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Living on the Edge in Mexico

Many households in Mexico are vulnerable to falling into poverty. Should social programs expand their coverage to encompass this group?

Vulnerability to poverty is an important issue in Latin America. The region has achieved steady reductions in poverty: the rate of moderate poverty (defined as living on less than \$4 a day) fell from about 42 percent in 2003 to 25.3 percent in 2012. Yet about two out of five Latin Americans remain vulnerable to falling back into poverty (defined as living on \$4–10 a day), making it the largest economic group in the region. Like most of its peers in the region, Mexico too has made progress in reducing poverty since the early 2000s. But the economic group defined as vulnerable—those who have left poverty but still lack the economic security to be considered part of the middle class—remains the largest, at 43 percent of the population in 2012.

This situation of high vulnerability—with a large number of households just above the poverty line—contrasts with Mexico's social policy, which has been focused on identifying and supporting chronically poor households. The country's vulnerable households, which by definition are not eligible for antipoverty programs, are at high risk of falling back into poverty in the event of a shock such as loss of employment, a natural disaster, or an economic crisis.

A recent paper by de la Fuente, Ortiz-Juárez, and Rodríguez-Castelán uses information from a special

module on social programs in national household surveys from 2002–06 and 2010 to better understand these vulnerable households, including their profile and their exposure to risk, and to document the extent to which they are covered by public transfers and insurance mechanisms. The special module identifies at least 15 types of cash transfers, which can be broadly grouped as scholarships, food vouchers, noncontributory pensions, and training and incentive transfers for starting up productive projects.

In profiling the vulnerable population in Mexico, the authors find that those classified in this economic group live mainly in urban areas (though a quarter still live in rural areas) and are engaged in wage-earning activities (73 percent), in microenterprises (74 percent), in the service sector of hotels and restaurants (20 percent), and to a lesser extent in retail (19 percent), manufacturing (17 percent), and agriculture (14 percent). While this vulnerable population shares some characteristics with the population in poverty (such as household size and incidence of disabilities), it differs significantly in others (such as access to basic services and occupational status). And it differs from the middle class in almost every indicator considered. For example, vulnerable people belong to households that are bigger on average (by one member) and are twice as likely to be unskilled workers (defined as having an incomplete primary education or less).

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What Has the Rise of China Meant for Labor Markets in Latin America?

The rapid growth in China led to a reduction in manufacturing employment in Mexico, though not in Argentina or Brazil

China has experienced impressive growth over the past three decades. Its GDP growth averaged 10 percent a year, and more than 500 million people have moved out of poverty. The country is now the world's largest exporter and manufacturer and a substantial importer of raw materials. The value of its trade has practically doubled every four years recently. Along with this growth has come an increasing academic and policy debate about China's effects on the performance of other economies.

For Latin American countries several questions remain unanswered. For example, how much of the change

in net exports and prices can be attributed to the growth of China? Did China's growth affect relative wages, employment, and informality in Latin America? How difficult was it for workers to move from a sector that received a negative shock to a sector that received a positive one?

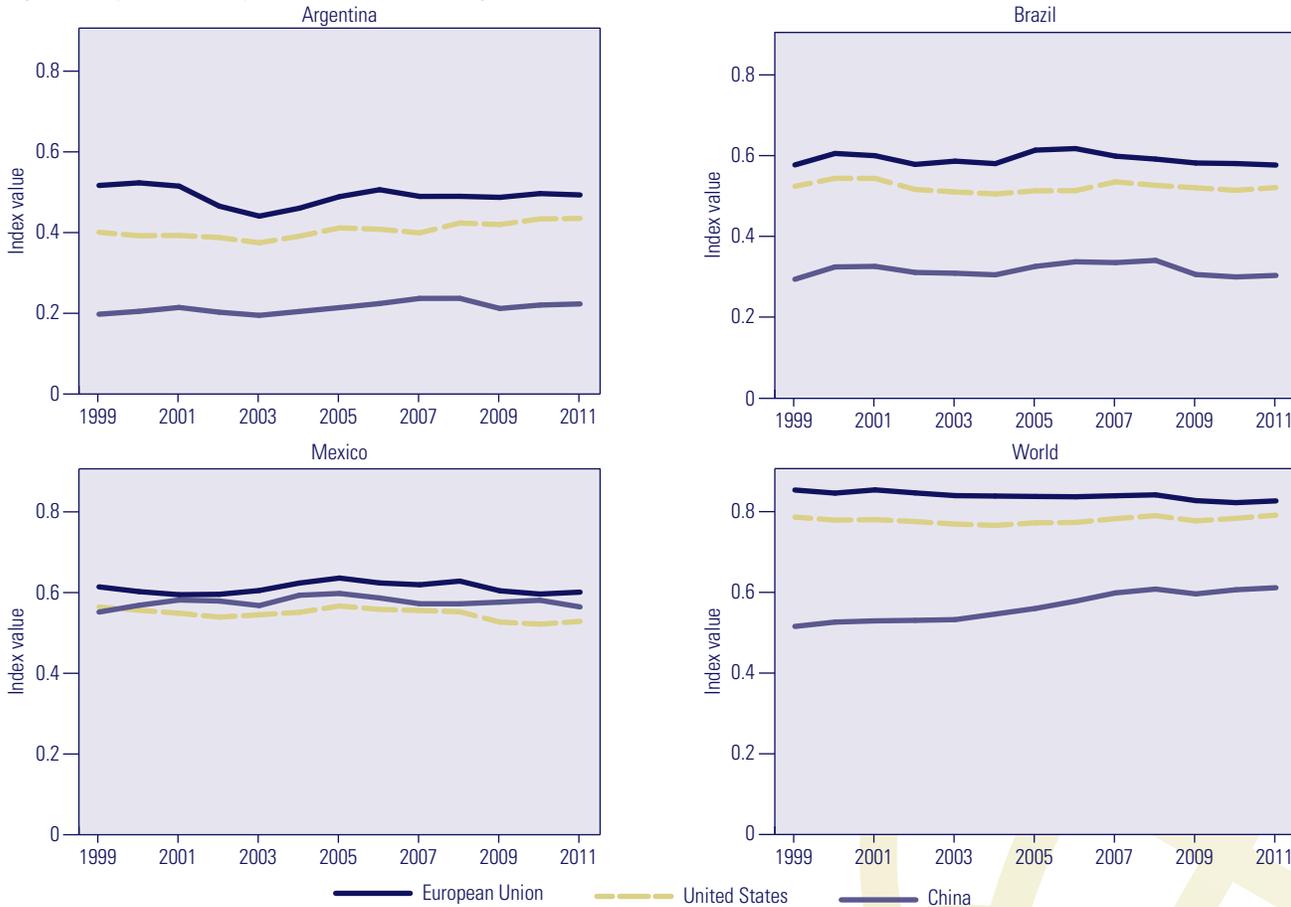
A recent paper by Artuç, Lederman, and Rojas contributes to the debate and provides some answers. The authors conceptualize China's growth as a negative trade shock for manufacturing exporters and a positive shock for mining and agricultural exporters, and identify the size of these shocks for a large set of Latin American and Caribbean economies. Using the identified shocks and an empirical model of labor markets, the authors analyze the impact on wages and employment in three large countries: Argentina, Brazil, and Mexico.

The opportunity and vulnerability measures developed in the paper suggest sizable effects on Latin America. The authors find important negative effects on manufacturing exports for such countries as Haiti, Honduras, and Mexico. Among the three large countries, only Mexico has manufacturing exports noticeably similar to China's; Argentina's and Brazil's manufacturing exports were not significantly threatened by the growth of China (figure 1). On the contrary, the authors find positive effects on agricultural exports for Argentina and Brazil as well as for Guyana, Paraguay, and Uruguay. They also find positive effects on mining exports for Brazil, Chile, Honduras, and Peru.

The China-related trade shocks affected Latin American labor markets, which are characterized by high labor mobility costs. These high costs

Figure 1. Export Similarity Index for Manufacturing, 1999–2011

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Source: Calculations based on World Integrated Trade Solution (WITS) mirror data.

Note: The export similarity index measures, for a pair of economies, the proportion of their exports that are similar.

Educating Our Future Teachers

How to produce excellent teachers? One important way is to make the teaching profession more attractive to talented young people

Good teachers are essential for high-quality education systems. A simple anecdotal review of successful education systems such as those in Finland, the Republic of Korea, and Singapore highlights the importance of teachers in producing good educational outcomes. Moreover, there is a growing consensus in the economics profession that teachers are an essential link in the chain from education spending to student learning. Students who have high-quality teachers during their school years are more likely to pursue higher education—and they tend to go to a better university and to subsequently earn more than their peers.

In many countries, however, the best and the brightest do not choose education majors. Those majoring in education tend to perform less well academically than their peers. Talented people are discouraged from pursuing a career in education by the lack of competitive salaries and challenging career paths. Nonetheless, what is the role of higher education in the formation of future teachers? Can teaching programs overcome the limitations imposed by the selection of less talented students into teaching? A recent paper by Balcázar and Ñopo addresses this question using data for Colombia.

In Colombia, as in many other countries, students who choose to study education not only show lower academic performance than their peers before enrolling in college; they also are more likely to come from a disadvantaged background. They are more likely to come from a larger family, with less-educated parents or guardians; they are less likely to migrate to pursue their studies; they are more likely to have attended a public school; and they are more likely to enroll in a public university and in a program with low tuition fees. If

prospective teachers start at a disadvantage, does higher education level the playing field?

To test this, the authors examine the extent to which the skills of students majoring in education improve or deteriorate in several areas—quantitative reasoning, native language (Spanish), and foreign language (English)—relative to the skills of students in other majors. They do so by combining the results of two standardized tests for Colombian students, one taken at the end of the senior year in high school and the other shortly before graduation from college. They find that the quantitative reasoning and foreign language skills of education majors deteriorate (or improve less) relative to those of students majoring in other subjects.

Even more interesting results come from a comparison of individuals with similar characteristics (gender, year of birth, parents' education, area of residence before and during college, and academic performance before enrolling in college). The authors find that after nearly five years of academic training, the learning gaps between prospective teachers and other students widen. These results raise a red flag about the quality of university-level teaching programs.

What can be done? Reforms might be needed in the institutions educating future teachers, the curricula they follow, or their pedagogical approaches. But there is also room for action relating to the selection of students into teaching, such as introducing stricter admissions standards. This may work through two channels—by having a direct effect on the skills of education majors and by having an indirect effect through their peers.

Yet better teacher education programs and higher admissions standards alone are likely to have only modest effects. It would be myopic to think that the solution lies only within the teaching community. Also necessary is to push for ambitious policies aimed at making the teaching profession more attractive to the most

talented young people. One appealing option is to offer higher salaries for teaching positions at public schools.

Carlos Felipe Balcázar and Hugo Ñopo. 2015. "Broken Gears: The Value Added of Higher Education on Teachers' Academic Achievement." Policy Research Working Paper 7168, World Bank, Washington, DC.

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What Has the Rise of China Meant for Labor Markets in Latin America?

resulted in big differences between the short- and long-run impacts on relative wages and employment in Argentina, Brazil, and Mexico. The highest mobility costs are found for workers switching from informal employment into formal jobs in agriculture or mining. These high mobility costs limited both the number of workers absorbed by these sectors and the reduction in informality induced by the favorable China effect.

The numerical simulations for Argentina and Brazil indicate that the positive shocks on agriculture and mining offset the negative shock on manufacturing, leaving total employment and real wages almost unchanged in the long run. In these countries a larger positive shock in mining and agriculture was needed to offset a smaller shock in manufacturing because this sector employed a larger share of workers. In the short run real wages increased in mining and agriculture. In Mexico, however, the shock to manufacturing provoked a reduction in employment in this sector in the long run after an increase in mining real wages and a decrease in manufacturing real wages in the short run.

Erhan Artuç, Daniel Lederman, and Diego Rojas. 2015. "The Rise of China and Labor Market Adjustments in Latin America." Policy Research Working Paper 7155, World Bank, Washington, DC.

The Growing and Long-Lasting Effects of Brazil's Trade Liberalization on Workers

Even two decades after Brazil liberalized trade, the costs and benefits remain unevenly distributed across the country

One important way in which the increasing openness of an economy leads to welfare gains is through the reallocation of resources across economic activities. Prominent theories of international trade rely on the reallocation of inputs across sectors or firms in order to generate production gains from trade. However, academic economists have traditionally paid little attention to the adjustment process, instead focusing on long-run models where reallocation is achieved without frictions. This focus has created a tension between academics advocating trade liberalization and policy makers concerned with the labor market outcomes of workers employed in contracting sectors or firms.

Although many countries underwent major trade liberalization episodes during the 1980s and 1990s (including Brazil, India, and Mexico), we still know very little about the medium- to long-run effects of these policy reforms on labor markets. A recent paper by Dix-Carneiro and Kovak helps fill this gap in the literature by examining the dynamics of local labor market adjustment in response to a major trade liberalization episode in Brazil in the early 1990s.

Using 25 years of administrative data from Brazil, the authors exploit variation in tariff declines across industries and variation in the industry mix of local employment across Brazilian regions to measure changes in local labor demand induced by liberalization. As one example, between 1990 and 1995 tariffs in apparel fell from 51.1 percent to 19.8 percent while tariffs in agriculture rose from 5.9 percent to 7.4 percent. Consequently, trade liberalization had a much more negative effect on labor demand in Rio de Janeiro (where a significant share of workers produce apparel) than in Traipu in the state of Alagoas (where

most workers produce agricultural goods). This approach, along with detailed longitudinal data, makes it possible to observe labor market dynamics for 20 years following the beginning of the trade policy changes.

While a growing body of research shows that changes in trade policy have varying regional effects in the short run, many economists had assumed that the short-run effects would be larger than longer-run effects, with labor markets restabilizing over time as workers move away from adversely affected regions. The authors find the opposite pattern. Short-run effects in the wake of Brazil's trade liberalization vastly underestimate the long-run effects. Even two decades after Brazil liberalized trade, the costs and benefits of liberalization remain unevenly distributed across the country.

These findings suggest substantial barriers to interregional mobility, but they also imply that local labor demand in more adversely affected regions kept falling relative to that in the rest of the country for years following the end of the liberalization. Indeed, firms adjusted slowly to the changes in tariffs, and their adjustments often exacerbated poor labor market outcomes in areas facing larger tariff declines. In these locations firms became less likely to create new jobs and more likely to close. Meanwhile, workers in those areas lost jobs and earnings, and these effects grew steadily for more than a decade before leveling off in the late 2000s. But earnings grew in other areas, where initial wages were lower and tariff reductions were smaller. Liberalization spurred growth in formerly marginal cities and towns rather than in Brazil's large, high-wage cities that traditionally served as the country's economic engines.

The data allow the authors to track individual workers over time and thus to observe outcomes for two otherwise identical workers who just before liberalization lived in regions that would subsequently face different local trade shocks. They find that workers whose initial region faced a larger tariff

decline became less and less likely to be formally employed over time and lost substantial amounts of formal earnings in the years following liberalization. Workers also adjusted in the face of negative labor demand shocks. Formal tradable sector workers facing larger negative local shocks were more likely to transition into formal nontradable sector employment, but on average could not offset employment or earnings losses in the tradable sector.

Using supplementary data from the census, the authors find that regions facing larger tariff declines experienced relative increases in informal employment. Informal sector jobs do not provide legally mandated labor protections or other benefits and often involve lower compensation, fewer opportunities for training and advancement, and generally less favorable working conditions. In harder-hit regions nonemployment also strongly increased in the medium run, but in the longer run nonemployed individuals eventually find employment in the informal sector. Geographic migration does not appear to respond to changing local labor demand conditions, suggesting that regional adjustment occurs primarily through workers' transitions into or out of formal employment.

The results show that the effects of liberalization on earnings and employment differ sharply across regions and that these effects grow for many years following liberalization. Contrary to what previous work anticipated, these findings thus suggest that trade policy has long-lasting effects on the labor market.

Rafael Dix-Carneiro and Brian K. Kovak. 2015. "Trade Reform and Regional Dynamics: Evidence from 25 Years of Brazilian Matched Employer-Employee Data." *Policy Research Working Paper 7025*, World Bank, Washington, DC.

Capturing Food Consumed Away from Home in Welfare Measures

Accounting for food consumed away from home leads to dramatic changes in poverty estimates—and to lower estimates of consumption inequality

Food consumed away from home (FAFH) represents an increasing share of food consumption around the world, and its share will continue to expand as per capita income grows and food systems evolve. Yet the majority of household surveys in developing countries collect little information on FAFH. What implications does this have for the measurement of poverty and inequality? The answer is far from clear, even for the direction of any change.

A recent paper by Farfan, Genoni, and Vakis explores this question by looking at the case of Peru. Consuming food away from home is a growing trend in the country: by 2013 Peruvian households spent on average 27 percent of their food budget on FAFH. In addition, Peru is among the few countries that collect high-quality data on FAFH. Its national statistical office (Instituto Nacional de Estadística e Informática) has been collecting detailed information on FAFH since 2004 as part of its national expenditure survey, which serves as the basis for measuring poverty. The survey includes information on the number of meals per week, the type of establishment, the type of meal, and the cost—all as

reported by the individual respondent.

Following Peru's official methodology for estimating poverty, the authors simulate a baseline scenario in which FAFH is not accounted for and compare the results with a world in which it is. FAFH affects the poverty estimate in two ways: it has both a direct impact on measured expenditure or consumption and, through its effect on the food basket, an impact on the value of the poverty line. Because these two effects may or may not go in the same direction, the overall effect depends on the magnitude and direction of each of them.

Once FAFH is accounted for, the authors find, extreme and moderate poverty change dramatically but in opposite ways. Extreme poverty is significantly higher—because the higher per-calorie cost of FAFH relative to homemade meals increases the poverty line more than the increase in household consumption. By contrast, moderate poverty is significantly lower—because of the increase in measured household food expenditures. The size of the effect is substantial: the extreme poverty rate for 2010 is 18 percent higher with FAFH taken into account, and the moderate poverty rate 16 percent lower (figure 1).

While FAFH tends to increase with household resources, the budget share devoted to FAFH follows the opposite pattern. As a result, consumption inequality is lower once FAFH is taken into account, though the impact is not

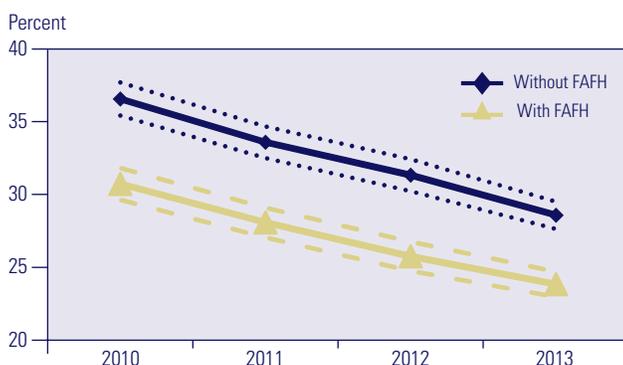
statistically significant from 2012 onward (figure 2).

The authors' analysis also produces an unexpected finding: accounting for FAFH leads to a change not only in the number of poor people but also in *who* is poor—because it results in a reordering of households along the expenditure distribution. About 20 percent of those in extreme or moderate poverty in Peru in 2010 “escape” poverty when FAFH is accounted for. This change is not trivial: it has a significant effect on the profile of the poor. For example, consistent with FAFH increasing as resources increase, per capita income is significantly lower and fewer household members are employed among those who are classified as poor when FAFH is accounted for.

Collecting information on FAFH through household surveys raises a number of methodological challenges. Further research and replication in other settings are badly needed to establish some best practices on what information to collect and on how best to collect it.

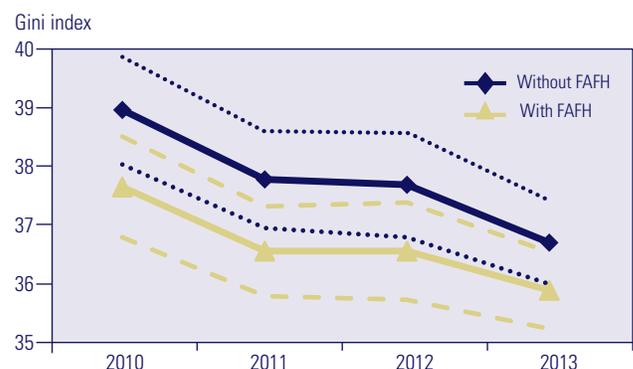
Gabriela Farfan, Maria Genoni, and Renos Vakis. 2015. “You Are What (and Where) You Eat: Capturing Food Away from Home in Welfare Measures.” Policy Research Working Paper 7257, World Bank, Washington, DC.

Figure 1. Moderate Poverty Rate in Peru with and without FAFH Taken into Account, 2010–13



Note: The dotted or dashed lines indicate 95 percent confidence intervals.

Figure 2. Consumption Inequality in Peru with and without FAFH Taken into Account, 2010–13



Note: The dotted or dashed lines indicate 95 percent confidence intervals.

A Behavioral Approach to Water Conservation

An experiment in Costa Rica shows that enabling people to compare their water use with that of peers can help reduce consumption

The United Nations estimates that more than two-thirds of the world's population will live in water-stressed regions by 2025. Demographic and economic pressures make water management an increasingly urgent policy priority, even in water-rich areas such as Latin America, home to nearly 31 percent of the world's freshwater resources.

Developing countries face unique challenges in water conservation. Accelerating urbanization often overwhelms the capacity of local water service provision: while the share of people with access to improved water and basic sanitation services has increased globally, there were more urban dwellers without access in 2010 than there were in 2000.

Costa Rica has climatic characteristics that in conjunction with its mountainous topography make the country a water-rich nation. Yet current water demand virtually matches production capacity, so there is risk of a water deficit in the near future. In some areas there are already shortages. And in parts of the country water security is threatened not only by overall demand growth but also by spatially unbalanced development (or the overdevelopment of areas with limited water supplies, such as the coast of Guanacaste).

In partnership with local authorities, a World Bank team conducted a randomized control trial in Belen, a small municipality in Costa Rica, with the aim of capturing innovative policy lessons for scaling up water conservation across the country. The project built on breakthrough approaches introduced through the growing field of behavioral economics, which challenges the underlying, intentionally simplified assumption of standard models: that people make rational decisions based on a self-interested cost-benefit analysis. Behavioral economics borrows from other sciences to consider the full scope of social and psychological influences on human decision making.

Traditionally, many water conservation initiatives have focused on communication and education campaigns—convincing people of the value of saving water—or on price increases to reduce demand for water. But communication efforts have had limited success. And water demand tends to be relatively inelastic—meaning that changes in price may not have a significant effect on consumption, especially for wealthy households. When price-based tools do work, they can also have regressive effects, pricing out low-income households while the consumption of the wealthy changes little.

In Belen focus groups revealed a wide consensus on the importance of water conservation, but few residents believed that they themselves needed

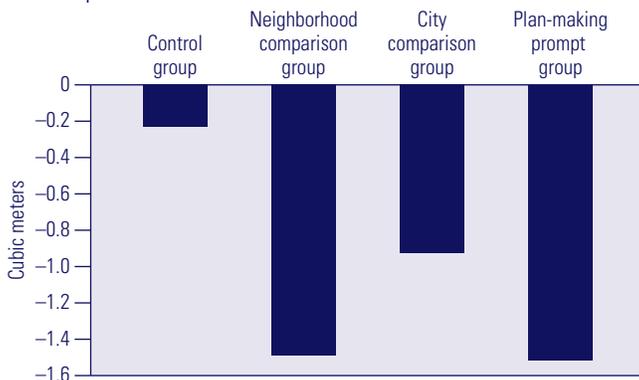
to use less water. Moreover, few had a benchmark to understand, measure, and compare their water use. Based on this deeper understanding of the problem, the team was able to design and test behavioral policy approaches—also known as “nudges”—that can affect individual decision making to reduce water consumption.

The study compared three randomized treatment groups and one control group. Consumers in the first treatment group were able to benchmark their consumption against the average consumption of neighborhood peers, and those in the second group against the average consumption of city residents. These consumers received with their bill an easy-to-read sticker with a smiley or “frowny” face indicating that they had consumed less or more than their peers.

Residents in the third group received planning worksheets with their bills, prompting them to set a concrete goal to reduce their water consumption (compared with the neighborhood average) while checking off strategies that they would use.

The results were striking. While the social comparison with other city residents led to little change, both the neighborhood comparison and the planning prompt led to large (about 4.5 percent) reductions in water consumption over the following four months (figure 1). As the Costa Rican experience demonstrates, these approaches are cost-effective—and they can be replicated in other resource-constrained environments. The results confirm that raising awareness about how much water individuals consume, and enabling them to compare their consumption with that of peers, can go a long way in helping to change behavior in the use of this finite resource.

Figure 1. Change in Households' Average Monthly Water Consumption after the Intervention



Saugato Datta, Juan José Miranda, Laura Zoratto, Oscar Calvo-González, Matthew Darling, and Karina Lorenzana. 2015. “A Behavioral Approach to Water Conservation: Evidence from Costa Rica.” Policy Research Working Paper 7025, World Bank, Washington, DC.

Using Satellite Images to Estimate Local Poverty

Satellites could aid in identifying where poverty is, by zooming in to photograph the tiniest villages and allowing constant monitoring

Many researchers have shown that measures of nighttime lights are correlated with GDP. If places that are more productive are brighter when viewed from space, it seems plausible that data from satellite sources could also be used to improve measures of poverty. But poverty is not the inverse of GDP, and on-the-ground surveys already provide measures of poverty—not to mention measures correlated with an area's nighttime brightness, such as population density and rates of electric light use. Would adding luminosity data to what we already have improve poverty estimates?

In one of the first studies to combine “big data” sensor information about luminosity with traditional survey data, Klemens, Coppola, and Shron found that using the sensor data does improve rural poverty estimates over using survey data alone.

On the survey side, the authors used data from the Guatemalan Censuses of 2002 and 2012, by the Guatemalan Instituto Nacional de Estadística (INE). The INE asked households questions about income, electrification, migration, and other relevant issues. In addition, the INE marked observations as being from urban or rural locations. Reasoning that urban lighting patterns differ from rural ones, the authors used the census data to separately consider the relationship between satellite measures and poverty rates in urban and rural areas.

On the sensor side, the authors used leaf coverage (or verdancy) data from the U.S. National Aeronautics and Space Administration (NASA) and luminosity data from the U.S. National Oceanic and Atmospheric Administration (NOAA).

The relative costs of the census and sensor data are worth noting. The

census requires hiring hundreds or thousands of interviewers to travel to every household, often several times before making contact. Because no census ever achieves a 100 percent response rate, there must also be at least some amount of post-canvassing imputation to fill in missing households, so that even the most well-run census will have some associated uncertainty. Conversely, the NOAA data are gathered every day of the year, cleaned using well-known algorithms (to correct for clouds, gas flares, and other anomalies), and bundled into a free download (http://ngdc.noaa.gov/eog/viirs/download_monthly.html). In the cost-benefit analysis of sensor data, the marginal cost of the satellite data the authors used is negligible.

The authors found that adding satellite measures of change in luminosity improved regressions predicting the change in rural poverty rates using data for demographic indicators such as population density, indigenous population, and electrification rates. Their measures of improvement included the traditional R^2 measure for linear regressions, mean squared error from cross-validation, and Kullback-Leibler divergence measuring information loss.

By contrast, adding luminosity data to survey-based regressions predicting urban poverty gave only a slight improvement. And the verdancy measures showed no statistically significant effect in either rural or urban contexts, perhaps because methods of cleaning verdancy data are less well established.

With the aim of keeping the model simple and focused on the data, the authors used only linear regressions. But small-area models of poverty estimates are typically much more

sophisticated, usually involving a hierarchy of nested models mirroring the geographic hierarchy of smaller regions nested in larger regions. Satellite data could play an especially useful role as the base of such a hierarchy, because modern sensors can produce data at a subkilometer scale, typically a much finer scale than survey data reported at the level of the municipality or province. Estimates at the scale of geographic regions can be brought down to a finer geography using the sensor data; the fine-scale sensor data can borrow strength from the regional-level survey data.

The results show promise for the use of sensor data in future work. Not surprisingly, we are still far off from measuring poverty using only sensors in space. But the authors' work shows that the sensor data do add information above and beyond the survey data—and at the cost of only a download and some extra computing time. So there is reason to believe that future survey-based poverty estimates may benefit from augmentation using sensor data.

We are still far off from measuring poverty using only sensors in space. But there is reason to believe that future survey-based poverty estimates may benefit from augmentation using sensor data

Ben Klemens, Andrea Coppola, and Max Shron. 2015. “Estimating Local Poverty Measures Using Satellite Images: A Pilot Application to Central America.” Policy Research Working Paper 7329, World Bank, Washington, DC.

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In looking at social programs, the authors find that these largely cover the poor but barely reach the vulnerable. Monetary transfers (particularly the conditional cash transfer program Progresa-Oportunidades) achieve the highest coverage among the poor population, but cover only about 17 percent of the vulnerable population (about 22 percent of those living on \$4–5.50 a day and about 15 percent of those living on \$5.50–10 a day). Yet after the poor population, the vulnerable group has the second highest incidence of cash transfers of all kinds. The middle- and upper-income groups have a relatively low incidence but receive significantly higher amounts than the vulnerable population.

The analysis also shows that until 2010 most social programs with productive components, such as vocational training and productive investment grants, barely reached the vulnerable. In addition, insurance programs to protect against risks (health, weather, and unemployment) have been expanded only in recent years to cover vulnerable households. In particular, the Seguro Popular scheme, developed to protect against financial risks linked to poor health, covered almost two-thirds of vulnerable households in 2012, up from 13 percent in 2006. The main public weather insurance scheme—part of the Mexican Catastrophe Climate Contingency Insurance Program (CADENA)—is also likely to cover many vulnerable

families given the eligibility criteria defined for it.

The low incidence of most social programs among vulnerable households is not necessarily worrisome, since most of these programs were conceived for poor people. Yet the few social programs that have a productive orientation also have a very low incidence among the vulnerable population. This is a greater concern, because members of this group have higher endowments of human capital, and support to develop their job skills could improve their wage prospects while training and credit for working capital could help them thrive. Moreover, the poor and vulnerable groups are similar in many characteristics, including levels of food insecurity and exposure to risk. Thus it would be worthwhile to discuss whether social programs and insurance mechanisms in Mexico should expand their coverage to encompass the vulnerable population—or whether a specific set of benefits, including targeted interventions and universal insurance schemes, should be created to serve this group.

Alejandro de la Fuente, Eduardo Ortiz-Juárez, and Carlos Rodríguez-Castelán. 2015. “Living on the Edge: Vulnerability to Poverty and Public Transfers in Mexico.” *Policy Research Working Paper 7165*, World Bank, Washington, DC.

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