NOT SO FOOTLOOSE AFTER ALL: LOCATIONAL BEHAVIOR OF INFORMATION TECHNOLOGY ESTABLISHMENTS IN THE UNITED STATES, 1989-1998

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Abstract – *Among the benefits that technology can provide is greater connectivity among economic agents. Commerce now occurs across great geographic distances at nominal transaction costs. Technology, therefore, seems to have the potential to unshackle economic agents from their suppliers and customers, enabling them to seek out alternative locations without being at a comparative disadvantage to other businesses. In this paper we address the following question, "Is there convincing evidence to support the thesis that, for firms in the information technology industry, distance is dead and they truly are footloose in choosing their locations?" Using a data set that only recently became available and which contains establishment births by county, this paper presents evidence that firms in the information technology industry respond positively to the economies found in metropolitan areas. This implies that the characteristics of such areas relative to those of non-metropolitan areas (population size, educational attainment of the labor force, and various kinds of agglomeration economies) make them attractive locations for information technology establishments. Therefore we find that, at least for the information technology industry, distance is not dead.*

Key-words **-** INDUSTRIAL LOCATION, ESTABLISHMENTS BIRTHS, INFORMATION TECHNOLOGY, AGGLOMERATION ECONOMIES, DISTANCE, FOOTLOOSE.

JEL Classification: R12, R30, O18.

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Among the benefits that technology can provide is greater connectivity among economic agents. Commerce now occurs across great geographic distances at nominal transaction costs. Technology, therefore, seems to have the potential to unshackle economic agents from their suppliers and customers, enabling them to seek out alternative locations without being at a comparative disadvantage to other businesses. This possibility has spawned the "death of distance" notion that distance no longer matters, that technology has made all locations equal. Such thinking has been encouraged by phenomena such as the widespread "outsourcing" of many back-office and service functions by U.S. firms and/or the location of many of these functions in India and other foreign countries.[1]

Information technology industries themselves provide an interesting case study of the locational behavior of firms. More than firms in any other industry, information technology firms ought to be positioned to capitalize on technology advantages, and should therefore be more likely to operate at dispersed locations. In this paper we address the following question, "Is there convincing evidence to support the thesis that, for firms in the information technology industry, distance is dead and they truly are footloose in choosing their locations?" As the title indicates, we find in the negative: firms are not footloose in choosing their locations and therefore, at least for now, distance is not dead.

Using a data set that only recently became available which contains establishment births by county, this paper presents the evidence that firms in the information technology industry respond to positively to the economies found in metropolitan areas. This implies that the characteristics of such areas relative to those of non-metropolitan areas (population size, concentration, and density; educational attainment of the labor force; and various kinds of agglomeration economies) make them attractive locations for information technology establishment. Bresnahan *et al.* (2002) find complementarities between information technology, workplace organization and the demand for skilled labor. Firms adopting these innovations tend to use more skilled labor. This supports the thesis that an educated workforce is critical to IT using and producing firms. Further, the negative characteristics of metropolitan areas (congestion costs, higher taxation than non-metropolitan areas, etc.) do not outweigh the positive agglomeration effects. Rosenthal and Strange (2003) find that while the benefits of agglomeration attenuate rapidly over the first few miles, and less rapidly thereafter, the benefits of labor market pooling and sharing inputs may extend over a greater distance such as a metropolitan area.

Research on the locational behavior of firms, in spite of its long history and voluminous contributions, has still not reached a consensus on precisely which factors influence the locational behavior of firms in which circumstances. Much of the locational research has focused only on traditional manufacturing, which represents a progressively smaller part of the economy, especially in

[1] Carlson (2004) presents a useful description of the effects of the digital economy.

terms of employment, because data for manufacturing industries as been better or more readily available. The unavailability of detailed comprehensive data for an entire economy, in both the geographic and industrial dimensions, has hindered the scope of the research and the methodologies that could be employed. This paper addresses this shortcoming in prior research on the locational behavior of firms by using a newly available micro data set of establishment births at the county level which permits analysis at a more detailed geographic level than has previously been possible.

The accepted theory of the locational behavior of firms assumes a profit-maximizing firm will locate where its expected profits are highest. Location-specific factors, such as the characteristics of the labor force, the educational attainment of the population, and the level of local taxes, have a direct bearing on the profitability of a firm (Rosenthal and Strange, 2001). Examining the locational behavior of firms, which are assumed to be driven by profit maximization, against the diversity of locations available within the U.S. offers an opportunity to test hypotheses regarding those elements that attract or repel firms.

Earlier research in the field of locational behavior of manufacturing industry in the United States produced conflicting findings. One source of these inconsistencies lies with the data. Due to the unavailability of micro data on establishments, researchers had to settle for aggregate measures of economic activity as proxies for establishment locational choices. This procedure simplified the estimation, but at the expense of aggregation bias. The availability of only aggregate data also has dictated the methodologies used to address the issue of locational behavior. The dearth of sub-state data compelled researchers to use states as the unit of measurement. Research at this level of aggregation is a departure from the reality of economic development activity (Cole, 2000): that of a firm making a discrete choice from all possible locations. Different measures of locational behavior yielded different conclusions about the role played by location-specific factors.

Accurate micro level data are slowly becoming more readily available. Early firm level micro data were flawed: the data were incomplete, and often failed to distinguish correctly between establishment births and deaths from reclassifications or changes in ownership (Cole, 2000). Some later micro data sets were constructed at great lengths by researchers, but with small geographic or industrial scope (e.g., Carlton (1983), Bartik (1987)). A data set is now available from the Census Bureau that overcomes the shortcomings of the early data sets.

This paper considers the spatial distribution of the locational decisions of establishments in the information technology (IT) industry in the U.S. The IT industry has evolved to encompass a broad array of activities including computer manufacturing and software design, as well as IT-intensive industries such as banking, stock brokering, and data processing. Rather than treating the IT industry as completely homogenous, this study will utilize two categories of IT industries identified by the U.S. Department of Commerce (1999): IT

producers and IT users. IT producing firms include producers of computer and communications hardware, software and services.[2]

The data to be employed were drawn from a custom data set obtained from the Department of Statistics of U.S. Business[3], a branch of the Census Bureau. The data set includes establishment births and deaths by three-digit standard industry classification (SIC) codes[4], by county, for four two-year periods: 1989-1990, 1990-1991, 1996-1997, and 1997-1998. The analysis of these four periods will provide insight for two distinct periods in the business cycle: a period of recession (1989-1991) and one of expansion (1996-1998).

The depth of the data, in terms of both spatial and industrial detail, coupled with its originality, give value to a descriptive analysis of the data. The availability of data on establishment births and deaths for every U.S. county marks a major advance over what had been available previously Furthermore, the micro level data permit a more powerful methodology to be employed: a firm-level approach to locational behavior is now possible.

The net result of the impact of information technology on locational behavior is that growth, as measured by employment growth of both manufacturing and finance and services, is expected to be more widespread. If information technology indeed unfetters companies, then low-cost locations, previously deemed unreasonable due to their remoteness, are now considered viable cost-cutting alternatives.

1. RESEARCH ON THE DETERMINANTS OF INDUSTRIAL LOCATIONAL

As stated above, locational behavior research has centered on the manufacturing industry and early research focused on the role of transportation costs. To reduce transportation costs businesses selected sites in close proximity to resources or customers (Weber, 1929; Perloff *et al.*, 1960; Wheat, 1973).

Carlton (1983) marked a departure from earlier studies by taking an establishment-level approach to the question of the determinants of locational behavior. Until 1983, research tended to use aggregate measures, such as the change in total employment, to gauge locational behavior. Such measures obscure the underlying locational decisions of establishments: movements in total employment are a function of net employment changes brought about

[2] IT using firms are identified by either of two measures: those with high IT capital stocks as a share of total equipment stock (net of depreciation) or those with high IT investment per employee. Examples of IT using industries include credit card companies, insurance firms, and advertising firms.

[3] Custom compilations of data from completed surveys are available for a fee from the Statistics of U.S. Business, U.S. Census Bureau (c.f., csd@census.gov.).

[4] A two-digit SIC code implies the broadest definition of an industry, e.g. SIC 30 is durable goods manufacturing. A three-digit SIC code implies one level of detail greater, e.g. SIC 357 is computer and office equipment manufacturing. A four-digit SIC is a still finer level of industry classification, e.g. 3571 is electronic computers manufacturing.

through establishment births and deaths, and expansions and contractions in workforce, all of which may be driven by different factors.

Bartik (1985, 1987) used establishments as the unit of measurement for locational behavior. In his 1985 study, he used a panel of data on branch plant openings by Fortune 500 companies for nineteen manufacturing sectors (SIC 20, and 22 through 39) for the periods 1976-78, 1978-80, and 1980-82. He found that unionization and taxes have a major impact on industrial location.

Bartik (1987) considered small business starts. He concluded that the primary influence on small business starts is high market demand relative to industrial supply. Bartik also found that adopting a panel analysis of business starts rather than using cross-sectional data yields better results. Panel analysis controls for unobserved area characteristics, where cross-sectional analysis would have these effects fall into the residual.

Papke (1991) continued Bartik's work by considering five manufacturing industries. Papke found that location-specific characteristics play a significant role in the locational behavior of firms, even after accounting for state heterogeneity. Furthermore, she noted that industries differ markedly in their responsiveness to economic characteristics. Papke's estimates suggest that the percentage decrease in manufacturing plant births with a 1% increase in the effective tax rates lies between 1.6 and 15.7. While the magnitudes of the estimates exceed Bartik's, they do corroborate Bartik's finding that *establishments* are the appropriate measure with which to study the issue of locational behavior. According to Papke:

A new consensus may be forming, based on establishment level data, which contradicts the conventional wisdom that state and local taxes have little or no effect on business location. (Papke, 1991, p. 66).

Cole (2000) recognized the need for locational behavior studies to be conducted with a finer level of geography than previously employed. Establishment deaths are included in his model and their influence on establishment births is analyzed. Cole found that establishment births reduce future births, implying a "discouragement effect." Firm births and deaths exert strong negative influence on future births and deaths, respectively, as the competitive effect contends. Significant feedback is found between firm births and deaths and local economic performance as measured by real per capita personal income and unemployment. Finally, areas with a larger proportion of smaller firms tend to experience higher birth rates, a trend which is consistent with a "seedbed" effect.

Two recent studies attempted to model the locational decisions of foreign-owned manufacturers in the U.S. (Friedman, Gerlowski and Silberman, 1992 and Coughlin and Segev, 2000). The consensus of these papers is that market size, existing manufacturing base, and education attract foreign direct investment. Taxes are found to impact foreign direct investment negatively in manufacturing plants.

Guimarães *et al.* (2003) revisited Papke's approach of applying the Poisson regression model to the problem of locational decisions. Using a data set of new foreign-owned manufacturing plants in Portugal between 1985 and 1992, Guimarães *et al.* found agglomeration to be a significant and positive determinant in locational decisions of manufacturers. Labor costs were found to be an insignificant explanatory variable, as were secondary education levels. Le Bas and Miribel (2005) found agglomeration to be important for information technology industries.

Table n° 1: Summary of Characteristics of Data Sets Used in a Sample of Prior Locational Behavior Research Papers

Author	Geographic Scope	Geographic Detail	Industrial Aggregation	Industrial Scope	Time Period	Location Measure
Perloff et al. (1960)	U.S.	50 States	1-digit SIC	Manufacturing	1939-1954	Not applicable
Wheat (1973)	U.S.	50 States	1-digit SIC t	Manufacturing	1947-1963	Employment growth (absolute and per capita)
Carlton (1983)	U.S.	39 MSAs	4-digit SIC	3 manufacturing industries (SICs 3079, 3662, 3679)	1960-1969	Branch plant openings
Bartik (1985)	U.S.	50 States	2-digit SIC	19 manufacturing sectors (SICs 20, and 22-39)	1976-82	Fortune 500 branch plant openings
Bartik (1987)	U.S.	50 States	2-digit SIC	Manufacturing	1976-1982	Business starts
Friedman et al. (1992)	U.S.	50 States	1-digit SIC	Manufacturing	1977-1988	884 openings of foreign-owned plants
Papke (1991)	U.S.	22 States	3-digit SIC	5 manufacturing industries (SICs 233, 251, 273, 366-7)	1975-1982	Births of non-branch plants
Duffy (1994)	U.S.	50 States	2-digit SIC	Manufacturing	1954-1987	Employment change
Zandi and Basel (1996)	U.S.	50 States	All industries	All industries	1984-1993	Relative employment
Cole (2000)	Pennsylvania	Counties	1-digit	Manufacturing	1985-1994	Firm births and deaths
Coughlin (2000)	2,316 Counties	Counties	1-digit	Manufacturing	1989-1994	Foreign-owned plant openings
Guimara?es et al. (2000)	Portugal	275 areas	N/A	Manufacturing	1985-1992	New foreign-owned manufacturing plants
Woodward et al. (2002)	U.S.	Counties	1-digit	Manufacturing	1989 and 1997	Establishment births

In summary, the literature reviewed as a basis for the work reported in this paper makes clear that analysis at the establishment level is needed.[5] Table 1 summarizes the characteristics of the data used in this prior research on industrial location. It is clear that a number of questions have been left

[5] The relevant literature is summarized in an appendix table available from the web site *http://www.buec.udel.edu/lathamw/Downloads/Not%20So%20Footloose%20Appendix%20Material.htm*

unanswered. The research presented in this paper attempts to address two of these: First, what are the locational determinants of industries today in the emerging digital economy and, in particular, in IT industries? Second, do agglomeration effects matter?

In deciding upon the appropriate level of geographic detail for analysis there are a number of considerations. It is desirable that no areas of the country should be excluded and that the areas utilized should not lead to selection bias. Metropolitan Statistics Areas (MSAs) are appealing for analysis because they combine sub-state areas containing a large population nucleus with adjacent communities that have a high degree of economic and social integration with the nucleus. However, even though 316 MSAs are defined within the United States, they do not cover the entire country. Furthermore, non-MSA areas have systematically lower population concentrations and lower business costs. Thus they would be expected to have different locational factors than their MSA counterparts and their exclusion might introduce selection bias into the analysis because their exclusion would introduce a non-random element. Thus MSAs fail on the both complete coverage and selection bias criteria.

States provide complete coverage and their use does not lead to selection bias. However, state level analysis misses much of the significant variation that exists within a state. By employing state level economic data, the disparate areas within the state can be masked by statistical aggregation. These considerations lead us to conclude that counties have the level geographic detail appropriate to this study.

2. DATA

The primary data are drawn from a custom data set of establishment births and deaths from the Department of Statistics of U.S. Business, a branch of the Census Bureau[6]. Observations in this dataset are the number of county level establishment births and deaths by three-digit SIC industries. The data set is a complete census of establishment births and deaths in the U.S. Unlike other sources, such as County Business Patterns, employment data, or Dun and Bradstreet's business starts data, there is no suppression of data for disclosure reasons. The Census Bureau matches establishments across years and verifies each recorded birth and death to ensure that the establishment has not merely been renamed, merged with another establishment, or been otherwise reclassified (all of which are sources of miss-measurement in other data sets).

Data availability has been a major impediment to locational research. Data limitations have, in prior research, narrowed the scope of studies in terms of industrial or geographical detail (see Table 1 for examples). The custom data set used in this paper does not suffer from these limitations and, therefore, its use permits a significant advance in the research in this area.

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6 The data were compiled by the Bureau of the Census specifically for this research. Hence the custom nature of the data set.

3. DESCRIPTIVE STATISTICS

The depth and breadth of the data permit detailed analyses of establishment births using a series of descriptive statistics. The resulting insights constitute a significant contribution to the body of knowledge regarding the locational behavior of firms.

The data are for the inter-year periods: 1989-1990, 1990-1991, 1996-1997, and 1997-1998. These years cover two distinct periods in the business cycle. At the beginning of the nineties the U.S. economy entered a recession. The Bureau of Economic Analysis (BEA) identifies the recessionary period as 1990Q3 to 1991Q1. By the mid-nineties, the economy was in the midst of the longest economic expansion in U.S. history. Thus, 1989-1991 represents a recessionary economy and 1996-1998 an expansionary one.

The aggregate data on establishment births and deaths for U.S. counties are shown in Table 2. A cursory look at the national data on establishment births in Table 2 suggests that the business cycle affects establishment births. In 1989-1990, the economy was slowing, but had not yet entered a recession. During that period, net establishment births exceeded 62,000 for all industries. In the following year, which was recessionary, net births fell below 30,000. In 1996-1997, one of the fastest growing periods of the last expansion, net establishment births rose to almost 160,000.

Table n° 2: Statistics for Establishment Births and Deaths for All Industries and for IT Sectors in the U.S. and for IT Producing and IT Using Establishments by County – Selected Years 1989-1998

	1989-1990	1990-1991	1996-1997	1997-1998
ALL INDUSTRIES *				
Establishment births	734,293	720,490	885,706	760,396
Establishment deaths	672,134	691,325	727,554	710,155
Net births	62,159	29,165	158,152	50,241
IT INDUSTRIES				
Establishment births	49,804	62,369	104,726	95,400
Establishment deaths	43,377	46,846	68,521	71,885
Net births	6,427	15,523	36,205	23,515
IT PRODUCING ESTABLISHMENTS				
Maximum Births in any County	866	919	1,467	1,598
Maximum Deaths in any County	722	842	1,139	1,113
Coefficient of Variation, Births	4.63	4.1	4.44	4.54
Coefficient of Variation, Deaths	4.53	4.59	4.39	4.31
IT USING ESTABLISHMENTS				
Maximum Births in any County	1,632	1,909	2,994	2,561
Max Deaths in any County	1,688	1,821	2,125	2,147
Coefficient of Variation, Births	5.16	4.99	4.8	4.86
Coefficient of Variation, Deaths	5.6	5.6	5.1	4.9

* *The "all industries" measure includes unclassified county births; unclassified births arise if an establishment birth is recorded, but its county is not. IT includes only classified county births.*

Table n° 3: Numbers of Establishment Births and Deaths: U.S. Totals and County Means for IT Producing, IT Consuming and Total IT Industry for Selected Years 1989-98

	1989-1990	1990-1991	1996-1997	1997-1998
All IT Industries				
U.S. Totals				
Births	49,804	62,369	104,726	95,400
	(77.9)	(90.9)	(153.2)	(141.1)
Deaths	43,377	46,846	68,521	71,885
	(70.8)	(76.5)	(103.5)	(105.8)
Net Births	6,427	15,523	36,205	23,515
County Means				
Births	15.9	19.9	33.3	30.4
Deaths	13.8	14.9	21.8	22.9
Counties with no births	1,023	684	556	658
IT Producing Industries				
U.S. Totals				
Births	19,654	26,342	44,974	45,786
	(29.0)	(34.4)	(63.6)	(66.2)
Deaths	17,643	18,774	30,938	31,462
	(25.5)	(27.5)	(43.3)	(43.2)
Net Births	2,011	7,568	14,036	14,324
County Means				
Births	6.3	8.4	14.3	14.6
Deaths	5.6	6.0	9.9	10.0
Counties with no births	1,511	1,074	1,022	1,042
IT Using Industries				
U.S. Totals				
Births	30,150	36,027	59,752	49,614
	(49.6)	(57.3)	(91.5)	(76.8)
Deaths	25,734	28,072	37,583	40,423
	(46.0)	(49.7)	(61.2)	(63.6)
Net Births	4,416	7,955	22,169	9,191
County Means				
Births	9.6	11.5	19.0	15.8
Deaths	8.2	8.9	12.0	12.9
Counties with no births	1,372	1,185	829	990

Classified establishment births only.
Standard deviations across counties are given in parentheses.

Information technology establishment births bucked the downward trend during the 1989-1990 and 1990-1991 years, adding 6,427 and 15,523 establishments in each of those periods. Indeed, IT net births accounted for 50% of all net births in the nation in 1990-1991. By 1996-1997, the economy had rebounded, raising aggregate establishment births, as well as IT births. In 1997-1998, IT net births once again accounted for almost 50% of total establishment births.[7]

[7] An appendix table available from the web site referred to in footnote 5 shows establishment births by state for all industries, summed for all years with available data. California, Texas and

Table 2 shows that, for IT producing industries, the coefficient of variation declines over the sample. Since the sample is left-censored, the data imply that some counties greatly outpaced the average number of births. The coefficient of variation of IT using births is consistently higher than that of producer births. Information technology producer births are occurring principally in MSAs (see Table 4). Ninety-five percent of net IT producer births occurred in MSA-member counties. The share of firms selecting center city sites rather than suburban sites is rising. This implies that producers are selecting MSAs in large numbers, and within an MSA are selecting the center city over a suburban alternative.

Summary data for IT industries are presented in Table 3. The county level data provide insight into the county-to-county performance of establishment births. The number of counties with zero IT establishment births almost halved over the period. The average number of births per county doubled between 1989-1990 and 1997-1998. Average IT producer births more than doubled between 1989-1990 and 1997-1998 from 6.3 to 14.6 (132%). Simultaneously, counties with zero births fell from 1,511 to 1,042 over the period. Essentially, between 1989 and 1998, the number of counties with any positive IT producer establishment birth activity rose from half of all counties to two-thirds.

Table n° 4: Gross and Net Numbers of IT Producing and IT Using Industry Births for Non-MSA, MSA, Suburban and Central City Areas for Selected Years 1989-98

	Gross Births				Net Births (Births – Deaths)			
	1989-90	**1990-91**	**1996-97**	**1997-98**	**1989-90**	**1990-91**	**1996-97**	**1997-98**
IT PRODUCING								
Non-MSA	1,865	3,336	3,952	3,816	89	1,358	1,249	712
MSA	17,789	23,006	41,022	41,970	1,922	6,210	12,787	13,612
% MSA	91	87	91	92	96	82	91	95
Central City	16,516	21,295	37,852	38,950	1,741	5,744	11,609	12,725
Suburban	1,056	1,472	2,682	2,642	198	459	1,028	853
% Suburban	6	6	7	6	10	7	8	6
IT USING								
Non-MSA	2,437	3,006	5,600	4,359	513	862	2,328	732
MSA	27,713	33,021	54,152	45,255	3,903	7,093	19,841	8,459
% MSA	92	92	91	91	88	89	89	92
Central City	25,907	30,879	49,924	41,641	3,764	6,812	18,117	7,628
Suburban	1,464	1,728	3,608	3,009	190	279	1,563	717
% Suburban	5	5	7	7	5	4	8	9

Note: Central city and suburban totals may not sum to MSA total due to ambiguities in coding, e.g., a single county code may contain multiple towns and cities that are classified as a mixture of center city and suburban locations.

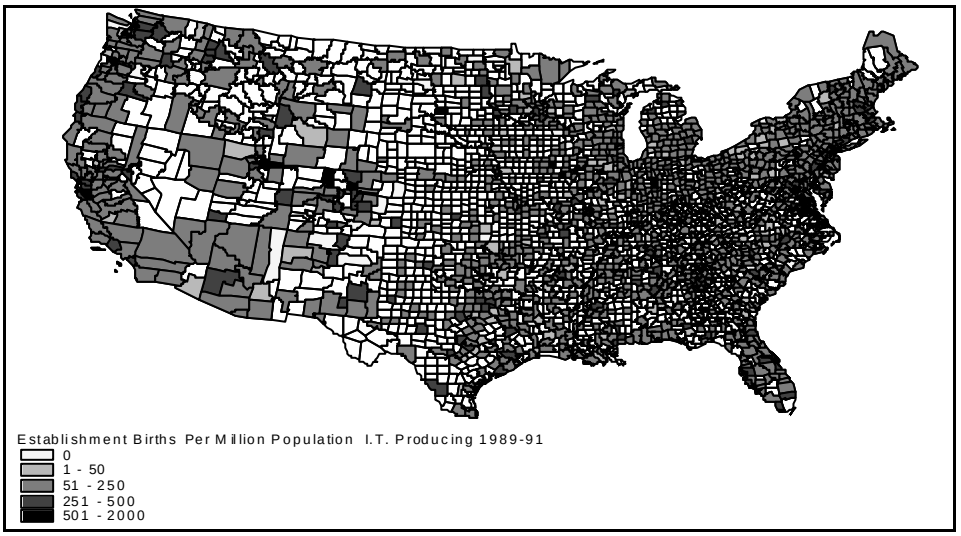
Florida ranks highest in terms of total net births (births minus deaths). The lowest ranked states are Connecticut, Massachusetts and New Hampshire. These states are among the states with highest business costs in the country. The data are also presented as per capita net establishment births in to order to adjust for the population size of each state. Nevada ranks first in net establishment births per capita.

An examination of IT using industries shows that average births increased to 15.8 from 9.6 (64%) between 1989 and 1998. Counties with no IT using establishment births fell from 1,372 in 1989 to 990 in 1998. Despite the larger number of counties with some IT birth activity, there persists a large degree of variation in activity. The highest number of IT producer births in any county was 1,598 in 1998, up from 866 in 1989. Similarly, the highest number of IT user births in any county was 2,561 in 1998, up from 1,632 in 1989.

Center city locations are costlier than the suburbs to businesses in terms of rental prices, congestion costs, taxation and wages. Yet the data reveal that both IT producers and users favor center city locations over the relatively less costly suburbs. This implies that center city benefits (labor force, agglomeration, educational attainment) outweigh the costs, making a center-city location relatively profitable.

Within the net establishment births, the proportion of IT producers choosing center city locations rises from 90% to 94% (the proportion net establishment births selecting the suburbs falls from 10% to 6%). The converse is the case with information technology users. The percentage of MSA births selecting center city bcations falls from 95% to 91% during the period (the proportion net establishment births selecting the suburbs increases from 5% to 9%).

Figure n° 1: IT Producing Establishment Births in U.S. Counties per Million Population 1989-1991



A series of geographic information systems (GIS) maps follow to illustrate the incidence of IT establishment births per million population. The years 1989-1990 and 1990-1991, and 1996-1997 and 1997-1998 are combined to smooth the volatility in single-year observations. In Figure 1, the majority of activity for IT producing establishment births is centered in the Northeast and

Figure n° 2: IT Producing Establishment Births in U.S. Counties per Million Population 1996-1998

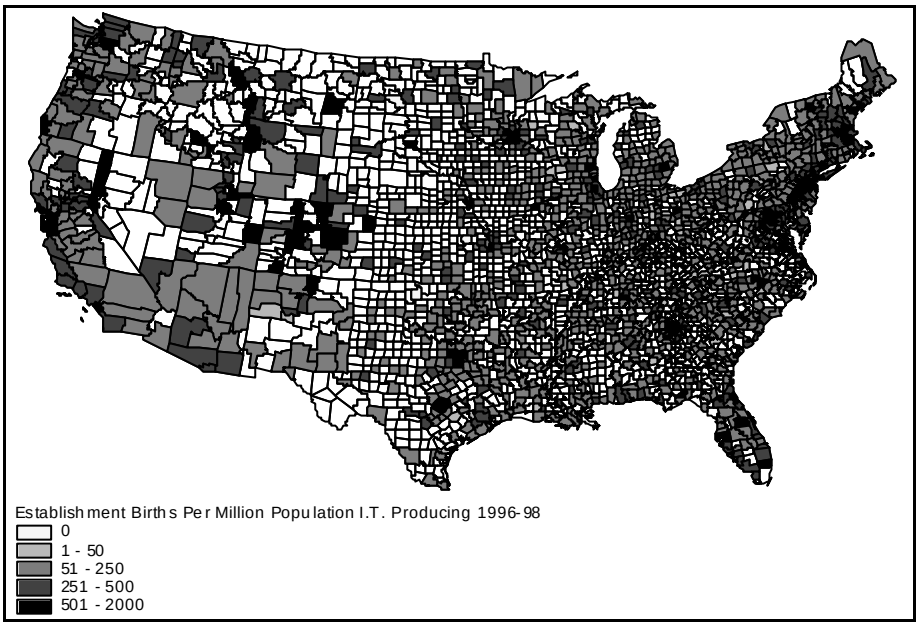
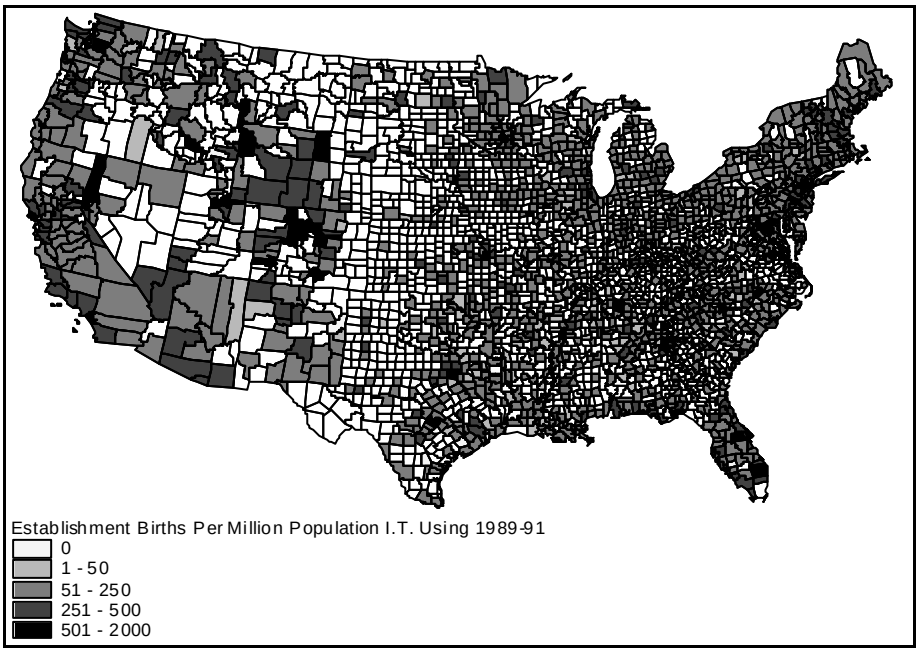


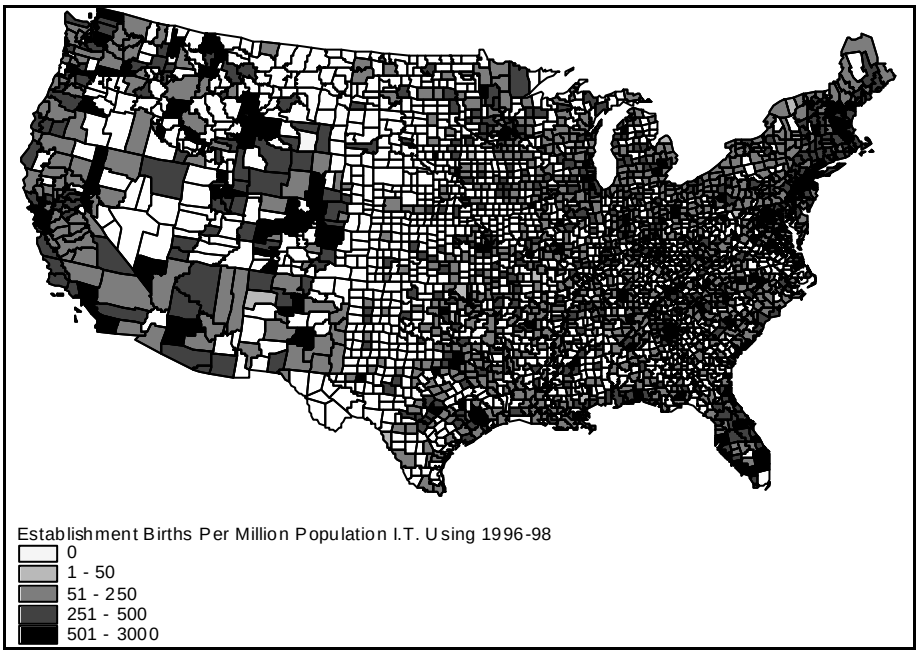
Figure n° 3: IT Using Establishment Births in U.S. Counties per Million Population 1989-1991



West. Few counties experience births of greater than 50 per million population. Those counties that do see significant growth in major metropolitan areas include: San Francisco, Seattle, Los Angeles and Boston. By 1996-1998 (Figure 2), many of the counties along the Interstate 95 corridor between Boston and Washington D.C. observed large numbers of births.

IT using births are relatively more dispersed in 1989-1991 than their IT producing counterparts (Figure 3). By 1996-1998, the number of births is even more widespread (Figure 4). To summarize, the business cycle appears to influence all industries in the amount of activity of establishment births and deaths in the nation. For IT intensive industries, however, the influence of the business cycle is less apparent. IT establishment births rose during the 1989-1991 period, which included a recession, and reached over 36,000 net births in 1996-1997.[8]

Figure n° 4: IT Using Establishment Births in U.S. Counties per Million Population 1996-1998



[8] An additional 8 maps showing establishment births in U.S. counties per million population for both IT producing and IT using for single years 1989-90 & 1990-91 and for 1996-97 & 1997-98 are available on the web site: http://www.buec.udel.edu/lathamw/Downloads/Not%20So%20Footloose%20Appendix%20Material.htm . The site also contains 16 more maps showing establishment births per square mile and establishment births as a percentage of total births for both IT producing and IT using for, 1989-90, 1990-91 and for 1996-97, and 1997-98.

CONCLUSION

IT industries are an important source of growth in the economy. In 1997-1998, IT producing or using industry net establishment births accounted for 46% of total net establishment birth activity in the nation. The majority of IT establishment birth activity occurs in metropolitan areas. This suggests, a priori, that the characteristics of metropolitan areas (high population, an educated workforce, and industrial clusters) are important. Agglomeration effects appear to attract establishment births. There is evidence that IT using establishments are choosing suburban locations over center city locations.

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LA LOCALISATION DES ÉTABLISSEMENTS EN TECHNOLOGIE DE L'INFORMATION AUX ÉTATS-UNIS (1989-1998)

Résumé – *Une plus grande connectivité entre agents économiques est un des avantages procurés par les nouvelles technologies de l'information. Le commerce se fait maintenant sur une plus grande distance et à faible coût. Ce constat a engendré la notion de "fin de la distance" qui signifie que la distance ne compte plus et que la technologie rend toute localisation également profitable. En ce sens, on été observés des phénomènes d'externalisation des fonctions tertiaires. Cet article tente de vérifier cette thèse en utilisant une base de données très récemment disponible sur la création d'établissements par comtés aux Etats-Unis. L'article montre que les entreprises de technologie de l'information ne sont pas insensibles aux avantages procurés par les zones urbaines. Les économies d'agglomération que présentent les zones urbaines*

(taille de la population, niveau d'éducation de la main-d'œuvre, etc.) sont recherchées par les activités. La distance n'est donc pas "morte".

LA LOCALIZACIÓN DE LOS ESTABLECIMIENTOS EN TECNOLOGÍA DE LA INFORMACIÓN EN ESTADOS-UNIDOS (1989-1998)

Resumen *– Uno de las ventajas de las nuevas tecnologías es una más grande conectividad entre actores económicos. El comercio ahora se realiza sobre una distancia más amplia con costes débiles. Esta constatación engendró la noción de "fin de la distancia" que significa que la distancia ya no cuenta y que la tecnología convierte cualquier localización igualmente beneficiaria. En este sentido, se observaron fenómenos de externalización de las funciones terciarias. Este artículo tiene como meta averiguar esta tesis, usamos una base de datos disponible desde hace poco tiempo, sobre la creación de establecimientos por condado en Estados – Unidos. El artículo muestra que las empresas de tecnología de la información no son insensibles a las ventajas que dan las zonas urbanas. Las economías de aglomeración que presentan las zonas urbanas (tamaño de la población, nivel de educación de la mano de obra, etc…) se buscan por actividades. La distancia entonces no se "murió".*