

Journal of Applied Economics and Policy

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Journal of Applied Economics and Policy

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Agglomeration Economies and Business Startups on Native American Tribal Areas

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Abstract

Recent, largely anecdotal, evidence suggests increased numbers of business startups in some of the historically poorest regions in the United States: Native American Indian Reservations. In this paper we look at information technology (IT) agglomeration to determine its impact on rural business growth, paying particular attention to startups on Native American Indian Reservation regions in South Dakota. For South Dakota counties over the period 1990 to 2007 we consider and compare the business startup activity in non-Indian reservation rural counties and Indian reservation rural counties. IT agglomeration has a positive and statistically significant impact on business startups in both Native American and non-Native American counties but the impact appears to be appreciably stronger in the Native American counties.

Keywords: Business Startups, Native American Regional Economic Development, Information Technology

JEL Codes: R11, R12, R30

I. Introduction

Recent scholarship has demonstrated increased interest in business growth in rural regions of the United States (Isserman, Feser, and Warren, 2010; Bruce, Deskins, Hill, and Rork, 2009). Part of this interest stems from the fact that poverty rates in the United States are not uniformly distributed geographically. Fisher (2007) reports that, as a long-term phenomenon poverty rates are higher in non-metropolitan regions. Historically, some of the poorest regions of the nation have been in rural areas, such as Native American Indian reservations where poverty rates can be triple the national average (Benson, Lies, Okunde, and Wunnava, 2011).

Efforts to intensify entrepreneurial start-ups in these communities have been viewed as a critical stimulus to economic development. Indeed, recent studies indicate small business formation has significant impacts on regional economies (Fritsch and Schroeter, 2011) and can be a major engine of rural economic growth (Henderson, 2006). The traditional reason for the lackluster growth in rural areas has largely been that they lack agglomeration economies. Missing in rural economies are agglomeration attributes such as ready access to productive capital inputs, an educated, skill-relevant, and experienced labor force, and an established transportation and communication infrastructure which can facilitate valuable information-sharing between businesses (Gabe, 2003, 2004; Carlino, 1980).

Recent evidence suggests that agglomeration economies as traditionally defined and measured, while still important, may be playing less of a critical role in regional economic development today than it has played historically (Decker, Thompson, and Wohar, 2009; Domazlicky and Weber, 2006; Lutzko, 2002). Indeed, recent evidence points to an increasing number of successful small businesses located in poorer, rural regions of the United States where traditional measures suggest limited agglomeration economies. Clement (2006a, 2006b),

highlighting largely anecdotal evidence, identified several instances of successful small enterprises on Native American Indian reservations of the Great Plains.

One reason suggested for this recent development has been the growth of information technology (IT), such as the expansion of broadband infrastructure, growing availability of relatively inexpensive computing equipment, and, of particular importance to our study, the diffusion of IT labor skills in many industries. IT involves the management of technology and spans a wide variety of areas that include computer software, information systems, computer hardware, programming languages, web-based applications and data management constructs. The cost of computing technology has fallen dramatically in the last 30 years. Software applications, which historically had been highly specialized assets requiring substantial computer programming skills, has developed in such a way as to be more generally accessible and applicable to a variety of business applications. As a result, IT and IT-related labor skill sets have a much larger presence in many industries today than it had historically and those with IT skills have increased greatly.

The implications for local business development of the diffusion of IT-related skills in industry as well as IT-related infrastructure, such as broadband access are subject to debate. One argument advanced is that IT reduces localization economies (Quah, 2001). Much of this debate emphasizes *IT infrastructure*. With the expansion of communication networks that facilitate information and data transfers, localization becomes less important. Another argument suggests that with the diffusion of *IT-related labor skill sets* in certain industries, concentration of such skills would tend to follow the concentration patterns of those IT-intensive industries. To the extent that local entrepreneurs can tap the skills of those trained in IT and employed locally in these IT-intensive firms, either formally or informally through local community engagement

(such as churches, school boards, and other civic organizations), then such expertise might facilitate business venture growth. Localization economies then may in some sense be preserved. Indeed, this is the implication of Le Bas and Miribel's (2005) finding that local labor productivity is enhanced by increased local concentrations of those industries with higher degrees of IT-trained labor force. Therefore, "nearness" still matters. Their research, however, focused on the employment skill sets, not on IT infrastructure.

Le Bas and Miribel (2005) supported their research by developing an alternative measure of agglomeration economies that focuses attention on industries whose operations incorporate a proportionally larger amount of IT-related input.¹ As we articulate below, we adopt this alternative measure to address whether or not rural business development patterns are impacted by such agglomeration economies.

This is an important direction to take. Rural economies tend to grow more slowly than urban ones and rural communities tend to suffer. Research has shown that new business startups promote rural economic growth (Henderson, 2006). A rich literature exists examining the effect of traditionally-defined agglomeration economies on business growth (see, e.g. Carlino, 1980; Henderson, 1986), some of which focus on rural economies. For instance, investigating county-level business growth in Maine, a largely rural state, Gabe (2003) finds local industry agglomeration to be a significant determinant of new business startups. However, neither Gabe, nor other authors who have studied agglomeration, have incorporated IT-specific agglomeration into empirical models of business growth. Yet, with Le Bas and Miribel's (2005) paper, we know that IT agglomeration measures do impact local productivity. However, they did not look specifically at business growth.

¹This notion is similar to the "agglomeration of knowledge" idea that links such agglomeration economies with entrepreneurial efforts directed towards technological innovation (see, e.g. Acs and Varga, 2005).

Anecdotal evidence regarding rural business growth, particularly on very impoverished Native American Indian reservation regions, does link IT development to business growth (Clement, 2006a; 2006b). But no broad-based, formal statistical studies do so. In this paper, we look at IT agglomeration's impact on rural business growth, with particular attention to startups on Native American Indian reservation regions in South Dakota. In particular, we consider and compare the business startup activity in non-Indian reservation rural and Indian reservation rural South Dakota over the period 1990 to 2007. We organize the paper as follows. In Section II, we detail the benefits of considering the South Dakota case. In Section III, we present the basic analytical model along with a discussion of data. In Section IV, we discuss model estimation procedures and present estimation results. In Section V, we conclude with some suggestions for future research directions.

II. The Case for South Dakota

South Dakota is an excellent case region to consider for a number of reasons. First, including the Cheyenne River, Pine Ridge, Rosebud, Yankton, Lower Brule, Crow Creek, and parts of the Standing Rock and Sisseton Reservations, the state is home to a large number of Native American tribes, many of which occupy a sizable portion of the western region of the state. When compared to the state's rural non-Indian regions, these reservations are significant.

Second, when we delineate Indian reservation rural areas, we follow Leichenko (2003) who classified Indian reservation areas *by county*. We needed to do this largely because much of the data needed to construct our agglomeration measures, as well as other data necessary to model business startups, is most complete at the county level.² Unlike Native American reservations in other states, the geography of many of the large South Dakota reservations tend to

² There is some data at the zip code or Census-tract level. However such data, particularly at the industry-level, is generally unavailable in rural regions, and is not available annually, as in the case of the Census data.

closely follow county delineations.³ Therefore, within South Dakota, county-level delineations are very close to county borders.⁴

Third, historically, a number of these areas ranked among the poorest regions in the country. For instance, in the 1980s and 1990s, Shannon County, South Dakota, encapsulated within the Pine Ridge Sioux Reservation, ranked last in per capita personal income in the state, averaging \$4,642 and \$9,706 per year in the 1980s and 1990s, respectively. Indeed, in the 1980s, Shannon County ranked second to last nationally in per capita income, just ahead of Starr County, Texas. These figures are quite low when compared to both the state averages of \$11,580 and \$19,933 in the 1980s and 1990s, respectively, and the national averages of \$11,340, and \$18,560 in the 1980s and 1990s, respectively.

Yet, there is clear evidence that these regions are experiencing improvement in their economic positions. Between 1990 and 2000, per capita personal income increased 68.9 percent in Shannon County, compared with 59.0 percent for the state as a whole and about 64 percent nationally. This improved the county's ranking nationally as well. While still struggling economically, its position rose from second to last to sixth to last.

Moreover, between 2000 and 2006, per capita income grew 27.1 percent in Shannon County, compared with 25.5 percent for the state, only slightly slower than the national growth

³ For instance, Standing Rock Reservation is essentially Corson County, Cheyenne River Reservation covers Dewey and Ziebach Counties, and Pine Ridge Reservation covers Shannon, Bennett and over half of Jackson County.

⁴ Problematic areas include the smaller reservation areas: Sisseton, Yankon, Crow Creek, and Lower Brule Reservations. To effectively count counties and reservation or non-reservation counties, we used Leichenko's (2003) classifications as well as some information from *Tiller's Guide to Indian Country: Economic Profiles of American Indian Reservations* (1996). However, there were some instances where we reconsidered these classifications given that our primary interest was business activity, not income, as in Leichenko. For instance, the Sisseton Reservation covers part of Roberts County and a small portion of Grant County. However, visual inspection of detailed county maps suggests that in Roberts County most settlements, where businesses would tend to operate, tend to fall within the reservation and is therefore counted, as in Leichenko, as an Indian reservation rural county. However, no observable settlements were within the portion of Grant County that includes Sisseton. Hence, unlike Leichenko, Sisseton is counted as a non-Indian reservation rural county.

rate of about 28 percent. Indeed, since the 1990s, Shannon County no longer ranks at the bottom of South Dakota's per capita income ranking.

Interestingly, Norton (2001) identifies South Dakota as experiencing the fastest growth in IT-related employment between 1986 and 1996 in the nation, which might further suggest the value of measuring potential IT agglomeration effects on business startups. Appendix Table A1 lists non-Indian reservation rural counties and Indian reservation rural counties. Details on how counties were grouped and what constitutes a "rural" county are discussed below.

Based on business startup data from the National Establishment Time-Series database (NETS), discussed in detail below, the share of rural area startups on Native American reservations steadily increased in South Dakota. As shown in Figure 1, over the period 1990 and 2000, the share was between 8.1 and 8.5 percent. To put this in context, between 1990 and 1995, new business startups totaled 763 in Native American counties, and 953 between 1995 and 2000. During the 2001-2007 period, the share of rural startups in Native American counties was 10.0 percent, totaling 1,612 new businesses. Hence, while business startups were growing in rural South Dakota, they were growing faster in Native American counties. Moreover, while many sectors experienced business startup activity, the greatest concentration of these new businesses occurred in the health care and general services sectors, as well as in waste management, agriculture, retail trade and the professional services sectors.

III. The Analytical Framework and Data

As indicated above, while we construct our dataset from a variety of sources, most of the data came from the National Establishment Time-Series database (NETS), compiled by Walls and Associates, Inc. While the data are proprietary, the length and consistency of data over time are beneficial. Perhaps one of the main reasons for the limited scholarship on rural business

growth is due to the paucity of business-level data available over time necessary to undertake such a study. NETS is perhaps the most complete database detailing 36.5 million records of US establishments in operation during the period 1990 to 2008. Detailed records include information such as establishment size (measured by both revenues generated and employment), industrial classification, start dates, end dates, minority ownership status, and so forth.⁵

The basic empirical model closely follows Gabe (2003). Specifically, we model new business starts as a function of a number of variables common to the literature:

$$\begin{aligned} START_{i,t} = f(ESTAB_{i,t-1}, TAX_INC_{i,t-1}, SPEND_POP_{i,t-1}, WAGE_WAGESD_{i,t-1}, \\ NL_NLSD_{i,t-1}, IT_LQ_{i,t-1}, COLLEGE_{i,t}, \varepsilon_{i,t}). \end{aligned} \quad (1)$$

where $STARTS_{i,t}$ are the number of businesses, as measured by NETS, opened in county i in year t . Following Gabe (2003), the independent variables are lagged one year to reflect the notion that the decision to start a new venture in year t is predicated on information available prior to year t . ESTAB, again from NETS, measures the total number of establishments in operation in county i , in period $t-1$.⁶ This variable is commonly used as a (traditional) measure of local agglomeration economies under the hypothesis that a larger number of existing business establishments facilitates new business startups.⁷

⁵ Publicly available US Census data on business establishments is useful but is only generally available in five-to-ten year increments, which can hinder insights into dynamic patterns. Again, the NETS data is valuable as it provides complete annual data from 1990 to 2008.

⁶ To ease notational exposition, subscripts i and t are dropped from the text discussion. We did attempt some alternative lags on this variables, such as additional lags, moving averages over 3 and 5 years, as well as various polynomial distributed lags. Such alternatives proved to have little impact on the overall results.

⁷ It is worth noting that other variables that have been used to reflect agglomeration, such as total county employment and population density, which have appeared in some models of business startups, have been omitted here. The reason is a pragmatic one. Both population density and total employment are highly correlated with ESTAB in our dataset. Hence, when these variables are included with ESTAB in our model, ESTAB as well as population density and/or employment prove to be statistically insignificant. Given that many authors tend to favor ESTAB as a measure of agglomeration, we've chosen to focus on that variable. However, if either population density or employment is used in place of ESTAB, the remaining model results are consistent with what is presented here, particularly with the IT agglomeration measure of interest. While not presented here, these alternative results are available upon request.

The key variable of interest in this study is IT_LQ. This variable represents a location quotient (LQ) that indicates the share of IT industries in a given county *relative* to South Dakota's IT share. The measure is usually constructed using industry-level employment data, and we employed three-digit NAICS code employment county aggregates calculated from the NETS database. The grouping of NAICS classifications into IT sectors was based on Le Bas and Miribel (2005) who identified in their research specific sectors which contain a significant amount of IT-related activities and expertise requirements. These groupings are listed in Table Appendix A2.⁸ Mathematically, IT_LQ for each county *i* is calculated in the following fashion:

$$IT_LQ = \left(\frac{EMP_{i,IT}}{EMP_{i,TOT}} \right) \bigg/ \left(\frac{EMP_{SD,IT}}{EMP_{SD,TOT}} \right). \quad (2)$$

We interpret the number as a measure of location concentration of industrial activity. For instance, an IT_LQ greater than one indicates that the share of IT-to-total employment in county *i* is greater than the share of IT-to-total employment in the state. Therefore, we conclude that such industries are more heavily concentrated in county *i* relative to other counties in South Dakota. As such, the LQ is a compelling empirical measure of agglomeration (see, e.g. Le Bas and Miribel, 2005). If a higher concentration of IT-related labor skills supports business growth, we would expect a positive effect of IT_LQ on STARTS.⁹

⁸ The IT and non-IT groupings in Le Bas and Miribel (2005) were based on a 2 to 4 digit SIC code classification. Since our data was available for NAICS classifications, direct replication of Le Bas and Miribel's IT construction was not possible. However, by comparing SIC and NAICS classification definitions, we were able to generate a grouping reasonably consistent with theirs. While the list of industries classified as IT appears to be fairly comprehensive, a number of sectors are not so classified. For instance, both the agricultural and the mining and construction sectors are not classified as IT. In addition, selected manufacturing sectors are non-IT as well, including primary metal and fabricated metal manufacturing. In terms of services, real estate, management of companies and enterprises, museums and amusement parks are non-IT as well. A complete listing of the non-IT sectors is available upon request.

⁹ It should be noted that this definition of IT_LQ does have the same limitation that Le Bas and Miribel's (2005) construction did. Notice that the focus is on this industry itself not specifically the IT labor component of this industry's total labor pool. As a result, the variable is not really a precise measure of the *use* of IT. Ideally, we would want to identify that percentage of each industry's employment engaged in IT specifically. Finding such data has

Labor costs are a major component of business operations. It is generally accepted that higher relative wages tend to reduce the frequency of business startups in a region, *ceteris paribus*.¹⁰ To capture this effect, per capita wage data (WAGES) was collected by county from the Bureau of Economic Analysis' *Regional Economic Information Service* (REIS). Since most business location decisions are based on the relative cost of labor we include WAGES_WAGESD, measuring per capital county wages relative to the state's wage rate per capita. We expect a negative effect.

Non-labor costs are also potential deterrents to new business activity as they may reflect higher costs of entry. To empirically approximate this, we adopt a procedure similar to Glaeser et. al. (1992), and utilized by Gabe (2003), to generate a relative non-labor, operating cost variable: NL. NL is calculated as follows:

$$NL = \frac{1-\alpha}{\alpha} EMP*WAGES \quad (3)$$

where α measures the ratio of total employment costs (EMP*WAGES) to gross sales.¹¹ Since $1-\alpha$ can be thought of as a measure of the share of non-labor operating costs to total sales, then $(1-\alpha)/\alpha$ gives the ratio of non-labor operating to labor costs.¹² Multiplying by EMP*WAGES produces a dollar measure of non-labor operating costs. Since business location decisions are likely based on the relative cost of operation, NL_NLSD, measuring the ratio of county operating costs relative to the state's costs, was included. We again expect a negative effect.

proven elusive. However, as Le Bas and Miribel's (2005) research identified these IT industries as requiring a high degree of IT-related expertise, we do have a reasonable *proxy* measuring local concentration of IT skills.

¹⁰ It is also possible, however, that a higher wage may be indicative of a more prosperous region that could attract a larger number of business startups. This might explain why the negative effect is not a universal empirical finding.

¹¹ EMP measures total employment in a given county (taken from REIS) and gross sales come from the dollar value of sales reported in the NETS database. Equation (3) was developed by Glaeser et al. (1992) and implemented by Gabe (2003) to address industry entry costs specifically. This was appropriate given that Gabe's study investigated new county business openings broken down by industry. Since our dependent variable is total new business openings by region, our implementation and interpretation is different.

¹² This construction does assume a zero economic profit condition and as such may over-state non-labor operating costs. However, this construction will likely capture some sizable portion of other operating costs.

It is generally accepted that higher tax regions experience slower economic activity, including fewer business startups, as tax liabilities discourage potential entrepreneurs from launching new ventures (Due, 1961; Bartik, 1985, 1992; Deller, 1998). Taken from the 1992, 1997, and 2002 *Census of Governments* and the REIS, the variable TAX_INC measures the ratio of tax revenue generated by county governments to county-level personal income, and is included to capture this effect.¹³ We expect a negative marginal impact on STARTS.

Local government spending can also be used to support local economic conditions by improving public infrastructure and educational facilities that could facilitate business startups in a region (Deller, 1998, Gabe, 2003). Again using county-level government expenditure data from the 1992, 1997, and 2002 *Census of Governments* and population data from the Bureau of Economic Analysis' *Regional Economic Information Service*, the variable SPEND_POP measures spending per capita and is included to capture this potential impact.¹⁴ We expect a positive marginal impact on STARTS.

Finally, we introduce a dummy variable labeled COLLEGE. This variable takes the value of 1 if there is a college, university or post-secondary technical school present in a given county in a given year, and 0 otherwise. We included this variable to test whether or not such educational institutes improve both labor quality or act as collaborative partners that aid in the development of new startups. This variable was constructed by doing extensive internet searches

¹³ The Census of Governments can be found at www.census.gov. At the time of this research, the tax data is only available for 1992, 1997 and 2002. There appears to be no established procedure for interpolating the intervening years. The simplest way, while far from ideal, would be to use population data for 1992, 1997 and 2002 from the REIS (available annually) to calculate taxes per capita. Under the assumption that county-level tax rates are unlikely to change substantially from year to year, the 1992, 1997 and 2002 taxes per capita are assumed constant. These rates were then multiplied by the population data for the intervening years to generate an annual time series of tax revenue figures. These figures were then divided by personal income.

¹⁴ Since the spending data is only available for 1992, 1997, and 2002, the intervening years were calculated in a fashion similar to that applied to the tax data. In addition, the spending data was deflated using the CPI from the Bureau of Labor Statistics (www.bls.gov).

to identify those institutions' locations and founding dates. An estimated positive coefficient would confirm this hypothesis.¹⁵ Summary statistics are presented in Table 2.

We estimate equation 1 over the period 1991 to 2007 for counties delineated as Native American reservation areas.¹⁶ By way of comparison, Equation 1 is also estimated over the same period for rural counties not delineated as Native American counties.¹⁷ While direct comparisons are difficult, such analysis might offer suggestions as to the relative impact of IT agglomeration on Native American economies.¹⁸

IV. Empirical Model and Findings

In this section, we present empirical findings on the effect IT agglomeration has on the frequency of new business startups in rural counties in South Dakota. Given the discrete nature of the business openings data, we employ modeling techniques appropriate for count data.¹⁹

¹⁵ There are other variables that have been addressed in the literature that are not included in our specification. In particular, some studies have found that rural areas that are closer in proximity to large metropolitan areas realize more new business startups when compared to those areas further from such cities. Our efforts to incorporate such a variable in our model proved unsuccessful. We suspect that this is largely due to the fact that within the state of South Dakota, there are only two regions classified by the Office of Management and Budget (OMB) as metropolitan areas: the Sioux Falls MSA and the Rapid City MSA. Both of these urban areas, however, are relatively small and somewhat concentrated. Closer proximity to such MSAs may offer some agglomeration advantages but none proved statistically meaningful over the sample period studied here.

¹⁶ The start year is due to the fact that we have a one-year lag in our model and the 2007 end year is because at the time of this writing, the REIS data was only available through 2007.

¹⁷ There are 66 counties in South Dakota. Conventionally, a county is designated as "urban" if it was included as part of a metropolitan statistical area (MSA) as defined by the OMB in 2006. Those counties in South Dakota classified as urban are Lincoln, McCook, Meade, Minnehaha, Pennington, Turner, and Union Counties. The remaining 59 counties are classified as "rural" and it is these counties that are split between Native American and non-Native American counties. It should be noted that there are a number of counties classified here as "rural" that the OMB classifies as comprising "micropolitan statistical areas." However, the county populations in South Dakota that are so classified do not appear to differ markedly from other rural counties. So in this analysis the micropolitan designation is ignored. However, it may be fruitful in future research to consider an analysis of business startups between micropolitan areas and rural areas.

¹⁸ It should be noted that the current study does not distinguish between firm size. It is conceivable that larger business openings may be sensitive to local conditions in ways that differ from smaller business operations and as such, a size breakdown may be a fruitful avenue for future research. That said, since the focus in this study is on rural business development, most of the new startups are relatively small. According to the NETS database, nearly 85 percent of business establishments in Native American counties have fewer than 10 employees and over 88 percent of businesses located in non-Native American counties have fewer than 10 employees as well.

¹⁹ While it is true that traditionally many business location studies utilize a conditional logit model, the application of count model techniques to new business startups is not without precedence. There are a number of benefits to the application of count models in such settings. For detailed discussion, see Guimaraes et al. (2003) and Gabe (2003).

Specifically, we estimate equation (1) first using a panel Poisson model (Greene, 2008, p. 915 – 921).

The Poisson density function, however, has the defining characteristic that the conditional mean of the outcome is equal to the conditional variance. It is most often the case that the conditional variance exceeds the conditional mean, a characteristic known as over-dispersed. Failure of the equi-dispersion assumption inherent in the Poisson distribution has consequences for the estimated standard errors of the β coefficients that are similar to those that result when heteroskedasticity is present in standard linear regression models. That is, the estimated variances on the vector of coefficient estimates will be biased estimators of the true variance of these estimated parameters, thus making statistical inference unreliable.²⁰ Under such a scenario, the Poisson model is usually rejected in favor of the Negative Binomial (NB) regression model whose distributional properties allow for over-dispersion.²¹ Therefore, below we test for the validity of the Poisson restriction.

As for variable measurement, we followed Le Bas and Miribel (2005) and have the independent variables entering equation (1) in natural log form. This formulation produced favorable econometric results; in particular it produced the largest log likelihood function value compared to other model constructions.

Model Specification Tests. As is the case with all models employing panel data, the choice between a fixed or random effects model must be justified. Table 3 reports the Wu-

Moreover, unlike Gabe (2003), who employed a zero-inflated Poisson to handle a large number of “zero new startups” observations in his county-industry, we did not need to proceed in similar fashion since in each year of our dataset any given county had at least one new business opening. However, future research extensions might involve an industry-county breakdown in startups which would necessitate such a model.

²⁰ In fact, Cameron and Trivedi (1998) illustrate that the magnitude of the standard error bias in a count model that fails to correct for over-dispersion can be much larger than a standard regression model that fails to correct for heteroskedasticity.

²¹ It can be shown that the Poisson density function is a special case of the NB density (see Cameron and Trivedi, 1998).

Hausman test for each of the estimated models. In every case except one, we reject the null that the appropriate model is the random effects model (Johnston and DiNardo, 1997, 403-404).²²

Therefore, the following results reflect the fixed effects framework.

A second specification test focuses on the choice between the Poisson or NB distribution in estimation. Table 4 reports estimation results for both the Native American and non-Native American rural counties using both the Poisson and NB distributional assumptions. Since the Poisson results, by construction, force equality between the conditional mean and conditional variance, it can be viewed as a restricted estimation result and a likelihood ratio test is used to determine if the restriction is statistically valid. Based on these results, it is clear that the Poisson restriction is significantly reducing the model's log likelihood value, indicating that there is over-dispersion in our data and that the NB estimation results are thus preferable. Over-dispersion seems characteristic of the business startup data in South Dakota.

Estimation Results. As reported in Table 4, in each instance the concentration of IT activity in a county has a positive and statistically significant effect on new business openings. Focusing on the NB results, for Native American counties a one percent increase in IT_LQ, which is roughly 90 additional IT jobs in Native American counties, results in a 0.84 percent increase in business starts. IT_LQ also has a positive and statistically significant impact on business openings in non-Native American counties. However, the effect appears to be smaller in percentage terms.²³ A one percent increase in IT_LQ in these counties leads to a 0.37 percent

²² The single case where we could not reject the null was in the Native American county Poisson model. While this is a curious result, as we demonstrate below, there is sufficient evidence to reject the Poisson model in favor of the more general Negative Binomial.

²³ Statistical tests to determine differences in coefficients across models for models with limited dependent variables such as count data models, have proven elusive. That said, we did attempt to undertake a statistical test by combining our two datasets, creating a dummy variable identifying Native American counties and interacting that variable with IT_LQ. While this is not necessarily a desirable approach to take as it restricts the effect of the other variables to be identical across all rural counties (including the Native American ones), the resulting coefficient was positive and statistically significant at the 10 percent level. This suggests that IT_LQ may indeed have a larger

increase in new business openings in these regions. Hence, the evidence suggests a spill-over effect. More IT-related businesses can stimulate indigenous business growth.

Many of the other model variables appear to affect new business openings in ways that conform to expectations. For example, broader, traditional, agglomeration economies appear to stimulate business startups in both rural regions as evidenced by the statistical significance of ESTAB. With an estimated elasticity of 0.61, the marginal impact again seems to be stronger in Native American counties than in non-Native American counties where the elasticity is 0.38. Also, as expected, in both rural regions higher taxation tends to depress business openings. Finally, on both rural regions, the higher relative non-labor cost of business operations (NL_NLSD) results in lower business startup activity.

With respect to local government spending (SPEND_POP), in both rural regions the estimated impact is positive, but it's statistically significant in both the non-Native American rural counties models and only statistically significant in the less-preferred Poisson Native American model. This might be indicating that other governmental support (federal, state, tribal, etc.) is more important to business startups in Native American regions than in other areas. Interestingly, COLLEGE does prove to be statistically significant for business startups in Native American counties. Indeed, the impact is rather sizable, a result consistent in the data. Average business starts in those Native American counties with a college or university present are about 25 per year. Native American counties without a college or university present average about 16 starts per year. While additional research to identify any specific characteristics of these educational institutions as they pertain to business growth is warranted (i.e. business courses, workshops, etc.), the results clearly suggest a notable impact. Finally, it is interesting that in

impact on business startups in Native American counties relative to other rural areas. Although not presented here, these results are available upon request.

both rural estimations, while the estimated relative wage elasticities are negative as expected, WAGE_WAGESD is not statistically significant.²⁴

V. Conclusion

In response to recent, largely anecdotal evidence suggesting increased business startups in what have historically been some of the poorest regions in the United States, i.e. Native American Indian reservations, we attempted to model new business startups in this paper. Since much of this anecdotal evidence suggested an important role for information technology, our model focused particular attention on the impact that IT agglomeration economies had on business growth, with focused attention to startups in Native American Indian reservation regions in South Dakota. In particular, we considered and compared the business startup activity in non-Indian reservation rural, and Indian reservation rural, South Dakota counties over the period 1990 to 2007. We found IT agglomeration has a positive and statistically significant impact on business startups in both Native American and non-Native American counties but the impact appears to be appreciably stronger in the Native American counties. By way of policy implications, local governments may seek to attract IT-related business, perhaps through local tax incentives. While a challenge, such policies may result in more indigenous business startups.

There are a number of avenues for future research. For instance, this study focused on new openings but not on enterprise success. It would be useful to know if growth in IT agglomeration economies supports longer duration of business operations as well as increased profitability (Forsyth, 2005). Also, research by Cornell and Kalt (1995) has shown that economic growth and prosperity differ markedly between Plains Indian tribes and Southwestern Indian tribes. It would be beneficial to develop an empirical model for Southwestern tribal areas,

²⁴ This result appears not to be related to multicollinearity as one might expect. While there is potential correlation between WAGE_WAGESD and NL_NLSD, when NL_NLSD is dropped from both models, WAGE_WAGESD is still statistically insignificant.

similar to the one developed here, and compare the relative impact of IT agglomeration on business growth. Moreover, alternative measures of concentration in IT industries that focus more attention on clustering may prove fruitful. For instance: Does having a more highly concentrated set of IT industries result in more startups? If so, does this effect vary between rural and Native American counties? One could use the NETS data to construct county-level Herfindahl Indexes to address this proposition. Finally, our measure of IT concentration has focused on the concentration labor skills present in the region. More work on the impact of the spread of IT infrastructure into rural communities (i.e. broadband access) is warranted. Such analysis may have implications for IT agglomeration in general. We leave these efforts for future consideration.

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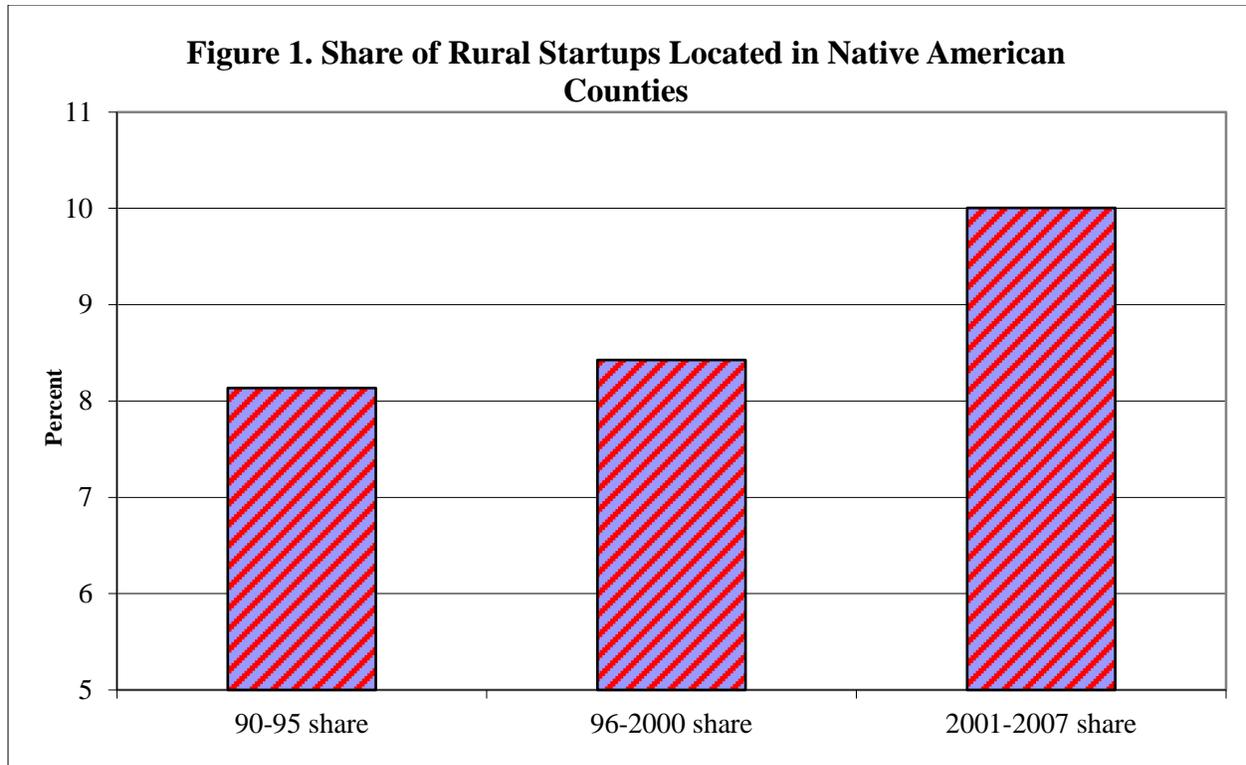


Table 1. Number of Business Startups in Native American Counties between 2000 and 2007 by industry

<u>Industry</u>	<u>Starts</u>
Health Care	248
Services	232
Administrative, Support and Waste Management and Remediation Services	227
Agriculture, Forestry, Fishing and Hunting	142
Retail Trade	136
Professional, Scientific, and Technical Services	134
Construction	119
Public Administration	110
Accommodation and Food Services	59
Wholesale Trade	56
Real Estate and Rental and Leasing	55
Arts, Entertainment, and Recreation	52
Transportation and Warehousing	45
Educational Services	45
Finance and Insurance	39
Information	38
Manufacturing	33
Utilities	7
Management of Companies and Enterprises	4
Mining, Quarrying, and Oil and Gas Extraction	1
TOTAL	1,782

Table 2. Summary Statistics				
	Mean	Std. Dev.	Min	Max
<u>Native American Counties</u>				
START	18.59	15.86	1.00	73.00
ESTAB	293.87	258.72	49.00	867.00
IT_LQ	1.29	0.46	0.56	2.07
TAX_INC	0.0122	0.0063	0.0003	0.0286
SPEND_POP	0.35	0.31	0.03	1.66
WAGE_WAGESD	0.8551	0.0920	0.7231	1.1596
NL_NLSD	0.0025	0.0023	-0.0008	0.0088
COLLEGE	0.29	0.46	0.00	1.00
<u>Non-Native American Counties</u>				
START	37.95	39.81	1.00	271.00
ESTAB	619.24	486.60	99.00	2,746.00
IT_LQ	0.88	0.20	0.44	1.67
TAX_INC	0.0125	0.0054	0.0038	0.0457
SPEND_POP	0.44	0.20	0.16	1.99
WAGE_WAGESD	0.8159	0.0949	0.6387	1.1412
NL_NLSD	0.0105	0.0195	0.0004	0.1756
COLLEGE	0.16	0.37	0.00	1.00

Table 3. Hausman Test: Fixed vs. Random Effects Model		
	<u>Hausman test statistic¹</u>	
	<u>Poisson FE vs. RE</u>	<u>NB FE vs. RE</u>
Native American Counties	10.71	18.62 *
Non-Native American Counties	499.05 *	181.29 *

¹Ho: Random effects favored over fixed effects. Critical $\chi^2(8)$ at 5 percent significance = 15.507
 '*' indicates rejection of Ho.

Table 4. Poisson and Negative Binomial Estimation Results

	<u>Native American Counties</u>		<u>Non-Native American Counties</u>	
	<u>Poisson</u>	<u>Negative Binomial</u>	<u>Poisson</u>	<u>Negative Binomial</u>
Constant		-5.05 *** (1.62)		-2.65 *** (0.82)
ln(ESTAB)	2.09 *** (0.22)	0.61 *** (0.24)	1.02 *** (0.04)	0.38 *** (0.12)
ln(IT_LQ)	1.71 *** (0.34)	0.84 * (0.51)	0.18 *** (0.05)	0.37 *** (0.13)
ln(TAX_INC)	-0.15 * (0.09)	-0.38 *** (0.12)	-0.38 *** (0.05)	-0.49 *** (0.09)
ln(SPEND_POP)	0.14 * (0.08)	0.19 (0.12)	0.13 *** (0.04)	0.40 *** (0.08)
ln(WAGE_WAGESD)	2.03 *** (0.71)	-0.73 (1.18)	-0.66 *** (0.15)	-0.47 (0.34)
ln(NL_NLSD)	-0.02 (0.10)	-0.27 ** (0.12)	-0.08 *** (0.02)	-0.10 ** (0.05)
COLLEGE	0.003 (0.29)	0.84 * (0.43)	0.01 (0.05)	0.29 (0.21)
No. Obs.	160	160	833	833
Log likelihood	591.79	481.99	4,043.22	-2,874.56
Pseudo R ²	0.55	0.67	0.74	0.82
LR statistic - Poisson restriction test		219.61 ***		2337.33 ***

Standard errors reported in parentheses

* - 10 percent significance

** - 5 percent significance

*** - 1 percent significance

Appendix Table A1. County Groupings

<u>Native American Counties</u>		<u>Non-Native Rural American Counties</u>				
Bennett	Jackson	Codington	Aurora	Deuel	Jerauld	Sully
Buffalo	Roberts	Day	Beadle	Douglas	Jones	Yankton
Charles Mix	Shannon	Gregory	Bon Homme	Edmunds	Kingsbury	
Corson	Todd	Hughes	Brookings	Fall River	Lake	
Dewey	Ziebach	Hyde	Brown	Faulk	Lawrence	
		Lyman	Brule	Grant	McPherson	
		Marshall	Butte	Haakon	Miner	
		Mellette	Campbell	Hamlin	Minnehaha	
		Moody	Clark	Hand	Perkins	
		Stanley	Clay	Hanson	Potter	
		Tripp	Custer	Harding	Sanborn	
		Walworth	Davison	Hutchinson	Spink	

Appendix Table A2. NAICS Sectors Comprising IT

(Based on Le Bas and Miribel)

	<u>Manufacturing</u>
323	Printing and Related Support Activities
325	Chemicals
334	Computer and Electronics
335	Electrical Equipment, Appliance, and Components
336	Transportation Equipment
	<u>Wholesale trade</u>
423	Merchant Wholesalers, Durable Goods
424	Merchant Wholesalers, Nondurable Goods
	<u>Transportation services</u>
481	Air Transportation
485	Transit and Ground Passenger Transportation
488	Support Activities for Transportation
	<u>Information services</u>
511	Publishing Industries
512	Motion Picture and Sound Recording Industries
515	Broadcasting
517	Telecommunications
	<u>Financial Services</u>
522	Credit Intermediation and Related Activities Securities, Commodity Contracts, and Other Financial Activities
523	Activities
524	Insurance Carriers and Related Activities
525	Funds, Trusts, and Other Financial Vehicles
	<u>Professional services</u>
541	Professional, Scientific, and Technical Services
	<u>Education and Health services</u>
611	Educational Services
621	Ambulatory Health Care Services
622	Hospitals & Health Services
624	Social Assistance
	<u>Public Services</u>
92x	Various Public Administration Support Services (921-928)

Obesity and the College Dining Commons

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Abstract

Obesity is recognized as a serious health problem facing Americans today. Weight gain in students during their college years is well documented. Some research has been done to identify the causal factors of this weight gain. This project adds to existing research by analyzing the effect of membership in a mandatory meal plan that entitles plan members to a large number of meals in an all you care to eat (AYCE) dining hall on changes in the body mass index (BMI) of college students. Because it is required for all campus residents, meal plan membership is exogenous to individual tastes and preferences for food. Regression analysis reveals the effects of students' emotional state, exercise habits, nutrition, and consumption of AYCE meals on initial BMI and changing BMI in their first year of college. Findings indicate that membership in the AYCE meal plan is significantly associated with decreasing BMI over the academic year.

Keywords: Obesity, College Health, Buffet, BMI Change

JEL Codes: I10, I12, D10

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I. Introduction

Obesity is recognized as a serious health problem facing Americans today. Although the rate of increase in adult obesity may be slowing, this good news comes after decades of steady increases (Ogden et al., 2012). A CDC / NCHS study found that in 2009 - 2010, 35.5 percent of U.S. adult men and 35.8 percent of women were obese (CDC / NCHS 2009 - 2010). Some studies have shown that the average weight gain in students during their college years is significant, with estimates ranging up to 13 pounds for females and 23 pounds for males (Racette et al., 2005 and 2008, Levitsky et al., 2004 and 2006). Researchers have explored possible reasons for student weight gain, but there is still much to be learned (Lloyd-Richardson et al., 2009, Mokdad et al, 1999, Strong et al., 2008). Indeed, some researchers have found no significant weight gain in this age group. Thus, the results are mixed and reveal a need for further study.

This paper adds to existing research by analyzing the effect of membership in a mandatory meal plan that entitles plan members to a large number of meals in an all you care to eat (AYCE) dining hall on body mass index (BMI) change. It also explores hypothesized relationships between BMI change and emotional, physical activity, and nutritional factors. Prior research has examined both self-reported and laboratory data to estimate the impacts of different behavioral and environmental factors on weight change. Recently, there has been an interest in the effects of AYCE dining on college campuses (Nelson et al, 2009, and Pliner et al, 2008). This interest is well justified considering the many important ways in which varying economic rules change human behavior; from the way changing tax structures altar individuals' incentives to provide work effort to the

way in which changing market types alter the allocations of total surplus between buyers and sellers, indeed, the examples are too numerous to catalogue here.

This study improves our understanding of the effect of AYCE dining on weight change by analyzing the effect of a student meal plan on students' weight changes at a regional state college. Students at the regional state college included in this study who were living on campus were required to purchase an AYCE meal plan while those commuting were not.¹ This requirement makes it possible to construct parallel treatment groups who differ in whether or not they are forced to participate in an AYCE meal plan. A study similar to this study from 2004 focused on incoming freshmen at Cornell University (Levitskey et al., 2004). In that paper, researchers attempted to estimate the effect on weight gain in students from consuming meals in an AYCE dining hall (among other variables of interest) using data from 60 freshmen subjects. However, their ability to accurately estimate any effect from eating in Cornell's AYCE dining hall is hampered by the fact that there is no control group (students that did not eat a majority of meals in the dining hall) and thus, there is little variation in the type of economic institution measured.

This study seeks to accomplish the following objectives. First, construct a theoretical model of behavior under AYCE dining. Second, develop hypotheses to illustrate relationships between explanatory factors related to BMI. Third, examine the importance of each explanatory factor in predicting BMI and BMI change. Accomplishing these objectives will add some clarity to the mixed results in the literature, shed light on the effect of AYCE dining on BMI, serve as a foundation for the

¹ IRB approval was obtained prior to commencement of the study and informed consent was collected from each subject.

development of new theory, and inform policymaking. In the next section of the paper, we offer a simple economic model of AYCE dining along with several other hypothesized relationships. This is followed by sections containing the literature review, data, methods, results, and conclusions.

II. Factors

A. AYCE Dining

A priori, economic theory predicts that the impact of increased frequency of AYCE meals will have a positive effect on BMI. That is to say, a traditional marginal cost versus marginal benefit economic analysis predicts that the quantity of food consumed at each meal will be greater when the fee schedule is a fixed payment for AYCE versus an a la carte pricing scheme.

The theoretical underpinning for this behavioral prediction is as follows:

People consume food at a meal until the marginal cost of the next item is greater than the marginal benefit. Thus, the stopping rule is as follows:

$$\textit{if } MB > MC \textit{ continue eating, otherwise stop} \quad (1)$$

With a la carte pricing, the marginal cost of the next item of food is its full menu price:

$$MC_{a \textit{ la carte}} = \$\textit{menu price} > \$0 \quad (2)$$

With a fixed fee, the marginal cost of the next item of food is zero²:

$$MC_{\textit{fixed fee}} = \$0 \quad (3)$$

² It is possible that the MC of consuming another food item could be greater than zero. For example, if one is already satiated, then consumption of another bite of food might cause discomfort. Nevertheless, the theoretical prediction of greater consumption under fixed payment holds because the MC of the next item in an ala carte pricing scheme always exceeds that of the same item in a fixed price scheme by the menu price.

So, larger meals are predicted to be consumed under a fixed pricing scheme.

This prediction reveals a potentially problematic effect of a policy which requires on-campus residents to consume the majority of their meals under a fixed payment pricing scheme. *Ceteris paribus*, if weight gain is greater under fixed payment versus a la carte, then the Residential Meal Plan (RMP) may increase the incidence of obesity. On the other hand, the availability and promotion of low-calorie nutritious food options in the dining hall may negatively impact BMI and positively impact overall health if RMP participants select more nutritious meals than they would otherwise consume.

We test the impact of AYCE and a la carte pricing by analyzing BMI change with respect to frequency of AYCE meals. On-campus resident students are required to purchase a RMP. A description of possible meal plans is found in Appendix A. Although commuter students may also eat in the dining hall, members of the RMP plan are expected to eat there more frequently. Importantly, the purchase of a RMP is required for *all* on-campus residents, so plan membership is unrelated to an individual's preference for large meals. This exogeneity allows for a random sampling of the student population while ensuring the sample is balanced between those students who consume most of their meals in an AYCE setting with those who do not.

Hypothesis 1: BMI is positively related to the consumption of AYCE meals.

B. Nutrition

The Dietary Guidelines for Americans 2010 recommends diets high in fruits, vegetables, whole grains, seafood, and other fat-free and low dairy products (USDA,

2010). Individuals following these prescriptions should become satiated with fewer calories than a diet rich in fats, oils, and other foods with high calorie to bulk ratios.

Hypothesis 2: BMI is positively related to the consumption of foods not recommended by the FDA.

C. Exercise

According to the U.S. Department of Health and Human Services (USDHHS), there is significant evidence that a lifestyle embracing frequent and intensive exercise prevents weight gain by burning calories and raising metabolism (USDHHS, 2008).

Hypothesis 3: BMI is negatively related to the frequency and intensity of exercise.

D. Emotional State

Eating in response to feelings such as depression, boredom, loneliness, chronic anger, anxiety, frustration, stress, problems with interpersonal relationships, and poor self-esteem instead of hunger can lead to weight gain (Mayo Clinic, 2009).

Hypothesis 4: BMI is positively related to poor interpersonal relationships and a depressed or pessimistic emotional state.

III. Literature Review

The literature on obesity and BMI shows that the four main factors we consider in our paper do not occur in isolation. Statistically significant health disparities have been observed among racial and ethnic populations, as well as by sex, income, and disability status (U.S. Department of Health and Human Services, 2011). Of these factors, income

has the least clear impact on obesity. In a recent National Center for Health Statistics study, men are found to have similar obesity rates at all income levels with a slight tendency for the rates to increase with income (NCHS Data Brief, no. 50, 2010). Among women, obesity tends to fall as income rises. The same study found that for all levels of educational attainment obesity rates were increasing for both men and women. For men, there was no significant relationship between education level and obesity but for women obesity rates decreased as education increased.

It is well established that obesity can become a problem before students enter college. As reported in a NCHS study, in 2007 - 2008 17 percent of children from 2 - 19 were obese (NCHS Data Brief, no. 51, 2010). The study notes that childhood obesity often continues into adulthood and that obesity is more prevalent in lower income populations. This effect was largely consistent despite minor race and gender differences. The connection between diet and weight gain is well established as summarized in the 2010 Dietary Guidelines for Americans published by the U.S. Department of Agriculture. The guidelines classify weight gain as a growing epidemic in the U.S. because the prevalence of obesity in all age groups is significantly higher than it was a few decades ago. The report identifies two choices that individual's face which directly affect their BMI: the food they eat and their level of physical activity. However, the report notes that the choices individuals face are often limited by what is available in their environments, including schools and worksites. When observing BMI, the worst environments discourage physical activity while promoting excessive consumption. The government report also indicates that primary factors contributing to overeating are

portion sizes and the availability of added fats and oils, grains, milk and milk products, and caloric sweetener.

The USDHHS has also published numerous reports about the benefits of physical activity and its connection to BMI. Benefits arise from the frequency, intensity, and duration of physical activity. On the other hand, inactivity is associated with increased incidence of depression. This could lead to increased eating in response to feelings and emotions rather than hunger. According to the Mayo Clinic report, this ‘emotional eating’ is commonly thought to suppress or soothe negative emotions such as stress, anger, fear, boredom, sadness and loneliness.

The effect of AYCE dining on weight change is less well developed. Nelson et al collect detailed qualitative data from students with regard to factors influencing weight and diet. Their subjects indicated that “the readily available abundance of food in residence halls and dining facilities was cited as a major cause of weight gain. Students felt that the buffet-style (all you can eat) food service influenced poor dietary habits and encouraged frequent overconsumption” (Nelson et. al, 2009, pp. 289). In a similar vein, French et al explore the impact of varied environments, pricing, and policy on consumption of fruits and vegetables (French et al, 2004). Finally, the previously mentioned study by Levitsky et al finds a significant and positive effect of the dining hall on weight gain in some specifications, but the effect loses significance when initial body weight is included as a control variable. Thus, the general literature indicates there is a positive association between AYCE and weight gain. However, quantitative measures appear to be sensitive to model specification and study design.

IV. Data

The pool of participants for the study was limited to freshmen students at Georgia Gwinnett College in Lawrenceville, Georgia. Parallel groups of participants were randomly recruited by email to ensure that an even number of residents and commuter students were included in the sample. Subjects were paid \$15 in compensation for their initial survey in the fall and \$35 for returning in the spring.

Of the 65 participants who were interviewed during the period from late September to early October, 2011, 53 returned for their follow-up interview in late April to early May 2012. Thus, there was approximately 30 - 32 weeks between surveys. All but five subjects were either 18 or 19 years old.³ The sample was fairly gender balanced with 29 female and 24 male participants. The subjects filled out questionnaires regarding demographic characteristics, eating and nutrition habits, exercise habits, emotional state, quality of interpersonal relationships, living arrangements, and the frequency of meals consumed on campus in the dining hall. The participants' heights and weights were recorded during both interview periods. Summary statistics of key variables collected along with statistical tests of differences across resident and commuter subject groups are reported in Table 1.

The mean change in BMI during the academic year was an increase of 0.2613 showing that subjects gained weight on average. The number of AYCE meals consumed per week varied from a minimum of zero to a maximum of 19.5. There were also substantial differences in subjects' dietary habits such as the number of fast food meals, fruits and vegetables, and unhealthy drinks consumed. Lastly, the frequency and intensity of exercise ranged from none to more than 11 high intensity sessions per week.

³ Five subjects ranged from age 20-35.

The possibility of combining subsets of the survey data including subjects' emotional state and interpersonal relationships along with various proxies for nutrition (including consumption of sugared drinks, alcohol, fruits, vegetables, and fast food) was explored, however, the Cronbach alphas for these combinations were 0.65 or lower. Therefore, different measures of emotional state and nutrition were used as robustness checks of the regression analysis described in the results.

The two groups were similar with the exception of five variables. Residents on average consumed more than eight meals per week in the dining commons than did commuter students. The resident sample was made up of 87% black students while commuters were only 35% black. Residents reported higher levels of emotional happiness (5.5) relative to commuters (5.0). The commuter sample was on average 1.3 years older than the residents, although all but 5 subjects in the experiment were either 18 or 19 years old. Finally, commuters' mean BMI change was 0.65 greater than the mean BMI change of the residents.

Prior to further analysis all variables were standardized. The variable "Nutrition" increases with the number of unhealthy portions consumed and decreases with healthy portions consumed. On the other hand, "Emotion" increases as self-reported emotional state improves, while "Exercise" increases as frequency and intensity increase.

Table 1

Summary statistics of key variables by group	Resident (n=30)				Commuter (n=23)				Difference in means by group: mean (res) - mean (comm)	
	mean	std. dev	min	max	mean	std. dev	min	max	difference	t
Initial BMI	26.87	9.12	17.59	58.47	26.18	6.998	15.99	49.56	0.682	0.298
BMI change	-0.021	1.329	-2.911	3.508	0.629	1.27	1.327	3.942	-0.65	-1.8*
AYCE meals (weekly)	9.517	4.872	1.5	19.5	0.946	1.031	0	4.75	8.57	8.28***
Emotional state (2 = most negative to 6 = most positive)	5.5	0.643	3.5	6	5.043	0.891	2.5	6	0.46	2.17**
Relationship w/friends (1 = very poor to 7 = very good)	5.85	0.789	4	7	5.739	1.242	2.5	7	0.11	0.396
Relationship w/parents (1 = very poor to 7 = very good)	5.65	1.457	2	7	5.652	1.62	2	7	-0.002	-0.005
Unhealthy drinks (weekly)	17.01	13.48	0	61.5	16.53	13.04	1	49.5	0.476	0.129
Fruits and vegetables (daily)	2.525	1.663	0	8	2.543	1.475	1	8	-0.02	-0.042
Fast food meals (weekly)	2.475	2.174	0	8	1.761	1.094	0	3.5	0.714	1.44
Exercise frequency (weekly)	3.383	2.172	0.25	11.25	3.293	1.786	0	6.5	0.09	0.16
Exercise intensity (1 = very low to 7 = very high)	4.5	1.326	1.5	6.5	4.337	1.559	1	6.5	0.16	0.41
Gender (=1 if female)	0.6	0.498	0	1	0.478	0.511	0	1	0.12	0.87
Race (=1 if black)	0.867	0.346	0	1	0.348	0.487	0	1	0.52	4.54***
Age	18.23	0.504	18	20	19.52	3.752	18	35	-1.29	-1.86*

Data on emotional state and exercise intensity consisted of the average of two or more self-reported characteristics.

t-ratio is significant at the $\alpha=.10^*$, $\alpha=.05^{**}$, or $\alpha=.01^{***}$ levels

V. Methods and Results

A regression of change in BMI on AYCE meals consumed will show if AYCE dining contributes to the problem of obesity. The literature provides evidence that a person's emotional state, exercise level and intensity, nutritional choices, gender, race, and income level may contribute to BMI. Hence, an expanded regression model including measures of these covariates will be estimated. We include initial BMI as a proxy for income and other factors that may have influenced subjects prior to the study (e.g., parents' income, education, genetics, and other unmeasured factors).

One concern in this analysis is that there could be an omitted variable which would bias results. To address this possibility, we check for and discover correlation between the residuals and number of AYCE meals consumed. We employ an Instrumental Variable approach using residential hall living status as an instrument for AYCE to overcome this problem. Residential status is a valid instrument as long as it is correlated with AYCE and uncorrelated with BMI.

A related concern is the possibility of sample selection bias if healthier students tend to live on-campus while less healthy students tend to live off-campus. In this case the choice of meal plan would not be exogenous. To check for this form of bias, we employ a Heckman selection model with residence as the selection tool.

Model 1 in Table 2 shows that a least squares regression of AYCE meals on change in BMI yields a significant coefficient of -0.34. On average this implies that eating an additional 5.6 meals in the dining commons reduces BMI by approximately 0.45 points. This result did not substantially change with the addition of control variables for a person's emotional state, exercise intensity, nutritional choices, initial BMI, gender, and race as reported in Model 2.

Table 2
Dependent variable: change in BMI

	Model 1: OLS	Model 2: OLS with control variables
Constant	0.00 (0.00)	0.07 (0.25)
AYCE	-0.34 (-2.58)**	-0.32 (-2.09)**
Emotion		0.17 (1.24)
Exercise		0.14 (0.78)
Nutrition		0.00 (0.02)
Initial BMI		-0.07 (-0.49)
Gender		0.43 (1.37)
Race		-0.48 (-1.60)
	$R^2 = 0.12$	$R^2 = 0.22$

t-ratio is significant at the $\alpha=.10^*$, $\alpha=.05^{**}$, $\alpha=.01^{***}$

There is however, a correlation of the residuals with AYCE which indicates potential omitted variable bias ($r=-0.72$ in Model 2). To compensate for this potential bias, we used an instrumental variable approach. Because the decision to live on campus is not determined by a student's preference for AYCE meals, and the correlation between residential status and AYCE

meals equals .76, residential status is a valid instrument for the dependent variable. Model 3 in Table 3 reports IV regression results of residential status on the explanatory variables. These results were consistent with those of Models 1 and 2 with an estimated AYCE coefficient of -0.41 and a z statistic of -2.35 (Pr. > |z| = 0.019).

Lastly, we examined the possibility of sample selection bias if healthier students decide to live on campus while less healthy students live off-campus. If that were true, then the choice of meal plan would not be exogenous with respect to the change in BMI. We checked for this possibility using the Heckman selection model with residence as a selection tool. Race is dropped from step two of the model because of its correlation with the selection variable (83 percent of residents were black). The estimated inverse Mills ratio (λ) reported in Model 4 in Table 3 was not statistically significant which indicates an absence of sample selection bias.

Table 3

Model 3: Instrumental Variable (AYCE = resident)		Model 4: Heckman Selection	
Dependent variable: change in BMI		Dependent variable: change in BMI	
			Selection: Residence
Constant	0.07 (0.25)	0.00 (-0.01)	-1.26 (-2.58)
AYCE	-0.41 (-2.35)**	-0.61 (-2.39)**	
Emotion	0.13 (1.01)	0.01 (0.05)	0.24 (1.2)
Exercise	0.19 (1.10)	0.45 (1.96)**	0.52 (1.47)
Nutrition	0.01 (0.10)	-0.18 (-0.83)	0.00 (0.02)
Initial BMI	-0.10 (-0.78)	0.08 (0.43)	(-0.03) (-0.14)
Gender	0.42 (1.41)		0.78 (1.49)
Race			1.64 (3.46)***
Lamda			0.35 (0.69)
R ² = 0.18			

z-ratio is significant at the $\alpha=.10^*$, $\alpha=.05^{**}$, $\alpha=.01^{***}$

VI. Conclusions

This study suggests that economic institutions may play an important role in health related outcomes. The design of this study allowed for a test of the effect of AYCE dining on BMI by using parallel groups that differed greatly in their participation in AYCE but not meaningfully in other characteristics. AYCE dining is the most important determinant of changes in BMI of college freshmen in this study. Specifically, eating in an AYCE dining hall significantly lowers BMI and thereby decreases the incidence of obesity. This result conflicts with the initial theory of behavior under AYCE. A revised theory to explain this observed relationship might incorporate the wide array of healthy choices, spatial arrangement of choices, self-determined portion sizes, low effort required to obtain healthy foods, absence of advertisements to induce consumption of unhealthy foods, and the presence of advertisements to induce consumption of healthy foods in the dining commons.

The information embodied in this study should be of interest to both individuals and policymakers. Prior to this study, it was commonly held that AYCE dining contributed to weight gain. The current results indicate that AYCE meal plans containing an array of healthy choices may not be a contributor to the epidemic of obesity and rather may be part of the solution. Further study is needed before one can advocate that organizations concerned about the health of their constituents should institute such a plan. However, these results show that individuals may actually benefit from limited choices within an AYCE format.

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Appendix A: Meal Plan Details

Resident meal plans (RMP)

Meals per Week	Munch money*	Total price per semester
Plan A - Unlimited	\$100	\$1,255
Plan B -14 Meals/Week	\$250	\$1,255
Plan C - 7 Meals/Week	\$375	\$1,210
Plan D - 85 Meals/Semester	\$525	\$1,160

* May be spent at other campus dining venues

Appendix B: Description of Dining Commons

The dining commons is on the lower level of the student center. It is open from 7:30 a.m. until 7:30 p.m. during weekdays and 10 a.m. until 6:30 p.m. on weekends. Upon descending into the commons, visitors enter the dining room. The buffet area is separated from the dining room. A salad bar and fresh fruit baskets are the first stations visible upon entry into the buffet area. Beyond those first stations are two hot entree bars, a fresh pasta bar, and a sandwich bar. Off to the left there is a pizza station, antipasto bar, self-serve ice cream, and a drink station. Deeper into the buffet area there is an Asian-style stir-fry bar. Finally, a grill with hamburgers, hot dogs, fries, and other less healthy choices is located at the very back of the room alongside another drink station. Outside of the buffet area on the far side of the dining room is a dessert and coffee station.

An Examination of Multistate Antitrust Enforcement by U.S. State Attorneys General

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Abstract

There has been a well-documented rise in multistate antitrust enforcement by state attorneys general in the recent past, with a striking disparity in participation rates among states. However, there has not been an integrated explanation why. Therefore, this study analyzes the multiple factors that may have changed the antitrust enforcement dynamic at the state level. Overall, our findings suggest that (1) intense political considerations including voter preferences and special interest effects along with (2) a changing legal environment that has over time decreased the cost of undertaking multistate antitrust actions by state attorneys general have had the greatest impact. These findings help to shed light on a relatively understudied area of antitrust law and policy.

Keywords: Federalism, State Attorneys General, Antitrust, Legal Institutions

JEL Codes: H77, K21

I. Introduction

For decades after the passage of the Sherman Antitrust Act, public antitrust enforcement was by-and-large conducted at the federal level. Although many states over that period had enacted statutes similar to the Sherman Antitrust Act, few states maintained active programs to enforce these statutes (Myers and Ross 2008; Rose 1994). The states' minimal role in antitrust enforcement began to change, however, in 1976, when Congress enacted legislation that greatly expanded the authority of state attorneys general (AGs) to enforce federal antitrust statutes and provided states with funds to create and implement enforcement divisions within their respective AG offices. Subsequently, numerous state legislatures enacted or amended state laws to grant AGs similar antitrust enforcement authority, further broadening state AG antitrust enforcement powers. In the meantime, federal deregulation under the Reagan Administration during the 1980s created a regulatory gap that many state AGs believed needed to be filled (Dove 2010, forthcoming).

In response to their new empowerment under federal legislation and the devolutionary policies of the Reagan Administration, state AGs began to coordinate their enforcement efforts under the guidance of a 1983 initiative of the National Association of Attorneys General (NAAG). With multiple states participating, state AGs were able to pool resources and bring antitrust cases against even large firms that would have been cost-prohibitive for an individual AG to pursue. These significant federal and state legislative changes, federal deregulatory policy, and the increased coordination among state AGs contributed to state AGs assuming the role of a de facto third national antitrust enforcement branch, along with the Department of Justice and Federal Trade Commission (Constantine 1991; Flexner and Racanelli 1993).

The economics literature is replete with studies of antitrust enforcement and policy issues at the federal level; yet, despite the dramatic rise in the role of state AGs in antitrust enforcement, much less has been done to evaluate state enforcement. For instance, there has been extensive analysis of antitrust enforcement decision-making processes and influences. Coate et al. (1990) and Coate (2005), examines the factors underlying FTC decisions of whether or not to challenge proposed mergers.¹ Additionally, a substantial number of studies have attempted to evaluate the overall efficacy of antitrust policy. Crandall and Winston (2003) review the literature dealing with the economic impacts of federal antitrust policy and enforcement and find little empirical evidence that antitrust policy benefits consumers or curtails anticompetitive behavior. Finally, Besanko and Spulber (1989) and Ghosal and Gallo (2001) highlight some institutional constraints affecting antitrust enforcement, including asymmetric information and budgetary issues, respectively.

We hope to build on this research and contribute to a more complete understanding of the antitrust landscape by focusing on the role of state AGs in antitrust enforcement. Overall, this study explores the emergence of this de facto third national antitrust enforcement branch. Specifically, while multistate antitrust actions have increased over time, a growing disparity has emerged among the actual participation rates of individual states. The purpose of this paper is to explore and empirically analyze potential explanations for this divergence. An increased understanding of the factors affecting state AG decisions to participate in multistate antitrust actions should facilitate useful comparisons between state AG enforcement and traditional, federal agency enforcement.

¹ Davies et al. (1999) authored a similar study analyzing antitrust enforcement by the Monopolies and Mergers Commission in the United Kingdom. For a comparative study on antitrust policy in the U.S. and E.U., see Bergman et al. (2010) (finding substantial policy differences, but finding overall that neither regime appears to enforce antitrust violations more aggressively than the other).

We posit that state AG participation in multistate antitrust actions can be explained by political considerations—including the method of selecting state AGs, party affiliation, and interest group effects—along with changes in the antitrust legal regime that have simultaneously increased benefits and lowered costs of pursuing such actions. In order to examine empirically how these changes have impacted multistate antitrust efforts, we employ a panel dataset of all multistate cases between 1990 and 2008 in order to pinpoint the specific issues that influence participation in these cases by state AGs.

The remainder of the paper proceeds as follows: section 2 provides a brief history of the office of state AG, as well as a detailed analysis of the rise in the prominence of the office in state politics. We then trace the changes in state and federal antitrust legislation and judicial interpretation, both of which have drastically reduced the cost of participating in multistate cases. Thus, section 2 examines the overall environment within which state AGs must operate when considering antitrust enforcement, how specifically the relative cost and benefit calculus has changed over the years and how this has impacted state-level antitrust enforcement. Section 3 provides the data, empirical specifications, and an interpretation of our findings. Section 4 concludes.

II. Historical, Political and Legal Changes

A. History of the Office and Rise of Multistate Actions

The office of state attorney general was initially found in the American Colonies, being preserved from the English legal system (Myers and Ross 2008; Harmon 1991). Before Independence, each state AG was an official delegate of the Crown. After American Independence most states provided either statutory or constitutional authority to carry on the office.

Today there is large variation across states regarding actual authority and powers. One of the most important is the method by which each AG is selected, with 43 of the states electing their AG. Another five states (Alaska, Hawaii, New Hampshire, New Jersey, and Wyoming) provide for a gubernatorial appointment. The remaining two states, Tennessee and Maine, allow for Supreme Court appointment and secret ballot vote of the legislature, respectively, to select their AGs. In forty-nine states the AG is considered a member of the executive branch, while in Tennessee the office is a part of the judicial branch.

For most states the office was, only until relatively recently, considered of little importance.² Two important legislative efforts by Congress in 1976 were major landmarks in the changing role of state AGs. The first, to be discussed in greater detail below, was the Hart-Scott-Rodino Act (HSR), which granted sweeping power to state AGs to enforce federal antitrust law in suits on behalf of state citizens. The other, an amendment to the Crime Control Act (CCA), provided \$25,000,000 in federal seed money to state AGs to create and implement antitrust enforcement divisions within their offices.

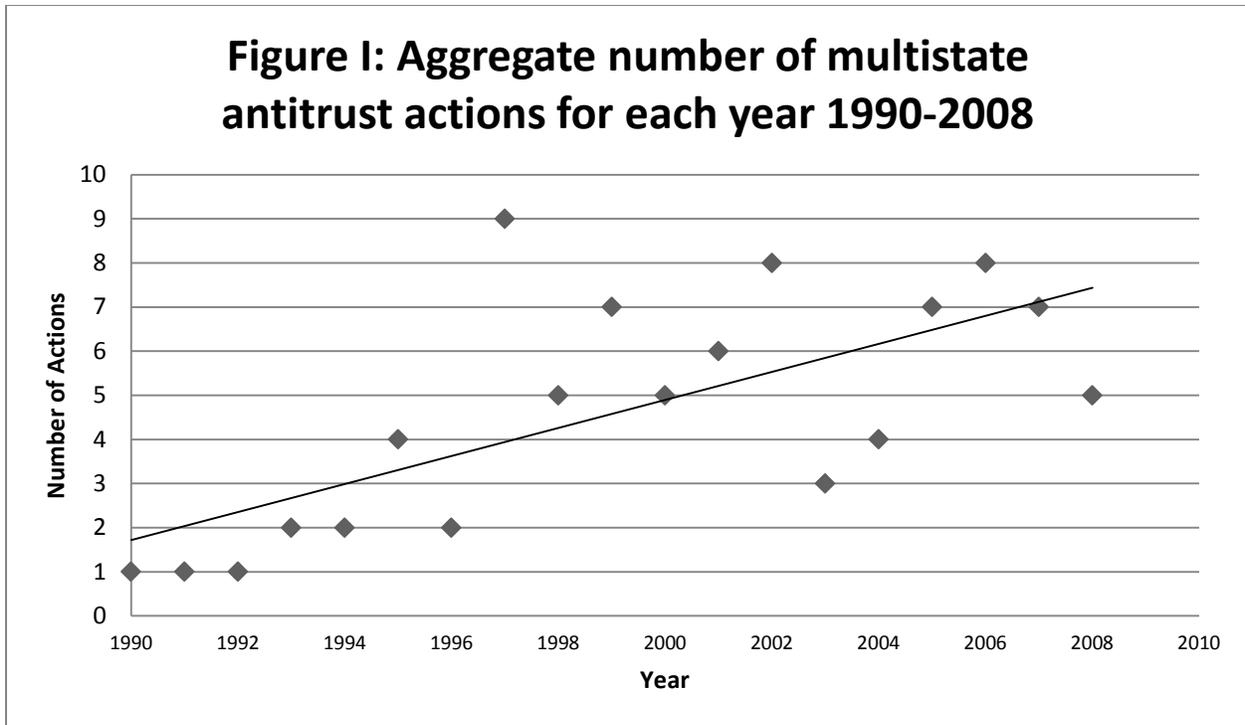
The role of state AG continued to change in the 1980s, when state-level regulatory enforcement generally became more prevalent than in the past and particularly with regard to antitrust (Myers and Ross 2008, Provost 2006).³ Antitrust enforcement saw a major shift from federal to state-level regulators under the devolutionary policies of the Reagan Administration

² A detailed history of the office of state AG can be found in Myers and Ross (2008). One interesting inquiry, although beyond the scope of this paper, would be an examination of the role of state AGs *before* the emergence of a large federal government. With regard to antitrust specifically, 21 states had antitrust statutes before the landmark Sherman Antitrust Act was passed at the federal level; in fact, the Supreme Court of the United States has described antitrust as an area of law traditionally regulated by the states (Karon 2003). However, as we note below, it appears that many states lacked effective enforcement mechanisms.

³ In regard to overall antitrust enforcement at the federal level, Crandall and Winston (2003) consider a sample of both DOJ and FTC cases from 1981 to 2000, finding a slight decrease in enforcement between 1981 and 1991, followed by an increase in enforcement over the 1991 to 2000 period. Ghosal and Gallo (2001) look at an even longer timeframe, but only for the DOJ, finding significant decreases in overall enforcement through the 1980s, and increases during the 1990s.

(Provost 2006; Dove forthcoming). The increasing prominence of many AGs emerged during this deregulation at the federal level (Clayton 2001; Zimmerman 1998; Provost 2003, 2006), during which the Administration sought to avoid many of its regulatory roles, including antitrust. This created a regulatory vacuum that motivated NAAG to launch its Multistate Antitrust Taskforce in 1983 (Clayton 1994, 2001; Greve 2005; Zimmerman 1998). The Taskforce coordinated multistate litigation to enforce antitrust violations and created several sets of antitrust guidelines regarding vertical restraints in 1985 and horizontal restraints in 1987 (Greve 2005). NAAG's coordination efforts, along with newly-established enforcement divisions established through CCA federal seed money, contributed to the rapid increase in the number of multistate antitrust actions beginning in the 1990s and carrying through to today.

Figure I provides the number of multistate cases undertaken between 1990 and 2008. Here it can be seen that between 1990 and 2008 there has been a clear, upward trend in multistate actions. Specifically, by breaking that data down, it shows that between 1990 and 1998 there was an average number of 3 cases per year, whereas between 1999 and 2008 this had increased to an average of 6.67 cases per year.



Most interesting in regard to multistate actions has been the large divergence among states in actual participation. Table 1 provides a breakdown of participation for each state that joined a multistate action between 1990 and 2008. Here, the disparity among participation rates is evident. New York had the highest participation rate at 46 cases, or just under 53% of all multistate cases over the period, while Wyoming was involved in the fewest at 16, or just over 18% of the cases. Therefore, the relevant question becomes: Why, given the general rise in multistate cases, has there been such a large divergence among states' participation rates? Part of this difference may be attributable not only to the increased exposure many state AGs saw through the 1980s, but also to the increased politicization of the office of state AG.

Table 1 Total number of multistate antitrust actions pursued by each state between 1990 and 2008

State	Number of Cases	Percentage	State	Number of Cases	Percentage
New York	46	0.528736	Rhode Island	25	0.287356
California	41	0.471264	Arizona	24	0.275862
Connecticut	40	0.45977	Arkansas	24	0.275862
Illinois	39	0.448276	Delaware	24	0.275862
Oregon	39	0.448276	Hawaii	24	0.275862
Massachusetts	38	0.436782	Michigan	24	0.275862
Washington	36	0.413793	New Mexico	24	0.275862
Maryland	35	0.402299	Tennessee	24	0.275862
Florida	33	0.37931	Kentucky	23	0.264368
Pennsylvania	32	0.367816	Louisiana	23	0.264368
Texas	32	0.367816	Minnesota	23	0.264368
Ohio	31	0.356322	New Hampshire	23	0.264368
Utah	30	0.344828	North Dakota	23	0.264368
Wisconsin	29	0.333333	Vermont	23	0.264368
Iowa	27	0.310345	Montana	22	0.252874
Nevada	27	0.310345	Oklahoma	22	0.252874
West Virginia	27	0.310345	South Carolina	22	0.252874
Colorado	26	0.298851	Alabama	21	0.241379
Idaho	26	0.298851	Nebraska	21	0.241379
Missouri	26	0.298851	New Jersey	21	0.241379
North Carolina	26	0.298851	Indiana	19	0.218391
Virginia	26	0.298851	Mississippi	19	0.218391
Alaska	25	0.287356	South Dakota	19	0.218391
Kansas	25	0.287356	Georgia	18	0.206897
Maine	25	0.287356	Wyoming	16	0.183908

B. Political Considerations

Aside from the changes that have taken place with regard to antitrust enforcement authority, the office of state AG has risen in overall significance and prominence, to a point where it has been suggested that AG effectively stands for “Almost Governor” (Provost 2010). Most state AGs—43 out of 50—are selected by partisan election. Now considered by many a springboard into higher office, over 70 AGs have run for either Governor or U.S. Congress and

another 20 have been appointed to U.S. federal court or higher federal agency post between 1980 and 1999 (Provost 2010). This has led many individuals to seek the office as a means for greater political gain (Ray and Spill 2002). Further work has found evidence connecting state AG antitrust enforcement to electoral cycles, showing that politically ambitious state AGs who ran for governor in their state were more likely to participate in antitrust enforcement cases (Dove forthcoming). As a result of this change, many AGs are incentivized to increase their exposure not only in the courtroom but also before constituents. Participation in multistate antitrust cases has increasingly become a means of achieving this. (Provost 2010).

Further, many state-specific issues may also influence the large disparity among state participation rates. The first consideration, especially for those 43 AGs that are elected, is the preferences of their respective constituents. Provost (2003, 2006) finds that AGs holding office in more liberal states were more likely to undertake consumer protection actions, possibly as a means to appear consistent with voter preferences. Therefore, we conjecture that AGs of states with more liberal voter bases will be more likely to participate in multistate antitrust cases.

Another important influence on an AG's decision may be his or her own party affiliation. Spill, Licari and Ray (2001) found that Democratic AGs in non-tobacco producing states entered into the multistate litigation against the tobacco industry in the mid-1990s much earlier than their Republican counterparts. Further, many Republican AGs may wish to convey a more "pro-business" attitude and would thus be less likely to enter into a multistate antitrust case. This has become especially apparent as many pro-business groups, including the US Chamber of Commerce, have increasingly made large campaign contributions to many Republican AGs running for office (Greenblatt 2003). Given this, we suggest that Republican AGs may be much less likely to participate in a multistate antitrust case.

Lastly, with the rise of multistate antitrust actions and, correspondingly, the role that AGs play in such actions, there may be increasing potential for special interests and lobbying to influence an AG's decision to enter into an action.⁴ Both Greve (2005) and Posner (2004), consistent with the general theory of Peltzman (1976), suggest that many antitrust actions undertaken by state AGs have been applied to out-of-state business interests, thus allowing AGs to protect in-state businesses from out-of-state competition with little regard to the actual welfare effects of these actions. Thus, we suggest that an AG's decision to participate in a multistate case may be influenced by special interest effects within a state. Further, as the number of special interests directly impacted by multistate actions increases, so too does their influence on an AG's decision. Indeed, the special interest effect has, for some, become one of the largest issues associated with state-level antitrust enforcement (Greve 2005; Majoras 2003; Posner 2001(a), 2001(b), 2004).

The growth in and increasing politicization of the office of state AG, along with special interests effects, may have increasingly influenced the decisions to enter into multistate antitrust cases. Notably, the characteristics of the office of AG that raise these possibilities stand in stark contrast to the traditional enforcers of antitrust law, the Department of Justice and the Federal Trade Commission. Both are bureaucratic organizations within the executive branch of the federal government and face significantly different constraints and incentives than do the many elected state AGs.⁵ Thus, although some studies have found evidence undermining interest group and political affiliation theories of antitrust enforcement by the Department of Justice (Ghosal and Gallo 2001), these factors may play a significant role in state AG enforcement decisions.

⁴ Some of the key expositions of private interest group theory and regulatory capture can be found in Stigler (1971), Stigler and Friedland (1962), Peltzman (1976), and Becker (1983).

⁵ For an examination of incentives facing individuals within bureaucratic institutions, see Niskanen (1968).

C. Legal Considerations

As the importance of the office of state AG has grown, there have been numerous changes with regard to antitrust law at both the state and federal levels. In 1976, Congress passed the Hart-Scott-Rodino Act, which was one of the most sweeping changes to antitrust law in decades (Flexner and Racanelli 1993; Farmer 1999; Calkins 2003). The Act amended Section IV of the Clayton Act and granted state AGs the power to pursue antitrust litigation under federal law, acting as *parens patriae*.

Literally meaning “parent of thy country,” *parens patriae* has a long legal tradition in both the English and U.S. common law (Curtis 1975). As applied to antitrust, *parens patriae* grants state AGs power to pursue alleged violations on behalf of the citizens of their states, essentially as a class action. However, what makes this authority fundamentally different than a class action suit is that it allows state AGs to circumvent the usual class certification requirements imposed on plaintiffs by Rule 23 of the Federal Rules of Civil Procedure⁶ (Farmer 1999). This procedural advantage, along with HSR’s provision entitling AGs bringing successful suits to recover treble damages, greatly increased the potential benefits associated with pursuing an antitrust action.

Before passage of the HSR, state AGs had little more than nominal ability to enforce antitrust laws, generally through pursuing injunctive relief or directly representing the state. Under the HSR, state AGs were granted sole discretion to pursue actions for all consumers and citizens of their respective states (Farmer 1999). Further, as a direct result of this legislation, many states slowly began to pass their own statutes granting state AGs the ability to pursue antitrust violations of state laws under *parens patriae* authority. By 1990, there were already 34

⁶ In fact, the perception that class action suits had been ineffective and unworkable in the antitrust context motivated Congress to provide for state AG *parens patriae* authority (Farmer 1999).

states that had granted such authority, increasing to 45 by 2008. Given the fact that *parens patriae* allows an AG to represent all of his or her constituents collectively when prosecuting antitrust cases, rather than pursuing cases on an individual basis, we conjecture that this authority has a significant impact on an AG's decision to pursue violations of antitrust law.

Another major event with respect to the HSR was a 1977 decision of the Supreme Court of the United States in *Illinois Brick v. Illinois*.⁷ The case involved a brick distributor and manufacturer, the Illinois Brick Company, which produced and sold bricks to various masonry contractors. These contractors would then turn around and submit bids for these bricks to general contractors, who would then submit their own bids to the final customers and consumers. One of these final customers was the state of Illinois, which accused the Illinois Brick Company of conspiracy in restraint of trade in violation of antitrust law.

At issue in this case was the fact that the state of Illinois was an indirect purchaser of the bricks, which passed through two separate distribution channels before actually reaching the state. In *Illinois Brick*, the Court held that the plaintiffs were excluded from making any sort of "pass through" arguments in an attempt to claim damages due to any sort of alleged overcharges. In other words, the state of Illinois, as an indirect purchaser could not claim that it had suffered damages from any overcharges due to monopolization. Therefore, the Supreme Court maintained that only direct purchasers were entitled to damages incurred through the purchase of goods from a monopoly or monopolized industry. This reversed the longstanding practice of permitting suits by indirect purchasers in federal antitrust actions.

This case had a profound impact, as it immediately reduced much of the authority that the HSR had granted to state AGs. Although the ability to bring *parens patriae* suits was still intact, given that both states and consumers were frequently indirect purchasers, it meant that pursuit of

⁷ 431 U.S. 720 (1977).

antitrust cases under federal statute would be greatly curtailed. State legislatures quickly realized the impact that this would have on a state's ability to pursue antitrust violations (Hubbard and Yoon 2005).

Therefore, over time many states passed what became known as *Illinois Brick* "repealer statutes" (O'Connor 2001; Karon 2003). These statutes generally granted each state's AG the ability as *parens patriae* to pursue violations of state antitrust law on behalf of *both* direct and indirect purchasers. Further, some state courts refused to follow the Supreme Court of the United States' interpretation of federal antitrust law in *Illinois Brick* and held that existing state antitrust statutes *did* permit suits by indirect purchasers. Between 1977 and 1989 ten states had enacted or judicially interpreted an *Illinois Brick* repealer.⁸

These repealer statutes were challenged in yet another Supreme Court case in 1989 in *California v. ARC America Corp.*⁹ In the *ARC* case, the Supreme Court ruled that federal antitrust law did not preempt state law regarding issues of indirect purchaser actions. Thus, the Court paved the way for state AGs to pursue violations of state antitrust statutes on behalf of indirect purchasers. This led an additional 15 states to pass their own *Illinois Brick* repealer laws between 1990 and 2008, resulting in a greater range and flexibility for state AGs to pursue alleged antitrust violations. Given this, we suggest that state AGs in states with an *Illinois Brick* repealer statute may be more likely to participate in multistate antitrust cases.

Overall, these changes in antitrust enforcement at the state level have decreased the cost associated with undertaking antitrust actions while simultaneously increasing the potential benefits attached with those actions. Further, the changing scope of the office as a more politicized position has also changed the nature of antitrust enforcement. The next section

⁸ Two additional state statutes (of Alabama and Mississippi) explicitly permitted suits by indirect purchasers even before the passage of the HSR.

⁹ 490 U.S. 93 (1989).

empirically examines how exactly the changes outlined above have impacted each AG's decision to pursue and participate in multistate antitrust cases.

III. Data and Empirical Analysis

A. *The Model*

In order to empirically analyze the impact that both the political considerations and the legal constraints have on an AG's decision to pursue a multistate case, we employ a population-averaged set of Poisson regressions on multistate antitrust actions undertaken between 1990 and 2008. The choice for a population-averaged model is due to the fact that the decision by a state AG to pursue a multistate antitrust action could be dependent upon the decision by other AGs simultaneously undertaking an action. The data on multistate antitrust actions comes from the National Association of Attorneys General *Antitrust Litigation Database*.¹⁰ Our model takes the following form:

$$Multistate_{it} = \alpha + X'_{it}\beta + Z'_{it} + \varepsilon_{it} \quad (1)$$

Where: $i = 1, \dots, 50$; $t = 1, \dots, 18$

Here $Multistate_{it}$ represents whether an AG in state i participated in a multistate antitrust case in year t . X'_{it} represents a set of six predictor variables, three of which are political characteristics of each state i in year t while three are legal and legislative variables found within each state i in year t . Specifically, the three political factors included are (1) the political disposition of a state's voter base, (2) the number of lobby groups found within each state and (3) the party affiliation of each AG represented by a "1" if the AG is a Republican and a "0" if he is a Democrat.

¹⁰ This information is freely available at <http://app3.naag.org/antitrust/search/>

The three legal and legislative variables employed are (1) whether or not a state AG has been granted statutory *parens patriae* authority by a state legislature (represented by a “1” if yes and “0” otherwise), (2) whether a state has either statutorily or judicially interpreted an *Illinois Brick* repealer law, (represented by a “1” if yes and “0” otherwise), and (3) The method of selecting an AG represented by a “1” if the AG is elected and a “0” if appointed.

Lastly Z'_{it} represents a set of eleven control variables (nine of which are socioeconomic while two specifically relates to the AG’s office), for each state in the sample. The socioeconomic variables include (1) Four-person median household income, (2) the percentage of the state’s population age 25 and above with a bachelor’s degree, (3) the median age of the population, (4) the percentage of a state’s population that is white, (5) the percent urban population in a state, (6) state population, (7) the state’s unemployment rate, (8) the percent change in the unemployment rate year over year, and (9) a dummy variable for whether or not the economy was in recession. These socioeconomic control variables are general to most literature.¹¹ The final control variables are whether or not a state has local prosecutors and also a proxy variable meant to capture the relative size and resources of each AG’s office.

Over the sample there were three states (Alaska, Delaware and Rhode Island) that did not have any local prosecutors. For each of these states the AG must handle all local legal matters directly. As such, we have included this control as it may in fact impact the decision to enter a multistate case for these three states, as fewer resources may be available. Finally, we also control for total per capita state expenditures. This variable has been used by a number of studies in order to proxy for total AG resources and also provides some evidence of the supply side responses to antitrust violations (Dove forthcoming).

¹¹ The first six variables were taken from the US Census Bureau (www.census.gov), while the unemployment data were taken from the Bureau of Labor Statistics (www.bls.gov), and the recession data were taken from the National Bureau of Economic Research (www.nber.org).

In order to measure the political disposition of a state's voter base we employ the Berry et al. (1998, 2007) measure of state citizen ideology. We use this measure as it is best able to account for intra-party variation (for example, the fact that a Democrat in a Southern State may be far more conservative than a Democrat in the Northeast or on the West Coast). Also, this measure includes all years back to 1960, and is therefore the most comprehensive available. The score is based on a 0 to 100 point scale, 0 being the most conservative and 100 the most liberal. The measure is a weighted score, which is based on the overall support the member of each congressional delegation within a state receives. This procedure is conducted for all candidates, whether they won or lost, in order to derive the overall measure.

Although there is no ideal measure of special interest influence, in order to best measure the impact this might have we follow Sobel and Garrett (2002) who measured the number of lobby groups in each state capital. Here we expand on this work and as a proxy for potential lobby influence we consider all firms in a state listed under the SIC code 8651 (from 1990-1996) titled "Political Organizations." For the period 1997-2008 we use all firms listed under the NAICS code 81394 titled "Political Organizations."¹² Under this framework, we are able to find the number of political organizations within each state annually. Table 2 provides the summary statistics for each variable employed.

¹² Although the two measures are virtually identical, the official industry classification system switched from the SIC coding method to NAICS coding in 1997, hence the need to employ the two different classifications over the sample.

Table 2 Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Multistate Cases	950	1.537	1.245	0	7
Berry et al. Citizen Ideology	950	50.018	15.246	8.500	95.972
Number of Lobby Groups	950	44.913	47.220	0	337
Parens Patriae (1=Yes)	950	0.745	0.436	0	1
Republican AG (1=Yes)	950	0.377	0.485	0	1
Illinois Brick Repealer Statute (1=Yes)	950	0.375	0.484	0	1
Elect/Appoint (1=Elected)	950	0.860	0.347	0	1
Direct Oversight of Local Prosecutors by an AG (1=Yes)	950	0.940	0.238	0	1
4-Person Median Household Income (In \$10,000s)	950	5.015	0.804	3.040	7.360
Unemployment Rate	950	5.100	1.370	2.130	11.220
% of Population with Bachelor's Degree	950	24.064	4.986	11.400	38.700
Median Age	950	35.717	2.613	26.300	43.000
% of Population that is White	950	83.203	11.986	25.681	98.722
Per Capita Government Expenditures (In \$10,000s)	950	0.511	0.167	0.255	1.490
% Urban	950	71.785	14.564	38.200	94.880
Population	950	5.550	6.081	0.454	36.604

B. Results and Interpretation

Table 3 provides the results for the empirical specification discussed. Here columns 1 through 3 run the initial specifications, incorporating for citizen ideology the Berry et al. (1998, 2007) citizen ideology index. Column 1 provides the results for all of the main variables of interest without controls, column 2 includes all controls excluding population, while column 3 also includes population. All of the coefficients listed are the marginal effects for each variable. Overall, the results provide considerably strong evidence about the impact that a number of these factors play on an AG's decision to enter into a multistate case. Specifically, the result for citizen ideology is positive and significant, suggesting that a one point increase in citizen's ideological disposition (meaning citizens become marginally more liberal) increases the probability that an AG will enter into a multistate case by anywhere between 0.78% and 1.5%.

An Examination of Multistate Antitrust Enforcement by U.S. State Attorneys General

Table 3: Poisson Regression Results

Dependent Variable = Number of Multistate Antitrust Actions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Berry et al. Citizen Ideology	0.00780*** (0.00264)	0.0148*** (0.00349)	0.0147*** (0.00354)						
ADA-COPE Score				0.00126 (0.00174)	0.00258 (0.00192)	0.00269 (0.00192)			
DW-NOMINATE							0.00330 (0.00353)	0.00499 (0.00376)	0.00528 (0.00377)
Number of Lobby Groups	0.00342*** (0.000738)	0.00217** (0.000903)	-0.000240 (0.00195)	0.00316*** (0.000834)	0.00182* (0.00102)	-0.00119 (0.00205)	0.00317*** (0.000835)	0.00180* (0.00101)	-0.00122 (0.00204)
Parens Patriae (1 = Yes)	0.177* (0.0939)	0.162* (0.0982)	0.172* (0.0996)	0.217** (0.0992)	0.209** (0.105)	0.217** (0.106)	0.215** (0.0989)	0.207** (0.104)	0.215** (0.105)
Republican AG (1 = Yes)	-0.200** (0.0804)	-0.159* (0.0838)	-0.158* (0.0845)	-0.203** (0.0900)	-0.170* (0.0924)	-0.166* (0.0928)	-0.195** (0.0908)	-0.169* (0.0925)	-0.164* (0.0929)
Illinois Brick Repealer Statute (1 = Yes)	-0.120 (0.0790)	-0.0633 (0.0869)	-0.0700 (0.0889)	-0.113 (0.0872)	-0.0141 (0.0975)	-0.0260 (0.0992)	-0.113 (0.0874)	-0.0138 (0.0964)	-0.0255 (0.0981)
Elect/Appoint (1 = Elected AG)	0.203* (0.109)	0.158 (0.135)	0.158 (0.139)	0.206 (0.125)	0.175 (0.155)	0.174 (0.158)	0.208* (0.125)	0.178 (0.153)	0.178 (0.156)
Direct Oversight of Local Prosecutors by an AG (1 = Yes)		0.201 (0.199)	0.159 (0.211)		0.131 (0.245)	0.0744 (0.260)		0.144 (0.240)	0.0895 (0.255)
4-Person Median Household Income (In \$10,000s)		0.205** (0.0972)	0.213** (0.0991)		0.255** (0.106)	0.260** (0.107)		0.258** (0.105)	0.264** (0.106)
Unemployment Rate		0.0606* (0.0359)	0.0572 (0.0362)		0.0759** (0.0382)	0.0710* (0.0384)		0.0785** (0.0378)	0.0736* (0.0381)
Percent Change in Unemployment Rate		-0.00339 (0.00325)	-0.00322 (0.00325)		-0.00348 (0.00327)	-0.00326 (0.00327)		-0.00350 (0.00328)	-0.00328 (0.00327)
Recession (1 = Yes)		0.0373 (0.119)	0.0105 (0.119)		0.0815 (0.120)	0.0458 (0.120)		0.0866 (0.120)	0.0505 (0.120)
% of Population with Bachelor's Degree		-0.0185 (0.0139)	-0.0162 (0.0143)		-0.0108 (0.0152)	-0.00777 (0.0155)		-0.0106 (0.0151)	-0.00759 (0.0154)
Median Age		-0.0778*** (0.0192)	-0.0790*** (0.0195)		-0.0618*** (0.0200)	-0.0636*** (0.0202)		-0.0572*** (0.0193)	-0.0589*** (0.0196)
% of Population that is White		0.00560 (0.00378)	0.00610 (0.00392)		0.00648 (0.00448)	0.00733 (0.00464)		0.00669 (0.00444)	0.00755 (0.00459)
Per Capita Government Expenditures (In \$10,000s)		-0.556 (0.386)	-0.611 (0.396)		-0.651 (0.432)	-0.699 (0.440)		-0.643 (0.427)	-0.690 (0.434)
% Urban		0.00252 (0.00416)	0.00111 (0.00435)		0.00344 (0.00483)	0.00150 (0.00503)		0.00385 (0.00479)	0.00196 (0.00498)
Population			0.0212 (0.0150)			0.0279* (0.0161)			0.0278* (0.0159)
Observations	950	950	950	950	950	950	950	950	950
Pearson Overdispersion Statistic	0.942	0.873	0.872	0.952	0.888	0.887	0.950	0.887	0.886

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Next, the special interest effect also appears to have a positive and highly significant impact on an AG's decision to pursue a multistate antitrust action. Here, the results suggest that as the number of lobby groups within a state increases by one, this increases the likelihood that an AG pursues an antitrust action between 0.22% and 0.34%.¹³ Further, AGs that had state level *parens patriae* authority and were elected were much more likely to pursue an antitrust action, though the results were much weaker. Specifically, *parens patriae* authority increased the likelihood of pursuing a multistate case between 16.2% and 17.7%, while being an elected AG increased that likelihood between 15.8% and 20.3%, though only one specification for this latter result (column 1) was statistically significant.

Lastly, Republican AGs were less likely to pursue multistate actions and, surprisingly, having an *Illinois Brick* repealer statute appeared to decrease the likelihood, though this result was not statistically significant. Here, the likelihood that a Republican AG pursued a multistate case decreased between 15.9% and 20%, while an *Illinois Brick* repealer statute reduced the likelihood between 6.3% and 12%.¹⁴

Columns 4 through 9 provide results using several different measures for citizen ideology for robustness. The first is the ADA-COPE score, which is a score that measures political liberalism of members of the U.S. Congress. This score is compiled annually by the organization Americans for Democratic Action. This score is based on the roll call vote of twenty legislative

¹³ Column 3 indicates a negative and statistically insignificant coefficient for lobby groups. However, this would appear to largely be a result of multicollinearity between this variable and population, which has a correlation coefficient of 0.91. Further, all remaining results in column 3 would appear to be consistent with those found in columns 1 and 2.

¹⁴ It is also interesting to evaluate the residuals from the regression estimates in order to assess which states the model predicts well and those not predicted as well. The four states predicted best are Alaska, Alabama, Montana, and Wyoming while the four worst predicted states include California, Michigan, New York, and Massachusetts. Although a full analysis of these results are beyond the scope of this current paper, consideration of these states and how others compare may be worthy of future research.

issues considered to be the most important in a given year. There is a total possible score of 100 points (5 for each issue), 100 meaning the most liberal and 0 meaning the most conservative.

The second ideological measure is the DW-NOMINATE score developed by Poole and Rosenthal (1985). This score was created to measure the ideological disposition of each member to the U.S. Congress by analyzing each member's roll call voting record. Thus, such a measure should proxy for overall voter ideology within a given state. In order to do this we employ the average DW-NOMINATE for each state's U.S. Senate delegation.

Overall, the results are remarkably similar to those found under the initial specification employing the Berry et al. (1998, 2007) citizen ideology measure. Interestingly, the only major difference to note is that, although AGs in states with relatively more liberal citizens are more likely to pursue multistate actions, the results for both the ADA-COPE and DW-NOMINATE scores are not statistically significant. Further, in Column 4, although elected AGs still appear more likely to pursue a multistate case, the result is not statistically significant. All of the remaining results have the same sign coefficients and statistical significance as was found in the original specification otherwise.

As a final robustness check we also break down the analysis and evaluate the model over the years 1990 through 1998 and 1999 through 2008. These results can be found in tables 4 and 5 respectively. Again, the sign coefficients and statistical significance of these results relative to table 3 are extremely similar. Therefore, for the sake of brevity we only discuss where these tables diverge relative to table 3. In table 4 the sign coefficient for lobby groups are all positive but are not statistically significant in columns 6 and 9. Further, the result for Republican AGs is not significant in column 4. Here, the results for an Illinois Brick repealer statute are actually positive, though again all results are statistically insignificant. The variable for appointed AGs is

Table 4: Poisson Regression Results: 1990-1998

Dependent Variable = Number of Multistate Antitrust Actions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Berry et al. Citizen Ideology	0.0189*** (0.00377)	0.00884* (0.00492)	0.00890* (0.00489)						
ADA-COPE Score				0.00621** (0.00267)	0.00187 (0.00281)	0.00184 (0.00283)			
DW-NOMINATE							0.00658 (0.00549)	0.00334 (0.00572)	0.00327 (0.00585)
Number of Lobby Groups	0.00551*** (0.000989)	0.00366*** (0.00120)	0.00433* (0.00229)	0.00541*** (0.00107)	0.00348*** (0.00122)	0.00366 (0.00236)	0.00536*** (0.00109)	0.00343*** (0.00122)	0.00355 (0.00239)
Parens Patriae (1 = Yes)	0.266** (0.121)	0.227* (0.124)	0.225* (0.123)	0.379*** (0.129)	0.264** (0.125)	0.264** (0.124)	0.422*** (0.130)	0.263** (0.126)	0.263** (0.125)
Republican AG (1 = Yes)	-0.248** (0.109)	-0.265** (0.114)	-0.262** (0.114)	-0.182 (0.126)	-0.260** (0.124)	-0.260** (0.124)	-0.221* (0.129)	-0.261** (0.126)	-0.261** (0.126)
Illinois Brick Repealer Statute (1 = Yes)	0.0475 (0.111)	0.107 (0.113)	0.107 (0.112)	0.173 (0.127)	0.159 (0.116)	0.159 (0.116)	0.157 (0.129)	0.158 (0.116)	0.158 (0.116)
Elect/Appoint (1 = Elected AG)	0.123 (0.145)	0.247 (0.158)	0.247 (0.156)	0.0498 (0.168)	0.265 (0.161)	0.265* (0.161)	0.0382 (0.173)	0.266* (0.161)	0.266* (0.161)
Direct Oversight of Local Prosecutors by an AG (1 = Yes)		0.361 (0.220)	0.371* (0.219)		0.407* (0.222)	0.409* (0.223)		0.414* (0.223)	0.416* (0.224)
4-Person Median Household Income (In \$10,000s)		0.0918 (0.125)	0.0867 (0.124)		0.118 (0.126)	0.117 (0.126)		0.126 (0.126)	0.125 (0.127)
Unemployment Rate		0.0950** (0.0457)	0.0962** (0.0458)		0.106** (0.0470)	0.107** (0.0477)		0.109** (0.0463)	0.109** (0.0470)
Percent Change in Unemployment Rate		0.0204*** (0.00527)	0.0203*** (0.00530)		0.0214*** (0.00526)	0.0213*** (0.00529)		0.0215*** (0.00525)	0.0214*** (0.00528)
Recession (1 = Yes)		-0.911*** (0.149)	-0.902*** (0.152)		-0.888*** (0.151)	-0.885*** (0.154)		-0.891*** (0.152)	-0.889*** (0.156)
% of Population with Bachelor's Degree		0.0140 (0.0191)	0.0136 (0.0190)		0.0180 (0.0194)	0.0180 (0.0194)		0.0181 (0.0195)	0.0181 (0.0195)
Median Age		0.0494 (0.0349)	0.0495 (0.0347)		0.0739** (0.0331)	0.0741** (0.0332)		0.0760** (0.0324)	0.0762** (0.0326)
% of Population that is White		0.00597 (0.00470)	0.00573 (0.00473)		0.00699 (0.00499)	0.00691 (0.00510)		0.00709 (0.00509)	0.00703 (0.00524)
Per Capita Government Expenditures (In \$10,000s)		0.273 (0.553)	0.286 (0.548)		0.473 (0.548)	0.476 (0.548)		0.460 (0.549)	0.462 (0.549)
% Urban		0.00167 (0.00502)	0.00205 (0.00512)		0.00210 (0.00521)	0.00219 (0.00532)		0.00222 (0.00526)	0.00228 (0.00536)
Population			-0.00584 (0.0185)			-0.00153 (0.0191)			-0.00106 (0.0194)
Observations	450	450	450	450	450	450	450	450	450
Pearson Overdispersion Statistic	0.944	0.903	0.904	0.966	0.904	0.906	0.974	0.904	0.905

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

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Table 5: Poisson Regression Results: 1999-2008

Dependent Variable = Number of Multistate Antitrust Actions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Berry et al. Citizen Ideology	0.00388 (0.00268)	0.00624 (0.00527)	0.00574 (0.00539)						
ADA-COPE Score				-0.000269 (0.00186)	-0.000819 (0.00235)	-0.00107 (0.00232)			
DW-NOMINATE							-0.000252 (0.00378)	0.00109 (0.00465)	0.000449 (0.00460)
Number of Lobby Groups	0.00294*** (0.000731)	0.00173 (0.00129)	-0.00485 (0.00299)	0.00292*** (0.000771)	0.00179 (0.00132)	-0.00515* (0.00303)	0.00292*** (0.000769)	0.00172 (0.00133)	-0.00509* (0.00302)
Parens Patriae (1 = Yes)	0.0773 (0.106)	0.115 (0.140)	0.151 (0.141)	0.112 (0.108)	0.133 (0.140)	0.171 (0.141)	0.110 (0.108)	0.130 (0.140)	0.166 (0.141)
Republican AG (1 = Yes)	-0.150* (0.0876)	-0.281** (0.112)	-0.249** (0.115)	-0.189* (0.0988)	-0.318*** (0.117)	-0.290** (0.120)	-0.185* (0.0988)	-0.295** (0.118)	-0.268** (0.120)
Illinois Brick Repealer Statute (1 = Yes)	-0.105 (0.0814)	-0.0866 (0.123)	-0.0966 (0.127)	-0.0972 (0.0860)	-0.0581 (0.123)	-0.0670 (0.130)	-0.0975 (0.0861)	-0.0651 (0.124)	-0.0760 (0.129)
Elect/Appoint (1 = Elected AG)	0.246** (0.109)	0.162 (0.204)	0.165 (0.214)	0.245** (0.117)	0.195 (0.203)	0.190 (0.217)	0.246** (0.117)	0.187 (0.205)	0.185 (0.216)
Direct Oversight of Local Prosecutors by an AG (1 = Yes)		-0.101 (0.364)	-0.233 (0.418)		-0.191 (0.395)	-0.354 (0.468)		-0.171 (0.390)	-0.319 (0.455)
4-Person Median Household Income (In \$10,000s)		0.255* (0.139)	0.251* (0.144)		0.271* (0.141)	0.265* (0.147)		0.259* (0.142)	0.254* (0.147)
Unemployment Rate		-0.0359 (0.0600)	-0.0297 (0.0609)		-0.0398 (0.0602)	-0.0326 (0.0612)		-0.0412 (0.0602)	-0.0344 (0.0611)
Percent Change in Unemployment Rate		-0.0181*** (0.00390)	-0.0183*** (0.00387)		-0.0184*** (0.00389)	-0.0186*** (0.00384)		-0.0182*** (0.00388)	-0.0184*** (0.00384)
Recession (1 = Yes)		1.457*** (0.230)	1.387*** (0.224)		1.532*** (0.232)	1.451*** (0.224)		1.513*** (0.228)	1.433*** (0.221)
% of Population with Bachelor's Degree		-0.0276 (0.0198)	-0.0189 (0.0205)		-0.0228 (0.0196)	-0.0133 (0.0205)		-0.0230 (0.0197)	-0.0140 (0.0205)
Median Age		-0.0918*** (0.0308)	-0.0927*** (0.0317)		-0.0693*** (0.0268)	-0.0746*** (0.0278)		-0.0753*** (0.0261)	-0.0783*** (0.0270)
% of Population that is White		0.00621 (0.00568)	0.00727 (0.00610)		0.00541 (0.00594)	0.00643 (0.00650)		0.00616 (0.00602)	0.00716 (0.00649)
Per Capita Government Expenditures (In \$10,000s)		-1.048* (0.564)	-1.197** (0.589)		-1.034* (0.567)	-1.227** (0.600)		-1.054* (0.571)	-1.214** (0.598)
% Urban		0.00158 (0.00646)	-0.00163 (0.00684)		0.00251 (0.00654)	-0.00130 (0.00708)		0.00290 (0.00663)	-0.000777 (0.00711)
Population			0.0550** (0.0219)			0.0582*** (0.0223)			0.0572*** (0.0222)
Observations	500	500	500	500	500	500	500	500	500
Pearson Overdispersion Statistic	0.826	0.575	0.566	0.824	0.579	0.570	0.825	0.580	0.570

Standard errors in parentheses

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

statistically significant in columns 6, 8, and 9. Finally, in column 4 the ADA-COPE variable is significant as well.

Although table 5 shows somewhat more divergence than the original specification, it is, in general, consistent with the original findings. The only major differences occur with each of the ideology variables, none of which are statistically significant and both the ADA-COPE and DW-NOMINATE variables showing a negative sign coefficient. Finally, only five of the specifications for lobby groups are statistically significant, while none of the results for *parens patriae* were significant. Overall then most of these results are consistent with those originally found, with divergences potentially caused by the reduced number of observations and also due to the fact that the overdispersion statistic on a number of specifications is relatively low.

These results suggest that the most important factors influencing an AG's decision to enter into a multistate action are the political affiliation of an AG and whether or not an AG has *parens patriae* authority. Further, the remaining political influences also play a role in an AG's decision. The fact that Republican AGs appear to reduce their involvement seems to be not only consistent with the literature but also consistent with the perceptions of being more "pro-business" (Spill, Licari and Ray 2001; Provost 2006). Further, as citizen ideology becomes more liberal, there is also an increase in the likelihood of participation, though this result is not robust. This could simply be due to the fact that, as the literature suggests, more liberal citizens may demand much greater involvement and action against perceived damages caused by firms in violation of antitrust statutes. As noted, this has been shown to be the case for state AG involvement in the tobacco settlement as well as consumer protection cases in general (Spill, Licari and Ray 2001; Provost 2006). Further, elected AGs are also much more likely to pursue multistate actions, though the result is somewhat weak. This may simply be due to the varying

incentives faced by an elected relative to an appointed AG and also the greater discretion that an elected AG may have relative to an appointed AG.

Most interesting is to note the impact that the special interest effect has relative to citizen ideology, or what may be median voter preference. Here, the results suggest that the special interest effect appears to have a much larger and more significant impact relative to voter preference, possibly indicating that the special interest effect outweighs the median voter's preference. Although this result requires more analysis, and is thus beyond the scope of this current work, it does warrant future research.

The impact that lobbying seems to play may also have other major implications. Specifically, these findings suggest that state AGs may be increasingly influenced by special interests located within a state. Given that 43 AGs are elected, as the number of lobby groups increases, so too might the campaign contributions flowing to those elections from the various groups. This may provide a vehicle whereby state AGs increasingly become involved with in-state businesses and industries, and thus may become more beholden to them, especially when the threat of an election looms. As Greve (2005) points out, there has been an increasing trend in state antitrust enforcement by AGs whereby their activity has resulted in more suits against out-of-state firms that have simultaneously benefited domestic firms and industries.

The results for *parens patriae* authority also seems to be consistent with much of the literature. As noted, *parens patriae* authority allows AGs bringing antitrust suits to circumvent many of the constraints and requirements associated with conventional class action lawsuits (Gifford 2008; Farmer 1999; Posner 2004). Further, it provides a vehicle whereby AGs are able not only to increase the number of injured parties they may represent, but simultaneously to increase the potential payouts to those parties (generally constituents). Thus, with *parens patriae*

authority the potential benefits of antitrust actions have over time increased (in the form of larger potential settlements) while simultaneously it has become less costly to undertake those same actions (as AGs bringing such suits are exempt from the burden of certifying a class pursuant to Rule 23 of the Federal Rules of Civil Procedure).

The variable which became less clear was *Illinois Brick* repealer laws. Under none of the results were *Illinois Brick* repealer statutes statistically significant. Further, the sign coefficient is actually negative, which was somewhat unexpected. One possibility may be that these statutes are only applicable to a very narrow group of affected individuals: indirect purchasers. Therefore, the ambiguity of this result may be on account of the inability to precisely determine what may or may not have been a case involving an indirect purchaser.

Overall, these results provide some interesting implications. Specifically, it appears that political considerations play the largest role for an AG in deciding whether to participate in a multistate antitrust case. Given this, these results provide the first empirical evidence that state AGs may in actuality be pursuing antitrust actions for purposes outside of general consumer protection or the public interest. These potential ulterior motives may be a result of the increased politicization of the office over time, as well as the desire for some office holders to pursue higher political offices. This may suggest that multistate actions are being pursued not only to increase the overall exposure of an AG, but also to accrue direct benefits to in-state constituents and business interests. It would also seem that the variation in both political and legal constraints among states has a large impact on an AG's decision to pursue a multistate antitrust case. Of course, these results and implications are speculative but should open new avenues for potential future research.

IV. Conclusion

Changes in the prominence of the of state attorney general as a political institution, as well as state and federal legislation and judicial decisions, have increased the prevalence of multistate antitrust enforcement efforts. This has resulted in state AGs becoming the de facto third national enforcer of antitrust law. One notable aspect of this development is the disparity in participation rates among state AGs in antitrust enforcement actions.

Overall, this study has attempted to understand this disparity in terms of the interaction of various political and legal considerations. We have found evidence suggesting that the decision of an AG to enter into a multistate antitrust suit is heavily influenced by both political considerations he must account for, as well as specific legal constraints that an AG may or may not face. We find that that the most important political influences that affect an AG's decision to enter into a multistate case are the special interest effects within a state and the party affiliation of an AG. Specifically, with more lobby groups located within a state, the more likely will that state's AG be to enter into a multistate action. Lastly, Republican party affiliation seems to reduce the likelihood that an AG will enter a multistate action.

In considering the legal constraints that an AG may face, the most important appears to be whether or not an AG has *parens patriae* authority to bring forth antitrust cases on behalf of his constituents. In other words, state AGs with *parens patriae* authority are more likely to undertake antitrust actions.

In this work, we have attempted to pinpoint more precisely influences that have most impacted the pursuit of multistate antitrust cases. Further, we have provided the first systematic empirical investigation into these influences. As such, this study has opened up an entirely new

avenue for scholars to research not only an understudied political office, but also, more generally, to examine issues of state level antitrust enforcement in greater detail.

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