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Global Family Change: Persistent Diversity with Development

Luca Maria Pesando, **GFC team**[*]
Population Studies Center and Department of Sociology, University of Pennsylvania. Address: 332 McNeil Building, 3718 Locust Walk, Philadelphia, PA, 19104 USA

Abstract

This article provides a broad empirical overview of the relationship between family change and socioeconomic development drawing on 30-plus years of Demographic and Health Surveys data from 3.5 million respondents across 84 low- and middle-income countries (LMICs). We conduct two sets of analyses. First, we document global and regional-level associations between the Human Development Index (HDI) and novel indicators reflecting multi-dimensional family change. Second, we use methods from the growth convergence literature to examine whether—and in which domains—there is evidence of cross-country convergence in family indicators over levels of development. We show that families in LMICs have transformed in multiple ways, changing differently across domains, world regions, and genders. Fertility, intra-couple decision-making, and women's life-course timing indicators are strongly associated with HDI, yet cross-country convergence is limited to the latter domain. Marriage, cohabitation, household structure, and men's life-course timing indicators are more weakly associated with HDI, and span a broad spectrum of convergence dynamics ranging from divergence to modest convergence. We describe this scenario as "persistent diversity with development," and shed light on the underlying regional heterogeneity—driven primarily by sub-Saharan Africa.

The family remains a fundamental building block of human societies, affecting health, reproduction, and well-being of both present and future generations. Decades of sweeping demographic, economic, and social change have radically transformed structures, gender roles, power relations, and intergenerational bonds of families worldwide (Bianchi 2014; Furstenberg 2014)—initially in high-income countries (HICs), and more recently in low- and middle-income countries (LMICs). At the global level, however, the process of change in families and family domains is inadequately understood (Ruggles 2012; Therborn 2014). This gap in knowledge about Global Family Change (GFC) is striking when compared to discrete socio-demographic events such as fertility, mortality, migration, and education, for which high-quality data exist across most world regions (e.g., UN World Population Prospects, Global Bilateral Migration Database, and Global Human Capital Project). No equivalent data resource exists for GFC. This paucity of comparable data capturing variation in family patterns over time and across space has limited scholars' capacity to evaluate

lucapes@sas.upenn.edu. Phone: +1.215.898.6441; Fax: +1.212.898.2124.
[*]Global Family Change (GFC) team members: Andrés F. Castro(University of Pennsylvania), Liliana Andriano (University of Oxford), Julia A. Behrman (Northwestern University), Francesco C. Billari (Bocconi University), Christiaan Monden (University of Oxford), Frank F. Furstenberg (University of Pennsylvania), Hans-Peter Kohler (University of Pennsylvania)

theories of GFC and its driving forces, and assess the interactions between GFC and broader social and economic development.

Transformations in families are a latecomer in social and economic changes occurring during the demographic transition, as declines in fertility and mortality are often preconditions for substantial systemic change that is associated with alterations in the life course of family members. While a lack of focus on family change might have been acceptable during the initial stages of the demographic transition, this is no longer the case. The preconditions for fundamental transformations of the families exist globally, and GFC has emerged as a central aspect of global social change.

Several potential drivers of GFC have been identified during recent decades, all of which are particularly relevant in LMICs: the largest-ever cohort of youth currently entering adulthood; dramatic technological change; rising economic uncertainty; longer lives and lower fertility; narrowing gender gaps in schooling and the labor market; and globalization forces affecting the flow of information, goods and people across the globe. Families have adjusted in diverse and sometimes surprising ways to these forces (Therborn 2004). Arguably, the transformation of the family that has occurred across high-income countries since the 1960s is currently entering its peak in LMICs. But GFC in LMICs is unlikely to be a simple extension of patterns observed in high-income countries (Furstenberg 2013). Heterogeneity in social, institutional, cultural and legal contexts, and differences in roles and functions of families may result in a diversity of GFC patterns that far exceeds the divergences in family trajectories that have been documented to date (Breen and Buchmann 2002).

This paper provides a broad empirical overview of the relationship between family change and socioeconomic development drawing on 30 years of Demographic and Health Surveys (DHS) data from 3.5 million respondents across 84 LMICs. We seek to advance the understanding of the changes in families that are occurring in many economically less-developed nations by focusing on a set of agreed-upon domains that are key to the notion of the "family," namely fertility, timing of life-course events, union formation (marriage and cohabitation), household structure, and intra-couple decision-making.[1] To this end, we first document global and regional-level associations between the Human Development Index (HDI) and novel indicators reflecting multi-dimensional family change. Second, we examine whether there is evidence of cross-country convergence in these indicators over levels of development and, if so, in which domains. Our analysis draws on a growing literature on whether fertility is converging across contexts (Casterline 2001; Dorius 2008; Wilson 2001, 2011), and extends this literature to broader family domains.

Our focus on GFC in this study takes the perspective of women (and men) in young- and primary-adult (i.e., reproductive) ages, rather than old ages. The motivation is threefold. First, family change at these ages is tied to socioeconomic considerations relating to

[1]We acknowledge that family change stems from the combination of complex, multiple, and concurrent processes that operate at different levels of analysis and cannot be fully captured through DHS data (e.g., coresidence with elderly). Yet we aim in this paper to measure change in some core dimensions that are well-understood and agreed-upon as being central to the functioning of families. By focusing on these domains, we by no means claim that these provide an exhaustive picture of the phenomenon—family change—under investigation, yet we claim that they provide a good starting point.

household production and investments in children that are of particular relevance for LMICs. Second, existing paradigms of family change, such as the Second Demographic Transition (SDT) theory, have generally focused on young- and primary-adult ages. Third, our aim to consider multiple dimensions of GFC in the largest possible universe of countries requires the use of DHS data, which are generally restricted to ages 15–49. We also focus on country-level analyses, as no similar comparative GFC studies exist to-date, and sub-national analyses will be addressed in subsequent GFC research.

Our analysis makes three important contributions. First, we extend the literature to LMICs, where comparatively less is known about cross-country patterns in family transformations. Second, we rely on a wealth of micro-level data to compute innovative indicators accounting for key sources of demographic variability such as changing age distributions and increasing life spans. Third, we extend the fertility convergence literature to look at convergence trends in multiple family domains. In so doing, we move beyond most of the attempts at conceptualizing convergence in families, which have so far been embedded into fertility-related discussions (Casterline 2001).

Our framework of analysis is summarized in the stylized graph below, along with a general overview of the findings (Figure 1). The plane is comprised of four quadrants defined by different combinations of weak/strong associations with HDI (*x-axis*, from left to right) and divergence/convergence patterns over HDI (*y-axis*, from bottom to top). Our diagrammatic representation points to each quadrant being occupied by at least one domain, suggesting that families in LMICs are distinct in many possible ways, and changes in families with development occur differently across domains. A strong association with HDI is observed for fertility, intra-couple decision-making, and women’s life-course timing indicators, yet cross-country convergence over HDI is limited to the latter domain (*top-right* quadrant). The remaining domains are more weakly associated with HDI, and cover a broad spectrum of convergence dynamics ranging from divergence (marriage) to modest convergence over HDI (men’s life-course timing, cohabitation, and household structure indicators). We refer to this heterogeneity as “persistent diversity with development.” In what follows, we further describe and categorize this diversity, shedding light on the underlying regional heterogeneity and the key departure of sub-Saharan Africa from the overall trends.

Background

Global families, quo vadis?

More than fifty years ago, Goode’s *World Revolution and Family Patterns* predicted that, as a consequence of industrialization, family patterns would globally converge to a prevalence of the “conjugal family form” of the West (Goode 1963). He concluded that individuals had become less dependent on extended family groups during the industrial revolution in the West, and hypothesized that other societies would go through the same family changes as they, too, went through the industrialization and urbanization processes. According to a 50-year analysis of global family change, Goode’s prediction about the convergence of family systems in high-income countries and the rising prevalence of conjugal families has not been realized (Cherlin 2012). Over the second half of the twentieth century, the Western family became complex in ways that Goode did not anticipate (e.g., the rise in cohabitation, singleparent families, and stepfamilies). Furthermore, Goode's implicit assumption that all developing countries would follow the same path to industrialization did not come to fruition (Ruggles and Heggeness 2008). Sub-Saharan Africa (SSA) has been largely left behind due to economic crises and the AIDS epidemic that stressed the SSA family; the Middle East and South Asia have struggled; progress in Latin America and Southeast Asia has been uneven, and only in East Asia has consistent economic growth occurred, along with changes in families consistent with Goode's hypothesis of declining family control (Cherlin 2012).[2]

More recently, scholars argued that changes in families are driven by a diffusion of new ideas about family forms via social networks, language and culture-based networks, and global communication networks (Johnson-Hanks et al. 2011). The idea of changes in families being driven by the interaction of socioeconomic development and ideational change has manifested itself in the theory of "developmental idealism," the notion that in many societies around the world the Western family is associated with a higher form of development (Thornton 2001, 2005). Thornton demonstrates that the developmental paradigm included the belief that Western Europe had transitioned from a predominantly extended-family system to a predominantly nuclear family system during its progression through the stages of development (Cherlin 2012). Convergence in family systems is an implication of developmental idealism, in that one of the central values of the framework is the desirability of a modern family—compatible with the needs of an industrialized society—along the lines of the nuclear Western family form.

However, the past half century has shown that there is not a singular pattern of family behaviors that constitutes "the modern family," and thus the potential endpoint of converging family systems. Rather than convergence, scholars are increasingly emphasizing the continuity of long-standing differences in family patterns, functions, and behaviors across the world. At least in the area of fertility, divergent demographic trajectories have started to characterize high-income societies (Billari and Wilson 2001; Rindfuss, Choe, and Brauner-Otto 2016). Such persistent heterogeneity is also predicted by Therborn (2004, 2014), who postulates that two aspects of family change are certain: "First, the family pattern will look different in different parts of the world, and the future will offer a world stage of varying family plays. Second, the future will not be like the past" (2014, 3). Therborn argues that three social phenomena drive family change differently in different parts of the world— the decline of patriarchy, changes in marriage forms and prevalence, and fertility decline—thereby producing seven family systems that differ by different combinations of these factors.[3]

The emerging hypothesis of a "convergence to divergence" in global family systems is not adequately reflected in other conceptual frameworks that are often invoked for guiding analyses of family change, including the two dominating lines of family research starting from work on the West: Becker's New Home Economics (Becker 1981; Becker, Landes, and Michael 1977) and Lesthaeghe and van de Kaa's SDT theory (Lesthaeghe and van de Kaa

[2]Goode did not really focus on Latin America, where signs of a Second Demographic Transition (SDT) can be seen even before the first transition is complete (Cherlin 2012).
[3]These are the *Christian-European* family, the *Islamic West Asian/North African* family, the *South Asian* family, the *Confucian East Asian* family, the *sub-Saharan African* family, the *Southeast Asian* family, and the *Creole* family.

1986; Lesthaeghe 2010, 2014). Both frameworks predict a weakening of the family due to women's pursuit of career and ideational changes valuing individual autonomy and self-fulfillment. According to SDT theory, ideational change triggers declines in fertility, which set in motion other life-course transformations such as less and later marriage, a multitude of living arrangements, a disconnection between marriage and procreation, and increased women's independence inside and outside of unions. The SDT theory correctly anticipated the unfolding of different patterns of partnership formation, the shift in value orientations that emerged as driving forces in childbearing decisions—such as attitudes about politics, sex, religion, and education—and the emergence of sub-replacement fertility as a lasting feature of advanced societies. Albeit starting as a Western theory, it has been expanded to other regions such as East Asia (Lesthaeghe 2010) and Latin America (Esteve, Lesthaeghe, and López-Gay 2012), and broadened to account for the role of path dependency and geo-historical legacies (Esteve and Lesthaeghe 2016). Whether the theory applies to other regions that still lag behind in the demographic transition (e.g., SSA), or where religion protects and reinforces patriarchal kinship organizations (e.g., Islamic countries) is still an open question (Cherlin 2012).

Lastly, a very recent line of family research (Esping-Andersen and Billari 2015; Goldscheider, Bernhardt, and Lappegård 2015; McDonald 2000) has theorized a new phase of family life characterized by a profound "gender revolution" that leads men and women to not only participate in the public sphere in equal terms, but also to share household and childrearing tasks more equitably. This theoretical view posits a long-run return to "more family" as gender egalitarianism gains increasingly normative status, and the predictions of fewer marriages, children, and greater couple instability show signs of reversal. Again, while the theory has proved applicable to some European countries, it is unclear whether it extends beyond European borders. If this theory has applicability to LMICs, we will likely observe changes over the next decades. As of now, most LMICs might still be undergoing the "first half" of the gender revolution, characterized by dramatic growth in female labor force participation rates, which bring challenges to family formation and union stability (Goldscheider, Bernhardt, and Lappegård 2015). As trends are still underway, it might be premature to theorize a new, blissful future for family life, especially at the global level (Cherlin 2016; England 2010).

Convergence in a demographic perspective

As the foundations of the convergence concept were initially developed within a demographic transition framework (Chesnais 1992), scholarly research to date has mostly dealt with mortality (Goesling and Firebaugh 2004; Janssen et al. 2016; McMichael et al. 2004; Montero-Granados, de Dios Jiménez, and Martín 2007; Neumayer 2003, 2004) and fertility studies of convergence (Casterline 2001; Coleman 2002; Crenshaw, Christenson, and Oakey 2000; Dorius 2008; Wilson 2001, 2011).[4] Combined with modernization theory,

[4]For studies of convergence in health and life expectancy, see Goesling and Firebaugh (2004), Janssen et al. (2016), McMichael et al. (2004), Montero-Granados, de Dios Jiménez, and Martín (2007), and Neumayer (2003, 2004). For studies of convergence in fertility, see Casterline (2001), Coleman (2002), Crenshaw, Christenson, and Oakey (2000) Dorius (2008), and Wilson (2001, 2011). For studies of convergence in broader living standard indicators such as wealth, educational enrolment, literacy, and television availability, see Jordá and Sarabia (2015), Kenny (2005), and Neumayer (2003).

this framework postulates that fertility and mortality rates vary over time in a predictable and uniform manner, and less-developed countries will follow a path of economic and social progress similar to the one observed in more-developed countries, thereby eventually converging in their fertility and mortality rates. The gradual transition from a high fertility and mortality scenario to one characterized by low vital rates would hence constitute the clearest example of demographic convergence (Salvini et al. 2015), pushing the world toward a new "demographic equilibrium" (Wilson 2001).

Despite clear theoretical predictions, the most puzzling aspect of existing studies of global demographic convergence is the ambiguous nature of their findings. In the area of mortality, global convergence has been modest throughout the past half century, and has been replaced by divergence since the late 1980s (Goesling and Firebaugh 2004; Moser et al. 2005), due in large part to declining male life expectancy in the Former Soviet Union, and the spread of HIV/AIDS in SSA. In the area of fertility, research points toward high levels of inter-country and intra-regional variation in the pace of fertility decline (Casterline 2001). The only conclusive statistical evidence for convergence in fertility is found after the mid-1990s, about two decades after the onset of the decline in world mean fertility (Dorius 2008).

Most important from the perspective of this paper, the demographic literature on convergence—with its heavy focus on the drivers of the demographic transition—shows evident gaps when it comes to embedding additional family dimensions in the picture.[5] Most of the attempts at conceptualizing family change to date have been incorporated into broader discussions of fertility dynamics (Casterline 2001; Ram 2012; Skinner 2014). For instance, it is indisputable that domains such as union formation and fertility are closely tied, and union formation remains a precondition for fertility in several contexts. Yet, the shift in focus onto understanding global social change requires endorsement of the idea that changes in multiple domains of the family matter independently of changes in fertility (van de Walle 1993).

Scholars have recently attempted to assess convergence in family dimensions such as marriage, cohabitation, and divorce, though rarely has the focus been comparative- and LMICs-oriented. For instance, Lundberg, Pollak, and Stearns (2016) documented diverging patterns in marriage, cohabitation, and childbearing over the last 60 years, but their focus is on comparing within-country trends among population subgroups—more- versus less-educated in the United States—rather than countries or world regions. Conversely, Billari and Wilson (2001) and Billari and Borgoni (2002) carried out cross-country comparative analyses of convergence in family dimensions and transition to adulthood markers such as early home leaving, timing of first union, total first marriage rate, and total divorce rate—but their focus is on European countries exclusively. To our knowledge, the present paper is the first comparative study to formally assess convergence in family indicators across multiple domains in LMICs. Our motivation is not to provide a further rejection of Goode's model of family convergence, but to identify which domains have been converging and which have not, to build a more comprehensive and theoretically robust framework for understanding GFC in LMICs.

[5]A similar claim could be made for convergence studies in the area of migration.

Data and measures

Data

This paper uses repeated cross-sectional DHS data from 84 LMICs across five world regions (Figure 2), namely Americas, Asia, Former Soviet Union, Middle East and North Africa (MENA), and sub-Saharan Africa. For the countries included, their regional classification, and the number (and year) of survey waves per country, see Appendix Table A-1.

Our analyses include micro-level information from 293 DHS survey waves—on average five waves per country—collected between 1985 and 2016. We combine socio-demographic information from these surveys with HDI time series provided by the UNDP (2015) Human Development Report. The HDI is a summary measure of average achievement in three key dimensions of human development: living a long and healthy life ("health and life expectancy"), being knowledgeable ("human capital"), and having a decent standard of living ("well-being"). The HDI is the geometric mean of normalized indices for each of the three dimensions, and it ranks countries into four tiers of development, namely "very high" (>0.8), "high" (0.7–0.799), "medium" (0.550–0.699), and "low" (<0.550), thus providing a standardized measure of development across diverse contexts.[6] We acknowledge that the composite nature of the HDI makes it less obvious to appreciate which socioeconomic factors are more closely associated with family indicators, yet we rely on the HDI as the primary index used by UNDP to monitor broadly-defined development goals. In doing so, our work aligns with a long stream of scholarly tradition in sociology, demography, and economics (Bijwaard and van Doeselaar 2014; Bongaarts and Watkins 1996; Bystrov 2014; Harttgen and Vollmer 2014; Kreidl and Hubatkova 2014; Jordá and Sarabia 2015; Myrskylä, Kohler, and Billari 2009; Tanaka and Johnson 2016). In the Appendix, we provide ancillary analyses using the three HDI-components separately, most of which support the conclusions reached using an HDI-based approach.

In sum, our work encompasses all available DHS surveys 1985–2016, drawing information from about 3.5 million respondents and representing the most comprehensive dataset for which these analyses are possible. By relying on high-quality surveys that provide comparable measures for a well-defined universe of countries—such as the DHS—we face an obvious trade-off between country coverage and data quality. This resulted in the exclusion of important LMICs for which no DHS is available. We acknowledge that this is a limitation of our study, and we aim to extend GFC analyses to China and other excluded LMICs in subsequent research. Nonetheless, we show in Appendix Figure A-1 that the sample of DHS countries included in the analysis well covers the complete range of the development spectrum of LMICs.

GFC indicators

We focus on five family domains: fertility, timing of life-course events, union formation (marriage and cohabitation), household structure (vertical, or inter-generational relationships), and intra-couple decision-making (horizontal, or intra-generational

[6]We imputed missing values on the HDI for specific years using linear interpolation.

relationships). This multifaceted conceptualization reflects the complexities and interrelatedness of global family change, with 20 indicators classified along three conceptual axes of analysis (Figure 3): Family Events and Behaviors (FEB), Linked Lives (LL), and Life-Course Patterns (LCP). Best documented to date have been changes in indicators of family events and behaviors, such as increases in unmarried cohabitation prevalence, and delays in the timing of marriage and/or onset of sexual intercourse (Bongaarts, Mensch, and Blanc 2017; Hayford, Guzzo, and Smock 2014; Manning, Brown, and Payne 2014). Indicators of linked lives (Elder 2001) illustrate the extent to which GFC transforms social relations, both within and across generations. Life-course pattern indicators combine measures of fertility, marriage, and cohabitation with information on mortality conditions to capture the average number of years spent in different family "constellations" across the adult life-course. The rationale behind this latter group lies in the premise that many LMICs have experienced increases in life expectancy during the last three decades (UN-DESA Population Division 2017), driven in part by declines in young- and adult-age mortality. These mortality changes are important for understanding family change, for instance, because the person-years spent married by individuals can increase despite a delay in entering marriage and/or increased rates of marriage dissolution. Similarly, the number of surviving children decreases less than fertility, or might even increase, if development is also associated with declines in infant mortality.

Indicators of family events and behaviors include the Total Fertility Rate (TFR), marriage and cohabitation prevalence, and a set of sex-specific timing indicators measuring mean ages at three critical life-course events—first sex, first marriage, and first birth—commonly used in prior analyses (Bongaarts, Mensch, and Blanc 2017). Following prior studies (Bongaarts and Blanc 2015; Clark and Brauner-Otto 2015), timing indicators are estimated using singulate mean ages (SMAFS: Singulate Mean Age at First Sex; SMAFM: Singulate Mean Age at First Marriage; SMAFB: Singulate Mean Age at First Birth), a methodology first developed for mean ages at first marriage (Hajnal 1953), and then adapted to the estimation of mean ages at first birth in contexts that lack accurate vital statistics (Bongaarts and Blanc 2015; Casterline and Trussel 1980; Booth 2001). The SMAFB relies on age-specific proportions childless, and is defined as the average length of life with no children among those who have children before age 50. Analogous definitions and data requirements apply for the SMAFS and SMAFM.

Indicators of linked lives are constructed combining information from the women's file with information from the household roster. Intra-generational indicators are obtained from the women's file and include the share of households in which the husband is the sole decision maker on women's health, household purchases, and women's visits to family and friends. Conversely, inter-generational indicators include the share of children living with both parents, and three indicators measuring the share of women living in a nuclear (a household where only one couple resides, either with or without kids), three-generation (a household where at least one member of the household roster reports that his/her relationship to the household head is one of grandparent or grandchild), and complex household (a household where at least one member of the household roster reports a lateral relationship with the household head). While the former indicator is obtained from the household roster only, the latter three are computed following a multistep process that draws information on women's living arrangements from both a woman- and a household-level perspective. Essentially, in instances in which the household roster does not provide conflicting or additional information with respect to the categorization based on the woman's perspective, the latter categorization is kept. Otherwise, both perspectives are combined to come up with a more precise categorization.[7] By computing these indicators, we do acknowledge that our aim in this article is not to capture coresidence patterns in society, but rather the household context of women in reproductive ages— which may significantly differ from broader coresidence patterns in society described, among others, by Ruggles (2009, 2010) and Ruggles and Heggeness (2008). For instance, we acknowledge that our indicators are a poor measure of coresidence with the elderly, which would require data on individuals aged 65 or older— which the DHS does not provide by design.[8]

Life-course pattern indicators—comprising the Net Reproduction Rate (NRR), marital expectancy at age 15, cohabitation expectancy at age 15, and marital and cohabitation expectancy at age 15—are constructed using mortality information from the UN Population Division's *World Population Prospects: The 2015 Revision*. We combine every DHS survey wave with available life tables from the year closest to the survey. We compute marital and cohabitation expectancies at age 15 using the Sullivan method (Imai and Soneji 2007), widely used to estimate healthy life expectancy yet rarely applied to the family realm. State-specific life-expectancies (or person-years spent in marriage, cohabitation, etc.) are obtained via $e_x^l = \frac{1}{l_x}\sum_x {}_n\hat{\pi}^l_x \, {}_nL_x$ where ${}_n\hat{\pi}^l_x$ are age-specific proportions in a certain state *i* computed from a survey (e.g., proportion of married women between ages 25 and 30), and l_x and ${}_nL_x$ are period life-table quantities. Expectancies are computed at age 15 as the DHS provide no data below 15.

Our indicators are age-standardized to eliminate influences resulting from age-structure differences across countries.[9] Age-standardization is critical—yet rarely adopted in comparative family studies—to ensure that comparisons identify the extent to which observed differences in indicators across countries are due to social processes underlying the changing nature of families, rather than driven by demographic considerations such as changing age structures. Age-standardized indicators are computed by combining age-specific proportions from DHS micro-data with national age-structure data provided by the UN Population Division's *World Population Prospects: The 2015 Revision*. All indicators are standardized to the 2000 age distribution for less-developed countries excluding the least

[7]The multi-step process followed to obtain the household categorization combines information on women's living arrangements obtained from both a woman and a household-level perspective. It proceeds as follows: (1) We first classify women in categories based on the information provided in the women's file; (2) We identify the household context using information on household members from the household-level file; (3) We combine the woman and household-level perspectives in such a way that the categorization based on the woman's perspective is kept if there is no additional or conflicting information provided in the household roster (otherwise the two are combined); (4) We merge back to the woman-level to obtain estimates at the individual level (e.g., share of *women* living in nuclear households), rather than at the household level (e.g., share of nuclear *households*). In terms of household classifications, if the household includes more than one couple, then it is not classified as *nuclear* but *complex*. Households classified as complex are essentially those that deviate from the nuclear case. Note that a three-generation household can also be complex, and vice versa.

[8]It is not clear that the patterns that pertain to the 65+ population extend to the younger population, which is the focus of our paper. Actually, almost certainly the patterns are quite distinct. Therefore, the likely divergence of our findings to those in Ruggles is due to a focus on different parts of the life-course (broadly reproductive ages in our case, ages 65+ in Ruggles' case), and the different patterns are not necessarily contradictory. We acknowledge that we are likely to miss a considerable amount of co-residence by relying on DHS data, yet we can get some other relevant information from the perspective of women in reproductive ages.

[9]Some indicators are age-standardized by construction, such as the TFR.

developed (2000 is the average survey year in the sample). Supplemental analyses show that age-standardization significantly shifts the observed distribution of age-sensitive indicators. For instance, cross-regional differences in marriage prevalence are narrower after age-standardization (Figure A-2 in the Appendix), suggesting that findings based on crude indicators could lead to overstate (understate) the role of behavioral (compositional) factors underlying family changes. Descriptive statistics of GFC-indicators are shown in Table 1.[10] All indicators are publicly available.[11]

Associations between GFC indicators and HDI

Analytical strategy

Our methodological approach proceeds in two stages. First, we conduct a series of descriptive analyses of family change indicators over levels of socioeconomic development—as measured by HDI—in a spirit similar to Myrskylä, Kohler, and Billari (2009) and Anderson and Kohler (2015). We plot each indicator against HDI, and assess whether a linear approximation summarizes the association reasonably well. To ease visualization and enable comparability across measures, we summarize the 20 scatterplots in a single graph that reports standardized associations (slopes) from a linear regression of each indicator on HDI. Indicators and the HDI are standardized on the pooled sample so that coefficients reflect changes in indicators measured in standard deviation (SD) per one SD change in HDI. Standard errors are clustered at the country level, and estimates are weighted for the number of survey waves by country to account for the fact that some countries have repeated observations (e.g., 11 waves in Peru) while others do not (e.g., one wave in Myanmar).

Although avoiding any claims of causality, we test the robustness of the associations using both contemporaneous and lagged values of HDI (the latter reported in the Appendix) to—at the very least—assuage endogeneity concerns due to reverse causation. Also note that throughout the study we provide both global and regional evidence. Whenever we provide regional evidence, we remove one region at a time rather than running separate analyses by region, as for some regional groupings, the number of country-years would be too limited to warrant an adequate sample size. By excluding one region at a time, we are able to preserve sample variability and appraise the contribution that each excluded region provides to the overall association/coefficient. This approach is similar to Dorius (2008).

Results

Figure 4 summarizes the association between HDI and the 20 GFC-indicators. Indicators are grouped by color and shape, following the three-way conceptual classification in Figure 3. Corresponding scatterplots are provided in Appendix Figure A-3. Note that the indicators in this graph—reported on the vertical axis—have been rephrased in terms of "trends," as we are interested in comparing the strength of the positive association of the indicators with

[10]We would like to caution the reader that the number of observations (country-years) varies by indicator (as also mentioned in the note to the table), hence there might be some country-year observations included in the computation of, e.g., the SMAFB but not in the SMAFM. The Table shows, for instance, that in MENA the SMAFM (23.49) is much higher than the SMAFB (19.85). However, once the same set of country-year observations are retained the SMAFB increases to an average that is almost the same as the SMAFM.
[11]The 20 indicators are publicly available on an interactive platform accessible through the following link: http://web.sas.upenn.edu/gfc/data/maps/.

HDI. For instance, as the TFR is negatively associated with HDI, we rephrased the indicator "TFR" as "Reduction in TFR." Each marker corresponds to the coefficient of a regression of the respective GFC indicator on HDI. Filled markers refer to statistically significant estimates (p-value<0.05), and larger markers indicate more precisely estimated associations. The detailed regression estimates are provided in Appendix Table A-2 (panel [a]), along with robustness checks using lagged HDI values (panels [b] and [c]).

Our analyses corroborate the well-established finding that increased socioeconomic development is associated with lower fertility (Bryant 2007; Myrskylä, Kohler, and Billari 2009). A one SD increase in HDI—corresponding to approximately a 10-point increase in HDI on a 0–100 scale— is associated with a 0.65 SD reduction in TFR. Accounting for mortality as reflected in the Net Reproduction Rate (NRR) weakens the association by about 0.1 SD, suggesting that reductions in infant mortality cause the number of surviving children to decline less than overall fertility levels. The association of fertility with HDI is the strongest among those considered in this study, followed by decision-making indicators (horizontal linked-lives indicators)—in areas as varied as women's health, freedom of movement, and purchases for the household—and timing indicators measured by the SMAFS, SMAFM, and SMAFB. For the latter, important gender differences emerge: statistically significant associations between timing indicators and HDI are found for women, while the relationship is weak and statistically insignificant for men. SMAFM is associated most strongly with development, followed in turn by SMAFB and SMAFS. This divergence is likely due to (mostly first) births increasingly occurring outside of marriage.

Coefficients on indicators of family events and behaviors are aligned with SDT predictions of lower fertility, delayed markers of adulthood, and increased women's autonomy associated with increases in HDI. As a complement to the SDT, which is mostly silent on gender convergence in the transition to adulthood, we also provide evidence of reduced gender differences: as women tend to have earlier ages at first sex, first marriage, and first birth than men, the stronger association with HDI for women as compared to men is suggestive of a trend toward converging gender patterns in the transition to adulthood. This diminishing sex discrepancy is consistent with global trends toward women's increasing commitment to education and labor force participation (Esteve et al. 2016).

Vertical linked-lives indicators are more weakly associated with HDI than the above family events and behaviors and horizontal linked-lives indicators. While a one-SD increase in HDI is associated with a 0.2 SD gain in the share of children living with both parents, there is no significant association between HDI and the share of women living in nuclear and three-generation households. This finding somewhat departs from theories postulating an inverse association between household complexity and socioeconomic development (Goode 1963; Le Play 1884), yet it is consistent with the stability in traditional family forms found in analyses of intergenerational coresidence across 15 developing countries by Ruggles and Heggeness (2008). We caution, though, that results are not fully comparable with census data from IPUMS, as with DHS we can only capture the living arrangements of women in reproductive ages.

Marital status indicators show that higher HDI is associated with a decline in marriage prevalence (0.2 SD reduction per 1 SD increase in HDI), while there is no statistically significant association with prevalence of cohabitation. Yet, once we account for period mortality conditions by computing person-years (PY) lived married, marriage shows remarkable persistence, as the association with HDI turns insignificant and its magnitude is reduced by more than 50 percent (0.08 SD). Conversely, differences between prevalence of cohabitation and the average number of years spent cohabiting are minimal, due to the fact that increases in cohabitation are driven by coresidence at relatively young ages, where the mortality effect is weakest. Summing the number of PY spent in marriage and cohabitation delivers an even clearer finding: increases in HDI are not associated with declines in the number of years adults spend in unions. This finding is due to reduced adult mortality and the increased PY lived as adults that have occurred in LMICs in recent decades. When seen through the lens of life-course pattern indicators, such as PY in marriage or cohabitation, our descriptive analysis therefore suggests that during the development process, families in LMICs have not been characterized by dramatic shifts in patterns of union formation. Overall, the associations are robust to replacing contemporaneous HDI with 2-year and 5-year lagged HDI values (Appendix Table A-2, panels [b] and [c]), and to substituting HDI with its components (Appendix Table A-4 and Figure A-4).[12]

Figure 5 expands our analyses in Figure 4 to consider heterogeneity by region. Following the same approach, each line in Figure 5 reports five (rather than one) markers that correspond to the coefficients of a linear regression of the respective indicator on HDI, excluding one world region at a time (e.g., the circle in the NRR line captures the association between the NRR and HDI on the pooled sample excluding the Americas). The cross (x) locates the global association provided in Figure 4. Filled markers indicate statistically-significant estimates ($p<0.05$). Detailed regression estimates are provided in Appendix Table A-3. For each line, markers that are clustered near each other indicate cross-regional homogeneity in the estimated association between the indicator and HDI. Close markers suggest that removing regions does not affect the association to a significant extent, i.e., no particular region is driving the association in either direction. This is the case for the TFR, with the association with HDI robust to the exclusion of each region, and stable around 0.6–0.7 SD. The case of the NRR is similar, although excluding SSA here results in a stronger association with HDI (0.63 SD versus the 0.54 SD shown in Figure 4). This is reasonable, as SSA has experienced substantial mortality declines along with increases in HDI in recent decades. Figure 5 reveals varying degrees of cross-regional homogeneity in women's timing and decision-making indicators. Homogeneity is particularly pronounced for women's SMAFM and intra-household decision-making on women's visits to family and friends, while for decision-making on women's health, excluding SSA, would result in a stronger positive association with HDI (0.72 SD versus 0.55 SD shown in Figure 4).

The regional picture for vertical linked-lives indicators is complex, as the Americas contribute to making the positive association between HDI and the share of children living

[12]Note that in panel [b] of Appendix Table A-2 the HDI is lagged by two years—rather than one—because some demographic estimates are obtained from DHS surveys which were collected over two years. Therefore, by taking the HDI value two years before we make sure we are not taking any contemporaneous value.

with both parents smaller than it would be, while the null or weak associations between HDI and the share of women living in nuclear and three-generation households is mostly driven by SSA and Asia. The case of SSA is also interesting in that the share of women living in a three-generation household is positively correlated with HDI. Although further research (beyond the scope of this article) is needed to untangle why this is the case, we suspect this is due to rapid demographic changes in the region, such as fastest mortality declines which increase young generations' opportunities to reside with parents or have a living grandparent (Ruggles and Heggeness 2008). The influence of the HIV epidemic and differential patterns of migration might also play an explanatory role. Lastly, consistent with prior findings on heterogeneous trends in men's ages at reproductive transitions (Bongaarts, Mensch, and Blanc 2017), the highest cross-regional heterogeneity in the associations is observed for men's timing indicators.

Overall, coefficients excluding SSA are most often at the lower or upper extremes of each line (with Former USSR at the opposite end, yet somewhat less distal from the average), suggesting that SSA is the region that contributes the most to the observed heterogeneity. Excluding SSA, regional trends would depart less from global trends in the associations between HDI and family domains. For instance, in the absence of SSA, we would observe stronger associations between HDI and NRR reduction, delay in mean ages at first birth, women's empowerment, decline in the share of women living in complex households, and decline in years spent in marriage or cohabitation.

Figures 4 and 5 combined suggest strong associations between women's family events and behaviors and horizontal linked-lives indicators and human development, with little cross-regional variability. Conversely, men's family events and behaviors, vertical linked-lives, and life-course pattern indicators are more weakly associated with HDI, and the associations show widespread heterogeneity. However, associational evidence of this kind provides little guidance to understand how change unfolds over advances in development. Specifically, it does not tell us whether LMICs are becoming more "similar" as HDI improves, and whether the extent of intercountry variability in family indicators narrows as countries move along the development path. In what follows, we carry out formal assessments of the convergence hypotheses outlined in the background section.

Convergence in GFC-indicators over HDI

Analytical strategy

To examine dynamics of change, we complement the previous cross-sectional investigation with formal statistical analyses of whether there has been convergence in family indicators over HDI using approaches pioneered by Barro and Sala-i-Martin (1992), Sala-i-Martin (1996), and Dorius (2008)— see also Gächter and Theurl (2011), Jordá and Sarabia (2015), Salvini et al. (2015), and Janssen et al. (2016) for more recent applications. Differently from previous related scholarship (e.g., Dorius 2008), we explore whether convergence has occurred over levels of socioeconomic development rather than time. Specifically, we test for convergence over HDI, and report parallel analyses for convergence over HDI per unit of time ("pace of development") in the Appendix (Table A-6).

Our analysis tests for *beta*-convergence (β), that is, the catching-up of countries "lagging behind" in specific indicators. In line with Dorius (2008), we estimate β-convergence following equation 1, where *ln* is the natural log, subscript *j* refers to the j^th^ country, $Y_{t_{i+n}}$ is the value of the demographic indicator observed in survey year, *i+n*, Y_{t_i} is the value of the same demographic indicator observed in survey year *i*, $\left(HDI_{t_{i+n},j} - HDI_{t_i,j}\right)$ is the difference in the value of the HDI between two repeated cross-sections (t_i and t_{i+n}) for the same country *j*, β is the convergence coefficient, α is the constant, and e_j is the error term for the j^th^ country:[13]

$$\frac{ln\left(Y_{t_{i+n},j}\right) - ln\left(Y_{t_i,j}\right)}{\left(HDI_{t_{i+n},j} - HDI_{t_i,j}\right)} = \alpha + \beta\left(Y_{t_i,j}\right) + e_j \qquad (1)$$

For every country, each previous cross-sectional survey forms the base measurement for the calculated growth rate. Hence, if a country has three repeated cross-sections, two growth rates are calculated over the corresponding periods. It follows that the set of country-years included in this second stage of the analysis is reduced (henceforth, "convergence sample"), as countries with only one survey are automatically excluded (i.e., 26 countries/survey waves are excluded, resulting in a sample of N=267 country-year combinations and 58 countries). For an overview of the countries with only one DHS survey, see Appendix Table A-1. In Appendix Table A-5 we show that averages of the GFC-indicators between the overall sample (N=293) and the convergence sample (N=267) are quite aligned. As the DHS countries with one survey are primarily from the former Soviet Union, some differences emerge for the TFR and NRR (higher in the convergence sample) and the timing indicators (lower in the convergence sample). Differences are, however, small and unlikely to invalidate our findings. If anything, the convergence sample is more representative of the low-income (rather than low- and middle-income) world.

A negative sign on the β-convergence coefficient indicates that lagging countries are catching up with leading countries, i.e., they are converging; a coefficient not significantly different from zero indicates that differences between countries are maintained, while a positive coefficient indicates that lagging countries are falling farther behind, i.e., they are diverging. Applied to fertility, for instance, β-convergence occurs when the rate of decline among countries with high fertility is greater than the rate of decline among countries with low fertility. In line with the literature, we complement tests for β-convergence with analyses of *sigma*-convergence (σ), the reduction of between-country variability— as measured by the coefficient of variation (CV)—in indicators over HDI levels.[14] σ-convergence analyses are reported in the Appendix.

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[13]When we test for convergence over HDI per unit of time ("pace of development"), the denominator $\left(HDI_{t_{i+n},j} - HDI_{t_i,j}\right)$ is replaced with $\left(HDI_{t_{i+n},j} - HDI_{t_i,j}\right)/n$, where *n* is the number of years between the two repeated cross-sections.

[14]A negative trend in the CV implies a decline in the variability relative to the mean, i.e., convergence; a flat trend implies differences are maintained; and a positive trend implies increasing heterogeneity, i.e., divergence. S*igma*-convergence analyses are a natural complement for β-convergence analyses in that the latter is a necessary but not sufficient condition for the former to hold (Barro and Sala-i-Martin 1992; Young, Higgins, and Levy 2008).

There is much debate in the literature on the appropriateness of using population weights in these types of analyses. Early studies of inter-country dynamics treated each country equally as the principal units of interest were economies. Subsequent scholarship suggested that whenever the research focus is on individuals, then countries should be weighted by population size/shares (Firebaugh 1999; Korzeniewicz and Moran 1997). In this study, country-years are the main units of analysis, hence we opt for the former approach. Doing so ensures that a change in Y for a large country like India does not disproportionately affect the estimates as compared to a similar change for a smaller country like Malawi.

Results

Table 2 reports results from a β-convergence model where the growth rate of each indicator over HDI is regressed onto its initial level.[15] Panel [a] provides global estimates, while panel [b] provides estimates on the sample excluding one region at a time, in an effort to isolate the contribution that each region provides to the overall global convergence coefficient. The left column of panel [a] reports coefficients from an unconditional β-convergence specification, while the right column controls for region-specific dummies to account for within-region heterogeneity, thereby providing conditional β-convergence estimates (Lall and Yilmaz 2001).[16] Conditional β-convergence estimates imply that pathways of convergence hinge upon the structural specificities of each region.

Despite the fact that the majority of coefficients are negative in sign—thereby pointing to convergence—statistical evidence of global convergence (panel [a]) is limited to a narrow subset of indicators, namely women's timing indicators (SMAFS, SMAFM, and SMAFB) and the number of PY spent in unions (marriage plus cohabitation). Unconditional β-convergence estimates offer no evidence of a catching-up process in fertility (TFR and NRR), thereby aligning with Dorius's (2008) analysis of global convergence in fertility over time, which shows that knowing the initial value of the TFR for the average country tells little about subsequent fertility decline over a 50-year time span (except for limited periods such as the 1995–2005 decade). Controlling for regional dummies provides some evidence of within-region convergence for the NRR and, in line with Dorius (2008), our estimates align with the idea that sub-Saharan African countries exert a braking effect on the global β-convergence coefficient. The regional counterfactuals (panel [b]) indicate that, without these countries, the sign of the β-coefficient would turn from null/positive to negative, leading to a 1.3 percent decline in the growth rate of the NRR over HDI in response to a one-unit increase in initial NRR. Conversely, excluding any other region would leave the global convergence coefficient virtually unchanged.

The idea that family change trajectories may follow different patterns by sex—suggested in Figure 3—is confirmed by strong cross-country convergence in women's (but not men's) postponement of first sex (SMAFS), first marriage (SMAFM), and first birth (SMAFB). For

[15]As the computation of growth rates over HDI yields extreme values due to small changes in the HDI between survey waves (ΔHDI, i.e. the denominator of the rate), we exclude outliers that fall outside the first quartile (Q1) minus three times the interquartile range (IQR), and the third quartile (Q3) plus three times the IQR.

[16]With the addition of region fixed-effects we are assuming different intercepts for each region, but common speed of convergence (i.e. same slope).

instance, a one-year increase in initial SMAFM for women reduces the average growth rate over HDI by about 0.1 percent. This gender discrepancy is likely to lead to growing similarities in transition to adulthood patterns between the sexes, thereby affecting couple-formation strategies and patterns of assortative mating by age and education (Mensch, Singh, and Casterline 2005). Again, panel [b] provides some evidence for the unique role of SSA yet, differently from above, excluding SSA would result in weaker—rather than stronger—convergence coefficients. SSA countries are therefore seemingly speeding up the convergence process in women's timing indicators.

Horizontal and vertical linked-lives indicators show negative yet non-significant coefficients, hinting at persistent differences with development. In a way that parallels fertility indicators, LMICs would be more strongly converging with development in intra-household decision-making in the absence of SSA, suggesting that countries in SSA are lagging behind other regions when it comes to improvements in intra-household bargaining. Similarly, coefficients on vertical linked-lives indicators indicate that heterogeneity within MENA and the former USSR regions drives results away from convergence in the share of women living in nuclear and three-generation households, while heterogeneity within SSA drives results away from divergence in the share of children living with both parents.

Lastly, marriage prevalence is the only domain in which clear evidence of divergence over HDI is observed, implying that countries where marriage prevalence is high have experienced a relatively slower decline in marriage as compared to countries where marriage prevalence is low. Note that these divergence trends are driven by the Americas, and findings excluding these countries would be consistent with a scenario of persistent differences with development. Combined with the observation that women across the world are converging in their mean age at first marriage—and in cohabitation practices, at least within regions—these findings suggest that in the realm of union formation we are likely to observe the emergence of heterogeneous clusters of countries varying by different combinations of marriage prevalence and timing.

β-convergence estimates over HDI per unit of time—reported in Appendix Table A-6—fully confirm our evidence of (1) global convergence in women's (but not men's) timing indicators and PY spent in unions, (2) global divergence in marriage prevalence, (3) within-region convergence in fertility and cohabitation, and (4) the peculiar role of regions (mostly, SSA) in slowing down or speeding up global convergence patterns.

Analyses of σ-convergence over HDI—reported in Appendix Figure A-5—show a good degree of consistency with β-convergence coefficients except for timing indicators, which display too little variability to detect meaningful trends. The linked-lives decision-making indicators follow an inverted-U shape, confirming that SSA—with mean HDI around 0.45—contribute the most to divergence patterns in these family domains. These findings align with the idea that in the absence of countries in the lowest HDI tiers, LMICs would converge toward more equal intra-household dynamics. Moreover, while variability is increasing in the share of married women, it is unambiguously decreasing for cohabitation indicators, confirming trends toward convergence in cohabitation practices.

Conclusions and discussion

This article has provided a comprehensive empirical assessment of the relationship between family change and socioeconomic development drawing on 30 years of survey data from 3.5 million respondents across 84 LMICs. We conducted two sets of analyses. First, we documented—in a descriptive and cross-sectional way—global and regional-level associations between HDI and novel indicators reflecting multi-dimensional family change. Second, focusing on this same set of indicators we explored whether—and in which domains—families in LMICs have converged over levels of development.

We documented strong associations, with little cross-regional variability, between HDI and women's indicators of family events and behaviors and horizontal linked lives. Conversely, HDI is more weakly associated with men's family events and behaviors, vertical linked-lives, and life-course pattern indicators, exhibiting regional idiosyncrasies that call for a more contextualized understanding of GFC. Although the emerging picture is complex and opens several research avenues, this simple analysis has value in that it questions the narrative that fertility and family change are closely synchronized during the demographic transition. Moreover, the conceptualization of family change adopted emphasizes the importance of interacting multiple axes of analyses—such as measures of both prevalence and timing, horizontal and vertical dynamics, and person-years in diverse constellations—with underlying demographic considerations such as increasing life expectancy and changing age structures. While in contexts like Europe or the United States neglecting mortality trends in studies of family change is likely to distort analyses to a minimal extent, our life-course pattern indicators point to a significant and oft-neglected role of mortality in shaping family trends across LMICs, particularly in SSA where recent mortality declines have been fastest. The "mortality effect" is most pronounced for union formation, where the combination of delays in marriage timing and increases in life expectancy suggest that the overall number of years spent in unions has remained unchanged across wide ranges of development.

These findings have provided evidence of global convergence in some dimensions of families over HDI, such as the timing of women's life-course events and PY spent in unions (mainly driven by cohabitation), accompanied by persistent differences and/or divergence in other domains, such as marriage prevalence. With reference to the timing indicators, we identified clear gender differences whereby countries are converging toward delayed first sexual intercourse, first marriage, and first birth for women, but less so for men. Whether these changes are purely structural, because more women live in cities and have gained schooling—factors that tend to delay the passage into adulthood—or whether they represent a profound transformation in the patterns of early and universal marriage that affect the entire population is a question that cannot be convincingly settled through this initial analysis. The changes are certainly linked with deep family transformations and are accompanied by, or perhaps in part caused by, increasing female independence inside and outside of unions.

Overall, our results combined suggest that families in LMICs have transformed in multiple ways, with changes occurring differently across domains, world regions, and sexes. The picture that best conforms to our findings is one of persistent diversity with development. Also, a point that is clear from the analysis is that development is not a powerful driver of convergence for all outcomes, suggesting the need to take into account additional factors that might contribute to explaining the observed heterogeneity. Among these, GFC scholars need to better consider geo-historical legacies and long-standing differences in social and economic institutions (Esteve and Lesthaeghe 2016) which play a role in shaping how globalization affects life-course patterns. The main institutional considerations that might enlighten the understanding of the demography of adult life in LMICs are those which pertain to the education system and the housing and labor markets (Furstenberg 2014; Grant and Furstenberg 2007). Some of these factors are embedded in indicators of human development, yet these macro-measures miss deeper elements underlying global social change, such as the path-dependent nature of institutions, institutional and cultural constraints, social norms, and the intangible role of diffusion processes in promoting or hindering change.

Our study has implications for theorization on global family change. First, our results engage with the convergence hypothesis advanced by Goode (1963) by suggesting a more nuanced categorization of convergence dynamics whereby convergence is "partial" and limited to specific domains. The idea that convergence toward the nuclear family type of the West has not occurred is not new and has been widely accepted by scholars over the past decades (Cherlin 2012, 2017). This article enriches existing knowledge by providing further evidence of which domains are experiencing cross-country convergence. Second, our findings of a positive association between HDI and women's family events and behaviors and horizontal linked-lives indicators align with the SDT theory, reflecting the so-called "postponement" (i.e., the upward shifts in ages at marriage and first births) and "non-conformist" (i.e., the growth of alternative family formation strategies and the rise of individualization) transitions (Lesthaeghe and López-Gay 2013). However, SDT proponents claim that the weakening of the institution of marriage is one of the main features of the SDT (Zaidi and Morgan 2017). Our focus on life-course pattern indicators accounting for mortality and person-years suggests that this conclusion is less likely to hold in the context of LMICs.[17] Third, our findings provide an empirical assessment of Therborn's postulated diversity of global "family systems" (2004). Although in this paper we do not deal with family systems, our findings align with Therborn's idea that families are "on the whole not converging and in some respects rather diverging; they will also characterize the world in the foreseeable future" (Therborn 2014, 3). Lastly, our findings on reduced imbalances in intra-couple decision-making and sex-discrepancies in timing of life-course events engage with the "gender revolution" framework predicting an increasing role of men in sharing household and childrearing tasks more equitably—which in turn translates into more gender-equal marriages and partnerships (Esping-Andersen and Billari 2015; Goldscheider, Bernhardt, and Lappegård 2015).

The emerging picture of persistent diversity with development—along with the GFC patterns that stem from the computation of innovative life-course pattern indicators—has

[17]Also, the SDT is rather silent on dimensions of household composition, such as our vertical linked-lives indicators.

important implications for understanding the social and economic consequences of global development and globalization, and should be considered in the policy for sustainable development and for increasing individual and family well-being. For instance, although development is associated with declines in fertility and delays in marriage, which in turn unfold along with more gender-equal dynamics within couples, unresolved remains the question of whether, globally, higher empowerment within the household translates into increasing female independence outside of unions, and how existing institutional support enhances female agency by reconciling family life and labor market opportunities. Given the heterogeneity of institutional, cultural, and policy contexts across LMICs, further research is required to investigate the extent to which gender equity in individual-oriented institutions combines with gender-equity in family-oriented institutions to sustain or hinder these trends (McDonald 2000). Other considerations stem from implications of family change for child well-being during development.

Closely related to these policy considerations is the role of SSA that emerges from this study. Countries in SSA—the region with the lowest levels of HDI—turn out to be those that contribute the most to the observed global heterogeneity, both in terms of associations of GFC-indicators with HDI and of β-convergence patterns. Figure 6 reproduces Figure 1 showing how the framework modifies if we exclude SSA from the convergence analysis. After removing SSA countries we move from covering the whole plane (i.e., four quadrants) to two polarized quadrants (bottom-left and top-right), thereby suggesting a decrease in "persistent diversity with development." The peculiar nature of SSA is apparent in the area of fertility (Bongaarts and Casterline 2013; Shapiro and Hinde 2017) and intra-couple decision-making, where detailed estimates show that the world would converge toward lower fertility and increased women's empowerment in the absence of SSA. We take this evidence as suggesting that further advances in dimensions such as education, literacy, income, and health within SSA might contribute to reducing disparities across regions and put the developing world on a more defined convergence trajectory. Although a convergence trajectory is not desirable *per se*, it is beneficial to the extent that it is conducive to higher human capital investments, higher female labor force participation rates, and increased compatibility between family life and economic success.

This study has important limitations that lay the ground for subsequent research. First, we recognize that the HDI may be subject to criticism for its narrownessand inadequacy in capturing all possible dimensions of development. The HDI has also been criticized on the grounds of construction (Kelley 1991), selection of variables (Srinivasan 1994; Alkire 2002), arbitrary weighting scheme (McGillivray and White 1993), and the redundancy of its components (Cahill 2005; McGillivray 1991; Ravallion 1997). Yet, our study is cross-country and comparative in scope and, as such, it encompasses multiple family dimensions across a wide range of countries. This inevitably requires reliance on a set of summary measures that are well-known and broadly understandable. Second, the synthetic-cohort nature of some of our indicators relies on the stationarity assumption, which may not hold when different cohorts undergo changes in family domains at different times and under different conditions. Although using age-specific proportions may be an alternative option, we believe there is no better measure *a priori*.[18] Third, it is likely that the quality of data pertaining to cohabitation and household composition might not be fully reliable, and the variables used might not be measured in exactly the same way and/or attributed the exact same meaning across time and space (Ruggles 2012; van de Walle 1993). DHS data were collected in a comparable manner in all countries, yet the differing cultural norms and practices regarding formation and dissolution of unions can affect the way in which respondents report their marital status (Shapiro and Gebreselassie 2014; Westoff, Blanc, and Nyblade 1994). This is particularly so given the well-documented multiplicity of conceptualizations and definitions of marriage (which has a direct effect on the definition of living together or cohabiting) in SSA (Hertrich 2002; Mokomane 2006). Similarly, some studies—mostly from the African context—have shown that survey data may be problematic when measuring household structure due to the country-to-country variability in the definition of households (Randall and Coast 2015; Randall et al. 2015). These concerns pose a threat to the validity of the estimates and suggest that findings in these areas need to be handled with care. Nevertheless, we embrace the view that for data quality to be improved in the future, presently available information ought to be used to produce comparative research its flaws. Lastly, this study does not adequately incorporate the idea that countries are not independent entities but are part of an international system or network that extends across international borders which, by means of peer influence and concerted efforts (e.g., family planning programs), is likely to shape some family domains more than others (Cherlin 2012). Future GFC analyses will pick up on these important points.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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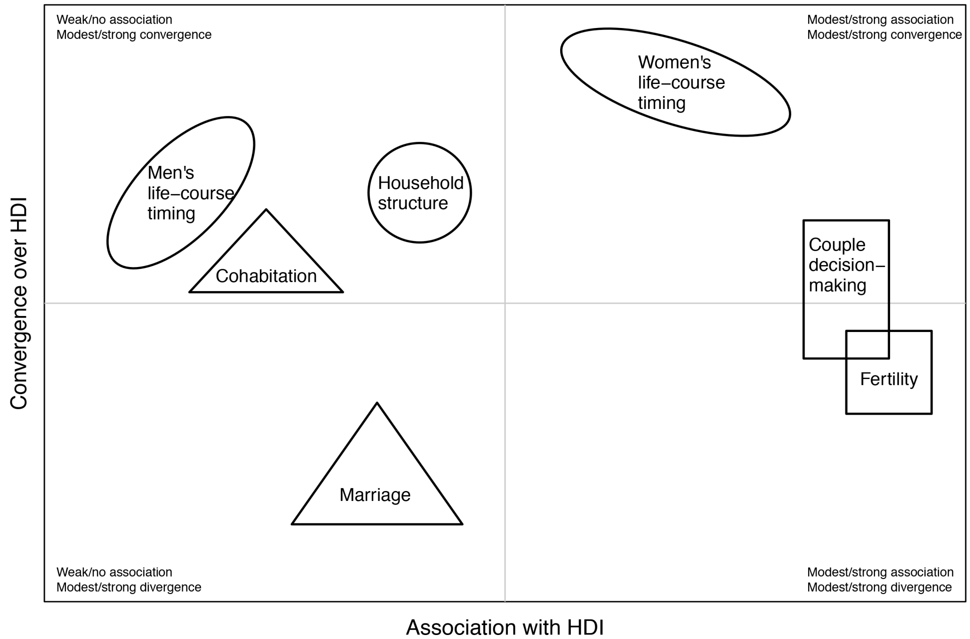

Figure 1.

Framework of analysis and general overview of findings

NOTES: This is a stylized diagram that builds on pooled (i.e., all LMICs combined) associations and coefficients presented throughout the paper. The horizontal axis measures the association of indicators of family change with HDI. Note that the association of family change indicators with HDI can be negative (e.g., fertility is negatively associated with HDI), yet the above graph summarizes the strength of association, i.e., it abstracts from the coefficients' sign. The vertical axis measures convergence over HDI (specifically, *beta*-convergence, as defined later in the paper). The gray line that cuts the plane horizontally corresponds to a null *beta*-convergence coefficient, pointing to neither convergence (above the gray line) nor divergence (below the gray line), i.e., persistent differences.

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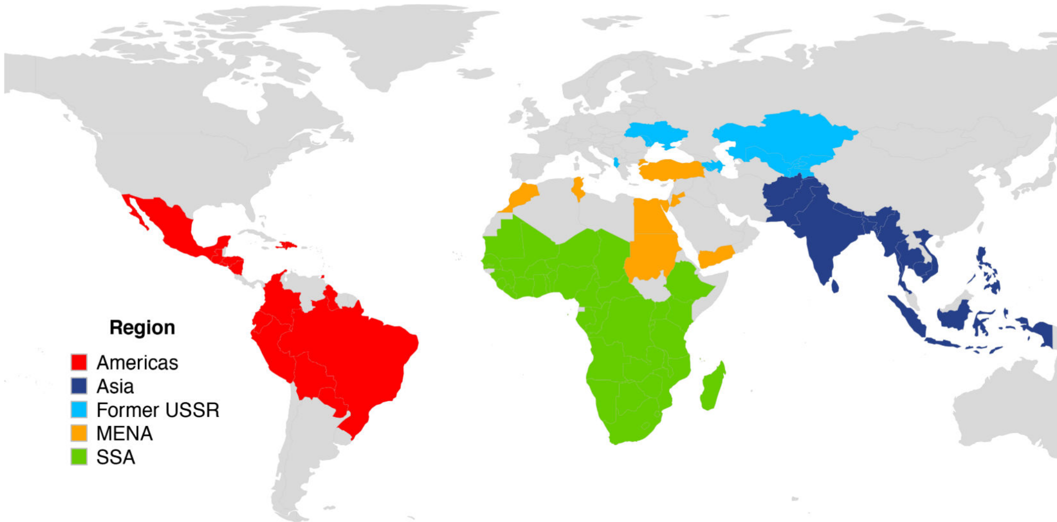

Figure 2.
Map of countries included in the analysis
NOTES: 293 DHS survey waves available for 84 LMICs, grouped into five regions: Americas, Asia, Former Union of Soviet Socialist Republics (USSR), Middle-East and North-Africa (MENA), and sub-Saharan Africa (SSA).
SOURCES: Demographic and Health Surveys (DHS).

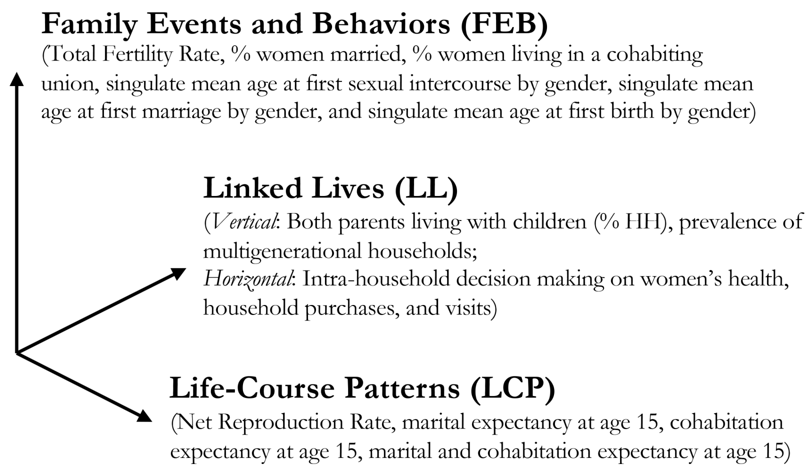

Figure 3.

Conceptual axes of analysis and indicators of Global Family Change (GFC)

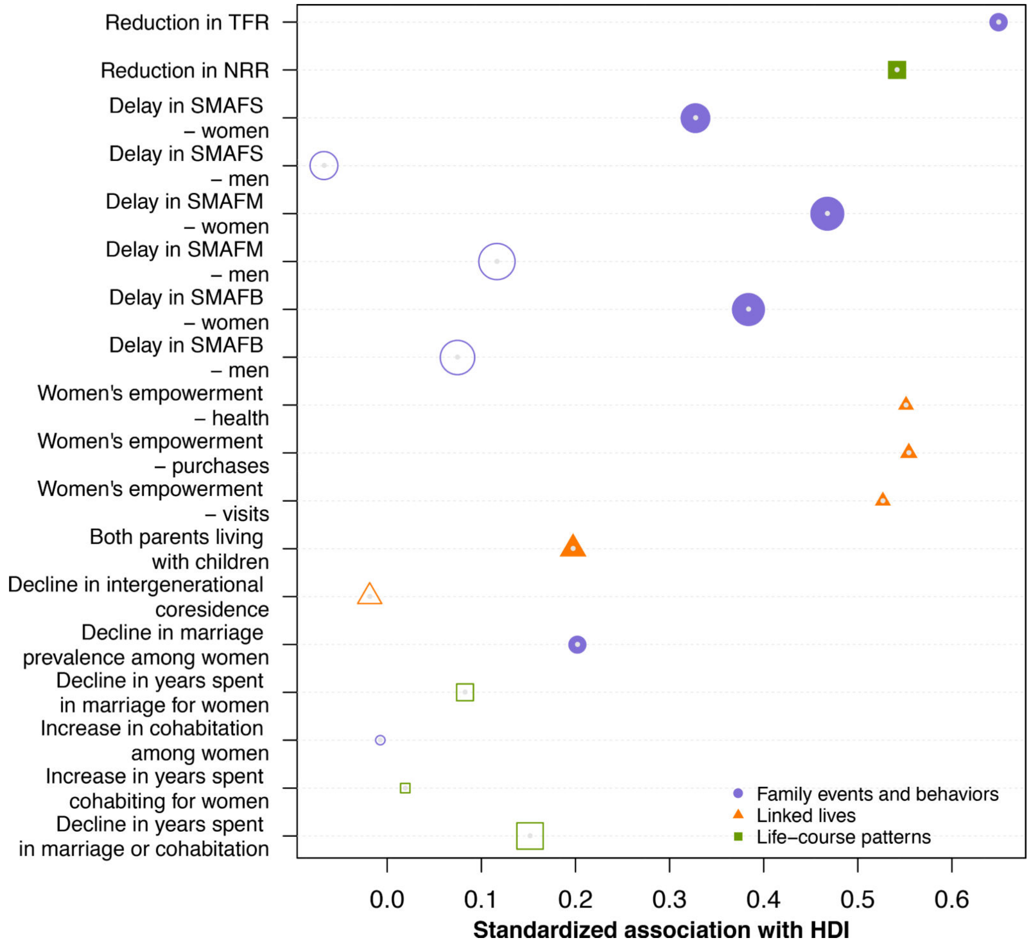

Figure 4.

Associations between HDI and GFC-indicators, global analysis

NOTES: Standardized beta coefficients reported. The central point corresponds to the estimated slope of the relationship. The area of each marker is inversely proportional to the spread of the distribution of each indicator. Filled markers identify statistically significant estimates (p-value<0.05). Standard errors clustered at the country level. Estimates weighted by the number of survey waves per country. Contemporaneous values of HDI used.

SOURCES: Demographic and Health Surveys (DHS), UNDP, and UN-DESA Population Division.

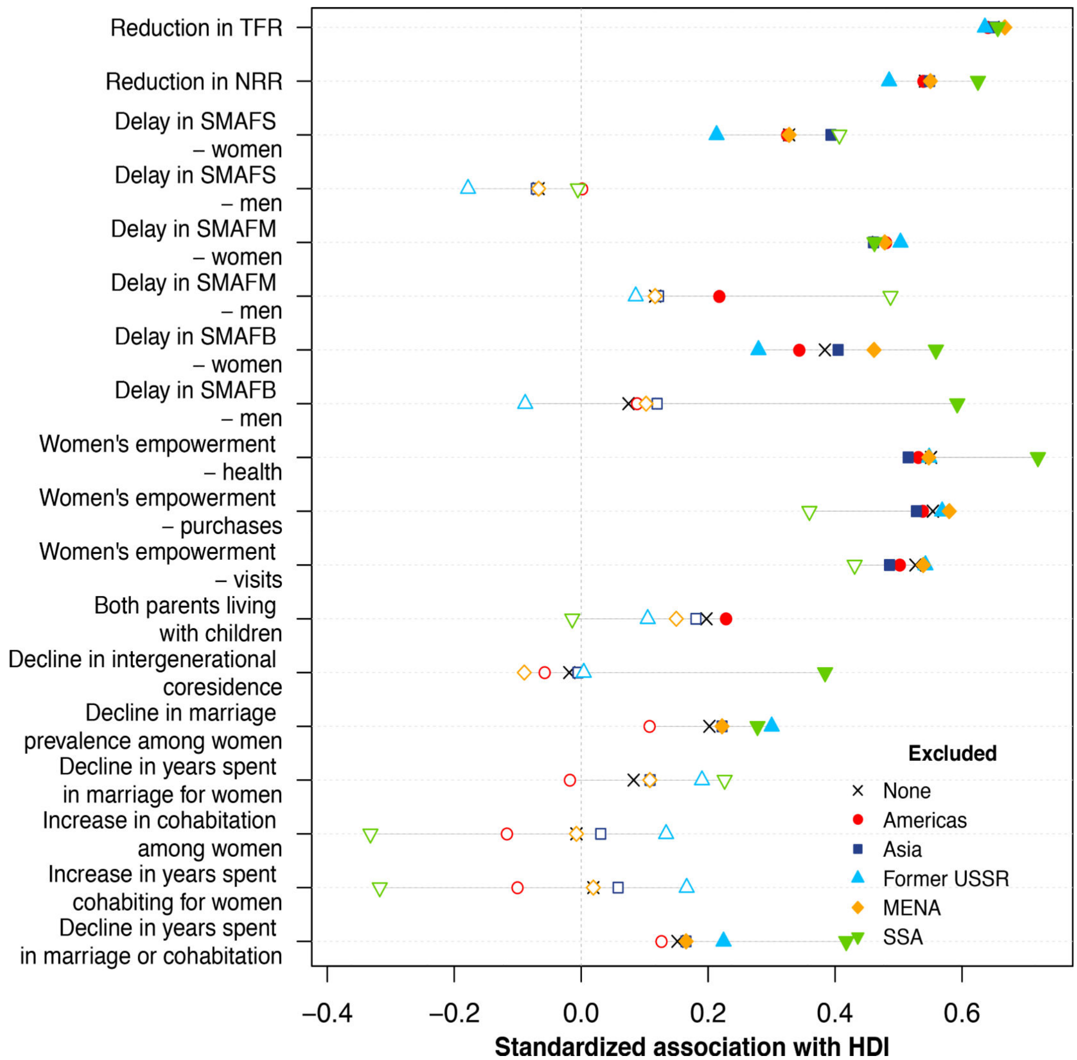

Figure 5.

Associations between HDI and GFC-indicators, regional analysis

NOTES: Standardized beta coefficients reported. Each point corresponds to the estimated slope of the relationship for the overall sample, excluding the region that corresponds to the respective color. Filled markers refer to statistically significant estimates (p-value<0.05). Note that MENA countries report no indicators for SMAFS (women and men), SMAFM (men), SMAFB (men), prevalence of cohabitation, average number of years spent cohabiting, and average number of years spent married and cohabiting. Therefore, the regional coefficient corresponding to MENA for those indicators is equivalent to the pooled 'global' one. Standard errors clustered at the country level. Estimates weighted by the number of survey waves per country. Contemporaneous values of HDI used.

SOURCES: Demographic and Health Surveys (DHS), UNDP, and UN-DESA Population Division.

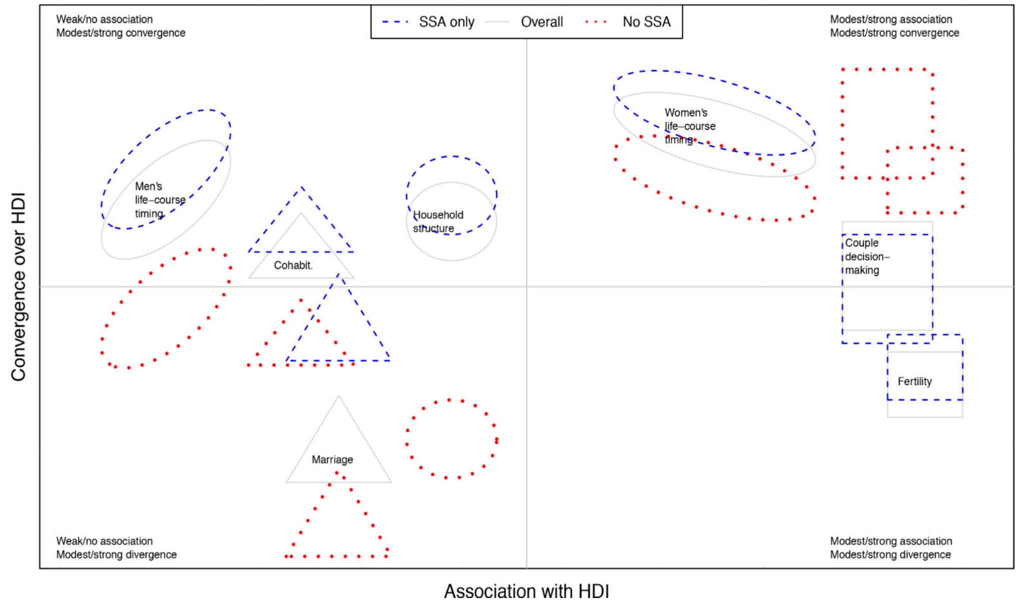

Figure 6.

Framework of analysis and general overview of findings, isolating the role of sub-Saharan Africa

NOTES: This is a stylized diagram. The horizontal axis measures the association of indicators of family change with HDI. Note that the association of family change indicators with HDI can be negative (e.g., fertility is negatively associated with HDI), yet the above graph summarizes the strength of association, i.e., it abstracts from the signs of the coefficients. The vertical axis measures convergence over HDI (specifically, *beta*-convergence). The gray line that cuts the plane horizontally corresponds to a null *beta*-convergence coefficient, pointing to neither convergence (above the gray line) nor divergence (below the gray line), i.e., persistent differences.

Table 1

Summary statistics on HDI and GFC-indicators, by region

		Overall (N=293)		Americas (N=54)		Asia (N=43)		Former USSR (N=14)		MENA (N=24)		SSA (N=158)	
	Type	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
HDI		0.52	(0.117)	0.60	(0.071)	0.55	(0.071)	0.66	(0.058)	0.54	(0.126)	0.44	(0.094)
GFC Indicators													
Total Fertility Rate (TFR)	FEB	4.14	(1.439)	3.53	(0.897)	3.23	(1.106)	2.29	(0.908)	4.06	(1.280)	5.14	(1.016)
Net Reproduction Rate (NRR)	LCP	1.72	(0.521)	1.59	(0.369)	1.43	(0.464)	1.05	(0.424)	1.76	(0.518)	2.02	(0.374)
SMAFS - women	FEB	19.24	(2.253)	19.97	(0.846)	19.48	(3.742)	21.58	(1.306)			18.41	(1.599)
SMAFS - men	FEB	19.46	(2.397)	18.23	(1.218)	19.86	(4.145)	20.38	(1.487)			19.51	(2.270)
SMAFM - women	FEB	21.82	(1.945)	22.03	(1.171)	22.23	(1.551)	22.35	(1.318)	23.49	(1.907)	21.40	(2.260)
SMAFM - men	FEB	25.90	(1.883)	25.19	(1.389)	24.72	(0.922)	26.40	(1.297)			26.15	(2.093)
SMAFB - women	FEB	21.48	(2.029)	22.54	(1.033)	20.80	(2.464)	23.92	(1.337)	19.85	(2.596)	21.04	(1.457)
SMAFB - men	FEB	26.48	(2.131)	26.40	(1.493)	24.31	(2.486)	28.13	(1.182)			26.79	(1.850)
Husband decides about women's health (% HH)	LL	0.30	(0.198)	0.13	(0.075)	0.22	(0.127)	0.12	(0.108)	0.24	(0.133)	0.40	(0.193)
Husband decides about household purchases (% HH)	LL	0.32	(0.178)	0.17	(0.065)	0.23	(0.111)	0.16	(0.124)	0.33	(0.117)	0.42	(0.166)
Husband decides about women's visits (% HH)	LL	0.24	(0.162)	0.10	(0.036)	0.16	(0.107)	0.12	(0.105)	0.19	(0.042)	0.34	(0.153)
Both parents living with children (% HH)	LL	0.68	(0.160)	0.65	(0.096)	0.82	(0.085)	0.82	(0.085)	0.91	(0.039)	0.58	(0.127)
Prevalence of multigenerational HH	LL	0.23	(0.068)	0.22	(0.039)	0.28	(0.056)	0.25	(0.084)	0.18	(0.054)	0.22	(0.067)
Prevalence of marriage	FEB	0.54	(0.186)	0.38	(0.117)	0.67	(0.084)	0.63	(0.063)	0.64	(0.054)	0.52	(0.213)
Marital expectancy at age 15	LCP	18.55	(6.427)	13.63	(4.027)	23.82	(2.540)	22.82	(2.153)	23.22	(1.689)	16.86	(6.962)
Prevalence of cohabitation	FEB	0.14	(0.152)	0.23	(0.105)	0.02	(0.037)	0.02	(0.019)			0.14	(0.168)
Cohabitation expectancy at age 15	LCP	4.43	(4.999)	7.83	(3.586)	0.70	(1.236)	0.64	(0.645)			4.57	(5.410)
Marital and cohabitation expectancy at age 15	LCP	22.15	(3.113)	21.46	(1.346)	24.11	(2.225)	23.46	(1.854)	23.22	(1.689)	21.24	(3.756)

NOTES: Estimates are weighted by the number of survey waves available per country. N refers to the number of country-year combinations. Specifically, as the N is indicator-specific, it refers to the maximum number of observations per group. FEB: "Family events and behaviors", LL: "Linked lives"; LCP: "Life-course patterns". Information on cohabitation, sexual intercourse, and timing indicators for men is not available for MENA countries.

SOURCES: Demographic and Health Surveys (DHS), UNDP, and UN-DESA Population Division.

Table 2

Beta-convergence over HDI, global (panel a) and regional (panel b) analysis. Beta- convergence coefficients reported

Indicator	*a. Global*		*b. Region excluded*				
	No controls	**Regional dummies**	**Americas**	**Asia**	**Former USSR**	**MENA**	**SSA**
Total Fertility Rate (TFR)	0.002 (0.003)	−0.005 (0.003)	0.002 (0.004)	0.002 (0.004)	0.001 (0.002)	0.003 (0.003)	−0.006 (0.005)
Net Reproduction Rate (NRR)	0.003 (0.011)	−0.021 * (0.009)	0.001 (0.013)	0.002 (0.014)	−0.001 (0.008)	0.008 (0.013)	−0.013 + (0.008)
SMAFS, women	−0.001 * (0.000)	−0.001 *** (0.000)	−0.000 (0.000)	−0.001 * (0.001)	−0.002 *** (0.000)	−0.001 * (0.000)	−0.000 (0.000)
SMAFS, men	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	0.000 (0.001)
SMAFM, women	−0.001 * (0.000)	−0.001 * (0.000)	−0.001 * (0.000)	−0.001 * (0.000)	−0.001 * (0.000)	−0.001 * (0.000)	−0.001 (0.001)
SMAFM, men	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.002)
SMAFB, women	−0.001 * (0.000)	−0.002 **	−0.001 * (0.001)	−0.001 * (0.001)	−0.002 ** (0.001)	−0.002 ** (0.001)	−0.001
SMAFB, men	−0.001 (0.001)	−0.002 * (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.000 (0.002)
Husband decides about women's health (% HH)	−0.000 (0.091)	−0.063 (0.092)	0.039 (0.088)	0.086 (0.102)	−0.046 (0.086)	−0.010 (0.095)	−0.442 + (0.255)
Husband decides about household purchases (% HH)	−0.040 (0.075)	−0.131 (0.118)	−0.002 (0.061)	−0.030 (0.103)	−0.047 (0.081)	−0.037 (0.074)	−0.541 * (0.202)
Husband decides about women's visits (% HH)	0.064 (0.088)	−0.103 (0.124)	0.036 (0.099)	0.095 (0.101)	0.033 (0.089)	0.068 (0.087)	−0.321 + (0.189)
Both parents living with children (% HH)	−0.012 (0.011)	−0.010 (0.012)	−0.016 (0.011)	−0.012 (0.013)	−0.008 (0.011)	−0.024 + (0.013)	0.038 ** (0.011)
Prevalence of multigenerational HH	−0.058 (0.064)	−0.083 (0.076)	−0.063 (0.069)	−0.088 (0.083)	−0.063 (0.067)	−0.110 + (0.060)	0.158 (0.101)
Prevalence of marriage	0.042 * (0.016)	0.017 (0.020)	0.025 (0.016)	0.036 * (0.018)	0.043 * (0.016)	0.041 * (0.016)	0.068 ** (0.023)
Marital expectancy at age 15	0.001 (0.001)	−0.000 (0.001)	−0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 * (0.001)
Prevalence of cohabitation	−0.086 (0.091)	−0.168 + (0.097)	−0.097 (0.111)	−0.081 (0.097)	−0.153 + (0.086)	−0.086 (0.091)	0.136 (0.195)
Cohabitation expectancy at age 15	−0.001 (0.003)	−0.005 + (0.003)	−0.001 (0.004)	−0.001 (0.003)	−0.005 + (0.003)	−0.001 (0.003)	0.010 (0.008)
Marital and cohabitation expectancy at age 15	−0.001 ** (0.000)	−0.002 ** (0.000)	−0.001 ** (0.000)	−0.002 ** (0.001)	−0.001 ** (0.000)	−0.001 ** (0.000)	−0.001 (0.001)

NOTES: Estimates are weighted by the number of survey waves available per country. Note that MENA countries report no indicators for SMAFS (women and men), SMAFM (men), SMAFB (men), prevalence of cohabitation, average number of years spent cohabiting, and average number of years spent married and cohabiting. Therefore, the regional coefficient corresponding to MENA for those indicators is equivalent to the pooled ‘global’ one. Standard errors clustered at the country level. Estimates weighted by the number of survey waves per country. Contemporaneous values of HDI used. Regional dummies not included in panel b.

Sig

*** $p<0.001$

** $p<0.01$

* $p<0.05$

+ $p<0.1$

SOURCES: Demographic and Health Surveys (DHS), UNDP, and UN-DESA Population Division.