International Journal of Comparative Sociology

http://cos.sagepub.com/

The Globalization of Economic Production and International Migration : An Empirical Analysis of Undocumented Mexican Migration to the United States

Matthew Sanderson and Rebecca Utz

International Journal of Comparative Sociology 2009 50: 137
DOI: 10.1177/0020715208101596

The online version of this article can be found at:
http://cos.sagepub.com/content/50/2/137

Published by:
SAGE
http://www.sagepublications.com

IJCS

International Journal of Comparative Sociology

http://cos.sagepub.com
Los Angeles, London, New Delhi, Singapore and Washington DC
Vol 50(2): 137–154
DOI: 10.1177/0020715208101596

The Globalization of Economic Production and International Migration

An Empirical Analysis of Undocumented Mexican Migration to the United States

Matthew Sanderson
Lehigh University, USA

Rebecca Utz
University of Utah, USA

Abstract

This article empirically investigates the relationship between the globalization of economic production and international migration by focusing on the case of Mexico. We describe undocumented Mexican migration to the US in the context of global economic restructuring and review previous studies. We then apply a multilevel modeling technique to retrospective data gathered by the Mexican Migration Project in order to test whether the density of manufacturing operations in Mexican communities explains variation in individuals' odds of making an undocumented migration to the US in the previous five years. The analysis indicates that higher densities of manufacturing operations are associated with lower odds of undocumented migration, net of controls. Moreover, this effect is stronger in Mexican communities located in northern border states. We discuss the findings in the context of previous research and elaborate on potential future research directions.

Key words: globalization • international migration • Mexican Migrant Project

INTRODUCTION

Movements of capital and labor across national boundaries are integral to the historical process of globalization. Over the past 30 years in particular, globalization has been characterized by both the geographic dispersal of economic production into less-developed countries (LDCs) (Dicken, 2006; Held et al., 1999) and an increase in the prevalence of international migration from LDCs (Castles and Miller, 2003). Globalization is contended to influence the

prevalence of international migration from LDCs (UN, 2006; UNCTAD, 1996; WB, 2006). Yet there is relatively little empirical evidence of this relationship (for exceptions, see Sanderson and Kentor, 2008, forthcoming).

Mexico provides an opportunity to investigate this relationship at a national level. Economic restructuring in Mexico has resulted in substantial inflows of foreign direct investment and dramatic increases in manufacturing operations. The growth of manufacturing operations, much of which is oriented towards export markets, has generated large internal flows of migrants to manufacturing centers throughout Mexico, but particularly to communities in the northern border states. There is continuing debate, however, over whether rising levels of manufacturing production in Mexican communities are associated with increases or decreases in the prevalence of Mexican migration to the US.

This article addresses the broader question of how global economic restructuring is related to migration flows by empirically examining undocumented Mexican migration to the United States. We focus on undocumented Mexican migration because it represents the largest share of Mexican migration to the US (Passel, 2006). However, disaggregating the study of migration is also justified on empirical grounds, as previous research reports qualitative differences between documented and undocumented Mexican migration to the US (Massey et al., 2002).

We begin by describing undocumented Mexican immigration to the US in the context of economic restructuring. Next, we review previous studies. We then conduct an empirical analysis to assess the relationship between the density of manufacturing operations and the prevalence of undocumented Mexican migration to the US. Finally, we discuss the findings in the context of previous research in this area and suggest opportunities for future research.

UNDOCUMENTED MEXICAN MIGRATION IN THE CONTEXT OF ECONOMIC RESTRUCTURING

Migration from Mexico to the US is the largest sustained flow of migration in the world (Castles and Miller, 2003; Massey et al., 2005). Undocumented migration grew after the cancellation of the Bracero Program in 1964 and the subsequent implementation of policies that criminalized a large portion of Mexican migration (Massey et al., 2002). Undocumented Mexican migration continued to increase throughout the 1990s, climaxed in 1999, and declined slightly after 2001, although it remains above the early 1990s levels (Passel and Suro, 2005). Between 2001 and 2005, an estimated 1.5 million undocumented Mexicans entered the US. Undocumented migration now dominates the flow of Mexican migrants to the US, representing an estimated 80–5 percent of the total flow, and Mexicans are the largest contingent of undocumented migrants in the US, comprising 56 percent, or 6.2 million, of the estimated 11 million undocumented migrants (Passel, 2006).

Although Mexican migration to the US has always been influenced by economic and political ties between the two countries (Massey, 1987; Massey et al., 2002), the majority of undocumented migrants currently in the US entered after the implementation of the North American Free Trade Agreement (NAFTA) in 1994 (Passel, 2006). This has raised questions about the impact of economic restructuring on Mexican migration patterns.

Economic restructuring in Mexico, however, predates NAFTA. From 1980–91, Mexico underwent a series of economic restructuring initiatives, including 13 structural adjustment loans from the World Bank and six agreements with the International Monetary Fund (McMichael, 2004). World Bank and IMF initiatives transformed the Mexican economy from one based upon an import substitution platform to one based upon an export-oriented platform of industrialization (Massey et al., 2002; Portes and Bach, 1985; Portes and Rumbaut, 1996). Restrictions on foreign direct investment (FDI) were relaxed (Middlebrook and Zepeda, 2003) and foreign investment flowed in to finance a dramatic expansion in manufacturing operations. As a result, Mexico was further integrated into the broader global political economy as a major exporter of manufactured goods (MacLeod, 2004; Middlebrook and Zepeda, 2003; Pastor Jr and Wise, 1998).

Although economic restructuring entailed the expansion of manufacturing operations throughout Mexico, most of the increase occurred in the northern border states, where FDI was particularly concentrated in export manufacturing plants known as *maquiladoras* or *maquilas* (Butler et al., 2001; Kopinak, 1996; Nunez, 1990; Peters, 2003; Sklair, 1993; Twomey, 1993). *Maquilas* import duty-free components, assemble these components into finished products, and then export the finished products, usually to the US. *Maquilas* have become an important component of the Mexican economy, accounting for approximately 25 percent of total FDI in Mexico (Twomey, 1993), 2 percent of GDP, 14 percent of total manufacturing production, 24 percent of total imports, 39 percent of total exports, and employing over 1 million Mexicans (Butler et al., 2001).

Economic restructuring in Mexico is ostensibly related to sustained outflows of undocumented migrants. However, it is still unclear whether the growth of manufacturing operations associated with restructuring has inhibited or promoted undocumented Mexican migration to the US.

PREVIOUS RESEARCH

Despite repeated calls for research in this area over the past three decades (Fernandez-Kelly, 1983; Kopinak, 2005; Martin, 1992), very few inquiries have attempted to answer this question. The few studies that have investigated the question provide only mixed results.

A survey analysis of migrants in California and the Mexican state of Baja California reports that export production in northern Mexico increased the prevalence of emigration from Mexico to the US (Zabin and Hughes, 1995).

Employment in export production was argued to reduce the costs and risks associated with moving to the US, which turned such employment into a 'staging ground' for US migration from the southern state of Oaxaca (Zabin and Hughes, 1995: 416). In this respect, export manufacturing areas are contended to be part of a stepwise incremental migration process in which rural inhabitants migrate to the industrialized regions and accumulate financial and social resources that are necessary to undertake future migrations abroad. Migrants from rural areas form expectations about employment opportunities in export manufacturing areas, but because these areas are not able to provide sufficient employment for all of those displaced from the rural interior, rural migrants use the border region to generate resources to continue their migrations into the US (Rivera-Batiz, 1986).

These findings are contradicted, however, by studies that report that export manufacturing is associated with a lower propensity to migrate to the US. A survey analysis of 739 *maquila* workers in Mexican border cities reported that there were no significant differences between *maquila* workers and non-*maquila* workers in their propensity to migrate to the US, and only 3 percent of *maquila* workers said they would consider quitting their job to migrate to the US (Seligson and Williams, 1981). Another survey analysis of 1200 *maquila* workers in Tijuana, Ciudad Juarez, and Nuevo Laredo found that 85 percent of *maquila* workers had no desire to migrate to the US and only 21 percent preferred a job in the US to a job in Mexico (Carrillo Huerta, 1991).

The deterrent effect of manufacturing employment is supported by several empirical analyses of the relationship between FDI and emigration. On a global level, there is evidence that FDI in export manufacturing is associated with lower levels of emigration from LDCs. In a cross-national analysis of 19 LDCs, Sanderson and Kentor (forthcoming) found that FDI stocks in the secondary sector of the host economy were associated with lower levels of net emigration over a series of 10-year time spans. They hypothesized that secondary sector FDI might reduce emigration by stimulating economic growth and providing additional employment opportunities, although data did not allow them to explicitly test these hypotheses.

Two studies of Mexico lend further support. Although they did not test the impact of manufacturing production directly, Massey and Espinosa (1997) included FDI in an event history analysis of Mexican migration to the US. The analysis found that the annual growth rate of FDI in Mexico was negatively related with the odds of first or subsequent migrations to the US. They speculated that FDI stemmed emigration to the US by providing employment opportunities for potential migrants. Davila and Saenz (1990) more directly investigated the effect of manufacturing production. They examined the effect of *maquila* employment on INS apprehension rates between 1978 and 1982. Their multivariate regression analysis demonstrated that *maquila* employment was associated with lower apprehension rates one month later. Again, *maquilas*

were hypothesized to stimulate the border economy and provide employment opportunities.

More recently, Fussell (2004) conducted an empirical analysis of data on 71 Mexican communities. These data included the city of Tijuana, which allowed a comparative analysis of the effects of manufacturing employment across community types in Mexico (e.g. rural, urban, and northern border). The analysis provided mixed results. The effect of manufacturing employment differed depending on the individual's migration history (e.g. first or subsequent migration) and community type. Manufacturing employment in rural areas increased the odds of making a *first* undocumented migration, but in urban interior areas it decreased the odds, and in Tijuana it had no effect. However, manufacturing employment reduced the odds of making a *subsequent* undocumented migration for individuals in each community type.

METHODS AND DATA

Our analysis extends previous studies in two respects. First, we use a broader sample of Mexican communities that includes a larger sample of Mexican communities (107) and includes more northern border state communities (12). This expanded sample allows for a more comprehensive test of key hypotheses. Second, we estimate the effect of an alternative measure of manufacturing: the density of manufacturing operations in a community. In doing so, we test the broader, community-level, effects of manufacturing on the prevalence of undocumented migration. These effects remain relatively unexplored.

Our analysis uses secondary data from the Mexican Migration Project (MMP). The MMP is a publicly available dataset derived from a collaborative research project based at Princeton University and the University of Guadalajara in Mexico. The MMP includes household surveys from 107 communities in Mexico over the period 1982–2004. Data are collected on 150–200 households in each community, and households are selected randomly from a census of each community. Data on social, economic, and demographic characteristics are collected on all members of the household. In addition, the MMP includes limited data on community characteristics at the time of the survey. While the MMP purposively samples communities in primary sending regions of Mexico, systematic comparison between the MMP and a nationally representative survey of the Mexican population found that the MMP data are generally representative of the Mexican population (Massey and Zenteno, 2000).

The analyses predict the *log odds of having made an undocumented migration to the US in the previous five years.* The dependent variable has two categories: made an undocumented migration to the US; did not make an undocumented migration to the US. The analyses are limited to migration patterns in the previous five years in order to ensure a reasonable time span between the independent and dependent variables.

The independent variable of primary interest is the *number of manufacturing operations in the municipality*. In order to test for whether the effect of manufacturing density varies across community types, manufacturing production is interacted with an indicator for the community type (rural interior community, urban interior community, northern border state community). Northern border state communities are defined as communities situated in a Mexican state that is geographically contiguous to the US. The sample used in the analyses includes communities in the northern border states of Baja California Norte, Chihuahua, and Nuevo Leon. Rural interior community is the reference category and is excluded from the analysis. The density of manufacturing operations is logarithmically transformed to correct for a skewed distribution.

The analysis controls for important individual-level characteristics that may influence the odds of migrating to the US, including *age*, *years of education* and *marital status*. The tendency to migrate increases with age up to a certain point and then decreases over time (Massey et al., 2005). The analyses controls for this non-linear effect by including a quadratic term for age (*age-squared*) in the model.

It has also been shown that the odds of migrating are strongly influenced by the prevalence of migratory social networks. Persons who have migrated previously to the US, or within Mexico, are expected to have expanded their knowledge of the labor market in these areas and to have established contacts that lower the costs and risks of moving in the future (Massey, 1990a, 1990b). The 'network effect' or the 'cumulative causation of migration' has been found to be one of the strongest predictors of Mexican migration (Durand et al., 2000; Massey, 1999; Massey and Espinosa, 1997; Massey et al., 2002, 2005).

The analysis controls for the 'network effect' in three respects. To control for the effect of migratory social capital gained from migratory experience in the US, the analysis includes a measure of *time spent in the US on previous migrations*. This variable is measured in month units, and is logarithmically transformed to correct for a skewed distribution. To control for the effect of migratory social capital gained from migratory experience within Mexico, the analysis includes a measure of *number of domestic migrations*. Finally, the accumulated amount of information gained and the social networks developed as a result of previous migrations to the US becomes part of the social structure in which potential migrants make decisions about moving (Massey, 1987; Portes and Bach, 1985). The analysis therefore also includes a measure of *community migratory social capital*, measured as the proportion of the community that has migrated to the US.

In addition to community migratory social capital, the analysis includes two additional terms to control for potentially confounding effects situated at the community-level. The *level of inequality* is contended to increase the odds of emigrating by increasing the sense of relative deprivation in the community

(Stark, 1991; Stark and Taylor, 1989). The analysis controls for the effect of relative deprivation in the community by controlling for the level of income inequality in the community. This measure is expressed as the absolute value of the difference between the proportion of the economically active population earning less than the minimum wage and the proportion of the economically active population earning at least twice the minimum wage.

Finally, in analyses that include data gathered over time, it is necessary to control for the influence of a time trend in the dynamic under study (Wooldridge, 2006). The analysis therefore includes a set of *time indicators* to control for the influence of factors that could alter the trend in migration over time, such as policy changes, natural disasters, and inter-societal conflict among other factors. Specifically, the time indicators represent four important time periods over which the data were collected: the immediate post-IRCA period (1987–93); the NAFTA period (1994–2000); and the immediate post-September 11 period (2001–04). The pre-IRCA period (1982–6) is the reference category and is excluded from the analysis.

The sample is limited to Mexican-born, non-US citizens over 18 years of age who were interviewed in Mexico. Complete information on the variables included in the analysis was available for 67,264 individuals in 95 communities over the time period 1982–2004.

We utilize generalized hierarchical linear regression (GHLM) to estimate models of undocumented migration. Logistic regression is commonly used to estimate models with a dichotomous outcome. However, logistic regression may result in inaccurate estimates when the data are clustered, or nested, in design. Data are clustered when lower-level units are nested within higher-level units. For example, the MMP data include information on individuals nested within communities. These data are measured at two levels of analysis: the individual-level; and the community-level. Clustered, or multilevel, data are likely to exhibit correlated error structures because the units are not completely independent (Raudenbush and Bryk, 2002). That is, individuals in a particular context are likely to share characteristics because they share the same social context (Hox and Kreft, 1994). This similarity among individuals within a particular context results in increased standard errors in regression coefficients from an OLS regression analysis, making Type I errors of inference more likely (Guo and Zhao, 2000; Hox and Kreft, 1994). GHLM relaxes the assumption of independence by allowing more complex error structures, which provides less biased estimates of parameters and more accurate standard errors (Guo and Zhao, 2000). In this respect, hierarchical linear models are an advancement over traditional OLS regression models for clustered data because they are able to model the dependence of observations in the data rather than treat the dependence as a problem to be avoided (Diprete and Forristal, 1994; Gelman and Hill, 2007; Snijders and Bosker, 1999).

The general model for the GHLM analysis is expressed in Eq. (1) and Eq. (2). At the individual level (level 1):

$$\ln [P_{ij}/(1-P_{ij})] = \beta_{0j} + \Sigma \beta_k x_{ija} + r_{ij} \quad (1)$$

where $ln\ [p_{ij}/(1-p_{ij})]$ is the log-odds of person i in community j migrating to the United States from Mexico, x_{ija} is a vector of j individual-level variables describing person i in community a, and r_{ij} is the residual, or error term, for person i in community j.

The individual-level intercepts (β_{0j}) are then modeled at the community-level (level 2):

$$\beta_{0j} = \gamma_{00} + \Sigma \beta_k z_{ma} + u_{0j} \quad (2)$$

where γ_{00} is the grand overall mean solution for the equation, z_{ma} is a vector of m community-level variables describing community a, and u_{0j} is the residual, or error term, for community j. Conceptually, each community's mean odds of migrating to the US is predicted by a vector of community level factors and a random error term associated with each community.

Because the models include a large number of level-2 units, we estimate the coefficients using GHLM with robust standard errors (Raudenbush and Bryk, 2002). This strategy provides more confidence in the estimates because it ensures that estimates are less dependent on the distribution of the random effects at level 1 or level 2 (Gelman and Hill, 2007).

Sample Characteristics

Table 1 presents descriptive statistics for the sample. The descriptive statistics are organized by community type in order to describe the characteristics of the three different community types included in the analysis. In general, the different community types are similar with respect to gender composition, mean age and mean percentage of individuals who have never married. Communities in northern border states, however, have higher average levels of education (8.9 years) compared to individuals in urban interior (7.3 years) and rural interior (5.9 years) communities. Notably, individuals in northern border state communities exhibit lower levels of undocumented migratory experience on each measure of undocumented migration. Individuals in northern border state communities have: lower levels of US migratory experience (9.6 months) compared to individuals in urban interior (9.9 months) and rural interior (14.6 months) communities; lower levels of previous migrations (.14) than individuals in urban interior (.30) and rural interior (.46) communities; and a lower percentage had made an undocumented migration to the US in the previous five years (1.7) compared to urban interior (7.0) and rural interior (11.0) communities. It is also worth noting that the prevalence of domestic, or internal, migrations is similar across community types, which suggests that internal migration patterns do not differ significantly across communities.

RESULTS

Table 1 presents the results from the GHLM analysis. Model 1 only includes individual level predictors. As is reported in previous studies (Fussell, 2004; Massey, 1987; Massey and Espinosa, 1997), the results indicate that undocumented migrants are more likely to be male, young, and less educated.

Males are approximately four times as likely as females to have made an undocumented migration in the previous five years (calculated as $[e^B]$). The odds of making an undocumented trip decreases with age in a non-linear manner. As individuals age, the odds of migration decreases, but this effect weakens at older ages. Higher levels of education are associated with lower odds of having migrated to the US without documents in the previous five years. Similarly, being single is also associated with a lower odds of migrating to the US without documents.

The effect of migratory social capital gained from previous migrations differs depending on the type of migration. Previous migrations to the US positively influence the odds of having migrated without documents to the US. This finding supports the cumulative causation theory of migration. More time spent in the US on previous migrations likely enables the migrant to establish and develop social resources that reduce the cost and risk of migrating, therefore making subsequent migrations more likely. The results indicate that previous migrations within Mexico, however, do not have an effect on the odds of having migrated to the US without documents.

The time trend indicators provide evidence to suggest that, compared to the pre-IRCA period (1987), the odds of making an undocumented migration to the US was higher in the 1990s, but then decreased between 2001 and 2004. These findings are consistent with Passel and Suro's (2005) description of undocumented migration after IRCA in 1986. The coefficients for these indicators, however, are not consistent predictors of undocumented migration across the models.

Model 2 includes community-level variables in addition to the individual-level variables. Two findings are particularly noteworthy. First, the results indicate that migration patterns differ across community types. In general, individuals in rural interior communities are more likely to have made an undocumented migration to the US than individuals in northern border state communities or urban interior communities. The northern border state community context exerts a strong negative effect on undocumented migration probabilities: individuals located in the northern border state communities are only 29 percent as likely as individuals located in rural interior communities to have made an undocumented migration to the US. Urban interior communities are also associated with lower undocumented migration probabilities, although the effect is weaker compared to communities in northern border states. Second, higher densities of manufacturing operations are associated with lower odds of having made an undocumented migration to the US, regardless of the type of community in which the operations are located.

Table 1 Descriptive statistics

	Northern border state communities		Urban interior communities		Rural interior communities	
	Mean or percentage	**SD**	**Mean or percentage**	**SD**	**Mean or percentage**	**SD**
Person characteristics						
Pct. male	47.5	–	47.7	–	46.2	–
Age	37.6	14.1	36.3	14.4	37.2	15.1
Years of education	8.9	4.2	7.3	4.5	5.9	4.1
Pct. born in state interviewed	71.9	–	68.2	–	87.9	–
Pct. never married	20.0	–	22.1	–	21.6	–
Number months spent in US	9.6	43.5	9.9	37.5	14.6	44.8
Number of US migrations	.14	.52	.30	1.1	.46	1.4
Pct. migrated to the US in previous five years	1.7	–	7.0	–	11.0	–
Number migrations within Mexico	.46	.77	.37	1.3	.46	1.5
N	7497		28,306		31,461	
Community characteristics						
Number of factories	3936	6936	784	1447	51	115
Pct. migrated to the US	12.0	–	17.7	–	24.0	–
Inequality	.37	.28	.24	.18	.26	.21
Pct. illiterate	3.4	–	11.4	–	15.6	–
Public investment in housing (pesos)	131,304	1,555,589	9,945,357	261,000,000	350,897	1,570,886
Number of government clinics	15.6	17.3	38.4	133.7	6.6	6.2
Labor force participation rate–males	73.2	–	68.6	–	67.8	–
Labor force participation rate–females	35.3	–	21.8	–	15.8	–
N	12		34		49	

Table 2 Multilevel logistic regression coefficients predicting log odds of undocumented migration to the United States

	Model 1		Model 2		Model 3	
	B (SE)	Odds ratio	B (SE)	Odds ratio	B (SE)	Odds ratio
Male	1.53*** (.08)	4.63	1.53*** (.08)	4.63	1.53*** (.08)	4.63
Age	–.04*** (.01)	.96	–.04*** (.01)	.96	–.04*** (.01)	.96
Age^2	–.0003** (.0001)	.99	–.0003** (.0001)	.99	–.0003** (.0001)	.99
Years of education	–.04*** (.01)	.96	–.05*** (.01)	.95	–.04*** (.01)	.96
Never married	–.15*** (.05)	.86	–.15*** (.05)	.86	–.15*** (.05)	.86
Months spent in US (ln)	.29*** (.06)	1.34	.29*** (.06)	1.34	.29*** (.06)	1.34
Domestic migration	–.01 (.01)	.99	–.01 (.01)	.99	–.01 (.01)	.99
Factories (ln)			–.14** (.06)	.87	–.12 (.08)	.88
Northern border state community			–1.61*** (.45)	.20	–.07 (1.04)	.93
Urban interior community			–.07 (.17)	.93	–.44 (.52)	.65
Community migratory social capital			3.81*** (.57)	45.0	3.95*** (.57)	52.0
Inequality			.33 (.37)	1.39	.54* (.33)	1.70
Factory * border community					–.27* (.17)	.76
Factory * urban interior community					.07 (.12)	1.07
1987–93	.54 (.66)	1.72	.32 (.38)	1.39	.39 (.39)	1.48
1994–2000	1.06* (.52)	2.89	.73* (.37)	2.07	.76* (.37)	2.15
2001–04	–.01 (.34)	.99	–.01 (.23)	.99	–.01 (.23)	.99
Intercept	–3.09*** (.54)		–2.80*** (.56)		–2.98*** (.53)	
N (Persons)	67264		67264		67264	
N (Communities)	95		95		95	

*$p < .05$; **$p < .01$; *** $p < .001$ (one-tailed tests).

The results also provide evidence that the density of social networks at the community level is positively associated with undocumented migration to the US, as the odds of migrating to the US for an individual is much higher in communities where a larger proportion of the community has migrated to

the US. This finding is consistent with previous studies (Massey and Espinosa, 1997), which report that the cumulative causation theory of migration is a robust explanation of migration at a variety of levels of analysis. The analysis indicates that inequality does not affect the odds of undocumented migration.

In order to examine whether the effects of manufacturing densities differ across community types, Model 3 includes interaction terms for community type and the number of manufacturing operations. Most importantly, the findings suggest that the effect of manufacturing is only significant in northern border state communities. Compared to rural interior communities, higher levels of manufacturing densities in northern border state communities are associated with lower odds of undocumented migrations to the US. It is worth noting that the main effects for northern border state community and manufacturing density are no longer significant. This means that it is the combination of manufacturing operations in the context of a northern border state community that deters undocumented migration to the US.

DISCUSSION AND CONCLUSION

This study empirically examined the broader relationship between economic globalization and international migration by investigating the relationship between manufacturing densities in Mexican communities and undocumented Mexican migration to the US. The most important finding of the analysis is that higher densities of manufacturing operations are associated with lower odds of undocumented migration to the US.

Our findings are consistent with the majority of previous research in this area (Carrillo Huerta, 1991; Davila and Saenz, 1990; Massey and Espinosa, 1997; Seligson and Williams, 1981). However, by testing the effect of an aggregate measure of manufacturing across a broader sample of communities, we further extend this research.

In light of previous analyses, our findings contribute to a growing body of empirical evidence demonstrating that manufacturing production can deter emigration flows from LDCs. In this respect, our results support neoclassical economic theories of migration, which generally suggest manufacturing production should decrease migration flows by directly and indirectly expanding employment levels in the economy (see Massey et al., 1994; Sauvant et al., 1993). While our data preclude an investigation into the specific mechanisms linking manufacturing operations to migration, it seems plausible that the employment generated by manufacturing production, and *maquilas* in particular, may indeed reduce the level of undocumented migration to the US.

We caution, however, against strong inferences from our findings. There are several limitations to our analysis. We highlight two in particular. First, and most importantly, our analysis does not examine the role of gender in structuring

migration flows from Mexico. Yet the impacts of global economic restructuring on migration patterns clearly differ across genders (Ehrenreich and Hochschild, 2004; Massey et al., 2005). Females confront a variety of social constraints when making a decision to migrate, including gender socialization and normative expectations (Curran and Rivero-Fuentes, 2003; Hondagneu-Sotelo, 1994). Similarly, the risks of international migration are perceived to be greater for females because of a 'culture of domesticity' (Kanaiaupuni, 2000). Thus, while females have been very prevalent in domestic migrations within Mexico, they are less likely than males to migrate internationally (Donato, 1993). As a result, it is likely that Mexican female migration patterns are qualitatively different from Mexican male migration patterns (Curran and Rivero-Fuentes, 2003). Thus, incorporating gender into an empirical analysis could provide additional insights into the causal mechanisms linking economic restructuring, manufacturing, and migration.

Second, and related to the previous point, our analysis does not examine documented migration. Yet manufacturing densities in particular communities might have different effects on migration depending on the type of migration being examined. For example, Mexican females may be more likely to make documented migrations to the US than undocumented trips, following their husbands or male partners who migrated previously (Cerrutti and Massey, 2001). If this is the case, then it would be necessary to disaggregate the analysis of Mexican migration by the type of migration (documented and undocumented) *and* by gender. Although an analysis of this sort was beyond the scope of this particular article, data from the Mexican Migration Project allow these sorts of analyses. Our analysis suggests that these inquiries would certainly be a worthwhile area for future research.

Despite these limitations, our analysis of Mexican migration has implications more generally for the question of how economic globalization impacts migration. This relationship continues to generate an expanding literature. However, cross-national empirical research remains relatively limited and much of the discourse in this literature continues to be based upon speculation and conjecture. Empirical studies can further develop this important area by testing propositions for their theoretical veracity.

In this respect, our findings provide evidence to motivate such research. While our analysis cannot be definitive on the question of whether economic globalization promotes or inhibits emigration from other LDCs, we have provided evidence that economic globalization does indeed influence international migration from Mexico. Future research that assesses this relationship in other countries would contribute to our still relatively undeveloped understanding of whether and how globalization is associated with rising levels of international migration worldwide.

Appendix A Zero-order correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) Undocumented migration	1.00																	
(2) Male	0.18	1.00																
(3) Age	–0.15	0.01	1.00															
(4) Age^2	–0.14	0.01	0.98	1.00														
(5) Education	–0.02	0.05	–0.41	–0.41	1.00													
(6) Never married	0.08	0.07	–0.39	–0.32	0.21	1.00												
(7) US migratory social capital	0.12	0.17	0.05	0.03	–0.06	–0.07	1.00											
(8) Domestic migratory social capital	–0.01	0.11	0.11	0.10	0.00	–0.08	0.02	1.00										
(9) Factory	–0.10	0.01	–0.01	–0.01	0.16	0.00	–0.07	–0.03	1.00									
(10) Border	–0.08	0.00	0.02	0.01	0.16	–0.02	–0.03	0.01	0.45	1.00								
(11) Urban interior	–0.04	0.01	–0.03	–0.03	0.09	0.02	–0.05	–0.04	0.23	–0.30	1.00							
(12) Rural interior	0.09	–0.01	0.02	0.03	–0.19	–0.01	0.07	0.03	–0.51	–0.33	–0.80	1.00						
(13) Community migratory social capital	0.15	–0.02	0.00	0.01	–0.19	–0.01	0.18	–0.01	–0.38	–0.22	–0.14	0.28	1.00					
(14) Inequality	–0.02	0.00	0.01	0.01	0.03	0.02	–0.02	0.01	0.16	0.43	–0.24	–0.03	–0.19	1.00				
(15) 1982–6	–0.001	–0.03	–0.03	–0.02	–0.08	0.02	–0.03	–0.07	0.03	–0.07	–0.07	0.11	–0.02	0.06	1.00			
(16) 1987–93	0.04	0.00	–0.03	–0.02	–0.11	0.00	0.01	0.01	–0.13	–0.25	0.22	–0.06	0.21	–0.15	–0.15	1.00		
(17) 1994–2000	–0.04	0.01	0.04	0.03	0.14	–0.01	0.00	0.01	0.11	0.27	–0.19	0.02	–0.20	0.12	–0.26	–0.92	1.00	
(18) 2001–04	–0.03	0.01	0.04	0.03	0.04	0.00	–0.03	0.02	–0.12	–0.15	–0.05	0.14	–0.29	0.13	–0.29	–0.30	0.32	1.00

N = 67,284.

REFERENCES

Butler, E.W., Pick, J.B. and Hettrick, W.J. (2001) *Mexico and Mexico City in the World Economy*. Boulder, CO: Westview Press.

Carrillo Huerta, M.M. (1991) 'The Impact of Maquiladoras on Migration in Mexico', in S. Diaz-Briquets and S. Weintraub (eds) *The Effects of Receiving Country Policies on Migration Flows*, pp. 69–102. Boulder, CO: Westview Press.

Castles, S. and Miller, M.J. (2003) *The Age of Migration*, 3rd edn. New York: The Guilford Press.

Cerrutti, M. and Massey, D.S. (2001) 'On the Auspices of Female Migration from Mexico to the United States', *Demography* 38: 187–200.

Curran, S.R. and Rivero-Fuentes, E. (2003) 'Engendering Migrant Networks: The Case of Mexican Migration', *Demography* 40: 289–307.

Davila, A. and Saenz, R. (1990) 'The Effect of Maquiladora Employment on the Monthly Flow of Mexican Undocumented Immigration to the U.S., 1978–1982', *International Migration Review* 24: 96–107.

Dicken, P. (2006) *Global Shift: Reshaping the Global Economic Map in the 21st Century*, 5th edn. New York: Guilford Press.

Diprete, T.A. and Forristal, J.D. (1994) 'Multilevel Models: Methods and Substance', *Annual Review of Sociology* 20: 331–57.

Donato, K.M. (1993) 'Current Trends and Patterns of Female Migration: Evidence from Mexico', *International Migration Review* 27: 748–71.

Durand, J., Massey, D.S. and Charvet, F. (2000) 'The Changing Geography of Mexican Immigration to the United States, 1910–1996', *Social Science Quarterly* 81: 1–15.

Ehrenreich, B. and Hochschild, A.R. (2004) *Global Woman: Nannies, Maids, and Sex Workers in the New Economy*. New York: Metropolitan Books.

Fernandez-Kelly, M.P. (1983) *For We are Sold, I and My People: Women and Industry in Mexico's Frontier*. Albany: State University of New York Press.

Fussell, E. (2004) 'Sources of Mexico's Migration Stream: Rural, Urban, and Border Migrants to the United States', *Social Forces* 82: 937–67.

Gelman, A. and Hill, J. (2007) *Data Analysis Using Regression and Multilevel/Hierarchical Models*. New York: Cambridge University Press.

Guo, G. and Zhao, H. (2000) 'Multilevel Modeling for Binary Data', *Annual Review of Sociology* 26: 441–62.

Held, D., McGrew, A., Goldblatt, D. and Perraton, J. (1999) *Global Transformations: Politics, Economics, and Culture*. Stanford, CA: Stanford University Press.

Hondagneu-Sotelo, P. (1994) *Gender Transitions: Mexican Experiences of Immigration*. Berkeley: University of California Press.

Hox, J. and Kreft, I. (1994) 'Multilevel Analysis Methods', *Sociological Methods and Research* 23: 283–99.

Kanaiaupuni, S.M. (2000) 'Reframing the Migration Question: An Analysis of Men, Women, and Gender in Mexico', *Social Forces* 78: 1311–47.

Kopinak, K. (1996) *Desert Capitalism: Maquiladoras in North America's Western Industrial Corridor*. Tuscon: University of Arizona Press.

Kopinak, K. (2005) 'The Relationship Between Employment in Maquiladora Industries in Mexico and Labor Migration to the United States', Center for Comparative Immigration Studies, University of California-San Diego, San Diego.

MacLeod, D. (2004) *Downsizing the State: Privatization and the Limits of Neoliberal Reform in Mexico*. University Park: Pennsylvania State University Press.

Martin, P. (1992) 'Foreign Direct Investment and Migration: The Case of Mexican Maquiladoras', *International Migration* 30: 399–422.

Massey, D.S. (1987) *Return to Aztlan: The Social Processes of International Migration from Western Mexico*. Berkeley: University of California Press.

Massey, D.S. (1990a) 'The Social and Economic Origins of Immigration', *Annals of the American Academy of Political and Social Science* 510: 60–72.

Massey, D.S. (1990b) 'Social Structure, Household Strategies, and the Cumulative Causation of Migration', *Population Index* 56: 3–26.

Massey, D.S. (1999) 'Why Does Immigration Occur? A Theoretical Synthesis', in C. Hirschman, P. Kasinitz and J. DeWind (eds) *The Handbook of International Migration: The American Experience*, pp. 34–52. New York: Russell Sage Foundation.

Massey, D.S. and Espinosa, K.E. (1997) 'What's Driving Mexico-U.S. Migration? A Theoretical, Empirical, and Policy Analysis', *American Journal of Sociology* 102: 939–99.

Massey, D.S. and Zenteno, R. (2000) 'A Validation of the Ethnosurvey: The Case of U.S.-Mexico Migration', *International Migration Review* 34: 766–93.

Massey, D.S., Arango, J., Hugo, G., Kouaouchi, A., Pellegrino, A. and Taylor, J.E. (1994) 'An Evaluation of International Migration Theory: The North American Case', *Population and Development Review* 20: 699–751.

Massey, D.S., Arango, J., Hugo, G., Kouaouchi, A., Pellegrino, A. and Taylor, J.E. (2005) *Worlds in Motion: Understanding International Migration at the End of the Millennium*. Oxford: Clarendon Press.

Massey, D.S., Durand, J. and Malone, N. (2002) *Beyond Smoke and Mirrors: Mexican Immigration in an Era of Economic Integration*. New York: Russell Sage Foundation.

McMichael, P. (2004) *Development and Social Change: A Global Perspective*, 3rd edn. Thousand Oaks, CA: Pine Forge Press.

Middlebrook, K. and Zepeda, E. (2003) 'On the Political Economy of Mexican Development Policy', in K. Middlebrook and E. Zepeda (eds) *Confronting Development: Assessing Mexico's Economic and Social Policy Challenges*, pp. 3–54. Stanford, CA: Stanford University Press.

Nunez, W.P. (1990) *Foreign Direct Investment and Industrial Development in Mexico*. Paris: Organization for Economic Cooperation and Development.

Passel, J.S. (2006) 'The Size and Characteristics of the Unauthorized Migrant Population in the U.S.: Estimates Based on the March 2005 Current Population Survey', Pew Hispanic Center, Washington, DC.

Passel, J.S. and Suro, R. (2005) 'Rise, Peak, and Decline: Trends in U.S. Immigration, 1992–2004', Pew Hispanic Center Washington, DC.

Pastor Jr., M. and Wise, C. (1998) 'Mexican-Style Neoliberalism: State Policy and Distributional Stress', in C. Wise (ed.) *The Post-NAFTA Political Economy: Mexico and the Western Hemisphere*, pp. 41–81. University Park: Pennsylvania State University Press.

Peters, E.D. (2003) 'Industrial Policy, Regional Trends, and Structural Change in Mexico's Manufacturing Sector', in K. Middlebrook and E. Zepeda (eds) *Confronting Development: Assessing Mexico's Economic and Social Policy Challenges*, pp. 241–76. Stanford, CA: Stanford University Press.

Portes, A. and Bach, R.L. (1985) *Latin Journey: Cuban and Mexican Immigrants in the United States*. Berkeley: University of California Press.
Portes, A. and Rumbaut, R.G. (1996) *Immigrant America: A Portrait*, 2nd edn. Berkeley: University of California Press.
Raudenbush, S.W. and Bryk, A.S. (2002) *Hierarchical Linear Models: Applications and Data Analysis Methods*, 2nd edn. Thousand Oaks, CA: SAGE.
Rivera-Batiz, F.L. (1986) 'Can Border Industries Be a Substitute for Immigration?', *American Economic Review* 76: 263–8.
Sanderson, M.R. and Kentor, J.D. (2008) 'Foreign Direct Investment and International Migration: A Cross-National Analysis of Less-Developed Countries, 1985–2000', *International Sociology* 23: 515–40.
Sanderson, M.R. and Kentor, J.D. (forthcoming) 'Globalization, Development, and International Migration: A Cross-National Analysis of Less-Developed Countries, 1970–2000', *Social Forces*.
Sauvant, K.P., Mallampally, P. and Economou, P. (1993) 'Foreign Direct Investment and International Migration', *Transnational Corporations* 2: 33–69.
Seligson, M.A. and Williams, E.J. (1981) *Maquiladoras and Migration: Workers in the Mexico-United States Border Industrialization Program*. Austin: University of Texas Press.
Sklair, L. (1993) *Assembling for Development: The Maquila Industry in Mexico and the United States*. San Diego: Center for US-Mexican Studies, University of California-San Diego.
Snijders, T.A.B. and Bosker, R.J. (1999) *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Thousand Oaks, CA: SAGE.
Stark, O.J. (1991) *The Migration of Labor*. Cambridge, MA: Basil Blackwell.
Stark, O.J. and Taylor, J.E. (1989) 'Relative Deprivation and International Migration', *Demography* 26: 1–14.
Twomey, M.J. (1993) *Multinational Corporations and the North America Free Trade Agreement*. Westport, CT: Praeger.
UN (2006) *International Migration and Development: Report of the Secretary-General*. New York: United Nations.
UNCTAD (1996) *Foreign Direct Investment, Trade, Aid and Migration*. Geneva: United Nations.
WB (2006) *Global Economic Prospects: Economic Implications of Remittances and Migration*. New York: World Bank.
Wooldridge, J.M. (2006) *Introductory Econometrics: A Modern Approach*, 3rd edn. Mason, OH: Thomson Southwestern.
Zabin, C. and Hughes, S. (1995) 'Economic Integration and Labor Flows: Stage Migration in Farm Labor Markets in Mexico and the United States', *International Migration Review* 19: 395–422.

Matthew Sanderson is a macro-comparative sociologist with interests in the areas of political economy and global social change, and is Assistant Professor of Sociology at Lehigh University. Address: Department of Sociology and Anthropology, Lehigh University, 681 Taylor Street, Bethlehem, PA 18015, USA. [email: matthew.sanderson@lehigh.edu]

Rebecca Utz is a medical sociologist, with training in gerontology, demography and the sociology of the life course. She is Assistant Professor in the Department of Sociology, University of Utah. Address: Department of Sociology, 325 BEH S, Salt Lake City, UT 84112, USA. [email: rebecca.utz@soc.utah.edu]