Internationalizing the Rural Southeast: The Determinants of Rural Southeastern Manufacturers' Decision to Export

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Introduction

The readiness of American firms to compete in an increasingly global economy has become a central policy question in the United States. Companies with more parochial orientations may be at a growing disadvantage in this developing economy.

This problem may be particularly acute in the rural southeast. In the last two decades manufacturing has become an important part of the economic landscape in rural counties. But rural areas typically are less oriented to international activities; and, hence, local firms may be less able to face the threats and to exploit the opportunities of the global economy. In the southeastern United States (defined in this paper as Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and South Carolina), the growing globalization of manufacturing may well begin to undercut the "ruralization" of manufacturing that has been occurring.

But we actually know very little about the potential seriousness of this problem, because little is known about the structure and location of export activity in the rural southeast. Our paper addresses this lacuna. Using a new database of southeastern exporters, we indicate where exporters are in fact located and discover whether indeed rural manufacturers are lagging in their export orientation. Then, using a previous survey of 1,700 Tennessee manufacturers, a new survey of southeastern exporters, and the database, we develop a model explaining which firms in this region decide to export.

The Ruralization of Manufacturing

Since World War II, U.S. manufacturing has been slowly but steadily moving into rural areas. In this period, the relocation of U.S. manufacturing can be divided roughly into three stages. The first, lasting from the 1940's until the mid-1960's, was characterized by the suburbanization of direct production employment around the traditional manufacturing centers of the Northeast and Midwest (Noyelle and Stanback 1983: 96). The second stage, beginning in the late 1950's and running through the early 1970's, saw the shift of direct production labor into the Sunbelt metropolitan areas. Finally, during the 1970's, direct production labor dispersed to small MSAs and to rural counties. This process has greatly expanded and diversified the economies of rural areas, but at the same time it has made these economies more vulnerable to any environmental changes that may threaten or undercut this process.

The rural southeast is today, among American rural areas, particularly manufacturing intensive. Table 1 shows that rural counties in the southeast contain a much higher share of their state manufacturing jobs than do states in the rest of the nation. In all states except South Carolina, recent decades have brought a clear relative shift of manufacturing to rural counties. Any changes in the business environment, such as globalization, which might effect either manufacturer performance, or future location decisions, would strike this region especially hard.

Table 1:
Rural Manufacturing Jobs as a Share of State Manufacturing Jobs: 1996

Alabama	44.0%
Georgia	45.0%
Kentucky	48.2%
Mississippi	75.7%
North Carolina	34.6%
South Carolina	34.6%
Tennessee	43.4%
Rest of the Nation	18.7%

Source: Bureau of Economic Analysis, REIS.

These shifts of production labor toward increasingly distant and sparsely-populated counties were accompanied by the concentration of nonproduction labor in those MSAs which already held a high proportion of the nation's nonproduction labor (Noyelle and Stanback 1983: 94).

Two stories can be told in explaining this shift. One has to do with the search for space for greenfield plants. The other has to do with the search for cheap and willing direct production labor. Both of these stories fit within the general framework of the product life cycle.

One of the major features of manufacturing location throughout the twentieth century has been "the search for space" (Hoover and Vernon 1962: 25ff). The dense built environment of a large city is an excellent location for small-scale craft activities. Obsolete buildings can be cheaply rented; vendors can be easily found for even the most unusual inputs; a large pool of skilled labor reduces the need for training by individual firms; and information is readily at hand regarding production techniques and market conditions. But firms engaged in large-scale production find it easier to obtain economies of scale through the construction of a greenfield plant. The optimal production process is laid out on a large plot of open land and a building is wrapped around the machinery, creating a mass production facility that relies on relatively unskilled production labor. In a sense, the movement of manufacturing into the suburbs and then into rural areas has been a movement along the product life cycle, from craft production to routinized mass production.

More importantly, though, the movement of manufacturing into rural areas may have been increasingly motivated by a search for reliable and cheap production labor. In the 1950s, Hoover and Vernon found that New York low-wage industries struggling with high turnover preferred locating near densely-populated, low income neighborhoods in order to be assured of continually replenishing their workforces. However, rural plants, in locations where "the labor force is somewhat isolated" were also able to secure a reliable, low-wage workforce simply because there were few alternatives for local workers (Hoover and Vernon 1962: 43). It seems, furthermore, that workers raised in rural areas are in many countries recognized as more willing workers than their urban counterparts.

By the 1970s, many of the urban poor began to be described as an "underclass" in which the work ethic had all but disappeared (Lemann 1986). The deterioration of urban low-wage labor would have certainly accelerated the search for production labor in rural areas.

Doubtless, improvements in transportation and communications throughout this period also played an important role in permitting companies to split apart their operations. Even distant rural counties that afforded space and reliable labor became feasible locations. The outward dispersion, however, was always one of activities late in the product life cycle, of mature industries, with large capital-intensive plants and relatively low-skill, routine labor.

The Global Economy: A Threat to Rural Manufacturing?

The development of a truly global economy during this same era, one where manufacturing industries need not be located within the national boundaries of their markets, is well known. There are several reasons to suspect that the continuing ruralization of U.S. manufacturing may be undercut by the

development of this economy. First, foreign competition may force a reorganization of production that reduces the advantages of relocating to rural areas. In the 1980s, American manufacturers responded to foreign competition by creating more "flexible" production systems. In significant ways, these changes involved moving towards earlier stages in the product life cycle. An emphasis was placed on changing product characteristics to suit the preferences of individual customers, and on delivering these products to customers in the shortest possible time. Customized and time-dependent goods require craft-style production processes. As a result, reliance on skilled labor, general-purpose machinery, and subcontracting all are increasing (Schonberger 1986).

An implication of these production changes is that urban locations may regain some of their advantages over rural areas. For in urban areas subcontracting is easier and the skill levels of workers higher. Moreover, the need for space weighs less with the widespread use of general purpose machinery.

Perhaps more importantly, success in a global economy is characterized by the ability to compete in foreign markets, and there are good arguments for believing rural firms to be disadvantaged in developing the capacity to export. Should this be the case, rural manufacturers may be differentially harmed by foreign competition, and, as above, urban areas may regain their earlier advantages. There are three major arguments that rural firms are less likely to export: (i) that rural firms face informational asymmetries, (ii) that they do not share the locational economies of urban areas, or that, more simply, (iii) the industrial mix of rural firms is skewed towards the sort of labor-intensive industries in which the United States does not have a comparative advantage.

Obtaining information on foreign prospects, market practices, and trading procedures are generally evaluated by U.S. firms as the most serious exporting problems (e.g. Hansen and Echeverri-Carroll, 1997:96, Kedia and Chokar, 1986:37).[1] Many analysts regard the acquisition of information on how to export as the most critical step of the process (e.g. Kotabe and Czinkota 1992, p. 654), a finding supported by government studies (U.S. Office of Technology Assessment 1994). Yet it is also argued that rural firms are disadvantaged in their ability to acquire this information (Paul-Wiedersheim et al 1978). In addition to the more parochial character of many rural communities, these firms may lack knowledge of, or easy access to, information providers such as banks, freight forwarders, ports, government agencies, or universities which tend to be located in urban areas. If information on global marketing is critical, and more difficult to obtain in rural areas, this could adversely affect the performance of existing manufacturers and discourage the location of new firms.

A very similar, though distinct, argument regards agglomeration economies. Here the notion is that urban areas are sites of intensive interaction among producing firms and service providers of all kinds. The synergies thrown off by this interaction may be important in the export decision and in exporting success. Networking and "experiential information gathering," rather than formal information acquisition, may characterize the initiation into exporting (Christensen 1990). If so, firms within an agglomeration, where networking is facilitated, are advantaged. A related idea is that of the importance of the geographic concentration of rivals for developing nodes of industrial competitiveness, as popularized by Porter (1990). In whatever formulation, the idea remains that more closely connected urban firms are better able to develop new opportunities and capacities, while more isolated rural firms lag behind. In a more slowly evolving economy other factors may outweigh the costs of this lag, but in a rapidly changing global economy these costs may finally become a significant obstacle to those who would otherwise choose to operate in rural areas.

We might note that the importance of agglomeration economies to exporting is by no means established, however. In Hansen and Echeverri-Carroll's (1997) examination of Texan high-tech exporting to Mexico, they found that,

unlike the experience of some European countries, where small firm's opportunities are embedded within local supply chains and local production networks, Texas exporters' contacts with other firms are primarily non-local. In other words, they do not rely on local networks for their exporting contacts or information. This result is consistent with the findings of other researchers (e.g., Malecki 1991), and raises the possibility that rural location may not pose a particularly serious problem for an exporting firm—if local contacts are relatively unimportant, then an isolated plant in a rural county may be as competitive as any urban plant.

The third argument for believing firms in rural areas to be less likely to export is fairly simple: manufacturing firms located in rural areas may be in less export intensive industries. This is essentially an argument of comparative advantage. It's generally thought that the cost and availability of labor is a main reason for the ruralization of manufacturing. This suggests that the industries most likely to relocate to rural areas are those that are most labor intensive. The post-war shifts in the textile and apparel industries may be one example. However it is also generally thought that American comparative advantage is vested in its capital intensive industries. Hence these should also be the most export intensive sectors. If so, one could conjecture that the sort of firm most likely to move to a rural area is the firm least likely to begin exporting, with the net effect being a growing gap in the regional location of exporting manufacturers.

The Extent of Exporting in the Rural Southeast

Thus, there are good reasons to think that firms in the rural southeast are significantly less likely to export. Though the question has been little studied, there is some indirect supportive evidence. Porterfield and Cox (1991) found that rural location was negatively associated with the decision to market out of state. Gale (1998) found that (a) rural area plants are less likely to export than metro plants and (b) southern state plants generally are less likely to export, though he believes the former finding is primarily due to the effects of firm size. We addressed this question using the Manufacturers' News Inc.'s *Manufacturing Database* of all manufacturing plants operating in Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and South Carolina in 1997. The database includes information on the area of distribution (local, regional, national, international) for each plant. For the seven states there were a total of 37,764 establishments, 7,517 of which were exporters. Fifteen percent of the firms with under 100 employees and about 43 percent of firms with 100 or more employees are identified as exporters, figures which accord well with those of the 1987 Census of Manufacturing sites, which found percentages of 16 and 43, nationally, for these same categories.

Plants were divided into urban or rural location depending on whether they are located within an MSA. We then tabulated the total number of exporters as a percentage of the total number of plants for the two locations. We also tabulated the total number of exporting plants with more than ten employees as a percentage of all plants with more than ten employees,

Table 2:
Regional Distribution of Exporters as a Percentage of All Plants, 1997

	Total	10 or less employees	>10 Employees	
Metro Plants	20.7	10.0	27.6	N=24613
Rural Plants	18.6	6.9	25.1	N=14374
	N=38987	N=15128	N=23859	

given that very small firms may be unusually disinclined to export and may, thus, present a different pattern of export behavior. The results are reported in Table 2.

In fact, the distribution of exporters in the southeast does not appear particularly skewed. Rural plants in the southeast are only a tad less likely to be exporting, if there is any real difference at all. The larger gap among very small plants suggests the obstacles noted above might operate for these firms, but this is far short of conclusive. One might argue a finer classification between urban and rural areas would produce greater differences in exporting behavior. Gale (1998:25) does find a larger national exporting gap between "core metro" counties (MSA counties of more than one million) and "completely rural nonmetro" counties (fewer than 2,500 people in urban places). However, for the southeast we find 21.8 percent of plants in the former to be exporting, as opposed to 17.4 percent in the latter, still a relatively slight difference. Nor do major differences appear if employing Beale's (1995) ten category urbanization code.

It is of course possible that there is an industry aggregation problem. As proposed earlier, differences in industry location patterns may disguise differences in exporting behavior. The figures in Table 2 appear to reject the comparative advantage argument that underexporting industries are more likely to migrate to rural areas. The truth may be a little more complicated, however. Elements of the comparative advantage argument can be found in the data. The most export intensive industry—the capital intensive medical, scientific, and industrial instrument industry—is disproportionately located in metro areas, while the industry with the lowest percentage of exporting firms—the labor intensive lumber and wood products industry—is disproportionately rural. It is generally the case that industrial sectors unusually concentrated in rural areas (e.g. textiles or food processing) are both relatively labor intensive and less likely to export, and the opposite is the case for metro areas. But these particulars are overwhelmed by the fact that firms in a large majority of industrial sectors are roughly evenly distributed across urban and rural areas, and the likelihood of exporting is similar for each.

One last possibility is that substantial intra-regional variation within the southeast is disguised by the aggregate figures. A map of regional exporters allows us to examine whether this is true. The map on the following page shows the percentage of manufacturing plants engaged in exporting for each county in the region. From the map we can dismiss the possibility that exporting is concentrated within some portion of the rural southeast, or is clustered in some fashion around one or several economic nodes. We do see several other patterns, however. The piedmont area of the Carolinas, as well as middle and east Tennessee, generally contain higher percentages of plants that export, while eastern Kentucky and mid-southern Mississippi, Alabama and Georgia are regions where relatively fewer plants export. Much of these patterns may be explained by industry mix: the higher exporting areas are also areas with relatively more firms in the more export intensive industrial machinery, electronics, and transportation sectors. Overall, we do not see any robust pattern of differentiation within the rural southeast that appears attributable to location itself.

We conclude, then, that there is no compelling evidence for thinking that firms in the rural southeast are unusually disinclined to export, or that the rural southeast is an unusually disfavored locale from which to export. In spite of some worrying evidence about the association of exporting, capital intensive production, and metro location, plants in the rural southeast exhibit the same proclivity to export as their urban brethren.

Explaining the Decision to Export

A second, more finely-tuned method to establish the conditions which may be hindering —or helping—the decision to export by firms in the rural southeast is to examine the specific factors underlying that decision. Identifying factors associated with the decision to export

should reveal what, if any, are the obstacles to exporting from this region.

We accomplish this in three steps. First we engage in an exploratory analysis using a sample of Tennessee firms. Second, we attempt to build an empirical model of the export decision that includes both company and locational characteristics. Finally, we use a survey of exporters to measure the importance they assign various sources of information and assistance in their endeavors to sell overseas.

Exploratory Analysis of the Export Decision

We first examine the export decision intensively using a database of over 1,700 establishments surveyed by Middle Tennessee State University's Business and Economic Research Center during 1989-1995. These enterprises, located in 49 of Tennessee's 95 counties, answered a detailed survey regarding their perceptions of local economic characteristics, along with questions about their market orientations. In these surveys, firms reported exports as a percent of total sales and responded to a series of questions about perceived market trends, labor force characteristics, the quality of the local educational system, and accessibility of transportation, among other issues. About half of all responses come from rural counties. Table 3 reports the exporter breakdown for MSA, locally owned rural, and non-Tennessee owned rural establishments, respectively.

Figure 1: Export Intensity by Southeastern County

(Exporters as a percentage of all manufacturing establishments)

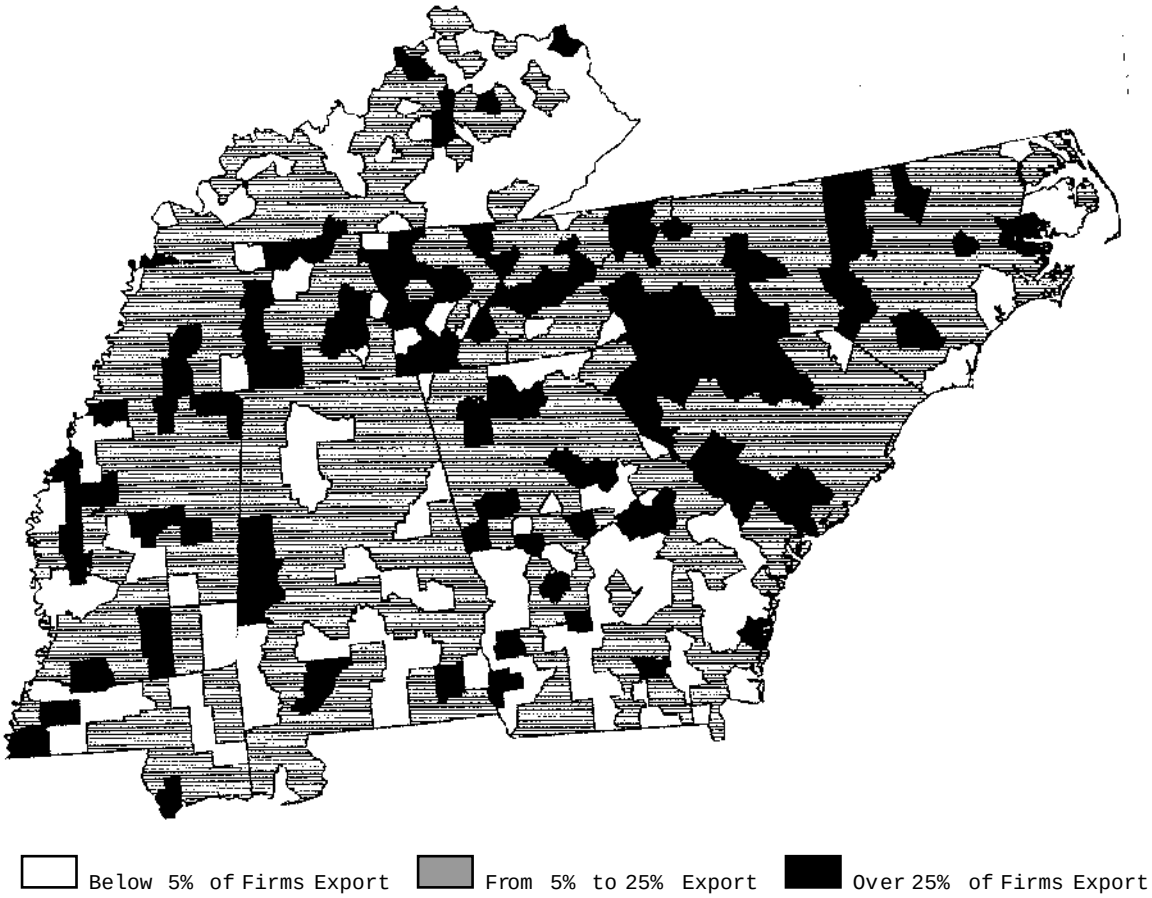

Table 3: Number of Exporters by Rural/MSA Location.

Area	*Not Exporters*	*Exporters*	*Total*
All MSA establishments			
Number	621	228	849
Percent	36.51	13.40	49.91
Row Pct	73.14	26.86	
Col Pct	55.85	38.71	
Rural Tennessee-Headquartered Establishments			
Number	379	183	562
Percent	22.28	10.76	33.04
Row Pct	67.44	32.56	
Col Pct	34.08	31.07	
Rural Establishments Headquartered Outside of Tennessee			
Number	112	178	290
Percent	6.58	10.46	17.05
Row Pct	38.62	61.38	
Col Pct	10.07	30.22	
Total Establishments			
Number	1112	589	1701
Percent	65.37	34.63	100.00

This sample reports somewhat higher levels of exporting than our regional analysis above, though, as also noted above, much of Tennessee exports at a higher rate than does the region as a whole. Also note that in this sample rural firms are by a small margin actually more likely to export than MSA firms. As an exercise in exploratory data analysis, we performed a Spearman rank order correlation between exports as a percentage of sales and about 330 candidate variables. Appendix I reports 60 items of interest that emerged from this analysis. The following discussion references in brackets the item numbers listed in Appendix I.

Several clues to the export decision emerge. First, but least surprisingly, size matters. Exporting establishments tend to be larger [1,4,6,11], are more likely a part of a multi-unit firm [3], and are more likely to be headquartered outside of the state [2]. Though there are dissenters (Calof, 1994), the association of firm size with exporting has been widely noted (most recently, Gale, 1998).

Second, exporting firms are more sensitive to labor conditions. Their responses differ from non-exporters on virtually every labor variable included in the survey. The quality of the labor supply is more important to exporters. These firms are more likely to regard labor force factors as determinative of whether they will stay or will expand operations in a community [48]. Similarly, they are more likely to regard the local wage rates, labor quality, and work ethic as positive, and as reasons for staying in their community [41,45]. Interestingly, while their labor is in fact relatively skilled [14], exporters are more likely to report that their labor is unskilled [13]. Exporters are more likely to require special job training [27], to desire information on employment issues [59], and to focus upon changing local labor force factors when asked for recommendations on how to improve the local business climate [50]. Perhaps as a result of this increased concern over labor issues, exporters also appear more active in employee relations. They are more likely to offer

employee assistance programs [26], to seek information about employee benefit programs [57], and to worry about substance abuse among their workforce [22]. Exporting firms have lower employee turnover [19]. Seemingly contradictorily, however, exporters also evaluate their labor more severely against their competition. Unlike the more satisfied non-exporters, they are more likely to unfavorably compare both their labor costs and their worker productivity to their competitors [16,17]. In fact, this may be only another measurement of heightened concern, an indication that exporting firms are less complacent about labor quality and performance. In any event, however measured, exporting is associated with heightened concerns about the firm's labor force. This may be due to quality control issues bound with entering foreign markets, though it is also possible that labor concerns are simply a proxy for the quality of the firm. The latter argument is consistent with the belief that the many benefits correlated with exporting (increased growth, labor wage rates, etc.) are actually more accurately credited to firm quality, which enables exporting, than to exporting itself.

A third cluster of differences revolves around infrastructure and locational issues. Exporting firms are generally more critical of their local environments than non-exporters. They give lower evaluations of their local business environment [46], and are less likely to have a good opinion of the county in which they do business [44], focusing on poor housing, medical care, and cultural amenities [20]. On the other hand, attitudes between the two groups do not differ on most locational issues, such as land availability, educational quality, business-government relations, or availability of financing [47,51,52]. It is difficult to evaluate the impact of exporters' more ungenerous appraisal of their communities on their behaviors. We could only be again measuring exporters' heightened critical awareness of their environment, and the negative correlation between the evaluation of one's local environment and the export decision may actually indicate the relative unimportance of locational issues.

Broadly speaking, infrastructure issues do not seem a particular concern. Exporters are more likely to regard interstate trucking costs as favorable [38], but are less likely to use this mode of transportation [36]. Exporters evidence their greatest dissatisfaction with air service [37,38], but given the relatively less intensive use of air transport by non-exporters [35], this may not be very significant. Exporters and non-exporters share similar views of the obstacles their road systems pose to business [49,52].

Attitudinally, exporting firms are clearly more concerned about education and labor force factors than on infrastructure, financing, or relations with governments [50,52]. They are perhaps more focused on capital investment and new technologies. Supporting the findings of Swamidass (1998), these firms are more likely to plan high levels of capital investment in their plant(s)[34], more open to new technologies [54], and more committed to using firm resources and evaluating these technologies [8,32].

Managerial characteristics, or firm "psychology," have often been found key to the export decision (Leonidu and Katsikeas 1996, Burpitt and Rondenelli 1998). Though close to a tautology, the argument is that those most concerned about globalization are the most likely to then enter global markets. Support for this view is found in our sample. In particular, exporting firms are more likely to believe that there will be rapid growth in foreign markets [10], and that foreign competition will be important to their future profits.

Finally, among the firms surveyed, exporters were disproportionate users of the Tennessee Department of Economic and Community Development [28], suggesting that information acquisition or specific state export enhancement policies may be important elements in the export decision.

This exploratory study suggests that exporters are more critical of their environments generally. They see more problems with local business conditions, education, and labor. And they are more likely to be pursuing new technologies and more information. Three interpretations of these findings are possible.

(i) It may be that the issues singled out by exporters reveal the major obstacles to exporting they have experienced, and thus these may be the major deterrents for other would-be entrants into foreign markets. (ii) An alternative explanation, explored before, is that the more critical stance is actually a proxy for firm quality. In this case, the critical attitude is more revelatory of exporters' higher standards than it is of any obstacles to exporting *per se*. (iii) A third argument is to note that those with the most critical stances about their environment are also the ones actually exporting. The obstacles to exporting are being identified after entrance into foreign markets. They are not stopping that entrance, indicating that, in fact, they may be relatively unimportant considerations for firms in their initial decision to enter foreign markets. An exploratory analysis alone is not sufficient to choose among these three positions, and we turn to a more formal analysis.

Modeling Southeastern Manufacturers' Decision to Export

In this section, we construct a logit model to explain which firms are exporting in the southeast. We will use this model to further analyze the issue of urban/rural differences in exporting behavior. The model is based on the exploratory analysis and arguments presented above, as well as on other research on the export decision. We begin with the database of 37,764 southeast manufacturers utilized above. From this we create an expanded database including information, by firm, of firm characteristics and of the occupational, labor market, demographic, and infrastructure characteristics of the county in which it is located. We also include data on county size, and proxies for the possibilities of aggregation economies, as well as other information.[2] From this dataset variables were included for analysis as discussed below. The full list of variables included in the initial equation is found in Appendix II.

Firm-Level Variables

We begin with information on the number of employees, age of firm, and headquarters location. From our initial discussion as well as most other research, it appears likely that larger establishments are more likely to export, as would those headquartered elsewhere.

Two-Digit SIC Manufacturing Sector Dummies

The product clearly influences the choice or ability to export. As we have seen, different industries evidence much different propensities to export. Dummies were produced for two-digit SIC manufacturing sectors to control for this factor. The dummy for SIC 24 (lumber products) was dropped to avoid perfect collinearity.

Labor Force Characteristics

The exploratory analysis showed the potential importance of labor issues to exporting. Availability, productivity, and cost are obviously of potential relevance. However, deeper characteristics of the labor force may also come into play, and may usefully be considered in the context of understanding differences between the rural and urban exporting environments.

In recent years, firms have become increasingly capable of splitting apart their operations, and locating each portion of each business function in a separate region. Thus, research, design, planning, marketing, advertising, finance, and production can be subdivided and located wherever most profitable or convenient. From this fact stems the importance of product life cycle theory and its near relatives—location is not so much driven by industrial sector as it is by the specific input requirements of a specific business function. This indicates the need for a more finely tuned notion of labor availability which includes specific attributes of the local working population as well as an overall measure of the labor pool.

Thompson and Thompson (1987) recognized this fact and drew the conclusion that an "occupational-functional" approach provides the best insight into the growth potential of a particular region. In the same spirit, we consider the potential impact of labor force characteristics on a firm's probability of exporting.

Labor Market Tightness

It is possible that tight labor markets may make firms unwilling or unable to exploit export opportunities. The measure used here is average 1997 county employment divided by the estimated 1997 working age population (those over the age of 14 and under the age of 80). Employment data came from the BLS LABSTAT ftp site; working age population for each county was estimated from the county race/age file on the Census Website.

Occupational Attributes

The availability of particular kinds of labor may be as or more important to a potential exporter than the simple existence of a pool of labor. The Equal Employment Opportunity Files (EEOF) list the number of civilian labor force members in each county, in each of 512 occupational categories. The enumeration was conducted as part of the 1990 Census, and workers are listed by place of residence.

Occupational attributes are drawn from a 1992 analysis of job characteristics carried out by Anne Clymer and Elizabeth McGregor, of the Bureau of Labor Statistics (BLS). As part of a program to inform high school students of their career options, Clymer and McGregor matched "18 job characteristics to over 200 occupations" the BLS monitors intensively in its Occupational Outlook program (Clymer & McGregor 1992: 7). The characteristics were determined by questioning BLS experts in each occupational area (Elizabeth McGregor, personal communication). Fourteen of the characteristics were employed in the present study. These are described in Table 4.

Some modification of the BLS scheme was required to fit the EEOF occupational taxonomy. In almost all cases it was easy to see how the relatively aggregated categories of the BLS Occupational Outlook encompassed the relatively disaggregated categories in the EEOF. The simple rule followed was to assign the same characteristics to every EEOF occupation fitting within one of the BLS categories. In some cases, obvious differences existed among the EEOF occupations within a BLS category. For example, the BLS category "painters and paperhangers" contains three EEOF categories: "painters," "paperhangers," and "supervisors of painters, paperhangers, and plasterers." The third category was differentiated from the first two by adding the characteristic "supervising" to the characteristics shared by painters, paperhangers, and plasterers. There were also a few cases in which the EEOF category had no obvious counterpart in the BLS taxonomy. "Funeral director" and "parking lot attendant" fall in this group. Here, we supplied the job characteristics.

The final result was a 512x14 attributes matrix A. Each row represents an EEOF occupational category, each column a job characteristic or attribute. Each element is either a zero or one. It is a one if the occupation possesses that attribute, a zero otherwise. A 589x512 data matrix B was drawn from the EEOF. Each row represents a county in the seven state area, each column an EEOF occupational category. Each element in B represents the number of labor force members in county i in occupation j. Premultiplying A by B creates a 589x14 matrix C, in which each row represents a county and each column an occupational attribute. Each element represents the number of workers in the row county holding an occupation with the column attribute. A final step is to modify matrix C so that it expresses not absolute numbers, but the percentage of labor force in each county holding a job with that particular characteristic. Thus, each element is divided by the total labor force in each county.

Table 4: Occupational Attributes

Abbreviation	Name	Description
RES	Researching and compiling	"Gathering and organizing information... by reading, conducting tests or experiments, or interviewing experts."
ANA	Analyzing and evaluating	"Examining... information to develop conclusions or interpretations." Generally follows researching.
TRO	Troubleshooting	"Identifying, diagnosing, and solving problems." Generally follows analysis, but with a specific, practical bent. "Involves a reaction to a situation or problem that arises."
ART	Artistic expression	"Designing, composing, drawing, writing, or creating original works or concepts."
INS	Instructing	"Teaching people by explaining or showing."
TRE	Treating and Advising	"Counseling or caring for others."
SUP	Supervising	"Directing, organizing, and motivating people and groups."
PER	Persuading	"Influencing the feelings of others."
PUB	Public Contact	"Meeting, assisting, and dealing directly with the public frequently on a daily basis."
MEC	Mechanical Ability	"Extensively using and understanding machines or tools. Setting up, operating, adjusting, and repairing machines may also be required."
OPE	Operating a Vehicle	"Driving and controlling vehicles or equipment."
REP	Repetitious	"Work in which the same duties are performed continuously in a short period of time. Sometimes a machine sets the pace of work."
GEO	Geographically Concentrated	Occupation concentrated in relatively few locations in the United States.
MOB	Mobile	"Requires frequent movement between various work locations, such as office buildings and construction sites. Can involve a combination of different work settings."
PHY	Physical Stamina	"Physically demanding. Workers must endure significant physical stress and strain, including lifting heavy objects."

Labor Costs

Two variables are used here: the average manufacturing wage in 1969, and the average manufacturing wage in 1996. In both years the data are drawn from REIS.

Education

Educational concerns were noted in our exploratory analysis. In addition, conventional wisdom holds that the United States exports products embodying high-skill labor and imports the product of lower-skilled workers. The 1990 Census provides data on educational attainment by county for persons over the age of 24. Two variables were created: the first gives the percent of all persons over age 24 who have at least a bachelor's degree; the second gives the percent of all persons over age 24 who never completed high school.

General Demographic Variables

It is conceivable that characteristics of the local population, other than the labor force characteristics detailed above, may condition the decision to export. For example, persons of higher income may have a more cosmopolitan outlook and, therefore, if involved in manufacturing, may be more likely to consider the possibilities of selling abroad, or, if not, may create a more cosmopolitan community presence

with the same result. Wealth is measured by the median household income and the median value of residences. Similarly, pockets of poverty may create communities less likely to be globally oriented, or may discourage the location of potential exporters. We measure this by the percentage of the county below the poverty level. Finally, studies on almost all aspects of American life find race to be a significant explanatory factor. Though no obvious logical reason for an explicit effect on exporting exists, the history of U.S. race relations makes it possible that this feature, too, of a county's economy, may be in some way conditioned by its racial composition. Therefore, we include the percentage of the county's population that is white as a variable. All variables are from the 1990 Census.

Degree of Urbanization

A simple rural/urban county classification may not adequately address the potential for differences between rural areas. It may be argued, for example, that proximity to a metropolitan area or the existence of any sizable urban locale within a county may have important economic effects. Thus, Gale (1998) analyzes exporting using a tripartite classification of rural counties. Though it has alternatives (e.g. Zabronsky 1989), and has been criticized (Wojan and Pulver 1995), the ten level county classification system developed by Beale (1995) provides one convenient way to combine information on a county's size and its location in relation to the national urban system to capture potential differences between rural areas. Frequently used, it is the basis for Gale's division. Dummies were created for each classification level, with the dummy for central counties of MSAs with more than one million persons dropped to avoid perfect collinearity.

Physical Infrastructure Variables

Physical infrastructure should play an important role in determining export behavior, since it conditions not only costs and productivity but also access to information about exporting opportunities and requirements. The exploratory data analysis on the Tennessee firms suggests that access to air service is particularly important—perhaps mostly because it improves access to information. However, for counties in the present study, shortcomings in the highway system may more seriously inhibit exporting, since manufacturing's presence in the rural southeast may be largely conditioned by highway access. The National Transportation Atlas Databases (NTAD) contain details on all highways making up the National Highway Planning Network. From these, data were calculated for the number of highway lane miles per county. This figure was then divided by 1997 population to get lane miles per person, and by land area to get lane miles per hectare.

The NTAD was also used to calculate the minimum distance from a county centroid to: i) an intermodal facility transferring between water and rail; ii) an intermodal facility transferring between truck and rail; and iii) a port. Minimum distance is, of course, just one of the possible measures of access to transportation infrastructure. For air service, it was possible to construct a gravity measure, since total enplanements were available for each airport. The measure is as follows:

$$(1) \qquad G_i = \sum_j \frac{E_j}{d_{ij}^{\beta}}$$

Thus, for each county i, the gravity measure G_i is created by summing—over all airports j—a ratio whose numerator is the number of enplanements at airport j, and whose denominator is the distance between airport j and county centroid i. The perennial problem with a gravity measure is that one does not know the correct value for the exponent β (Isard 1960: 515-517). Here, five different gravity measures were constructed, each with a different value of β. In addition, two other air service measures were calculated: i) the number of enplanements within 60 miles of each county centroid; and ii) the largest airport (measured in number of enplanements) within 60 miles of each county centroid. All seven air service measures were converted to logs.

A county may also be constrained by obsolete physical infrastructure—an existing built environment may embody obsolete technology, yet the cost of demolition and renovation may be prohibitively high. Veblen's 1915 analysis of the industrialization of Germany (Veblen 1939) was perhaps the first to show that this factor can be an important determinant of growth opportunities. In the regional U.S. context, Hoover and Vernon (1962) argue that the suburbanization of manufacturing in New York City was largely driven by the need for open land to lay out space-consuming industrial equipment. Eff (1989) claims that much of the differential productivity growth across U.S. metropolitan areas can be attributed to the constraints of an obsolescent built environment. The median age of single family residential units was chosen as a proxy for built environment obsolescence in each county. These figures are from the 1990 Census.

County Manufacturing Size

As discussed above, locational economies may significantly influence a firm's orientation to exporting. Productivity studies have found significant differences across counties in such external economies, both of urbanization and of localization (Moomaw 1986; Sveikauskas, Gowdy, and Funk 1988). We proxy urbanization economies with 1997 population and population density. Economies of localization may be indicated by various manufacturing sector size measures. We use number of 1997 manufacturing establishments, number of 1996 manufacturing workers, and manufacturing workers as percent of all workers for each county. We also utilize as a measure of localization the percent of all manufacturing establishments engaged in the same four-digit SIC category to capture potential industry specific economies.

County Specific Manufacturing Characteristics

In a related fashion, we presume the general characteristics and quality of manufacturing within a locality will inform the decision to export. This may be the result of local information networks and the spread of "best practices," or it may be associated with the manufacturer's original decision of where to locate. We thus develop several county level variables to measure this. Internalized economies of scale are indicated by the 1997 average number of employees per establishment in the county. The 1992 Census of Manufacturing is the source of county level value added per employee, a measure of productivity. The complexity of the production process within a county is given by the 1992 manufacturing value added as a percent of value of shipments (simple assembly, for example, would have relatively low value added per dollar of shipment). The 1992 percent of manufacturing employees who are not production workers gives some indication of whether a county's economic specialization is in administrative, technical, or sales functions.

Mimetic Exporting Behavior Variables

To a large extent, exporting is constrained by ignorance. Not all firms are aware of opportunities for exporting, and many are daunted by export regulations and requirements they do not understand (Kotabe and Czinkota 1992:654, Kedia and Chhokar 1986a, 1986b). It seems probable, then, that a firm would be more likely to export when located in a county where a large proportion of other firms export. Two variables were created. The first is the percent of exporting firms within the same four-digit SIC (excluding the current firm). The second is the percent of exporting firms outside the current firm's four-digit SIC. These two variables give some insight into the degree to which mimetic exporting behavior is a county-wide or a sector-specific phenomenon.

State Characteristics

States are political units, and, as such, provide a set of differentiated policies in the political managing of economic matters. Specifically, each state provides a different set of export promotion policies and a different delivery system for those policies. As we have

seen in our Tennessee survey, exporters seem unusually heavy users of state development agencies. Ideally, these policies would be directly entered into the equation, but we are forced to use dummies variables because of insufficient data on the delivery of export promotion policies at the county level. Even the valuable Consolidated Federal Funds Reports, which show federal expenditures at the county level, assign virtually all federal export promotion dollars to state capitals, leaving unanswered questions about the final disposition of these funds. The dummy for Mississippi was dropped to avoid perfect collinearity.

RESULTS

Each block of variables discussed above was tested to see if it functioned as a determinant of exports. Table 5 presents the likelihood ratio for each hypothesis test, where the null hypothesis is that the block of variables does not belong in the model. The results are a bit surprising: the labor market variables do not appear to belong, nor do the general demographic variables, nor the Beale category variables.

Accepting that the three blocks above do not belong in the model, the next step was to weed out insignificant variables from the remaining

Table 5: Likelihood Ratio Tests

Regression	-2*logL	Degrees Freedom	Number Restrictions	Likelihood Ratio Chi-Square	p-value
1 Unrestricted Regression	33,139	87			
Restricted Regressions					
2 Dropping Labor Force Variables	33,140	84	3	1	0.8126 x
3 Dropping Occupational Attributes	33,173	72	15	34	0.0037
4 Dropping General Demographic Variables	33,140	82	5	1	0.9667 x
5 Dropping Physical Infrastructure Variables	33,163	74	13	24	0.0304
6 Dropping County Size Variables	33,161	85	2	21	0.0000
7 Dropping Manufacturing Sector Size Variables	33,217	83	4	77	0.0000
8 Dropping County Specific Manufacturing Variables	33,154	81	6	15	0.0214
9 Dropping Dummy Degree of Urbanization (Beale Codes)	33,152	78	9	13	0.1827 x
10 Dropping Dummy for State	33,193	81	6	5	0.0000
11 Dropping Dummy Two-Digit SIC classification for each firm	34,669	68	19	1,530	0.0000
12 Dropping Mimetic exporting behavior	33,377	85	2	237	0.0000
13 Dropping Firm-level variables	34,508	84	3	1,369	0.0000
14 Dropping Labor Market, General Demographic, and Beale Code Variables	33,161	70	17	22	0.1988
15 Dropping above, plus the following irrelevant variables: res pub mec rep phy tre ins dens lmt96 avgtot vavs pnpe valab mwl96 tn sc nc sic20 sic29 sic32 sgrav0 lsgrav1 lsgrav 2 lsgrav3 lsgrav4 enp60 lmxe60 hwyjrd hage wr	33,184	40	47	44	0.5889
16 [14] as Unrestricted Regression; [15] as Restricted Regression			30	23	0.8328

Notes: Null hypothesis is that dropped variables do not belong in the model; "x" indicates that null hypothesis not rejected at 0.10 size of test.

Table 6: Regression Results

	Total		Rural		MSA		H0: MSA coefficient = Rural coefficient		
Variable	**Stand. Coef.**	**Wald p-value**	**Stand. Coef.**	**Wald p-value**	**Stand. Coef.**	**Wald p-value**	**MSA-Rural**	**Wald**	**p-value**
INTERCPT		0.0001 ***		0.0885 *		0.0001 ***		0.22	0.6398
ANA	0.097	0.0004 ***	0.088	0.0009 ***	0.086	0.0450 **	-0.003	0.46	0.4954
TRO	-0.047	0.0054 ***	-0.095	0.0003 ***	-0.023	0.4412	0.072	0.17	0.6826
ART	0.067	0.0032 ***	0.063	0.0013 ***	0.045	0.1087	-0.018	4.12	0.0424 **
SUP	0.064	0.0005 ***	0.053	0.0196 **	0.047	0.0928 *	-0.006	0.17	0.6768
PER	-0.144	0.0001 ***	-0.136	0.0001 ***	-0.121	0.0011 ***	0.014	0.11	0.7381
OPE	-0.077	0.0001 ***	-0.045	0.1233	-0.066	0.0047 ***	-0.021	4.16	0.0415 **
GEO	0.044	0.0162 **	0.075	0.0047 ***	0.010	0.7022	-0.065	0.44	0.5067
MOB	0.044	0.0158 **	-0.006	0.8204	0.074	0.0006 ***	0.080	5.01	0.0253 **
HWYPOP	0.042	0.0016 ***	0.023	0.2432	0.037	0.0272 **	0.014	1.91	0.1671
HR	-0.033	0.0066 ***	-0.025	0.1418	-0.028	0.0757 *	-0.003	0.40	0.5284
PP	0.025	0.0088 ***	0.034	0.0188 **	0.037	0.0114 **	0.003	0.18	0.6690
POP97	-0.144	0.0001 ***	-0.059	0.0307 **	-0.152	0.0001 ***	-0.093	1.48	0.2244
ML96	-0.060	0.0183 **	-0.090	0.0262 **	-0.066	0.0418 **	0.023	2.69	0.1008
TOTEST	0.145	0.0001 ***	0.132	0.0015 ***	0.171	0.0001 ***	0.039	5.32	0.0211 **
POWNEST	-0.084	0.0001 ***	-0.049	0.0040 ***	-0.165	0.0001 ***	-0.116	85.26	0.0001 ***
MWL69	0.047	0.0003 ***	0.037	0.0195 **	0.052	0.0006 ***	0.015	0.48	0.4867
KY	-0.061	0.0001 ***	-0.097	0.0001 ***	-0.058	0.0001 ***	0.039	1.16	0.2816
AL	-0.080	0.0001 ***	-0.074	0.0001 ***	-0.105	0.0001 ***	-0.031	1.04	0.3069
GA	-0.046	0.0001 ***	-0.054	0.0011 ***	-0.055	0.0001 ***	-0.001	0.01	0.9370
SIC21	0.024	0.0001 ***	0.034	0.0004 ***	0.019	0.0196 **	-0.016	0.88	0.3483
SIC22	0.114	0.0001 ***	0.119	0.0001 ***	0.102	0.0001 ***	-0.017	1.09	0.2964
SIC23	0.060	0.0001 ***	0.040	0.0107 **	0.076	0.0001 ***	0.036	5.84	0.0157 **
SIC25	0.073	0.0001 ***	0.085	0.0001 ***	0.074	0.0001 ***	-0.012	0.38	0.5356
SIC26	0.038	0.0001 ***	0.039	0.0019 ***	0.038	0.0002 ***	0.000	0.19	0.6665
SIC27	-0.075	0.0001 ***	-0.127	0.0001 ***	-0.004	0.8264	0.123	20.46	0.0001 ***
SIC28	0.132	0.0001 ***	0.080	0.0001 ***	0.157	0.0001 ***	0.078	13.61	0.0002 ***
SIC30	0.121	0.0001 ***	0.122	0.0001 ***	0.129	0.0001 ***	0.008	0.14	0.7066
SIC31	0.043	0.0001 ***	0.038	0.0004 ***	0.045	0.0001 ***	0.007	1.82	0.1773
SIC33	0.057	0.0001 ***	0.055	0.0001 ***	0.062	0.0001 ***	0.008	0.00	0.9576
SIC34	0.089	0.0001 ***	0.086	0.0001 ***	0.099	0.0001 ***	0.013	0.00	0.9478
SIC35	0.226	0.0001 ***	0.198	0.0001 ***	0.264	0.0001 ***	0.067	6.57	0.0104 **
SIC36	0.153	0.0001 ***	0.138	0.0001 ***	0.162	0.0001 ***	0.024	0.12	0.7247
SIC37	0.118	0.0001 ***	0.128	0.0001 ***	0.116	0.0001 ***	-0.012	0.04	0.8437
SIC38	0.128	0.0001 ***	0.084	0.0001 ***	0.148	0.0001 ***	0.063	0.27	0.6004
SIC39	0.069	0.0001 ***	0.073	0.0001 ***	0.083	0.0001 ***	0.010	0.03	0.8603
OTHERX	-0.019	0.0519 *	-0.030	0.0567 *	-0.032	0.0130 **	-0.003	0.99	0.3186
OSICX	0.110	0.0001 ***	0.073	0.0001 ***	0.125	0.0001 ***	0.052	2.52	0.1126
DHQ	0.129	0.0001 ***	0.156	0.0001 ***	0.115	0.0001 ***	-0.041	3.00	0.0834 *
EMP	0.272	0.0001 ***	0.211	0.0001 ***	0.303	0.0001 ***	0.091	0.63	0.4285
AGE	0.047	0.0001 ***	0.082	0.0001 ***	0.030	0.0018 ***	-0.052	10.38	0.0013 ***
	Total		Rural		MSA				
Log Likelihood Ratio Test (zero slopes)	4,511	(0.0001)	1,636	(0.0001)	3,023	(0.0001)			
Number Firms	37,764		13,904		23,849				
Exporters	7,517	19.9%	2,582	18.6%	4,935	20.7%			
Non-Exporters	30,247	80.1%	11,333	81.4%	18,914	79.3%			
Count R^2) (Prob Level=0.50		81.0%		82.0%		80.3%			
Concordant		74.3%		74.6%		74.7%			
Discordant		25.3%		25.0%		24.9%			
Tied		0.4%		0.4%		0.4%			
Number of Pairs		227,366,699		29,261,806		93,340,590			

Notes: Standardized coefficients give the number of standard deviations the dependent variable will change for a one standard deviation increase in the independent variable. "*"indicates that null hypothesis rejected at 0.10 size of test. "**" and "***" are for 0.05 and 0.01 sizes of test, respectively. Count R^2 gives the percent of observations correctly estimated by the model, when 0.5 is used as the cut-off assigning estimated values of the dependent variable to either zero or one. The final lines compare all pairs of observations with *different* values of the dependent variable; concordant pairs are those where the observation whose observed value is highest (i.e.,1) also has the highest estimated value; discordant pairs are those where the observation whose observed value is highest has the lowest estimated value.

categories. This was done using a backwards selection procedure that led to the elimination of 30 additional independent variables. Table 5 reports the likelihood ratio test for dropping all these variables (47 in all): the null hypothesis that they do not belong in the model cannot be rejected.

Table 6 reports the standardized coefficients and p-value for each independent variable in the final model. In addition, the standardized coefficients and p-values were separately estimated for MSA and rural counties. The final columns show whether or not the results are significantly different for MSA and rural counties.

Discussion

In a statistical sense the model performs well. The Log Likelihood Ratio Test easily rejects the null that all variables have zero slopes. The Count R^2 is 81%, indicating that the model correctly classifies the export decisions of four out of every five firms. The model appears to perform equally well across urban and rural areas. Mapping errors onto the region (i.e. creating a map as above showing errors in prediction by county) showed no clustering of cases suggestive of omitted variables or other systematic errors. However the power of the model is called into question by the fact that a naïve guess that no one exported would produce a very similar Count R^2! The inability to best this naïve guess lends credence to those arguments that place great weight on internal management characteristics in the export decision, without regard to the firm's location, environment, or external support network (e.g. Burpitt and Rondenelli 1998, Dicthl et al 1990). There is an irreducible idiosyncratic element to the export decision, no matter where a firm is located.

Our model reveals firm level characteristics to be most important to exporting. Size, measured by employment, is the most powerful variable influencing the export decision. Here we reconfirm the conventional wisdom against its challengers (c.f. Calof 1994, or McConnell 1979). Establishment age also shows as a significant albeit weaker factor. Contra McConnell, we find branch plant status positively increases the chances of exporting. Industry, measured by two-digit SIC, was primarily included as a control, but, not surprisingly, the model demonstrates that, based on standardized coefficients, it ranks second only to size as a determinate of exporting.

Conventional wisdom, and our exploratory analysis, both suggest that local labor conditions ought to be a powerful influence on exporting, if for no other reason than their impact on location decisions. Our results do not support this. Perhaps the large national and multinational firms locating in this region as platforms for serving the entire North American market are simply too small a part of the total manufacturing sector for their behavior to be statistically important. We note, however, that Leonidu and Katsikeas (1996) reach a similar finding that "organizational determinants," including production efficiency and technological intensiveness, do not seem correlated with exporting.

Demographics, generally, have at best a modest impact on exporter location. The concentration of several sets of occupational skills appears related to where exporters are located, but no obvious pattern jumps out. Many skills one would suppose relevant to manufacturing, such as mechanical manipulation, are not significantly related to exporter location. The strong negative correlations of "persuading" and "trouble-shooting" skill concentrations with exporting is suggestive of a process of subdividing different business processes, in these cases perhaps marketing or engineering, respectively, where exporting would not be relevant, in separate locales. But the strong positive correlations of exporting with local skill concentrations in analyzing and artistic creation can equally be read as undercutting this argument. Note, finally, that county population size is inversely related to export propensity, contrary to most thinking, and to our expectations.

Our exploratory analysis indicated that infrastructure was not likely to be a significant obstacle to exporting. The regression results do not disconfirm this. The three infrastructure variables, though significant, have relatively small coefficients and one, distance from a port, is wrongly signed. However, some attention might be paid to the reinforcing variables of highway mileage per capita and highway distance to a truck-rail intermodal site, both of which prove significant and suggest some residual difficulties for would-be exporters in remoter areas.

Our variables attempting to measure the impact of external economies on exporting largely fail to demonstrate their importance. Not only are the coefficients relatively quite small, but two are of the wrong sign (i.e. external economies are negatively associated with exporting). On the other hand, there does seem good evidence of mimetic exporting. The percent of other county firms within the same four digit SIC that are exporting is a relatively good predictor of whether a firm in question is doing the same.

The state dummies are significant and negative for Alabama, Georgia, and Kentucky. This reconfirms our conclusions from the regional map of exporters. However, as this equation does hold industry sector constant, it suggests that the regional difficulties observed are more serious than first thought—even controlling for industrial makeup and demographic variables these are regions that are systematically underexporting.

Finally, does the model reveal significant differences between MSA and rural exporting in the Southeast? We would argue the contrary, that the best evidence is that there is no significant difference in exporting behavior in the two areas. The model performs equally well, and very similarly, when it is applied to rural areas and MSAs separately. Several variable coefficients are found to be significantly different between the two regions, but bear in mind that one should expect this given the number of variables contained in the analysis. Nor does there appear much of a pattern to which variables do differ in their impact. None are dramatically different, and only one changes its sign (the occupational category involving physical mobility). Among the few differences that may be telling a story are the much greater importance of branch plant status to exporting out of rural areas, and that, of the four industrial sectors where regional differences are significant, all show rural firms less likely to be exporting. Still, in spite of these few differences, the larger finding once again is there is little evidence that rural firms are less apt to enter export markets, or that they do so under different stimuli than do their urban counterparts.

Patterns of Information Utilization: Comparing Urban and Rural Firms

One aspect of the export decision not particularly amenable to an analysis such as that above is of the role of information in the export decision. Both the information and locational economies arguments presented earlier either explicitly or implicitly believe information acquisition to be crucial in the decision to enter foreign markets. Though we have to some extent attempted to proxy the availability of information to firms in different locations, it is much more difficult to account for whether it is utilized. Rural firms may face greater obstacles in obtaining information, leading to different export decisions (though the model presented above does not seem to support this). Rural firms may face greater obstacles, but still reach same decisions as their similar urban counterparts. Or, urban and rural firms may simply utilize different sources of information based on what is available in their different locales, with an indeterminate impact on the ultimate export decision. Even if current export behaviors are largely similar, dissimilarities in how rural and urban establishments acquire export information could suggest important informational gaps or behavioral differences pregnant for the future development of exporting in rural areas.

To address this final question, a survey was

Table 7: Survey Results

Question	Total			Rural			MSA			Chi-square [df]
How helpful are these for learning about export regulations?										
	very	moderately	not used	very	moderately	not used	very	moderately	not used	
Own Staff	26.4%	49.1%	24.5%	26.9%	50.0%	23.1%	25.9%	48.1%	25.9%	0.058 [2]
Freight forwarders/shippers	54.7%	39.6%	5.7%	65.4%	26.9%	7.7%	44.4%	51.9%	3.7%	3.511 [2]
Law firms	5.7%	24.5%	69.8%	3.8%	26.9%	69.2%	7.4%	22.2%	70.4%	0.419 [2]
Private marketing consultants	3.8%	13.2%	83.0%	3.8%	15.4%	80.8%	3.7%	11.1%	85.2%	0.215 [2]
Private banks international lending officers	1.9%	43.4%	54.7%	0.0%	42.3%	57.7%	3.7%	44.4%	51.9%	1.059 [2]
Trade shows	7.5%	30.2%	62.3%	11.5%	30.8%	57.7%	3.7%	29.6%	66.7%	1.254 [2]
Magazines or Internet	11.3%	49.1%	39.6%	19.2%	38.5%	42.3%	3.7%	59.3%	37.0%	4.081 [2]
Trade Associations	15.1%	45.3%	39.6%	15.4%	46.2%	38.5%	14.8%	44.4%	40.7%	0.029 [2]
Ties with parent firm	20.8%	20.8%	58.5%	26.9%	11.5%	61.5%	14.8%	29.6%	55.6%	3.105 [2]
Ties with vendor firms	11.3%	32.1%	56.6%	11.5%	23.1%	65.4%	11.1%	40.7%	48.1%	1.986 [2]
Federal Agencies(SBA,DOC,etc)	13.2%	43.4%	43.4%	11.5%	46.2%	42.3%	14.8%	40.7%	44.4%	0.211 [2]
Local economic development office/chamber of commerce	3.8%	26.4%	69.8%	7.7%	19.2%	73.1%	0.0%	33.3%	66.7%	3.152 [2]
State government export promotion office : export regulations	5.7%	32.1%	62.3%	11.5%	23.1%	65.4%	0.0%	40.7%	59.3%	4.484 [2]
How helpful are these for learning about export opportunities?										
	very	moderately	not used	very	moderately	not used	very	moderately	not used	
Own Staff	34.0%	35.8%	30.2%	42.3%	34.6%	23.1%	25.9%	37.0%	37.0%	1.923 [2]
Freight forwarders/shippers	11.3%	20.8%	67.9%	15.4%	11.5%	73.1%	7.4%	29.6%	63.0%	3.033 [2]
Law firms	1.9%	5.7%	92.5%	0.0%	3.8%	96.2%	3.7%	7.4%	88.9%	1.335 [2]
Private marketing consultants	5.7%	20.8%	73.6%	7.7%	15.4%	76.9%	3.7%	25.9%	70.4%	1.159 [2]
Private banks international lending officers	1.9%	20.8%	77.4%	0.0%	7.7%	92.3%	3.7%	33.3%	63.0%	6.633 [2] **
Trade shows	20.8%	47.2%	32.1%	23.1%	50.0%	26.9%	18.5%	44.4%	37.0%	0.642 [2]
Magazines or Internet	11.3%	58.5%	30.2%	19.2%	42.3%	38.5%	3.7%	74.1%	22.2%	6.263 [2] **
Trade Associations	18.9%	49.1%	32.1%	19.2%	50.0%	30.8%	18.5%	48.1%	33.3%	0.040 [2]
Ties with parent firm	24.5%	18.9%	56.6%	26.9%	15.4%	57.7%	22.2%	22.2%	55.6%	0.458 [2]
Ties with vendor firms	11.3%	41.5%	47.2%	11.5%	30.8%	57.7%	11.1%	51.9%	37.0%	2.618 [2]
Federal Agencies(SBA,DOC,etc)	0.0%	41.5%	58.5%	0.0%	53.8%	46.2%	0.0%	29.6%	70.4%	3.199 [1] *
Local economic development office/chamber of commerce	5.7%	32.1%	62.3%	7.7%	19.2%	73.1%	3.7%	44.4%	51.9%	3.956 [2]
State government export promotion office	3.8%	35.8%	60.4%	7.7%	26.9%	65.4%	0.0%	44.4%	55.6%	3.423 [2]
Relative to the average firm in										
	better	same	worse	better	same	worse	better	same	worse	
the US, the quality of your local transportation infrastructure is	20.8%	69.8%	9.4%	26.9%	53.8%	19.2%	14.8%	85.2%	0.0%	7.991 [2] **
the US, the quality of your workforce is	35.8%	52.8%	11.3%	42.3%	46.2%	11.5%	29.6%	59.3%	11.1%	1.027 [2]
your local county, the quality of your workforce is	52.8%	45.3%	1.9%	57.7%	42.3%	0.0%	48.1%	48.1%	3.7%	1.291 [2]
Has NAFTA substantially affected your business environment and marketing plans?										
	yes	no		yes	no		yes	no		
	28.3%	71.7%		38.5%	61.5%		18.5%	81.5%		2.596 [1]

Notes: Null hypothesis of Pearson Chi-squared is that there is no association between MSA/rural and the responses for the question. Significant at 0.10 size of test=*; significant at 0.05 size of test=**.

sent to 1,000 randomly selected exporting manufacturing firms in the seven states under study.[3] Questions where directed to where their exporting information was acquired and how important they regarded each of the major categories of export information suppliers. The export decision features two major steps, discovery of opportunities and knowledge of procedures, and so we asked firms to evaluate sources of information on export opportunities and export regulations separately. We also used the survey to delve further into two questions where our exploratory and final data analyses disagreed: transportation infrastructure and labor quality. Survey results are reported in Table 7.

The survey results shed additional light on several issues raised earlier. One reason for the seemingly weak effects of locational economies on exporting can be detected from Table 7: exporters do not heavily rely on the resources of such economies for their information. Law firms, consultants, banks, and vendor firms, the core of the supposed informational advantages of being in an urban area, are used only moderately, if at all, by the large majority of exporting establishments. Neither are governmental agencies intensively used (*The Report Card on Trade*, 1995, makes a similar finding). As perhaps a fact of interest to these agencies, urban firms do appear to make more use of them in locating export opportunities, but not to a statistically significant degree. To the extent state export policies are being transmitted through state agencies, they are not having a particularly sizable impact, perhaps accounting for the low explanatory power of the state dummies in our model.

Instead, exporting firms turn, first and foremost, to freight forwarders and shippers for information on export regulations, followed by their resources in-house (own staff or the parent firm). This is true wherever the firm is located, with rural firms possibly even more likely to utilize freight forwarders and shippers (though this is not confirmed statistically). When it comes to finding export opportunities, these firms primarily employ internal resources and advertising venues.

On the whole, the evidence is that urban and rural firms are obtaining their information from the same sources and roughly in the same degree. Only in the greater urban utilization of banks and vendor firms for discovering foreign sales opportunities does there appear much difference. And of these, even for urban firms only about a third use banks, while the difference in use of vendor firms, though suggestive, is not statistically significant. In sum, the survey indicates that in both source and intensity of use, current export information flows do not differ in any systematic manner between urban and rural firms in the Southeast. Specifically, rural exporters do not appear to be structurally disadvantaged in obtaining export information. The sources of information to which urban firms would likely have easier access are not the sources most frequently used by exporters.

Lastly, survey questions were directed to the issues of labor force and infrastructure. In the case of labor, urban and rural exporters actually evaluate the quality of their labor force very similarly. This may help explain why labor issues do not appear systematically linked to any urban-rural biases in exporting. For infrastructure, there is a significant difference in the responses of rural and urban firms. A fifth of rural respondents complain their local infrastructure is worse than average, while no urban manufacturer views its infrastructure in the same light. But this is muddied by the fact that more rural than urban exporters also see their local infrastructure as better than average. It may very well be that a more subtle measurement of infrastructure than we employed may have better captured its power in the export decision. But given the far greater variance in rural responses, there is no reason to believe that this measure would have shown rural firms to be net disadvantaged.

Conclusion

We began with three questions. Are rural manufacturers in the Southeast less likely to export, or disadvantaged in their ability to do so? Might this problem undercut the on-going ruralization of manufacturing that has so contributed to the local economies in this region? And what factors do account for the decision to export, especially within the Southeast? We presented plausible arguments that globalization may be a serious economic problem for this part of the United States.

Our answers are largely optimistic. The exporting behavior of rural manufacturers does not appear in any way substantially different than that of their urban counterparts. They rely on the same sources of information, export in about the same percentage, and do not appear to suffer from any major obstacles specific to their rural location. While we do find evidence that locational factors are associated with the decision to export, they are hardly determinative. Firm level characteristics, size in particular, are far more important. Moreover, many of the factors which one would consider potentially serious for rural exporters, such as labor conditions, demographics and infrastructure, have irregular or at best very modest impacts. Thus, we conclude that location itself, while important, does not appear to be a severe obstacle to exporting in the rural southeast.

APPENDIX I

Results of Exploratory Data Analysis (Spearman rank order correlation, over 330 candidate variables):

Firms which export a higher percentage of their output are

1) more likely to have a lower-level functionary answer survey.

2) more likely to have headquarters outside Tennessee (but not more likely to have HQ overseas).

3) more likely to be part of multi-unit firm.

4) less likely to be recently established firms (but no relationship with date unit established in county).

5) less likely to sell high share of output locally or within state, but more likely to sell high percentage of output in the rest of United States.

6) less likely to buy high share of inputs locally, but more likely to purchase high share from rest of United States and overseas.

7) no more likely than anyone else to identify themselves as belonging to particular stage of the product life cycle.

8) more likely to regard *new products, foreign competition, domestic competition, quality of labor, raw material costs,* and *new technology* as important to future profits.

9) less likely to regard *consumer incomes* and *availability of financing* as important to future profits.

10) more likely to consider that rapid growth prevails for their industry in foreign markets.

11) more likely to have high numbers of full-time workers (past, present, future), to have high numbers of current temporary workers (NOT past or future), but no more likely to have large or small numbers of part time workers.

12) more likely to have a high percentage of labor force in union.

13) less likely to have a high percentage of labor force high-skill, more likely to have a higher percent unskilled, no more likely than other firms to have a high or low percent semi-skilled.

14) however, more likely to hire electricians, tool & die, maintenance, machinists, computer operators, and mechanics.

15) more likely to obtain new workers through job service or through posting in plant.

16) less likely to regard own labor costs as favorable, when compared to competitors' labor costs.

17) less likely to regard own productivity as good, when compared to national competitors' productivity.

18) more likely to regard workers' compensation awards as high.

19) more likely to have lower employee turnover rate and lower absentee rate.

20) more likely to rate their county as having poor *cultural richness, medical care (availability and quality),* and *availability of management housing and rental housing.*

21) no more likely to rate their county as poor or good in *quality of roads, quality of police, fire or ambulance service,* or *recreational areas.*

22) more likely to regard substance abuse within the firm as a serious problem.

23) more likely to administer a drug test to applicants for employment.

24) no more or less likely to monitor their workforce with periodic drug tests.

25) more likely to have a high percent of those tested test positive for drug use.

26) more likely to offer an employee assistance program.

27) more likely to require special training which is accomplished through *on-the-job training, state vocational technical schools,* or *community colleges.*

28) more likely to have used services of Economic and Community Development.

29) more likely to regard the costs of *water* or *sewer services* as low. No more likely to regard the costs of *electricity, natural gas,* or *telephone services* as low or high.

30) more likely to regard cellular telephone service as not important for company's growth.

31) more likely to lease (rather than own) some or all of their facilities.

32) more likely to commit resources to assess and evaluate technologies which might enhance the manufacturing process.

33) more likely to have attracted relocation bids from places outside the state.

34) more likely to plan high levels of capital investment in plant.

35) more likely to use (for shipping AND receiving) *air, water,* and *rail.*

36) less likely to use (for shipping AND receiving) *intrastate trucking, mail,* or *electronic shipping.*

37) more likely to rate *accessibility to* and *quality of* air transportation and electronic shipping as poor; no more or less likely to regard access to and quality of other modes as poor.

38) more likely to regard the cost of interstate trucking and mail as good; less likely to regard the cost of air as good.

39) more likely to use, with greater frequency, commercial air travel.

40) more likely to use charter flights, as percent of flights.

41) more likely to regard their community's best features as *favorable wage rates, trainable labor, work ethic,* and *cost of living.*

42) less likely to regard their community's best features as *quality of local services (fire, health, etc.), business environment, community's size, location,* and *public elementary/secondary education.*

43) no more or less likely to regard their community's best features as *people, scenic area, land availability, higher education,* or *housing.*

44) less likely to have a good opinion of the county as a place in which to do business.

45) more likely to regard the following factors as favorable to remaining, expanding or relocating within the present community: *wage rates, labor, work ethic,* and *cost of living.*

46) less likely to regard the following factor as favorable to remaining, expanding or relocating within the present community: *business environment.*

47) no more or less likely to regard the following factors as favorable to remaining, expanding or relocating within the present community: *services, community size, people, location, scenic area, land cost/availability, education, transportation, recreation, roads, government treatment, economy*.

48) more likely to regard the following factors as discouraging for expanding or remaining within the community: *education, labor force factors.*

49) no more or less likely to be discouraged by *roads, business-government relations, government procedures*, or *financing*.

50) more likely to recommend changes in *education* and *labor force factors* in order to improve the local business environment.

51) less likely to recommend changes in *government procedures* in order to improve the local business environment.

52) no more or less likely to recommend changes in *roads, business-government relations*, or *financing*.

53) more likely to have experienced problems in all areas specified by survey: *production methods, machinery/equipment, computer hardware/software, quality control/workforce, plant energy usage, telecommunications, new product design, materials, production management*, and *waste disposal*.

54) more likely to believe that new technologies would help meet growth goals.

55) more likely to believe that there is a need for manufacturing-focused seminars or training.

56) more likely to send representatives of company to specific training (of 15 types, all but *marketing methods*).

57) more likely to express interest in additional information on: *child care, marketing assistance, telecommunications, job training assistance, exporting workshops, export financing, assistance in selecting foreign distributors, health care cost containment strategies, employee stock ownership plans*.

58) less likely to express interest in additional information on: *total quality management*.

59) no more or less likely to express interest in additional information on: *business plan assistance, financing assistance, management assistance*, and *drug testing*.

60) more likely to be involved (or interested in involvement) with local educational institutions (secondary, vocational, community college) through *job recruitment, curriculum input, equipment donation, employees acting as part-time instructors, co-op programs*, and *career days*.

APPENDIX II

Variables Used in Logistic Regressions

Variable	Description
Dependent Variable	
DXPRT	Dummy: firm exports=1; firm doesn't export=0
Firm-level Variables	
DHQ	Headquarters located elsewhere=1; All Others=0
EMP	Employment of current firm, 1997
AGE	Age of current firm, 1997
Dummy Two-Digit SIC classification for each firm	
SIC20	Food And Kindred Products=1; All Others=0
SIC21	Tobacco Products=1; All Others=0
SIC22	Textile Mill Products=1; All Others=0
SIC23	Apparel And Other Textile Products=1; All Others=0
SIC24	Lumber And Wood Products=1; All Others=0
SIC25	Furniture And Fixtures=1; All Others=0
SIC26	Paper And Allied Products=1; All Others=0
SIC27	Printing And Publishing=1; All Others=0
SIC28	Chemicals And Allied Products=1; All Others=0
SIC29	Petroleum And Coal Products=1; All Others=0
SIC30	Rubber And Miscellaneous Plastics Products=1; All Others=0
SIC31	Leather And Leather Products=1; All Others=0
SIC32	Stone, Clay, And Glass Products=1; All Others=0
SIC33	Primary Metal Industries=1; All Others=0
SIC34	Fabricated Metal Products=1; All Others=0
SIC35	Industrial Machinery And Equipment=1; All Others=0
SIC36	Electronic & Other Electric Equipment=1; All Others=0
SIC37	Transportation Equipment=1; All Others=0
SIC38	Instruments And Related Products=1; All Others=0
SIC39	Miscellaneous Manufacturing Industries=1; All Others=0
Labor Market Variables	
EP	Labor Market Tightness: 1997 county employment/1997 county working age population
Occupational Attributes	
RES	Percent of 1990 county civilian labor force in occupations involving Research
ANA	Percent of 1990 county civilian labor force in occupations involving Analyzing
TRO	Percent of 1990 county civilian labor force in occupations involving Trouble-Shooting
ART	Percent of 1990 county civilian labor force in occupations involving Artistic Creation
INS	Percent of 1990 county civilian labor force in occupations involving Instruction
TRE	Percent of 1990 county civilian labor force in occupations involving Treating and Advising
SUP	Percent of 1990 county civilian labor force in occupations involving Supervising
PER	Percent of 1990 county civilian labor force in occupations involving Persuading
PUB	Percent of 1990 county civilian labor force in occupations involving Public Contact
MEC	Percent of 1990 county civilian labor force in occupations involving Mechanical Manipulation
OPE	Percent of 1990 county civilian labor force in occupations involving Operating a Vehicle
REP	Percent of 1990 county civilian labor force in occupations involving Repetition
GEO	Percent of 1990 county civilian labor force in Geographically concentrated occupations
MOB	Percent of 1990 county civilian labor force in occupations involving Mobility
PHY	Percent of 1990 county civilian labor force in occupations involving Physical Stamina
Labor Cost	
MWL96	Manufacturing wage per worker, county average, 1996
MWL69	Manufacturing wage per worker, county average, 1969
Education	
PCOL	Percent of over-24 1990 county population with at least Bachelor's degree
PNHS	Percent of over-24 1990 county population which never received High School degree
General Demographic Variables	
MEDHHINC	County 1990 median household income
MEDAGE	County 1990 median age of population
MEDHVAL	County 1990 median value of single family residence
PCTPOOR	County 1990 percent of population below poverty level
PWHITE	County 1990 percent of population white
Dummy Rural/Urban Continuum Codes (Beale Codes)	
CD0	Central county of MSA with 1993 population of 1 million or more =1; Other county=0
CD1	Fringe counties of MSA with 1993 population of 1 million or more =1; Other county=0
CD2	Counties in MSA of 250 thousand to 1 million population; Other county=0
CD3	Counties in MSA of less than 250 thousand population =1; Other county=0
CD4	Urban population of 20,000 or more, adjacent to an MSA=1; Other county=0
CD5	Urban population of 20,000 or more, not adjacent to an MSA=1; Other county=0

CD6	Urban population of 2,500 to 19,999, adjacent to an MSA =1; Other county=0
CD7	Urban population of 2,500 to 19,999, not adjacent to an MSA=1; Other county=0
CD8	Completely rural or less than 2,500 urban population, adjacent to an MSA=1; Other county=0
CD9	Completely rural or less than 2,500 urban population, not adjacent to an MSA=1; Other county=0

Physical Infrastructure Variables

HWYPOP	1997 county highway lane miles / 1997 county population
HWYJRD	1997 county highway lane miles / county land area
HAGE	County 1990 median age of single family residence
PP	1997 county minimum distance to a port
HR	1997 county minimum distance to a truck-to-rail intermodal transfer site
WR	1997 county minimum distance to a water-to-rail intermodal transfer site
LMXE60	Logged number of 1997 enplanements at largest airport within 60 miles of county centroid
ENP60	Logged total number of 1997 enplanements within 60 miles of county centroid
LSGRAV0	Logged 1997 county air service gravity measure (equation 1): β=0.5
LSGRAV1	Logged 1997 county air service gravity measure (equation 1): β=1
LSGRAV2	Logged 1997 county air service gravity measure (equation 1): β=2
LSGRAV3	Logged 1997 county air service gravity measure (equation 1): β=3
LSGRAV4	Logged 1997 county air service gravity measure (equation 1): β=4

County Size Variables

DENS	1997 county population / county land area
POP97	1997 county population

Manufacturing Sector Size Variables

ML96	Number of manufacturing jobs in county, 1996
LMT96	Percent of county's jobs that are manufacturing jobs, 1996
TOTEST	Number of manufacturing establishments in county, 1997
POWNEST	Percent of firms within county that are in the same 4-digit SIC as current firm, 1997

County Specific Manufacturing Sector Variables

AVGTOT	Average number of employees per manufacturing firm in county, 1997
VAVS	Value-added as percent of value of manufacturing shipments, county average, 1992
PNPE	Percent of manufacturing employees which are non-production workers, county average, 1992
VALAB	Value-added per manufacturing worker, county average, 1992

Mimetic exporting behavior

OTHERX	Percent of other firms in county which export (looking only at firms outside current firm's 4-digit SIC), 1997
OSICX	Percent of other firms in county which export (looking only at firms inside current firm's 4-digit SIC), 1997

Dummy for State

TN	Firm is in Tennessee=1; Firm is elsewhere=0
AL	Firm is in Alabama=1; Firm is elsewhere=0
KY	Firm is in Kentucky=1; Firm is elsewhere=0
GA	Firm is in Georgia=1; Firm is elsewhere=0
MS	Firm is in Mississippi=1; Firm is elsewhere=0
NC	Firm is in North Carolina=1; Firm is elsewhere=0
SC	Firm is in South Carolina=1; Firm is elsewhere=0

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Endnotes

1 Of particular interest here is a recent survey of South Carolinian firms confirming the primacy of these obstacles (Teel, 1996).

2 This dataset is available by request from the authors.

3 Surveys were mailed to 500 rural and 500 urban establishments. The response rate was five percent, within the generally accepted rate for surveys delivered in this manner.