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The Effects of Direct Foreign Investment

on Local Communities
David N. Figlio and Bruce A. Blonigen
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ABSTRACT

The large increase in direct foreign investment (DFI) into the United States in the late 1980s has generated considerable research on why these flows occurred and where these foreign firms located. However, very little has been done to evaluate the impact these foreign firms have on the local communities in which they locate. As a first step in addressing this topic, we use detailed county-level panel data from South Carolina across 5 year intervals from 1980 through 1995 to investigate the effect of foreign manufacturing firms on local labor markets and on the level and distribution of local government budgets. We find that manufacturing employment by foreign firms has a substantial impact on industry wages and county budgets which is significantly different from domestic manufacturing employment. With respect to wages, we find that while increased manufacturing employment generally increases county wages in an average two-digit industry, this effect is more than seven times larger when the employment growth comes from a foreign firm, rather than a domestic one. On the budget side, we find that foreign employment leads to larger declines in per capita revenues and expenditures at the county level, and to significant redistribution of county expenditures away from public school funding and toward transportation and public safety.

David N. Figlio
Department of Economics
University of Florida
Gainesville, FL 32611-7140
figliodn@dale.cba.ufl.edu

Bruce A. Blonigen
Department of Economics
University of Oregon
Eugene, OR 97403-1285
and NBER
bruceb@oregon.uoregon.edu

Introduction

The United States experienced a large wave of direct foreign investment (DFI) flows in the second half of the 1980s and the early 1990s. This has generated an extensive literature both on why these flows occurred and where these new firms located.¹ Surprisingly, very little has been done to analyze the costs and benefits to the United States from the substantial stock of foreign firms now operating here. Yet, there are many obvious policy questions that relate to the impact of DFI stock on a country. At the economy-wide level, the influx of DFI raises questions such as trade balance effects, technology spillovers and competitive effects on the domestic industry.²

However, there are also important policy questions connected to the impact of DFI on local communities. Bhagwati et al.'s (1992) concept of *quid pro quo* DFI suggests that DFI will directly stimulate "goodwill" with local communities, which in turn will lead to lower levels of future trade protection. They argue this may be an important motivation for DFI flows into the United States. In prior work (Blonigen and Figlio, 1998), we find that DFI generally increases the likelihood of trade protection votes by U.S. congressmen, but that paper does not address whether this is due to any specific effects (or lack thereof) of DFI on local communities. At the same time, policymakers and economists have questioned whether the competitive bidding for foreign investment by local communities is actually harmful. A number of recent high profile foreign investments in the United States, particularly in the automobile industry, generated considerable debate about whether state and local governments have offered unreasonably large incentives to entice foreign firms to invest in their area. The main concern is that

¹ See Graham and Krugman (1995) for a survey of possible explanations for the wave of inward DFI in the U.S. and related literature. Papers on location of DFI in the United States include Coughlin, Terza, and Arromodee (1991), Woodward (1992), and Head, Ries and Swenson (1995)

² Graham and Krugman also survey the economy-wide impacts of DFI. Blomström and Kokko (1994) examine the effects of *outward* DFI on domestic investment, exports, and employment in the Swedish economy.

various localities may end up in a bidding war that results in a “prisoner’s dilemma” that benefits the foreign firms at the expense of the winning community and the welfare of the entire country. In fact, to the extent that communities have a common valuation of the foreign firm located in their area, the community that receives the investment may suffer a “winner’s curse.” The most notable of these incidents may have been the incentives offered by the State of Alabama to attract Mercedes-Benz AG. As detailed by a November 24, 1993 article in the *Wall Street Journal*, Alabama ended up promising over \$300 million in incentives to Mercedes, including free land, employee salaries the first year of operation, property tax relief, payroll tax credits, state spending on Mercedes automobiles, etc. This led many to believe Alabama may have paid too high of a price, as expressed by George Autry, head of an economic development group based in North Carolina (a rival bidder): “They’re [Alabama] losing money to invest in their people, their roads, their state in general. For a state like Alabama, which needs money for education, that’s a problem.” (*Wall Street Journal*, September 30, 1993, p. A12)

At first glance, it may not be clear why one would expect foreign firms to have different impacts on communities than do domestic firms. In fact, studies examining the effect of new manufacturing jobs on local communities, and particularly their impact on local labor markets,³ may be sufficient for gauging the local effect of manufacturing DFI. However, recent studies have found significant economic differences between foreign-owned and domestic-owned establishments. Howenstein and Zeile (1994) use plant level data from the Annual Survey of Manufactures for 1989 and 1990 and find that foreign affiliates in the United States are larger, more capital intensive and pay higher wages than domestic plants. Globerman, Ries and Vertinsky (1994) find qualitatively identical results to those of Howenstein and Zeile using data

³ These include Marston (1985), Topel (1986), Cridfield (1989), Bartik (1991), Terkla and Doeringer (1991), and Glaeser et al. (1992). Bartik gives perhaps the most comprehensive overview of the effects of local job growth. Both his extensive review of the literature and his own analysis find that local job growth has a positive and significant long-run impact on real earnings in the community. He also finds evidence that long-run unemployment rates decrease and housing prices increase with local job growth.

on foreign affiliates and domestically-owned plants in Canada. Doms and Jensen (1996) examine manufacturing plant-level data in the U.S. and find that foreign affiliates are more productive and pay higher wages even after controlling for four-digit industry, state, plant age and plant size. Finally, Aitken et al. (1996) find that wage differentials between domestic and foreign-owned enterprises are more substantial in data on Mexican and Venezuelan enterprises than for U.S. enterprise data, particularly when controlling for industry, size and capital intensity differences.⁴

Additionally, one might not expect any differential impact on budgets depending on whether the firm is foreign or domestic. State incentives and bidding wars occur with large investments by domestic firms as well. However, there is indication that states may be particularly interested in investment by foreign firms. Woodward (1992) points out that many U.S. states have overseas trade and development offices which are intended to both promote the state's exports and attract foreign investment. Interestingly, the National Association of State Development Agencies database used by Woodward shows that over 75 percent of these expenditures are on efforts to attract foreign investment. This is significant since there are no comparable expenditures to attract investment by domestic firms and suggests that local communities may be willing to forgo greater amounts of tax revenue to attract foreign firms. In addition, anecdotal evidence suggests that foreign firms may be interested in different types of incentives than are domestic firms, which may affect the composition of local budgets accordingly. A number of *Wall Street Journal* articles on foreign investment in the United States have detailed the extensive funding for training and education programs that foreign firms (especially German firms in the Carolinas) have requested and

⁴ A related paper by Feenstra and Hanson (1997) examines the impact of DFI on the relative wages of skilled and unskilled workers in Mexico. They find that DFI, and the likely more skilled-intensive production processes connected with it, accounts for over half the increase in skilled labor wage share that occurred in Mexico in the late 1980s.

received.⁵ Foreign firms may also differ from domestic ones in terms of roads and other infrastructure they ask local governments to provide.

This paper is a first step to examine the impact of DFI at the level of the local community. We employ detailed county-level panel data from South Carolina across five year intervals from 1980 through 1995 to investigate the differential effect of foreign manufacturing firms on local labor markets and on the level and distribution of local government budgets. We focus on South Carolina for several reasons. South Carolina has one of the highest level of foreign manufacturing jobs relative to total manufacturing employment of any state. As detailed below, DFI in South Carolina varies significantly across its 46 counties with the percentage of foreign-affiliate jobs in each county ranging from zero to over fifty percent, making South Carolina an excellent focus for our analysis. In addition, because of relatively high levels of DFI historically, South Carolina has exceptionally detailed information on foreign firm presence in their state over a long time period. These data considerations were also important for our decision to focus on South Carolina.

We examine effects on wages and local budgets because, as indicated in the discussion above, these are natural dimensions over which to explore the direct costs and benefits of DFI. In addition, our focus is on the differential impact of a foreign versus domestic investment on a local community. We find that manufacturing employment by foreign firms has a substantial impact on industry wages and county budgets which is significantly different from domestic manufacturing employment. With wages we find that the addition of an average-sized new foreign manufacturing firm (190 employees in our sample) is associated with more than a 2.3 percent increase in real wages for all workers, foreign and domestic, in that industry in the county, while the estimated wage increase associated with an equal-sized new domestic firm is just 0.3 percent. This result is statistically significant and is consistent with previous studies, mentioned

⁵ For example, a *Wall Street Journal* article, May 4, 1993, reports a state-funded 2 ½ year training program for a Robert Bosch Gmbh plant in Charleston, SC.

above, that found wage differences across all U.S. plants when not controlling for local labor market conditions. It also explains why local communities may be more interested in attracting foreign firms. However, our results also suggest that communities' efforts to attract foreign firms comes at a cost. An average-sized new foreign firm is associated with a 1.2 percent reduction in real per capita revenues at the county level in South Carolina and a 1.8 percent reduction in real per capita expenditures, while the relevant comparison figures for new domestic firms are 0.1 percent and 0.2 percent reductions, respectively. Finally, we find that not only levels, but also composition of county budgets change. Specifically, foreign firm presence is associated with lower per pupil expenditures by county governments (the main source of school district financing in South Carolina), but higher expenditures on transportation and public safety. None of these compositional effects on budgets occur with domestic manufacturing employment.

Trends in DFI, manufacturing wages and county budgets in South Carolina

Historically, South Carolina has had one of the highest levels of employment by foreign firms as a percentage of total state employment, as well as a high level of growth in this percentage during the last two decades. In 1980, 4.6 percent of South Carolina employment in nonbank sectors was with foreign-owned affiliates. This was second only to Alaska and well above the 2.1 percent U.S. state average. By 1993, this percentage in South Carolina had grown to 6.7 percent, behind only Hawaii, which experienced large investment by Japanese firms, and Delaware, which had changed its tax codes substantially to attract corporate headquarters.

If we focus on manufacturing sectors only, the percentage of employees in foreign subsidiaries went from 6 percent of all manufacturing jobs in South Carolina in 1980 to over 12 percent in 1995. Throughout this section and most of the paper, we define foreign subsidiaries as only those that were established by the foreign parent as new (or greenfield) investments. In later years of our sample, there

were significant numbers of foreign acquisitions of existing domestic plants in South Carolina. In our statistical analysis described below, we find that these acquired plants are much more similar to domestic operations than foreign ones in their impact on local communities and thus, we classify them as domestic firms. However, if one includes these foreign-acquired firms, employees in foreign-owned plants grew to over 18 percent of total South Carolina manufacturing employment by 1995. Thus, regardless of how one defines DFI, employment due to foreign-owned affiliates in South Carolina is substantial, both in terms of levels and growth.

These trends have not been uniform across South Carolina's 46 counties by any means.

Table 1 gives a breakdown of levels in domestic manufacturing employment and foreign manufacturing employment from 1980 through 1995 in South Carolina's Metropolitan Statistical Areas (MSAs). Our data on total manufacturing employment comes from the County Business Patterns database, while foreign employment numbers by county come from appropriate annual issues of the South Carolina Industrial Directory.⁶ In terms of levels, the Greenville-Spartanburg-Anderson MSA has had a proportionally high share of South Carolina's total and foreign manufacturing employment across all years. However, in terms of growth in the percentage of foreign manufacturing employment, the Florence and Charleston MSAs have seen the greatest increase. It is clear from table 1 that MSAs in South Carolina generally have a larger

⁶ The *South Carolina Industrial Directory*, an annual publication, details information on manufacturing plants in South Carolina, including location, total employees, Standard Industrial Classification (SIC) codes, year of establishment, and parent company. The latter information allowed us to establish which plants were subsidiaries of foreign companies. These data were listed consistently in the annual publication back to 1980. One feature of the data were changes in plant ownership from foreign to domestic, or domestic to foreign. These changes were often observed in the industrial directories by observing changes in the listed parent company, but where questions arose we called plants directly to verify information. In about 8 percent of foreign plant-year observations, we had missing data on employee numbers. In all cases we had some information to help estimate the missing data, such as previous or subsequent period employee levels, but this of course, leads to some measurement error.

percentage of manufacturing jobs in foreign plants than the average “other county” in South Carolina.⁷ Notable other counties with a high percentage of foreign manufacturing jobs are Chesterfield and Georgetown counties with 22.3 percent and 26.9 percent of manufacturing jobs by foreign-owned plants in 1995, respectively. It is also interesting to note that growth in foreign manufacturing employment during this period was not matched by similar growth in domestic manufacturing. In fact, for most regions there was significant decline in domestic manufacturing numbers from 1980 to 1985, with fairly constant numbers after 1985. Finally, table 1 does not show the significant variation in the percentage of foreign employment that exists across the 2-digit industries in each county. All the South Carolina MSAs see this percentage range from zero percent foreign in some industries to essentially all the industry employment due to foreign-owned plants in others. Our wage regressions below exploit this variation across industries, as well as counties.

As a first look at the relationship between DFI and local community effects, we examine changes in real wages and budgets across South Carolina counties from 1980 to 1994 (or 1995, depending on the variable), and then break these changes down by how much growth in DFI a county received over the same period. Columns 1-3 of table 2 indicate how average real wages and per capita budgets changed in South Carolina from 1980 through 1994/5. Real wages grew 16.9 percent over this time period from an annual real wage of \$15,600 to over \$18,000, both expressed in 1982 dollars, while per capita real county revenues and expenditures both grew slightly during this period. Columns 4 and 5 examine whether these changes vary with the degree of DFI counties received during this same period. In fact, counties that experienced relatively high levels of DFI growth also experienced greater growth in real wages (25.9 percent compared to 12.4 percent), while these same counties had less growth in real per capita revenues

⁷ Distribution of DFI by source country is quite varied across South Carolina as well. The top source countries in terms of employee numbers in South Carolina are Germany (27 percent of total foreign employment in South Carolina), France (19 percent), Japan (17 percent), and the United Kingdom (10 percent).

and declines in real per capita expenditures. These results are only suggestive because we have not controlled for other factors and additionally, the differences between columns 4 and 5 in all instances are not statistically significant at conventional levels. However, table 2 does indicate the possibility that DFI may have a positive impact on wages at the expense of county budgets, and therefore, we next turn to more formal estimation of these relationships below.

Do foreign and domestic investment differentially affect wages?

The preceding discussion describes how foreign investment has rapidly grown in importance in South Carolina since 1980 and suggests it may be having an effect on real wages and county budgets. This section tests more formally whether foreign firms have a systematically different effect on local communities than do domestic firms. We first investigate whether foreign investment leads to different wage levels than does domestic investment. Previous studies by Howenstein and Zeile (1994) and Doms and Jensen (1996) find that foreign plants pay higher wages than domestic ones. However, the impact of these differences on local wages is not clear for a variety of reasons, including percentage of foreign-plant jobs in the local community and indirect effects of DFI on local labor supply and domestic demand conditions. In addition, there is suggestive evidence that states like South Carolina are attractive to foreign firms because of low labor costs. A *Wall Street Journal* article on investment by German firms in the Carolinas reports that low labor costs in these states more than compensates for the increased transportation costs these firms face (*Wall Street Journal*, May 4, 1993, p. A1;1). In addition, studies by Glickman and Woodward (1988) and Coughlin, Terza, and Arromdee (1991) find that high wages in a state discouraged investment by foreign firms. One might expect the wage premium given by a foreign firm to be mitigated or eliminated when that firm may be attracted to the area precisely because of its relatively low wages.

To examine the relationship between domestic and foreign employment in a county and the wage

levels in the county, we use data from County Business Patterns on industry-specific (2-digit SIC) county-specific real wages in 1980, 1985, 1990 and 1994 (the last year for which we have data) to estimate the model

$$w_{ikt} = \hat{\alpha}e_{ikt} + \hat{\alpha}f_{ikt} + \tilde{\alpha}_{kt} + \tilde{\alpha}_i$$

for county i in time t for each two-digit manufacturing industry k . Here, w reflects the average annual wage, deflated by the consumer price index to be expressed in 1984 dollars, in industry k in county i during time t .⁸ The variable e_{ikt} is total manufacturing employment for county i in SIC industry k in time t , while f_{ikt} is the level of employees in foreign-owned greenfield establishments for the specific county, industry and time. These variables come from the sources noted in the section above. The coefficients on the variables e and f are our key parameters of interest. The parameter $\hat{\alpha}$ represents the marginal relationship between wages and manufacturing employment in the industry in the county. This is similar to what has been estimated by previous studies using comparable specifications (see Bartik, 1991). Unlike previous studies, we also estimate the *differential* marginal effect of foreign manufacturing employment in the industry in the county, represented by parameter $\hat{\alpha}$. To capture unobserved county-specific differences in wages, we control for county-specific fixed effects $\tilde{\alpha}$, while to control for time-varying industry-specific common effects we include industry-time-specific fixed effects $\tilde{\alpha}$.

While this specification is extremely parsimonious, we contend that it captures sufficiently the differential relationship between foreign and domestic investment and the wages in a community.⁹ In

⁸ A shortcoming of these data is that we cannot distinguish full-time from part-time workers, and we must pool together all occupations within an industry. The ideal data set would have individual-level observations on specific occupation and hours worked to more fully control for these potential differences. However, we know of no datasets that would have sufficient individual -level observations in any given geographic area to address this issue. We note, however, that our approach is comparable to that used by previous studies.

⁹ We tried alternative regressor specifications to estimate the differential impact of foreign employment on wages and budgets. These included substituting the regressors, f and e , with f/e by itself and with f/e and e . These generally gave qualitatively similar results with less precision, but also raised

particular, we note that while it is easy to think of time-varying, county and industry-specific factors that are correlated with *both* changes in foreign and domestic investment in a county, it is difficult to conceive of a variable that should be associated with the *share* of total employment held by foreign firms and also with wages paid in the community. Therefore, while the estimated parameters α may not reflect the true relationship between employment and wages as a whole, the parameters $\hat{\alpha}$ should be accurate reflectors of the *differential* effect of new foreign versus domestic employment.

We report the results of this estimation in the first row of Table 3. First, we observe that the relationship between domestic manufacturing employment and wages in a county is significantly positive. We find, for instance, that each additional domestic manufacturing worker in an industry in a county is associated with about a 25 cent increase (in 1984 dollars) in annual wages for *all workers in that industry*. Contrast this finding with the estimated relationship between foreign employment and county wages: each additional foreign manufacturing worker in an industry in a county is associated with about a \$1.75 increase in annual wages for *all workers in that industry*. Hence, we find that the marginal new foreign manufacturing job has about seven times the effect on wages as does the marginal new domestic manufacturing job. This difference is statistically significant at any reasonable threshold. All standard errors are adjusted to correct for heteroskedasticity and within-county correlations of errors.

How large are these effects? At first glance, though strongly statistically significant these numbers appear quite small. But consider the estimated effects on wages of adding a single average-sized firm. In our data, the average-sized new foreign manufacturing firm has about 190 employees; our results would suggest, therefore, that adding a single foreign firm to a county is associated with more than a 2.3 percent increase in real wages for *all workers, foreign and domestic, in that industry in the county*. The estimated

extra issues, such as collinearity problems in the case of the latter.

wage increase associated with an equal-sized new domestic firm is just 0.3 percent.¹⁰ As a sensitivity check, we also estimate our model in differences, in which we can now control for county-specific *trends*, rather than just level fixed effects. While the estimated difference between the estimated effects of foreign and domestic manufacturing jobs is considerably smaller than before, it remains statistically significant at conventional levels.

Of course, it is always possible that our results could suffer from endogeneity bias. If for some reason foreign firms are attracted to high-wage areas, then we might overstate the difference between foreign and domestic firms. While this explanation seems unlikely (as discussed above, the evidence suggests that, if anything, foreign firms are attracted to low wage areas) it is still plausible. We could not find an instrument that explains a significant portion of the variance in within-county, within-industry changes in foreign investment shares over time, while also passing Hausman instrument exogeneity tests. However, we propose an alternative way of gauging the degree to which this possible simultaneity may be driving our results. As noted earlier, to this point we have treated foreign-acquired plants as if they were domestic. If there is something special and unobservable about a county that would attract a disproportionate amount of foreign investment (rather than domestic investment) and that is driving our results, we would expect that foreign-owned but acquired firms would have the same effect as the one we find regarding new foreign investment. To explore whether this is the case, we estimate our model with

¹⁰ One focus of Aitken et al. (1996) was measuring spillover effects in wages from foreign firms to domestic ones. Because our industry wage data is at the county level, rather than the country level as in Aitken et al., we do not have separate wage data for foreign and domestic firms to identify direct versus spillover effects from foreign firm employment. However, there may be some evidence for spillovers in our estimates. If we assume that domestic firms' do not respond to higher foreign employment in the sector (i.e., no spillovers), then a 14% pay differential between foreign and domestic firms is necessary in our data to explain the larger increase in *industry* real wages from an additional foreign firm versus an additional domestic one. Howenstine and Zeile (1994) find a 16% pay differential (\$38,300 in foreign plants compared to \$33,000) using BEA plant-level data for all U.S. plants in 1990. However, they find that only 30% of this pay differential is due to within-industry differences rather than industry-mix effects. This suggests a within-industry differential of only 5%, which is significantly lower than the 14% differential necessary to preclude spillovers in our estimates.

three categories of firms: domestic firms, foreign acquisitions, and new foreign investment. We find that there is no discernable difference (either in magnitude or statistical significance) between domestic firms and foreign-acquired ones in the relationship between employment and wages, but both are substantially (and significantly) different from new foreign investment. This suggests that our results are not likely driven by endogeneity of foreign investment and wages.

Effects on county budgets

In the preceding section, we report that foreign firms apparently lead to differentially high wages in local communities. Thus, our results suggest this is a benefit to workers in these communities. At the same time, there has been concern that the incentives needed to lure these higher wage jobs may incur a large cost and come at the expense of other important areas often funded by local communities, such as education. In this section we examine the differential impact between foreign and domestic manufacturing employment growth on both the level of per capita county revenues/expenditures and the composition of these budgets. On the one hand, our wage results might imply that county budgets may rise with DFI, if it correlates with rising property values as well. On the other hand, if foreign firms, either because of their size or because of their foreign-ness, receive differentially large tax breaks or exert influence to lower local budgets, it is possible that they may lead to lower revenues and expenditures per capita than would occur if the new employment came from domestic firms.

To explore this possibility, we estimate the differential relations between domestic and foreign firms and two measures of local government budgets: real per capita revenues and real per capita expenditures.¹¹ (As before, we express these variables in terms of 1982 dollars.) Our budget data come from the South Carolina Department of Revenue (for the years 1990 and 1995) and the City and County

¹¹ Here we measure budgets as the sum of all local government (county or municipal) revenue or expenditures in a county.

Data Books (for the years 1980 and 1985). We estimate variants of the equation:

$$b_{it} = \hat{a}e_{it} + \hat{a}f_{it} + \tilde{a}_t + \tilde{a}_i,$$

where b represents the real per capita budgets of *all* local governments in county i during time t , e and f are total manufacturing employment and foreign manufacturing employment taken from the same sources as before, and \tilde{a}_t and \tilde{a}_i are year and county fixed effects, respectively. As before, the \hat{a} coefficient will estimate the differential impact of foreign employment relative to domestic employment.

We report the results of this exercise in the second and third rows of Table 3. We observe that in the cases of both revenues and expenditures, new foreign employment apparently leads to significantly lower levels of per capita budgets than does a comparable amount of new domestic employment. Specifically, a new foreign firm is associated with twelve times the revenue reduction and eight times the expenditure reduction of a new domestic firm of the same magnitude. For instance, while an average-sized new foreign firm is associated with a 1.2 percent reduction in real per capita revenues and a 1.8 percent reduction in real per capita expenditures, the relevant comparison figures for new domestic firms are 0.1 percent and 0.2 percent, respectively.¹²

We observe that foreign firms apparently lead to lower budget levels than before. Do they seem to systematically change the composition of local budgets as well? To explore this possibility, we investigate the differential relationships between foreign and domestic employment and several important local spending categories for which we have data.

Education spending

Two-thirds of all local government expenditures in South Carolina support public education. As

¹²Theoretical work by Janeba (1997) suggests that even though state budgets may be adversely affected in the short-run from tax incentives, states may be able to extract greater revenue once the firm is relocated, particularly when firms are immobile. Unfortunately, the necessary data to test Janeba's proposition do not currently exist.

with local budgets, it is impossible to sign ex ante the expected relationship between foreign firms and support for public education. On the one hand, the anecdotal evidence suggests that foreign manufacturers value a highly-skilled and well-educated work force and so might be expected to push for higher educational spending - foreign firms often request education and training expenditures from local communities as part of location incentive packages. On the other hand, if employees of foreign firms tend to disproportionately enroll their children in private schools, one might expect support for public education in communities with increasingly important foreign employment shares to atrophy.¹³ Since school districts in South Carolina are dependent on county governments, county governments have considerably more latitude in shifting resources to or away from schools in South Carolina than in states (principally in the north and west) where school districts are independent.

To investigate the relationship between foreign investment and support for public education, we estimate an equation identical to those used for the budget specifications above, except that now the dependent variable is real per pupil expenditures on K-12 education. The results of this analysis are reported in the fourth row of Table 3. The results suggest that while communities with increasing levels of domestic employment tend to increase their support for public education (though this relationship is insignificant), those with increasing shares of foreign employment apparently tend to decrease their support for public schools. While the effects of any one firm are quite modest--for instance, an additional new foreign firm is associated with less than half a percent decrease in per pupil school expenditures--aggregating up to a number of new foreign firms in a county could lead to more substantial changes. For instance, a one-standard-deviation increase in foreign employment in a county is associated with almost a two percent reduction in real per pupil school expenditures.

¹³ German nationals located in the Carolinas apparently avoid sending their children to public schools in favor of private ones, according to a May 4, 1993 *Wall Street Journal* article. Also, training and education programs requested by foreign firms are often for apprenticeship programs in area vocational schools that will directly lead to employment in their firm.

What could lead to this change? In the fifth row of Table 3 we explore the differential effects of foreign versus domestic investment on the fraction of K-12 students in the county who attend public schools. We observe that foreign employment is significantly related to the fraction of students attending public schools in a county. A new foreign firm of average size is associated with about 0.11 percentage points fewer students attending public schools. Since just over six percent of students attend private schools in South Carolina, on average, this suggests that adding a single new average-sized foreign firm is associated with a 1.8 percent larger private school sector in the county. A new domestic firm is (insignificantly) associated with a slightly larger public school sector (or smaller private sector). Hence, apparently employees of foreign firms are disproportionately likely to send their children to private schools.

What is the effect of the reductions in school spending on measured school services? To address this issue, we correlate changes in foreign and domestic employment in a county with changes in measured school services in the school districts in that county using private-access data from the Schools and Staffing Surveys administered by the U.S. Department of Education. While not a population sample, we have a panel of observations for 52 school districts, more than half of all school districts in the state of South Carolina, for the 1990-91 and 1993-94 academic years, the closest years that we could get to 1990 and 1995. Despite the lower average per pupil expenditures associated with foreign firms, there is no perceptible average reduction in real teacher salaries (found by Figlio, 1997 to be associated with higher teacher quality levels) or teacher-student ratio. However, there is considerable heterogeneity in the relationship between these variables and foreign investment. Specifically, it turns out that for below-median-income (in the state) school districts, the estimated effect of foreign employment on measured school services is significantly more negative than the estimated effect of foreign employment in above-median-income districts. Furthermore, it is only the lower-income areas that see differential movement to private schools and reductions in public school expenditures associated with foreign investment. Therefore, it appears that employees of foreign firms in lower-income areas tend disproportionately to enroll their

children in private schools, but this tendency is not observed for higher-income areas. In the lower-income areas, increased foreign employment is strongly associated with lower levels of school expenditure and measured services.

Not only does foreign investment appear to change spending on schools in affected communities, but it also appears to change affected schools' *priorities* as well. Using data from the Schools and Staffing Surveys, we find that school districts whose counties experience increases in the foreign share of manufacturing employment are significantly more likely to introduce policies of free teacher retraining in mathematics, science and foreign languages over the same period. Therefore, we find suggestive evidence indicating that public schools in areas with foreign investment growth tend to shift their focus toward science, mathematics, and foreign language instruction.

Transportation and public safety

It appears that spending on public education is negatively related to foreign investment--at least in low-income communities. We next explore whether these expenditures are switched in part to other budget categories. For example, Coughlin, Terza, and Arromodee (1991) find that foreign firms are attracted to states with more extensive transportation infrastructure, which suggests local communities may direct more monies into transportation expenditures. To examine this issue, we estimate similar models to the ones described above, except that now the dependent variables are the fractions of total local expenditures going to transportation or to public safety.¹⁴ Here, we only have observations for three years--1980, 1990 and 1995--taken from the City and County Data Books (in the case of 1980) or data provided us by the South Carolina Department of Revenue for the other years. The results of these regressions are reported in the

¹⁴ Our dependent variable takes a different form here (fraction of total spending, as opposed to per pupil spending) than it does regarding education due to data limitations. We look at public safety and transportation because these are the two budget line items for which we have three years of data that correspond to the years for which we have information on foreign investment.

last two rows of Table 3.

We observe that while new domestic manufacturing firms do not seem to affect the fraction of local expenditures going to transportation or public safety, new foreign firm apparently significantly increase the fraction of expenditures going to transportation, at least. While the relationship between foreign employment and public safety expenditure is statistically insignificant at conventional levels, the point estimate on foreign firms is much larger than that estimated for domestic employment. Hence, it appears that foreign investment leads local governments to redistribute funds from education spending to spending on transportation and possibly public safety.

Does the size distribution of foreign firms matter?

Our preceding evidence suggests that foreign firms have a substantially different effect on wages and budgets in local communities than do domestic firms. But the question remains: does the size distribution of foreign firms matter, or is the sheer fraction of foreign employment all that matters? That is, if a county gets 500 new foreign jobs, is the effect on local wages and budgets the same if the 500 new jobs come from one manufacturing concern, as opposed to ten 50-employee manufacturing firms? Many of the studies that have examined differences in foreign versus domestic plants, including Globerman, Ries and Vertinsky (1994) and Doms and Jensen (1996) find that controlling for size can significantly affect estimated differences. Thus, if foreign firms are systematically larger than the average domestic firm, our results may be explaining differences in large and small firms, not foreign and domestic ones. To explore the sensitivity of our results, we estimate similar models to those presented above, except this time allow the marginal effects of foreign employment to vary depending on the market concentration of foreign firms in the industry (or county).

The first row of Table 4 presents the results of our estimation of the equation:

$$w_{ikt} = \hat{\alpha}e_{ikt} + \hat{\alpha}f_{ikt} + \hat{\epsilon}f_{ikt}h_{ikt} \tilde{\alpha}_{kt} + \hat{\alpha}_i ,$$

where h represents a measure of the market concentration of foreign firms in the industry in the county. Specifically, we calculate h as the sum over all foreign firms in the industry in the county of their squared market shares (as a fraction of total employment in the industry). Therefore, a higher value of h reflects greater concentration of the foreign firms in the industry in the county, and presumably greater influence of any given foreign firm in the county.

We observe that the relationship between foreign employment and wages is strongly related to the concentration of foreign firms in the industry. Specifically, we estimate that the marginal effect of an additional foreign employee on wages is twice as large if the market concentration is at the 75th percentile in the state, relative to when the concentration is at the 25th percentile in the state. Therefore, it appears that wages in the county will increase more if one new large foreign firm enters, as opposed to when a number of smaller foreign firms with the same aggregate level of new employment enter the industry.

We also find limited evidence suggesting that the market concentration of foreign firms plays a role in determining local budgets as well. Specifically, the marginal effect of foreign investment on per capita revenues is three-quarters as high when the market concentration is at the 75th percentile in the state, relative to when the concentration is at the 25th percentile in the state. However, this difference is much smaller (and less significant) in the case of per capita expenditures. With regard to budget categories, the only case in which concentration of foreign firms seems to matter involves the fraction of local expenditures going to transportation. In that case, the marginal effect of foreign investment on the transportation spending share is 47 percent higher when the market concentration is at the 75th percentile in the state, relative to when the concentration is at the 25th percentile in the state. In many ways, one might expect the last result more than any of the others, as transportation spending is more likely to have localized effects within a county than would other budget spending categories; hence, it is reasonable to expect that a firm with relatively high market power should be more likely to influence spending on transportation than would a collection of firms, each with low market power.

Conclusion

This paper presents evidence that foreign firms have considerably different effects on local communities than do domestic firms. Using detailed data on foreign and domestic investment across industries and counties and over time in South Carolina, we find that foreign firms tend to significantly increase wages paid to workers in an industry in a local community, but also lead to substantially lower per capita government budgets. Moreover, foreign firms apparently induce changes in local government budget allocations; specifically, we find evidence suggesting that communities experiencing relative increases in DFI tend to substitute from education spending to spending on transportation and public safety.

We acknowledge that there are limitations to our analysis and results. For example, while our results show that the presence of foreign firms is associated with higher wages in the industry in a community, our results cannot identify whether this is due to foreign firms paying higher wages to a given worker, foreign firms using higher skilled workers that command higher pay, or some alternative explanation. Likewise, while foreign firm presence is associated with lower per capita budgets, we have not directly tested whether offered tax incentives are the source of this result. Nevertheless, our results point to substantial differences in how foreign manufacturing firms affect local communities than domestic ones, and we intend to explore potential explanations further in future work.

References

- Aitken, Brian, Ann Harrison and Robert E. Lipsey. (1996) "Wages and Foreign Ownership: A Comparative Study of Mexico, Venezuela, and the United States," *Journal of International Economics*, 40(3/4): 345-71.
- Bartik, Timothy J. (1991). *Who Benefits from State and Local Economic Development Policies?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
- Bhagwati, Jagdish N., Elias Dinopoulos, and Kar-Yui Wong. (1992) "Quid Pro Quo Foreign Investment." *American Economic Review, Papers and Proceedings*. 82(2): 186-90.
- Blomström, Magnus. (1991) "Host Country Benefits of Foreign Investments," in D. G. McFetridge (Ed.), *Foreign Investment, Technology and Economic Growth*. Calgary: University of Calgary Press.
- Blomström, Magnus, and Ari Kokko. (1994) "Home Country Effects of Foreign Direct Investment: Evidence from Sweden." NBER Working Paper No. 4639.
- Blonigen, Bruce A. and David N. Figlio. (1998) "Voting for Protection: Does Direct Foreign Investment Influence Legislator Behavior?" *American Economic Review*, 88(4):1002-1014.
- Caves, Richard E. (1979) "Multinational Firms, Competition and Productivity in Host-Country Industries," *Economica*. 41: 176-93.
- Coughlin, Cletis, Joseph V. Terza, and Vachira Arromodee. (1991) "State Characteristics and the Location of Foreign Direct Investment within the United States," *Review of Economics and Statistics*, 73(4): 675-83.
- Crihfield, John B. (1989). "A Structural Empirical Analysis of Metropolitan Labor Demand," *Journal of Regional Science*, 29(3): 347-371.
- Doms, Mark E. and J. Bradford Jensen. (1996). "Comparing Wages, Skills, and Productivity Between Domestic and Foreign Owned Manufacturing establishments in the United States," mimeo.
- Feenstra, Robert C. and Gordon H. Hanson. (1997). "Foreign Direct Investment and Relative Wages: Evidence from Mexico's Maquiladoras," *Journal of International Economics*, 42(3/4): 371-393.
- Figlio, David N. (1997) "Teacher Salaries and Teacher Quality," *Economics Letters*, 55(2): 267-271.
- Glaeser, Edward L., Hedi D. Kallal, Jose A. Scheinkman, and Andrei Shleifer. (1992). "Growth in Cities," *Journal of Political Economy*. 100(6): 1126-1152.
- Glickman, Norman J. and Douglas P. Woodward. (1988). "The Location of Foreign Direct Investment in the United States: Patterns and Determinants," *International Regional Science Review*. 11(2): 137-154.
- Glickman, Norman J. and Douglas P. Woodward. (1989). *The New Competitors: How Foreign Investors*

are Changing the U.S. Economy. New York: Basic Books.

Globerman, Steven, John C. Ries, and Ilan Vertinsky. (1994). "The Economic Performance of Foreign Affiliates in Canada," *Canadian Journal of Economics*, 27(1): 143-156.

Graham, Edward M. and Paul R. Krugman. (1995). *Foreign Direct Investment in the United States, Third Edition*. Washington, DC: Institute for International Economics.

Head, Keith, John Ries, and Deborah Swenson. (1995). "Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States," *Journal of International Economics*, 38(3/4): 223-247.

Howenstein, Ned G. and William J. Zeile. (January 1994). "Characteristics of Foreign-owned U.S. Manufacturing Establishments," *Survey of Current Business*, 74(1): 34-59.

Marston, Stephen T. (1985). "Two Views of the Geographic Distribution of Unemployment," *Quarterly Journal of Economics*, 50(1): 57-79.

Terkla, David G. and Peter B Doeringer. (1991). "Explaining Variations in Employment Growth: Structural and Cyclical Change among States and Local Areas," *Journal of Urban Economics*, 29(3): 329-348.

Topel, Robert H. (1986). "Local Labor Markets," *Journal of Political Economy*, 94(3): S111-S143.

Woodward, Douglas P. (1992). "Locational Determinants of Japanese Manufacturing Start-ups in the United States," *Southern Journal of Economics*, 58(3): 690-708.

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Table 1
 South Carolina Domestic Manufacturing Employment
 and Foreign Manufacturing Employment, By Metropolitan Statistical Area and Year

Region	1980			1985			1990			1995		
	Domestic	Foreign	Percent Foreign	Domestic	Foreign	Percent Foreign	Domestic	Foreign	Percent Foreign	Domestic	Foreign	Percent Foreign
Charleston ¹	17810	1454	7.55	17078	2631	13.35	17833	3799	17.56	17822	4085	18.65
Columbia ²	25676	2939	10.27	23875	3727	13.50	22025	3939	15.17	23762	4153	14.88
Florence	12406	200	1.59	11055	1078	8.88	11028	1698	13.34	11075	1883	14.53
Greenville-Spartanburg-Anderson ³	128304	14227	9.98	111523	16407	12.82	107959	21869	16.84	104755	24367	18.87
Other Counties	193737	5377	2.70	171459	5662	3.20	176488	8432	4.56	175470	11586	6.19
State Total	377933	24197	6.02	334990	29505	8.09	335333	39737	10.59	332884	46074	12.16

¹ Berkeley, Charleston, and Dorchester counties.

² Lexington and Richland counties.

³ Anderson, Cherokee, Greenville, Pickens, and Spartanburg counties.

Table 2
Over-time Changes in Wages and County Budgets in South Carolina:
Broken Down by Changes in Direct Foreign Investment Shares

Variable	Mean real value in 1980 (thousands of 1982 dollars)	Mean real value in 1994/5 (thousands of 1982 dollars)	Percentage change from 1980 to 1994/5	Percentage change from 1980 to 1994/5 (counties with below- median change in DFI)	Percentage change from 1980 to 1994/5 (counties with above- median change in DFI)
Real wage in industry in county	\$15.60	\$18.24	16.9%	12.4%	25.9%
Real per capita revenues	\$0.96	\$1.02	6.3%	11.6%	2.1%
Real per capita expenditures	\$0.97	\$0.99	2.1%	8.5%	-3.0%

Table 3
Differential effects of domestic and foreign manufacturing employment on industry-specific, county-specific real wages
and real county-level per capita budgets and budget items

Dependent variable	Effect of an additional domestic manufacturing job	Effect of an additional foreign manufacturing job	Difference between foreign and domestic manufacturing jobs	Difference in the case in which dependent variable measured in changes ¹
Real annual wage (\$1984) ²	0.249 (p=0.002)	1.751 (p=0.000)	1.502 (p=0.000)	0.649 (p=0.052)
Real per capita revenues (\$1984) ³	-0.005 (p=0.481)	-0.061 (p=0.103)	-0.056 (p=0.099)	-0.056 (p=0.196)
Real per capita expenditures (\$1984) ³	-0.011 (p=0.233)	-0.090 (p=0.061)	-0.079 (p=0.054)	-0.035 (p=0.203)
Real per pupil school expenditures (\$1984) ³	0.013 (p=0.110)	-0.032 (p=0.045)	-0.045 (p=0.004)	-0.046 (p=0.016)
Fraction of K-12 students in public schools (x100) ³	0.131 (p=0.308)	-0.585 (p=0.018)	-0.716 (p=0.002)	-0.677 (p=0.053)
Fraction of local expenditures going to transportation (x100) ³	0.006 (p=0.174)	0.035 (p=0.052)	0.029 (p=0.089)	n/a ⁴
Fraction of local expenditures going to public safety (x100) ³	0.000 (p=0.959)	0.058 (p=0.190)	0.058 (p=0.164)	n/a ⁴

¹Models control for county-specific time trends as well as dependent-variable-specific fixed effects noted below.

²Model controls for county-specific fixed effects and industry-year-specific fixed effects. Standard errors are heteroskedasticity-robust.

³Model controls for county-specific fixed effects and year effects. Standard errors are heteroskedasticity-robust.

⁴Cannot estimate model due to lack of observations. Standard errors are heteroskedasticity-robust.

Table 4

Dependent variable	Effect of an additional foreign manufacturing job when foreign concentration in manufacturing is at 25 th percentile	Effect of an additional foreign manufacturing job when foreign concentration in manufacturing is at 75 th percentile	Difference between columns
Real annual wage (\$1984) ¹	0.752 (p=0.125)	1.510 (p=0.000)	0.758 (p=0.001)
Real per capita revenues (\$1984) ²	-0.102 (p=0.006)	-0.077 (p=0.042)	0.025 (p=0.001)
Real per capita expenditures (\$1984) ²	-0.100 (p=0.028)	-0.094 (p=0.047)	0.006 (p=0.348)
Real per pupil school expenditures (\$1984) ²	-0.031 (p=0.090)	-0.032 (p=0.057)	-0.001 (p=0.803)
Fraction of local expenditures going to transportation (x100) ²	0.019 (p=0.262)	0.028 (p=0.082)	0.009 (p=0.000)
Fraction of local expenditures going to public safety (x100) ²	0.066 (p=0.182)	0.062 (p=0.185)	-0.004 (p=0.449)

¹ Model controls for county-specific fixed effects and industry-year-specific fixed effects. Standard errors are heteroskedasticity-robust.

² Model controls for county-specific fixed effects and year effects. Standard errors are heteroskedasticity-robust.