Poverty and the Binational Population:

A Note on Poverty Measurement

Preliminary, Please Do Not Cite Without Permission

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Abstract

Traditional poverty measures are inappropriate for migrant populations. Frequently cited poverty thresholds are calculated under assumptions that individuals and their families face only one set of prices annually. This study formulates (and contrasts to current thresholds) alternative measures for a population that spends substantial time in two (or more) countries. Poverty measure weights based on annual week allocations, income, family characteristics, and comparative price levels are developed. For illustration, a case study example is drawn from the Mexico-U.S migration context using survey data. Results contribute to statistical poverty measurement by demonstrating how alternative thresholds can be generated for those whose annual work spans international boundaries. This should offer additional policymaking inputs that are of interest academically, and to those involved in ground-level statistical calculations pertaining to demographic trends and the welfare state.

Keywords: poverty measurement, immigration, transnational population

JEL codes: I32, J33, Q12

1   Introduction

Mexican migrants are often among the poorest members of the working class in the United States. Traditional poverty measures, however, are inappropriate for analyzing this population and others with similar characteristics. Frequently cited poverty measures include thresholds and lines that are functions of family size, but are calculated under the assumption that individuals and their families face a common price level set throughout the year. Those participating in migrant streams spanning borders, however, split annual time between source and receiving countries and face different costs of living domestically and abroad. This may apply to single individuals, to entire families who migrate together, or only to select members of a family unit (e.g., a parent who alone participates in seasonal or other temporary work in a foreign country).

A primary aim of this note is to examine the appropriateness of current, and hypothetical alternative, poverty measures for the case of a population that spends substantial time in two (or more) countries. Much of the academic literature pertaining to immigration and poverty has focused either on poverty among settled immigrants within a receiving country, or on the effects of transfers (often remittances) on poverty for family (or community) left behind in a source country as migrants work internationally. This study proposes to address this gap in the academic literature by examining outcomes among migrants themselves and their immediate family members while adjusting for time spent abroad and therefore for different living costs faced. Furthermore, public aid program eligibility is often a function of poverty status and therefore this study is of policy significance beyond the goal of improving statistical calculations for demographic study purposes.

Methodology involves calculating poverty rates under alternative weighting schemes and examining whether variation across measures is statistically and economically significantly different from official U.S. poverty thresholds. In addition to formalizing these theoretical specifications, an empirical example is calculated for the case of Mexico-U.S. migrant streams. Given cost of living differences, U.S. wages that put a worker's total family income below

U.S. thresholds often do not put the same worker's family below Mexico's poverty guidelines. Furthermore, once adjustments are made for time spent in various locations, wages that put a worker's total family income below U.S. thresholds may not put the same worker under adjusted thresholds.

Results contribute to studies of the statistical measurement of poverty and of border populations more generally, and have applications to interregional migration within a country in addition to the international context. The project demonstrates how alternative poverty measures can be calculated for populations engaging in short-term and often seasonal work across boundaries, as well as more frequent border commuters. While these measurements will not be prescriptive of specific public policies by themselves, they should offer complementary inputs into informed policy decision making in the areas of immigration, more general population movements, and poverty alleviation. This is of interest to both academic researchers, and to those directly involved in ground-level statistical calculation pertaining to demographic trends and the welfare state nationally and internationally.[1] Although the application in this paper relies of national level threshold differences, the general criticism of frequently used poverty calculations and the adjustment technique presented here equally applies to variation in cost of living across cities and areas within one country.[2]

This note is organized as follows. Section 2 discusses theoretical considerations for adjustment of poverty measures for the binational population and formalizes a framework. Section 3 explores a case study example pertaining to Mexico-U.S. migrant streams. Section 4 discusses policy significance and concludes.

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[1] Anderson and Gerber (2004) illustrate how another index can be adapted for border populations in their study of human development indices in the context of the Mexico-U.S. border.

[2] In addition to general regional cost of living differences related to prices, border regions particularly present their own differences. Earning differentials, for example, are particularly well documented along the Mexico-U.S. border (e.g., Smith and Newman (1977), Dávila (1982), Dávila and Mattila (1985), Dávila and Mora (2008)).

2 Literature and Theoretical Considerations

Academic literature on the interrelationships between immigration and poverty has focused on poverty among settled immigrants within a receiving country, and on the effects of transfers on family or community poverty left behind. Lesser work has been done on poverty measurement in an international context. Hoynes, Page, and Stevens (2006), however, in a survey of poverty literature, cite a relationship between rather constant official U.S. poverty rates over time and immigrant inflows in general, but find by way of an empirical exercise that official U.S. poverty rates are only 0.1% higher due to immigration in a 1979 to 1999 time period comparison. The authors note that this figure, however, represents a lower bound of an immigration effect on poverty if negative wage effects are associated with immigration.[3]

Table 1: U.S. Poverty Thresholds 2009

Number persons	Threshold ($)
1	11,161
2	14,366
3	16,781
4	22,128
5	26,686
6	30,693
7	35,316
8	39,498
9+	47,514

Source: U.S. Census Bureau. Thresholds for family sizes of 1 and 2 are based on household heads that are less than 65 years of age.

As noted, poverty thresholds and lines are calculated under the assumption that a family faces a common price level set throughout the year, and U.S. wages that put a worker below U.S. thresholds may not put him/her below thresholds adjusted for binationality or below source country thresholds based on like or different definitions. Furthermore, definitions of "thresholds" may differ substantially depending on context. In the United States, official thresholds are based on 1963-1964 U.S. Department of Agriculture "food budgets" and are

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[3]Whether immigration decreases overall wages received by both immigrants and natives is a point of continued debate within the academic literature on the economics of immigration.

updated annually using the Consumer Price Index for All Urban Consumers (CPI-U). Official U.S. poverty thresholds for year 2009 are presented in Table 1 for illustration. Values vary by family size.

As a comparison to the U.S. case, Mexico circulates separate statistics from two poverty measure frameworks. The first, like the U.S. computation, is food-based. The second is asset-based. Other countries offer different formulas, and international organizations calculate poverty statistics independently as well. The World Bank, for example, uses reference lines set at \$1.25 and \$2 per day in purchasing power parity terms. Inequality and vulnerability are separate notions and relate to relative poverty in a societal context and risk of poverty respectively (Coudouel, Hentschel, and Wodon (2002)).

Several considerations enter a discussion of how to appropriately re-weight poverty measures to account for transnationality. Particularly, consider a formula such as:

$$new\_threshold = \frac{U.S.\_weeks}{total\_weeks} * (U.S.\_threshold) + \frac{abroad\_weeks}{total\_weeks} * (abroad\_threshold) \quad (1)$$

where $U.S.\_threshold$ and $abroad\_threshold$ are functions of family size and of year. An idea then might be to compare total annual family income to this value. This type of formula, while representing a starting point, has several caveats. Perhaps the most important of these is that the formula is only valid if U.S. and international-specific thresholds follow like methodology. In general, however, this is not true and instead, more wealthy nations are seen to have more generous poverty standards.

The comparison poverty threshold examined here uses purchasing power parity (PPP) indices and time spent in the U.S. versus abroad as adjustment factors.[4] Particularly, consider:

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[4]Deaton (2010), however, discusses imperfections in the use of PPP numbers of analyzing cross-county poverty especially under circumstances where cross-country consumption patterns differ. Still, this is used here as a best approximation to currency differences across borders. It should be further noted, however, that a more ideal index for this purpose would be based on pricing, separately for each country of interest, a common bundle of commodities used by migrants. This bundle may differ from that of an *average* consumer in any country.

Figure 1: PPP ratio, Mexico-U.S. Example

Source– World Bank, World Development Indicators database and author's calculations.

$$threshold = \frac{U.S.\_weeks}{total\_weeks} * (U.S.\_threshold) + \frac{abroad\_weeks}{total\_weeks} * (PPP\_ratio) * (U.S.\_threshold)$$

$$(2)$$

where PPP_ratio represents the ratio of per capita PPP indices between the second country of interest and the U.S. Comparative poverty rates calculated by this formula for those of varying family sizes are presented in the case study illustration below. Figure 1 presents per capita purchasing power parity ratios for the Mexico-U.S. example over time.[5] The figure illustrates generally small changes in the per capita PPP ratio between Mexico and the U.S. each year, but some evidence of increase in this this statistic over time.

3 Case Study Illustration: Mexico-U.S. Migration

The National Agricultural Workers Survey (NAWS) is a representative survey of employed farmworkers in the United States.[6] The public use data have been taken over fiscal years 1989 through 2006 based on a survey design which samples three times a year following the agricultural seasons of fall, winter/spring, and summer. The survey is representative nationally for the U.S., for 12 agricultural regions within the U.S. and for each year and season. The sampling procedure is based on sampling from work sites as opposed to houses to mute undersampling concerns revolving around both the undocumented population and workers living in nonstandard housing situations. The total sample size of the public use data is 46,566. Of this total, 20% of workers report being U.S. born (25.0% survey weighted) and 73% report origins in Mexico (68.7% weighted), with the remainder reporting other international origins. The sample therefore being largely Mexican, representative, and with

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[5]World Bank current year values of per capita purchasing power parity are used to calculate the PPP ratio. Values from the International Monetary Fund (IMF) and the Central Intelligence Agency (CIA) are generally within rounding.

[6]It should be noted that household structure and income data are believed to be accurately measured given survey design that allows differential values pertaining to inside and outside the U.S., and therefore hypothesized that any complexities raised by this particular migrant population are minimized.

detailed information on legal status represents the basis of the case study presented here.[7]

Survey respondents are asked for the numbers of weeks that they spend in farm work, in non farm work, and abroad. On average, Mexican workers report 11.5 weeks per year spent outside of the country. Using U.S. official poverty thresholds, family poverty in this population is 45.8%. For Mexican undocumented workers, these numbers are greater with average weeks abroad at 16.1 per year and a poverty rate of 52.5%. In contrast, U.S. born workers report only 0.3 weeks per year spent out of the country and incomes consistent with a family poverty rate of 29.2% overall.

Table 2: Family Structure in the NAWS, Restriction to Mexican Workers

Family Size	Freq.	Percent	Weeks Abroad	Poverty	*Native Poverty*
1	6,629	23.94	15.78	33.75	32.63
2	3,846	13.89	12.02	39.84	21.01
3	5,140	18.56	11.53	47.46	27.80
4	4,755	17.17	10.41	54.70	32.01
5	3,621	13.08	9.09	62.14	33.74
6	1,989	7.18	10.74	68.26	60.61
7	977	3.53	9.92	78.61	60.72
8-15	730	2.65	9.01	74.22	66.85

Source: National Agricultural Workers Survey, public use version, 1993-2006. Note that final column corresponds to U.S. born poverty rates for purpose of comparison.

Complete family composition data are only available in 1993 waves of the survey onward.[8] Table 2 presents statistics conditional on family size for survey data collected from 1993 to 2006 for Mexican and U.S. born workers as comparison. For Mexican workers, weeks spent abroad is generally decreasing with family size and poverty (by the standard U.S. definition) is generally increasing. Poverty rates by family size are more constant for U.S. born workers with increases happening later in the series.

Census Bureau poverty thresholds for various years and family sizes corresponding to

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[7]Pena (2010) presents a study of poverty within this population. That study, however, uses U.S. poverty definitions. This note was inspired by comments regarding that previous work.

[8]While respondents are asked about spouses and children, they are not asked about other dependent family members in the household. For the Mexico-U.S. migrant case, this omission is important given cultural norms pertaining to extended family.

NAWS worker observations are combined with the PPP adjustment formula as given in equation (2) as well as with particular reported weeks abroad for individual workers. Per capita PPP ratios calculated from the World Bank, World Development Indicators, for years matched to the survey data, as presented in Figure 1 are used.

Table 3: Revised Poverty Rates by Family Structure

Family Size	Weeks Abroad	Old Poverty	New Poverty	Difference	Number Misclassified
1	15.78	33.75	30.63	***	207
2	12.02	39.84	34.82	***	193
3	11.53	47.46	43.22	***	218
4	10.41	54.70	52.60	***	100
5	9.09	62.14	60.40	***	63
6	10.74	68.27	66.60	***	33
7	9.92	78.61	76.79	***	18
8-15	9.01	75.38	75.18		1
TOTAL					833

Source: Author's calculations using all sources above. $* * * p < 0.01$, $* * p < 0.05$, $* p < 0.1$ for paired two-sample mean-comparison tests.

Adjusted poverty rates are presented in Table 3. Differences in poverty rates are found to be statistically significant for most family sizes through differences decrease for larger families. Results from paired two-sample mean-comparison tests are presented in the table with asterisks denoting statistical significance. For the Mexico-U.S. case, official poverty rates are shown to be overstated for agricultural workers in the case study example. In other country contexts where the PPP ratio is greater than 1, official poverty rates will be understated following this reasoning.

While statistically these differences are significant, it is worth considering the economic magnitudes of these differences as well. Particularly, the differences generated by the alternative formula here suggested a total of 833 misclassifications in the case study example. Kandel (2008) estimates that there were 1.01 million hired farmworkers in the United States in 2006. NAWS weighted summary statistics suggest that 68.7% are of Mexican origin. Back of the envelope calculations therefore suggest that the NAWS sample is at approximately the

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Figure 2: Fraction of Mexican Farmworkers under Current and Adjusted Poverty Thresholds
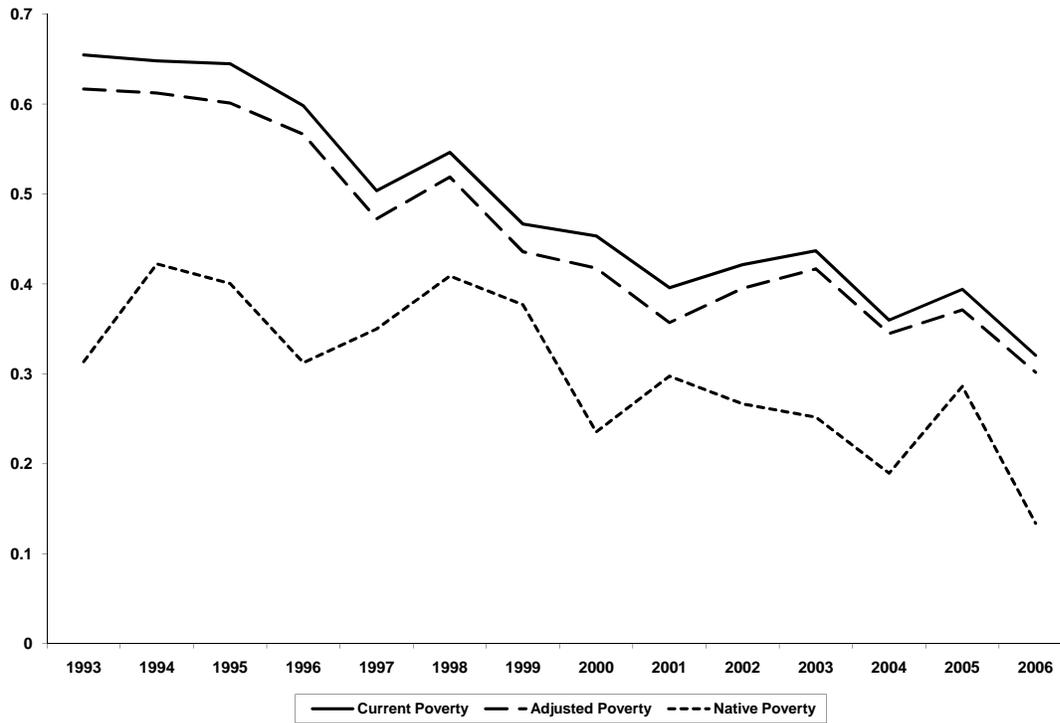
SOURCE– National Agricultural Workers Survey, pooled cross sections 1993-2006.

Figure 3: Fraction of Mexican Farmworkers under Current and Adjusted Poverty Thresholds, Restriction to Family Size of 1
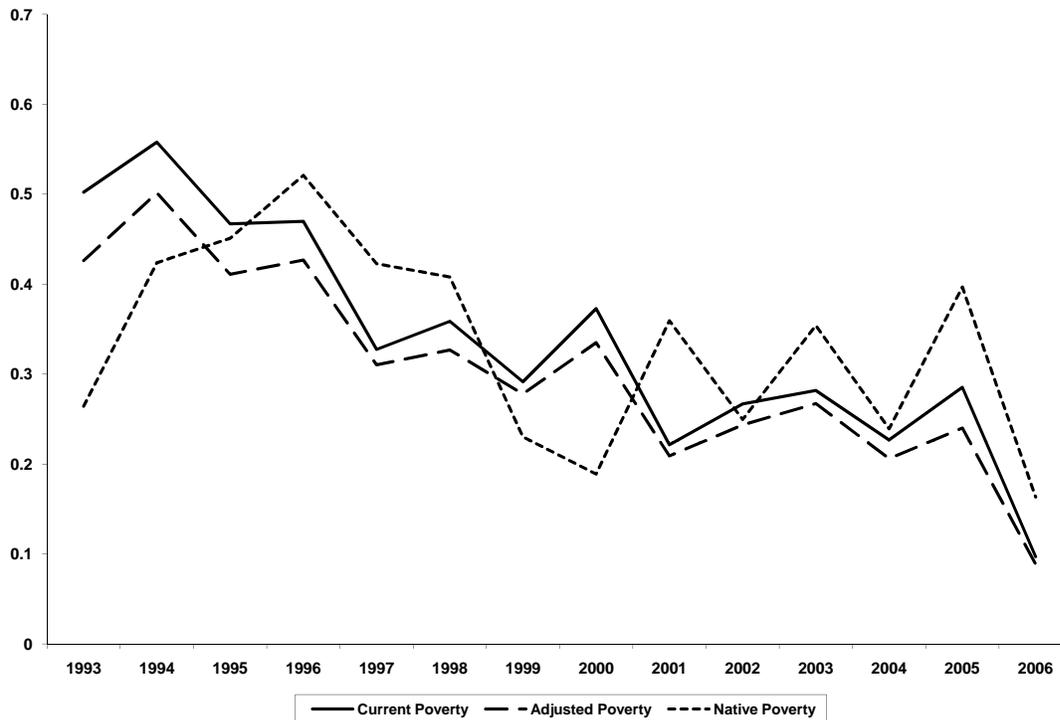
SOURCE– National Agricultural Workers Survey, pooled cross sections 1993-2006.

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4.6% level and that approximately 18,326 poverty misclassifications among Mexican agricultural workers alone are suggested by this example. This is notable especially given that the formula should continue to overcount poverty if positive remittances (not adjusted for here) are present.

The fraction of Mexican farmworkers under both current and adjusted poverty thresholds is illustrated in Figure 2. Both current and adjusted series are found to be generally decreasing for Mexican workers. Native poverty rates calculated by the current measure are presented for comparison. Adjusted Mexican agricultural worker rates, while lower than current rates, overall do not approximate native rates. This finding is related, however, to differences in family structures across these populations. In contrast to Figure 2, Figure 3 presents poverty rate comparisons between Mexican and native farmworkers restricting to a family size of 1 and rates are shown to be more similar.

4   Discussion and Conclusions

In March 2010, the Obama administration announced a new poverty measurement technique (Supplemental Poverty Measure) for presentation alongside existing measures. Specifically and unlike existing measures, the new measure will make allowances for decreases to family resources such as tax payments, work and child care expenses, and out of pocket medical expenses and for increases in resources due to supplemental sources such as in-kind benefits. The new thresholds are set to rise proportionally to average American living standards and are based on a definition of poverty status below the 33rd percentile. The new measure therefore is based on comparative, as opposed to absolute purchasing power, and is controversial, despite announcements that the new measure will not be used for benefits determination.[9]

The study of the effectiveness and possible improvement of poverty definitions also is a

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[9]See press release: "Census Bureau to Develop Supplemental Poverty Measure" http://www.commerce.gov/NewsRoom/PressReleases_FactSheets/PROD01_008963.   Of further interest, the administration is interested in methods and data sources used to geographically adjust poverty thresholds (*Federal Register*, Vol. 75, No. 101, Wednesday, May 26, 2010). The new measures are scheduled to be released in November 2011 alongside the official statistics (old method).

theme of this paper. This study has examined the idea of adjustments to the poverty definition for binationality. Specifically, purchasing power differences exist across borders and therefore those partaking in migrant streams spanning borders may be inappropriately classified either as poor or non-poor depending on the direction of these differences. "Poverty" has traditionally been defined relative to one country's prices. Here the relevance of comparative purchasing power figures has been argued. The adjustments suggested in this work could hypothetically be applied to either old official or new poverty measures for comparison purposes and statistical analysis of the impoverished population and therefore have the potential to be included alongside other improvements. For the case study example, adjustments suggest that fewer Mexican migrants should be considered poor by U.S. standards than what is found using current formulas. However, a parallel argument may be made regarding native border residents who also may have access to lower prices. This suggests that poverty rates for some households native to a source country also should be reconsidered.

The formula given in equation (2) has the caveat that it will continue to overstate poverty to the degree that there are positive remittances from the U.S. to the second country and understate poverty if the reverse is true. Furthermore, the fraction of time spent in the U.S. versus abroad may differ across family members.[10] Approximations were used in this note to examine the extent of misclassification in the current poverty measures related to the transnationality consideration, which is found to be significant. Of further interest is the extent to which misclassification due to binational population movements occurs from the source country perspective in which case the formula in equation (2) could be used with the source threshold substituted and PPP ratio inverted. This was not completed for the case here due to threshold data availability.

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[10]More sophisticated allowances could be made for reported activity of family members other than the migrant him or herself. Particularly, adjustments could be designed for total annual incomes and composition of family that partakes in the migrant stream using equivalence scales from development and family economics to account for differences in relative household consumption by age and gender. This was not completed in this note but should be considered for future work in this area.

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