



The mixed effects of migration: Community-level migration and birthweight in Mexico

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ABSTRACT

Research on the relationship between migration and infant health in Mexico finds that migration has mixed impacts on the risk of low birthweight (LBW). Whereas the departure and absence of household and community members are harmful, remittances are beneficial. We extend this work by considering a different measure of infant health in addition to LBW: macrosomia (i.e., heavy birthweight), which is associated with infant, child, and maternal morbidities but has a different social risk profile from LBW. We link the 2008 and 2009 Mexican birth certificates with community data from the 2000 Mexican census to analyze the association between various dimensions of community-level migration (i.e., rates of out-migration, receipt of remittances, and return migration) and the risk of LBW and macrosomia. We examine this association using two sets of models which differ in the extent to which they account for endogeneity. We find that the health impacts of migration differ depending not only on the dimension of migration, but also on the measure of health, and that they are robust to potential sources of endogeneity. Whereas community remittances and return migration are associated with lower risk of LBW, they are associated with increased risk of macrosomia. By contrast, out-migration is associated with increased risk of LBW and lower risk of macrosomia. Our analysis of endogeneity suggests that bias resulting from unmeasured differences between communities with different levels of migration may result in an underestimate of the impacts of community migration on birthweight.

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1. Introduction

Approximately 7% of infants in Mexico are born into households split by migration (Sunil et al., 2012). Research shows that this split-household migration has mixed consequences for the health of mothers and infants in sending communities, reflecting the complex ways that migration impacts those left behind (Frank and Hummer, 2002). Infants born into migrant-sending households are vulnerable to the adverse health consequences of emotional hardship resulting from the migration of family members, but they benefit from improved material wellbeing due to migrant remittances. Research also shows that the “mixed” effects of migration on infant health may extend beyond migrant households to non-migrant households, which contribute a larger number of births in Mexico (Kanaiaupuni and Donato, 1999). That the migration of unrelated community members has an impact on the health

of infants born in sending communities reveals the far-reaching and important transnational linkages formed through migration.

Research on infant health in Mexican migrant-sending communities has focused on two key measures of infant health: low birthweight (LBW) and infant mortality. LBW, defined as births under 2500 g, is a risk factor for various child morbidities as well as for infant mortality, especially among those with very low birthweight (Paneth, 1995). LBW and infant mortality have similar social risk profiles, with increased risk for socioeconomically disadvantaged mothers. Thus, it is not surprising that LBW and infant mortality are related in similar ways to migration (Hildebrandt and McKenzie, 2005).

A different and less studied indicator of infant health is macrosomia, or birthweights greater than 4000 g. Like LBW, macrosomia is a risk factor for child morbidities and infant mortality, especially among severely macrosomic infants (Zhang et al., 2008). But macrosomia’s social risk profile is unique, with increased risk for socioeconomically advantaged women (Frank et al., 2000). Thus, it is possible that macrosomia has a different relationship with migration than does LBW, which, if true, would suggest that

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the relationships between migration and infant health are mixed not only along different dimensions of migration, but also along different dimensions of health.

Recent research on the relationship between migration and overweight in sending communities suggests that this may indeed be the case. This research shows that household and community migration are associated with increased risk of child and adult overweight in Mexico, arguably because remittances—both monetary and social—result in less healthy diets and lower levels of physical activity (Creighton et al., 2011; Riosmena et al., 2013). Maternal weight prior to pregnancy and maternal weight gain during pregnancy raise infant birthweight (Siega-Riz et al., 2009). If migration raises the weight of adults in sending communities, it may thereby also raise the weights of infants both above the threshold for LBW and above the threshold for macrosomia, which would mean that migration has mixed impacts on the health of infants, decreasing risk for some but raising it for others. Heavy birthweight infants are at risk of heavy weight throughout life (Oken and Gillman, 2003). By raising the risk of macrosomia, migration may contribute to the obesity epidemic in Mexico by placing infants at risk of overweight at the very beginning of their lives.

In this paper, we simultaneously examine the impacts of several dimensions of community migration on LBW and macrosomia. We link newly available natality files from the 2008 and 2009 Mexican vital statistics, which provide a complete census of all registered, live births in Mexico in those years, with data on community characteristics, including three measures of the different dimensions of migration within a community: the rate of community out-migration measures departures and absences, the rate of community receipt of remittances measures the potential for improvements in material conditions, and the rate of community return migration captures the influence of ideas and practices that are transmitted by migrants from the destination to the sending country (i.e., “social remittances”). By focusing on the community level, our analysis will capture mechanisms occurring in both migrant and non-migrant households in migrant-sending communities, as compared to households in non-migrant sending communities.

We also address a different explanation for the association between migration and infant health in sending communities: migrant-sending communities may differ from non-migrant sending communities in ways that produce both high levels of migration and unique health profiles. Most existing studies address this possibility by controlling for a limited set of potential confounders. We follow a strategy used by Hildebrandt and McKenzie (2005) and use historic state migration rates to instrument for community receipt of remittances to determine whether our results are robust after we account for unmeasured differences across communities with varying levels of migration.

2. Background

2.1. Infant health at both ends of the birthweight distribution

LBW and macrosomia represent opposite ends of the birthweight spectrum: births less than 2500 g and births greater 4000 g, respectively. In Mexico, LBW occurs more than twice as often as macrosomia (8.4 vs. 3.0% of all births) (INEGI, 2012).

LBW is the more serious of the two outcomes, with LBW being a key risk factor for infant mortality as well as for infant and child morbidities (Paneth, 1995). Macrosomia is associated primarily with an increased risk of birth-related injuries to the infant and mother, including shoulder dystocia, asphyxia, postpartum hemorrhage, and severe perineal lacerations, which are for the most

part short-term morbidities that can be addressed with prompt medical attention (Oral et al., 2001; Stotland et al., 2004). However, macrosomic infants are at increased risk of diabetes and overweight in childhood, associations that are independent of gestational diabetes (Jolly et al., 2003; Ornoy, 2011; Schaefer-Graf et al., 2005; Sparano et al., 2013). Extremely macrosomic infants (>5000 g) are at increased risk of subsequent mortality (Zhang et al., 2008).

The number of studies on LBW far exceeds that on macrosomia. The few existing studies of the demographic and social correlates of macrosomia suggest a very different risk profile for macrosomia than for LBW (Frank et al., 2000; Jolly et al., 2003; Stotland et al., 2004). This literature is based on analysis of U.S. populations, so it is an open question how relevant the results are to Mexico. In the U.S., adequate prenatal care, education, marriage, and white race are all associated with lower risk of LBW but higher risk of macrosomia. Why macrosomia occurs at higher rates among the socioeconomically advantaged is not clear, as the observed associations occur among full-term pregnancies and are net of health and health behaviors.

Mother's health and health behaviors also have contrasting associations with LBW and macrosomia, but these differences reflect the unique etiologies of LBW and macrosomia. Stress reduces birthweight and increases the risk of LBW (Wadwa et al., 1993). Underweight mothers and inadequate pregnancy weight gain are risk factors for LBW (Chomitz et al., 1995). By contrast, overweight mothers, excessive pregnancy weight gain, and gestational diabetes are independent risk factors for macrosomia (Jolly et al., 2003). While gestational diabetes is a strong risk factor for macrosomia, only 5% of births between 4000 and 4999 g, and 11.5% of births greater than 5000 g, are to mothers with gestational diabetes (Zhang et al., 2008). The incidence of gestational diabetes in Mexico is not definitively known, as diagnostic criteria and frequency of screening vary, but a recent report by the Ministry of Health shows estimates ranging between 3 and 20% of births, with 4 out of 6 studies reporting rates below 7% of pregnant women (Calderón Cisneros et al., 2009). Smoking during pregnancy slows intrauterine growth, and, as such, it increases the risk of LBW and decreases the risk of macrosomia (Wilcox, 1993).

2.2. Mechanisms linking migration to infant health

Prior work identifies three mechanisms linking migration and infant health. These mechanisms are (1) stress, (2) improvements in material conditions, and (3) changes in dietary norms and habits. While these mechanisms have been primarily identified at the household level, we draw out their relevance to the community level. Because we do not have information about migration at the household level, our estimates of the impact of community-level migration on birthweight captures both household and community-level impacts. Thus, mechanisms operating at both conceptual levels are relevant for interpreting our results.

2.2.1. Stress

A growing body of work shows that migration-induced separation between family members has adverse effects on the psychological wellbeing of those who remain behind (Wilkerson et al., 2009). Migration deprives family members of the instrumental and social support of key family members (Kanaiaupuni, 2000). Children left behind feel abandoned by their parents and experience feelings of being unloved, rage, and worry as a result (Dreby, 2010). The geographic distance and length of separation creates social distance and undermines marital unions between migrants and their family members (Frank and Wildsmith, 2005). These consequences arguably account for why migration-induced absence

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