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Abstract

This paper considers the relationship between local industrial organization and agglomeration economies. Prior work has argued for the existence of a virtuous circle of urban entrepreneurship: the presence of small establishments produces an environment conducive to growth, in particular entrepreneurial growth. The paper investigates this prediction empirically, showing that additional activity at smaller establishments is associated with a larger amount of entrepreneurial activity.

There is more than one way to make the same shoe or dress or toy. One is the way of the New York Metropolitan Region's producers: to accept the handicaps of high labor costs, traffic congestion, urban rents, and urban taxes, while exploiting the advantages of speed, flexibility, and external economies. The other is to shed the New York-type handicaps while accepting the disadvantages of remoteness and inflexibility in a larger and more self-contained plant.

-Raymond Vernon (1960, p. 75)

Large firms...are much more fully integrated and therefore depend less on outside suppliers. On the one hand, this means that, dollar for dollar, their business is less of a stimulus to the creation of a community of independent suppliers. On the other hand, the new entrant is not likely to find that the company is anxious to spread its fixed costs by making its services available to outsiders.

-Benjamin Chinitz (1961, p. 288)

I. Introduction

There is a long history of research on the relationship between agglomeration and productivity. See Rosenthal and Strange (2004) for a review. There is also a long history of urban thinking that has considered the role of the organization of production into firms in the generation of increasing returns. Notable contributions include Vernon (1960) and Chinitz (1961) – as quoted above – and also Jacobs (1969), Piore and Sabel (1984), and Saxenian (1994). In particular, there has been much attention paid to the role of small firms in the generation of agglomeration economies. This paper will carry out an econometric analysis of the organization-agglomeration relationship. It will thus consider the relationship between the corporate organization of production (into establishments) and the spatial organization of production (into cities).

Agglomeration economies are inherently geographic in nature. It does not matter whether the increasing return arises from consumer/supplier linkages (as in the quotes above), from entrepreneurial spillovers (as in Sorenson-Audia (2000) and Klepper (2007)), or from knowledge spillovers or labor market pooling (as in Marshall (1890)). In all cases, the agglomeration economy arises from spatial proximity. We will therefore consider the impact of small establishments on entrepreneurship in an explicitly geographic setting.

To carry out this analysis, we make use of data from Dun and Bradstreet (D& B) Marketplace from the first quarter of 2007 and the fourth quarter of 2005. The data are available at the zip code level. We convert zip code data into census tracts in order to make use of Census demographic data. These

data allow us to include controls for local socio-economic characteristics. Next, we compute the levels of activity within 1 and 5 miles of the geographic centroid of a given census tract, both total employment and employment at individual two-digit industries. These employment data are disaggregated further by establishment size. Specifically, we break down the employment within a given distance of a census tract into employment at small establishments (10 or fewer employees), medium-sized establishments (11-50 employees), and large establishments.

Our basic specification will be as in Rosenthal and Strange (2003). This involves estimating arrivals and new establishment employment models with agglomeration variables that account in a flexible way for the size distribution of establishments at a given location. In addition to the socio-economic controls, the specification includes MSA fixed effects to control for a range of MSA-level characteristics that potentially impact entrepreneurship. We also estimate a model with census tract fixed effects to further control for the determinants of entrepreneurial activity.

The results of these models are consistent with the idea that small establishments have big effects. In the arrivals models, our estimates of the marginal effect of employment at large establishments have the wrong sign, are insignificant, or are substantially smaller than the effects of employment at small and middle-sized establishments. The weak effect of employment at large establishments continues to hold in models where new establishment employment is regressed on indicators of local employment. For both arrivals and employment models, the effects tend to be strongest for small establishments. In the cases where the small establishment effect is not the strongest, it is always the case that the medium-sized establishment effect dominates. This pattern of results holds in models where the local environment is defined according to activity within 1 mile and according to activity within 5 miles. These results hold for models considering overall activity nearby (urbanization) and activity in an establishment's own 2-digit industry (localization). The results persist in the models with tract fixed effects. Taken as a group, these models provide strong evidence of a small establishment effect.

This leads to what is arguably the fundamental question in research on agglomeration: what are the micro-foundations of the external increasing returns that give rise to the agglomeration patterns

observed in the data? In our case, we are concerned with the micro-foundations of the small establishment effect. We began the paper by discussing the Vernon (1960) and Chinitz (1961) notion that small establishments lead to increasing returns by fostering productive consumer/supplier linkages. There are, of course, other explanations. These include entrepreneurial spinoffs, knowledge spillovers, and labor market economies. We will take several approaches that will allow us to move towards a better understanding of the forces behind the small establishment effect. First, we will consider the implications of the spatial pattern of the small establishment effect for the various micro-foundations. Second, we will look directly at the Vernon-Chinitz effect by considering the relationship between key service supplier sectors and the local establishment size distribution. Finally, we will make use of the 1992 Bureau of Economic Analysis (BEA) input-output table to consider further whether the presence of small establishments in linked downstream sectors contributes to new business creation. The results of these approaches are suggestive of the existence of consumer/supplier linkages. The analysis does not allow us to rule out other effects, as will become clear below.

The remainder of the paper is organized as follows. Section II reviews the theoretical and empirical literatures on industrial organization and agglomeration. Section III discusses data and our approach to estimation. Section IV presents the results of the estimation. Section V concludes.

II. Literature

The Introduction discussed some of the classic references on the relationship between industrial organization and agglomeration. In order to motivate our empirical work, this section will more completely review this literature. This will both clarify the theoretical foundations of the paper's empirics and also the contribution of the paper to the empirical literature.

A. Theory

There is a relatively sparse theoretical literature on organizations and agglomeration. Ota and Fujita (1993) is a salient contribution. It builds on the classic models of interaction and urban structure of

Fujita and Ogawa (1980) and Ogawa and Fujita (1982). The model includes three sorts of land use: producers' "front office" activities, producers' "back office" activities, and residential land use by workers. Communication costs determine whether a firm's front office and back office are separated in space. For sufficiently low communication costs, the equilibrium involves a central business district made up of front offices, with back offices at the periphery. This is exactly in the spirit of the quote from Vernon (1960) presented above. Front office activities benefit from the flexibility made possible by agglomeration, while back office activities are more routine and so better able to operate in a self-contained fashion.

Several recent papers have followed up this line of research. Duranton and Puga (2005) present a model of the spatial disintegration into management and production units in a system of cities, rather than taking the within-city approach of Ota and Fujita. The key comparative static is that decreases in communication costs between managers and production workers allow spatial disintegration, with cities specializing in management or production rather than in a particular industry. Rossi-Hansberg et al (2009) explain the intra-city spatial disintegration of firms into management and production units as a consequence of city growth.[1] These papers focus primarily the impact of urban fixed factors on corporate organization, rather than on impact of small establishments on entrepreneurship. Helsley and Strange (2007) present a model of vertical disintegration and market thickness. The paper shows that agglomeration can reduce opportunism, resulting in the more efficient organization of production. There is a coordination issue, however. It is consistent with equilibrium for all firms to choose vertical integration or for all firms to choose disintegration.

The paper that provides the best motivation for our empirical work is Helsley and Strange (2002). This paper presents a matching model of input sharing. There are two sorts of producer in the model: input suppliers and final goods producers (input demanders). Demanders and suppliers have addresses in a characteristic space, and an adjustment cost is incurred when the addresses of transacting firms are not

[1] Helsley and Strange (2006) present a model of spatial interaction within a city where activities are allocated across space according to differences in values accruing from access to other agents. This can be interpreted in a straightforward way as a within-city model of back office – front office location.

the same. In keeping with Vernon's notion that physical proximity is most important for "unstable" activities (i.e., ones where the production process is not settled) it is supposed that demander addresses are probabilistic. The birth of new businesses depends, therefore, on expected input matches. In an economy dominated by large firms, the input market will be thinner than in an economy dominated by small establishments.

This is the small establishment effect that we will examine empirically. In Helsley-Strange (2007), and in some of the other models in the theoretical literature, there is a kind of virtuous circle in urban entrepreneurship, where small establishments create a situation that is favorable to the entrepreneurial creation of more small establishments. The theoretical literature is thus consistent with the ideas of Vernon, Chinitz, Jacobs, Piore and Sabel, Saxenian and others. Our paper will consider these ideas empirically.

B. Empirical research

The empirical literature on the impact of local industrial organization on entrepreneurial growth is somewhat more developed than the theoretical literature. Glaeser et al (1992) include average establishment size in a regression of city-industry-growth on local characteristics. Henderson (2003) also considers establishment size in a city level analysis. Both find that activity at small firms contributes more to external economies. Rosenthal and Strange (2003) estimate an alternative model. The paper shows that the agglomeration effect of additional employment is greater for employment at small establishments. This is true even when average size is controlled for. More recently, Faberman (2007) has shown that metropolitan areas with younger firms display higher rates of growth. Delgado et al (2007) find that the co-location of linked industries in a cluster encourages growth. Finally, Glaeser and Kerr (2007) consider the determinants of entrepreneurship at the MSA level. They find a very strong "Chinitz effect" associated with firm size. Finally, Lu and Li (2008) establish a positive relationship between agglomeration and vertical distintegration among Chinese manufacturing firms. Using lagged population as an instrument, they argue for a causal relationship.

A number of other empirical papers examine related issues. Holmes (1999) shows that there is a greater value of purchased input intensity when the activity in an establishment's own industry within 50 miles is larger. This is consistent with establishments being more involved in the local economy in an industry cluster. Holmes and Stevens (2002) consider establishment size directly, looking across the nine Census regions, they find a positive correlation between the location quotient of the location and the size of establishments relative to the industry norm (a different sort of location quotient). This is true whether the correlation is computed for locations or for establishments. It also holds for the ten largest MSAs. It holds as well when the smallest establishments in an industry (possibly performing different activities) are excluded, although measures of industry concentration do change when the data are cut this way. Holmes and Stevens (2004) present some further results on this issue, showing that unlike the manufacturing sector, in service industries, small establishments are located disproportionately in agglomerations. In a related vein, Garicano and Hubbard (2003), show that the scope of law firms becomes narrower in markets with substantial legal activity.

Our paper will be closer to Rosenthal-Strange (2003, 2005). Like these papers, the estimation in this paper will take a geographic approach to characterizing the environment in which entrepreneurship takes place. The specifics of our approach are described below.

III. Data and estimation

A. Data

Our primary data source is the MarketPlace file from Dun and Bradstreet (D&B) for the first quarter of 2007 and the fourth quarter of 2005. These data are used to measure establishment births and the distribution of economic activity. The 2007:Q1 file is used to identify establishments that were created in the 12 months prior to that quarter. Throughout most of the analysis, we focus on arrivals in 35 2-digit industries in four 1-digit categories, Manufacturing, Wholesale Trade, FIRE, and a select segment of Services. The 2005:Q4 file is used to characterize the economic environment that entrepreneurs would

have taken as given when deciding whether and where to open a new establishment in the year preceding 2007:Q1. For both quarters, the data are coded to the US postal zipcode location of the establishments.

It is important that we control as completely as possible for local characteristics that may affect arrivals of new companies. To do so, we make use of census tract socio-economic attributes from the 2000 Census. The data were obtained from the Neighborhood Change database of Geolytics Inc., and are coded to the year-2000 census tract boundaries. From these data we obtain census tract controls for the percent population Hispanic, percent population African American, average age of population, percent population male; average income, average income squared, percent of population with high school degree, percent of population with some college, percent of population with college degree or more, unemployment rate, poverty rate, percent of families that are female-headed with children, average age of the housing stock, and percent of housing stock that is single family.

To match the D&B data geography with the census tract controls, we convert the D&B data from zipcode to census tract geography. US Postal Service zipcode boundaries are established "at the convenience of the U.S. Postal Service."[2] They are based on postal logistics rather than on a geographic or socioeconomic concept of a neighborhood, in contrast to census block or tract geography. In response, Census has created a boundary file that approximates the geographic region associated with each US Postal zipcode based on the associated year 2000 census blocks found in that zipcode. The resulting boundary file is referred to as the zipcode tabulation area (ZCTA) file on the Census website and is available for download from Census. We augmented the ZCTA boundary file with a 1999 file available on the US Census website that reports the latitude and longitude of the US Postal zipcodes in the US in 1999.[3] Using this augmented ZCTA boundary file and also the year 2000 census tract boundary file (available from Census over the web), we calculated the correspondence between ZCTA geographic units and census tracts. Those correspondence weights were used to calculate the number of establishments and employees present in each census tract given the original US postal zipcode-level data from D&B.

[2] See http://www.census.gov/epcd/www/zipstats.html.
[3] After merging those coordinates into the year 2000 ZCTA file, we were able to geocode all but a very small number of the year 2001 zipcodes obtained from D&B.

Having converted all of the employment data to census tract geography allows us to match the D&B data with year-2000 tract-level socioeconomic attributes of the local population.

Our primary objective is to see how the local environment is related to the births of new establishments and the scale at which they operate. Our data allow us to take a geographic approach, rather than assuming that the MSA or county is the level at which agglomeration economies operate. Prior empirical work strongly suggests that agglomeration effects are localized geographically (i.e., Rosenthal and Strange (2003, 2005)). In the present paper, we will define the environment as comprising the activity that takes place within 1 mile of the geographic centroid of a census tract. We will also consider the activity that takes place within 5 miles. In order to ensure that our geographic treatment of the data produces a reliable estimate of local activity, we will estimate using a sample of MSAs each of which is large enough to contain at least 250 census tracts, a number that corresponds roughly to a population of one million people.

Our estimation will relate the creation of new establishments and their employment to the levels of activity within 1 and 5 miles of the centroid of a given census tract. When measuring existing activity we take into account both total employment and employment in an arriving establishment's own two-digit industry. These employment data are disaggregated further by establishment size. Specifically, we break down the employment within a given distance of a census tract into employment at small establishments (10 or fewer employees), medium-sized establishments (11-50 employees), and large establishments. Newly created establishments are defined as those created in the last 12 months. This window is wide enough to allow for many new establishments in the data. It is also narrow enough to at least partially mitigate concerns about newly created companies that fail prior to 2007:Q1 and do not appear in the data.

B. Estimation

The key hypothesis with which we are concerned is that an increase in activity at small establishments will have a larger effect on entrepreneurship than will an equivalent increase in activity at

large establishments. We will measure entrepreneurship in two ways, the births of small establishments and the scale or level of employment at which these new establishments operate.

To motivate the empirical specification, we make use of a model adapted from Rosenthal and Strange (2003, 2005). Suppose that the price of output is normalized to one. In this case, an establishment generates profit equal to $\pi(y) = a(y)f(x)-c(x)$, where $a(y)$ shifts the production function $f(x)$, y is a vector of local characteristics, the components of which will be clarified below, and x is a vector of factor inputs that cost $c(x)$. Input quantities will be chosen to maximize profits by satisfying the usual first order conditions. Employment (n), for example, is chosen such that $a(y)\partial f(x)/\partial n - \partial c(x)/\partial n = 0$.

Establishment births occur if an establishment can earn positive profits, with all inputs chosen at their profit-maximizing levels. Establishments are heterogeneous in their potential profitability. This is captured by rewriting the profit function as $\pi(y,\varepsilon) = \max_x a(y)f(x)(1 + \varepsilon) - c(x)$. We suppose that ε is independent and identically distributed across establishments according to the cumulative distribution function $\Phi(\varepsilon)$. For any y, there is a critical level $\varepsilon^*(y)$ such that $\pi(y, \varepsilon^*(y)) = 0$ and $\pi(y, \varepsilon) > (<) 0$ as $\varepsilon > (<) \varepsilon^*(y)$. In this case, the probability that an establishment is created is $\Phi(\varepsilon^*(y))$.

We assume that new establishments are opened at locations chosen from among all of the census tracts in the cities that contain them. We also assume that location and employment decisions are made taking the prior economic environment (2005:Q4) as given. Let the vector y_j describe the local characteristics of each tract. Aggregating over establishments in a given tract gives the number of births (B) and total new-establishment employment (N) in industry i and tract j. In the empirical work to follow, we express these as follows:

$$B_{ij} = by_{ij} + b_m + b_i + \varepsilon_{b,ij}, \quad (1)$$

$$N_{ij} = ny_{ij} + n_m + n_i + \varepsilon_{n,ij}, \quad (2)$$

where ε_b and ε_n are error terms, b and n are vectors of slope coefficients, b_m and n_m are MSA fixed effects, and b_i and n_i are industry fixed effects. We estimate (1) and (2) using a Tobit specification to account for the censoring of both kinds of entrepreneurial activity at zero.[4]

As discussed above, local variation in agglomeration that affects productivity will affect births and employment at the new establishments. Thus, the vector y_{ij} includes variables characterizing the spatial distribution of employment as perceived by industry i in tract j. Specifically, y_{ij} includes the level of employment within and outside of industry i. These measures are referred to as localization and urbanization, respectively. These variables are measured separately for establishments of various sizes. This allows us to examine the impact of proximity to small establishments. In addition, y_{ij} also includes the long list of tract level socio-economic characteristics presented above.

The city and industry fixed effects in (1) and (2) control for a number of unobserved determinants of entrepreneurship that might vary geographically. For example, Blanchflower et al (2001) report that "latent entrepreneurship," the unfulfilled desire for self-employment, varies substantially across countries. It is reasonable to suspect that it might also vary between cities. Black et al (1996) show the availability of collateral to be an important determinant of new enterprise creation in the UK. The entrepreneur's own housing is shown to be the single most important source of such collateral. Since housing markets in larger cities are different than in smaller cities, this may be another metropolitan-wide effect captured in the model fixed effects. Furthermore, there is a well-documented correlation between entry and failure. See Caves (1998) for a review of this literature. This correlation implies that resources that can be used by new establishments may be more plentiful where there has been activity of a similar sort previously. Carlton (1983) includes this in his concept of the "birth potential" of an area. This is clearly an important

[4]An alternative would have been to estimate a count model of the number of new establishments, while estimating new establishment employment by Tobit. We chose to estimate both by Tobit to facilitate comparison of results across models. Note also that estimating the Tobit models with fixed effects raises a potential econometric issue. Noisy estimates of the fixed effects in nonlinear models typically leads to inconsistent estimates of the slope coefficients [e.g. Chamberlain (1980, 1985), Hsiao (1986)]. However, such bias goes towards zero as the number of observations per fixed effect becomes large. In our sample the number of observations per fixed effect is in fact quite large. In the first model presented in Table 2 below, for instance, there are 632,180 observations and 76 fixed effects.

issue in estimation where identification is based on inter-city variation in the data. In our case, however, the identification comes from intra-city variation. As long as establishments that fail were free to have chosen any location within their MSAs, this effect will be captured by the fixed effects. This is obviously an important advantage of estimating below the MSA level of geography.

To further address the issue of unobserved determinants of entrepreneurship, we also estimate models with tract fixed effects. The functional forms are:

$$B_{ij} = by_{ij} + b_j + b_i + \varepsilon_{b,ij}, \quad (3)$$

$$N_{ij} = ny_{ij} + n_j + n_i + \varepsilon_{n,ij}, \quad (4)$$

where B_{ij} and N_{ij} are respectively is births and new establishment employment in tract j. The key difference with (1) and (2) is that MSA fixed effects are replaced with tract fixed effects, b_j and n_j. As a result, all tract-specific variables drop out of the model, including local socioeconomic attributes and measures of the total amount of employment in the census tract.

C. Brief data description

The data are described in Table 1. The table reports the census tract values for various sorts of activity. In every case, we restrict attention to cities large enough to have 250 census tracts. Table 1a reports establishment and employment counts computed at the 2-Digit level and then aggregated to 1-digit industry groups. Each observation is a census tract/2-digit industry pair. The number of observations, therefore, is equal to the number of census tracts covered in the sample multiplied by the number of 2-digit industries.

The first panel reports arrival data. There are 16,616 new establishments employing 36,256 workers in Manufacturing industries. The number is similar for Wholesale Trade. Not surprisingly, the

numbers are larger in FIRE and the portion of Service industries included in our sample. Looking at the bottom of the first panel shows that a large fraction of census tract/2-digit industry pairs experienced positive arrivals for the 1-digit industry groups, Wholesale Trade, FIRE, and Service. There are more zero observations in Manufacturing, but even for this 1-digit grouping there are arrivals in more than one-quarter of the census tract / industry pairs.

The rest of Table 1a breaks down the employment within 1 mile of the centroid of a given census tract into employment in the establishment's own industry (localization) and employment in all industries (urbanization). The data are broken down further into employment at small establishments (less than 10 workers), medium-sized establishments (10-49 workers) and large establishments (50 or more workers). In every instance, there is more employment at large establishments than in any other category.

Table 1b repeats this exercise for select 2 digit industries: Business Services (SIC 73), Legal Services (SIC 81), and Engineering-Accounting-Research-Management-Related Services (SIC 87). These are all activities for which a firm might be expected to choose between internal and external sourcing. We will therefore be interested in how these specific sectors are related to the local organization of production. In Table 1b, we see that the pattern from Table 1a continues to hold. While there are some tracts that have no arrivals, a large fraction of tracts have positive arrivals. Furthermore, large establishments in aggregate tend to employ larger fractions of neighboring employment than small establishments in aggregate or middle-sized establishments in aggregate.

IV. Empirical results

This section presents the results of our estimation. We will control for the local environment in two ways. First, we control for urbanization, the total activity nearby. Second, we control for activity in the own industry, localization. For both, we disaggregate by establishment size, breaking down the employment within a given distance of a census tract into employment at small establishments (10 or fewer employees), medium-sized establishments (11-50 employees), and large establishments. Some establishments in the D&B data have missing values for employment. It is possible that these might be

small establishments, and this has the potential of biasing our estimates. To address this, we include in the regressions the number of establishments for which D&B does not report employment.

A. Small establishment effects: Tobit models

Table 2 reports results for Tobit models estimated separately for 1-digit industries. In these models, all of the own-industry variables are measured at the 2-digit level. For each industry group, there are two columns, the first reporting the arrivals model and the second reporting the new establishment employment model. To facilitate review of the results, we scale the right hand side control variables by 1,000. This allows us to avoid scientific notation in the regression tables. In both arrival and new establishment employment models, the coefficients thus measure the effect of adding 1,000 additional workers to the local environment at establishments of given size (or 1,000 additional companies among those for which size is not known). We are interested here in the impact of industrial organization on agglomeration economies, so we do not report coefficient estimates for our socio-economic controls. It is worth pointing out, though, that in this model and in all models that follow, the socio-economic variables are highly significant. This is evidenced by the extremely low p-values reported at the bottom of the table for the various models that we estimate.

The upper rows of Table 2 report coefficients associated with urbanization (aggregate activity). For Manufacturing, the only significant urbanization coefficients are associated with employment at small establishments. An increase in aggregate activity in small establishments is associated with an increase in both arrivals and the total scale of arrivals. The effects of increases in medium- or large-establishment employment are insignificant. For Wholesale Trade, the small establishment coefficients are the largest, but are insignificant. The large establishment coefficients for Wholesale Trade are an order of magnitude smaller, and have also insignificant. For FIRE, the medium sized establishment coefficients are significant in both the arrivals and new establishment employment models. The small establishment coefficients are larger, but are insignificant. The large establishment effects are much smaller and are clearly insignificant. Finally, for Services, the small establishment coefficients are again largest. They

are also significant. While the large establishment coefficients are significant, they are nearly two orders of magnitude smaller than are the small establishment coefficients.

The pattern of urbanization coefficients in Table 2 is thus quite clear. The large establishment coefficients are either of the wrong sign, are insignificant, or are much smaller than coefficients for smaller establishment sizes. The small or medium sized establishment coefficient is always significant and is largest for all four industry groups.

The bottom rows of Table 2 report localization effects (own 2-digit industry employment). For Manufacturing, the medium sized establishment employment coefficients are significant in both the arrivals and employment models. The other localization coefficients are either insignificant (small establishment) or have the wrong sign (large establishment). For Wholesale Trade, all sizes of establishment are associated with significant increases in entrepreneurship, whether measured as arrivals or as new establishment employment. However, the small and medium sized establishment coefficients are largest. For FIRE, the small establishment coefficients are both the largest and significant. For Services, the largest coefficients are associated with employment in medium sized establishments, but the small establishment coefficients are of similar magnitude. The results hold for both the arrivals and employment models.

This pattern of results is obtained in models that estimate the arrival and scale of small establishments as functions of the activity that takes place within 1 mile. The result is robust. We have estimated models using a 5-mile geography, and we have found the same pattern of results. We have also estimated models for the arrival of all establishments, not just small ones. Again, the pattern of results does not change. Finally, we have also estimated this relationship separately for various individual 2-digit SIC industries: Apparel (SIC 23), Printing and Publishing (SIC 27), Machinery and Equipment (SIC 35), Wholesale Trade (SIC 50), Brokerage and Exchanges (SIC 62), Business Services (SIC 73), Legal

Services (SIC 81), and Engineering et al (SIC 87).[5] While the pattern varies slightly among industries, employment at smaller establishments is consistently more important in these models.

The basic pattern is now in place: an increase in employment at a small establishment is associated with a larger increase in entrepreneurial activity than is an increase in employment at large establishments. Put bluntly, the 1960 analysis of Vernon and Chinitz about urban development in general applies in the new century to urban entrepreneurship.

It is important for us to be clear that our identification of these effects is based on within-MSA variation in an establishment's local business environment. Any effects that operate at the MSA level are captured by MSA fixed effects. It is also important to observe that the models have been estimated with controls for a range of tract level socio-economic characteristics that proxy for other characteristics of the local business environment.[6] This will control for at least some of the local variation of the business environment within cities. These socio-economic variables are highly significant in every model presented in Tables 2-5.

Despite these extensive controls, the possibility remains that unmeasured characteristics could be responsible for both the prior level of small business activity and also contemporaneous small business activity. However, such factors must (a) not operate at the MSA level, (b) not be captured by the range of extensive and highly significant socio-economic variables, (c) be associated with the presence of small and medium sized establishments but not large establishments, and (d) be broadly consistent across a range of manufacturing and service sectors and industries.

[5] Results are for the three service industries are presented shortly. Results for the other 2-digit industries noted above are not reported to avoid proliferation of tables.

[6] As noted above, these controls include census tract racial composition (percent Hispanic, percent African American), average age of population, percent male; average income and its square, percent high school degree, percent with some college, percent with college degree or more, unemployment rate, poverty rate, percent of families that are female-headed with children, average age of the housing stock, percent of housing stock that is single family.

B. Census tract fixed effect models

To further assess the robustness of the small establishment effect that we have found, we also estimate models that employ census tract fixed effects. These obviously control for an even greater range of local factors that might impact entrepreneurial activity. In these models, identification comes from within-tract variation, so it is not possible to estimate urbanization effects. Tract-specific socioeconomic control variables also drop out of the model. Given the very large number of fixed effects (nearly 32,000), we estimated these models by OLS. As above, we estimate models for both arrivals and for new establishment employment. In addition, estimates are presented for two samples: first, for a sample in which we pool data across all 35 2-digit industries used in the previous analysis, and then again pooling just the 20 2-digit industries in Manufacturing. In all cases, we control for 2-digit industry fixed effects. We also continue to use 1-mile controls as our preferred geography in measuring the agglomeration variables. In some models we augment this specification by including additional controls for agglomeration within five miles. This allows us to highlight the degree to which the small establishment effects are highly spatially localized.

Table 3 reports the results. Consider first the models that control for just the 1-mile agglomeration measures and for the sample with all 35 2-digit industries. For these specifications, we again have a pattern where the effects of own 2-digit industry employment are much stronger for employment at small and medium sized establishments than for employment at large establishments. The small establishment coefficients are all significant. The medium sized establishment coefficients are roughly three times as large. The large establishment coefficients are negative and insignificant in both the arrivals and employment models. A similar pattern is evident for the Manufacturing industries. For arrivals, the small establishment effect is bigger than the medium sized establishment effect by roughly an order of magnitude. The large establishment effect is negative and insignificant. For employment, the small and medium sized establishment coefficients are similar in magnitude, but only the latter is significant. The large establishment coefficient is negative and marginally significant. The small

establishment effect result from the Tobit models is, thus, quite robust. It persists even in models that make great demands on the data, such as these tract fixed effect specifications.

Consider next those models in Table 3 that include agglomeration controls for activity between 0 and 1 mile and also activity between 0 and 5 miles. Specified in this manner, the 1-mile variables are interactive terms; their coefficients reflect the degree to which effects differ when employment is located within one mile as compared to one to five miles. The 5-mile variable coefficients in contrast reflect the influence of employment situated at companies 1 to 5 miles away.[7] These models allows us to test whether the marginal impact of employment at a give size category of establishment differs depending on whether that establishment is within one mile or one to five miles.

The attenuation patterns revealed by the 1-mile coefficients are noteworthy. For both the aggregate 35 industry and Manufacturing samples, and for both the arrival and employment specifications, the coefficients on the small establishment 1-mile variables are significant and positive. This is consistent with geographic attenuation. We also find significant 1-mile effects of similar magnitude for the medium sized establishments in the 35 industry models, but not for Manufacturing. For large establishments, the 1-mile coefficients are either negative or insignificant or much smaller than the coefficients for small establishments. Once again we continue to observe small establishment patterns. In this instance, the evidence indicates that small-establishment effects attenuate with distance.

The persistence of the small establishment effect pushes us inexorably to asking: why? We now turn to this question.

C. Identifying the sources of the small establishment effect

As discussed in Section II, there are a number of potential explanations for the small establishment effect. The emphasis in Chinitz and Vernon is given to consumer/supplier linkages. In a market dominated by small establishments, a thick input supplier market will arise. This will further support the entrepreneurial creation of additional small establishments. However, as noted above, there

[7] Note that the effect of employment within one mile is given by the sum of the 1- and 5-mile coefficients.

are other standard explanations for agglomeration, and it makes sense to consider these as possible explanations for small establishment effects. It is at least possible that some sorts of labor market pooling might take place more readily in a small-establishment dominated environment, that knowledge spillovers might be greater from small establishments, and that entrepreneurial spinoffs might occur more frequently from small establishments. With regard to knowledge spillovers, however, the work on "anchor tenants" and innovation (Agrawal-Cockburn (2003), Feldman (2005)) reaches the conclusion that larger innovators exert stronger effects on neighbors. With regard to entrepreneurial spinoffs, Klepper (2007) finds that entrepreneurs who have worked previously at successful firms are more likely to themselves be successful. These studies have found what amounts to large establishment effects. Thus, we may need to look beyond knowledge spillovers or entrepreneurial spinoffs for explanations of small-establishment effects.

We will take several approaches to shed light on the sources of the small establishment effect. It is important for us to be clear at this point that none of the approaches will provide a definitive answer. This should not be surprising. Our task is parallel to identifying the microfoundations of agglomeration economies, an undertaking that continues to resist definitive solutions despite the considerable intellectual energies that have been devoted to it. Since this issue is so important and so resistant to definitive resolution, we believe that even the modest results that we will present are useful additions to knowledge.

Our first approach is to consider more carefully the geographic pattern of the small establishment effect that was reported in Table 3. Recall that the small-establishment effect clearly attenuates with distance. The conclusion is clear: the small-establishment effect is highly localized. This suggests that at least one of the underlying mechanisms that drives the small-establishment effect must operate primarily at the very local level.

We discussed several mechanisms earlier in the paper. These were: labor market effects, entrepreneurial spinoffs, knowledge spillovers, and the Chinitz-Vernon consumer/supplier linkages explanation. Labor market effects are likely to operate at the scale at which workers commute. This is essentially how the MSA definition of a city is constructed. These effects are likely to operate at a large

geographic range and would be at least partly swept out by our location fixed effects. In contrast, knowledge spillovers are likely to have a local element as noted by Rosenthal and Strange (2003, 2005, 2008) for a range of activities and by Arzaghi and Henderson (2008) for advertising. In addition, the geographic range at which entrepreneurial spinoffs might operate is unclear. The spinoff process might operate at the MSA level because entrepreneurs are fixed to a particular city. Or the entrepreneur might be fixed to a neighborhood by highly specialized local knowledge. Similarly, customer/supplier effects could operate at a highly local level (the level of New York's garment district, for some of the effects discussed by Vernon) or at the MSA level (which is implied by the two quotes at the beginning of the paper. On balance, our geographic results are suggestive that knowledge spillovers, entrepreneurial spinoffs, or customer/supplier effects could all potentially lie behind the local nature of the small establishment effect. Labor pooling seemingly does not. Since the anchor tenant and entrepreneurial spinoff work discussed above seems to suggest that large firms have larger effects, we are left with customer/supplier linkages as the most appealing explanation of our small-establishment effects.

To investigate the micro-foundations issue further, it would be desirable to look for direct evidence that would be consistent with various mechanisms. The D&B data that we use does not contain information that allows us to directly address either knowledge spillovers, entrepreneurial spinoffs, or labor market pooling. It does, however, contain information that speaks directly to the presence of consumer/supplier linkages.

The heart of the linkages hypothesis is that the presence of many small downstream establishments encourages upstream activity. Since large establishments tend to internally source to a greater degree, employment at large establishments does not encourage upstream activity to the same degree that employment at small establishments does. In order to assess the consumer/supplier linkages hypothesis, we will therefore look for direct evidence that the presence of small downstream firms encourages the growth of upstream sectors.

To do this, we will begin by focusing on three industries whose services are sometimes contracted out, but at other times provided internally. These industries are Business Services (SIC 73), Legal

Services (SIC 81), and Engineering-Accounting-Research-Management-Related Services (SIC 87). We then consider whether an increase in aggregate economic activity (urbanization) in smaller establishments is associated with an increase in the supplier industry's scale. This involves estimation parallel to Table 2's Tobit models, where we separately regress arrivals and new establishment employment on urbanization variables disaggregated by establishment size. We include localization variables as controls, and we also include both MSA fixed effects and socio-economic controls as in Table 2.

The results are presented in Table 4. Since any establishment could potentially be a customer of these sectors, we are particularly interested in the urbanization coefficients (based on employment across all industries). These coefficients exhibit a clear and familiar pattern. For Business Services, in both the arrivals and employment models, the small and medium-sized establishment coefficients are of similar magnitude, positive, and significant. The large establishment coefficients are insignificant. For Legal Services, it is the small establishment coefficients that are positive and significant. For Engineering et al, the small and medium sized coefficients are again positive and of quite similar magnitude for both the arrivals and employment models. All have coefficients significant at the 10% level at least.

These results indicate that when a local environment has many small establishments, there is much more activity in these three key service input sectors. When the environment is instead dominated by large establishments but is otherwise identical in overall scale, there is less activity in the three sectors. This is obviously consistent with the Chinitz-Vernon customer/supplier linkages hypothesis.

In fact, we see a similar pattern when we revisit the urbanization coefficients in Table 2. For Manufacturing and Services, the coefficients on small-establishment urbanization employment are positive, significant, and larger in magnitude than the other urbanization variables. For FIRE, the middle-sized coefficients are largest. For Wholesale Trade, the small establishment coefficients are again largest, but they are only marginally significant, or insignificant. To the extent that the entire local economy comprise potential customers for a given industry sector, these patterns are suggestive that the presence of small establishment customer companies enhances new business creation among suppliers. Of course,

our filter used here to identify the customer base is rather crude compared to the three sector analysis discussed above.

Our final approach to identifying direct evidence of customer/supplier linkages makes use of the 1992 Bureau of Economic Analysis input-output table. We first calculate the percentage of a given industry's total sales to each 2-digit industry throughout the economy. We do this for 30 of our 35 2-digit industries, including all industries in Manufacturing, Wholesale Trade, FIRE, and also business services.[8] For each of these industries, we then calculate a weighted sum of downstream employment. The weights used for these calculations are the percentages obtained in the first step; these are multiplied by the corresponding industry employment levels in the local economy.[9] We then estimate linear tract fixed effect models as in Table 3. These models now include both the localization measures (own industry employment) and also the downstream employment measures. Both are broken down by establishment size.

Results are presented in Table 5. The first point to make about these results concerns the own-industry coefficients. We continue to find greater effects for small- and medium-sized establishments, even controlling for downstream activity. This is true for both the 30-industry sample and for Manufacturing. This underlines the robustness of the paper's main finding.

There is also an interesting pattern to the downstream employment coefficients. In the 30-industry sample, results are mixed and inconclusive when comparing estimates between the arrivals and employment models. This finding could be interpreted as being inconsistent with Chinitz. However, an alternate plausible explanation is that the cross-industry coefficient restrictions implicit in the 30-industry model obscure customer/supplier effects that differ across industries. Partly for that reason, we also estimate the model for just the manufacturing sector.

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[8] Five additional service industries were not represented in the 1992 BEA input-output files and are dropped from this portion of the analysis for that reason. These include SIC industries 80, 81, 86, 87, and 89, Health, Legal, Membership, Engineering, and Services not classified elsewhere, respectively.

[9] It is worth noting that this weighted sum of downstream employment is identical in form to the urbanization employment variables included in Tables 2 and 4. The difference arises with the weights. In Tables 2 and 4, the urbanization variables attach equal weight to employment at all local industries.

In Table 5, for the manufacturing sample, the presence of downstream employment at small establishments always is positively associated with a greater degree of new entrepreneurial activity. In two of four models these effects are clearly significant. This finding is similar to that found for the three service industries highlighted in Table 4. The result is also consistent with the urbanization coefficient patterns from Table 2. Together, these results are suggestive of Chinitz-type effects: nearby downstream employment housed in small companies contributes to business creation in supplier industries.

V. Conclusion

This paper has considered the relationship between local industrial organization and entrepreneurship. We estimate models of the birth of small establishments and the magnitude of their operations. This estimation is carried out at the census tract level, using within-MSA variation in local industrial organization to estimate the models. By estimating at below the MSA level, we are able to employ MSA, and in some instances, census tract level fixed effects. These fixed effects control for a range of unobserved characteristics that might impact entrepreneurship. In addition, our MSA fixed effects models include a long list of tract-level socio-economic controls to further reduce unobserved heterogeneity.

A very clear pattern emerges from this estimation. Additional employment at large establishments has an effect on births and on new establishment employment that is insignificant, of the wrong sign or much smaller than the effects for small or medium establishments. In contrast, for nearly every 1-digit industry group or 2-digit industry that we estimate models for, there are positive and significant effects associated with employment at small and or medium sized establishments. The results prove to be very robust. These results are very much in the spirit of the more particular and less econometric analysis of Vernon (1960), Chinitz (1961) and others.

A further implication of this pattern is that the small establishment effect will reinforce other tendencies in the system of cities towards a core-periphery type of outcome. In part, this is because small companies benefit and rely more on shared infrastructure and related agglomeration economies

characteristic of central cities (e.g. Holmes (1999)). As a result, those cities with vibrant small business sectors will tend to continue to have vibrant small business sectors. Those without much small business will have difficulty achieving takeoff.

The paper also provides some evidence regarding the mechanisms responsible for this small establishment effect. We find suggestive evidence that the sort of customer-supplier linkages considered by Chinitz and Vernon are at work.

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Table 1a
1-Digit Industry Establishment and Employment Counts
In MSAs with 250 or More Census Tracts

	Manufacturing SIC 20-39	Wholesale Trade SIC 50, 51	FIRE SIC 60-65, 67	Services SIC 73, 80, 81, 86, 87, 89
Arrivals in census tract in the last 12 months for Estab with < 10 workers (2007:Q1)				
Total New Establishments	16,616	18,914	38,836	96,861
Total Workers at New Establishments	36,256	42,928	88,385	179,472
Numcensus tract/ind pairs with > 0 arrivals	149,692	55,998	139,823	158,141
Num census tract/ind pairs with 0 arrivals	488,468	7,818	83,533	33,307
Avg Emp in OWN Industry Within 1 Mile of arriving company's census tract centroid (2005:Q4)				
All Size Estab	309	692	479	1,480
Small-Estab (< 10 workers)	28	178	82	248
Med-Estab (10 to 49 workers)	65	246	107	342
Large-Estab (> 50 workers)	217	268	290	891
Avg Emp in ALL Industries Within 1 Mile of arriving company's census tract centroid (2005:Q4)				
All Size Estab	18,096	18,410	16,243	18,448
Small-Estab (< 10 workers)	2,726	2,838	2,395	2,727
Med-Estab (10 to 49 workers)	3,969	4,076	3,453	3,944
Large-Estab (> 50 workers)	11,401	11,496	10,395	11,777

Table 1b
Selected 2-Digit Industry Establishment and Employment Counts
In MSAs with 250 or More Census Tracts

	Business Services SIC 73	Legal Services SIC 81	Engineering, Accounting, Research, Management, and Related Services SIC 87
Arrivals in census tract in the last 12 months for Estab with < 10 workers (2007:Q1)			
Total New Establishments	46,209	2,403	26,581
Total Workers at New Establishments	77,833	5,867	49,093
Number of census tracts with > 0 arrivals	31,687	14,954	30,821
Number of census tracts with 0 arrivals	221	16,954	1,087
Avg Emp in OWN Industry Within 1 Mile of arriving company's census tract centroid (2005:Q4)			
All Size Estab	1,646	2,824	1,681
Small-Estab (< 10 workers)	271	522	261
Med-Estab (10 to 49 workers)	394	606	412
Large-Estab (> 50 workers)	981	1,695	1,008
Avg Emp in ALL Industries Within 1 Mile of arriving company's census tract centroid (2005:Q4)			
All Size Estab	16,972	49,321	21,022
Small-Estab (< 10 workers)	2,545	6,277	3,039
Med-Estab (10 to 49 workers)	3,665	9,958	4,466
Large-Estab (> 50 workers)	10,761	33,087	13,516

Table 2: Tobit Models for the Number of Arrivals and Employment for New (< 12 months old) Small (< 10 worker) Establishments By 1-Digit Industry Category (Robust standard errors in parentheses)

	Manufacturing SIC 20-39		Wholesale Trade SIC 50, 51		FIRE SIC 60-65, 67		Services SIC 73, 80, 81, 86, 87, 89	
	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
ALL industries within 1 Mile of Census Tract Centroid (all controls in 1,000s)								
Establishments with size NA	-0.2072	-0.6069	-0.2963	-0.8977	-0.4405	-0.9936	-1.9500	-4.4170
	(0.0425)	(0.1158)	(0.2934)	(0.8236)	(0.1669)	(0.4123)	(0.5052)	(1.0542)
Emp at estab with < 10 workers	0.0142	0.0370	0.0309	0.0984	0.0165	0.0301	0.1093	0.2183
	(0.0029)	(0.0078)	(0.0232)	(0.0643)	(0.0108)	(0.0269)	(0.0334)	(0.0693)
Emp at estab with 10 to 49 workers	-0.0002	0.0013	-0.0272	-0.0844	0.0060	0.0176	-0.0136	-0.0154
	(0.0009)	(0.0024)	(0.0088)	(0.0251)	(0.0028)	(0.0070)	(0.0086)	(0.0179)
Emp at estab with > 50 workers	-0.0002	-0.0004	0.0013	0.0042	0.0003	0.0006	0.0022	0.0055
	(0.0001)	(0.0003)	(0.0008)	(0.0024)	(0.0004)	(0.0011)	(0.0013)	(0.0027)
OWN industry within 1 Mile of Census Tract Centroid (all controls in 1,000s)								
Establishments with size NA	7.1420	26.2700	-68.6100	-170.6000	-10.4100	-28.8600	3.3490	8.4460
	(2.3649)	(6.6675)	(16.9407)	(45.8602)	(1.0866)	(2.8184)	(1.3237)	(3.9102)
Emp at estab with < 10 workers	0.0245	-0.3390	0.8419	1.5850	0.5602	1.4060	0.1888	0.4994
	(0.1441)	(0.3942)	(0.1900)	(0.4818)	(0.0905)	(0.2264)	(0.0444)	(0.1051)
Emp at estab with 10 to 49 workers	0.1597	0.6065	0.3007	1.2120	-0.0237	0.0601	0.2710	0.5707
	(0.0626)	(0.1758)	(0.1489)	(0.4081)	(0.0550)	(0.1397)	(0.0299)	(0.0687)
Emp at estab with > 50 workers	-0.0121	-0.0435	0.2232	0.6056	0.0184	0.0420	-0.0195	-0.0581
	(0.0049)	(0.0156)	(0.0603)	(0.1628)	(0.0048)	(0.0124)	(0.0075)	(0.0174)
2-Digit SIC FE	20	20	2	2	7	7	6	6
MSA FE	56	56	56	56	56	56	56	56
P-value on 14 yr-2000 SES tract controls	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	632,180	632,180	63,218	63,218	221,263	221,263	189,654	189,654
Censored Obs	483,717	483,717	7,701	7,701	82,589	82,589	32,911	32,911
Uncensored Obs	148,463	148,463	55,517	55,517	138,674	138,674	156,743	156,743
Log-L	-137226.94	-275614.82	-55246.96	-107748.80	-140201.70	-260451.85	-254359.05	-360088.72

Table 3: Linear Tract Fixed Effect Models for the Number of Arrivals and Employment for New (< 12 months old) Small (< 10 worker) Establishments Controlling for Local Employment Within 1 and 5 Miles (Robust standard errors in parentheses)

	All 35 2-Digit Industries				Manufacturing SIC 20-39			
	1-Mile Controls Only		1- and 5-Mile Controls		1-Mile Controls Only		1- and 5-Mile Controls	
Local Activity Within 1 Mile (in 1,000s)	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
OWN industry estab. with size NA	-5.6000	-10.5000	-4.8500	-7.4800	4.2700	18.2200	4.7800	20.1800
	(0.7407)	(1.8261)	(0.8802)	(2.1808)	(1.5641)	(4.4657)	(1.7836)	(5.1349)
OWN industry emp at estab with < 10 workers	0.1000	0.2300	0.2400	0.5400	0.2900	0.3500	0.4500	0.8200
	(0.0254)	(0.0644)	(0.0363)	(0.0853)	(0.0983)	(0.2734)	(0.1148)	(0.3118)
OWN industry emp at estab with 10 to 49 workers	0.3000	0.7000	0.2500	0.5700	0.0200	0.2500	-0.0400	0.0600
	(0.0217)	(0.0552)	(0.0260)	(0.0642)	(0.0333)	(0.1168)	(0.0500)	(0.1200)
OWN industry emp at estab with > 50 workers	-0.0015	-0.0094	0.0069	0.0100	-0.0025	-0.0200	-0.0003	-0.0100
	(0.0031)	(0.0085)	(0.0037)	(0.0085)	(0.0028)	(0.0104)	(0.0029)	(0.0072)
Local Activity Within 5 Miles (in 1,000s)								
OWN industry estab. with size NA	-	-	-0.0500	-0.4200	-	-	-0.1300	-0.5000
			(0.0658)	(0.1479)			(0.0872)	(0.2688)
OWN industry emp at estab with < 10 workers	-	-	-0.0094	-0.0200	-	-	-0.0300	-0.1100
			(0.0022)	(0.0044)			(0.0062)	(0.0205)
OWN industry emp at estab with 10 to 49 workers	-	-	-0.0041	-0.0039	-	-	0.0100	0.0400
			(0.0017)	(0.0035)			(0.0025)	(0.0084)
OWN industry emp at estab with > 50 workers	-	-	-0.0020	-0.0050	-	-	-0.0004	-0.0005
			(0.0002)	(0.0005)			(0.0001)	(0.0004)
Census Tract Fixed Effects	31,908	31,908	31,908	31,908	31,908	31,908	31,908	31,908
Observations	1,116,780	1,116,780	1,116,780	1,116,780	638,160	638,160	638,160	638,160
R-sq within	0.2945	0.2484	0.2962	0.2505	0.1049	0.0681	0.1055	0.0688
R-sq between	0.0274	0.0350	0.0367	0.0446	0.0300	0.0406	0.0323	0.0433
R-sq overall	0.2564	0.2138	0.2593	0.2172	0.0919	0.0637	0.0927	0.0647

Table 4: Tobit Models for Select Service Industries of the Number of Arrivals and Employment for New (< 12 months old) Small (< 10 worker) Establishments (Robust standard errors in parentheses)

	Business Services SIC 73		Legal Services SIC 81		Engineering, Accounting, Research, Management, and Related Services SIC 87	
	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
ALL industries within 1 Mile of Census Tract Centroid (all controls in 1,000s)						
Establishments with size NA	-4.5910	-9.7430	-1.0730	-2.5020	-2.6830	-6.2180
	(2.5648)	(5.1279)	(0.1717)	(0.4802)	(1.2899)	(2.8787)
Emp at estab with < 10 workers	0.1992	0.3137	0.0527	0.1212	0.0890	0.1972
	(0.1119)	(0.2241)	(0.0111)	(0.0308)	(0.0514)	(0.1078)
Emp at estab with 10 to 49 workers	0.1488	0.3343	-0.0106	-0.0289	0.0878	0.1753
	(0.0295)	(0.0624)	(0.0054)	(0.0159)	(0.0412)	(0.0985)
Emp at estab with > 50 workers	0.0032	0.0068	0.0012	0.0040	0.0068	0.0153
	(0.0077)	(0.0161)	(0.0010)	(0.0036)	(0.0044)	(0.0096)
OWN industry within 1 Mile of Census Tract Centroid (all controls in 1,000s)						
Establishments with size NA	-158.50	-318.90	-42.380	-135.00	-62.560	-141.80
	(68.6147)	(141.1062)	(17.6583)	(49.0909)	(33.2766)	(74.2408)
Emp at estab with < 10 workers	-0.2469	0.0898	0.6249	1.5210	-0.2009	-0.6157
	(0.5742)	(1.1220)	(0.1570)	(0.4422)	(0.4367)	(1.0616)
Emp at estab with 10 to 49 workers	0.6067	1.0910	0.3180	1.0320	0.2129	0.7640
	(0.2696)	(0.5538)	(0.1747)	(0.4914)	(0.2839)	(0.6761)
Emp at estab with > 50 workers	0.0223	0.0652	-0.0559	-0.1506	-0.0453	-0.0725
	(0.0421)	(0.0905)	(0.0174)	(0.0477)	(0.0220)	(0.0465)
MSA FE	56	56	56	56	56	56
P-value on 14 yr-2000 SES tract controls	0.00	0.00	0.00	0.00	0.00	0.00
Observations	31,609	31,609	31,609	31,609	31,609	31,609
Censored Obs	210	210	16,803	16,803	1,063	1,063
Uncensored Obs	31,399	31,399	14,806	14,806	30,546	30,546
Log-L	-63870.71	-83290.28	-13645.92	-28009.61	-49140.04	-70689.49

Table 5: Linear Tract Fixed Effect Models of the Number of Arrivals and Employment for New (< 12 months old) Small (< 10 worker) Establishments with Downstream Controls (Robust standard errors in parentheses)

	30 2-Digit Industries				Manufacturing SIC 20-39			
	Local Activity Within 1 Mile		Local Activity Within 5 Miles		Local Activity Within 1 Mile		Local Activity Within 5 Miles	
Local Activity (in 1,000s)	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
OWN industry estab. with size NA	-5.7500	-12.6900	-0.2800	-0.8200	4.1800	17.6300	0.1700	0.7400
	(1.1454)	(2.5636)	(0.0735)	(0.1701)	(1.5200)	(4.3000)	(0.0720)	(0.2085)
OWN industry emp at estab with < 10 workers	0.2400	0.4400	-0.0300	-0.0700	0.2800	0.3600	-0.0063	-0.0500
	(0.1048)	(0.2178)	(0.0037)	(0.0106)	(0.1007)	(0.2769)	(0.0063)	(0.0189)
OWN industry emp at estab with 10 to 49 workers	0.1600	0.4700	0.0300	0.0600	0.0400	0.2600	0.0200	0.0500
	(0.0653)	(0.1511)	(0.0039)	(0.0091)	(0.0421)	(0.1209)	(0.0037)	(0.0079)
OWN industry emp at estab with > 50 workers	0.0084	-0.0057	0.0015	0.0054	-0.0051	-0.0200	-0.0014	-0.0028
	(0.0089)	(0.0218)	(0.0005)	(0.0013)	(0.0036)	(0.0114)	(0.0002)	(0.0007)
Downstream industry estab. with size NA	-2.5200	-4.2100	-0.0500	-0.1200	0.1500	0.8100	0.0028	0.0085
	(0.4444)	(1.0795)	(0.0291)	(0.0609)	(0.1064)	(0.3632)	(0.0054)	(0.0166)
Downstream industry emp at estab with < 10 workers	-0.1000	-0.3000	0.0100	0.0100	0.0300	0.0400	0.0029	0.0040
	(0.0465)	(0.1167)	(0.0023)	(0.0041)	(0.0121)	(0.0348)	(0.0009)	(0.0026)
Downstream industry emp at estab with 10 to 49 workers	0.1200	0.3100	0.0042	0.0200	-0.0200	-0.0200	-0.0046	-0.0073
	(0.0350)	(0.0957)	(0.0025)	(0.0060)	(0.0082)	(0.0238)	(0.0008)	(0.0021)
Downstream industry emp at estab with > 50 workers	-0.0034	0.0053	-0.0033	-0.0087	0.0026	0.0035	0.0012	0.0023
	(0.0067)	(0.0172)	(0.0004)	(0.0011)	(0.0017)	(0.0051)	(0.0001)	(0.0004)
Census Tract Fixed Effects	31,908	31,908	31,908	31,908	31,908	31,908	31,908	31,908
Observations	957,240	957,240	957,240	957,240	638,160	638,160	638,160	638,160
R-sq within	0.3033	0.2545	0.2887	0.2349	0.1050	0.0682	0.0908	0.0496
R-sq between	0.0285	0.0357	0.0000	0.0003	0.0276	0.0371	0.0002	0.0011
R-sq overall	0.2720	0.2247	0.2556	0.2027	0.0914	0.0629	0.0736	0.0406