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**Mediating Incentive Use:
A Time-Series Assessment of Economic
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ABSTRACT

State incentive granting for the purpose of firm retention or recruitment remains highly controversial and is often portrayed as antithetical to long-range economic development planning. This paper uses quasi-experimental methods to measure the impact of state-level economic development incentives on employment growth at the establishment level in North Carolina. Using North Carolina's rich history of strategic planning and sector-based economic development as a backdrop, we develop a theory of sectoral "mediation." This enables us to compare the effectiveness of incentives offered in mediated and nonmediated industries and show that when incentives are coupled with sectoral economic development efforts they generate substantially stronger employment effects than at establishments with limited sector-based institutional support.

JEL Classification Codes: O20, O25, O43, R58

Key Words: Incentives, mediation, employment impacts, firm retention, recruitment

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1. INTRODUCTION

As state governments throughout the United States face unprecedented fiscal crises, every public program—from education to pensions to prisons—has come under intense scrutiny and is a potential target for budget cuts. But even as the pressure to reduce state spending has increased, the need for job creation has intensified, as unemployment remains stubbornly high in the aftermath of the Great Recession. Thus, economic development practitioners who are charged with bringing new employment opportunities to their communities face a sharp tension. On the one hand, there is pressure to use their most common and most tangible tool—direct tax incentive payments—when negotiating with mobile businesses to “win” jobs for local residents. Simultaneously, critics of economic development incentives claim that such payments are unnecessary giveaways to the private sector and should not be used while basic services such as education and health care are being cut.

To further complicate the issue, many scholars argue that using direct incentives is antithetical to a more strategic approach to economic development that entails public funding for industry-wide support systems such as key infrastructure projects, research and development facilities, technology centers, or state-of-the-art workforce development systems. Although the theoretical and empirical literature on economic development incentives is rich (Bartik 2005; Greenstone and Moretti 2003; also see, for example, Markusen 2007; Persky, Felsenstein, and Wiewel 1997; Peters and Fisher 2004), this paper engages the incentive debate in a novel way. Specifically, we conduct a quantitative assessment of the effectiveness of state incentives in creating sustained employment opportunities. However, we present this analysis of incentive use

within the context of existing state-level economic development practices that have developed in our case state of North Carolina over the past several decades.

North Carolina has a long track record of public-private partnerships and state-led efforts to promote economic development through common-pool industry resources. Early examples of this include the development of the Research Triangle Park (RTP) and a relatively strong commitment to higher education; more recently, there have been experiments in regional and sectoral initiatives in the 1980s and 1990s. Incentive use in North Carolina is even more recent: North Carolina initiated its first statewide statutory tax incentive program in 1996—the William S. Lee Tax Credit Program—and only began its two major discretionary incentive programs in 2000 (One North Carolina Fund) and 2003 (Job Development Investment Grants [JDIG]).

Given the state’s recent adoption of incentives and its unique policy history, North Carolina is an ideal setting in which to test the effectiveness of incentives in creating and sustaining job opportunities in the long run. Instead of comparing incentive use to a fictional, counterfactual reality where no incentives are given, this paper explores the question of whether economic development incentives are more effective when they are used as inducements to industry, or whether they are better used to support sector-wide functions of long-range strategic planning.

This paper employs a quasi-experimental research design to measure the impact of incentive granting on employment growth at the establishment level, using a data set of nearly all state-level incentives granted between 1996 and 2008. Incentivized establishments are matched to the National Establishment Time-Series Database (NETS) for North Carolina, which contains longitudinal information on employment as well as the highly detailed establishment characteristics needed to construct a set of realistic control groups. We measure the impact of

retention incentives using an interrupted time-series research design that compares pre- and post-trends in employment at “treated” establishments to a set of control establishments selected by peer industry establishment size.

Specifically, this analysis compares “deals” made in industries that are the focus of traditional long-term economic development planning activities such as state-funded research centers, workforce development initiatives, and joint industry-state planning agencies, to those deals that occur in other sectors. We employ the term “mediated industries” to distinguish these sectors from others that lack more coordinated development activities. Thus, the main research questions posed address not only the straightforward policy question of “Do economic development incentives induce growth?” but also the more specific question of “In which context are incentives more likely to induce growth?” In addition, we make a similar set of comparisons for incentives that flow to firms recruited from outside of North Carolina. Since we lack pre-incentive employment observations for this set of incentives, we employ a modified research design that builds a control group using a nearest-neighbor matching technique based on each establishment’s unique characteristics, including birth year, industry, mobility, and ownership structure.

Ultimately, we find that both the retention and recruitment incentives offered by the state of North Carolina positively influence future employment growth at the establishment level. However, the positive impacts are concentrated in sectors that are directly or indirectly connected to sector-specific planning efforts. These findings have significant implications for both policymakers and theory. First, we interpret the empirical results as evidence of the effectiveness of state-level industry mediation in general, which implies that state funding for long-range strategic and sector-based planning efforts should be maintained and even expanded.

Second, this analysis indicates that incentives are efficient when used in the context of broader supports for economic development—including support for common pool resources across key industries—and should not be viewed by theorists as strictly antithetical to sound economic development practice.

The remainder of this paper is organized as follows. Section Two lays out the policy background of incentive use in North Carolina and presents our theory of how state actors engage in “mediating” incentives within certain targeted industries. This section also summarizes previous empirical analysis of the impact of incentives on employment. Section Three describes the data sources used and the assumptions made in constructing our matched panel data set from NETS and presents summary statistics that describe incentive use in North Carolina over the study period. Section Four presents two distinct methodologies for detecting employment impacts in both retained and recruited firms in North Carolina. Section Five presents the main empirical findings and discusses the robustness of these findings. Section Six concludes and presents our interpretation for policymakers and theory.

2. BACKGROUND AND LITERATURE REVIEW

2.1 State Economic Development Strategy and the Evolving Use of Incentives

After a long period of reluctance on the part of lawmakers, North Carolina is now a significant player in the incentive game nationally. The North Carolina General Assembly took initial steps to authorize incentive use for economic development in the early 1990s. The legislature created the Governor’s Industrial Recruitment Competitiveness Fund in 1993 to provide matching funds to local governments to expand the capacity of local incentive granting. Then, in 1996, the North Carolina Supreme Court ruled in *Malready v. The City of Winston-*

Salem that tax credits and cash grants were constitutionally permissible when used for economic development by both state and local governments.

North Carolina initiated its first statewide statutory tax incentive program in 1996 under the William S. Lee program. As first enacted, the William S. Lee Act provided a series of entitlement incentives—tax credits for any firm choosing to locate, create jobs, and provide investment in North Carolina. In order to promote investment outside of the state’s wealthier urban counties, the statute directed larger credit amounts for those firms locating in more economically distressed counties, designated by five tiers, ranging from the most distressed (Tier 1) to least distressed (Tier 5).¹ Additionally, the state attached strict performance criteria and clawback mechanisms to these credits in order to ensure that firms lived up to their promised job creation targets in exchange for the public subsidy. Ultimately, the Lee Act was repealed and replaced by a series of new entitlement tax credits (most notably, Article 3J credits for job creation).

As mentioned in the first section, North Carolina also has two major discretionary incentive programs, including the OneNC Fund (the renamed and expanded Governor’s Industrial Recruitment Competitiveness Fund) and the Jobs Development Investment Grant, or JDIG, program, created in 2002). In its current form, the OneNC Fund provides matching grants to local governments to increase the amount of incentives that local governments can offer for retention, expansion, and recruitment deals. Although any unit of government across the state may apply for OneNC funds, the program’s matching structure is intended specifically to benefit the most distressed counties, which would otherwise have less fiscal capacity to offer competitive incentives. Unless paired with a JDIG grant, OneNC funds are normally disbursed in

four equal tranches over a three-year period, subject to strict job creation accountability provisions (North Carolina Department of Commerce 2012).

JDIG, the state's flagship program, is a performance-based incentive program that provides annual grant distributions to a maximum of 25 qualifying firms per year for a period of up to 12 years for the purpose of supporting retention, expansion, and recruitment. Unlike the OneNC Fund, the JDIG provides cash grants directly to the recipient firms, based on a percentage of the withholding taxes paid by new employees during each calendar year. In effect, the program avoids the constitutional limitations on tax incentives by providing cash assistance equal to the value of the taxes paid by employees, thus tying the grant obligation to the firm's performance in job creation. JDIG grants possess strong wage requirements, performance criteria, and clawback mechanisms, which the state has not hesitated to employ in the 14 cases (as of 2012) in which a firm has failed to meet to its job creation targets. Given the 12-year disbursement period, none of the grants have been fully disbursed to recipient firms, so total job creation and investment totals are currently incomplete.

Beyond the state-level programs, many local governments in North Carolina offer their own incentives, usually in the form of cash grants or constitutionally appropriate tax breaks, but little is known about their scope, scale, or effectiveness. To remedy this knowledge gap, the General Assembly passed legislation in 2011 requiring the Department of Commerce to track and report local incentive activity on a quarterly basis.

2.2 North Carolina's Incentive Use in a Theoretical Context: Explaining Mediation

While industrial recruitment has a long history in North Carolina, as the above section suggests, the use of incentives to attract and recruit individual firms is a fairly recent practice, especially when compared to other Southern states that have been in the incentive-granting game

since the 1930s. Prior to the 1990s, North Carolina chose instead to give priority to investments in institutions and infrastructure that could make the state an attractive location for business development, be that locally driven or through recruitment efforts involving outside establishments. As early as the 1920s, North Carolina state government invested heavily in transportation infrastructure, paving more miles through state funding than virtually any other state in the nation and earning the moniker “The Good Roads State.” In 1959, North Carolina created the Research Triangle Park with the goal of increasing good-quality employment opportunities for graduates of the region’s preeminent universities (Link 1995; Rohe 2011). In the 1960s, North Carolina established one of the nation’s first state-level science and technology advisory boards, whose primary mission was to advise the governor on science and technology policy across the state (Feldman and Lowe 2011).

Under Gov. Jim Hunt, the North Carolina Board of Science and Technology recommended the formation of several high-profile economic development and educational institutions, including the Microelectronics Center of North Carolina and the North Carolina School of Science and Mathematics. During that time, the Board also established and managed the North Carolina Biotechnology Center, the nation’s first state-funded economic development organization to support life-sciences industry development, eventually spinning it out as a quasi-public institution (Feldman and Lowe 2011). In the 1990s, regional coordination of economic development was institutionalized by the state legislature through the creation of seven regional partnerships designed to align local development priorities and resources. In addition to these developments, North Carolina has built an impressive community college system that is considered to be one of the more inclusive and better functioning in the nation (Osterman and Batt 1993).

Broadly speaking, each of these initiatives has contributed to common-pool resources for promoting and supporting industrial development in North Carolina. With this contribution in mind, scholars and analysts alike are often quick to dismiss North Carolina's more recent foray into incentive granting as a step backwards and as antithetical to this earlier, more progressive policy tradition. Many analysts lament the recent policy shift towards incentive granting, claiming that it even undermines the strategic work of earlier generations. At times, this impression is reinforced through media accounts of incentivized recruitment and retention deals in which public officials make apologetic statements about their reliance on incentives to attract or retain industry. These statements reflect a common narrative that North Carolina was forced to lower its economic development standards after losing several high profile recruitment deals to neighboring states that offered sizable incentive packages.

Although there is likely some truth to this “race to the bottom” characterization, it also overlooks important elements in the evolution of economic development policy in this state. First, the conventional narrative gives the false impression that North Carolina, in limiting earlier incentive use, had also avoided recruitment and retention strategies altogether. On the contrary, retention and recruitment have long played a role in economic development in the state; a recent biography of Governor Hunt—a much-praised, four-term governor who was instrumental in strategic planning efforts—acknowledges that he dedicated considerable time while in office to marketing the state to outside industrial prospects (Grimsley 2003). Second, the conventional account discounts the fact that the emergence of incentive-granting processes is grounded in the state's well-established institutional infrastructure, which earlier forms of strategic planning helped to create. These interconnections help to establish standards within the incentive-granting process itself and, more importantly, contribute to structures for mediating the relationship

between incentive use and development outcomes over time. As this suggests, there are spheres in which new and old policy efforts intersect and even complement one another. By recognizing this, we can turn our focus to areas of overlapping strategy and consider the implications this may have for long-term development planning.

In this paper, we analyze two types of interactions between incentive-granting and established strategic planning efforts. The first interaction is information-intensive, reflecting the use of analytical tools and techniques by local and regional economic development practitioners and analysts in an effort to better guide and evaluate incentive-granting processes. In North Carolina, as elsewhere, this is primarily achieved through **industry or sector targeting**—that is to say, concentrating economic development efforts in industries that demonstrate high growth potential for the region. Industrial or sector targets are typically generated through rigorous statistical analyses, which take into account the industrial legacies and characteristics of the regional economy (Bartik 2005). This can include the use of growth models that factor in existing supply chains, workforce skill specializations, and export performance. In some cases, analyses also include inventories of regional support institutions designed to nurture and support targeted industry (Cox et al. 2009). Targeting efforts can be beneficial for channeling public resources to entrepreneurial development (Woodward and Guimarães 2009). However, they are most commonly associated with strategies of industrial recruitment and retention and, by default, the application of incentives (Goetz, Deller, and Harris 2009).

In the North Carolina context, industry targeting has been especially visible at the multicounty regional level. Although state development agencies frequently acknowledge industries of interest for the entire state, the tendency is to decentralize explicit targeting efforts to the regional level, given North Carolina's diverse industrial landscape and regionally varied

economic strengths. Still, state agencies actively support regional targeting efforts. As one illustration, North Carolina's Department of Commerce in 2001 provided each of the state's seven regional partnerships with funding to conduct in-depth economic analyses of their regions, in an effort to identify existing and emergent industrial strengths. The goal of this exercise was to encourage regions to channel state and local resources to activities that supported targeted industry development and revitalization, including, but not limited to, firm recruitment and retention.

The second relationship between incentive granting and strategic planning that we explore involves **institutional mediation**. By institutional mediation we mean active involvement by sector-oriented institutions in mediating and governing incentive-backed recruitment and retention activities. As this implies, mediation efforts are closely linked to targeting strategies, insofar as the mediating institutions also have a sector or industry focus. But institutional mediation goes beyond efforts to simply inventory or catalog industry-support institutions. Rather, mediation implies active engagement by those same institutions in planning processes designed to guide and moderate sector-specific recruitment and retention efforts. This includes playing an active role in establishing and maintaining strong relationships with firms before, during, and after the recruitment or retention deal-making period. In the case of firm recruitment, institutional engagement also means developing relationships with industrial prospects well before there is a need for a new facility and structuring those early conversations in ways that shape later perception of or interest in North Carolina.

Other mediation activities include tracking and responding to ongoing and emergent sector challenges and constraints—an information-gathering and assessment task that is itself dependent on the maintenance of close relationships with networks of firms within the sector.

Additionally, institutional mediation entails coordination of economic development planning across multiple levels of decision making and across distinct areas of development strategy. By this we mean that mediating institutions ensure that recruitment and retention activities are not performed in isolation, but rather are shepherded in a way that ratchets up standards for how incentive-backed deals get made, regardless of whether the locus of deal-making is at the local, regional, or state level. However, to an equal extent, mediated institutional support entails stitching together and aligning recruitment, retention, and even entrepreneurial efforts, and doing so in ways that motivate the development of a cohesive policy “portfolio.”

Although this may sound ambitious and perhaps even impossible to implement, it is important to recognize that North Carolina has already embraced institutional mediation and has experienced success, as illustrated in the biomanufacturing sector (Lowe, forthcoming). In-depth case study analysis points to a central mediating role of North Carolina’s Biotechnology Center, an institution long associated with North Carolina’s strategic planning efforts. Since its creation in 1981, the Biotech Center has supported research and development activities through a variety of grant, loan, and industry networking initiatives. Over the decades, the center has also assisted in the recruitment of preeminent scholars in an effort to further enhance university research—an early example being Prof. Oliver Smithies, who went on to win a Nobel Prize in physiology in 2007. In addition to these successes, the Biotech Center has formalized its role in industrial recruitment and retention, establishing itself as a leading institution for strategy development. Furthermore, the center approaches this task in partnership with North Carolina’s Department of Commerce and the state’s community college system, with each entity playing a unique but complementary role in strategy development and implementation.

By mediating recruitment and retention efforts, the Biotech Center, with the help of these core institutional partners, has been able to better anticipate and thus prepare for recruitment opportunities. In addition, it is in a position to identify and resolve emergent industry challenges that have the potential to affect firm retention over time. In considering both recruitment opportunities and retention challenges, the Biotech Center has concentrated on improving industry support institutions, especially in the area of technical training and education. In partnership with the community college system, the Biotech Center has enhanced the quality of manufacturing establishments recruited to the state and motivated firms that locate in North Carolina to experiment with innovations in life science manufacturing. By working closely with the Department of Commerce, the Biotech Center also ensures strong coordination between state and local economic development planning efforts; such coordination includes empowering local practitioners to uphold industry recruitment standards based on job-quality concerns and evidence of a strong fit between an industrial prospect and the practitioners' community. Ultimately, the mediated approach taken by the Biotech Center and its partners encourages sustained manufacturing job growth and promotes regional advantages that ultimately reinforce industry stickiness and staying power.

Drawing inspiration from biomanufacturing, experiments in institutional intermediation are underway in other sectors and industries in North Carolina, most notably in advanced textiles, including nonwovens and—more recently—aerospace. This presents an opportunity to systematically examine the impact of institutional mediation on incentive-backed recruitment and retention. Before turning to this analysis, it is useful to first situate our work in relation to other quantitative studies in this area.

2.3 Previous Empirical Analysis of Incentive Impacts

The literature on the economic impact of state economic development incentive use is extensive but remains unsettled in terms of the overall assessment of incentives; this ambivalence is mirrored by the ongoing controversy over incentives in practice. From the standpoint of an ideal research design, analysts and policymakers would wish to answer the so-called “but for” question with regard to incentives (i.e., *But for* the incentive, would the firm have come or have been retained?). In fact, most careful cost-benefit analyses of incentives hinge on this very question. However, it is nearly impossible to answer this question absolutely given that the analyst cannot know the exact nature of each firm’s location decision *a priori* and that firms are never randomly assigned an incentive, which makes it difficult to generate coherent control groups.

Despite these challenges there have been many attempts to evaluate incentives indirectly. For example, some researchers have focused on state- or county-level aggregate outcomes such as employment growth and changes in tax revenue, comparing areas that spend more or less on development incentives. Goss and Phillips (1997) show that state spending on economic development incentives is positively associated with employment growth across the United States, and Loh (1993) finds that Ohio’s incentive grants in the 1980s made a positive impact on county-level employment and income growth. In a detailed analysis of highly competitive economic development deals in the United States, Greenstone and Moretti (2003) overcome the problem of endogeneity between the intensity of public incentive-granting and employment by comparing county-level outcomes for communities that won a “million-dollar plant” to those of counties that bid for but did not complete the deal. They find that total earnings grew 1.5 percent faster for incentivized industries in winning counties than for such industries in those counties

that lost the plant. However, a more recent analysis of Michigan's MEGA tax incentive program (Hicks and LaFaive 2011) found no statistically significant impact on county-level income, employment, unemployment rate, or wages.

Although the majority of research has focused on impacts at an aggregate areal level—largely because of limitations in obtaining establishment-level outcomes—some papers have attempted to measure the impact of incentives at the firm or establishment level. For example, Faulk (2002) uses firm-level data from corporate tax returns to estimate the employment impact of Georgia's Jobs Tax Credit program from 1993–1995. This study compared employment change in eligible firms that participated in tax credit programs to employment change in eligible firms that did not participate in tax credit programs and found that firms taking advantage of the tax credit created 23–28 percent more jobs.

However, these incentives are not discretionary, in the sense that offers are made by public officials to a single firm, so it could be that firms that were planning to add jobs in the future were simply more likely to participate in the program. Similarly, Gabe and Kraybill (2002) analyzed the impact of incentives on 366 manufacturing establishments that expanded during the 1980s and showed that incentives actually had a negative impact on subsequent employment change. However, since their data set of both incentivized and nonincentivized observations was drawn only from establishments that were already expanding, their results may be biased downward. This is because their control group did not include firms in similar industries that did not expand locally but either left the region to expand elsewhere or would have added jobs if they had received an incentive.

Overall, while most quantitative assessments of incentives focus on county- or state-level impacts, those papers that do focus on the firm or establishment level often fail to construct an

appropriate control group of nonincentivized firms to generate valid estimates. These highly quantitative assessments tend to focus on one form of economic development policy— incentives—in isolation and make no attempt to understand the potentially critical interaction between recruitment or retention policy and other long-range strategic planning efforts. This paper advances the empirical literature on incentives in two ways. First, we conduct our analysis at the establishment level using time-series data for (nearly) all establishments in North Carolina that allow for the construction of a reasonable set of controls. Second, by comparing the impact of incentives in sectors of the economy that are the focus of state-led planning efforts, we can provide empirical evidence of the effectiveness of such planning efforts in a general sense. This is particularly interesting since it is often difficult for policymakers to demonstrate the effectiveness of broad-based institutional supports for economic development. Therefore the research design proposed below will allow us to make an estimate not only as to the impact of incentives on employment growth, but also as to the broader impact of industry mediation in the process of economic development.

3. DATA SOURCES

3.1 Database Construction Steps

As we said above, a key aspect that distinguishes this paper from previous quantitative analyses is the focus on employment effects at the establishment level using quasi-experimental methods that isolate the causal impact of the incentive itself on future job growth. To conduct this analysis we use two major sources to build a time-series database of observations for those establishments that received an economic development incentive and a time-series database for those that did not—our two control groups. First, we use data on incentive grants obtained from

a comprehensive media study of announced deals generated by the University of North Carolina's Kenan Institute. This database was constructed by searching all major newspapers in the state for announced incentive deals from 1996 to 2006. This data set contains information on incentives that involved discretionary funding from the state—primarily from the OneNC and JDIG programs—but does not include grants made exclusively by local government.² The media survey contained 387 total incentives during the study period, consisting of 173 retention grants and 214 recruitments. This database also recorded the date of announcement, the total incentive amount (state and local match), the expected number of jobs created, and the county in which the project occurred. To ensure that the media survey covered the full extent of state incentive grants, we compared the database to annual reports from the North Carolina Department of Commerce covering the name of establishment, incentive amount, and promised and actual job creations.³ These combined sources were used to define the set of “treated” establishments and the key variables of interest—the timing of the incentive (year) as well as whether the incentive was a retention or recruitment deal.

Next, we matched our treatment set of incentive establishments to the National Establishment Time Series (NETS) database. The NETS has the distinct advantage of offering a consistent time-series of observations on employment between 1990 and 2008; this series provides a host of establishment characteristics on which we rely to construct a set of control samples of similar, nonincentivized businesses. Although the NETS database is used with increasing frequency in academic research (Lester 2011; Neumark, Zhang, and Wall 2005) it is useful to provide some background here. The NETS is a longitudinal data set privately produced by Walls and Associates based on 19 annual snapshots of the Dun and Bradstreet (D&B) business-listing and credit-rating service. Because it is based on information from D&B—which

has a strong economic incentive to reach every business—the NETS is a near-census of business establishments in the United States. While the measurement of employment levels at establishments has been a concern of some observers, at an aggregate level, employment figures are consistent with trends observed in publicly available sources such as the Quarterly Census of Employment and Wages (QCEW) and the County Business Patterns (CBP) (Neumark et al. 2005). The advantage of using NETS is that information is available at the establishment level on a wide variety of characteristics, including year of birth and death, detailed industry codes (up to an eight-digit SIC), sales, mobility, and branch plant status.

We matched our incentive database to the NETS based on the company name, county, and approximate employment size. Of the 387 incentives, we successfully matched 270 (69.7 percent) to valid records in the NETS database. The primary reason some incentive records were not matched to the NETS is that the official company name in the D&B files differed from the company name listed in the media or in the North Carolina Department of Commerce report. Name discrepancies may arise from recent merger activity or from a name change that is unobservable. In other cases, company records may simply not exist in the NETS, which is a comprehensive but not a 100 percent complete census. What is critical for our purposes, however, is that firms that have gone out of business or moved outside the state are still listed in the NETS database and are therefore captured in our analysis. This avoids the problem of positively biasing our results by screening out failed firms or companies that took an incentive and then moved elsewhere. Ultimately our matched sample has a proportional breakdown of retention and recruitment deals and is similar to NETS in terms of industry sectors. Thus we interpret the matched sample of 270 records as a representative sample of incentivized establishments in North Carolina.

3.2 Operationalizing Institutional Support Factors

As indicated in Section Two, a key aspect of this paper is comparing incentive impacts across industry sectors that have benefited from additional state-led strategic planning initiatives. Specifically, we examine differential impacts of incentives in sectors identified by regional planning entities as targeted industries, as well as statewide mediated industry sectors. We define “targets” as industries that were formally recognized in target plans made by each of North Carolina’s seven regional economic development partnerships—the multicounty planning organizations designated by statute to help coordinate economic development activities across different regions of the state. In 2000, each regional partnership undertook a cluster identification and strategic targeting planning process that resulted in the identification of selected industries for growth encouragement within the region. We obtained the list of targeted NAICS codes and broke down each region’s targets by categorizing them as “existing strength targets”—industries that have an employment location quotient relative to the United States of greater than 1.1—or “aspirational” targets for industries that lacked regional concentration.

However, the critical focus of our paper is on incentives made in those industries that have received significant state intervention over the past several decades. We argue that these industries are examples of state “mediation,” and—according to the theory presented in Section Two—we expect that incentive deals within these sectors will perform better than those made in sectors that do not simultaneously receive high levels of institutional support. We define mediated sectors as the life-sciences/biotechnology sector and the advanced textile manufacturing and nonwovens industries. Appendix A lists the NAICS codes of incentivized establishments that we coded as mediated for this analysis.

3.3 Incentive Use in North Carolina

Between 1996 and 2008—the period in which our media survey is based—North Carolina engaged in approximately 387 agreements with private companies to either stay or relocate within the state in exchange for state-funded incentives. The pace of incentive-granting increased significantly in 2000 when the JDIG program was initiated. Since 2000, an average of 41 incentive deals have been made each year, with a peak of 75 in 2006. Overall, the average incentive amount offered per job was \$23,849, with an average of approximately 200 announced jobs created or retained per incentive. As Table 1 describes, North Carolina favored recruitment deals by a slim margin (55 percent vs. 45 percent). Not surprisingly, incentive amounts were higher, on average, for recruitment deals because there is likely more competition with other states and because existing North Carolina establishments face sunken costs associated with moving outside the state.

Table 1 Descriptive Statistics of Incentive Use in North Carolina, 1996–2008

	All incentives	All matched incentives	Regional target		Mediated industry	
			Yes	No	Yes	No
No. of incentive deals	387	269	180	207	68	319
% retention	45	54	45	44	51	43
% recruitment	55	46	55	56	49	57
Average incentive/job (\$)	23,849	20,177	32,228	16,685	16,608	25,416
Average jobs announced	199	182	210	189	156	208

SOURCE: Authors' analysis of data from a media study by the University of North Carolina's Kenan Institute, and the North Carolina Department of Commerce.

Examination of incentive use in regionally targeted or state-mediated industries shows that the share of incentives going to recruitment in these industries stays approximately the same. Throughout the study period there were 180 incentives (46.5 percent) made to establishments corresponding to regionally targeted or state-mediated industries; interestingly, the average incentive package offered to targeted establishments was nearly double (\$32,228/job) that

offered to nontargeted companies (\$16,685/job). This might suggest a greater willingness to pay on the part of state and local officials for the added strategic benefits of a targeted firm (i.e., positive externalities associated with clustering, import substitution, long-term growth potential, etc.), or it may simply reflect greater competition for firms in “rising” industries.

For mediated industries, however, there seems to be an opposite effect on incentive levels. In total, 67 incentives were made in the biotechnology/life sciences and advanced textiles sectors. Mediated incentive deals tended to be significantly lower on a per-job basis—\$8,800 less—than those in nonmediated sectors. Although we cannot observe each negotiation process directly, this supports the argument made above and in Lowe (forthcoming) that, in mediated sectors, state actors possess deep knowledge about industry dynamics and emerging technologies in the field. Such knowledge can potentially help bridge the information asymmetry present in most incentive talks with mobile firms. In addition, we hypothesize that the process of mediation helps narrow the potential set of incentivized establishments to those that are a better fit for the region and are thus more likely to build stronger ties within the broader cluster.

4. METHODOLOGY

To assess the effectiveness of economic development incentives in maintaining and expanding employment opportunities, and to test the hypothesis that mediation matters, we design two empirical strategies using time-series data on employment at the establishment level. We split up our analysis of incentives in North Carolina based on whether they were devoted to firms that already existed in the state (i.e., retentions) or to attracting new establishments (i.e. recruitments). The primary reason for dividing up the analysis is that our panel data set is limited to observation of employment levels in the years before an incentive for establishments already

located in North Carolina. Thus the recruitment deals have no preperiod in which to conduct a difference-in-differences estimate of the employment impacts of an incentive. Below, we describe the details of our empirical strategy for measuring employment effects for retentions using panel data, and for recruitments using a collapsed data set and a propensity score-matching design to generate appropriate control groups.

4.1 Retentions

Our primary empirical strategy for measuring the impact of an incentive grant on employment growth is to use our panel data set to generate difference-in-differences estimates by comparing employment levels in years before and after an establishment received a retention deal. The key independent variable in this approach is the timing of the incentive. Equation (1), below, summarizes the main specification. In this model the incentive variable ($Inctv_{it}$) is coded “0” for each year (t) that the establishment (i) was located in North Carolina *before* receiving an incentive, and “1” for each year *after* the grant was made. Thus, our analysis only uses the incentive as a dichotomous (dummy) variable and does not include the dollar amount of the incentive, which is sometimes front-loaded and sometimes granted over time.⁴ The main outcome variable is expressed as the natural log of employment at the establishment level. Logging the outcome variable will smooth out the differences between employment changes at small and large firms and enable us to interpret the value of β_1 as a semi-elasticity, the percentage change in employment resulting from changing the incentive status from zero to one.

$$(1) \quad \ln Emp_{it} = \alpha + \beta_1 Inctv_{it} + \gamma_t + \tau_i$$

Model 1 also includes fixed effects for each year (γ_t) and each establishment (τ_i). The inclusion of year fixed effects controls for any changes in employment that are due to cyclical trends

correlated with time, such as macroeconomic shocks or broad growth trends that affect the entire state. The establishment fixed effects control for any idiosyncratic differences across establishments, which is essential for isolating the impact of the incentive on employment. In essence, the coefficient (β_1) is estimated solely on variation in employment *within* establishments over time. Thus, we interpret (β_1) as a difference-in-differences (DD) estimator in that it is created by comparing employment changes in establishments that received an incentive (i.e., where the *Inctv* variable changes from zero to one) to those that never received an incentive (i.e., the control group).

A critical aspect of any difference-in-differences research design is to generate a reasonable set of controls so that we can reliably interpret the coefficient as a result of the policy itself, rather than as a spurious correlation generated by some form of endogeneity. For example, it is reasonable to suspect that state policymakers may favor firms in rapidly growing industries and that an evaluation that compared incentivized firms—which may be in “sunrise” industries—to firms in all other North Carolina industries may simply be picking up on the industry effects. Similarly, we would not want to include in the control group those establishments whose growth is largely tied to population trends, such as industries like restaurants and local retail. Thus, for our control group for the analysis of retention deals we use only those establishments that are in the set of peer three-digit Standard Industrial Classification (SIC) codes that ever received an incentive grant. Similarly, when we analyze incentive deals in either mediated industries or regional targets, we limit the control groups to firms in the narrower set of peer SICs that make up each group, respectively.

4.2 Timing of Incentive Effects

Another potential concern when analyzing employment growth in “treated” (incentivized) establishments is that policymakers may have some unobservable knowledge about the establishments that leads them to grant an incentive in the first place. This introduces the possibility of endogeneity between the treatment and the outcome. It is possible that establishments approach state officials at a critical time in their lifespan, when they are planning to either upgrade their plants or expand production. This would positively bias the results if those firms that received an incentive were already growing. Conversely, establishments that are part of a larger corporate structure that is retracting because of falling demand may receive an incentive in order to preserve employment in North Carolina and encourage the firm to make plant closings elsewhere. This would potentially negatively bias the results. The problem of pretreatment bias was first illustrated by Ashenfelter and Card (1985); they showed that a downward trend in earnings among job training recipients prior to training led to biased estimates of the value of training programs. To test for the presence of an “Ashenfelter dip,” we estimate a modified version of our main specification with a distributed lag structure of the incentive indicator variable.

$$(2) \quad \ln Emp_{it} = \alpha + \sum_{k=t-2}^{k=t+1} \beta_k Inctv_{ik} + \gamma_t + \tau_i$$

In Equation (2), the variable $Inctv_{it}$ is estimated for each year from two years prior ($k = t - 2$) to the actual year incentive through a one-year lag ($t + 1$). We use only one year postincentive since our data only go through 2008 and we would be forced to drop all incentives granted in 2006. In addition, we are more concerned with checking for a pretreatment bias than for the timing of potential growth after the incentive is made. In fact, since the one-year lag is coded “1” for all subsequent years, the value of β_{t+1} can be interpreted as the long-term impact on employment.

4.3 Recruitments

As indicated above, we cannot analyze the recruitment incentives with the same panel regression models since we do not have any pretreatment observations on the outcome variable. To overcome this we adopt a different research design that simply compares the differential growth rate in employment between incentivized and nonincentivized establishments. We collapsed the panel database used for the retention analysis and calculated the net and percentage change in employment change over the lifespan of all establishments in North Carolina. We then compared the mean growth rate across the treatment and control groups and analogously broke out the results for regional targets and mediated sectors.

After collapsing the database and calculating growth rates at the establishment level, we needed an appropriate control group to conduct a simple difference of means test on the growth rates of incentivized firms and nonincentivized ones. Because year and establishment fixed effects cannot be used in this context, a more nuanced estimate of which establishments would serve as good controls was necessary. To do this we used a Mahalanobis nearest-neighbor matching technique that finds candidate control observations for each treated establishment based on its values on a set of observable covariates. Similar to propensity score matching, this technique uses the values of the nearest-neighbor index to weight the outcome variable of the controls. The specific matching criteria are the three-digit SIC Code, the start-up year, a dummy variable indicating whether the establishment moved from out of state, whether it was a branch plant or a subsidiary of a larger corporation, and the number of related establishments within the firm. Since we are matching on the year that the establishment appeared in the NETS, this effectively matches a firm that received an incentive in, say, 2003 with an establishment in a similar industry that also started in that year. Although these results are not directly comparable

with the retention analysis, they use the same difference-in-differences logic described above. We discuss the findings of this empirical analysis in Section Five, below.

5. EMPIRICAL RESULTS

Overall, this analysis indicates that firms that received either form of state-level incentive experienced moderate and statistically significant positive employment growth in the years following the deal. However, this result may not be surprising, given that 1) the incentive dollars may positively influence the profitability of subsidized firms and 2) North Carolina's historical cautiousness in using incentives may result in less risky use of incentives statewide. More importantly for the main hypothesis—that long-term state-led planning and mediation positively influence incentive effectiveness—we find convincing evidence that mediation does indeed matter for the primary outcome that economic developers attempt to influence, namely jobs. Below, we discuss the findings in detail for retention and recruitment deals.

5.1 Retention Impacts

Table 2 presents the results of the difference-in-differences regression analysis for retentions. Column 1 lists the impact of incentives on all retention deals made during the study period relative to nonincentivized establishments in the set of three-digit peer SIC codes in North Carolina. The point estimate (β) on the natural log of employment of 0.199 is significant at the 0.01 level and indicates that establishments that received a retention grant grew approximately 20 percent faster after the incentive than nonincentivized companies. In columns 2 through 5 we explore the impact of incentives across industries that were identified by the state's regional partnerships as strategic targets.

Table 2 Employment Impacts for Retention Incentive Grants in North Carolina

	All	Regional targets			Mediated sectors		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Incentive estimate (β_1)	0.199***	0.147***	0.109**	0.334***	0.043	0.279***	0.081**
(on ln employment)	(0.027)	(0.043)	(0.049)	(0.072)	(0.054)	(0.058)	(0.034)
Sample restrictions							
Treatment	All retentions	Regional targets	Nontargets	Aspirational targets	Existing strengths (LQ > 1.1)	Mediated sectors	Nonmediated sectors
Control	All peer SICs	Target peer SICs	Nontarget peer SICs	Target peer SICs	Target peer SICs	Mediated peer SICs	Nonmediated peer SICs
<i>N</i>	939,024	444,826	493,797	444,451	444,646	174,784	764,058
Adj. <i>R</i> -squared	0.8743	0.8728	0.8645	0.8583	0.8587	0.8824	0.8546

NOTE: All models include year fixed effects and establishment fixed effects. Robust standard errors in parentheses below estimate. Incentive estimate refers to the coefficient β on the incentive dummy variable. Dependent variable is the natural log of employment. ** significant at the 0.05 level; *** significant at the 0.01 level.

Overall, deals made in industries that were regional targets performed slightly better than nontargeted deals (0.147 vs. 0.109). Each point estimate is significant, although the difference between these two estimates is not. When we break down the targeted incentives in more detail we find that deals made in industries that we consider “aspirational” for the respective region—meaning that that particular industry did not have a location quotient greater than 1.1 at the county level—were significantly stronger than those made in industries that were already strong export industries. Although we do not have a strong sense of how state and local policymakers are using and implementing the targeting planning process, we interpret this finding as being broadly supportive of the role of using incentives within a strategic process of industrial development. The reason why incentivized establishments in aspirational target industries showed significantly higher employment growth could be that state planners are successfully building out growth clusters in the region (i.e., they are helping grow the industries that support or have strong linkages with existing export sectors) or that strategic analysis allows the state to be more successful at reaching high-growth establishments. Since these incentives are for

establishments that started in North Carolina—presumably without a direct subsidy—this result can also be interpreted as a focus on supporting endogenous growth in emerging industries.

More interestingly, our findings on the impact of mediation on incentive outcomes (columns 6 and 7) show strong support for the arguments outlined in Section Two. Specifically, we find that incentives made in the mediated sectors of life sciences/biomanufacturing and textiles/nonwovens were associated with 28 percent faster employment growth at the establishment level compared to nonincentivized establishments in the same industry sectors. As a reminder, this is not simply a result of these sectors performing better overall, since the control observations come from the same set of industries. Incentives made in all other (nonmediated) sectors did not perform nearly as well, having a point estimate of 0.08. We suggest that the process of mediation itself enables the system of actors that participate in the incentive negotiation process to sift through the universe of potential firms to consider a range of benefits they will receive from engaging with the assets of the region and the state. This includes sector-based workforce development supports that can expedite hiring and expansion decisions, thus directly affecting employment outcomes.

5.2 Robustness Check for Pretreatment Bias

To test for the presence of a pretreatment trend in employment growth, we re-estimated all of our models using Equation (2). These results are presented in Table 3, below. Note that although each model includes two lead terms and one lag ($t-2$ through $t+1$), we only report the coefficient for β_{t+1} , which is interpreted as the impact on employment for one year after the incentive took effect and all subsequent years. In this analysis, the overall magnitude and pattern of the findings remains the same, which is reassuring in terms of concerns over a pretreatment bias.

Table 3 Employment Impacts for Retention Incentive Grants in North Carolina, Distributed Lag Structure

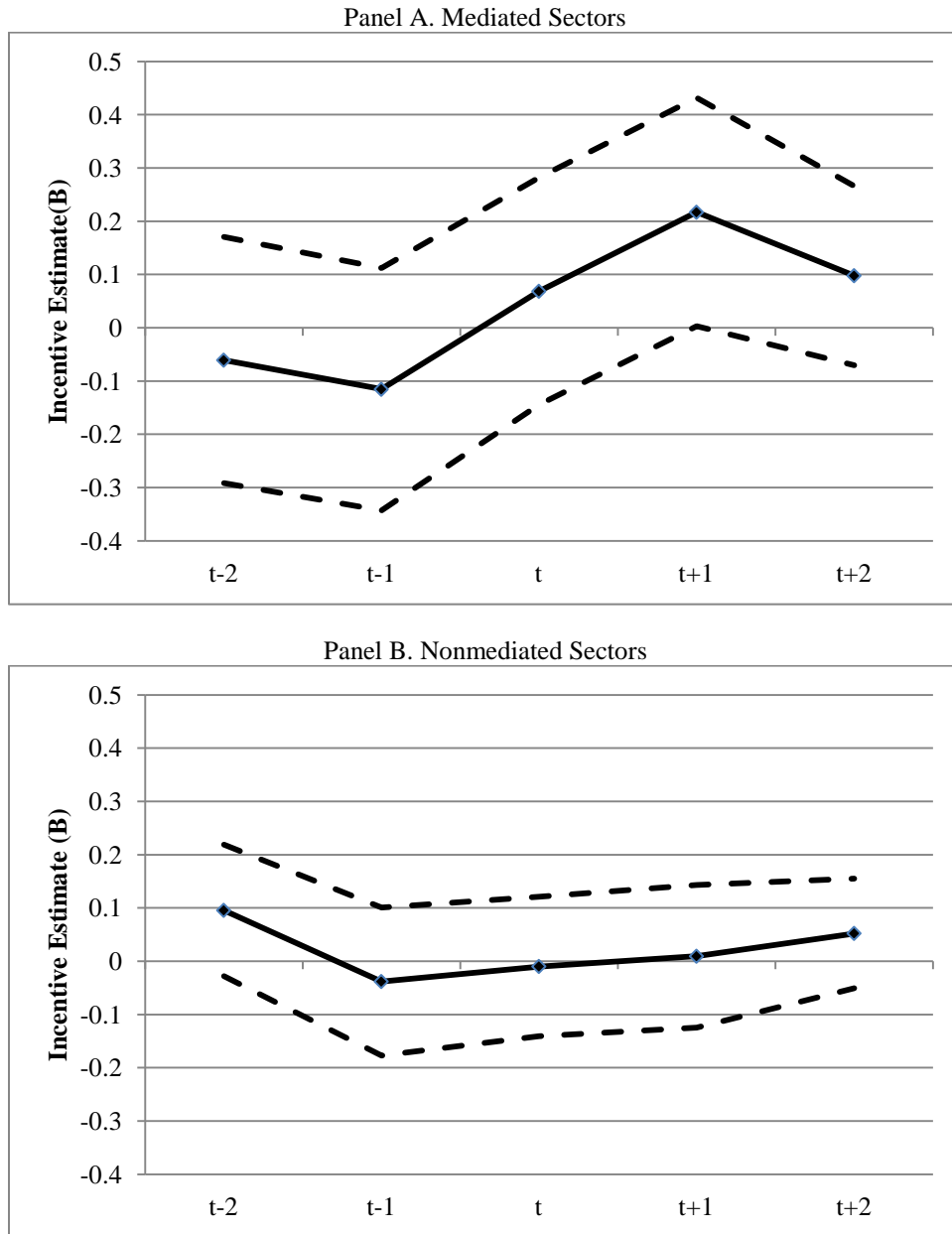
	All		Regional targets		Mediated sectors		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Incentive estimate (β_{t+1})	0.157*** (0.048)	0.154*** (0.074)	0.113 (0.091)	0.267*** (0.129)	0.095 (0.090)	0.289*** (0.101)	0.063 (0.060)
<u>Sample restrictions</u>							
Treatment	All retentions	Regional targets	Nontargets	Aspirational targets	Existing strengths (LQ > 1.1)	Mediated sectors	Nonmediated sectors
Control	All peer SICs	Target peer SICs	Nontarget peer SICs	Target peer SICs	Target peer SICs	Mediated peer SICs	Nonmediated peer SICs
<i>N</i>	939,024	444,826	493,797	444,451	444,646	174,784	764,058
Adj. <i>R</i> -squared	0.8743	0.8728	0.8645	0.8583	0.8587	0.8824	0.8546

NOTE: All models include year fixed effects and establishment fixed effects. Robust standard errors in parentheses below estimate. “Incentive estimate” refers to the coefficient β_{t+1} on the incentive dummy variable. Regression also includes variables for the incentive dummy in $t-2$, $t-1$, and t . Coefficients on other lead and lag terms are not reported here for brevity’s sake. Dependent variable is the natural log of employment. *** significant at the 0.01 level.

For all retention deals, there was a statistically significant positive impact of 0.157, or approximately 16 percent faster employment growth. Incentive deals made in regional targets and mediated sectors also outperformed nontargeted and nonmediated sectors, respectively. However, to examine the issue of pretrends in more detail, we plot the values of each lead and lag coefficient (this time with two years pre/post) for mediated and nonmediated sectors.

As shown in Figure 1, above, the timing of the positive employment growth impact for incentives in mediated sectors is closely associated with the timing of the incentive deal, with point estimates close to zero and insignificant before the deal and positive afterwards (see Panel A). However, for nonmediated incentives (Panel B) the pattern appears relatively flat. We take this as evidence of a robust causal influence of the impact of incentives on employment growth for mediated sectors.

Figure 1 Time Path of Retention Incentive Impact on the Natural Log of Employment in North Carolina Establishments in Mediated and Nonmediated Sectors



NOTE: Figures plot the coefficients for the distributed lag specification of Model 2 with two leads and lags of the incentive dummy variable. All models include year and establishment fixed effects. Coefficients are plotted in the solid line, and the 90 percent confidence interval is represented by the dashed lines.

5.3 Recruitment Impacts

Finally, we report the findings of our analysis of recruitment deals in Table 4. Unlike the panel regression models described above, the figures reported in this table are simple difference-of-means tests comparing the net employment change over the lifetime of the establishment in North Carolina. Like the retention analysis, we repeat the test for each category of incentive. Column 3 is the key column for interpreting the results, since it lists the difference in employment growth between the treatment (i.e., incentivized establishments) and controls. This is also referred to as the *local average treatment effect* (LATE) (Imbens and Angrist 1994). The number of treatment cases is listed in parentheses in each row.

Table 4 Employment Change in Recruited Establishments and Control Groups in North Carolina

	(1) Treatment	(2) Controls	(1) – (2) Difference	<i>t</i> -stat
All recruitments (<i>N</i> = 119)	13.43	1.91	11.53	2.33
Regional targets (<i>N</i> = 49)	19.92	2.47	17.45	2.37
Nontargets (<i>N</i> = 69)	8.83	3.38	5.45	0.83
Mediated sectors (<i>N</i> = 17)	25.00	-1.82	26.82	1.81
Nonmediated sectors (<i>N</i> = 101)	11.49	3.52	7.96	1.54

NOTE: Outcome variable is the net employment change since establishment start. Matching variables for Mahalanobis metric matching (3-digit SIC Code), First year, In-mover status, Relocated YN, Branch, Subsidiary, No. of related establishments in firm.

As described earlier, the control observations for each are selected based on a Mahalanobis nearest-neighbor metric matching system. This system uses the observed characteristics in the matching variables to choose a set of nontreated observations for each treatment case. For example, for a given recruitment deal that occurred in 2002 the matching program will find control observations that also started in NETS in that year and had the same (or a very similar) three-digit SIC code and similar corporate structure characteristics. Overall,

the same general pattern of impacts is observed for recruitment deals as for retentions: the overall impact is positive and statistically significant.

Specifically, establishments that received a recruitment incentive added 11.53 more jobs over their lifespan relative to similar establishments in the state. Note that while this figure seems small compared to some of the job announcements made at the time of incentive, this figure is the difference in net jobs created compared to the first year the establishment appears in the NETS data set. So if a plant opens in 2002 with 100 jobs and has 120 in 2008, the net job creation since start-up is 20 jobs. Regional targets seemed to be more effective at subsequent job creation compared to nontargeted deals. Recruitments made in mediated sectors had the largest differential effect compared to the control group, with a net difference of 26.8 jobs. This figure is significant at the 0.10 level, which is notable given the relatively small sample size of recruitments.

6. CONCLUSION AND POLICY IMPLICATIONS

This paper has presented a detailed empirical analysis to determine the employment impact of state-level incentive granting in North Carolina from 1996 to 2006. It is one of the few studies to conduct difference-in-differences tests of the effectiveness of incentives in generating net new job creation. Relative to carefully selected control groups, both retention and recruitment deals were shown to produce positive and statistically significant employment growth. Since we use two distinct research designs—for retention and recruitment deals, respectively—the results are not directly comparable on a job-for-job basis. However, in both cases we find that incentives made in sectors that were either regional targets or associated with broader industry mediation efforts at the state level outperformed those made outside such sectors.

A fundamental implication of the empirical analysis offered by this paper is that planners cannot continue to look at the issue of incentives in a narrow, positive-or-negative way. Our results indicate that what drives the positive incentive impacts in North Carolina overall is not simply the amount offered relative to other locations, but the fact that incentives are integrated into a broader institutional support system epitomized by a process we call mediation.

NOTES

1. In 2008, the system was collapsed to three tiers.
2. While we cannot directly estimate the universe of economic development incentives made exclusively by local government, we feel that we capture the majority of large incentive projects since 1996 in the state of North Carolina. Local governments must obtain permission for any tax expenditure or bond issue from the Local Government Commission (LGC). The LGC is a state agency that exercises fiscal oversight of local government and results in a major curtailment of risky development policies such as tax increment financing.
3. The annual reports were accessed at <http://www.nccommerce.com/research-publications/incentive-reports>. However, since these annual reports only contain information on incentives that were active in the given year, and since annual reports were not available for the full set of years, we use the Kenan Institute's Media Study as the universe of incentives, and we confirm the information on year of incentive through the North Carolina Department of Commerce reports.
4. While this approach is less nuanced than using the dollar level, given the lack of good-quality data on incentive dollar amounts that companies actually received, we believe it is a cleaner way to conduct the analysis. In addition, we are not interested in portraying the results as an elasticity (i.e. the percentage change in employment expected with a given percentage change in incentive dollars).

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