A research note on the importance of a holistic approach for family demography

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Abstract

This research note illustrates the importance of a holistic approach to family demography and children's well-being. Using the *family configurations* published in a previous study, we show that a configurational measure of family patterns predicts better the country-level proportion of stunted and wasted children across 75 low- and middle-income countries than 20 single family-related variables, world regions, and the Human Development Index. We contend that demographers need to do a better job of measuring social systems because individuals' choices are influenced by contexts that are better represented with measures that capture multiple related factors (holistic approach) than with a single variable (analytical approach).

Key words: family system change, children's well-being, development, holistic analysis

Introduction

According to Nisbett and Masuda (2003), holistic and analytic thinking represent distinctive styles for perceiving, describing, and explaining reality. Holistic thinking emphasizes the whole as a system, whereas analytical views focus on its parts. In scientific research, holistic approaches start by an inductive exploration of the system's characteristics. Analytical approaches, instead, rely on predefined analytical categories and deductively defined hypotheses. This distinction has also been expressed in terms of configurational- vs. variable-based research (Ollion 2011). Analytical research has been the favored approach in quantitative social sciences for reasons that are deeply embedded in Western scientific culture (Henrich 2020). However, some disciplines are more prone to holistic analysis (e.g., structuralist anthropology) than others (e.g., economics and demography).

Two defining features of the holistic approach to research may explain why demography as a discipline has not found this approach attractive (Sigle 2021). First, the meaning of theory under a holistic approach is distinct from the meaning of theory in analytical approaches. The latter often understand theory as a set of interrelated and testable prepositions describing the relationships among variables. This understanding of theory has strong a correspondence with what Abbott has termed the "The General Linear Reality", materialized in the widespread use of linear regression models for testing and developing theories about the social world (Abbott 1988). Instead, the holistic approach uses the word theory in a different way. Following Abend's (2008) arguments, the holistic approach aligns closely with theories that attempt to characterize social systems, labelled as theories$_3$:

> "[…] given a certain phenomenon *P* (or a certain fact, relation, process, trend), it [theory$_3$] asks: 'what does it mean that *P*?,' 'is it significant that *P*?,' 'is it *really* the case that *P*?,' 'what is *P* all about?, or 'how can we make sense of or shed light on P?' […] what theories$_3$ offer is an original

> ‘interpretation’, ‘reading,’ or ‘way of making sense’ of a certain slice of the empirical world. They may shed new light on an empirical problem, help one understand some social process, or reveal what ‘really’ went on in a certain conjuncture. Unlike theory$_1$, theory$_3$ does not view *P* as the value of a variable *y*, which in turn is related to other variables in such a way that can be described by a function $y = F(x_1, x_2, \ldots, x_n)$. Unlike theory$_2$, theory$_3$ *may or may not* causally explain P.” (Abend 2008, p. 178)

Second, holistic approaches are better operationalized inductively than deductively, meaning that the research process goes from the data (*bottom*) towards concepts, ideal types, or typologies (*up*). This *bottom-up* approach is different from analysis that used predefined statistical categories and concepts (e.g., demographic equilibrium) to test deductively-defined hypotheses (*up*) by fitting models to the data (*bottom*). Importantly, quantitative social research cannot be fully inductive because there is a good deal of theoretical work (in the sense of theories$_5$ (Abend 2008)) underlying data collection, particularly when it comes to demographic measures of family patterns (Bledsoe et al. 1994; Bourdieu 1996). However, partially-inductive approaches allow greater flexibility for detecting and describing non-linear and heterogenous paths of societal and institutional change, including family change (Johnson-Hanks et al. 2011). These non-linearities and heterogeneities are often neglected in deductive research frameworks which tend to overemphasize convergence, perhaps as a legacy of highly influential functionalist theories and Eurocentric views of the social world (Krause 2016; Sigle 2021; Walby 2020).

Hence, holistic approaches are useful for redefining social phenomena (i.e., the above-mentioned *P* in Abend´s long citation) in terms of configurations or combination of patterns, under the premise of synergistic associations among them, i.e., under the premise that interactions and relations matter more (or at least differently) that single factors. And that there are multiple

potential imprints of social and institutional change rather than a unique developmental path where "avant-gardists" and "laggards" distribute (some examples of analytical and linearly-oriented works include Dorius (2008), McNicoll (2011), Goldscheider, et al. (2015), and Pesando and the GFC-team (2019)).

Despite not being common in demographic studies, the holistic approach is not fully alien to demography. The Theory of Conjunctural Action (TCA), proposed by Johnson-Hanks et al. (2011 Introduction) states the importance of the confluence of circumstances for understanding family variation and change. Likewise, the concept of segmented rationality by McNicoll (1992), conceptualize individual choices as embedded in configurational social contexts. Similarly, intersectionality scholars have insisted on the importance of the intersection of social categories of sex, race, and social class for understanding inequality (Crenshaw 1991; Hill Collins and Bilge 2016). Yet, quantitative intersectional and configurational approaches are rare, particularly regarding cross-national comparison, and there are ongoing debates as to how to implement them (Bauer et al. 2021).

This note illustrates the potential of holistic analyses for understanding how country-level family characteristics (e.g., prevalence of marriage, total fertility rate, age difference between partners, prevalence of nuclear households) associate with children's well-being. Under a holistic approach to country level comparisons of the family, the first step is to measure the interrelationships among family characteristics in order to reveal existing combinations of family patterns. These patterns are the equivalent of *P* in Abend's description of type 3 theories. The inductive (*bottom-up*) nature of this step is fundamental for keeping a holistic lens. The next step consists of examining how

these combinations correlate with children´s outcomes, as a strategy for assessing their potential value in understanding how a systemic approach might compare with an array of single variables.

We follow these two steps by correlating the *family configurations* - an inductively-defined configurational measure of partnership regimes, reproductive patterns, gender relations and households' composition - proposed by Castro Torres et al. (2021) with the proportions of children under the age of five that are stunted and wasted (proportion stunted and wasted children herein) in low- and middle-income countries (LMICs). To demonstrate the predictive power of the *family configurations* we also correlate these two measures of children's health with 20 separate family-related measures, geographic regions, and the Human Development Index (HDI).[1] We find that *family configurations* generally predict a higher proportion of the variance of children's outcomes than the single family-related variables, measured by the adjusted-R2 (adj-R2). In addition, according to the Akaike Information Criteria (AIC), *family configurations* also yield a better fit when predicting children's outcomes than separate family-related variables. Similar to the adj-R2, the AIC measures the goodness of fit of the model, with the addition that the AIC is not monotonic with respect to the number of predictors (i.e., more predictors does not necessarily yield a better AIC). Finally, we examine trends over time in children's outcomes for each *family configuration* and find consistent relations between change in these *family configurations* and better outcomes for children.

[1] The Human Development Index is a compound measure of countries' achievement in three dimensions of human development: Healthy and long lives (measured by the life expectancy at birth), Education (measured by the means years of schooling and the expected years of schooling), and Standards of Living (measured by the gross national income per capita).

These three results –higher accounted variance, better goodness of fit, and consistent time trends– illustrate the power of *family configurations* for predicting country-level differences in children's health. The substantive implication of these findings is that children's well-being depends more on the confluence of familial circumstances (*family configurations*) than on a one specific factor. Our results suggest that demographers need to do a better job of measuring social systems because individuals' choices are influenced by contexts that are better represented with measures that capture multiple interrelated factors (holistic approach) than with a single variable (analytical approach).

Children's well-being and familial contexts

Stunting and wasting are indicators of children's chronical and acute nutritional deficiency, respectively. At the population level, these two conditions are fundamental measures of the next generations' survival opportunities (Danna 2021) and, conditional on infant survival, the potential for development of children's capacities (Black et al. 2017) and a range of outcomes over the lifecycle (Hoddinott et al. 2013). These early-life conditions correlate with later-life health and socioeconomic outcomes, which makes them relevant for understanding socioeconomic inequalities (Amato et al. 2015; Case and Paxson 2010).

Macro-level studies in LMICs have compared children's health across world regions using poverty, place of residence, and city size as key explanatory factors (Montgomery et al. 2003). There is a dearth of studies that examine how children's well-being varies across familial contexts.

Given the myriad of dimensions that can be measured regarding family contexts (e.g., partnership regimes, fertility, gender relation, and household composition), a holistic approach seems suitable.

The holistic approach represents a departure from the assumptions of the analytical perspective that social reality can be reconstructed by adding the influences of separated factors (e.g., interpreting regression coefficients in a multivariate model). Our central assumption, instead, is that social reality is experienced by people as a confluence of circumstances, and that these confluent circumstances are strong predictors of behaviors, and, in turn, of aggregate outcomes. What variables interact (or do not interact) with each other? How strong are these interactions? Do these interaction (or their lack thereof) matters for child outcomes? These are the question that an inductive analysis could elucidate.

The *family configurations* proposed by Castro Torres et al. (2021) provide a country-level measure of confluent family circumstances. Based on 20 family-related variables, this typology considers how families are organized and function in terms of partnership regimes, fertility and contraception, gender relations (both at the household and society level), and household composition. As acknowledged by the authors, this typology is not free from limitations. Author' capacity to measure all aspects of *family configurations* is limited by the availability of comparable information across countries and the geographical coverage and sampling design of their data sources (only women are included in the surveys they used). In addition, their family typology can be criticized for the common methodological issues that arise when assigning categories to countries (i.e., difficulty to specify causal mechanisms between typologies and outcomes, within-category heterogeneity, and changes over time in countries' classification). However, Castro

Torres et al. (2021) took steps for building up a comprehensive typology by combining 20 carefully-designed single indicators (e.g., see their discussion of gender measures in Appendix A), accounted for subnational heterogeneity by separating urban and rural areas, analyzed *family configurations'* change over time, and partially validated their typology using indicators that were not included in the construction of the typology (e.g., female labor force participation, and six measures of women's participation in decision making). Therefore, testing whether this typology predicts a higher proportion of variance of children's health outcomes is a valid approach for assessing the potential of inductive and holistic approaches in family demography.as well as exposing the limitations of an analytical strategy.

Figure 1 displays the spatial distribution of this typology according to the most recent data point for each country.

Figure_1

This typology distinguishes one modern cluster (Q1, modern-changing) comprising urban areas from all latitudes and is characterized by low fertility, relatively delayed partnership formation, changing partnership regimes towards the equal prevalence of formal marriage and cohabitation, higher divorce, separation and remarriage, and relatively more egalitarian gender relations. There are two traditional clusters (both displaying relatively low fertility and early marriage – Q2-1 and Q2-2). These clusters spread across South and South-East Asia. They are termed "traditional" due to the universal, early, and intact nature of marriage, lower prevalence of female headship and female labor force participation, large age difference between partners, and the preference for male

births. The cluster comprising predominately rural areas (Q2-2, highly-traditional-mobile) is changing more than the urban cluster (Q2-1, highly-traditional-rigid). Finally, there are three clusters that spread across the African continent and the rural areas of Latin America (Q3 and Q4). In rural areas of West Africa (Q3, traditional-moderately-mobile), fertility is the highest, and gender norms largely favor men, marriage is virtually universal and occurs early in women´s life. This is the cluster with the highest level of polygyny. In rural areas of East and Central Africa (Q4-1, non-traditional-lagged) fertility is slightly lower, gender norms are less traditional than in Q3, marriage is not the only option for partnership formation, and women participate more in productive activities outside of the household. Finally, in rural areas in the south of Africa and America and urban areas all over the African continent (Q4-2, slightly-vanguard-mobile) family patterns are similar, albeit slower, with respect to Q1: fertility is declining and partnership, and gender regimes are changing rapidly towards more egalitarian, however, these changes are slower than observed in Q1.

Data and methods

We rely on a database covering 75 countries, 250 units of observation (country-area-year combinations) spanning the period 1990-2018. These data include a categorical variable describing the *family configurations* (Q1, Q2-1, Q2-2, Q3, Q4-1, and Q4-2) and the 20 family-related measures used to build this typology. All these variables were calculated using the Demographic and Health Surveys (DHS). We supplement this database with country-year-level estimates of the HDI provided by the United Nations Development Program, and the proportion of children that are stunted and wasted from the DHS-StatCompiler (Measure DHS 2020) .

We conducted 23 separate simple regressions predicting the proportion of children stunted and wasted as a function of the f*amily configurations*, the 20 separate family measures, the HDI grouped into five categories and a geographical classification of countries (Americas, Asia, Former USSR, Middle East and North Africa, and Sub-Saharan Africa). For each regression, we measure the proportion of variance that is accounted for by the predictors (adj-R2) and the goodness of fit (AIC). Next, we fit regression models with two independent variables: (1) the measure of *family configurations,* and (2) one of the single family-related variables, HDI, or the variable capturing the region. These specifications allow us to assess the gains in models' performance when an additional variable is added to the model that predicts children's health outcomes using the *family configurations*. If model performance does not improve substantially when an additional variable is included in the model, this will mean that the relevant information is already accounted for by the *family configurations*.

Finally, we visually examine time trends in children's outcomes by *family configurations* in light of Castro Torres et al. (2021)'s description of global family change. According to the authors, some *family configurations* are "mobile" meaning that family change is occurring rapidly, whereas some others are lagging or rigid (no significant change over time), particularly in the realms of partnership regimes and gender relations. If the confluence of family features matters for children's health, we would expect consistent (i.e., non-erratic) trends in children's outcomes by *family configurations* over time. This consistency will warrant more in-depth research on why some *family configurations* associate with better or worse children's outcomes, an important question that goes beyond the scope of this note.

Results

Figure 2 displays the ranking of the 23 independent variables according to the proportion of explained variance (adj-R2 – black dots) for the country-level proportion of children stunted (left) and wasted (right). Circles indicate the adj-R2 of models with one predictor. The black dashed lines starting at the adj-R2 for the *family configurations* (red vertical line) represent the gain in the adj-R2 by adding single family-relate variables to the model that predicts children outcomes based on the *family configurations*. The red continuous lines indicate the gains in the adj-R2 associated with the addition of the *family configurations* as predictor to bivariate models based on single family-related measures.

Figure_2

The *family configurations* (FamilyConfig) variable is top-one and top-four in the adj-R2 for the proportion of stunted and wasted children, respectively. This means that the combination of family features, inductively captured by the *family configurations*, accounts for a larger share of the cross-national variation in almost all cases compared to the single family-related variables. Only the proportion of married women (Marriag), the proportion of women living in complex households (Complex), and the regional classification of countries display a higher adj-R2 for wasting.

In addition, Figure 2 shows that, in general, there is little that is not accounted for by the *family configurations*. Only in a few cases, the adj-R2 of models with two predictors (black dashed line) are substantially higher than the adj-R2 of regression models with only the *family configurations* as a predictor. These cases involve the proportions of married women (Marriag), early marriage

(FirstMa) and, hypergamous couples (Hyperga) for both outcomes, and the proportion of women in complex households (Complex) for wasting. All other family measures add very little (less than 10 p.p.) to the adj-R2.

Contrary to these patterns, the gains in the adj-R2 due to the incorporation of regional dummies (WRegions) and the HDI (HD_Index) are above 15 p.p. These larger gains suggest that *family configurations* capture contextual features beyond the ones accounted for by world regions and the HDI. Finally, adding the *family configurations* as a predictor to simple regression models with separate family features significantly improves the proportion of explained variance (red lines). These results are fully in line with the results using the AIC instead of the adj-R2.

Figure 3 shows trends over time in the proportion of stunted (left) and wasted (right) children by *family configurations*. Using robust locally weighted regression, smoothed lines describe trends in the proportion stunted (left) and wasted (right) over time within each of the *family configurations*. These trends suggest that changes within *family configurations* are not erratic despite the relative low number of observations, meaning that *family configurations* do group country-areas based on meaningful features for children's well-being.

Figure_3

For example, Q1 (modern-changing) displays the lowest levels of stunting and wasting over the entire period. This is consistent with the overrepresentation in this cluster of urban areas where health outcomes are usually better. Likewise, Q3 (traditional-moderately-mobile) displays

negative trends in child stunting and wasting over time, which is consistent with the relative mobility of this cluster in terms of family characteristics towards partnership regimes and gender relations that are beneficial to children's health. The highly-traditional-rigid and highly-traditional-mobile (Q2-1 and Q2-2) display worsening trends over time, this is particularly sustained for Q2-1, and it may be associated with the lack of family change within this *family configuration*. Given the similarity in fertility between Q1, and both Q2-1 and Q2-2, the fact that these clusters display divergent levels and trends in children outcomes may imply that low fertility and high prevalence of contraceptive use does not necessarily correlate with better child outcomes. Likewise, the divergence in children's outcomes between Q3, and Q2-1 and Q2-2 contrasts with their similarity in terms of traditional partnership and gender regimes, suggesting that gender and partnership alone is not always associated with children's health.

Finally, Q4-1 and Q4-2 display similar levels and trends in the proportion of wasted children, however, the Q4-1 (non-traditional-lagged) display much higher levels of stunting. Given the geographical clustering of these two configurations (Figure 1), this striking difference would have remained masked if we were to analyze trends by region because most country-areas in Q4-1 and Q4-2 are in Sub-Saharan Africa, which points to another strength of a configurational approach.

Conclusion

Using data from 75 LMICs (1990-2018), we show that methodological approaches that account for a confluence of family patterns are a useful and, in some respects, a more comprehensive tool for understanding children's well-being than indicators capturing only distinct family features, regional classifications, or the HDI. International policies to improve children's living conditions

ought to incorporate multiple family dimensions *and their interactions*, as represented by the *family configurations*. For example, lower fertility does not suffice to improve children's health where gender unequal relations persist. Likewise, more gender-equal *family configurations* don't necessarily yield better health for children. This is because social actors act upon the confluence of circumstances rather than upon the sum of separate dimensions of their social reality (e.g., marriage, fertility, gender, household). This idea has not been fully implemented in quantitative comparative family research. We hope this research note will contribute to spurring a debate about the importance of alternative approaches to measuring family dynamics worldwide.

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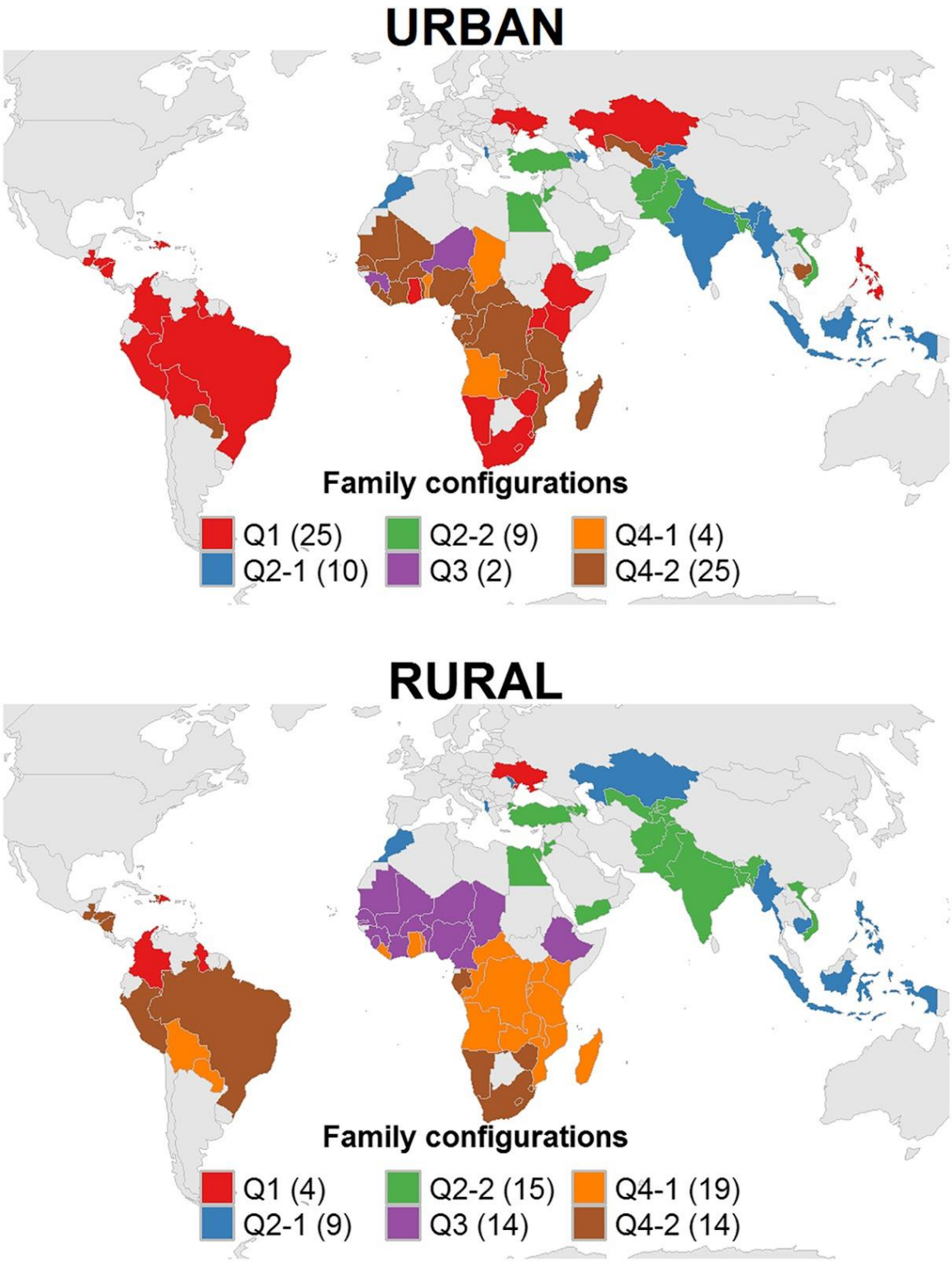
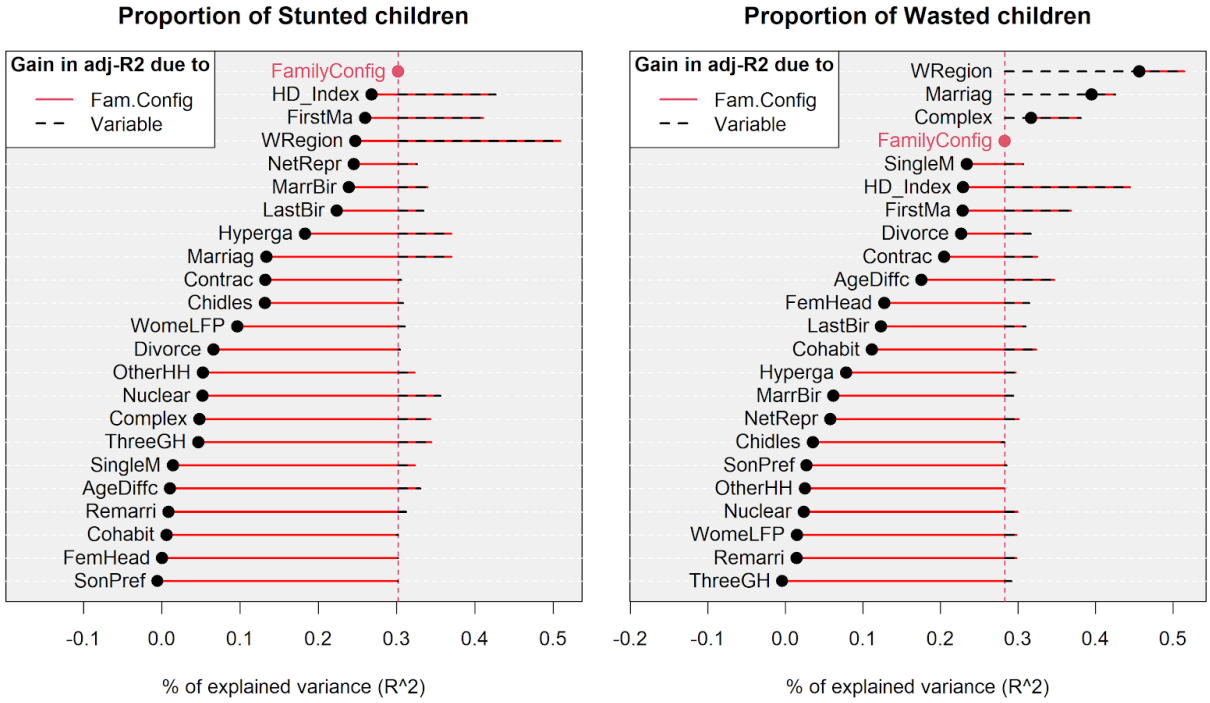
Fig 1. - Spatial distribution of *family configurations* according to Castro Torres et al. (2021)



Note: Numbers in parenthesis indicate the total number of country-areas in each cluster

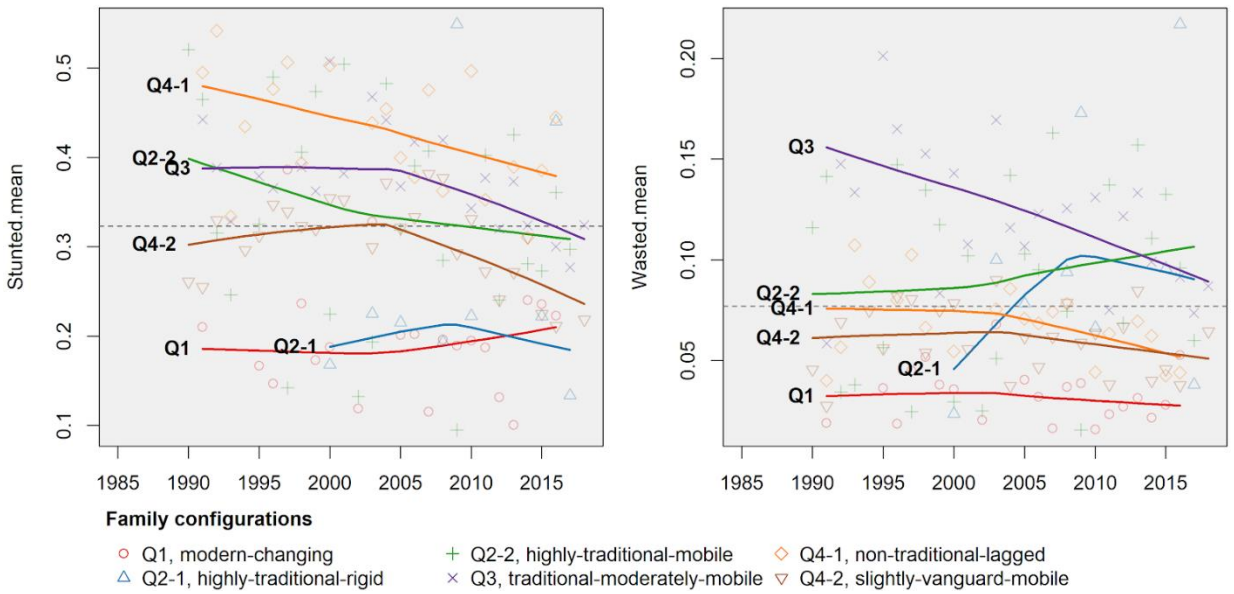
Fig. 2 - Proportion of explained variance in regression models with one and two predictors predicting the proportion of Stunted (left) and Wasted children below age five in 75 LMICs



Note: The ranking of variables and the patterns in the gains in the adj-R2 are consistent when the measure for models' performance is the Akaike Information Criterion (AIC).

List of variables: The 20 family-related variables are: proportion of women in cohabitation among never married, proportion of divorced or separated women, proportion of women married or in union before age 18, proportion of women married, proportion of women declaring more than one marriage/union, average difference between indexed women and their partners, proportion couples where women are more educated, proportion women working for paid among women in couples, proportion of women in a couple who are head of their household, ratio of women without daughters to women without sons, proportion of multinuclear households, proportion of women living only with couple and children, average number of non-related household members, proportion of women living only with children, proportion of women living in three-generation households, average age at last birth women age 40 to 49, proportion of women age 45 to 49 without children, proportion of women with met need for contraception, net reproduction ratio, singulate mean age at first birth.

Fig. 3 - Time trends in the proportion of Stunted (left) and Wasted children below age five in 75 LMICs by *family configurations* 1990-2018.



Note: Color codes are the same as in Figure 1.