

# Restructuring of the US Meat Processing Industry and New Hispanic Migrant Destinations

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FINDINGS FROM the 2000 US Census confirm two critical Hispanic population trends within nonmetropolitan counties. The first is an extraordinarily high rate of Hispanic population increase outside urban areas over the past decade, with growth rates exceeding both metropolitan and nonmetropolitan growth rates for all other racial and ethnic groups (Cromartie 2000; Guzmán and Diaz McConnell 2002). The second is that for the first time in US history, roughly half of all nonmetropolitan Hispanics live outside the traditional five Southwestern states of Arizona, California, Colorado, New Mexico, and Texas (Kandel and Cromartie 2004). While many new destinations include urban areas, the diversity of new rural destinations raises questions about forces attracting migrants to areas outside the Southwest and the links between economic restructuring and Hispanic population growth in nonmetropolitan counties. Recent studies document growing proportions of Hispanics and immigrants in various primary and manufacturing industries over the past decade. However, the relative newness of these demographic trends revealed through Census 2000 data has limited the number of quantitative analyses that relate demographic and economic changes on a broader scale, particularly for rural areas (Saenz and Torres 2003).

This study links Hispanic population growth and geographic dispersion to industrial restructuring. The first section of the article reviews different efforts to explain Hispanic migration to new rural destinations and elaborates on Piore's dual labor market theory to highlight the centrality of industrial restructuring for understanding changes in labor demand and population movements (Piore 1979). The second section examines structural change in the meat processing industry, a sector of the economy increasingly located in the rural Midwest and Southeast and employing large

numbers of low-skilled workers, to explain industrial processes undergirding growing Hispanic settlement in nontraditional rural areas. The third section uses data from the 1980, 1990, and 2000 US Censuses combined with the Census Bureau's annual County Business Patterns data to analyze nationwide changes in Hispanic representation at the nonmetropolitan county level by modeling change in the Hispanic proportion of the population according to employment and industrial sector characteristics. Our results highlight the importance of industrial transformations in the meat processing industry for understanding Hispanic migration to new geographic destinations across the United States.

### **New patterns of rural Hispanic settlement: Theoretical background**

By the end of the 1990s, Hispanic population growth rates in nonmetropolitan counties had exceeded those of metro counties, accounting for over 25 percent of all nonmetropolitan population growth, while representing just 5.5 percent of its stock by 2000 (Kandel and Cromartie 2004). Such growth was not geographically isolated. In nonmetro counties, Hispanic population growth exceeded non-Hispanic growth for every state except Hawaii. Despite this dispersion, rural Hispanics have concentrated geographically, with a third of the population residing in 109 nonmetropolitan counties, or less than 5 percent of all 2,289 nonmetropolitan counties defined in 1993. Moreover, they are more likely than non-Hispanic whites to reside in larger towns within nonmetropolitan counties (Kandel and Cromartie 2004). Particularly striking have been the growth rates of Hispanics outside rural areas of the Southwest, where the majority of rural Hispanics have resided for centuries, with growth rates especially high in the Midwest and Southeast. Table 1 shows that between 1990 and 2000 the Hispanic population in the nonmetropolitan Midwest and Southeast grew by 13 and 19 percent, respectively. At the same time, the percentage of Hispanics in the nonmetro Southwest declined from 66 to 53 percent. Media reports tend to emphasize dramatic examples of Hispanic influx in places such as Dalton, Georgia; Storm Lake, Iowa; and Siler City, North Carolina; and a growing body of mostly ethnographic research documents the mixed reception Hispanics typically receive in relatively small communities with little experience or few public services to assist foreign-born newcomers (Engstrom 2001; Gozdzik and Martin 2005; Grey and Woodrick 2002; Griffith 1995; Guthey 2001; Viglucci 2000; Zúñiga and Hernández-León 2005).

Recent scholarship on Hispanic demography offers several explanations for Hispanic population growth in Southeastern and Midwestern states that until recently were home to relatively few Hispanic migrants. Although they highlight different dimensions of the migration process, these perspectives are not mutually exclusive. The policy perspective attributes changing

**TABLE 1** Hispanic and non-Hispanic population change by metropolitan status and region, United States 1980–2000

	Total population	Percent change over decade	Percent distribution among US regions				
			North-east	Mid-west	South-east	West	South-west
<b>Hispanics</b>							
Nonmetro							
1980	1,497,624		2.3	10.2	13.3	8.7	65.6
1990	1,902,418	27.0	3.1	10.1	10.6	10.6	65.5
2000	3,175,953	66.9	3.2	12.9	19.3	11.5	53.1
Metro							
1980	13,111,049		19.6	8.6	9.8	2.5	59.5
1990	20,451,641	56.0	18.1	7.5	10.9	2.6	61.0
2000	32,129,865	57.1	16.0	8.5	13.4	3.8	58.3
<b>Non-Hispanics</b>							
Nonmetro							
1980	48,038,159		10.4	33.6	39.2	8.3	8.5
1990	48,995,484	2.0	10.6	32.2	39.5	8.8	8.9
2000	52,983,373	8.1	10.2	31.1	40.0	9.5	9.3
Metro							
1980	163,898,973		25.4	25.3	24.9	5.0	19.5
1990	177,360,330	8.2	23.6	23.8	26.3	5.4	20.9
2000	193,132,715	8.9	22.2	23.2	27.6	5.9	21.0

NOTE: Regions are census regions except for the Southwest, which borrows from the West and the Southeast and consists of Arizona, California, Colorado, New Mexico, and Texas. Northeast includes: ME, NH, VT, MA, RI, CT, NY, NJ, PA; Midwest includes: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS; Southeast includes: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK; West includes: MT, ID, WY, UT, NV, WA, OR, AK, and HI; Southwest includes: AZ, CA, CO, NM, and TX.

SOURCE: US decennial censuses, SF1 files, 1980–2000.

settlement patterns to unintended consequences of the accumulated tangle of US immigration laws and policies that were codified in the 1986 Immigration Reform and Control Act (IRCA) (Massey, Durand, and Malone 2002). This line of reasoning has two central tenets. First, the legalization by IRCA of the status of more than 2.3 million formerly undocumented migrant workers provided those migrants with the geographic mobility to explore labor markets in new destinations. Second, increased funding provided by IRCA for US border enforcement policies at well-established crossing points caused new migrants to cross farther east along the Mexico–US border and consequently into previously ignored regions of the Midwest and Southeast. Moreover, by effectively increasing the financial cost of what was previously a more routine transnational “commute,” such policies prompted many migrants to extend their stays in the United States to recoup their investment in crossing the border. Empirical research demonstrates that migrants who reside for longer periods in the United States are more likely to establish social ties, solidify employment arrangements, obtain legal status, and ulti-

mately sponsor and support additional migration (Massey et al. 1987; Massey 1990). Hence, migrants who became established in new receiving areas of the rural Southeast can now be expected to generate greater migration to that region through their social networks, norms of reciprocity toward family members and friends, and housing and financial assistance to new arrivals.

The urban out-migration thesis posits that rural Hispanic population growth represents internal migration away from traditional migrant-receiving cities by immigrants who prefer rural areas for their children and themselves. Much of this evidence is anecdotal, but it points to labor market saturation in cities like Los Angeles, Chicago, and Miami, particularly following the economic recession of the early 1990s and the IRCA amnesty. Immigrants have also sought to escape expensive and crowded housing, poor schools, and gang violence (Fennelly and Leitner 2002; Fennelly 2005; Suro and Singer 2002). Research by Hernández-León and Zúñiga (2000, 2003) documents how internal migrants apply their prior experience and resources acquired in traditional destinations to facilitate their own settlement in new areas as well as settlement of new international migrants.

A third explanation centers on the influence of corporate recruitment. Johnson-Webb (2002) and Krissman (2000) describe how some rural-based firms and industries with high turnover rates have sought to maintain necessary quotas of workers through active recruitment efforts and migrants' own social networks. Despite high turnover rates, the US Department of Labor usually does not classify employment in many rural-based industries as temporary. Moreover, such employment is generally not highly skilled, forcing employers to use recruitment and other alternatives to the H2A or H2B visa programs to contract foreign workers, the majority of whom are likely to be undocumented (Carlin 1999; Katz 1996a, 1996b; Smothers 1996; Taylor and Stein 1999). Corporate and other forms of recruitment have been identified in a variety of industries, including meat processing, carpet manufacturing, oil refining, and forestry, leading to increasing Hispanic representation in rural areas of destination that traditionally did not receive immigrants (Broadway 1994; Engstrom 2001; Hernández-León and Zúñiga 2000; Gouveia and Stull 1995; McDaniel and Casanova 2003).

### **Industrial restructuring and the demand for immigrant labor**

Subsumed within these explanations of Hispanic population growth is an assumption of increasing labor demand for particular types of jobs that we contend results from industrial restructuring in key rural industries, especially meat processing. An extensive literature documents global industrial restructuring and its impact on labor markets, employment stability, occupational mobility, and economic inequality (Belous 1989; Bernhardt et al.

2001; Danzinger and Gottschalk 1993; Freeman 1994; Smith 2001; Whitenner and McGranahan 2003). During the 1970s, many industries began facing growing international competition from producers in low-wage countries. Domestic firms responded to declining profitability with several strategies. They reduced employment levels, lowered wages and benefits, renegotiated or eliminated union contracts, and increasingly made use of nonunionized subcontractors (Bluestone and Harrison 1982). Some applied new technologies and became more capital-intensive and less labor-dependent. Others relocated production overseas or to nonmetropolitan areas with lower land and labor costs. Still others took advantage of tax incentives, subsidies, and other inducements that many localities began offering to tempt plants to locate within their tax districts.

Piore and others argue that in this process, the labor markets of developed societies have become increasingly bifurcated into "primary" and "secondary" sectors whereby stable, well-paying jobs with defined occupational mobility structures coexist with unstable, poorly paid, "dead-end" employment. Dual labor market theory posits that the character of jobs in the secondary sector and their role in the structure of developed societies lie at the heart of migration flows from less to more developed countries. Employment instability, seasonality, occupational immobility, and overall poor job quality of the secondary sector imply that firms needing to expand their labor forces face considerable obstacles to satisfy labor demand with domestic labor supply. Given the social context of employment, most native workers refuse to accept low-status jobs without monetary compensation that exceeds what is feasible in light of limited skill requirements for these jobs and extensive local and international competition faced by companies. Jobs are also embedded within occupational hierarchies that require earnings differentials for various occupational grades. Firms that raise wages for low-skilled employees must often do the same for all other employees to maintain an acceptable hierarchy, a practice most firms would resist (Piore 1979).

According to Piore, the solution to social and economic conflicts inherent in dual labor market firms is the employment of immigrant guest-workers whose social and economic orientation remains with their countries of origin instead of their host countries. Migrants thereby occupy a growing number of labor market niches that are unattractive to native-born workers. Reliance on migrant workers solves the quandary of flexible low-wage employment recruitment because their transnational status permits them to profit economically through the conversion of destination-country wages to home-country standards of living, and their social frame of reference in home countries ameliorates their unstable condition and low social status in destination countries.

Accordingly, grasping the processes undergirding changes in labor supply in rural areas requires an understanding of shifts in labor demand as

well as particular characteristics of jobs being created. In the case of Hispanic migrants in new rural destinations, this implies that transformations in local industries have altered the organization of production, generating jobs especially tailored to migrant populations. The meat processing industry is particularly illustrative of the impact of industrial restructuring on population change. Stagnant real wages, high turnover rates, and relatively high injury rates have been accompanied over the past two decades by a growing presence of foreign-born workers, many of whom arrived recently (Stanley 1994; Stull, Broadway, and Griffith 1995).

### **Restructuring of the meat processing industry**

Four central processes of industrial restructuring within the meat processing industry have fostered domestic and international Hispanic migration to rural areas that traditionally did not receive immigrants. Despite variation within the industry among beef, pork, and poultry producers, the path of restructuring has followed a fairly consistent sequence that yields similar consequences for Hispanic migration. First, changes in American consumption patterns have increased demand for convenience, triggering a sizable expansion of the industry's unskilled labor force. This has been accompanied in the last 50 years by changes in processing technology that have lowered the cost of all meats relative to other food products and of different meat products to each other. Second, growing industrial concentration of meat production in a handful of large and highly integrated firms has significantly altered the relationship between labor and management, weakening job stability and benefits and facilitating the recruitment of immigrant labor. Third, meat processing firms have increasingly sought to relocate plants in nonmetropolitan counties to reduce transportation costs and associated risks to livestock, and not coincidentally to decrease the likelihood of union organizing. This has reduced the attractiveness of these jobs for native workers and created a demand for labor that often cannot be met in rural areas, given prevailing wages. Fourth, the physical demands and work conditions of meat processing employment relative to other employment with comparable wages, particularly in labor-short rural areas, have fostered exceptionally high employee turnover rates that have helped to spawn labor recruitment practices focused on Hispanics, particularly immigrants.

### **Changes in the organization of production**

American food consumption patterns may be among the earliest causes of industrial restructuring within the meat processing industry. Throughout the 1950s, Americans, on a per capita basis, consumed three times as much beef and twice as much pork as they did poultry. Since then, technological



innovations and economies of scale in poultry production, such as integration of chicken raising and slaughtering operations and increased use of specialized processing technology, have reduced absolute and relative poultry prices, thereby bolstering demand (Barkema et al. 2001; Bugos 1992; MacDonald et al. 2000; Ollinger et al. 2000). From 1960 to 1982, the retail price of whole chickens declined in constant 1983 dollars from \$1.38 to \$0.71, while the price of comparably weighted beef increased from \$2.70 to \$4.86 (Ollinger et al. 2000).

In addition to declining prices, health considerations and the switch by consumers toward low-fat diets also prompted greater chicken consumption relative to other meat products. Between 1970 and 2000 per capita annual consumption of beef declined from 80 to 65 pounds while that of chicken almost doubled from 28 to 53 pounds (Putnam and Allshouse 1997). Real beef prices fell significantly after the mid-1980s as the sector adopted strategies and technologies similar to those of poultry production, but two decades of shifting relative prices helped to permanently alter Americans' eating habits. Thus, by the end of the 1990s, Americans per capita were consuming less beef, the same quantity of pork, and twice as much chicken and turkey compared with 1970. National employment figures reflect these trends. Between 1972 and 2001 employment in the beef and pork processing industry increased only modestly from 240,400 to 253,100, while employment in the poultry processing industry jumped from 106,600 to 258,200 (Bureau of Labor Statistics 2003).

The growing importance of poultry within the meat industry has direct implications for Hispanic employment in rural areas. Unlike beef processing, chicken production has always been located predominantly in rural areas outside traditional immigrant-receiving areas. In 1993, for instance, the four leading poultry-producing states were Alabama, Arkansas, Georgia, and North Carolina (Boyd and Watts 1994). As poultry prices dropped and competition for American consumers' protein budget heated up, other meat processing sectors that until the late 1970s were largely located in metropolitan areas began relocating processing plants in rural areas to reduce costs. Poultry industry growth and meat processing relocation to rural areas have clearly increased low-skilled labor demand in rural areas (Stanley 1994).

The growing domestic demand for cut and pre-prepared products has also affected labor requirements within the meat processing industry. As growing numbers of women entered the labor force in the 1960s, American consumers increasingly demanded fast and convenient food products. Beef, pork, and poultry firms began to supplement their slaughtering plants with production facilities that further processed meat. Table 2 illustrates how cut-up meat products changed from being a relatively minor share of all meat production in the early 1960s to becoming its dominant output by the 1990s. The poultry product-mix sold in American supermarkets in 1963,

**TABLE 2** Cut-up meat products as a percent of total shipments from meat processing plants, 1963–97

Year	Beef	Pork	Chicken	Turkey
1963	9.3	27.5	15.2	3.4
1972	15.5	33.2	29.6	16.7
1982	39.5	34.9	48.1	29.9
1992	56.2	52.4	78.2	55.1
1997	n/a	n/a	86.9	n/a

SOURCES: Tables 4.1, 4.2 in MacDonald et al. (2000) and Table 2.2 in Ollinger et al. (2000).

for example, consisted of 85 percent whole birds and 15 percent cut-up products; by 1997, that proportion had completely reversed.

In addition to cutting up meat products for different markets, many large pork and poultry plants also further process the meat by sorting, packaging, seasoning, and cooking it prior to shipment (Ollinger et al. 2000). These operations, in the context of extensive mechanization and increased plant productivity, generated significant demand for low-skilled manual labor to perform jobs that are generally physically tiring, repetitive, and prone to injury.

Another factor affecting meat industry production has been the segmentation of the consumer market and expansion into international markets. The growing predominance of pre-cut and boxed meat allowed beef and pork producers to more conveniently ship their products overseas. Increased preference for cut-up poultry products by American consumers, on the other hand, has allowed poultry producers to segment domestic and international production. In some cases, this is conveniently done according to consumer preference, with breasts and other white meat shipped for domestic consumption and legs and other dark meat shipped for export to China, Mexico, and Russia. Table 3 illustrates the growth of meat exports beginning in the 1970s. Poultry exports, which for decades rarely exceeded 5 percent of all production, increased noticeably in the 1970s and even more sharply in the late 1980s. Thus, while US per capita red meat consumption has been declining, a growing national population, greater public health

**TABLE 3** US meat exports, 1970–2000

Year	(millions of pounds)		
	Beef	Pork	Chicken
1970	40	83	94
1980	175	252	567
1990	1,006	243	1,143
2000	2,328	1,167	5,548

SOURCE: Putnam and Allshouse (1997).



concerns, and rising exports have contributed to burgeoning demand for pork and poultry while maintaining a stable demand for beef. Accordingly, employment in red meat processing has remained unchanged for 30 years, while employment in poultry processing grew by 150 percent over the same period and now exceeds the former (US Department of Labor 1972–2001).

### Industrial concentration

In response to rising competition and changing consumption patterns, meat processors gradually shifted production to larger plants designed to slaughter individual species, thereby increasing profitability through economies of scale and specialization. Poultry processing operations, for example, began to integrate vertically in the 1950s by contracting with livestock growers for specific sizes of animals at set prices and providing growers with young livestock, feed, vitamins, and other elements necessary for raising them. Other meat processing sectors engaged in similar practices over different time periods with comparable outcomes. Thus, while increasing their profitability, vertically integrated firms could also lower consumer prices, which declined in real terms between 1960 and 1997 by roughly 55 percent for poultry and 35 percent for beef (Ollinger et al. 2000).

As smaller producers struggled unsuccessfully to compete within this increasingly competitive sector, plant consolidation produced an industry dominated by few firms using large processing plants (MacDonald et al. 2000; Martinez et al. 1997). Table 4 illustrates the growing importance for meat production of plants with 400 or more employees. By the end of the 1990s, large plants accounted for most of the meat processed in the United States.

**TABLE 4 Measures of consolidation and concentration in meat processing, 1963–97**

Year	Percent of total US shipment value produced in plants with 400 or more employees				Percent of total US shipment value produced by the four largest US firms			
	Beef	Pork	Chicken	Turkey	Beef	Pork	Chicken	Turkey
1963	31	66	n/a	n/a	26	33	14	23
1967	29	63	29	16	26	30	23	28
1972	32	62	34	15	30	32	18	41
1977	37	76	45	29	25	31	22	41
1982	51	76	65	35	44	31	32	40
1987	58	72	76	64	58	30	42	38
1992	72	86	88	83	71	43	41	45
1997	74	88	90	85	80	54	47	48

NOTE: In 1998, the four largest firms were: *Beef*: IBP, ConAgra Beef, Excel (Cargill), and Farmland National Beef Package; *Pork*: Smithfield, ConAgra (Swift), IBP, and Cargill (Excel); *Broilers (Chicken)*: Tyson Foods, Gold Kist, Purdue Farms, and Pilgrim's Pride; *Turkeys*: Jennie-O, Butterball (ConAgra), Wampler, and Cargill (Heffernan et al. 1999).

SOURCE: Tables 3.1, 3.2, and 3.4 in MacDonald et al. (2000).

The table also shows that during this 35-year period, the “four-firm concentration ratio,” representing the proportion of total production controlled by the four largest firms, increased to the point where four firms accounted for roughly 50 percent of US poultry and pork production and 80 percent of beef production by the late 1990s.

### Geographic relocation

In conjunction with the processes discussed above, geographic relocation to rural areas became a central strategy to reduce transportation costs, ensure steady supplies of animals, and maintain high levels of plant use year-round (Drabenstott et al. 1999). Processing plants located in rural areas are also less likely to encounter union organizing, which is more prevalent in urban areas (Broadway 1995; Moody 1988). Rural communities desperate for jobs and local tax revenue typically offer a range of economic incentives and less stringent environmental restrictions to induce firms to relocate (Broadway 1994).

Rural relocation varies by meat processing sector. Chicken production has always been established in rural areas, especially in the Southeastern United States. Beef processing plants, on the other hand, have gradually relocated to large feedlots where cattle are raised, notably in Colorado, Kansas, Nebraska, Oklahoma, and Texas (Broadway 1995; MacDonald et al. 2000). Hog processing plants have also relocated to nontraditional regions outside the Midwest, exploiting lower land and labor costs in rural areas of the West, Southwest, and Southeast (Drabenstott et al. 1999).

Table 5 reports the location of meat processing employment by region and metropolitan status in 1981 and 2000. Two trends are worth highlighting. First, meat processing production has shifted in all regions of the country from metropolitan to nonmetropolitan counties, with the exception of the Northeast, which has relatively few meat processing facilities and whose total share of the meat processing workforce declined during this period. Differing definitions of nonmetropolitan county aside, these data illustrate the historical transition of meat processing from an urban- to a rural-based occupation, with a sizable portion of the transition occurring in just over two decades. The shift from urban to rural labor markets is particularly remarkable given the large increases in the numbers of persons employed in this industry. In the Southeast, for example, the proportion of meat processing production based in nonmetro counties increased from 66 percent to 76 percent during a period when the number of employees in the industry almost doubled. The total number of meat processing employees in rural areas doubled from 147,000 (46 percent of 319,000) to 294,000 (60 percent of 491,000) during the period. Moreover, national population growth did not alleviate predictable labor market pressures. Many nonmetro coun-

**TABLE 5** Location of meat processing employment by region and metropolitan status, 1981 and 2000

Region	1981		2000		1981–2000
	Number of employees	Percent working in non-metropolitan counties	Number of employees	Percent working in non-metropolitan counties	Percent change in number of employees
Northeast	31,882	14	26,745	13	-16.1
Midwest	117,417	45	162,370	58	38.3
Southeast	115,856	66	225,026	76	94.2
West	9,262	30	12,207	51	31.8
Southwest	44,194	27	63,785	35	44.3
Total	319,336	46	490,621	60	53.6

SOURCE: Enhanced County Business Patterns data, 1981 and 2000.

ties in the Midwest and Great Plains have lost population throughout the past 50 years (Rathge and Highman 1998), and population growth in the nonmetro Southeast and West occurred within the context of growth in manufacturing, services, retirement, and recreation sectors that placed their own demands on local labor markets.

All of these circumstances—changing consumer preferences toward more convenient food choices, industry consolidation and concentration, and relocation to rural areas—contributed to a growing demand for an alternative supply of low-skilled workers willing to accept relatively unattractive work. Moreover, vertical integration, large-plant development, and the effective de-skilling of previously skilled butchering into unskilled, repetitive, and hazardous work have all exacerbated employee turnover rates, facilitating immigrant recruitment.

### Work conditions

Several connected transformations, particularly de-unionization and de-skilling, have affected work conditions in the meat processing industry in a manner that has had direct implications for its racial and ethnic composition. Historically, meat processing jobs and especially meat packing offered stable and relatively well-paid jobs for those with little education. Faced with mounting competition in the late 1970s, however, meat processing firms with unionized beef and pork processing plants in the Midwest began demanding that workers accept wages comparable to those of nonunion plants. Following an extended series of strikes and work stoppages throughout the 1980s, hourly wages and rates of unionization declined significantly (Bjerklie 1995). In contrast, poultry processing firms traditionally based in the Southeast had rarely

faced significant union organizing, and real wages in that industry have remained unchanged for roughly three decades (Ollinger et al. 2000).

At the same time, meat processing as an occupation has become almost entirely de-skilled. Conventional labor economics theory posits that greater technological innovation by firms would lead to increased skill requirements for their workers, but this has not been the case for the meat processing industry. A formerly urban, unionized, and semiskilled workforce employed in production plants, supermarkets, and butcher shops in the 1950s was transformed into one with rural, mostly nonunion, and unskilled workers concentrated at the industrial processing end of the meat production chain by the end of the 1980s (Skaggs 1986; Stanley 1994; Stull et al. 1995). Employment that previously required butchering skills and some degree of craftsmanship became routinized and repetitive, as once relatively small plants processing many types of livestock were replaced by much larger plants often specializing in specific livestock breeds. A recent analysis of nine broad industrial sectors (e.g., other agricultural processing, nondurable manufacturing, mining) between 1972 and 1992 found that meat processing was the only industry that experienced a decline in its ratio of skilled to unskilled workers (Lee and Schluter 1999; Schluter and Lee 2002).

More broadly, even though meat processing wages remain high compared to low-skilled employment in other industrial sectors, they entail relatively unattractive working conditions for those with employment alternatives. A cursory review of website data on injury rates for full-time workers from the Bureau of Labor Statistics provides support for ethnographic studies and popular accounts of meat processing as a hazardous occupation (Bjerklie 1995; Fink 1998; Striffler 2002; Stull 1994; Sun and Escobar 1999). Meat processing plants are necessarily dark, wet, and noisy—conditions most workers find unpleasant. Moreover, while plants reap efficiencies by locating in rural areas near livestock production, employees in these plants have more difficulty finding convenient housing, public services, and retail stores, and must therefore undertake longer, more expensive, and occasionally more hazardous commutes. Not surprisingly, large, rural-based processing plants have difficulty filling employment slots. Estimates of annual employee turnover in the meat processing industry range from 60 to 140 percent (Grey 1999; Macguire 1993) or in some cases significantly higher (NIOSH 1989). Hence, although meat processing is situated within a declining manufacturing sector (Griffith 1995), changes in the organization of production, industrial concentration, plant relocation, and relatively unattractive working conditions have increased demand for low-skilled, often foreign-born Hispanic workers.

Table 6 presents several key socioeconomic indicators for the meat processing labor force by race and ethnicity for 1980–2000. During these two decades, the non-Hispanic white proportion of its workforce declined from 74 percent to under 50 percent, while its Hispanic proportion increased from under 10 percent to almost 30 percent and also became overwhelmingly

**TABLE 6 Socioeconomic characteristics of the meat processing labor force by race and ethnicity, 1980–2000**

Characteristics	Hispanic	Non-Hispanic white	Non-Hispanic black	Other	All workers
Ethnic composition					
1980	8.5	73.6	16.3	1.6	16,239
1990	13.4	66.4	16.9	3.3	17,139
2000	28.5	48.6	18.3	4.5	22,556
Percent foreign born					
1980	49.7	4.0	1.4	45.7	
1990	60.9	2.5	1.0	59.9	
2000	82.0	3.1	1.9	61.8	
Percent with less than high school diploma					
1980	65.1	29.8	42.9	40.3	
1990	60.8	17.1	21.8	35.7	
2000	62.7	12.5	14.9	31.8	
Mean annual wage income (constant 2000 dollars)					
1980	26,070	30,674	21,151	24,600	
1990	20,979	27,348	18,592	21,918	
2000	20,807	30,286	20,517	24,008	

SOURCE: Integrated Public Use Micro Sample (IPUMS) data, 1980–2000.

foreign-born, 82 percent, by 2000.<sup>1</sup> A similar pattern is evident for the small proportion of mostly Asians in the “Other” category, highlighting the importance of an immigrant labor force for the industry.

Moreover, while the educational background of non-Hispanic whites and blacks improved markedly between 1980 and 2000, the proportion of Hispanics with less than a high school education remained unchanged at about 60 percent. These differences in human capital characteristics by race and ethnicity also correspond to annual income differences, with incomes of Hispanics dropping more precipitously between 1980 and 1990 and not subsequently recovering between 1990 and 2000 as compared with all other groups. Together, these changes highlight a dilution over time of native Hispanic education gains as a result of the considerable influx of less educated foreign-born Hispanics and the negative impact of that influx on wages, underscoring increased demand for low-skilled Hispanic workers in the industry.

Further examination of the characteristics of the foreign-born population in the meat processing industry illustrates the peculiarities of the Hispanic labor force. Table 7 shows that at almost any time during this period, roughly half of all foreign-born Hispanic workers had arrived in the United States within the previous ten years. Moreover, the percentage lacking a high school diploma—more than twice that of foreign-born non-Hispanic

**TABLE 7 Socioeconomic characteristics of the foreign-born meat processing labor force by race and ethnicity, 1980–2000**

Characteristics	Hispanic	Non-Hispanic white	Non-Hispanic black	Other
Percent recent arrival (within 10 years)				
1980	49.9	26.1	42.1	74.4
1990	55.0	17.3	70.4	67.1
2000	55.8	43.0	53.2	45.3
Percent with less than high school diploma				
1980	76.8	48.4	36.8	40.4
1990	71.9	31.4	25.9	44.9
2000	69.4	25.1	27.3	40.9

SOURCE: Integrated Public Use Micro Sample (IPUMS) data, 1980–2000.

whites and blacks—deviates only modestly from the percentage for all Hispanics shown in Table 6. These data suggest that among all Hispanics, meat processing employment is increasingly relegated to the foreign-born with little education and little US experience.

### Changing immigrant destinations and industrial structure in nonmetro counties

To better assess the link between industrial restructuring of the meat processing industry and Hispanic population growth in rural America, we analyze decennial Census and County Business Patterns (CBP) data to model change in the proportion of Hispanics living in nonmetro counties from 1980 to 1990 and from 1990 to 2000. We use the nonmetro county as the unit of analysis. The main expectation is that, controlling for other determinants of population growth, changes in the industrial representation of meat processing will be a driving force of Hispanic growth in nonmetro counties and that its effect will become more relevant in more recent periods. Means and standard deviations for all variables are shown in Table 8.

The dependent variable is the absolute change in the Hispanic proportion of the nonmetro county total population over each decade. On average, Hispanic representation in nonmetro counties grew by half a percent from 1980 to 1990, a rate that tripled to 1.6 percent between 1990 and 2000. These values, which average across all 2,391 counties, mask a great deal of variation. Recent studies of rural Hispanics, for example, have included typologies that distinguish among counties with relatively minor, established, and sizable rapidly growing Hispanic populations (Kandel and Cromartie 2004; Kandel and Parrado forthcoming). Because these census

**TABLE 8 Model for analyzing change in the Hispanic proportion of the nonmetro country population: Means and standard deviations of variables**

	1980–90		1990–2000	
	Mean	S.D.	Mean	S.D.
<b>Dependent variable</b>				
Change in Hispanic proportion of nonmetro county population	0.005	(0.018)	0.016	(0.028)
<b>Independent variables</b>				
Change over decade in US proportion employed in				
Agriculture	−0.049	(0.046)	−0.037	(0.036)
Construction	−0.014	(0.025)	0.009	(0.018)
Durable goods manufacturing	−0.019	(0.039)	−0.012	(0.039)
Nondurable goods manufacturing (except meat processing)	−0.027	(0.048)	−0.014	(0.046)
Meat processing	0.005	(0.033)	0.002	(0.026)
Transportation	−0.003	(0.015)	0.003	(0.013)
Communication, utilities	−0.005	(0.012)	0.005	(0.011)
Wholesale and retail trade	−0.016	(0.030)	−0.049	(0.028)
Services (reference)	0.129	(0.040)	0.092	(0.037)
Public administration, FIRE (finance, insurance, real estate)	0.000	(0.011)	0.002	(0.010)
Nonmetro county–level economic indicators: start of decade				
Poverty rate (proportion below poverty level)	0.171	(0.074)	0.181	(0.080)
Male unemployment rate (proportion unemployed)	0.069	(0.041)	0.068	(0.037)
Mean household wage income (\$10,000)	1.496	(0.258)	2.541	(0.460)
ERS Natural Amenities Scale value <sup>a</sup>	3.465	(1.021)	3.465	(1.021)
Nonmetro county population status: start of decade				
Total population ('000)	22.730	(21.321)	23.646	(23.536)
Population growth rate across decade	1.014	(0.149)	1.093	(0.150)
Proportion Hispanic	0.038	(0.107)	0.043	(0.115)
Proportion adjacent to metro county	0.387	(0.487)	0.412	(0.492)
Proportion not adjacent to metro county (reference)	0.613	(0.487)	0.540	(0.498)
Proportion living in				
Northeast	0.042	(0.200)	0.042	(0.200)
Midwest	0.359	(0.480)	0.359	(0.480)
Southeast	0.365	(0.481)	0.365	(0.481)
West	0.097	(0.297)	0.097	(0.297)
Southwest (reference)	0.137	(0.344)	0.137	(0.344)
Number of cases (nonmetro counties)	2,391		2,391	

<sup>a</sup>See endnote 2.

NOTES: In order to follow nonmetro counties since 1980, we use the 1983 definition of nonmetro, which yields a slightly higher number of nonmetro counties than the 1993 definition. For states included in various US regions see note to Table 1.

SOURCE: US decennial censuses, SF3 Files, 1970–2000; US Census Bureau's annual County Business Patterns data, 1981, 1990, 2000; Economic Research Service–US Department of Agriculture Natural Amenities Scale, 1999.



data do not distinguish between foreign- and native-born Hispanics, we focus our analysis on Hispanic population growth rather than Hispanic immigrant population growth.

Independent variables include controls for change in US industrial sector employment and county-level characteristics assumed (i.e., in setting up the model) to affect population growth. Industrial sector employment follows categories provided by Census SF3 data and includes ten sectors, with manufacturing broken into durable and nondurable goods manufacturing, and nondurable goods manufacturing further divided by extracting our key subsector of interest, meat processing (roughly 7 percent of that sector's employment). We did so by computing the ratio of meat processing to nondurable goods manufacturing employment using CBP data for 1981 (a proxy for 1980), 1990, and 2000 and applying this ratio to decennial Census data for those years. Industrial sector variables were computed in a manner similar to that used for the dependent variable and represent the change over each decade in the proportion of total employment within that sector. Sectoral employment proportions in any given year and their change over the decade necessarily sum to one and zero, respectively.

Controls for county-level economic conditions at the beginning of each decade include mean household wage income, proportion of county population with incomes below poverty, and male unemployment rate. These characteristics invariably change over the course of the decade, and considerably for some counties, but we anticipate they sufficiently capture the variety of employment and economic conditions that help predict population inflows or outflows. To control for non-employment-related factors attracting in-migrants to rural areas, such as climate, topography, and scenic beauty, we include in each model a Natural Amenities Scale value<sup>2</sup> to capture physiographic variation associated with retirement, second home, telecommuting, and tourist destinations that have spurred economic development in many nonmetro counties (McGranahan 1999). This value has not been recalibrated for periods earlier than 1999, but the environmental features it measures are unlikely to have changed significantly over the two-decade span of our analysis.

To control for county population conditions, we include measures of total population, decadal population growth rate, and proportion Hispanic at the beginning of the decade. The last measure is expected to capture population momentum arising from social networks that foster settlement in new destinations. To account for proximity to urban employment centers, we include indicators for three categories of metropolitan status: metropolitan counties (the omitted category) and nonmetropolitan counties either adjacent or not adjacent to metropolitan counties.<sup>3</sup> Because population change over a decade may prompt counties to be reclassified from nonmetropolitan to metropolitan, or vice versa, we use the initial period's 1980 classification through-

out the analysis. Finally, we include region to control for the aforementioned changes in the geographic pattern of Hispanic population since 1980.<sup>4</sup>

Key elements of rural economic restructuring over the course of two decades can be gleaned from mean values shown in Table 8. During the 1980s, which began and ended with economic recessions and ushered in an era of layoffs, corporate downsizing, and growing income inequality, employment share in all industrial sectors fell except for high-end services, which increased significantly (Harrison and Bluestone 1990). Economic and employment growth during the 1990s was characterized by the continuing decline of employment share in agriculture and manufacturing and employment growth in almost all other sectors. Declining employment share in manufacturing sectors reflects both its declining importance and the movement of much manufacturing employment to the secondary sector, characterized by diminished wages and benefits and greater employment instability.

Table 9 presents results from ordinary least squares regression models estimated separately for 1980–90 and 1990–2000. Boldface coefficients indicate statistically significant differences in parameter estimates across decades. Results for the effect of industrial structure on Hispanic growth suggest three main trends. First, estimates confirm the relative importance of certain sectors, namely agriculture, durable and nondurable goods manufacturing, and meat processing, in driving Hispanic population growth in rural areas. Changes in the employment representation of these sectors are positively associated with growing Hispanic representation in rural counties, and the effect of such changes is present across both decades.

Second, differences in parameter estimates support the idea of the growing importance of the meat processing industry in driving Hispanic population flows. Across decades, the effect of changes in the proportion employed in meat processing in the US economy on changes in the Hispanic proportion of nonmetro county population grew from 0.059 to 0.261, a statistically significant increase. Finally, results also highlight the growing importance of change in other nondurable goods manufacturing industries, including apparel, furniture, textiles, tobacco, and other sectors documented in the literature, in contributing to Hispanic population growth in nonmetro counties. Parameter estimates for change in nondurable goods manufacturing increased from 0.032 to 0.170 across decades, a statistically significant difference.

Results for the control variables reinforce the validity of our model specification. Immigrants and migrant workers are relatively mobile populations who are attracted to places with employment opportunities, and our results show a consistent negative relationship between Hispanic population growth and unemployment rates and poverty. Moreover, the former relationship becomes stronger across decades, even as average unemployment rates at the start of each decade increased. Likewise, the negative and significant coefficients of the natural amenities scale on Hispanic popula-

**TABLE 9 Results of analyzing change in the Hispanic proportion of the nonmetro county population: OLS regression estimates**

	1980–90		1990–2000	
	Coef- ficient	S.E.	Coef- ficient	S.E.
<b>Intercept</b>	0.027**	(0.005)	0.023**	(0.007)
<b>Change over decade in US proportion employed in</b>				
Agriculture	<b>0.035**</b>	(0.010)	<b>0.123**</b>	(0.020)
Construction	0.035**	(0.015)	0.020	(0.031)
Durable goods manufacturing	<b>0.032**</b>	(0.011)	<b>0.114**</b>	(0.019)
Nondurable goods manufacturing	<b>0.032**</b>	(0.013)	<b>0.170**</b>	(0.019)
Meat processing	<b>0.059**</b>	(0.015)	<b>0.261**</b>	(0.025)
Transportation	-0.032	(0.022)	0.077	(0.043)
Communication, utilities	-0.010	(0.027)	-0.117**	(0.049)
Wholesale and retail trade	-0.027**	(0.013)	0.037	(0.022)
Public administration	-0.066**	(0.030)	-0.141**	(0.050)
<b>County-level economic indicators— start of decade</b>				
Poverty rate (percent below)	-0.015**	(0.007)	-0.005	(0.012)
Male unemployment rate	<b>-0.048**</b>	(0.008)	<b>-0.145**</b>	(0.018)
Mean household wage income (\$10,000)	0.001	(0.002)	-0.001	(0.002)
Amenity Scale Value	-0.001**	(0.000)	-0.002**	(0.001)
<b>County population status</b>				
Total population ('000) (start of decade)	0.000	(0.000)	0.000**	(0.000)
Population growth rate	0.004	(0.003)	0.030**	(0.004)
Percent Hispanic (start of decade)	0.026**	(0.004)	0.028**	(0.006)
Adjacent to metro county	0.001	(0.001)	-0.001	(0.001)
<b>National region</b>				
Northeast	<b>-0.017**</b>	(0.002)	<b>-0.026**</b>	(0.003)
Midwest	-0.020**	(0.002)	-0.019**	(0.002)
Southeast	<b>-0.021**</b>	(0.001)	<b>-0.012**</b>	(0.002)
West	-0.011**	(0.002)	-0.006**	(0.002)
Adjusted R square	0.280		0.204	
Number of cases	2,391		2,391	

\*\*p &lt; 0.01.

tion change indicate that Hispanics were more likely to migrate to areas with low levels of natural amenities despite research demonstrating a strong positive relationship between geophysical amenities and total nonmetro population growth (McGranahan 1999). This result is consistent with our focus on the meat processing industry, which has located plants in rural agriculturally based areas in the Midwest and Southeast that often rank

low on natural amenities. At the same time, higher percentages of Hispanic population at the beginning of the decade facilitate growth in nonmetro Hispanic representation, presumably the result of social networks. Total nonmetro population growth also drove nonmetro Hispanic population growth and may be capturing total employment growth independent of changes in relative industry sector share.

Particularly interesting is the variation in the effect of region on Hispanic growth across decades. While negative coefficients for the four regional indicators in the model demonstrate the relative dominance of the reference category of the Southwest—where roughly half of all nonmetro Hispanics reside (but only 14 percent of the total nonmetro population)—the effect of location in the Northeast and Southeast changes considerably over time. Between the 1980s and 1990s counties in the Northeast became less likely to increase their Hispanic representation, with the parameter estimate decreasing from  $-0.017$  to  $-0.026$ , a statistically significant difference. In contrast, the Southeast experienced elevated nonmetro Hispanic population growth during the 1990s. Across decades, the negative effect of being located in the Southeast on change in Hispanic proportion decreased from  $-0.021$  to  $-0.012$ , also statistically significant. Results for the Midwest and West indicator variables, while not statistically significant across periods, are consistent with the experience of geographic dispersion of nonmetro Hispanics outside the Southwest.

## Discussion

Several factors have fostered extraordinary Hispanic population growth in the United States in the past two decades, particularly in nonmetropolitan counties outside traditional migrant-receiving areas. These include changes in border enforcement policies, unfavorable employment and living conditions in traditional and urban migrant destinations, and active recruitment by firms seeking to replenish a continuously depleted supply of low-skilled labor. Although just a tenth of all Hispanics live in nonmetro counties as of 2000, their rapid growth, which exceeded 100 percent in about half of all US states over the past decade, has profound implications for rural areas. Numerous studies of Hispanic settlement patterns indicate that high growth rates recorded for earlier periods tend to continue, and in some cases growth accelerates. Under such conditions, upper limits to Hispanic population growth in rural areas may be determined in large part by characteristics of local labor markets.

We have presented an explanation of increasing Hispanic representation in rural areas that emphasized the role of industrial restructuring, especially in the meat processing industry. Changes in American meat consumption patterns, combined with new technological innovations in processing, altered relative prices among meat products and elevated com-

petition between producers. In response, the industry became increasingly concentrated among several large producers whose use of technology, growing processing plant sizes, and propensity for rural locations yielded greater economies of scale. Yet, in spite of the industry's rapid adoption of labor-saving mechanization, demand for value-added production from a growing US population, fast-food marketing, and considerable export expansion all resulted in increased demands for labor.

A key outcome of this industrial transformation has been the growing Hispanic presence in the meat processing labor force. Immigrant labor in food processing follows a pattern found in crop agricultural and other non-durable and durable goods manufacturing sectors. As educational attainment for the general population rises, and other employment options reduce the relative attraction of manufacturing sector employment, US firms that do not or cannot locate production overseas may adopt strategies to create similar economic conditions in the United States through cost-cutting measures. A central strategy is the use of low-cost labor.

As we demonstrated, Hispanic population growth is responsive to the industrial transformation affecting rural counties. This is especially clear in the case of beef and poultry industries that, through concentration, consolidation, and relocation, have remained labor-intensive enterprises. The new manufacturing jobs created by these sectors offer relatively higher wages than other sectors employing low-skilled labor, but poor work conditions and isolated locations limit their attractiveness to domestic workers. In certain areas of the country, growing Hispanic representation in this industry results from, and rapid Hispanic population growth corresponds to, high meat processing output (Kandel and Parrado 2004).

In addition, when we examine this phenomenon at a broader scale and model industrial transformation for all US nonmetro counties, our regression results are consistent with our hypothesis that Hispanics are becoming more responsive to industrial transformation over time. These results occur for three industries associated with industrial and labor force transformations in nonmetro counties: agriculture, durable goods manufacturing, and nondurable goods manufacturing. Over the past three decades, these sectors have exhibited relative declines in overall employment and increasingly consist of jobs offering little occupational stability and mobility. Such an outcome is consistent with a segmented labor market interpretation of Hispanic employment occurring in industries and occupations that native residents increasingly shun.

Our findings generate two sets of policy implications. First, industrial transformation as described here implies employment in industries with limited prospects for occupational mobility. In light of rapid Hispanic population growth generally and particularly as Hispanics represent a growing proportion of US children, such trends portend substantial long-term impacts for increases in social and economic inequality. Second, on a more immedi-

ate time horizon, industrial transformation may signal the growth of local and regional pockets of Hispanic enclaves in rural counties that may be unprepared to address the social service needs of these populations.

Several caveats apply to our quantitative results. First, potential aggregation biases in interpreting overall migration flows mean that our results should be interpreted as the behavior of the average or typical migrant. Yet Hispanic arrivals in new rural destinations are heterogeneous, and there is a great deal of variation in their characteristics and behaviors. Moreover, while our model results do not prove that industrial structural change causes Hispanic population growth, they are clearly consistent with such a causal relationship. They support our thesis that a restructured food processing industry, employing large numbers of workers throughout counties in the Midwest, West, and Southeast, increasingly relies upon immigrant labor. Given the cumulative nature of the process of international migration, its fairly consistent path to permanent settlement, and current immigration policies favoring family member sponsorship and unification, the results imply continued growth of the nonmetro Hispanic population.

Our findings also have implications for the debate on the effect of immigration on native workers' employment. Contemporary concerns over native-worker unemployment and the "jobless recovery" currently underway have been exacerbated by the fact that many new jobs added to the US economy in recent years have been taken by immigrants. These trends have been noted by social scientists and by the public at large, fueling indignation and resentment toward immigrant workers. Such sentiments are tenuously founded on facts. Our findings contribute to a large literature that suggests that immigrants are not substitutes for native workers. Instead, they appear to be taking unstable, unpleasant, and often low-paying jobs in declining sectors of the economy that better-educated native residents find unattractive. Greater attention to the types of jobs the US economy is creating, and to how such jobs might influence the demand for immigrant labor, may prove more illuminating than a focus on the ethnic and foreign-born composition of recently created jobs.

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## Notes

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May 2003. Opinions expressed herein do not reflect those of the Economic Research Service or the US Department of Agriculture.

1 These data are for all meat processing workers in both metro and nonmetro counties. Data from the Current Population Survey (not shown here) indicate that the Hispanic proportion of the nonmetro meat processing labor force increased even more substantially, from 27 percent to 64 percent, during this pe-



riod. Moreover, because the CPS tends to undercount Hispanics, these proportions are actually conservative.

2 The Natural Amenities Scale is a composite measure, compiled by the Economic Research Service–US Department of Agriculture, of six indicators of climate, topography, and water area characteristics reflecting environmental qualities most people prefer. These characteristics (and their measures in parentheses) include warm winters (average January temperature), winter sun (average January days of sun), temperate summers (winter–summer temperature gap), summer humidity (average July humidity), topographic variation (topography scale), and water area (water area as proportion of total county area). Because each item has different scales, the amenity measures are standardized so each has a mean of zero and a standard deviation of one. The combined scale is created by summing those standardized measures. (For more information on this scale, see McGranahan 1999: 2–9.)

3 “Nonmetropolitan” areas follow the Office of Management and Budget definition

based upon population and commuting patterns. A metropolitan area consists of one or more core counties with an urbanized area of 50,000 or more inhabitants, together with surrounding counties with metropolitan characteristics with respect to population and commuting data. Nonmetropolitan areas consist of all other counties and contain only open country, small towns, or small cities. Hence, counties can be grouped according to whether they are metropolitan or nonmetropolitan. The term “nonmetropolitan” is distinct from “rural,” which despite its frequent general usage also refers to a Census Bureau definition for places with fewer than 2,500 inhabitants.

4 Correlation matrixes indicated positive correlation values above 0.4 between poverty and unemployment, and between amenities and the Southwest and West, as well as negative values between poverty and income, and between amenities and the Midwest. Because removing covariates had little impact on model results, we retain all variables for the sake of analytic comprehensiveness.

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