3fgVc>

argue that after that point companies (and their consultants) knew that applications were more open to public scrutiny. I summarize these cases in Table 2 and discuss a number of them below.

The first application in the program, by Dow Chemical, is shockingly open about its plans, noting in a cover letter that the new Chapter 313 legislation had just been passed. In justifying Texas as a location, Dow used an approach similar that taken by other companies in noting a global presence as evidence of Dow's ability to locate elsewhere. But the application is especially candid on the investment decision in the footnotes. Footnote 1 links the new plant opening to the closure of another plant in LaPorte, Texas, and the transfer of some of the jobs from that location to the new, 313-incentivized location.²⁶ Footnote 2, most relevant for this paper, states "Unavailability of rules/regs and application forms prevented filing prior to start of construction". In a number of other cases, companies list specific alternative locations in Texas, providing evidence that locations outside of Texas are not under consideration (for example, Application #2).

The most surprisingly revelation is JD Wind's application (Application #54) for a Chapter 313 agreement, three years after construction of a wind farm. In that application, JD Wind clearly points out that the original application for a wind project was submitted prior to construction by a previous project owner, but that that application never had been voted

²⁶ Footnote 1 states: "Please be aware that Dow has announced the probable closure of its PMDI production facilities at the LaPorte, Texas, plant sometime in the 2005 time frame as these facilities will no longer be able to compete with the newer technology facility mentioned above. Although approximately 90 jobs are anticipated to be affected by such closure, Dow is and will be making every effort to redeploy those jobs within the company. It is our belief that we will create at least 10 new qualifying jobs at this new plant location as required to meet the stipulations of a value limitation agreement and we will re-examine this issue at the end of the two-year qualifying period to ensure compliance."

on by the school district. Thus, since only the *filing* of the application is technically required prior to construction, JD Wind applied for a 313 for those already built wind farms and for additional wind farms that would expand the project further. The project ultimately was approved by the school board and the Comptroller's office for both the three-year old facility as well as its expansion.

Applications providing clear evidence of the inability to relocate are rare. More common are company announcements prior to application and, in some cases, the breaking of ground. The clearest cases of companies building their projects prior to having received approval for a 313 agreement are several wind farms. Wind farm construction, as opposed to the expansion of existing oil and gas investments, are much easier to track since the Federal Aviation Administration (FAA) collects data on the construction of wind towers within five days of completion.

One of the most striking examples is Application #29 for Horse Hollow Wind Farm in Jim Ned Independent School District. The application was amended in November 2005 and was approved by the school district in December 2006. Numerous pieces of evidence clearly indicate that the wind farm was built prior to receiving approval for a Chapter 313 agreement.

First, the application, again accepted in December 2005, notes that construction will begin in April of 2005 and that only Texas counties were considered for the investment. Second, Horse Hollow Wind also was the subject of the first court case against a wind farm for "nuisance" based on the noise from the wind turbines. Horse Hollow was sued by neighboring property owners in February 2005 because of wind turbine noise months before applying for Chapter 313. FAA records indicate that permanent wind towers were completed

by April 2005, and Texas Public Utilities Commission documents specify that the wind farm was complete in October 2005. Thus, this wind farm was built prior to receiving approval for a Chapter 313.

These examples provide additional qualitative evidence that even of the projects accepted by the Comptroller's office and approved by school districts, many of the companies already had committed to investing in Texas prior to negotiating a Chapter 313 agreement. Perhaps most telling is that an audit of three projects in 2009 found that two Chapter 313 agreements estimated to be worth over \$34 million were granted to Sandridge Energy. The Texas State Auditor (2014, p. 36) notes that

The Comptroller's Office did not recommend that the two applications that SandRidge Energy, Inc. submitted be approved for agreements. That decision was based on the Comptroller's Office's determination that (1) SandRidge Energy, Inc. was unable to relocate the projects that were described in the applications to another state or another region of the state and (2) SandRidge Energy, Inc.'s use of the property was not one of the economic activities defined in Texas Tax Code, Chapter 313, as an eligible business activity.

The cases summarized in Table 3, provide evidence that in 29 out of 86 original applications, companies participating in the 313 program had very high likelihoods of investing in Texas with or without tax abatements. The publicly available documents submitted to the school districts and comptroller's office, along with other information, such as press releases and FAA records on wind farm construction suggests that the redundancy of the 313 program is an open secret. Firms that freely admitted that they weren't considering alternative locations were granted millions in economic development incentives. Some companies were brazenly building their facilities in a school district, and in some cases completing the projects, and then calling on the school board to vote on their incentives. It is implausible that the school boards were unaware of the progress on these projects, but the

structure of the program made authorizing the incentives in the school boards' financial interests.

<Insert Table 3 here>

Evidence also suggests that the Comptroller's office likewise had access to information indicating the 313 program's ineffectiveness. The Comptroller's office formally certifies that property tax abatements are a determining factor in company location decisions but indicates some caveats in the fine print. For example, a number of wind farms were found to have begun construction prior to the application to qualify for the Federal Production Texas credit.²⁷ In some cases, the Comptroller posted news reports of groundbreaking ceremonies, company announcements, or investor presentations on planned investments that call into question the company's claims of being able to relocate to another state.²⁸ These examples provide further evidence of companies that are not only very likely to have invested in Texas, but that those plans were known to the parties authorizing the incentives.

8. Conclusion

The evaluation of economic development policies is hampered by the inability to analyze systematically just how pivotal targeted incentives were for the relocation, expansion or retention of commercial enterprises. The research reported herein addresses that shortcoming by examining a unique property tax abatement program in Texas. The program's granting of "supplemental payments" to public school districts in exchange for school district support for a state-funded tax incentive provides a measure of the bargaining

²⁷ For example, see Agreements 1064, 1065, 1066, and 1069.

²⁸ For example, see Agreements 1012, 1028, 1030, 1048, 1116, 1122, 1128, 1132, 1133, 1137, 1142, 1144, 1147, 1148, 1149, 1157, 1172, 1173, 1177, 1178, 1185, 1191.

leverage of firms *vis-à-vis* school districts. I argue that the outcomes of those bargains provide information on the ability of a firm to locate in another school district or another state.

Using media reports and expert interviews, I validate that measure of bargaining leverage as a proxy for the ability of a company to relocate elsewhere and, thus, to assess the importance of the incentive program in attracting investment to Texas. I use the measure to estimate the likelihood that the incentive program was pivotal in attracting the firm to a particular location.

I find that a very small percentage of firms participating in the state's Chapter 313 program—less than 15% in most models—actually were swayed by incentive agreements to invest in Texas. The majority of firms were likely to locate in Texas anyway, particularly the oil and chemical companies investing along the Gulf of Mexico coast. My research suggests that existing reports estimating the cost per job “created” to be as high as \$350,000 (Michaels 2016a) probably are too low; the majority of tax dollars generate zero new jobs and no economic benefits to the state.

The overall implications of this study suggest that the design of the Chapter 313 program leads school districts to overuse economic development incentives. Even in cases when it is certain the recipient company is coming to Texas even without incentives, the structure of the program leads school districts to authorize this program. The program's structure not only leads to a mismatch between some goals of the program such as job creation, but also may actually dramatically reduce the tax base by providing tax benefits to companies that would otherwise would have been paying property taxes.

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Table 1: Validating bargaining as a measure of incentive effectiveness

	Media Report		Expert Survey	
313 Necessary	-0.282*** (0.030)	-0.238*** (0.049)	-0.118*** (0.038)	-0.139** (0.053)
Constant	0.297*** (0.027)	0.239*** (0.049)	0.229*** (0.019)	0.281*** (0.050)
Industry Dummy	No	Yes	No	Yes
Post 2010 Dummy	No	No	No	Yes
Observations	34	34	82	82
R-squared	0.306	0.495	0.069	0.116

*** p<0.01, ** p<0.05, * p<0.1.

Table 2: Logit models of redundant incentives

	Tax Ratio			Alternative Tax Ratio		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Tax Ratio	-22.52**	-6.538**	-7.212*	-21.52**	-6.262**	-7.041*
	(8.838)	(2.847)	(4.009)	(8.440)	(2.596)	(3.601)
Post-2010		-1.246*	-1.435*		-1.222*	-1.426*
		(0.719)	(0.761)		(0.718)	(0.756)
Chapter 41 District			-2.047***			-2.110***
			(0.755)			(0.765)
Constant	0.166	0.103	1.554	0.164	0.125	1.650*
	(0.798)	(0.762)	(1.002)	(0.795)	(0.759)	(0.991)
Observations	34	82	82	34	82	82

Note: The independent variable *tax ratio* in models 1-3 is the supplemental payments/total tax benefit. Models 4-6 uses an alternative *tax ratio* which is calculated as supplemental payments/(total tax benefit-revenue protection payments).

*** p<0.01, ** p<0.05, * p<0.1.

Table 3: Companies considering only Texas for their investments

	Company	Location	Description
1	Dow	Brazoport ISD	Application cover letter (footnote 2) states construction began prior to this application. Sources: Application #1
2	Sabaina (Atofina BASF)	Port Neches ISD	Application lists Deer Park, Texas as alternative locations on application. Source: Application #2
13	Praxair	Port Arthur ISD	Announcement of plant on April 1, 2003 prior to application in August 2003. Source: https://tinyurl.com/y9jhx594
22	Premcor	Port Arthur ISD	Plant announced at shareholder meeting on May 3, 2003, prior to October 6, 2004 application. Source: https://tinyurl.com/ydhqnrnu
24	BASF	Brazoport ISD	Plant announced via BASF communications on December 15, 2004, prior to January 6, 2005 application. Source: http://www2.basf.us/corporate/121504_sap.htm
28	Windkraft Nord Texas	Hermleight ISD	Application approved by school district 10/18/05 FAA Record on 8/18/05 of construction of wind towers. Source: FAA data: https://oeaaa.faa.gov
29	Horse Hollow	Jim Ned ISD	Application submitted on 5/25/2005 and accepted by school district on 12/14/05. Application states they will start production in April 2005. FAA date indicates 4/18/05 construction for some towers. Public Utility Commission of Texas list as in service on Oct 2005. Operation was subject to a wind nuisance lawsuit in Feb 2005 (prior to approval). Application states they are only looking at TX counties Source: Application #29 Source: Public Utility Commission: https://tinyurl.com/y6w8wvrn Source: FAA data: https://oeaaa.faa.gov Source: Lawsuit: Rankin v. FPL Energy LLC
30	Horse Hollow	Blackwell ISD	Application submitted on 5/25/2005 and accepted by school district on 12/14/05. Application states they will start production in April 2005. FAA date indicates 4/18/05 construction for some towers. Public Util Commission of Texas list as in service on Oct, 2005. Operation was subject to a wind nuisance lawsuit in April 2005 (prior to approval). Application states they are only looking at TX counties

			<p>Source: Application #30 Source: Public Utility Commission: https://tinyurl.com/y6w8wvrn Source: FAA data: https://oeaaa.faa.gov Source: Lawsuit: Rankin v. FPL Energy LLC</p>
46	Plainview Bioenergy	Plainview ISD	<p>Company sold facility in November 2006, prior to applying for 313. Final application approved in December 2006 after construction had began.</p> <p>Source: Application #46 Source: Construction: http://www.businesswire.com/news/home/20061102005741/en/White-Energy-Acquires-100-Million-Gallon-Greenfield</p>
49	Wildorado Wind Farm	Vega ISD	<p>Application was submitted on September 2006 and approved by school district on 12/21/06. Company announced ground breaking April 21, 2006 (Earth Day) and FAA data shows wind towers completed on 12/7/06</p> <p>Source: Construction: https://tinyurl.com/ybp7vku3 Source: Source: FAA data: https://oeaaa.faa.gov</p>
50	Wildorado Wind Farm	Wildorado ISD	<p>Application was submitted on September 2006 and approved by school district on 12/21/06. Company announced ground breaking April 21, 2006 (Earth Day) and FAA data shows wind towers completed on 12/7/06</p> <p>Source: Construction: https://tinyurl.com/ybp7vku3 Source: FAA data: https://oeaaa.faa.gov</p>
54	JD Wind	Gruver ISD	<p>Original three phases for project built prior to acceptance of application. New owners applied for 313 three years after operation and for new expansions. Application documents why this project still legally qualifies for 313 agreement.</p> <p>Source: Application #54</p>
59	Roscoe Wind	Loraine ISD	<p>Application originally submitted on 2/2007 and was approved by school district on 12/12/2007. FAA data shows wind towers completed on 6/12/07</p> <p>Source: FAA data: https://oeaaa.faa.gov</p>
60	Scurry Wind/Camp Springs	Hermleigh ISD	<p>Applications in 06/07, approved 10/16/07 Company announced commercial operations on 7/16/2007. FAA data shows wind towers completed on 1/4/2007.</p> <p>Source: Company announcement: https://tinyurl.com/y9sx5gen Source: FAA data: https://oeaaa.faa.gov</p>

61	Scurry Wind/Camp Springs	Scurry ISD	Applications in 06/07, approved 10/16/07 Public Utility Commission of Texas list as in service on 7/16/2007. FAA data shows wind towers completed on 1/4/2007. Source: Public Utility Commission: https://tinyurl.com/y6w8wvrn Source: FAA data: https://oeaaa.faa.gov
62	Air Liquide Large Industries	Brazosport ISD	Application originally submitted on 2/2007, amended application approved 12/18/07. Amended application states construction began on June 2007. Source: Application #62
75	Barton Chapel Wind	Bryson ISD	Application submitted on 8/13/2007 and accepted by school district on 12/10/07. Public Utility Commission of Texas list as in service on 12/2005. Source: PUC https://tinyurl.com/y6w8wvrn
84	Goat Wind	Sterling City ISD	Application submitted on 9/07/2007, amended application submitted 10/8/2007 and accepted by school district on 12/05/07. FAA data shows wind towers construction beginning 9/2007. Source: FAA data: https://oeaaa.faa.gov
87	Goad Wind	Robert Lee ISD	Application submitted on 9/18/2007, amended application submitted 10/22/2007 and accepted by school district on 12/05/07. FAA data shows wind towers construction beginning 9/2007. Source: FAA data: https://oeaaa.faa.gov
92	Wolf Wind	Muester ISD	Application states "The Applicant can relocate anywhere with prevailing wind conditions conducive to power generation, including multiple counties in Texas". Source: Application #92
100	Ocotillo Windpower	Forson ISD	Agreement approved on 12/17/07. Formal testimony by company to Public Utility Commission of Texas on 3/2007 indicates substantial financial commitment. Permanent Met Tower began construction on 12/15/07. Application doesn't provide any argument about ability to relocate to other location. Source: Application #100 Source: PUC https://tinyurl.com/yb6xbfyj
101	Capricorn Ridge Wind II	Robert Lee ISD	Application states considering multiple counties in Texas. Source: Application #101
115	Pyron Wind Farm	Hermleight ISD	Application approved by school district on 11/08/08. Construction was listed as March 2008 in application and announced in summer 2008.

			<p>FAA Data show wind towers completed on 7/30/08. Public Utility Commission of Texas list as in service on 11/ 2008.</p> <p>Source: Application #115 Source: FAA data: https://oeaaa.faa.gov Source: PUC https://tinyurl.com/y6w8wvrn</p>
116	South Trent Wind	Trent ISD	<p>Application approved by school district on 11/10/08. Public Utility Commission of Texas lists as in service on 7/2008</p> <p>Source: PUC https://tinyurl.com/y6w8wvrn</p>
117	Panther Creek Wind	Glasscock ISD	<p>Approved by school district on 10/13/2008. Public Utility Commission of Texas list as in service on 7/2008.</p> <p>Source: PUC https://tinyurl.com/y6w8wvrn</p>
124	Panther Creek Wind	Forsa ISD	<p>Approved by school district on 10/27/2008. Public Utility Commission of Texas list as in service on 7/2008.</p> <p>Source: PUC https://tinyurl.com/y6w8wvrn</p>
134	SandRidge Energy Inc	Fort Stockton ISD	<p>Comptroller had not recommend approval due to company's inability to relocate in another district.</p> <p>Source: https://www.sao.texas.gov/reports/main/15-009.pdf</p>
135	SandRidge Energy Inc	Fort Stockton ISD	<p>Comptroller had not recommend approval due to company's inability to relocate in another district.</p> <p>Source: https://www.sao.texas.gov/reports/main/15-009.pdf</p>
142	Notrees Windpower	Kermit ISD	<p>Application approved by school district on 11/20/08. NY Times article has construction on 5/2008. Public Utility Commission of Texas PUC lists as in service 1/2009. Public Utility Commission of Texas PUC testimony indicates substantial financial commitment prior to application for 313.</p> <p>Source: NYTimes: https://tinyurl.com/y8mjvn9f Source: PUC https://tinyurl.com/y6w8wvrn Source: PUC https://tinyurl.com/yb6xbfyj</p>

Figure 1: Effectiveness estimates based on four swing projects

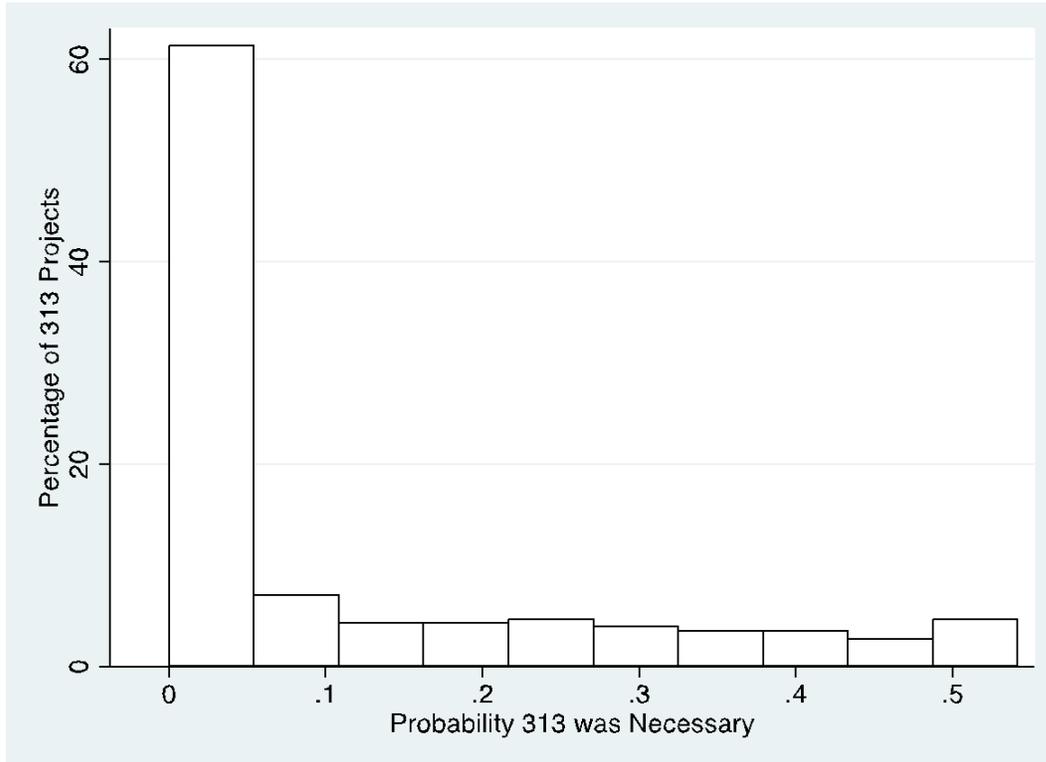


Figure 2: Effectiveness estimates based on expert survey

