The contributions of labor market pooling and transport access to intra-urban economies of agglomeration *

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Abstract

This paper compares the relative importance of labor market pooling to spillovers from employment density for intra-urban economies of agglomeration. The analysis measures agglomeration potential for an industry, at a location, as the sum of employment and the potential labor force within a specified distance or travel time range. The birth of new establishments and new establishment employment indicate agglomeration at a location. The main results are that labor-market pooling does contribute to economies of agglomeration, as measured by employment, and that greater travel time to other establishments and a potential labor force reduces agglomeration benefits.

JEL Classification: O1; R4

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1 Introduction

Economies of agglomeration, including labor market pooling, input sharing, and technological spillovers, improve productivity not only as a club good, between urban areas, but also attenuate within urban areas as distance from economic activity increases (Rosenthal and Strange, 2003). This finding would suggest that the location of greatest employment density in an urban area would have the greatest economies of agglomeration for a particular industry. The present analysis evaluates two reasons why employment concentration may overstate a location's economies of agglomeration. First, workers' residences are typically more spread out than employment concentrations, therefore, the spatial distribution of benefits from labor market pooling may differ from other economies of agglomeration. If employment and residential population are similarly distributed, the effects of employment spillovers and labor market pooling may be indistinguishable. Second, high density employment areas are also likely to have high congestion, limiting access to other establishments and a potential labor force.

The present analysis builds on the empirical methodology of Rosenthal and Strange (2003), which regresses establishment births, and new establishment employment per square mile, in a ZIP code, on existing employment surrounding the ZIP code. Focusing on new establishments, rather than on total employment growth, treats existing employment as exogenous. Establishment births will occur near existing concentrations of employment if economies of agglomeration are present. Rosenthal and Strange supplement ZIP code level employment data with Metropolitan Statistical Area fixed effects to control for other sources of establishment birth, such as fiscal policies, wage rates, and natural advantages. Rosenthal and Strange, as well as other researchers using this methodology (Van Soest et at., 2006), find economies of agglomeration in employment that attenuate with distance.

However a positive effect of employment concentration on nearby establishment births does not differentiate between access to economic activity and access to a potential labor force. Access to economic activity comprises input sharing and technological spillovers. If there are scale economies in input production, then clustered businesses will be able to purchase inputs at a lower price than in isolation. At the urban level, Holmes (1999) finds strong clustering of establishments around input providers in many industries. If technology and knowledge spill from one firm to another within local areas, then clustered businesses will be more productive. At the urban level, Jaffee et al. (1993) find that patent citations are 5 to 10 times as likely to come from the same SMSA as control patents. Rosenthal and Strange (2008) estimate the effect of high skill workers on wages using place-of-work census data for 2000. They find that proximity to high skill workers increases wages, while accounting for endogeneity of employment density using instrumental variables such as bedrock and landslide hazard. Bacolod et. al (2008) find that cities concentrate employment of those with cognitive and people skills, generating higher wages for those with such skills.

Access to a potential labor force should confer other economies of agglomeration, namely, improved matching of workers to establishments. Wheeler (2006) tracks wages of urban and non-urban workers using the National Longitudinal Survey of Youth and finds that wages of urban workers rise faster, largely driven by job changes and possibly indicating better matching. Bleakley and Lin (2007) find that in more dense urban areas, young workers switch jobs more rapidly and older workers switch less rapidly, possibly indicating a matching process whereby young workers rapidly identify superior industry and occupation matches and then stick with them.

While improved matching may benefit both workers and establishments, dispersed housing and daily commuting costs limit the accessibility of locations to a potential labor force. Numerous studies of urban geography find that job housing balance is highly

varied throughout a typical city.[1] In addition to places of residence being distributed differently than places of work, many workers cross-commute, or pass each other in opposite directions (Giuliano and Small, 1993).

In order to differentiate the effect of labor force pooling from other economic activity, measure proximity to workers' places of residence. In regressions of new establishment employment, on existing employment and labor (total and industry) within ranges of proximity, access to labor has a positive and significant effect in most industries. Furthermore, including labor reduces the effect of employment on establishment birth, suggesting that a portion of the economies of agglomeration attributed to employment concentration, may actually derive from labor force concentration.

I also evaluate the importance of travel time access to employment and labor for economies of agglomeration. Because of infrastructure layout and traffic congestion, the travel time required to cover a specified distance will vary throughout a city. Furthermore, employment concentration and travel time for a specified distance are likely to be positively correlated. Therefore, employment concentration may suggest greater access to other establishments than is actually feasible. Graham (2007) estimates production functions for businesses in the UK and finds that productivity improves with access to employment. The effective density of a location equals the sum of the employment at all locations divided by the distance or travel time to those locations.[2]

The present analysis measures economies of agglomeration in a different manner and in conjunction with labor, includes employment at establishments with multiple locations, and uses industry definitions that are more narrowly focused.In order to compare the importance of travel time and distance for measuring agglomeration potential, the I

[1]See Anas et. al (1998) for a survey of the literature on urban spacial structure.

[2]Timothy and Wheaton (2004) estimate wage equations for workers commuting among zones of two urban areas, and find that wage is correlated with average commuting from a zone. They conclude that this may be due both to equilibrium agglomeration effects or disequilibrium distribution of employment.

identify the employment and labor force that is inaccessible from a location within a specified travel time, and includes the accessible and inaccessible employment and labor as independent variables in regressions. Regression results suggest that greater travel time suppresses the agglomeration potential of a location.

2 Model

Rosenthal and Strange (2003) base their regression specification on an establishment level production function that depends on local characteristics y and an establishment's potential profitability, ϵ. All establishments at a location receive y, but ϵ is independent and identically distributed across establishments. Therefore, Variation in y across locations shifts the production function and changes the probability that an establishment is created. There are $j = 1, ..., J$ potential locations for opening an establishment, Census tracts in the present analysis. Establishments evaluate existing location characteristics in period $t-1$ and open in period t.

Characteristics in a census tract, denoted y_j, comprise characteristics that vary by census tract indicating access to economic activity, denoted $y_{j,t-1}$, and characteristics that vary by metropolitan area, denoted γ_m. New establishment employment in location j in time t, is denoted $N_{j,t}$, and specified

$$N_{j,t} \;=\; \beta y_{j,t-1} \;+\; \gamma_m + \epsilon_t. \tag{1}$$

With the fixed effects γ_m controlling for the birth potential in metropolitan areas, and β, the coefficient of $y_{j,t-1}$, reflecting the effect of intra-urban economies of agglomeration. Because I only consider new establishments, employment growth is never less than zero. Therefore, I use a tobit truncated at zero for all regressions.

3 Data and Variables

The present analysis uses detailed, geographic data, at the census tract level and measures access to local employment and a potential labor force, in terms of distance and travel time.

To measure the scale and change in employment, I use Dun & Bradstreet, establishment level data, as it is assembled in the National Establishment Time Series (NETS) for California. Each year Dun & Bradstreet identifies and contacts millions of individual establishments throughout the country, whether they are stand alone businesses or branches, and inquires about their employment level, industry (6 digit NAICS code), and physical location, among other information. Establishments have an incentive to participate to facilitate interactions with other businesses, creditors, and marketers. Dun & Bradstreet tracks establishments from year to year using a DUNS number. Using DUNS numbers, Walls & Associates has constructed a longitudinal dataset (NETS) tracking establishments from birth to death. Neumark et al. (2007) compares a California extract of the Walls & Associates dataset to other employment data sources and verifies the completeness and accuracy of NETS data.

I use the same California extract and match geocoded establishments to year 2000 census tracts, courtesy of David Neumark. Census tracts are typically smaller than ZIP codes (California has more than 7,000 census tracts and fewer than 2,000 ZIP codes), allowing for a fine level of spatial analysis. Although this dataset limits the analysis to California, the large population and multiple urban areas in the state allow for sufficient observations and heterogeneity.

I have selected a variety of industries in professional services, innovation, finance, and manufacturing, with a citywide or national component to their output, so that establishments do not choose a location simply based on local sales potential. I focus

on software development and customization, apparel, machinery, consulting, commercial banking, law offices, and motion picture & video production.[3] The non-manufacturing industries in the present analysis rely heavily on high skill, specialized employees. In addition, I measure total employment among all industries at every location.

To measure the scale of a potential labor force, I use year 2000 Census population data on workers (age 16+) by industry. Whereas NETS data measures employment at the place of work, Census data measures workers at their place of residence. The census data industry codes allow for only 19 industry groups, at the 2 digit NAICS code level. I use industry data to measure manufacturing employees, the potential labor force for the apparel and machinery industries. For the other industries, I identify the occupation that is most related to the skills that drive production in each industry, associating financial specialists with commercial banking; business operations specialists with consulting; legal occupations with law offices; arts, design, entertainment, sports, and media occupations with motion picture and video production; and computer and mathematical occupations with software development and customization. Thus, an establishment's potential labor force need not all work in the industry of that establishment, but simply have the skills most important for the establishment's productive activity or service.

Local characteristics, $y_{j,t-1}$ specify the number of employees, and the potential labor force, for an industry, within specified distance intervals from a census tract centroid. I partition $y_{j,t-1}$ into characteristics of Census tract j, other census tracts with centroids less than 5 miles from the centroid of j, and those with centroids 5 to 10 miles from j (calculated with GIS software). Government agencies draw Census tracts based on population, not employment, resulting in a variety of sizes and employment totals. Therefore,

[3]Rosenthal and Strange (2003) use software, food products, apparel, publishing & printing, fabricated metals, and machinery. Graham (2007) uses manufacturing, construction, hotels & catering, transportation, storage & communication, real estate, information technology, banking, finance & insurance, business services, and public services.

the dependent variable of new establishment employment, and the variables of own census tract characteristics are measured as employment and per square mile. See Figures 1 and 2 for a gradient illustration of total employment and labor within 5 miles of each census tract. I include MSA fixed effects for the 10 largest MSAs in California, each with over 100 Census tracts. Regressions with these variables should indicate whether the density of a potential labor force contributes to economies of agglomeration.

While NETS and Census data are available for all of California, travel time data, another means of measuring access, is only available for selected Metropolitan Planning Organizations (MPOs). Specifically, I use morning, peak travel time data from the Southern California Association of Governments, or SCAG (comprising Los Angeles, Orange, Ventura, San Bernardino, Riverside, and Imperial Counties), and the San Diego Association of Governments, or SANDAG (comprising San Diego County). The data for both MPOs gives a complete matrix of simulated, drive alone, travel times between all Transportation Analysis Zones (TAZs), at both origins and destinations.[4] The simulations assume trip generation and infrastructure capacity for the base year of 2003.

To measure travel time access, I subdivide the 5 to 10 mile ring into census tracts that may access j in 20 minutes or less, or more than 20 minutes. Regressions with a travel time component should indicate whether accessibility has distinct contributions from proximity in determining economies of agglomeration. See Figures 3 and 4 for a gradient illustration of total employment in the 5 to 10 mile range from each Census tract that is not accessible in 20 minutes and is accessible in 20 minutes.

[4]Both MPOs match TAZs to Census tracts for the purpose of estimating trip generations. There are typically multiple TAZs corresponding to a single Census tract, so I average the travel time between all TAZs corresponding to each pair of Census tracts, in each direction.

4 Results

All regressions use the employment data for the base year of 2003, and labor force data for 2000. For each industry, regressions report economies of localization, based on own industry employment and labor, and urbanization, based on all other employment and labor. New employment is total employment in 2005 of establishments born in 2003 or 2004.

4.0.1 Labor market pooling in California

Regressing new employment on local characteristics for the sample of all Census tracts in California indicates that access to a potential labor force contributes to economies of agglomeration (Table 1).

First note that in regressions with only employment characteristics (odd numbered columns), economies of localization and urbanization tend to diminish with distance (Rosenthal and Strange, 2003). For all industries, urbanization of a census tract has a positive and significant effect on new establishment employment. This effect may differentiate census tracts which are largely residential from those that have significant commercial or industrial real estate. Census tract economies of localization are also positive and significant for all industries, suggesting that immediate proximity is especially important for agglomeration in these industries. Economies of urbanization from surrounding Census tracts tend to be negative, possibly indicating the positive effect of density on rental rates. In contrast economies of localization from surrounding Census tracts are positive and significant, but decline with distance.

Economies of agglomeration from employment persist alongside economies of agglomeration from labor, but diminish in magnitude in some cases (even numbered columns). Economies of localization within a Census tract fall in all industries except banking,

but only by a small amount. In contrast, economies of localization decline by a large magnitude for the 5 mile and 5 to 10 mile ranges in almost every industry. This result suggests that some of the economies of agglomeration attributed to employment density may actually derive from proximity to a potential labor force.

For most industries, proximity to a potential labor force in a Census tract or the surrounding 5 miles has a positive and significant effect on new establishment employment, on an order of magnitude similar to that from proximity to employment. Thus, the presence of a worker delivers an agglomeration benefit equivalent to an employee. Aside from manufacturing, all industries have at least one distance result significant at the 5 percent level. While the apparel industry can operate in close proximity to population centers, as in Los Angeles, the machinery industry is more segregated to industrial zones, and does not exhibit economies of agglomeration from a potential labor force. For all industries, economies of urbanization from total labor force are negative or insignificant, suggesting that even those industries with service components (banking and legal), are not simply locating alongside residential areas. Fixed effects vary considerably between cities.

4.0.2 Travel time access in Southern California

Regressing new employment on local characteristics for the sample of Census tracts in Southern California indicates that travel time access to employment and a potential labor force is important for the functioning of economies of agglomeration (Table 2). First note that the Southern California sample exhibits similar patterns to the full sample when access is measured with distance (odd numbered columns). Effects in the 5 to 10 mile range for all types of agglomeration are most often insignificant.

In contrast, when travel time access divides the characteristics of the 5 to 10 mile range by those not accessible in 20 minutes, and those accessible in 20 minutes (even numbered

columns), many of the localization effects for employment and labor become significant, and have the expected relationships in relative effect. Namely, the positive effect of accessible employment and labor is, in most cases, greater than that of inaccessible employment and labor. For example, in the consulting industry without considering travel time, the effect of employment within 5 to 10 miles is insignificant and small. When travel time partitions this employment, the portion that is accessible has a significant effect similar in magnitude to employment in the 5 mile range. Meanwhile, inaccessible employment has a very small effect that is not significant (with analogous relationships for labor force accessibility).

5 Conclusion

In conclusion, this analysis estimates the effect of access to employment and labor on new employment growth, measuring access in terms of distance and travel time, and finds that proximity to a labor force contributes to economies of agglomeration and that economies of agglomeration rely, in part, on travel time access. Although limited to a single state, this analysis covers a variety of narrowly defined industries and corresponding labor forces across many metropolitan areas.

An implication of these results is that locations with high employment density may increase their agglomeration potential by attracting their workforce to reside nearby, or by making their location more accessible to workers and other businesses. However, this analysis does can not conclude whether such a change would be welfare enhancing. Investments in housing and infrastructure in a high employment area are expensive, and may simply divert agglomeration potential from one location to another.

Another implication is that for industries where employment and residential population are similarly distributed, it may be difficult to distinguishing whether intra-urban

economies of agglomeration derive from labor market pooling, shared inputs, or knowledge spillovers. Including a larger dataset of more states, industries and MPOs would expand and strengthen the findings of the present analysis.

6 References

Anas, A., Arnott, R., Small, K., 1998. Urban Spatial Structure. Journal of Economic Literature 36, 1426-1464.

Bacolod, M., Blum, B., Strange, W., 2008. Skills in the City. Working Paper.

Costa, D.L., Kahn, M.E., 2001. Power Couples. Quarterly Journal of Economics 116, 1287-1315.

Giuliano, G., Small, K., 1993. Is the journey to Work Explained by Urban Structure. Urban Studies 20, 1485-500.

Giuliano, G., Small, K., 1999. The determinants of growth of employment subcenters. Journal of Transport Geography 7, 189-201.

Giuliano, G., Redfearn, C., Agarwal, A., Li, C., Zhuang, D., 2007. Employment concentrations in Los Angeles, 1980 2000. Environment and Planning A 39(12), 2935 2957.

Graham, D., 2007. Variable returns to agglomeration and the effect of road traffic congestion. Journal of Urban Economics 62, 103-120.

Holmes, T. J. 1999. Localization of Industry and Vertical Disintegration. Review of Economics and Statistics 81(2), 314-25.

Jaffe, A. B., Trajtenberg, M., Henderson, R., 1993. Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations. Quarterly Journal of Economics 108: 577-598.

Marshall, A., 1920. Principles of Economics. London: MacMillan.

Neumark, D., Zhang, J., Wall, B., 2007. Employment Dynamics and Business Relocation: New Evidence from the National Longitudinal Establishment Time Series. Research in Labor Economics 26, 39-83.

Rosenthal, S., Strange, W., 2003. Geography, industrial organization, and agglomeration. Review of Economics and Statistics 85, 377393.

Rosenthal, S., Strange, W., 2004. Evidence on the nature and sources of agglomeration economies. In: Henderson, J.V., Thisse, J.-F. (Eds.), Handbook of Urban and Regional Economics, vol. 4. Elsevier, Amsterdam, pp. 21192172.

Rosenthal, S., Strange, W., 2008. The attenuation of human capital spillovers. Journal of Urban Economics forthcoming.

Timothy, D., Wheaton, W., 2001. Intra-Urban Wage Variation, Employment Location, and Commuting Times. Journal of Urban Economics 50, 338-366.

Wheeler, C. H., 2006. Cities and the growth of wages among young workers: Evidence from the NLSY. Journal of Urban Economics 60, 162-184.

Table 1

Tobit regression of own industry, new establishment employment per square mile, by industry

			Apparrel		Banking		Consulting		Legal	
Agglomeration	Industry	Range	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Employment	Localiz.	0 miles	0.02879280***	0.02667795***	0.00729979***	0.00812734***	0.00938133***	0.00913052***	0.00960795***	0.00928841***
		0 to 5 miles	0.0000409	-0.00005552	0.00145711***	0.00102240*	0.00182042***	0.00126346***	-0.00046096**	-0.00119723***
		5 to 10 miles	-0.0001349	-0.00000968	0.00102776***	0.00071192*	0.00064390***	0.00024743	0.00035026***	-0.0002777
	Urbaniz.	0 miles	0.00005197	0.00005859*	0.00060685***	0.00058826***	0.00099991***	0.00099204***	0.00130090***	0.00132325***
		0 to 5 miles	0.00000228	0.00001486	-0.00002302***	-0.00001631*	-0.00005384***	-0.00003338***	0.00002313**	0.00006079***
		5 to 10 miles	0.0000046	0.00000026	-0.00000292	0.00000037	-0.00001505***	0.00000677	-0.00002246***	0.00001983*
Labor force	Localiz.	0 miles		-0.00935028***		0.02027475***		0.02253865***		0.03352141***
		0 to 5 miles		0.00025794***		0.00017801		0.00236972***		0.00259580***
		5 to 10 miles		-0.00010660**		0.00068485*		0.00080453**		0.00048371
	Urbaniz.	0 miles		0.0003695		-0.00069370***		-0.00106949***		-0.00172400***
		0 to 5 miles		-0.00004775**		-0.00001195		-0.00006826***		-0.00005596**
		5 to 10 miles		0.00002267		-0.00001451		-0.00002710**		-0.00003634**

Agglomeration: total employment or labor within a range of proximity to a census tract, j.

Industry: Employment and labor within the industry (Localization), or employment and labor in all other industries (Urbanization).

Range: Total employment and labor in census tracts with a centroid in the specified range of distance. 0 mile indicates census tract j employment and labor per sq. mile.

Fixed effects: 10 Metropolitan Statistical Areas

Sample: California, 7,036 Census tracts.

Significance levels: * = 0.10, ** = 0.05, *** = 0.01

Table 1 (continued)

Tobit regression of own industry, new establishment employment per square mile, by industry

			Machinery		Motion picture		Software	
Agglomeration	Industry	Range	(9)	(10)	(11)	(12)	(13)	(14)
Employment	Localiz.	0 miles	0.00645904***	0.00590589***	0.03925693***	0.03369778***	0.02691656***	0.02503930***
		0 to 5 miles	0.00051393**	0.00063195**	0.00335610***	-0.00265364***	0.00385423***	0.00188017**
		5 to 10 miles	0.00026162	0.00047509**	0.00059948***	-0.00181619***	0.00192791***	0.00136790*
	Urbaniz.	0 miles	0.00005686*	0.00005251	0.00060024***	0.00040464**	0.00091613***	0.00094618***
		0 to 5 miles	-0.00000086	0.00001066	-0.00004874**	-0.00003719	-0.00006260***	0.00006952*
		5 to 10 miles	-0.00001133***	-0.00001278**	-0.00003094**	0.00003751	-0.00003746***	0.00001052
Labor force	Localiz.	0 miles		-0.00097435		0.07499005***		-0.00303247
		0 to 5 miles		-0.00014997*		0.01493388***		0.00236865**
		5 to 10 miles		0.00000553		0.00502703***		-0.00043311
	Urbaniz.	0 miles		-0.00055352*		-0.00401365***		-0.00071249
		0 to 5 miles		0.00000268		-0.00036429***		-0.00029916***
		5 to 10 miles		0.00000547		-0.00008512*		-0.00002957

Table 2

Tobit regression of own industry, new establishment employment per square mile, by industry

			Apparrel		Banking		Consulting		Legal	
Agglomeration	Industry	Range	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Employment	Localiz.	0 miles	0.04382660***	0.04331769***	0.06715417***	0.06749275***	0.00274405***	0.00294047***	0.01048649***	0.01048610***
		0 to 5 miles	-0.00024483	-0.00030308	0.00100498*	0.00136547**	0.00080304***	0.00092663***	-0.00083327***	-0.00083222***
		5 to 10 miles	-0.00011528		0.00028137		0.00026872		-0.00013608	
		> 20 min.		-0.00013167		-0.00059453		0.00005378		-0.00017899
		< 20 min.		-0.00028354		0.00169408***		0.00107053***		-0.00005185
	Urbaniz.	0 miles	0.00012928	0.00011658	0.00064397***	0.00062581***	0.00101698***	0.00101862***	0.00104110***	0.00104446***
		0 to 5 miles	0.00001909	0.00001732	-0.00002119**	-0.00003908***	-0.00001858	-0.00003533**	0.00004985***	0.00005007***
		5 to 10 miles	0.00000903		0.000004		0.00000123		0.00001262	
		> 20 min.		0.00001485		0.0000075		-0.00000138		0.00001311
		< 20 min.		0.00000285		-0.00001827*		-0.00001208		0.00001024
Labor force	Localiz.	0 miles	-0.01055164***	-0.01057897***	0.02334319***	0.02385772***	0.06828374***	0.07186550***	0.02792187***	0.02769281***
		0 to 5 miles	0.00013442	0.00018222	0.00122827***	0.00076262	0.00304593***	0.00265300***	0.00176083***	0.00178018***
		5 to 10 miles	-0.00003981		0.00020067		0.00061479		0.00005914	
		> 20 min.		-0.00001386		-0.0008205		0.00008603		0.00014642
		< 20 min.		-0.00005309		0.00169880**		0.00325880***		-0.00004922
	Urbaniz.	0 miles	0.00029603	0.00030746	-0.00006269	-0.00007285	-0.00127330***	-0.00143038***	-0.00041828	-0.00041033
		0 to 5 miles	-0.0000435	-0.00004384	-0.00000539	0.00002517	-0.00005674**	-0.00003842	-0.00004270**	-0.00004489**
		5 to 10 miles	0.00000119		-0.00001664		-0.00002547*		-0.00002794**	
		> 20 min.		-0.00000918		0.0000175		0.00000256		-0.00002887**
		< 20 min.		0.0000036		-0.00004864**		-0.00007970***		-0.00002388

Agglomeration: total employment or labor within a range of proximity to a census tract, *j*.

Industry: Employment and labor within the industry (Localization), or employment and labor in all other industries (Urbanization).

Range: Total employment and labor in census tracts with a centroid in the specified range of distance and time. 0 mile indicates census tract *j* employment and labor per sq. mile.

Fixed effects: Los Angeles & Oragne County, San Diego County

Sample: Southern California, 3,400 Census tracts

Significance levels: * = 0.10, ** = 0.05, *** = 0.01

Table 2 (continued)

Tobit regression of own industry, new establishment employment per square mile, by industry

			Machinery		Motion picture		Software	
Agglomeration	Industry	Range	(9)	(10)	(11)	(12)	(13)	(14)
Employment	Localiz.	0 miles	0.00449787**	0.00439363*	0.02863304***	0.02760721***	0.03735506***	0.03728622***
		0 to 5 miles	0.00144119**	0.00133372*	-0.00378992***	-0.00418522***	-0.00028068	0.0000323
		5 to 10 miles	0.00094742*		-0.00220779***		0.00045905*	
		> 20 min.		0.00117451*		-0.00182180***		0.00069107*
		< 20 min.		0.00042879		-0.00320760***		0.00078968**
	Urbaniz.	0 miles	0.00021736***	0.00022926***	0.00130563***	0.00137571***	0.00053630***	0.00051761***
		0 to 5 miles	0.00000363	0.00000355	-0.00002351	0.00002618	0.00000879	-0.00000841
		5 to 10 miles	-0.00001219		0.00008764***		0.00000481	
		> 20 min.		-0.00001903*		0.00011552***		0.00000174
		< 20 min.		-0.00000125		0.00008827*		-0.00001243
Labor force	Localiz.	0 miles	-0.00026356	-0.00027493	0.08260779***	0.08823633***	0.01347679**	0.01310560**
		0 to 5 miles	-0.00021140**	-0.00021399**	0.01838423***	0.02099846***	0.00251490***	0.00213078***
		5 to 10 miles	-0.0000157		0.00528850***		0.00026564	
		> 20 min.		-0.00001238		0.00540611***		-0.00037191
		< 20 min.		-0.00004483		0.00592685**		0.00126464**
	Urbaniz.	0 miles	-0.00103821*	-0.00104241*	-0.00605922***	-0.00623963***	-0.00008264	-0.00009192
		0 to 5 miles	0.00002715	0.00002549	-0.00045073***	-0.00060937***	-0.00007177***	-0.00004345*
		5 to 10 miles	-0.00000043		-0.00014380***		-0.00002070*	
		> 20 min.		0.00000669		-0.00023129***		0.00000232
		< 20 min.		0.00000015		0.00003956		-0.00003692**