



Local Problems Facing Manufacturers

Results of the ERS Rural Manufacturing Survey

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The economic health of many rural towns and regions depends on their ability to maintain a competitive manufacturing sector. In a recent ERS survey, rural manufacturers reported that, more than any other factor, the quality of local labor hindered their competitiveness. Other frequently cited local problems included State and local taxes, environmental regulations, the attractiveness of the area to managers and professionals, and the quality of local schools. The extent of these problems varies by region more than along a rural-urban dimension. Labor quality problems were more likely to be reported by manufacturers who paid below-average wages, hired less-educated workers, and used advanced technologies. Advanced-technology users in counties that specialized in manufacturing or had 2-year colleges were less likely to report labor quality problems.

With their ready supply of reliable, low-cost labor, rural areas have historically been attractive to manufacturers. Industrial plants with relatively routine technologies and steady markets moved to or sprang up in rural areas from the 1950's through the 1970's, generating up to a million new rural jobs a decade. By 1980, nearly three times as many rural people worked in manufacturing as in agriculture.

But, since the early 1980's, new manufacturing technologies and the globalization of markets have changed the competitive context for rural manufacturers. New technologies have created a greater need for more highly skilled labor (Teixeira, 1998). Globalization has meant competition from countries with extremely low wages, reducing the competitive advantage of rural regions in the United States. During the 1980's, rural areas had virtually no gain in manufacturing jobs and growth in the current decade has been limited. With the continued viability of a rural low-wage, low-skill strategy in doubt, how can rural regions and their manufacturers best compete in today's technological and economic environment?

The Rural Manufacturing Survey inquired about the current situation of manufacturers in five potential local problem areas: human resources, transportation infrastructure; access to suppliers and customers; physical plant; and government (see box, p. 2). The first three are of particular interest, given recent changes in technology and markets.

Labor Quality Is the Problem Most Often Cited by Rural Employers

Three out of four rural manufacturers indicated that quality of available labor was at least a minor problem and over a third reported it to be a major problem for their establishment (table 1). While State and local taxes and environmental regulations followed labor as the most cited problems, human resources concerns, including the attractiveness of the area to managers and professionals and the quality of primary and secondary schools, otherwise tended to dominate as problems.

These results are somewhat surprising, as labor reliability (along with low wages) is commonly held to be a major reason that manufacturers locate in rural areas. The results

Why We Need to Know More About Barriers to Competitiveness

The question is particularly important in the context of heightened Federal and State interest in rural development and the reduced trade barriers resulting from GATT, NAFTA, and other trade agreements. The USDA loaned or spent roughly \$7 billion on rural development last year, in programs ranging from telecommunications to water and sewer projects to enterprise zones to business and housing loans. Many programs are aimed at helping rural enterprises, manufacturers in particular.

Both exports and imports of manufactured goods are now much higher than 15 years ago, reflecting both new opportunities and new constraints. Recent devaluations of Southeast Asian currencies are likely to heighten competition from imports in the near future. Yet little is known about local factors that inhibit rural manufacturing competitiveness in the international marketplace. The ERS Rural Manufacturing Survey was designed to address these concerns.

may reflect an increasing concern for worker skills associated with the recent adoption of new technologies and work organizations by many rural manufacturers. Also, with fewer farms and smaller farm families, agriculture is no longer a plentiful source of new workers.

Rurality Reduces Costs and Raises Problems of Access, but the Quality of Labor Problem Pervades

Manufacturers in large urban areas cite problems of taxes, cost of facilities and land, and cost of labor more than manufacturers in other locations, but cite problems of transportation infrastructure and access to suppliers and customers much less often (table 2). This is a classic trade-off—access has a price.

Within rural areas, problems of access are greater in counties not adjacent to urban areas,

particularly in the most rural counties—those lacking towns of over 2,500 residents. The problems of access reported in the survey most often relate to human resources (the attractiveness of the area to managers and professionals and access to training courses) and transportation infrastructure, notably access to airports and, particularly in completely rural counties, railroads. The transportation problems may reflect the closings in recent years of many airports and railroad lines serving more rural areas.

Major problems of access to customers and suppliers were reported relatively rarely, even in completely rural counties. Problems of access to market information and legal and business services are minimal and do not increase with rurality. Except for the most rural counties, Gale (1997) found little rural lag in technology adoption, once rural-

Table 1—Rural manufacturers responded that quality of available labor and State and local taxes as the major factors affecting their establishment's ability to compete

Local factors ¹	Any problem ²	Major problem
	<i>Percent</i>	
Human resources		
Quality of available labor	74.9	34.3
Attractiveness of area to managers and professionals	47.5	14.8
Quality of primary and secondary schools	36.6	10.2
Access to training courses	44.9	8.9
Local cost of labor	36.4	7.3
Local management-labor relations	27.0	3.7
Transportation infrastructure		
Access to airport facilities and services	44.1	8.9
Interstates and major highways	26.4	6.8
Railroad access	20.7	6.4
Local roads and bridges	30.2	5.6
Access to:		
Material suppliers	39.5	6.5
Major customers	36.9	6.4
Market information	33.7	5.3
Equipment suppliers	34.2	5.0
Financial institutions	23.6	4.1
Business services	19.9	1.4
Physical plant		
Cost of facilities and land	38.4	8.2
Water and sewer systems	31.2	7.9
Government		
State and local tax rates	64.1	22.4
Environmental regulations	57.5	21.4
Police and fire protection	17.2	1.6

¹Ordered within categories by proportion of rural respondents indicating factor is a major problem. ²Major or minor problem. Source: ERS Rural Manufacturing Survey, 1996.

Table 2—Both rural and urban manufacturers perceive labor and taxes as their two major locational problems. Rural manufacturers perceive attractiveness of the area and lack of access to airports as additional problems.¹

Local factors ²	Urban area		Rural county		
	Large	Small	Adjacent to:		Nonadjacent to:
			Urban area	Town >2,500	Town <2,500
	<i>Percent</i>				
Human resources:					
Quality of available labor	31.9	35.2	36.0	30.9	37.4
Attractiveness of area to managers/professionals	7.4	7.1	13.4	16.2	20.7
Access to training courses	4.1	8.1	7.7	10.2	13.5
Local cost of labor	13.6	9.6	7.4	6.9	7.9
Transportation infrastructure:					
Access to airport facilities and services	1.0	3.4	6.6	11.7	13.9
Interstates and major highways	3.6	3.2	4.8	9.9	8.0
Railroad access	1.6	2.4	5.4	6.3	16.5
Access to:					
Material suppliers	1.9	5.5	4.9	8.6	9.1
Major customers	6.9	4.8	4.5	8.3	12.5
Equipment suppliers	2.5	2.1	4.0	6.1	7.5
Physical plant:					
Cost of facilities and land	22.6	10.7	8.9	7.7	5.0
Government:					
State and local taxes	33.4	24.9	22.9	22.1	19.4

¹Only factors where differences across urban-rural code were significant are included.

²Ordered within categories by proportion of rural respondents indicating factor is a major problem.

Source: ERS Rural Manufacturing Survey, 1996.

urban differences in industry types were taken into account.

Some speculate that businesses in remote locations lack access to financial institutions; yet, the rural manufacturers surveyed, even those in completely rural counties, appeared largely unaware of any difficulties—only 6 percent reported this as a major problem. This proportion is actually about the same as in small urban areas (7 percent).

Except in major urban areas, where it ranks a close second to State and local taxes, the quality of local available labor is the most frequently cited problem across the rural-urban spectrum. The nature of the problem is not necessarily the same everywhere, however. Manufacturers in adjacent counties and in the most rural counties report this problem more often than manufacturers in counties having towns but not adjacent to urban areas. Manufacturers in both adjacent counties and in the most rural counties report this

problem more often than manufacturers in counties having towns but located away from major urban areas. Urban proximity means larger labor pools but also competition with higher paying urban businesses for labor. Manufacturers in completely rural counties have less competition, but operate in small labor markets.

Regional Differences Are Substantial

Problems reported by manufacturers vary considerably from one region to another, more than along an urban-rural dimension (table 3). Five regions were selected for comparison: the industrial Great Lakes, historically an intense manufacturing region; three very different distressed regions—the Great Plains, the Mississippi Delta, and Appalachia; and the growing Pacific Northwest.

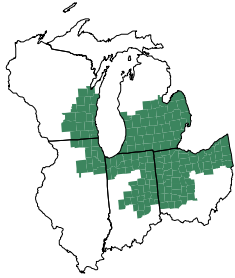
In the Industrial Great Lakes, major labor quality problems were reported by over 40 percent of the rural manufacturers. This re-

Answers Depended on Respondent's Role in the Enterprise

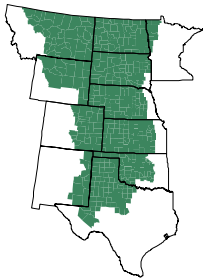
The perception of problems depended slightly on who at the manufacturing plant answered the survey. The only substantial difference was that rural company heads (presidents, CEO's, owners, etc.) were more likely than others to cite State and local taxes (27 percent vs. 20 percent) and environmental regulations (30 percent vs. 18 percent) as major problems, probably in part because their positions involve more exposure to these issues. But, even for company heads, the quality of available local labor was the most frequently mentioned major problem (37 percent).

**Regions Used
in This Report**

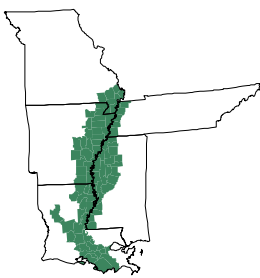
Industrial Great Lakes



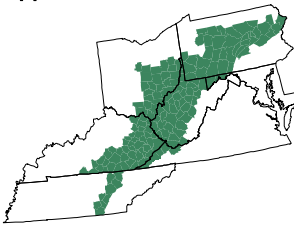
Great Plains



Delta



Appalachia



Northwest



gion has had a very tight labor market—its manufacturers faced county unemployment rates averaging only 4.8 percent in 1995, a full point below the national average. State and local taxes, typically higher in the northeastern quarter of the country, were also cited more often in the industrial Great Lakes than elsewhere.

Manufacturers in the Great Plains reported the ability to attract managers and professionals as a major problem almost as often as the quality of available labor. Managers and professionals may be reluctant to move to sparsely settled Great Plains areas, particularly where population loss has hampered community services and there are few other new residents. In this region, the labor problem seems to be one of availability rather than quality, since virtually none of the manufacturers reported that the quality of local schools was a major problem. Sixteen percent of rural Great Plains manufacturers reported a major problem with access to airport facilities, suggesting that recent reductions in airline services may be impeding development in parts of the region.

The Mississippi Delta region appears attractive in terms of taxes and environmental regulations—perhaps the major motivations for manufacturers to locate there—but human resources problems are ranked quite high. Delta manufacturers report major problems

with the quality of available labor (42 percent), the ability to attract managers and professionals (29 percent), and the quality of local schools (25 percent).

Manufacturers in Appalachia, another relatively poor region, report problems with the quality of labor relatively infrequently (18 percent—about half as often as in rural areas in general). Unemployment rates have been relatively high (7.5 percent in 1995), making labor more available. The school system is not seen as problematic in Appalachia, even though education levels are somewhat below the rural average. Infrastructure, including water and sewer systems (and, particularly in southern Appalachia, local roads), is a more central issue in Appalachia than elsewhere.

The results for the Pacific Northwest suggest why this area has been attractive to high-tech firms. Few manufacturers in this region report problems with the area’s attractiveness to managers and professionals, local school systems, or airport access. Over 70 percent of these manufacturers have a community college in their county, an important asset for advanced-technology firms. While nearly a quarter of the manufacturers reported problems with the quality of available labor, this was substantially less than in other regions. Environmental regulations are the most frequently cited major problem in the Northwest. Water and sewer system prob-

Table 3—Regardless of region, rural manufacturers have much the same chief concerns. Delta manufacturers’ attitudes toward local tax rates and quality of local schools are somewhat different from those of manufacturers in other regions.

Local factors ¹	Industrial	Great	Great	Delta	Appa-	North-
	Great	Plains	Plains	Delta	latchia	west
<i>Ranking: 1 = Greatest problem</i>						
Quality of available local labor	1	1	1	1	4	2
State and local tax rates	2	5	8	1	1	3
Environmental regulations	3	3	5	2	2	1
Attractiveness of area to managers and professionals	4	2	2	3	3	16
Quality of primary and secondary schools	7	19	3	10	10	10
Access to training courses	10	11	4	16	7	7
Access to airport facilities and services	9	4	6	9	13	13
Cost of facilities and land	8	14	17	11	5	5
Water and sewer systems	5	10	14	5	4	4

¹Ordered within categories by proportion of rural respondents indicating factor is a major problem. Note: Values are in descending order. Source: ERS Rural Manufacturing Survey, 1996.

lems also rank relatively high, perhaps because of the high rates of growth.

These regional patterns show that human resources are a central concern in a variety of settings, but the nature of the problem depends on the setting. For example, in some poor or sparsely settled areas, the problem is not simply one of finding adequate production workers but extends to the ability to find people for managerial and professional positions as well.

Adopters of New Technology Face Greater Problems, Particularly in Human Resources

In our study, rural manufacturers who had adopted a relatively large number of new production technologies, forms of work organization, and telecommunications (high-adopters) generally had more highly educated workforces, paid higher wages, and had greater employment growth in the previous 3 years than other manufacturers. However, they also have more problems with human resources and access than either rural manufacturers who have adopted few technologies or urban high-adopters (fig. 1). Rural high-adopters are somewhat more likely to report problems with the quality of available labor, but nearly twice as likely to report problems with attracting managers and professionals, school quality, and access to airports and equipment suppliers—all important competitive factors in these types of enterprises. Among high-adopters as among all manufacturers, rural areas offer advantages in labor and land costs and taxes, but there are rural disadvantages associated with the adoption of new technology as well, disadvantages which may limit the effective development of advanced technology plants in some rural regions.

Behind the Quality of Labor Problem

The extent and pervasiveness of the quality of labor problem reported by rural manufacturers raise the issue of its nature and origins. Data from our survey show that rural manufacturers most often have major problems, not with production workers' basic skills, or even their technical skills, but with their reliability and work attitudes (Teixeira, 1998). However, problems finding applicants with

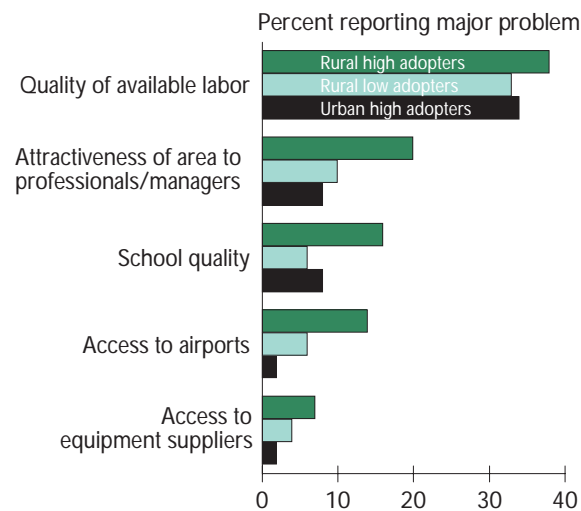
technical and problem-solving skills do exist and rise sharply with the level of adoption of new technologies and work organization.

The labor quality problem is in part a national problem extending to all sectors: surveys including a wide range of employers have found worker reliability and attitude to be a central concern. But there are reasons to expect that manufacturing may be particularly affected by labor quality problems. Inflation-adjusted hourly earnings of production workers declined in manufacturing from 1980 through the early 1990's, more rapidly than in the "services-producing" sector, reducing both real and relative wages. Combined with the job uncertainty and lack of career opportunities associated with declining manufacturing employment, the narrower wage advantage makes manufacturing less attractive than services for many job-seekers. Thus, particularly where other jobs are readily available, manufacturers may now find it difficult to attract and hold on to any but the least skilled workers.

Not all manufacturers reported major problems with the quality of available labor, however, and some further insight may be gained by comparing the situations of manufacturers who reported problems with those that did not. Logistic regression analysis permits a simultaneous consideration of a number of plant and county conditions that

Figure 1

Rural adopters of new technology report more barriers to competitiveness



Source: ERS Rural Manufacturing Survey, 1996.

might affect the ability to find qualified labor. Four sets of measures were considered: plant characteristics, local labor availability (expected to be associated with less reporting of labor problems), local human capital (also expected to mean less reporting of labor problems, particularly for advanced technology firms), and rurality (table 4).

Manufacturers, particularly advanced-technology manufacturers, were less likely to report labor quality problems if their plants were large, branches of larger firms, relatively well-paying, and manned by a workforce that completed high school. Branch plants probably have fewer labor quality problems partly because local labor quality was used as a criterion in selecting the site for the plant. The lower incidence of reported quality of labor problems among manufacturers paying above average wages suggests that the current low manufacturing wage levels have made it difficult for manufacturers, particularly advanced-technology users, to attract the quality of worker needed.

There is some evidence that manufacturers can have problems competing for labor. Manufacturers reported labor problems more rarely in counties with relatively high unemployment. However, the association between high average local earnings and the reporting of labor problems was weak (and not statistically significant). Except for advanced-technology users, high population growth was associated with greater reporting of labor problems, perhaps because high population growth reflects the availability of alternative jobs in growing service sectors for prospective (and current) low-skill manufacturing workers.

There is strong evidence that human capital is important, particularly for advanced technology manufacturers. The presence of a community college and county specialization in manufacturing are both associated with a lower reporting of labor problems by advanced-technology manufacturers. Community colleges now often provide training geared toward local manufacturing and

Table 4—Manufacturing plants where all production workers have graduated from high school are less likely to report problems with local labor pool quality¹

Characteristics	Difference due to characteristic ²	
	All plants	High-adopters
	<i>Percentage points</i>	
Plant		
More than 200 employees	-7	-12
Branch of larger firm	-7	-10
Unionized	-3	-7
All production workers have high school diploma	-11	-18
Above-average production worker pay	-7	-13
County labor market conditions³		
High unemployment rate	-5	-6
High average earnings per job	3	4
High population growth	7	-2
Human capital		
High county school drop-out rate (ages 25-44) ³	4	5
Manufacturing specialization ⁴	-3	-9
Community college in county	-3	-11
Population 30 percent or more black	7	14
Rurality		
Nonadjacent to urban area	-5	-12
With no towns of 2,500 or more residents	7	1

Bold numbers are statistically significant at the 0.10 level. Results of logistic regression controlled for industry (20 categories: SIC 2-digit level), four Census regions, and level of technology adoption.

¹By percentages shown. ²Computations assume all other characteristics are at their rural averages, except in the case of "With no towns of 2,500 or more residents," where the nonadjacency is assumed. These coefficients cannot be added to estimate combined effect. ³Top (or bottom) quarter for all rural survey enterprises. ⁴ERS designation, based on 30 percent or more of personal income from manufacturing in 1989.

Source: ERS Rural Manufacturing Survey, 1996, and various county-level data sets maintained by ERS.

many even develop courses for particular manufacturers. Specialization in manufacturing may create a pool of relatively skilled workers (and professionals). Manufacturers in counties with high proportions of blacks, particularly advanced technology manufacturers, are much more likely than others to report labor quality problems. (They apparently ascribe much of the problem to local school systems: 47 percent of the advanced technology manufacturers in these counties reported that the quality of local schools was a major problem.)

The relationships between county high school drop-out rates and the reporting of labor quality problems were weak for both the total or advanced-technology samples. (The relationship was actually reversed for the low-adopters, who appeared to prefer low-education areas.) The fact that the advanced technology manufacturers did not report more problems where the drop-out rates were high is somewhat confusing, since these manufacturers in particular report fewer problems where their workforces include no drop-outs.

Overall, these labor availability, labor quality, and plant characteristics had a strong association with the reporting of major labor quality/availability problems. Manufacturers with four or more of seven significant conditions (high pay, high worker education, large plant, branch plant, high local unemployment, county specialization in manufacturing, presence of a community college, and non-adjacent location) reported problems with the quality of available labor 19 percent of the time, compared with 43 percent of the manufacturers with two or fewer of these attributes. Among high-adopters, the comparable percentages were 19 percent and 70 percent.

Summary and Implications

The major local problems that rural manufacturers face in their locations are not generally problems that have been stressed in Federal rural development policy, which has tended to focus on infrastructure, credit, and business assistance. While manufacturers in some areas—most notably Appalachia—may cite infrastructure problems, most do not. Access to financial institutions is generally not perceived as a major problem by rural manufac-

turers. Except in the most rural counties, access to information does not seem to be a particularly rural problem either. This echoes the survey's findings with respect to technology adoption, with only the most rural counties showing a lag, once the urban-rural differences in industry structure are taken into account (Gale, 1997). This is not to say that rural infrastructure, credit, and business/technical assistance problems do not exist and are not serious for some manufacturers in some areas. But, at present, these problems are dwarfed by human resources problems.

The central local issue for rural manufacturers is access to human resources, especially reliable production workers. This is not a question of basic schooling as much as work attitude and, in the case of advanced technology users, specialized skills and problem-solving. The low level of general skills in the local workforce is clearly a problem in some areas, particularly in counties with a high proportion of blacks. And adopters of new technologies are having problems finding technically skilled workers able to solve problems as they arise in production. Training programs such as the school-to-work programs (which are meant to inform labor force entrants of basic employer needs) are potentially quite useful. Community colleges can be important, particularly for adopters of new technology. These programs are likely to be most relevant to small, local manufacturers, who cannot develop their own training programs. Other things being equal, rural towns and regions with relevant training institutions and programs should have more competitive manufacturing sectors, with more advanced technologies.

But the issue is not simply one of labor force training. Clearly, there is a tension between the need for capable workers and the need to keep wages low. Rural manufacturers, particularly the high-adopters, were much more likely to report problems with the quality of the available local labor when they paid below average wages to a low-education workforce. For manufacturers, there is no clear solution to the skill vs. wages dilemma. For rural communities, an emphasis on the adoption of new technologies may be worthwhile, as advanced technology users typically provide more training and pay higher wages.

Finally, labor problems are not the only ones facing rural manufacturers. Advanced technology users in particular report major problems with their ability to attract managers and professionals, the quality of local schools, access to training, and access to airports. While access to airports is likely to remain a rural problem, the importance of quality-of-life factors (including schools) for high- and mid-level employees suggests an avenue for improvement, at least in some areas (see also McNamara and others, 1988). Here, again, rural manufacturers face a dilemma. Areas attractive to managers and

professionals are also attractive to other types of businesses, which then compete with manufacturers for low-skill production labor. For rural regions, however, this should be a welcome dilemma. Efforts to improve quality-of-life factors, including school quality and physical and cultural amenities, may help not only to attract new businesses but also to improve the quality of life of current residents.

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About the Survey

The data in this report are from the 1996 ERS Rural Manufacturing Survey, a nationwide study of local barriers to competitiveness. The survey is the most comprehensive to date on technology use, changing skill needs, and local problems facing rural manufacturers.

The Rural Manufacturing Survey sample includes 2,844 rural and 1,065 urban manufacturing establishments, representing all manufacturing industries. ERS developed the survey instrument, and Washington State's University's Social and Economic Sciences Research Center planned and carried out the phone survey. The survey asked manufacturers whether or not they used five advanced production technologies, five management practices, and six telecommunications technologies. These technologies and management practices are used by manufacturing businesses to improve worker productivity, product quality, and organizational flexibility.

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