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Economic Development Quarterly 2014 28: 132 originally published online 20 March 2014

DOI: 10.1177/0891242413514771

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Mediating Incentive Use: A Time-Series Assessment of Economic Development Deals in North Carolina

Economic Development Quarterly
2014, Vol. 28(2) 132–146
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DOI: 10.1177/0891242413514771
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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 article 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, the authors develop a theory of sectoral "mediation." This enables the authors 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.

Keywords

incentives, mediation, employment impacts, firm retention and recruitment

As state governments throughout the United States face unprecedented fiscal crises, every public program—from education to pensions and prisons—has come under intense scrutiny and is a potential target for budget cuts. Whereas the pressure to reduce state spending increases, 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 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 literatures on economic development incentives is rich (see, e.g., Bartik, 2005; Greenstone & Moretti, 2003; Markusen, 2007; Persky, Felsenstein, & Wiewel, 1997; Peters & Fisher, 2004), this article 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 in 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, coupled with a relatively strong commitment to higher education, with more recent experiments in regional and sectoral initiatives in the 1980s and 1990s. Incentive use in North Carolina is more recent. North Carolina initiated its first statewide statutory tax incentive program in 1996—the William S. Lee program—and only began its two major discretionary incentive programs in 2000 (OneNC funds) 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 to test the effectiveness of incentives in creating and

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sustaining job opportunities in the long run. Instead of comparing incentive use to a fictional counterfactual reality in which no incentives are given, this article instead explores the question of whether economic development incentives are more effective when they are used in conjunction with industry- or sector-wide supporting functions of long-range strategic planning.

This article uses 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 (NETS) database 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 posttrends in employment at “treated” establishments compared with 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, with deals that occur in other sectors. We use 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 North Carolina. Because we lack preincentive employment observations for this set of incentives, we use 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 policy makers 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.

This article first lays out the policy background of incentive use in North Carolina and presents our theory of how state actors engage in “mediating” incentives in certain targeted industries. It then summarizes previous empirical analysis of the impact of incentives on employment and describes the data sources used and the assumptions made in constructing our matched panel data set from the NETS, and then presents summary statistics that describe incentive use in North Carolina over the study period. The article then discusses two distinct methodologies for detecting employment impacts in both retained and recruited firms in North Carolina. The final sections in the article describe the main empirical findings, discuss the robustness of these findings, and offer our interpretation for policy makers and theory.

Background and Literature Review

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, which provided a series of entitlement incentives—tax credits for any firm choosing to locate, create jobs, and provide investment in North Carolina. To promote investment outside 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 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).

North Carolina also has two major discretionary incentive programs, including the OneNC Fund, the renamed and expanded Governor’s Industrial Recruitment Competitiveness Fund, and JDIG, 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 3-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 purposes of supporting retention, expansion, and recruitment. Unlike the OneNC Fund, 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 together the grant obligation to the firm's performance in job creation. JDIG grants possess strong wage requirements, performance criteria, and claw-back mechanisms, which the state has not hesitated to use 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.

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

Industrial recruitment has a long history in North Carolina, as the previous section suggests, but the use of incentives to attract and recruit individual firms is a fairly recent practice, especially when compared with other southern states that have been in the incentive-granting game since the 1930s. Before the 1990s, North Carolina chose instead to prioritize 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 of the "Good Roads State." In 1959, North Carolina created the Research Triangle Park with the goal of increasing 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 & Lowe, 2011). Under Governor 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 science industry development, eventually spinning it out as a quasi-public institution (Feldman & 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 & 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 backward and as antithetical to this earlier, more progressive policy tradition. Many analysts lament the recent policy shift toward incentive granting, claiming 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 of 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. To the contrary, retention and recruitment have long played a role in economic development in the state; a recent biography of Governor Jim 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 in the incentive granting process itself and, more important, 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 article, 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, 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, which 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, Alevy, Harris, & Andreozzi, 2009). Targeting efforts can be beneficial for channeling public resources to entrepreneurial development (Woodward & Guimarães, 2009). However, they are most commonly associated with strategies of industrial recruitment and retention and, by default, the application of incentives (Goetz, Deller, & Harris, 2009).

In the North Carolina context, industry targeting has been especially visible at the multicounty regional level (Feser & Luger, 2003; Feser & Renski, 2000). 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 provided each of the state's seven regional partnerships with funding to conduct in-depth economic analyses of their region in 2001 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—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, which is itself dependent on the maintenance of close relationships with networks of firms in 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 ensures 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. This helps limit the size of the incentive offer by ensuring that economic development practitioners are marketing the state of other attributes. But equally 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 (Feser & Renski, 2000; Link, 2002; Lowe, 2013; Rohe, 2011). In-depth case study analysis on biomanufacturing, in particular, points to a central mediating role of North Carolina's Biotechnology Center, an institution long associated with North Carolina's strategic planning efforts (Lowe, 2013). Since its creation in 1981, the Biotech Center has supported research and development activities through a variety of grant, loan, and industry networking initiatives (Feldman & Lowe, 2011; Rohe, 2011).

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 Professor 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 (Link, 2002). 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 (Lowe, 2007; Lowe, Goldstein, & Donegan, 2011).

By mediating recruitment and retention efforts, the Biotech Center, with the help from 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, which 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 their community. This partnership has also helped to provide an institutional check to excessive incentive offers by helping local practitioners recognize that there is real value for these companies, beyond the incentive offer, to locating in their community. As one example, Holly Springs North Carolina was selected by Novartis for a large-scale vaccine manufacturing facility despite the fact that the state of Georgia offered a significantly larger incentive package—this locational choice was based primarily on the quality of the regional workforce in North Carolina, an attribute that was actively promoted by state and local practitioners (Lowe, 2013). 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 under way in other sectors and industries in North Carolina, most notably in advanced textiles, including nonwovens, and—more recently—aerospace. This emerging practice presents an opportunity to systematically examine the impact of institutional medication

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.

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 of incentives in practice. From the standpoint of an ideal research design, analysts and policy makers 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 be 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” with those counties that bid for but did not complete the deal. They find that total earnings grew 1.5% faster in incentivized industries in winning counties compared with those counties that lost the plant. However, a more recent analysis of Michigan's MEGA tax incentive program (Hicks & LaFaive, 2011) finds 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 articles 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 to 1995. This study compared employment change in eligible firms that participated in tax credit programs with eligible firms that did not participate in tax credit programs and found that firms taking advantage of the tax credit

created 23% to 28% 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, because their data set of both incentivized and nonincentivized observations was drawn only from establishments that were already expanding, their results may bias downward, as 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 received an incentive.

Overall, whereas most quantitative assessments of incentives focus on county- or state-level impacts, the research that does focus at the firm or establishment level often fails 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 article 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 because it is often difficult for policy makers 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 of the impact of incentives not only on employment growth but also on the broader impact of industry mediation in the process of economic development.

Data Sources

Database Construction Steps

As indicated above, a key aspect that distinguishes this article 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 those that did not—our 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 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 it 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 with 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 NETS database. The NETS offers the distinct advantage of a consistent time-series of observations on employment between 1990 and 2008 that 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, & Wall, 2005), it is useful to provide some background here. The NETS is a privately produced longitudinal data set produced by Walls and Associates based on 19 annual snapshots of the Dun & 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. Whereas some observers have been concerned about the measurement of employment levels, at an aggregate level, employment figures are consistent with trends observed in publicly available sources such as the Quarterly Census of Employment and Wages and the County Business Patterns (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 8-digit Standard Industrial Classification [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%) to valid records in the NETS database. The primary reason why some incentive records were not matched to the NETS is variation in the official company name in the D&B

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 |
| Percentage retention | 45 | 54 | 45 | 44 | 51 | 43 |
| Percentage recruitment | 55 | 46 | 55 | 56 | 4 | 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 University of North Carolina Kenan Institute Media Study data and North Carolina Department of Commerce.

files with the company name listed in the media or North Carolina Department of Commerce report. Name discrepancies may arise because of recent merger activity or a name change that is unobservable. In other cases, company records may simply not exist in the NETS, which is comprehensive but not a 100% census. Critical for our purposes, however, 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. To examine the issue of sample selection bias, we compared the matched sample (270) with the complete set of incentives (387) on a number of dimensions that are critical to our analysis. Overall, our matching technique was relatively more successful in matching retention deals compared with recruitments, with retentions making up 53.9% of the matched sample compared with 44.7% overall. This is not surprising given that retained establishments have had more time to be captured in the D&B survey and for name changes and merges to be captured and reflected in the name variable. In addition, because we separate our analysis techniques for retentions versus recruitments, this difference cannot bias our results. On the categories of interest however, the matched sample closely matches the full sample. For example, 19.7% and 45.0% of matched records were in mediated and regional target sectors, respectively, compared with 17.5% and 46.5% for the full sample. Thus, we interpret the matched sample of 270 records as a representative sample of incentivized establishments in North Carolina.

Operationalizing Institutional Support Factors

As indicated in the second section of the article, a key aspect here is comparing incentive impacts across industry sectors that have benefitted 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 in the region. We obtained the list of targeted North American Industry Classification System [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 this article 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 the second section—we expect that incentive deals in 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. The appendix lists the NAICS codes of incentivized establishments that we coded as mediated for this analysis.

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 then, an average of 41 incentive deals have been made each year, with a peak of 75 in 2006. Based on the incentive data we collected, the overall 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% vs. 45%). It is not surprising that 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 sunk costs associated with moving outside the state.

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 (46.5%) incentives made to establishments corresponding to regionally-targeted or state-mediated industries; interestingly, the average incentive packages offered to targeted establishments were nearly double (\$32,228/job) those 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 (2013) 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—and the industry-specific knowledge it entails—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.

Method

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 with which to conduct a difference-in-differences estimate of the employment impacts of an incentive. One caveat is important to mention here. This research design does not allow us to measure the effectiveness of North Carolina’s incentives vis-à-vis the

competition with other states. Some critics of incentives argue that incentives themselves are seldom the sole determining factor in a given company’s location decision, and instead operate as a proxy for the broader “business climate” of the region. Although this suggestion is plausible, it is impossible to test this assertion without data from multiple states, including detailed data on the value of incentive offers that were not ultimately made. 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.

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-difference 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) 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. For example, if an establishment was located in North Carolina from 1990 on, but only received an incentive in 1998, the ($Inctv_{it}$) variable would be coded 0 from 1990 through 1998 and 1 from 1999 onward. 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 enables us to interpret the value of β_1 as a semielasticity, the percentage change in employment resulting from changing the incentive status from 0 to 1.

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

The log-linear functional form in Model 1 is standard in the policy impact and empirical labor economics literature (see, e.g., Dube, Lester, & Reich, 2010, and Lester, 2011, on minimum and living wage impacts). This model 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 controls for any idiosyncratic differences across establishments that do not vary over time, which is essential for isolating the impact of the incentive on employment. No other

establishment-level controls are included in the model, and none would be necessary because the only aspect that will vary within an establishment record over time is the policy variable itself. 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-difference estimator in that it is created by comparing employment changes in establishments that received an incentive (i.e., in which the $Inctv_{it}$ variable changes from 0 to 1) with those that never received an incentive (i.e., the control group). The time period of our analysis is the full 1990–2008 period of observable employment counts in the NETS data. Although the incentives are observed between 1996 and 2006, only the extended panel period is useful as we are interested in capturing *trends* in employment before and after an incentive was granted.⁵

A critical aspect of any difference-in-difference 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 policy makers may favor firms in rapidly growing industries, and that an evaluation comparing incentivized firms—which may be in “sunrise” industries—to all other North Carolina industries may simply be picking up 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 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 3-digit 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 comprise each group, respectively.

Timing of Incentive Effects

Another potential concern when analyzing employment growth in “treated” (incentivized) establishments is that policy makers 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 to 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 to preserve employment in North Carolina and encourage the firm to close plants 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:

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

In Equation (2), the variable $Inctv_{it}$ is estimated for each year from 2 years prior ($k = t - 2$) to the actual year incentive through a 1-year lag ($t + 1$). We use only 1 year postincentive because our data only go through 2008, and we would be forced to drop all incentives granted in 2006. Thus, we are unable to accurately test for and break out longer term impacts of incentives without significantly reducing the number of treatment observations. In addition, we are more concerned with checking for a pretreatment bias than the timing of potential growth after the incentive is made. In fact, because the 1-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.

Recruitments

As indicated above, we cannot analyze the recruitment incentives with the same panel regression models because 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 percent 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 break 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 and nonincentivized firms. 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 3-digit SIC Code (which includes establishments engaged in a closely related product market and therefore affected by similar industry demand shocks),

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 (B) (on ln Employment) | 0.199*** (0.027) | 0.147*** (0.043) | 0.109** (0.049) | 0.334*** (0.072) | 0.043 (0.054) | 0.279*** (0.058) | 0.081** (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 |
| N | 939,024 | 444,826 | 493,797 | 444,451 | 444,646 | 174,784 | 764,058 |
| Adjusted R ² | .8743 | .8728 | .8645 | .8583 | .8587 | .8824 | .8546 |

Note. SIC = Standard Industrial Classification; LQ = location quotient. 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. The sample size (N) reported in each column refers to the combined sample of treatment and control observations across the full panel of years (18).

the start-up year, a dummy variable indicating if 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. Because we are matching on the year that the establishment appeared in the NETS, this effectively matches firms 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 the next section.

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. Although this result may not be surprising given that (a) the incentive dollars may positively influence the profitability of subsidized firms and (b) North Carolina's historical cautiousness in using incentives may result in less risky use of incentives statewide. More notably, 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.

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 3-digit peer SIC codes in North Carolina. The point estimate β on the natural log of employment of 0.199 is significant at the 1% level and indicates that establishments that received a retention grant grew approximately 20% faster

after the incentive than nonincentivized companies. In columns 2 to 5, we explore the impact of incentives across industries that were identified by the state's regional partnerships as strategic targets.

Overall, deals made in industries that were regional targets performed slightly better than nontargeted deals (0.147 vs. 0.109), and although each point estimate is significant, 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 export strengths. Although we do not have a strong sense of how state and local policy makers are using and implementing the targeting planning process, we interpret this finding as broad support for the role of using incentives in a strategic process of industrial development. The reason that 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. Because 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 earlier in the second section. Specifically, we find that incentives made in the mediated sectors of life sciences/biomanufacturing and textiles/nonwovens were associated with 28% faster employment growth at the establishment level compared with nonincentivized establishments in the same industry sectors. As a reminder, this is not simply a result of these sectors performing better overall because the control observations come

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*** (.048) | 0.154*** (.074) | 0.113 (.091) | 0.267*** (.129) | 0.095 (.090) | 0.289*** (.101) | 0.063 (.060) |
| 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 |
| N | 939,024 | 444,826 | 493,797 | 444,451 | 444,646 | 174,784 | 764,058 |
| Adjusted R ² | .8743 | .8728 | .8645 | .8583 | .8587 | .8824 | .8546 |

Note. SIC = Standard Industrial Classification; LQ = location quotient. All models include year fixed effects and establishment fixed effects. Robust standard errors in parenthesis 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. Dependent variable is the natural log of employment. The sample size (N) reported in each column refers to the combined sample of treatment and control observations across the full panel of years (18).

from the same set of industries. Incentives made in all other (nonmediated) sectors did not perform nearly as well, with the 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 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.

Robustness Check for Pretreatment Bias

To test for the presence of a pretreatment trend in employment growth, we reestimated all our models using Equation (2). These results are presented in Table 3. 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 1 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 about a pretreatment bias.

For all retention deals, there was a statistically significant positive impact of 0.157, or approximately 16% 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 2 years pre/post) for mediated and nonmediated sectors.

As shown in Figure 1, 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 0 and insignificant prior to the deal and positive afterward (see Panel A). However, for nonmediated incentives the pattern appears relatively flat. We take

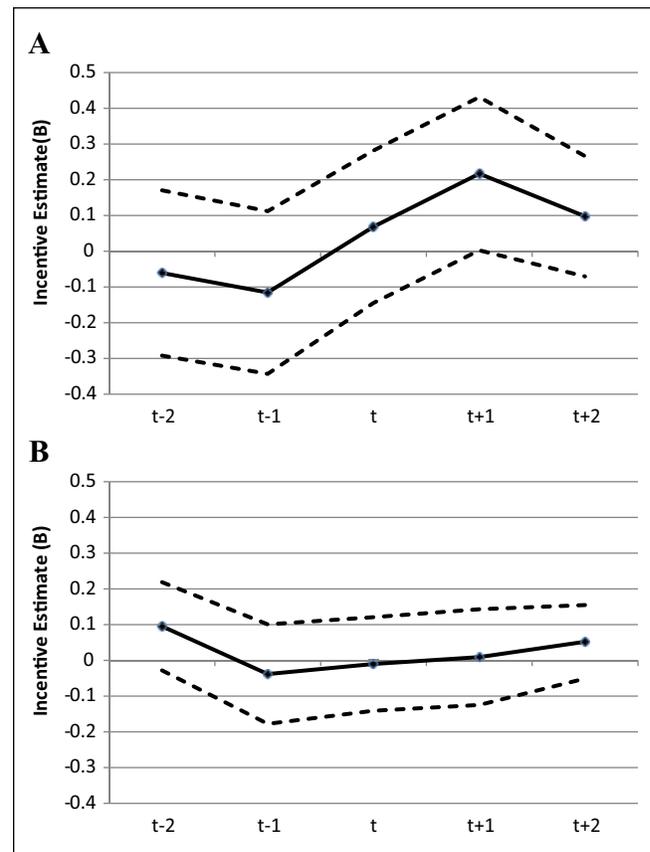


Figure 1. Time-path of retention incentive impact on the natural log of employment in North Carolina establishments in (A) mediated and (B) nonmediated sectors.

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% confidence interval is represented by the dashed lines.

this as evidence of a robust causal influence of the impact of incentives on employment growth for mediated sectors.

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

| | (1) | (2) | (1) - (2) | T-stat |
|-----------------------------------|-----------|----------|------------|--------|
| | Treatment | Controls | Difference | |
| All recruitments ($N = 119$) | 13.43 | 1.91 | 11.53 | 2.33 |
| Regional targets ($N = 49$) | 19.92 | 2.47 | 17.45 | 2.37 |
| Nontargets ($N = 69$) | 8.83 | 3.38 | 5.45 | 0.83 |
| Mediated sectors ($N = 17$) | 25.00 | -1.82 | 26.82 | 1.81 |
| Nonmediated sectors ($N = 101$) | 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 (Standard Industrial Classification [SIC] code, 3-digit), first year, in-mover status, relocated YN, branch, subsidiary, number of related establishments in firm.

Recruitment Impacts

Finally, we report the findings of our analysis of recruitment deals in Table 4. Unlike the panel regression models described earlier, the figures reported in this table are simple differences 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, as 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 (Imbens & Angrist, 1994). The number of treatment cases is listed in parentheses in each row.

As described earlier, the control observations for each are selected based on a Mahalanobis nearest neighbor metric matching system that selects a set of nontreated observations for each treatment case based on the observed characteristics in the matching variables. For example, for a given recruitment deal that occurred in 2002, the matching program will find control observations that also started in the NETS that year and had the same (or very similar) 3-digit SIC Code and similar corporate structure characteristics. Overall, the same general pattern of impacts is observed for recruitment deals as with retentions, with the overall impact being 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 although this figure seems small compared with some of the job announcements made at the time of incentive, it is the difference in net jobs created compared with 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 with nontargeted deals. Recruitments made in mediated sectors had the largest differential effect compared with the control group, with a net difference of 26.8 jobs. This figure is significant at the 10% level, which is notable given the relatively small sample size of recruitments.

Conclusion and Policy Implications

This article presents 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-difference 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. Because 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 that this article offers is that planners cannot continue to look at the issue of incentives in a narrow, positive versus 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 with common pool resources such as community colleges and the North Carolina Biotech Center into a broader institutional support system in a process we call mediation. Given the importance of mediation for improving the effectiveness of incentive-backed retention efforts, our results have several important implications for policy makers and future research and reinforce those already specified in a detailed case study of recruitment practices in North Carolina's biomanufacturing industry (Lowe, 2010). First, these findings help remind us that industrial recruitment and retention is not *synonymous* with the use of incentives. Rather, incentives are simply one policy tool that communities can deploy in support of broader recruitment and retention strategies, in the same way that these two strategies are also supported by targeting and mediation. Both mediation and incentives are designed to improve the effectiveness of a community's recruitment and retention strategies, and indeed, as the example of North Carolina's Biotech Center and the

biomanufacturing industry demonstrates, these tools can be *combined* in mutually reinforcing ways that improve the job creation performance of the state's retention and recruitment efforts.

Second, in the type of portfolio approach used in North Carolina, mediated firms choose to locate or remain in a community in large part because of strategic public investments. These investments include common pool resources such as highly customized workforce development services delivered through community colleges and coordinated by the Biotech Center. By providing skilled labor and technical assistance, these industry-specific mediating institutions create locational advantages for North Carolina, giving firms cost-saving opportunities not available in other states and reducing their incentives to locate or move elsewhere. As a result, these public investments in industry-specific mediating institutions diminish the relative importance of the incentive itself, instead prioritizing the value added by the mediating institutions and reducing the incentive to a deal-sweetener or deal-closer, rather than the entire focus of the state's retention effort. Indeed, our findings suggest that—as in the case of Novartis—biomanufacturing firms choose to locate in North Carolina over other states with larger incentive packages precisely *because* of the common pool investments in that industry. And once located in the state, recruited firms have been known to collaborate in ways that help protect and bolster these institutional supports (Lowe, 2007) and

in ways that are strengthening previously unexplored interdependencies in biopharmaceuticals (Rosenfeld, 1997).

Last, as a lesson for other states, these results indicate that existing incentive-granting practices can have a stronger impact when they are targeted to sectors of the economy that are the focus of additional state support. As our findings on mediated and targeted sectors indicate, the social benefit of incentives is maximized when they are coupled with strategic, sector-based economic development planning efforts.

It is important to note the regulatory context in which North Carolina's mediating investments operate. North Carolina's incentive policies have long been hailed as some of the nation's most progressive, requiring extensive performance monitoring of firm job creation progress, making multiyear incentive granting contingent on previously specified progress targets, and mandating aggressive use of clawbacks when firms prove unable to meet these targets. Although it is certainly likely that these provisions improve long-term incentive effectiveness in the state by ensuring that firms actually fulfill the job creation promises they make in exchange for incentives, all the incentivized firms in our study operated under this same regulatory environment, making it impossible to gain causal leverage over the precise nature of these relationships. As a result, more empirical research is necessary to determine the interaction between mediation and these performance and accountability measures and the extent to which these policies strengthen (or weaken) incentive effectiveness in mediated industries.

Appendix

List of NAICS Codes Classified as Mediated Industries

| NAICS | Mediated Industries | Mediated Industries |
|---|---------------------|------------------------|
| 3231—Printing and Related Support Activities | | Life Sciences |
| 3254—Pharmaceutical and Medicine Manufacturing | | Life Sciences |
| 3256—Soap, Cleaning Compound, and Toilet Preparation Manufacturing | | Life Sciences |
| 3259—Other Chemical Product and Preparation Manufacturing | | Life Sciences |
| 3391—Medical Equipment and Supplies Manufacturing | | Life Sciences |
| 5413—Architectural, Engineering, and Related Services | | Life Sciences |
| 5415—Computer Systems Design and Related Services | | Life Sciences |
| 5417—Scientific Research and Development Services | | Life Sciences |
| 3131—Fiber, Yarn, and Thread Mills | | Textiles and Nonwovens |
| 3132—Fabric Mills | | Textiles and Nonwovens |
| 3133—Textile and Fabric Finishing and Fabric Coating Mills | | Textiles and Nonwovens |
| 3149—Other Textile Product Mills | | Textiles and Nonwovens |
| 3152—Cut and Sew Apparel Manufacturing | | Textiles and Nonwovens |
| 3159—Apparel Accessories and Other Apparel Manufacturing | | Textiles and Nonwovens |
| 3252—Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing | | Textiles and Nonwovens |
| 3379—Other Furniture Related Product Manufacturing | | Textiles and Nonwovens |

Note. NAICS = North American Industry Classification System. Selection of NAICS industries was by the reported NAICS code of the individual companies that received an incentive grant.

Acknowledgments

The authors would also like to thank Daniel Hartley, Nikhil Kaza, Maryann Feldman, and the participants of the University of North Carolina Working Group on Economic Development for helpful comments. Thanks to Michael Levengood and Patrick Nerz for critical research assistance on this project.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The work was supported in part by an early career mini-grant from the W. E. Upjohn Institute for Employment Research (11-133-05).

Notes

1. In 2008, the system was collapsed to three tiers.
2. Although 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 in the state of North Carolina. Local governments must obtain permission for any tax expenditure or bond issue from the local government council, which is a state agency that exercises a 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 here: <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 with information on year of incentive confirmed with the North Carolina Commerce reports.
4. Although this approach is less nuanced than using the dollar level, given the lack of quality data on incentive dollar amounts that companies actually received, we believe that 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).
5. We are not concerned that we may be missing some establishments that received a state incentive grant prior to 1996 since this was the year in which the first major state incentive program was initiated.

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