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REBUILDING BABEL: FINDING COMMON DEVELOPMENT SOLUTIONS USING CROSS-CONTEXTUAL COMPARISONS OF MULTIDIMENSIONAL WELL-BEING

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REBUILDING BABEL: FINDING COMMON DEVELOPMENT SOLUTIONS USING CROSS-CONTEXTUAL COMPARISONS OF MULTIDIMENSIONAL WELL-BEING

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SUMÁRIO

ABSTRACT

We build on the theoretical tradition of livelihood strategies and capital portfolios to empirically assess wellbeing among rural households, but with an eye to comparison across contexts. First, we estimate a multidimensional measure of poverty based on fuzzy logic, for two rural frontiers: Nang Rong, Thailand and Altamira, Brazil. To enable cross-contextual comparison, we calculate a second estimate using a subset of shared measures. We find that the pattern of response over the range of many key variables – for example education, income, and demographic dependency ratio – is robust to model specification, suggesting that comparative generalizations, useful in formulating cost-effective policy interventions across contexts, could be satisfactorily identified in many instances. More generally, our approach provides researchers and policymakers with a framework for understanding the interaction of context and the subjective construction of wellbeing that is useful for distinguishing stable corollaries of poverty from those that are volatile across contexts.

Keywords: Multidimensional poverty, Amazonia, Thailand, Cross-site comparison, Grade of Membership

RESUMO

Com base na tradição teórica relativas a estratégias de sobrevivência e portifólios de capitais, propomos uma adaptação e combinação de metodologias para analisar o bem-estar entre domicílios rurais, dando especial atenção à comparação entre diferentes contextos. Em primeiro lugar, nós estimamos uma medida multidimensional de pobreza baseada em lógica nebulosa, para duas áreas de fronteira agrícola: Nang Rong, na Tailândia e Altamira, no Brasil. Para que a comparação entre contextos fosse possível, nós calculamos uma segunda estimativa utilizando um subconjunto das medidas presente nas duas áreas de estudo. Nossos resultados sugerem que o padrão de resposta em relação a várias características chave – por exemplo, educação, renda e razão de dependência demográfica – é robusta à especificação do modelo, sugerindo que generalizações comparativas, útil na formulação de políticas públicas que sejam custo-eficientes quanto à intervenção em contextos distintos, poderiam ser identificadas em diversas situações. Mais genericamente, nossa abordagem fornece aos pesquisadores e gestores de políticas um arcabouço que possibilite entender a interação do contexto com a construção subjetiva de bem-estar. A compreensão dessa interação é útil para distinguir corolários estáveis de pobreza daqueles que são voláteis em contextos distintos.

Palavras-chave: Pobreza multidimensional, Amazônia, Tailândia, Comparação entre contextos, Grade of Membership

JEL: O15, P47, Q12

1. INTRODUCTION

The concept of poverty has received vigorous theoretical attention and revision in recent years (SEN; 1985, 1999; KAKWANI; SILBER, 2008; ALKIRE, 2007). As a result, we have witnessed the emergence of a large and still-growing literature that seeks to identify numerous dimensions of human well-being, each distinct from existing unidimensional measures of monetary income (BIBI; 2005). This conceptual refinement has been hailed as a major step forward for the study of what is now commonly termed *multidimensional* poverty (MDP). However, there is at present far less recognition of the new difficulties posed by high-information measures of MDP: namely a potential loss in ability to assess and compare poverty across contexts using these more refined measures. That is, the evolution of MDP measures to include any of the dozens of new dimensions of poverty so far identified in the literature – e.g. housing poverty, physical poverty, subjective poverty, human capital, social capital, exclusion, health, leisure, neighborhood, and so on – has resulted in a major obstacle to comparative studies of poverty that is both methodological and theoretical.

Methodologically, differences in data collection strategy, approach, and purpose virtually guarantee that the growing number of individual measures used in a high-information MDP measure decreases the likelihood that all relevant measures exist across all comparison contexts of interest. Thus any summary MDP measure enabling cross-contextual comparisons is likely to suffer from some unknown degree of bias due to the omission of important variables or dimensions of poverty in one or more sites. Theoretically, and more concerning yet, is the very real possibility that the specification and measurement of MDP may exhibit a dependency on context that renders cross-contextual comparison difficult, if not wholly inappropriate. We say possibility because the methodological challenges just described have effectively prevented the empirical exploration of context-dependence with high-information MDP measures. In sum, we do not currently have the theoretical or methodological basis necessary for exploring and understanding the influence of context when constructing and interpreting quantitative MDP measures, nor for making comparative statements across contexts about important factors contributing to poverty and wellbeing, one of the chief advantages of high-information measures. From both a scientific and a policy standpoint, this is a troubling state of affairs.

In this paper, we suggest a rudimentary framework enabling such cross-contextual comparisons under some, but not all circumstances, and demonstrate its potential utility using data from two frontier regions – one in Northeastern Thailand and a second in the Brazilian Legal Amazon. We address the methodological challenges of comparing high-dimensionality MDP measures across contexts by using a modified strategy of identification of multidimensional profiles that relies on the construction of "extreme profiles" of poverty and well-being over many dimensions and proceeds to assign fuzzy membership in each profile to every house in a sample (GUEDES ET AL., *forthcoming*). The resulting summary measures of relative poverty allow for the differential contribution of specific dimensions or measures to the overall wellbeing of each household – a property known as vagueness that shifts the focus in MDP measurement from seeking strict cutoff points to identifying gradations of poverty (CHELI, 1995; CHELI; LEMMI, 1995; CHIAPPERO-MARTINETTI, 2004). Similarly, we address the theoretical challenge of cross-contextual poverty comparisons using a sequential process in which we sort all available measures of poverty for all contexts of interest into two major groups. The

first, termed *plenary measures*, consists of all those measures of any dimension of poverty that are available for all contexts. The second, termed *idiomatic measures*, consists of all additional measures which, for whatever reason, are unique to one or more contexts or datasets. Modeling the plenary set separately from a set that additionally includes the idiomatic measures enables us to get some purchase on the question of what effect the idiomatic (site-specific) elements of poverty have on overall MDP estimates. Our chief aim, however, is not the accurate estimation of absolute levels of poverty or inequality across multiple contexts. For accurate poverty assessments, traditional context-specific, high-information measures can generally be shown to provide superior estimates. Rather, our aim is to assess the effect of using a reduced, lower-information MDP measure supportive of true cross-contextual comparisons across a variety of metrics. In short, our question becomes not "which is the best model for poverty assessment?" but instead, "if we use the best model available in multiple contexts, to what extent are our estimates degraded?" Equally important, we address the follow-up question, which is, "if estimates are degraded when restricting ourselves to the common (plenary) set of poverty measures, does this worsening inhibit our ability to make broad comparative statements about poverty across contexts?"

To preview our results, we confirm that after identifying a large set of plenary poverty measures (P) and an equally large set of idiomatic poverty measures (I) for two distinct contexts, the best fitting models are indeed those containing the most information (in our terminology, model "P + I" fits better than model "P" for both contexts). However, we go on to show that on a wide range of important and policy-relevant individual measures, the observed relationship between the general attribute and the summary MDP measure is not altered substantially from model P +I to model P. Variables of importance for which the pattern is consistent include both measures of general capital classes ranging from financial to human and social as well as a variety of livelihood activities that are associated with greater wellbeing in our study sites. These results suggest that it may be acceptable to draw broad conclusions about the distribution of composite MDP measures across these measures of interest in multiple contexts. The methodology also enables us to quickly assess which factors display a common distribution across contexts and which show a more complex relationship. These results represent a major first step in the unraveling of the relationship between contexts generally and MDP using high-information measures.

We begin in Section II by drawing attention to the lack of studies attempting to make quantitative cross-contextual comparisons of MDP using highly dimensional measures and briefly summarizing the literature on MDP assessment. Section III presents our fundamental framework and describes the specific contexts, data, and methods employed. Descriptive results are reported in Section IV. We conclude in Section V with a discussion of the future of cross-contextual examinations of MDP, and offer additional practical suggestions to researchers struggling to colonize the middle ground between the rich, single-site examinations and the fairly shallow cross-contextual comparisons that characterize the present state of MDP research.

2. BACKGROUND

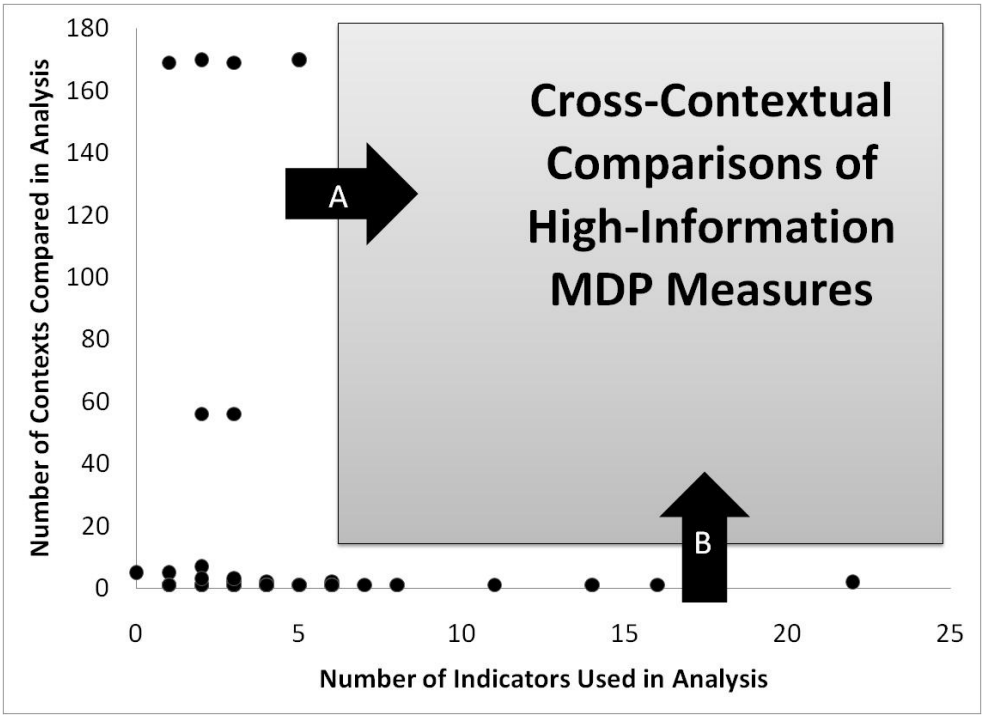
2.1. Cross-contextual comparisons of multidimensional poverty

A large and diverse literature exists at present surrounding the identification of independent dimensions of poverty and the construction of multi-dimensional summary measures of poverty (KAKWANI; SILBER, 2008a; 2008b). This area of research has benefitted considerably in recent decades from an improvement in the depth and breadth of poverty-relevant survey research across a wide variety of contexts, making the identification of distinct dimensions of poverty possible (BETTI ET AL., 2005). But despite the much greater availability of secondary data sources supporting detailed poverty assessments, the literature on multidimensional poverty as a whole has increasingly displayed a strong bifurcation. On the one hand, we have numerous studies directed at using large multi-thematic datasets to construct high-information, high-dimensionality poverty measures capable of picking up important nuances of human experience missed by simpler measures (and hence suggesting modifications to development policy) (e.g. BELLIDO ET AL., 1998; LAWSON ET AL., 2006; LUZZI ET AL., 2008; RAMOS ET AL., 2008). The price paid for such detailed measurement would seem to be generalizability, as these studies consistently focus on single contexts. At the other extreme we observe comparative studies of poverty across contexts (e.g. CHEN; RAVALLION, 2007; KRISNAKUMAR, 2008; ANDERSON ET AL., 2008; CHAKRAVARTY; SILBER, 2008). But, while these do compare poverty multidimensionally across a large sample of contexts (most often, nations), they rely upon a small number of both dimensions and indicators. A second major shortcoming of the latter is the current lack of micro-scale (individual or household-level) assessments of poverty, with the vast majority of such comparative work being carried out using national-level measures, which may hide or obscure important aspects of the poverty experience.

Between these extremes lies the difficult challenge of developing both the methodology and the supporting datasets needed to make cross-contextual comparisons of multidimensional poverty that are based upon many indicators and multiple dimension (i.e. high-information measures of multidimensional poverty). To better demonstrate the specific nature of this challenge, we undertook an informal survey of recent empirical studies measuring poverty multidimensionally. We selected an edited volume (KAKWANI; SILBER, 2008B) containing articles by some of the leading scholars in this field, and supplemented it with additional articles found using ISI and JSTOR searches on the term “multidimensional poverty.” In all, we examined 21 studies between 2004 and 2008 that measure multidimensional poverty using a variety of methodologies – including latent class, fuzzy set, structural equation, and axiomatic approaches. Figure 1 presents a simple classification of these studies according to two measures: 1.) the number of unique indicators used in each final MDP measure reported in the paper, and 2.) the number of unique contexts over which the MDP measure was used. The pattern that we have been informally describing – an abundance of low-information, high-comparison studies and an abundance of high-information, low comparison studies with little in the middle – is readily apparent in FIG. 1. In summary, it seems that as measurement of context-specific MDP becomes more precise, a major stated purposes of poverty measurement – the comparison of degrees of poverty, shares of the population impoverished, and rankings *across* contexts – may become less attainable.

FIGURE 1

Two Paths to More Information-Rich Comparisons Charted Atop Cross-Classification of Recent MDP Analyses (*n*=21)



Superimposed on Figure 1 are two "paths forward" to the accomplishment of high-information cross-contextual comparisons of MDP, labeled "Path A" and "Path B." Path A corresponds to an enlargement of the scope of current large-scale cross-contextual comparisons to include a greater number of measures. Chief among the obstacles to such an approach is the difficulty of obtaining reliable data on the additional dimensions of poverty of interest for the full sample of countries in the world. Simply put, current efforts like those of Chakravarty and Silber (2008) to compare poverty across samples of 170 nations may represent an upper bound on the number of poverty indicators included in such analyses at around 5 or 6 (typically GPD per capita, expenditure estimates, life expectancy at birth, food expenditure estimates, and literacy rates or school enrollment levels). Path B represents, to us, a s more tractable methodological and theoretical set of challenges. This path corresponds to increasing the number of contexts involved in high-information MDP comparisons. Doing so requires us to address a number of concerns, discussed in detail in the following section.

2.2. Theoretical Obstacles to Cross-Contextual Comparisons of MDP

As much as depth studies help us to understand the dimensional structure of MDP in specific contexts, and provide detailed understanding of its constituent elements, they provide questionable basis for cross-contextual comparison on a theoretical level. Simply put, not all entities that contribute

to wellbeing are A.) monetizable or B.) commensurable. To become monetized, a service, object, or other valued entity must have its value to potential users fixed with reference to a monetary unit of account, such as dollars, pesos, or conch shells. Despite centuries of attempts to fix value in human societies to a single base unit, and considerable success, many valued entities that constitute human experience and influence both subjective and objective measurement of MDP remain non-monetized, for example, the value of child care and housework when provided by family members (ZELIZER, 1989; 1997; CHASE-DUNN; KAWANO; BREWER, 2000), the value of land that has been passed down over generations (CARNEIRO 2001; VANWEY; CEBULKO, 2007; GUEDES; QUEIROZ, 2008; LUDEWIGS ET AL., 2009; VANWEY; GUEDES; D'ANTONA, 2011), or the monetary value of scholarly advice and editorial services rendered between colleagues (PRENDERGAST; STOLL, 1996). Even if the monetary value of an entity could be determined in principle, there are several reasons why researchers should be cautious in doing so. In cases like those above, humans are not simply lacking the ability to monetize a good or service, but actively resisting such pecuniary valuation in deference to cultural norms, mores, and social institutional restrictions.

Just as important, humans also continue to stubbornly impose a complex web of non-economic valuations onto many of their exchange transactions. These protected values (BARON; SPRANCA, 1997) restrict the range of goods and services that are commensurable, and therefore raise a number of concerns about how to quantify values that humans themselves actively resist quantifying. These concerns are both ethical and pragmatic. Ethically, if a respondent states that no monetary price can or should be affixed to vital services rendered by friends and family, is may not be justifiable for the researcher to simply attach a monetary value to them anyway. At a minimum, the professional community of poverty researchers should be giving serious attention to core issues of how non-pecuniary values affect the evaluation of non-monetized goods and services. Pragmatically, in avoiding attaching an arbitrary monetary value to various constituent elements of well-being, we encounter commensurability in a different form. In a specific context like Altamira, Brazil, for example, land is valued based upon many complex factors, only some of which are directly monetizable, and to complicate matters further, land is not bought and sold with a regularity sufficient to establish a reliable average price for land. And yet, in such a context, the natural capital embodied in the land is a central component of household wellbeing (GUEDES ET AL., *forthcoming*). Thus, the practical challenge is how to include land in a measure of MDP along with per capita income, for example. One approach is to explicitly reject single-unit calculations of wealth. Such approaches, while avoiding the need to make financial capital and natural capital directly commensurable, are limited by the difficulty in making overall comparisons across units of analysis when each unit may have multiple differing "scores" for poverty – one for each class of valued entities assessed.

An alternative approach is to consider each indicator as having an underlying distribution of some sort and calculate the position in that distribution for each household or other unit of analysis. By "adding up" the relative position of households on each dimension, one comes closer to a measure of MDP that assesses the value of a bundle of goods, capitals, and other valued entities that are not strictly commensurable. However, such an approach still fails to consider the interactive potential of a household possessing sufficient amounts of two capitals, like land and labor, that provide much greater levels of wealth and well-being in conjunction with each other than separately. Our answer to this problem, to be detailed in Section 3 is to utilize Grade of Membership (GoM) modeling, which

belongs to a class of latent class models which can simultaneously consider the relative position of a household on each distribution and assign that household an overall score of belonging to each of a set of "extreme profiles" measuring MDP. Each profile states which specific responses the most well-off possible households would have provided to a given survey instrument, and which the least well-off households would have provided. Our basic measure, therefore, represents not an absolute measure of total assets, well-being, or poverty, but rather a relative measure which can be interpreted as a household's (or other unit's) location on a distribution of distances from "maximal wealth" or "maximal poverty." Importantly, the vagueness of a fuzzy approach to poverty measurement ensures that the relative contribution of each separate constituent member is permitted to vary across households and, vital for comparative work, across contexts. Thus, for example, if income represents a different relationship to total household wellbeing in two different research locations, our method will permit us to accurately estimate this contribution in each place and still maintain the overall comparability of the composite measures. In the next section, we describe this approach in greater detail.

3. DATA AND METHODS

3.1. Data and Context

To illustrate the application and utility of our comparative framework, we selected two sites at different stages of transitioning from frontier to established agricultural regions (VANWEY; HULL; GUEDES, *forthcoming*). The first, Nang Rong District, Thailand, began to witness dramatic population growth attributable to an influx of frontier settlers in the 1950s. Altamira, located in the Brazilian state of Pará on the threshold of the Amazon, similarly experienced a large influx of settlers following the opening of the Trans-Amazon highway in the 1970s. In both cases, decades-long extensive field work has been paired with quantitative longitudinal data collections (for introductions to the datasets and more detailed descriptions of methodology, see RINDFUSS ET AL., 2009 for Nang Rong and BRONDÍZIO ET AL., 2002; VANWEY ET AL., 2007; VANWEY; GUEDES; D'ANTONA, 2011; GUEDES ET AL., *forthcoming* for Altamira). As a result, we have two general quantitative socioeconomic survey instruments which have undergone extensive field-testing over the years to improve the validity of individual items and the overall breadth of domains represented in the questions. We will discuss further in section 3.2 the significance of these observations, but first we briefly describe the two sites in greater detail.

In our Altamira study site, 402 households and farm properties were sampled. The sample corresponds to a stratified sample of farm units by cohort of settlement and is representative of the farm units in the region. The survey interviewed both heads of the household and any other women in the property aged fifteen and over. Males responded to an economic and land use questionnaire, while females answered questionnaires covering family socio-demography, reproductive history, and the use of contraceptive methods. For poverty measures using multidimensional variables, we restricted our sample to the 1997/1998 owners who had complete information on income and additional selected characteristics. The final sample totaled 307 observations.

In our Nang Rong study area, we rely upon data collected during the dry (non-agricultural) season in the year 2000. A complete census was conducted in each of 92 villages originally selected in 1984 as part of an evaluation project for development. Household interviews were conducted with key informants on a wide range of subjects, including demography, life histories for some household members, migration histories, economic measures, agricultural production, and land use. In addition, community-level interviews were carried out with key informants in every village in the district (approximately 350), which were used to construct a small number of measures in the present analysis. In total, 8638 households were interviewed, of which 8,583 provided a full set of usable responses for this analysis.

3.2. Selecting Indicators

Recent research suggests that a hybrid approach to constructing MDP measures involving both systematic data reduction and expert judgment could be as effective as unsupervised methods alone (ALKIRE, 2007). Our own hybrid approach focuses attention on indicators rather than dimensions in order to remove uncertainty about what is being measured that might confound comparisons across context. We begin by grouping all existing indicators from each dataset into two categories. The first, what we term the set of plenary, shared, poverty measures (P), includes all relevant poverty indicators which exist in all datasets and which have relevance in all contexts.[1] The second, termed idiomatic poverty measures (I), are all others poverty indicators of interest which are not available for all datasets or relevant in all contexts.[2]

Tables 1A and 1B contain the full P and I sets of indicators used in our analysis. In Table 1A, we see a side-by-side comparison of the available indicators judged to be similar enough to allow for a direct comparison across study sites. Table 1B lists all indicators for which no corresponding measure wasw available in the other dataset. Such a state of affairs seems to us to characterize most attempts at comparative work relying upon secondary data. While it is extremely important that researchers continue to press for new multi-context, multi-thematic datasets, their cost makes them exceedingly rare. Meanwhile, the abundance of single-site multithematic datasets urges us to develop a methodology capable of supporting the measurement and analysis of MDP in the present.

[1] Plenary, both in the sense of being a complete set of shared measures and in the sense of being "attended by all."

[2] Idiomatic in the sense of being peculiar to a particular context, as well as unique to a particular research initiative.

TABLE 1A

Plenary Measures of Multidimensional Poverty Used in Model P

Level	Measure: Nang Rong	Measure: Altamira
Ordinal	Educational attainment of the household head	Educational attainment of the household head
Ordinal	Demographic dependency ratio of the household	Demographic dependency ratio of the household
Dichotomous	Household has at least one refrigerator?	Household has at least one refrigerator?
Dichotomous	Household has at least one color tv?	Household has at least one color tv?
Dichotomous	Household has at least one sewing machine?	Household has at least one sewing machine?
Dichotomous	Does the household operate shop, stall, or peddlers car?	Does the household operate a small business?
Dichotomous	Does the household use herbicide in one or more plot?	Does the household use herbicide?
Dichotomous	Does the household use fertilizer in one or more plot?	Does the household use chemical fertilizer?
Dichotomous	Does the household use pesticide in one or more plot?	Does the household use pesticide?
Dichotomous	Does the household use irrigation/water diversion in one or more plot?	Does the household use irrigation/water diversion?
Dichotomous	Do 1 or more migrants remit cash or goods to the household?	Did at least one migrant remit money or good to the household?
Ordinal	Total land used for agriculture in the previous year (hectares)	Proportion of the property used for agriculture (pasture, perennial, annual, orchard) (quintiles)
Ordinal	Number of plots owned by the household	Number of rural properties owned by the household
Ordinal	Per capita household income (ag prod+ag wage+other wage) in US 2000 dollars (quintiles)	Per capital household income (agriculture, wage, pension) (quintiles)
Dichotomous	Household used family labor (rice, cassava, sugar) in the last season?	Does the household use family labor?
Dichotomous	Household used non-monetized labor (rice, cassava, sugar) in the last season?	Does the household use sharecropper labor?
Dichotomous	Household used monetized labor (rice, cassava, sugar) in the last season?	Does the household use paid labor?
Ordinal	Number of years that the village has had electricity	Type of power supply
Dichotomous	Household has piped water indoors?	Does the household have piped water?
Ordinal	Values of all livestock in 2000 US dollars (quintiles)	Amount of cattle owned by the household (quintiles)
Dichotomous	Current household members work outside the village?	Does anyone in the household has off-farm employment?

TABLE 1B

Idiomatic Measures of Poverty Added in Model P + I

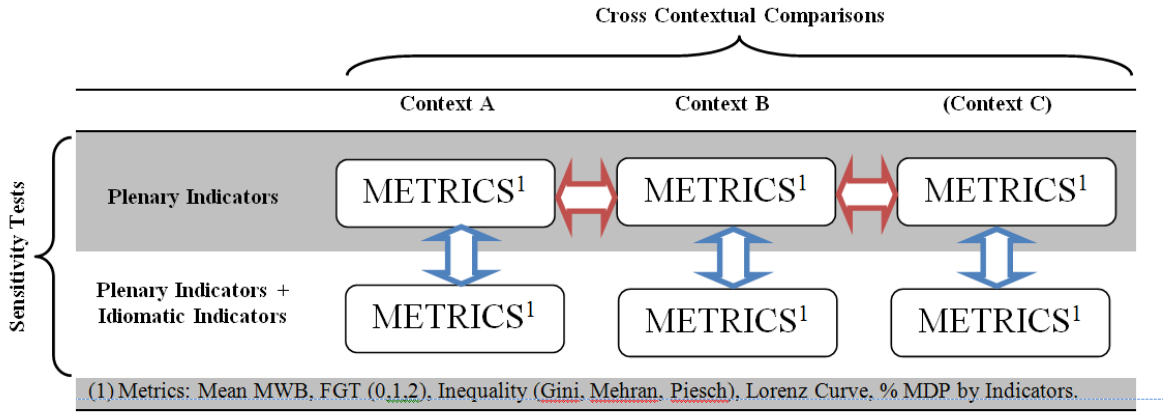
Level	Nang Rong Idiomatic Measures	Level	Altamira Idiomatic Measures
Dichotomous	HH speaks minority language	Dichotomous	Household received lot from INCRA
Ordinal	Housing quality	Dichotomous	HH has other relatives or friends living in region
Ordinal	Type of windows in house	Dichotomous	HH has a member living in the urban study area
Ordinal	Type of cooking fuel used	Ordinal	Quintiles of per capita monetized production for self-consumption
Ordinal	Degree of secure title to home	Ordinal	Proportion of the lot in pasture
Dichotomous	HH owns telephone	Ordinal	Proportion of the lot in forest
Dichotomous	HH owns computer	Ordinal	Proportion of the lot in perennials
Dichotomous	HH owns microwave	Ordinal	Proportion of the lot in annuals
Dichotomous	HH owns washing machine	Dichotomous	Production technology based in animal draft?
Dichotomous	HH owns air conditioner	Dichotomous	Manual-based production technology?
Dichotomous	HH owns car	Dichotomous	Motor-based production technology?
Dichotomous	HH owns VCR	Dichotomous	Accessibility during rainy seasons?
Dichotomous	HH owns mobile phone	Dichotomous	Position of house on the lot
Dichotomous	HH owns farm engine	Ordinal	Number of credits ever received
Dichotomous	HH owns bicycle	Dichotomous	HH does participate in forma/informal agricultural organization?
Dichotomous	HH owns large motorcycle	Ordinal	Type of material wall is made of
Dichotomous	HH owns small motorcycle	Ordinal	Type of material the floor is made of
Dichotomous	HH owns large truck	Ordinal	Type of material the roof/cover is made of
Dichotomous	HH owns pickup truck	Ordinal	Location of the bathroom
Dichotomous	HH does silk weaving for sale	Ordinal	Type of drain/sewage system
Dichotomous	HH raises silk worms for sale	Dichotomous	Well-off position upon arrival in the region
Dichotomous	HH weaves cloth for sale	Ordinal	Number of other properties
Dichotomous	HH makes charcoal for sale	Ordinal	Number of assets household currently owns
Dichotomous	HH gathers firewood for sale	Ordinal	Proportion of lot high-fertility soil (terra roxa)
Ordinal	Total income from remittances		
Dichotomous	Migrant remitted clothing		
Dichotomous	Migrant remitted food		
Dichotomous	Migrant remitted household goods		
Dichotomous	Migrant remitted vehicle		
Dichotomous	HH owns large tractor		
Dichotomous	HH owns large tiller		
Dichotomous	HH owns rice thresher		
Ordinal	Years with major rice crop failure (flood/drought)		

3.3. General Comparative Framework

To move from indicators to a synthetic poverty measure, we utilize a fuzzy approach known as Grade of Membership (GoM), described in detail in the next section. We repeat this process twice, first with only the plenary poverty measures (P), and second incorporating all variables from both the plenary and the idiomatic sets of indicators (P +I). The purpose of this procedure is twofold. First, we wish to arrive at a comparison of multidimensional poverty *between* contexts that incorporates the complete set of measures that are common to both contexts. But second, we are also concerned with determining the effect of excluding the idiomatic poverty measures from the first model, asking what happens to MDP *within* context as the measurement approach itself is altered. The purpose of this latter sensitivity analysis is to determine the nature, strength, and generalizability of the conclusions drawn from the first set of cross-contextual comparisons. Our comparative framework is summarized graphically in Figure 2.

FIGURE 2

Framework for Comparison of Multidimensional Poverty across Contexts.



If context shapes the construction and the experience of poverty, then we should expect that in many contexts, the results of the first (P) and second (P +I) models will diverge in non-trivial ways. Far from being a nuisance, however, this is among the most important practical conclusions to be derived from our approach. If a researcher or practitioner requires only the most accurate measurement possible of poverty in a single context, then existing approaches may prove more adequate. But when trying to understand the interaction of context and poverty measurement, what is needed foremost is a simple heuristic to assist researchers in identifying potentially invalid comparisons. In the absence of a single, common metric for the determination of all value[3], the best one can do is compare those things that are common first, and then attempt to gauge the impact of adding in the rest.

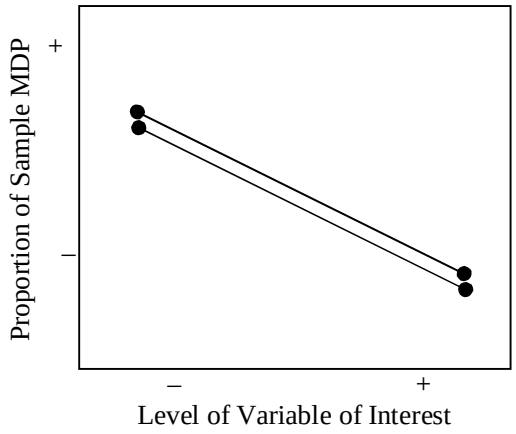
[3] As discussed in an earlier section, money is not the panacea for this problem that it is frequently claimed to be. To the arguments about value already laid out, we would only add that, again, cross-contextual variation in the monetization of similar valued entities presents a difficult, perhaps intractable, problem.

We will gauge this impact in the following way. Once we have estimated a composite measure of MDP, we plot the proportion of households in each sample that are considered multidimensionally poor over the ranges of individual indictors. Doing so enables us to quickly assess changes in the relationship between overall MDP and individual components for multiple contexts when one moves from the ideal site-specific model (P + I) to one appropriate for cross-contextual comparisons (P). We ask, in essence, how the relationship between the individual indicator and the overall MDP measure changes in response to reducing the total information included in the overall measure. To guide us in interpreting these potential changes, we introduce a 3-part heuristic, summarized in Figure 3. The first possibility is that we observe no change in the overall level or distribution of poverty across levels of a variable when comparing model P to model P + I. This would indicate that the inclusion of additional variables in model P + I has no impact on the relationship. The second scenario is a change in the overall levels of poverty across different levels of a variable, but a consistent pattern. Such a pattern would suggest that it is acceptable to talk about reductions of poverty across levels of that variable irrespective of which model is considered. It is this class of variables that will receive the most interest, as these represent stable patterns that may point the way to more efficient cross-contextual poverty alleviation strategies. The third class consists of variables for which both the level and the overall shape of the distribution of MDP across levels of a given variable shift markedly between models P and P+I. For this group, the extra dimensions and information included in model P + I are highly correlated to what is included in model P, introducing bias when they are omitted and fundamentally altering the conclusions reached about the relationship between that variable and overall MDP.

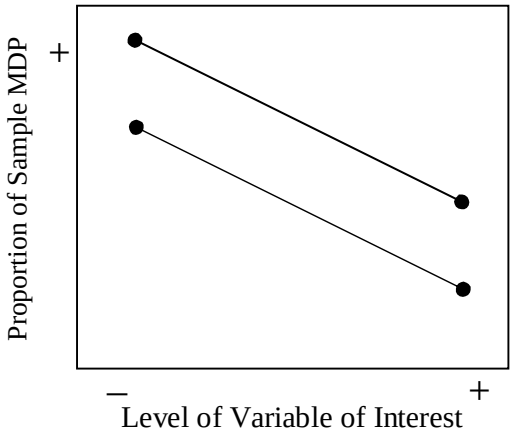
The end result of our process is the ability to determine which of these three conditions holds for each variable of interest. If the first holds for all contexts, then one can generalize about both levels and patterns for that variable across contexts. If only the second is true, some generalizations across context still make sense, but only those that pertain to general patterns. Generalizations about the level of poverty in this case are unreliable because the estimates of poverty levels are highly sensitive to the inclusion or exclusion of factors that are highly specific to that single context. If the third obtains, no generalizations are generally warranted, as both the level and the pattern of relationships between specific variables. In this case, additional qualitative scrutiny is highly recommended to understand how poverty is experienced and in which ways the intersection of dimensions affect the overall poverty experience (LAWSON ET AL.; 2006).

FIGURE 3
Generalized Patterns of Response to Inclusion of Idiomatic Poverty Measures

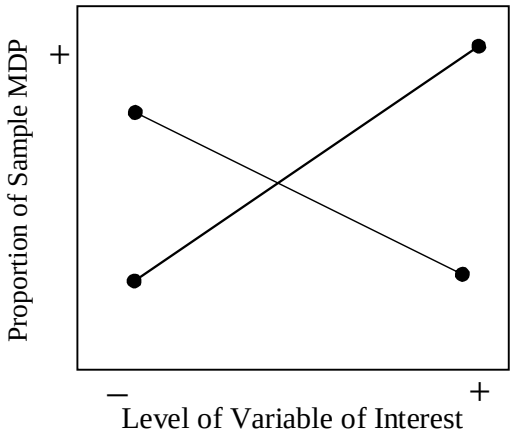
1.) No change



2.) Change in Level



3.) Change in Pattern



3.4. Grade of Membership Modeling Applied to Multidimensional Scalars

We utilize Grade of Membership (GoM) modeling, a fuzzy logic methodology (MANTON ET AL., 1994), to generate a single continuous measure of the extent to which a household is multidimensionally poor, while avoiding the direct commensuration of various household assets. Instead, we compare the empirical profile of each household in our sample to theoretical profiles of maximal well-being, in the process generating a measure of the distance between that household's lived experience and a sociological ideal type of maximum well-being (GUEDES; CARMO, *forthcoming*; GUEDES ET AL., *forthcoming*). Following Garcia et al. (2007) we call this approach the *hierarchical latent scalar approach*, differing from a traditional exploratory latent class approach where profiles of well-being would freely arise from empirical correlation structure of the data.

Instead of using initial random probability matrices for the locational parameters estimation within GoM environment, as done is most of the applied literature (SAWYER ET AL., 2002; GUEDES ET AL., *forthcoming*), we define a model with two extreme profiles, K = 2, where for each variable, *j*, in profile k =2, the category representing the most well-off will receive probability equal to one (λ_{kjl} = 1,000), and zero for the others. For profile k = 1 the opposite is done, that is, for the least well-off category of a variable *j*, the probability equals one and zero for all the others. With this strategy, the fuzzy partition parameter ($g_{ik=2}$, or simply g_{i2}) will measure the manifested multidimensional intensity of well-being for each individual in the sample. An illustrative example of the matrix is shown in Table 2. Once the fuzzy partition g_{i2} is estimated, we use it as the empirical function of multidimensional well-being. This function is used to estimate the traditional Headcount, Poverty Gap and Squared Poverty Gap indices of poverty (FOSTER ET AL., 1984) and the Gini and L-Theil of inequality. These indices hold the same axiomatic properties, but based on a multidimensional scalar, instead of monetary income.

TABLE 2

Exemplifying the Hierarchical Latent Scalar Approach for Multidimensional Well-being Estimation – Informed Hierarchical Latent Probability Matrix (λ_{kjl})

Variable	Unconditional Probability	Hierarchical Latent Probability (λ_{kjl})	
Educational Attainment of the Household Head (Nang Rong, Thailand)	Sample Population	K = 1	K = 2
Illiterate	0.8107	1.0000	0.0000
1 to 4	0.1131	0.0000	0.0000
5 or else	0.0762	0.0000	1.0000

3.5. Multidimensional Poverty and Inequality Assessment

3.5.1. FGT Measures

We utilize 3 summary measures of poverty and two measures of inequality in order to assess differences between models P and P+I. FGT (Foster-Greer-Thorbecke) metrics correspond to a set of indices based on headcounts and poverty gaps. These indices are widely applied in poverty studies and used to measure several aspects of poverty such as proportion, intensity and severity (STEWART, 2006). Therefore, instead of substitutes, they must be seen as complementary to each other since they respond differently to different aspects of poverty (FOSTER *ET AL*., 1984; HOFFMANN, 1998). The three FGT measures used in this paper are: the headcount ratio (HC), the poverty gap index (PGI), and the squared poverty gap index (PGI). Although FGT measures are traditionally used to estimate poverty based on per capita income level, we applied them to our scalar measure of multidimensional well-being in order to assess both the change in MDP levels using model P and P+I and the distribution of composite wellbeing across a variety of individual indicators.

3.5.2. Inequality Measures: Gini and L-Theil

We apply two of the most common income inequality measures in the empirical literature: Gini and L Theil. Gini coefficient can be derived from the synthetic wellbeing distribution or from the Lorenz Curve. Gini coefficient graphically represents the increase in the cumulated proportion of income due to the cumulated proportion of population over the i-th person. The closer to unity, the higher the inequality of the population (DORFMAN, 1979). Interpretation of L Theil is similar to the Gini coefficient, although it has a wider range of scalar variation and is bound to 0 and infinity. The closer to zero, the lower the inequality is. Different from Gini, L Theil is not applicable to households with no income (HOFMANN, 1998).

4. RESULTS

4.1. Model Fit

Table 3 reports fit statistics for each of the four models run. Although essentially a formality, it is important that we confirm the improved fit of model P + I for both contexts prior to moving on. Decreased model fit in what is presumed to be the higher-information model could indicate additional problems of model specification requiring attention. In our case, model the two models including additional idiomatic measures of poverty do indeed show a better overall fit according to the AIC when compared to the plenary-only models (P). In substantive terms, this tells us that we are indeed working with a degraded set of estimates if we should subsequently choose to interpret the P models. To better understand the nature of this degradation, we next look at what happens to the estimates for each of the FGT measures and the two inequality measures.

TABLE 3

Fit Statistics for Models P and P + I for Nang Rong and Altamira

Model	K	N	L	λ	G	P	LN(L)	AIC
Altamira, Brazil, 1997/98								
P	2	307	52	104	614	718	-51566.8	104570
P + I	2	307	121	242	614	856	-143704.1	289120
Nang Rong, Thailand, 2000								
P	2	8583	50	100	17166	17266	-1427617.6	2889767
P + I	2	8583	124	248	17166	17414	-2158995.8	4352820

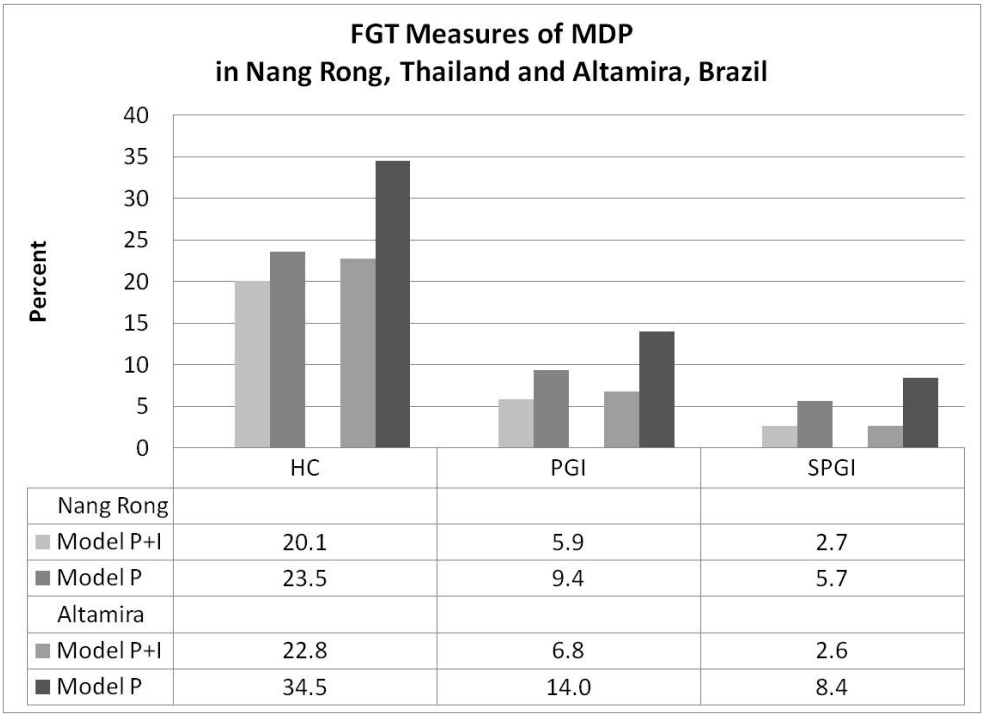
4.2. Comparing Levels of MDP and Inequality Across Models

Figure 4A contains estimates for all three of the FGT measures by model and context. In Nang Rong, the head count poverty estimate jumps from 20 percent to 23 percent when one moves from the optimal model to one supporting cross-contextual poverty comparisons. This suggests that the lower-information model is overestimating the total proportion of the population living in poverty by excluding idiomatic measures that help certain households rise above the poverty line when included. In Altamira, the increase in poverty is much more substantial – a jump from 22 to 34 percent. The implication is that the idiomatic measures as a group have an even greater influence on our ability to accurately estimate poverty in Altamira than in Nang Rong. This same pattern is observed for both the PGI and squared PGI measures.

The story is much the same for the Gini and L Theil measures of inequality. This time, however, the greater increase from model P+I to model P occurs in Nang Rong, where inequality on the Gini measures jumps from 0.24 to 0.33 when one moves to the lower information model. The corresponding jump in Altamira is from 0.22 to 0.26. The implication is that use of model P will lead us to overestimate the extent of inequality on our multidimensional poverty scalar. If our interest were simply in making statements about the relationships between poverty and various indicators in one context or the other, we would readily accept that model P+I is superior in both cases. However, as stated from the outset, our chief aim in this exercise is to determine whether any conclusions about poverty and its association with specific factors of interest may be warranted across multiple contexts. Due to the potential for interaction between context-specific indicators of poverty and our overall measure, it is questionable whether such inferences can be appropriately based upon a comparison of models which contain very different idiomatic measures. Hence, we now move to a consideration of the specific instances in which a comparison of model P for each site may be appropriate and useful.

FIGURE 4A

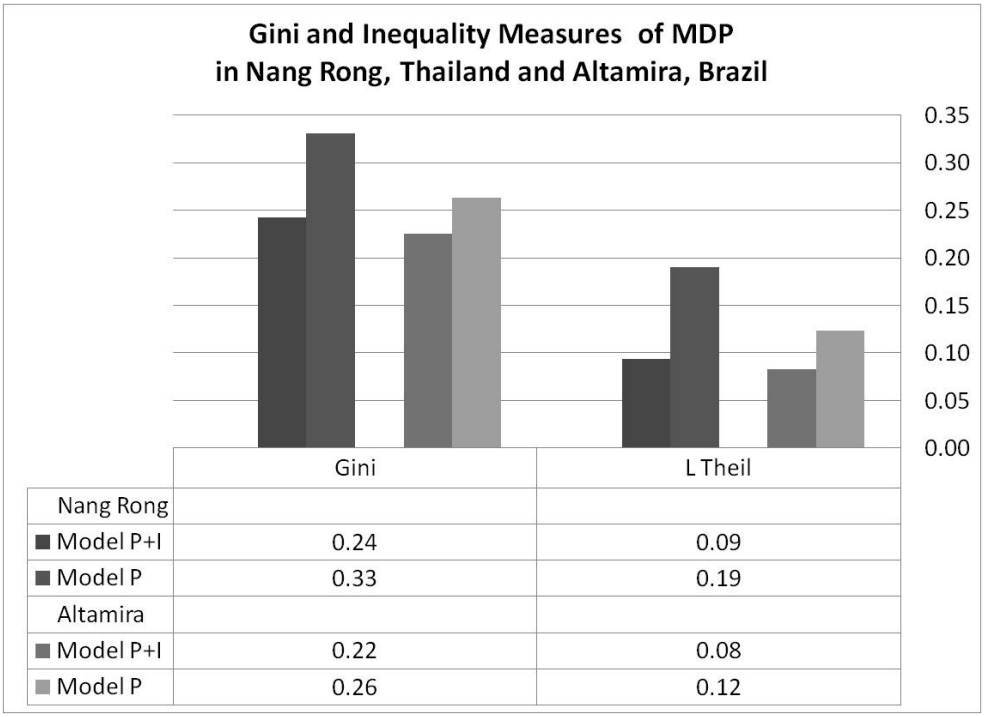
Comparison of Multiple Poverty Measures across Contexts and Models



	HC	PGI	SPGI
Nang Rong			
Model P+I	20.1	5.9	2.7
Model P	23.5	9.4	5.7
Altamira			
Model P+I	22.8	6.8	2.6
Model P	34.5	14.0	8.4

FIGURE 4B

Comparison of Multiple Inequality Measures across Contexts and Models

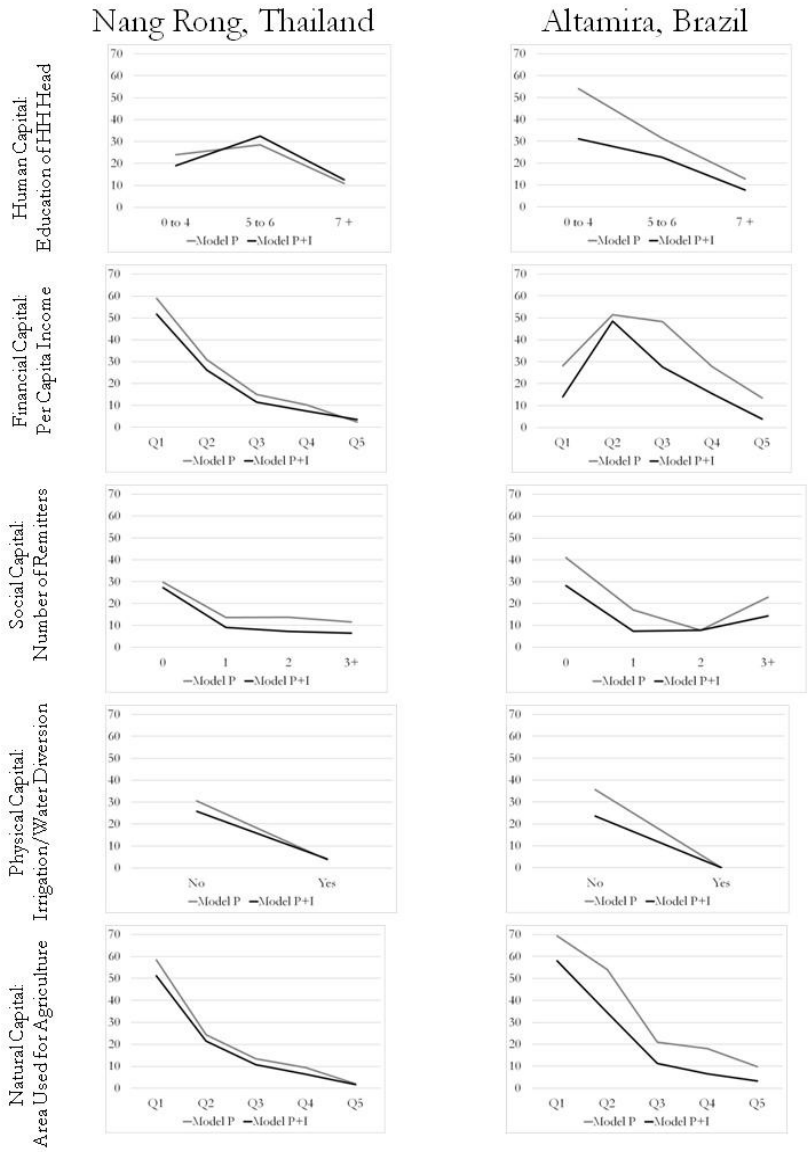


	Gini	L Theil
Nang Rong		
Model P+I	0.24	0.09
Model P	0.33	0.19
Altamira		
Model P+I	0.22	0.08
Model P	0.26	0.12

4.3. Distributions of MDP Over the Range of Select Variables

Figure 5 presents the distribution of our summary MDP measure across a set of five variables, selected for their correspondence to the five capitals most commonly identified by proponents of the sustainable livelihoods framework – financial capital, physical capital, natural capital, social capital, and human capital (BEBBINGTON, 1997; 1999; CARNEY, 1998; DESHERBININ ET AL., 2008). While these are not a perfect fit in all cases, we are nevertheless able to take a summary view across each of these five capitals in the two contexts and make a number of interesting observations. First, we find little evidence that interpreting the lower-information model (gray lines) would result in a different interpretation of the relationship between any of these five individual indicators and the overall measure of MDP from the conclusions reached using the optimal model (black lines). In some instances, as for example with our natural capital measure in Altamira, we do observe a shift in the estimated level of poverty for each quintile group. But the shift occurs across the board and appears to show no more complicated interaction with this measure of area used for agriculture.

Figure 5: Proportion MDP Over Range of Key Capitals, Plotted by Context and Model (Gray = P, Black = P+I)

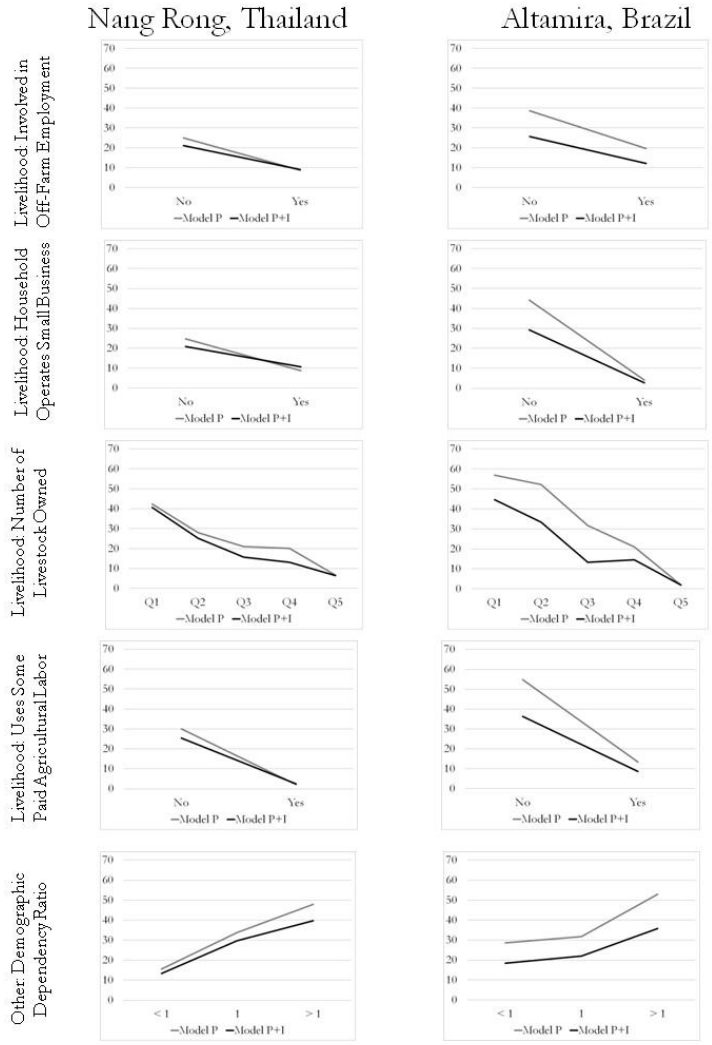


Observing that the general patterns are consistent across models opens the door for us to interpret these patterns substantively. Building on the work of VanWey, Hull, and Guedes (*forthcoming*) we can add one additional piece of information about the general context of these two sites which is extremely relevant for interpreting these results: namely, that our Nang Rong study site occupies a later stage of a general frontier transition than the Altamira research area. If we interpret the present results in light of this observation, we can observe first that in both sites, natural capital displays a simple monotonic positive relationship with wellbeing (as proxied by area in agriculture). This is consistent with a broad literature citing the significance of natural capital in frontier contexts. Physical capital as proxied by irrigation investments shows a similar relationship, with those

households possessing irrigation equipment showing far lower levels of MDP than households without. When we move up to social capital as proxied by the number of migrants remitting cash or goods, however, we observe an interesting difference. While households with more migrants display a greater level of multidimensional wellbeing in Nang Rong, those households in Altamira with the greatest level of wellbeing occupy an intermediate set of values on number of remitting migrants. This possibly suggests important differences in the significance and success of migration as a strategy for poverty alleviation in these two sites, with Nang Rong representing a more mature and better integrated frontier with greater opportunities for migrants. Discrepant patterns are similarly evident across sites for our proxies of financial capital (per capita income) and human capital (education attainment of household head). While each incremental increase in the quintile of per capita income is associate with a reduction in overall MDP frequency for Nang Rong, such is not the case in Altamira, where we observe a curvilinear association. Among households in the lowest quintile of financial capital we observe better overall levels of MDP than for the next two higher quintiles. This observation may again speak to the youth of this frontier context, in which it is possible for households to thrive and achieve adequate levels of wellbeing in the absence of large stocks of financial capital.

We can conduct the same sort of analysis using a second set of measures that roughly proxy a variety of significant livelihood strategies in both contexts. As with Figure 5, we are limited in choosing these variables to the plenary set of indicators. From this set, we selected four theoretically interesting livelihood strategies and one additional measure that proxies the stage of the household lifecycle of households (MCCRAKEN ET AL., 2002). As with the measures of various capitals, we see a broad pattern of consistency across models, suggesting that generalizations about the relationship of overall MDP with these select livelihood indicators are justified. We do, however, observe changes in the level of estimated poverty across the range of many of these variables. Thus, as before, we constrain ourselves to talking about the general pattern of association between each livelihood strategy and overall MDP, rather than making comparative statements about either the absolute level of poverty across contexts or the likely level of response to a given change in status. All four of the selected livelihoods – involvement in off-farm employment, ownership of a small business, participation in livestock raising, and the use of monetized agricultural labor – represent to varying degrees alternatives to a traditional smallholder subsistence livelihood characteristic of initial frontier colonization in these two locations. Thus, it is not particularly surprising that we confirm here an comparative reduction in MDP among those households practicing some degree of involvement in these livelihoods in both Thailand and Brazil. In each case, the effect of including additional information in model P+I is to attenuate slightly the magnitude of this improvement, suggesting again that a more nuanced measure of poverty reveals additional routes to wellbeing as compared to a more limited measure. A similar pattern is apparent in Nang Rong, though the degree of the mitigation is more slight. Turning to the demographic dependency ratio, our proxy of household lifecycle stage, we see a consistent pattern of increasing MDP levels with higher numbers of dependents relative to working age individuals. However, it would appear that the greatest decline in wellbeing associated with dependency ratio occurs at lower levels in Nang Rong than in Altamira, indicative of either contextual differences in how such demographic burdens translate into poverty, or a transition that is related to the age of the frontier.

Figure 6: Proportion MDP Over Range of Livelihoods, Plotted by Context and Model (Gray = P, Black = P+I)



5. DISCUSSION AND CONCLUSIONS

In this paper, we present a framework for comparison of micro-level multidimensional poverty (MDP) across differing social and economic contexts and illustrate its use. Our systematic approach enables researchers to compare relative MDP levels among households in settings where the constituent elements of household well-being may not be identical, as long as there is some shared set of common measures. This general framework allows researchers to incorporate the full extent of information about each locale while still permitting a limited set of useful comparative inferences to be drawn in many cases. This methodology is not intended to replace existing approaches to poverty measurement and analysis previously identified (depth and breadth approaches), but rather to provide researchers a means of making meaningful comparisons across relevant contexts of interest. Importantly, because our method includes several built-in sensitivity analyses, it also helps to direct

the attention of researchers and policy-makers to the nuances and qualifications that are often necessary to making cross-contextual comparative statements without sacrificing the validity of the conclusions. This is frequently a danger when discussing the nature of poverty across contexts.

Our primary concern in this paper has not been the *explanation* of poverty, or even simply the *measurement* of poverty, though both of these are related. Instead, we have attempted to open the door to improved studies of the *influence of context* on poverty measurements. As we have shown, such cross-contextual comparisons can provide valuable generalizations that can support both policy refinements and the development of other types of theory. In particular, our emphasis on the returns to various sorts of assets, whether human capital, physical capital, social capital, or otherwise supports ongoing efforts at the characterization of development and household wellbeing in frontier contexts, especially those in tropical and subtropical regions. Our approach allows us to gauge in a more precise, quantitative way just how much stock to place in a given set of comparisons.

Our approach encourages researchers to use site-specific knowledge derived from multiple methods – quantitative and qualitative – to inform the process of constructing MDP measures rather than relying solely on data reduction techniques. While this may seem at first glance to open the door wider to subjective bias, we argue that the present approach to MDP is already rife with subjectivity which becomes readily apparent when one attempts comparative work. Judgment is routinely exercised anytime research foci are chosen, measures are selected, or concepts are mapped onto indicators. While the most effective strategy for achieving better comparative measurement of MDP must obviously include systematization of these earliest stages of research planning and execution, particularly *between* studies, a pragmatic approach is also needed that enables researchers to take advantage of the many large datasets already in existence to carry out secondary analyses of MDP. Vital to the usefulness of any such approach is that it must focus attention directly on the limitations of existing sources of data and indicators used in assessing MDP. Our method does this by directly incorporating several levels of robustness testing.

6. ACKNOWLEDGEMENTS

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