Revisiting mid-twentieth century fertility shifts from a global perspective

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Abstract

The historic process of fertility decline was interrupted during the central decades of the twentieth century with an unexpected period of increasing fertility that has been called the baby boom. This boom has received widespread attention in the developed world where it is a mainstay in the existing literature. Normally it is considered a phenomenon exclusive to countries participating in the historic demographic transition. Recent studies suggest that a similar trend change in fertility may have also taken place in some developing nations at approximately the same time and with similar characteristics to the fertility boom in the developed world. The main goal of this paper is to examine the extent to which these trend changes took place in an important sample of developing countries, examining cohort data from a comparative perspective. Data for this analysis are taken from the *Integrated Public Use Microdata Series, International (IPUMS-I)*. The analysis shows that the shift upwards of fertility for cohorts born during the 1930s appears to be a trend common to many countries in both the developed and the developing world.

Introduction

In many developed nations, the historic process of demographic transition was interrupted during the central decades of the twentieth century by a period of unexpected fertility increase that has been called the baby boom. During this period, reproduction dynamics shifted with an acceleration of nuptiality together with more or less important increases in total fertility leading to a generalized increase in yearly totals of births. The process itself was diverse in timing and intensity, with substantial fertility increases in some societies and very modest

ones in others. In all cases, however, a true trend reversal took place that brought decades of fertility decline to a halt. While this period has been widely studied, the resulting literature deals almost exclusively with the developed world (Byerly and Rubin, 1985; Chesnais, 1992; Emeka, 2006; Macunovich, 2002; Owram, 1996; Requena and Salazar, 2014; Romaniuk, 1984; Russell 2006; Sardon, 2006; van Bavel, 2014; van Bavel and Reher, 2013; Sandström, 2014).

In a recent paper, Jan van Bavel and David Reher (2013) returned to the theme of the baby boom from a comparative perspective based on data for 24 developed nations. In many countries —mostly those situated in the English-speaking, non-European world together with nations from Northern Europe— the baby boom was very important, characterized by significant and prolonged increases in fertility. In other parts of Europe, the intensity of the baby boom was much lower, especially in nations of Southern and Eastern Europe where it ranged from modest to inexistent. The increase in cohort fertility seen in many countries suggests that the baby boom involved far more than simply a period effect. A marriage boom also took place nearly everywhere as people married earlier and more of them married than before. In some nations, marital fertility rose as well, thus contributing significantly in those societies to the overall rise in fertility. A common characteristic of the baby boom was an important reduction of childlessness, likely associated at least in part to more widespread and younger marriage patterns and perhaps to the persistence of contraceptive failure. It is also possible that in the developed world people may have aimed for and obtained larger families, much as increasing marital fertility in many countries seems to suggest (van Bavel & Reher, 2013: 275-80).

In the developing world, relatively little is known about fertility before its pronounced decline beginning in the 1960s and 1970s. Some years ago, Tim Dyson and Mike Murphy (1985, 1986) published seminal papers regarding fertility swings in a small set of nations in the developing world. Using very rudimentary indicators they found that there was indeed a period of high, even increasing fertility during the 1950s, precisely when the baby boom was underway in the developed world. Even though they did not take their interpretation much further, the apparent simultaneity of fertility swings in some developing nations was an important result and is the point of departure for the present paper. Beyond this, however, little is known of the component parts of this trend change.

The persistent neglect of a truly global perspective on fertility trends during the twentieth century is the result not only of the self-centered obsession of many scholars working in and on the developed world, but also because there are little data available that might afford an alternate vision of demographic trends in the developing world before mid-century or later. This may not be the case everywhere and for countries with good statistical systems and valid vital registration it is possible to probe the earlier period with useful results. These notwithstanding, however, for much of the developing world reliable data are very difficult to find.

Two recent publications have launched a full-fledged assault on this dearth of knowledge regarding the developing world at mid-century (Reher & Requena, 2014a; 2014b). In the first paper, micro-census data were used to reconstruct cohort fertility trends for a set of developed and developing countries (13 in total) and in the second one the analysis was extended to include ten nations from Latin America. These census data contain estimates of the number of children ever born by the mother's date of birth and can be used to track cohort fertility patterns for women born after the start of the twentieth century. The data cover the period just prior to the boom, the fertility boom itself and the beginnings of the ensuing baby bust as well, thus offering a portrayal of fertility for women bearing their children between approximately 1925 and 1990. The results of these studies suggest that in the countries from the developing world included in the sample there was an upward swing in fertility for women born between about 1925 and 1945 who were having their children at about the same time as baby boom participants in the West. This fertility cycle was also characterized by decreasing levels of childlessness, decreasing variability of individual fertility outcomes at a national level and an important though partially surprising role of education for fertility. Finally, the authors show that in the developing countries used in their analysis, the role of mortality looms large because the rapid improvements of survivorship tended to augment the impact of increases in fertility experienced by these boom cohorts. The most salient result of these papers is the proof they give of the similarity in fertility shifts in both the developed and the developing world.

Despite the limited number of developing countries included, these papers have high impact results for many parts of the world. The goal of the current paper is to apply a number of the methods used in the original studies to a much larger set of data from all over the developing world. Are the results in the original papers applicable to the entire world? This is

unquestionably a pertinent question because before the onset of massive fertility decline, very little is known about reproductive patterns in the developing world. The detailed description of reproductive changes in the region presented here is based entirely on retrospective fertility data for cohorts of women born during the first half of the twentieth century. These results offer a complementary approach to the more common use of vital statistics to reconstruct fertility cycles during this period that, at least in some countries, is possible as shown in a recent book by Héctor Pérez Brignoli (2010). Cohort fertility estimates, unlike other synthetic measures, have the advantage of reflecting the actual reproductive experience of real women.

Data

Research for this paper is based on the census data contained in the Integrated Public Use Microdata Series, International (Minnesota Population Centre, 20111) (hereafter, IPUMS-I). To date, this massive database contains individual census returns for 258 censuses corresponding to 79 countries and containing information on 560 million persons. While population censuses are not designed specifically to measure fertility, using them for fertility studies is not only possible but also at times highly profitable. Of particular interest on this point is the possibility of using a single census to assess fertility trends in the past, across different birth cohorts (David y Sanderson, 1990). The data referring to the number of children enables us to make use of a cohort perspective, as long as we use only women who have completed their fertile period (>40). In this way, cohort fertility can estimated over time for all birth cohorts for women above that age, as long as mortality and migration do not have significant selective effects on the fertility of these cohorts. These data have enabled us to reconstruct certain key indicators of reproduction for women born during the first half of the twentieth century in several nations in Latin America, Asia, and Africa.

In order to ascertain data quality, initially three different tests were used. (1) One was based on levels of non-response to the question about children ever born. All cohorts with levels of non-response >5% were excluded from the sample. (2) Results from different censuses were compared with those derived from the World Fertility Survey for the same cohorts. Only countries where the CEB estimates fell within the 95% confidence intervals of those derived from the WFS were retained for this analysis. (3) CEB levels were compared with estimates of total period fertility rates approximately 25-30 years after the birth cohort derived from the United Nations World Population Prospects database. While the different indicators should

not be the same, we checked to see if the trends shown were approximately similar. The rule of thumb used here has been to include only cohorts and countries that passed all three tests. The only exception is where WFS data are missing. In these cases, if the other two tests were passed, the country census was included for analysis.[1]

A major goal of the present paper is to widen our selection of countries from the developing world. In order to do so, two strategies have been used. (1) We widened our selection strategy to include countries from regions like Sub Saharan Africa that had been neglected in the earlier studies. (2) The selection criteria were relaxed in the following ways: (a) the tolerable limit of non-response was increased to 7% and (b) countries with no World Fertility Survey or those with data slightly outside the 95% confidence intervals were also included as long as they met the other criteria. This implies that some of the countries included here have less than perfect data. Here we have made use of data meeting strict quality control guidelines (A data) together with data where quality controls were more relaxed (B data). The basic classification of countries by data quality is shown in Table 1. Ultimately these differences are not important as long as the overall patterns shown are similar. In fact, this proved to be the case as the time trends in the number of children ever born by birth cohort derived from different censuses was identical in all countries selected for analysis (except for Iran, Cameroon, and South Africa where only one census was available and no cross-checking is possible) (Feeney, 1995, 2014). The advantage of this strategy is that our sample for the developing world increases substantially. A total of 24 countries have been included for this study with a total sample size of more than 67 million persons. They are taken from Latin America (12), Africa and Asia (six each). These countries are listed in Table 1 where they are organized by world region, the birth cohorts used and their data quality. While limited to those countries present in the IPUMS-I dataset, it constitutes a massive sample from the developing world.

TABLE 1 about here

Map 1 about here

[1] For a more detailed description of these tests, see Reher & Requena (2014a; 2014b)

Results

The results presented here provide convincing proof that the central decades of the twentieth century were ones of increasing fertility throughout the developing world. These are summarized by continent (Latin America, Asia and Africa) in Figure 1 where the average number of children ever born by birth cohort can be seen.[2] The fertility boom is clear with increasing numbers of children ever born beginning with the 1915-19 birth cohort and reaching a high point among women born 1930-34 or, more generally, 1925-1939. Afterwards there is an abrupt decline in fertility with the initial lower levels being surpassed first in Latin America and later in Asia and Africa. It is a complete fertility cycle that lasts for approximately six five-year birth cohorts. The boom cohorts correspond to children being born between approximately 1945 and 1970, almost exactly reflecting the baby boom cycle in the developed world.

Figure 1 about here

Despite important differences in fertility in any given cohort, with higher levels in Africa and Asia than in Latin America, these results point to the existence of a common pattern that is similar in many ways to that holding in the developed world where period indicators show relatively low fertility in the 1930s, higher fertility starting after World War II and lasting into the 1960s or, in some cases, 1970s, followed by sharp fertility decline thereafter (Van Bavel & Reher, 2013; Reher, 2015). In some developed countries, a similar pattern has been seen with cohort indicators (again, Van Bavel & Reher, 2013: 261 and Freija & Sardon, 2004). It mirrors the results published recently for a small set of developing nations (Reher & Requena, 2014a) and dovetails nicely with those presented 30 years ago by Dyson and Murphy (1985, 1986) based on rudimentary period data. If we approximate cohort with period fertility, the simultaneity of the trend changes shown here is uncanny.

[2] Continents do not always have data for every cohort and country. When estimating averages by continent this can be a problem when the regional sample is made up of a relatively small number of countries (Africa, Asia), especially when the country lacking data has either very high or very low fertility with respect to the others. In order to generate reliable regional estimates, missing data have been estimated from the trends shown by countries where complete data are available. For example, if a regional time series based on six countries exists for, say, 1935-9 but not for 1940-4 where only five countries are available, the relative difference between 1935-9 and 1940-4 is estimated based on the series with five countries and then applied to the full regional series. This adjustment for missing data is based on the premise that the time trends of the five-country series represent those of the region as a whole with reasonable accuracy and thus can be applied to the full regional series. This paper also includes country by country estimates in a number of figures.

Figure 2 contains basic estimates of the relative change in CEB with respect to benchmarks centered on the lowest pre-boom fertility for the 24 countries in the sample. It shows that nearly everywhere some sort of fertility increase took place among these key cohorts though there is considerable heterogeneity in the intensity of the patterns observed. In some countries there is no indication at all of any sort of fertility boom (Argentina, Uruguay, Brazil and perhaps South Africa), in others the shift appears to be muted while in others it is strong and lasting. While there is no easy explanation for the outliers, it is clear that the vast majority of the 24 countries included here went through a period of increasing fertility at this time.

Figure 2 about here

The intensity of these fertility shifts can be estimated in a straightforward way as the relative growth in fertility between the pre-boom low prior to the 1920 birth cohort and the high levels reached during the cohorts of the 1930s. These estimates can be found in Table 2. The intensity of the fertility boom does not appear to be specific to any world region. Where it was strongest, fertility increased by over 15 percent. This intensity can be seen in three Central American nations (Panama, Costa Rica and El Salvador), two Southeast Asian nations (Cambodia and Indonesia) and one African nation (Cameroon). Increases of between 10 and 15 percent are found in four Latin American nations (Bolivia, Mexico, Nicaragua and Venezuela), three Asian nations (Iran, Thailand and Turkey) and three African nations (Ghana, Kenya and Morocco). Elsewhere the spurt in fertility was lower but still visible. This type intensity appears to be somewhat lower than that shown by countries such as the USA or Austria (34-41 percent), similar to that shown by countries like France (24 percent) and higher than in a number of southern and eastern European nations where the boom was muted at best (Reher & Requena, 2014a). More generally, the observed intensities are within the range set by the developed world, though nowhere are they as strong as in countries situated in the non-European English-speaking world. Considering the very high levels of fertility for the very early cohorts used in this sample, indicating near natural fertility populations, this fertility spurt is remarkable.

Table 2 about here

Family building strategies appear to have changed during the fertility boom with decreasing proportions of childlessness coupled with some indication of increases in large families. Studies based on the developed world have shown that nearly everywhere the incidence of

childlessness diminished, but the results for higher parities often have been mixed with increases in large families only visible in countries with strong baby booms (Reher & Requena, 2014a). Much less is known of what actually happened in the developing world. For the developing nations presented in Figure 3, reductions were pronounced, often by as much as 40 percent, and affected every nation included in the sample. Generally, childlessness was by far highest in Latin America and considerably lower in Asia and in Africa, but the pattern of change was everywhere the same. The key reason for this in the developing world is the revolution in maternal and child health taking place at the time in which intrauterine deaths and stillbirths were declining due to improved public health measures and, equally as important, health and nutritional status of mothers were improving. The higher overall levels of childlessness in Latin America can be explained by the fact that nuptiality was somewhat more reduced on that continent than in Africa and Asia. Change over time, however, appears to largely the result of improved health. The period of reduction in childlessness came to an end with the 1945-49 birth cohort and either levels out (Latin America) or begins to rise (Asia, Africa) afterwards. This start of a trend change was likely the result of the hesitant beginnings of artificial contraception in these regions. In sum, the decline in childlessness appears to be a universal characteristic of the mid-century fertility boom.

Figures 3 and 4 about here

The importance of large families (4+ children) throughout the period also increased substantially during the fertility boom (Figure 4), but at a much rate than the reduction of childlessness. The increase is first visible among women born 1915-1924 and reaches its highest levels for women born in the 1930s. In all, it mirrors the regional trends in overall fertility quite closely. Higher proportions of large families in Africa and Asia are the result of higher fertility in those continents. Despite some differences by continent, these data suggest that women (couples) were seeking and obtaining larger families during the 20-year fertility boom in the developing world. This desire was facilitated by a regime of imperfect contraception and took place in the context of the health revolution mentioned earlier.

Improvements in education are generally considered to be a source of social modernization mainly because of the way education influences behavior, decreasing the willingness of people to accept their situation as one that is difficult or even impossible to change. We know much more about education throughout history in the developed than in the developing world, though it is unquestionable that everywhere great strides were made during the twentieth

century towards increasing the educational levels of national populations. The presence in censuses of questions about education enables us to delve into the way education changed over the period and how this affected reproductive behavior.

Education had a strong and expected effect on fertility. In Figure 5, where the number of children ever born by educational attainment and birth cohort is shown, the effect is unmistakable.[3] The highest levels of fertility can be found among the least educated women and it decreases and is lowest among the most educated women. In a recent study of Latin America where it was possible to distinguish between women with a secondary school degree and those with university degrees, the pattern of fertility by educational status was even more pronounced with lowest fertility found among women with highest educational attainment (Reher & Requena, 2014b). Of equal interest is the fact that all educational categories appear to have participated in the fertility boom of the 1930s, thus suggesting that this fertility shift was not the result of one given sector of society but rather one in which women of all educational levels participated. When data were decomposed to reflect the contribution of educational levels and of educational structures to fertility trends, it was shown that during the fertility boom changing educational structures tended to depress fertility while all educational levels contributed to increasing fertility. During the incipient fertility bust that followed, however, both changing structures and all levels of education collaborated in driving fertility downwards (Reher & Requena, 2014a; 2014b).

Figure 5 about here

Throughout this paper, our entire assessment of the fertility boom has been based on a straightforward demographic indicator like children ever born. If, however, our goal is to analyze the impact of the boom on society, other indicators may be preferable. This is especially the case with countries from the developing world that continued to be affected by high levels of mortality during the early stages of life. There, the impact of increases in fertility would be multiplied if the scale of mortality changed over the period under analysis, as indeed it did. In developing countries where the demographic transition was just getting underway, the role of mortality was likely greater than it would have been in the developed world where childhood mortality was already at relatively low levels during this period. In

[3] Since the numbers of women with higher education is extremely low in most of the countries included here, especially those of Africa, here women with a university education and those with secondary school education have been merged into a single category. In some countries, such as Iran, there may be widespread defects in the registration of this variable.

most of the countries included in our sample censuses include a question regarding the number of surviving offspring that can be used to approximate the evolution of mortality. It is important to remember that this indicator does not refer strictly speaking to mortality in infancy but rather to survival at the date of the census. This means that older women will always tend to have fewer surviving offspring than younger ones, though the differences on this count should be relatively small because in the early stages of the demographic transition most mortality and most mortality change were concentrated in the initial stages of life. This indicator also reflects the impact for reproduction of improving survivorship among adults. The demographic implications of this aspect of changing survivorship, while substantial especially in the developing world, probably tended to be less important for net reproduction than improvements in childhood survival. [4] This approach should yield a relatively robust though approximate indicator of the role of survivorship for the mid-century fertility boom.

Figure 6 about here

In Figure 6 the relative increase in fertility with respect to a benchmark cohort can be seen together with the relative increase in net fertility for the same cohorts.[5] In this way, the relative contribution of improving survivorship and of cohort fertility to the mid-century boom in net fertility —and therefore family size— can be visualized in an approximate way. In this figure, where regional averages are portrayed, the dashed line represents the increase in net fertility with respect to the benchmark cohort and the solid line the increase in CEB for the same cohort. The area beneath the solid line would correspond to increases attributable strictly to fertility and the area between the solid and the dashed lines the part corresponding to health improvements. In Figure 7, the same strategy is used, but here the performance of individual countries is portrayed.

Figure 7 about here

[4] Making use of data from Mexican and Costa Rican life tables for approximately similar dates (1920-30 and 1960-70 for Mexico, 1920 and 1950 for Costa Rica) the increases in male life expectancy between 20 and 50 years of age were substantial (4.3 years in Mexico and 5.1 years in Costa Rica). Since this analysis is based exclusively on women having completed their reproductive period, the changes in male adult mortality indicate that the duration of unions in the absence of divorce experienced dramatic increases between the period prior to the fertility boom and the peak boom years. See Zavala de Cosío (1993: 29, 84) and Pérez Brignoli (2010, anexo IV).

[5] Only women with at least one child are used in this analysis. By implication this means that the cohort fertility measure used (CEB of women with 1+ children) is slightly higher than in other parts of this paper where they are based on all women, independent of whether or not they had offspring. The relative change in this indicator is smaller than in CEB of all women because it does not include the part belonging to the very relevant decrease in childlessness.

In most nations, increases in survivorship are even more important for net fertility than those due to fertility change itself. The net effect of both variables places the Latin American fertility/health boom on a level only slightly below that of the strongest baby booms in the developed world (the USA, for example) and well above the impact of the boom in many other developed countries (Reher & Requena, 2014a).[6] This result has important implications for the long-term economic and social consequences of the fertility boom in Latin America because it means that the actual number of offspring —net family size— increased far beyond what would have happened solely with increases in cohort fertility. The key element behind the population explosion of the developing world was a unique combination of increasing fertility coupled with dramatic improvements in child health (Ehrlich, 1968).

Discussion

This paper enables us to answer some of the research issues stated earlier but leaves other intriguing and significant issues unanswered that promise to command the attention of future research on the subject. The most important conclusion is that there was indeed a fertility boom in the developing world similar to the one seen in many developed countries. Despite some notable exceptions, most of these developing countries participated in this fertility shift with certain common characteristics. The intensity of this increase in fertility was slightly lower than that holding in the most salient cases in the West but the timing was similar. The boom came to a crashing end among women born in the 1940s or early 1950s. With few exceptions, the pattern shown in different societies is similar and cannot be attributed to data problems in any particular society. We are looking at a world fertility boom that bears striking similarities in timing and in intensity with the baby boom in the West. This grand fertility cycle can be seen clearly in Figure 8 containing relative changes in cohort fertility of the regions studied alongside cohort fertility estimates for 17 developed nations.[7] The process shows considerable heterogeneity with some societies with almost no boom at all and others

[6] In developed countries, health improvements would have had only a marginal effect on net reproduction because mortality was already at very low levels. In any case, this variable is not available in most censuses from the developed world carried out during the latter years of the twentieth century.

[7] The developed country cohort fertility estimates are the INED Developed Country database. It is based on a total of 17 nations taken from Northern and Southern Europe and from four developed countries from the non-European English-speaking world. We have not included countries from Eastern Europe where there was little if any baby boom (van Bavel & Reher, 2013). Since the INED data are yearly cohort estimates, the benchmark used is the average for 1905-9. All developing country estimates refer to five-year birth cohorts. With regard to the African data used in this figure, the benchmark cohort (1905-9) has been estimated based on trends seen in Latin America and Asia together with trends in cohorts in Africa after 2010.

with very important ones. This heterogeneity is also characteristic of the baby boom in the developed world. Even so, the global nature of this cycle is unquestionable.

Figure 8 about here

The overall shift downward in fertility started first in Latin America followed by Asia and can be linked to the availability of widespread and inexpensive contraception and the differences in timing are probably related to the pace of contraceptive use in different countries (Reher, 2004). On this point, there is considerable heterogeneity within any world region, though the cohorts born in the 1940s were the pioneers of the trend downwards. Beyond the specifics of individual nations, the most noteworthy aspect of the results presented here are precisely the similarities in timing of both the fertility boom and the start of the subsequent fertility bust.

The results presented here have added further evidence to the fact that a fundamental, even universal characteristic of this period of increasing fertility was an important decline in childlessness. In the developing world childlessness declined by 40-45% in most nations, reaching extremely low levels (near 4-5%) in Asia and Africa for women born in the 1940s. Everywhere independent of starting levels, however, childlessness declined. Relative declines in developed nations appear to be similar to those of developing nations seen here, though prevailing levels of childlessness tended to be higher in societies with relatively restricted nuptiality. This holds for most developed societies and for certain Latin American countries such as Argentina or Uruguay (van Bavel & Reher, 2013; Reher & Requena, 2014a; 2014b). The universal nature of these declines in childlessness is explained by improvements in maternal health and nutritional status. Increasing nuptiality also played a role, though this effect was more visible in countries where nuptiality tended to be delayed and muted than where it tended to be widespread and early.

At higher parities, the most visible result of this study is the proof presented of an increase in higher order births among women in nearly every developing society studied. These increases were only modest in developing nations mostly because fertility was already at high levels before the fertility boom. In certain developed nations, this was not the case because fertility had already reached much lower levels by the 1930s. It is impossible to discount the fact that couples wanted and obtained larger families during the period, even in the developing world. The role of imperfect contraception cannot be discounted either, though plausibly its role was less important. Improved maternal health was clearly another factor of importance.

The twentieth century was a period of enormous advances in educational attainment. At the outset of the century, in most of the developing nations levels of adult female education were alarmingly low, well below the lowest levels found in Europe. Yet as the century progressed, especially starting with women born in the 1930s, educational levels began a prolonged and thorough change. In this study, education have been shown to have a substantial impact on reproductive behavior with women of higher educational attainment invariably exhibiting lower fertility and the less educated showing higher fertility, a result similar to the one found in the developed world. During the period of the fertility boom, all social and educational groups participated in higher fertility, much as they did in the lower fertility that followed. This suggests that these large fertility swings (boom, bust) responded to ideas and values shared by all social groups, irrespective of their levels of education.

At the same time as the educational revolution underway in much of the world, enormous strides in the fight against infant and child mortality and infectious disease were being made. This change had powerful implications for family size because it increased the numbers of surviving children enormously. When our admittedly approximate census-based indicator of the number surviving offspring is used, it turns out that the intensity of the fertility boom nearly doubles in the developing world and even in countries like Brazil with no apparent fertility spurt there is a marked increase in the number of surviving offspring. Increasing family size was the product of increasing fertility coupled with sharply decreasing mortality. It also had implications for reproduction by means of improved adult survivorship leading to longer married lives for adults, facilitating reproduction in the absence of divorce and in contexts of imperfect fertility control. This second effect may have been smaller than the one influencing surviving children, though it represents a significant and often overlooked contribution of adult mortality change to fertility during the boom period, despite the fact that it constitutes a key part of the population explosion taking place in the developing world at this time. Managing this growth in population was no small task for these countries. Its initial consequence was breakneck population growth in the region, intense migration and increasing levels of poverty. Only now is the developing world beginning to emerge from this scenario, thanks largely to the enormous reduction in fertility and in family size whose beginnings are visible in the data presented here.

Further thoughts

This paper has presented strong evidence from a large sample of developing countries that a fertility boom took place during the central decades of the twentieth century, concretely among women born between 1925 and 1945. While not every country participated in this boom, most did. Considering the heterogeneity that characterized the baby boom in the developed world, these disparities should come as no surprise. The basic timing of the boom mirrored closely the cycle taking place in the developed world, as did many of its component parts. Despite evident differences between both world regions, the overall impression is that they are different parts of a great mid-century change in fertility. The idea of a real world pattern in fertility during much of the twentieth century remains hypothetical but this study has offered ample data and proof that it is an idea is worth exploring further. Explaining the factors behind world fertility patterns is another task, well beyond the scope of this paper.

These strides in our understanding of past fertility patterns outside of the developed world have been made thanks to a massive data set bringing with micro-census data for many countries and censuses corresponding to the final years of the twentieth century. These data are not without problems and careful vetting to ascertain data quality has been necessary. This is not to say that the data included here are not without problems, yet the reality they reveal is similar to that found in censuses from developed countries and coincides with other sources based on vital statistics, where available. It would have been ideal to use only vital statistics for this paper, much as van Bavel and Reher (2013) did in their paper on the baby boom, but these statistics are simply not available or are not reliable for much of the developing world. The micro census data and the IPUMS-I database have enabled us to unlock a large parcel of world population history that until now was largely unknown. Lack of adequate data is no longer a reason to overlook the history of fertility during the central decades of the twentieth century.

Despite the similarities, in the end we are hesitant to call the mid-century fertility boom a real baby boom. The term ‘baby boom’ was tailored to the developed world specifically and referred to the sharp rise in fertility taking place around the time of the war or afterwards. Since starting levels were relatively low, it refers to a real trend change taking place at a fairly advanced stage of the demographic transition. In the developing world, this is not the case, as the rise in fertility took place before the demographic transition when starting levels of fertility were still very high. The main distinguishing factor here is the timing of the

demographic transition. From that perspective, in some ways the fertility boom in the developing world has the appearance of the period just prior to the historic demographic transition when fertility ceased its gradual decline, even rising slightly.[8] This notwithstanding, however, the increase in fertility prior to the historical fertility transitions was much more muted than the increase visible in the developing world at mid-century. More important, prior to the historic demographic transition it was accompanied by relatively stable or even rising levels of mortality, quite unlike the developing world where the mid-century fertility boom was accompanied by massive decreases in mortality and led to sudden and pronounced increases in family size, likely unmatched in intensity in any historical society known to us.

That said, however, the similarities in both worlds shown here are striking. A matter of coincidence? We do not believe in coincidences, especially when they affect several different aspects of fertility in a wide array of nations. These commonalities offer ample justification for addressing this period of change from a global perspective. The underlying reasons for this pattern remain to be identified fully, but they may well be related to the changes in mortality occurring everywhere in the world, a process affecting improved maternal health, increasing survivorship among infants and longer marriages. Other factors likely include a certain sense of social, economic and political optimism holding during the period and the persistent lack of efficient and secure contraception everywhere.[9] The 1960s with its attendant cultural revolution, the introduction of safe and inexpensive contraception and high levels of demand for fertility limitation —especially visible in the developing world—, brought this grand cycle to a dramatic end as an enduring fertility bust increasingly became the central characteristic of world populations.

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[8] Often called the 'ski-jump' effect of the historic transition, this brief and mostly modest turnaround in fertility took place during the third quarter of the nineteenth century in some but not all European nations (van de Walle, 1998).

[9] The glowing accounts of Tibor Mende of Latin America (1952) and Asia (1951) reflect this optimism, at least in the eyes of an expert international observer.

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TABLE 1. SELECTED COUNTRIES, CENSUSES, SAMPLES, AND COHORTS

Country	Census Date	Sample Fraction	N*	Cohorts Included	Data Quality
Latin America					
Argentina	2001	10.0%	3,626,103	1905-1959	A
Bolivia	2001	10.0%	827,692	1905-1959	A
Brazil	2000	6.0%	10,136,022	1905-1959	A
Chile	1992	10.0%	1,335,055	1910-1954	A
Colombia	2005	10.0%	3,213,657	1910-1959	B
Costa Rica	2000	10.0%	381,500	1905-1959	A
El Salvador	1992	10.0%	510,760	1905-1954	B
Mexico	2000	10.0%	10,099,182	1905-1959	A
Nicaragua	1995	10.6%	435,728	1915-1954	A
Panama	2000	10.0%	284,081	1910-1959	A
Uruguay	1996	10.0%	315,920	1905-1954	A
Venezuela	2001	10.0%	2,306,489	1915-1959	A
Asia					
Cambodia	1998	10.0%	1,141,254	1915-1959	B
China	1982	1.0%	10,039,191	1915-1944	A
Indonesia	1980	5.0%	7,234,577	1905-1939	A
Iran	2006	2.0%	1,299,825	1920-1959	B
Thailand	1980	1.0%	388,141	1905-1939	B
Turkey	1985	5.0%	2,554,364	1905-1944	A
Africa					
Cameroon	2005	10.0%	1,772,359	1915-1949	B
Ghana	2000	10.0%	1,894,133	1915-1959	A
Kenya	1999	5.0%	1,407,547	1915-1959	A
Morocco	2004	5.0%	1,482,720	1915-1959	A
Rwanda	1991	10.0%	742,918	1910-1949	A
South Africa	1996	10.0%	3,621,164	1910-1944	B
* N = Total sample size					
A= Countries with data quality control					
B= Countries without full data quality control					

TABLE 2. INTENSITY AND DURATION OF FERTILITY BOOM. SELECTED COUNTRIES

	Lowest TCFR		Highest TCFR		N of cohorts involved	Differences	
Country	**TCFR**	**Cohort**	**TCFR**	**Cohort**		**Absolute**	**Relative**
Latin America							
Argentina	2.68	1920-24	2.95	1905-09	4	-0.27	-9.3%
Bolivia	5.50	1905-09	6.30	1930-34	6	0.80	14.6%
Brazil	5.39	1910-14	5.41	1920-24	3	0.02	0.4%
Chile	4.19	1910-14	4.60	1925-29	4	0.41	9.8%
Colombia	5.79	1910-14	6.11	1925-29	4	0.32	5.5%
Costa Rica	5.36	1905-09	6.48	1930-34	6	1.12	20.8%
El Salvador	4.59	1905-09	5.65	1935-39	7	1.06	23.0%
Mexico	6.00	1905-09	6.68	1930-34	6	0.68	11.4%
Nicaragua	6.27	1915-19	7.19	1935-39	5	0.92	14.8%
Panama	4.58	1910-14	5.50	1925-29	4	0.92	20.0%
Uruguay	2.45	1920-24	2.63	1910-14	3	-0.18	-6.8%
Venezuela	5.28	1915-19	5.95	1930-34	4	0.66	12.5%
Asia							
Cambodia	5.21	1915-19	5.99	1940-44	6	0.79	15.1%
China	5.18	1915-19	5.62	1925-29	3	0.44	8.5%
Indonesia	4.61	1910-14	5.46	1935-39	6	0.85	18.5%
Iran	5.73	1920-24	6.51	1940-44	5	0.78	13.6%
Thailand	5.13	1905-09	5.69	1925-29	5	0.55	10.7%
Turkey	5.27	1905-09	5.84	1930-34	6	0.57	10.8%
Africa							
Cameroon	4.66	1915-19	5.67	1940-44	6	1.01	21.7%
Ghana	5.85	1915-19	6.55	1935-39	5	0.69	11.9%
Kenya	6.68	1915-19	7.53	1940-44	6	0.84	12.6%
Morocco	6.13	1915-19	6.92	1935-39	5	0.79	12.8%
Rwanda	7.52	1910-14	8.14	1930-34	5	0.62	8.2%
South Africa	4.94	1910-14	5.14	1930-34	5	0.20	4.1%

Source: IPUMS-I.

MAP 1 . SELECTED COUNTRIES

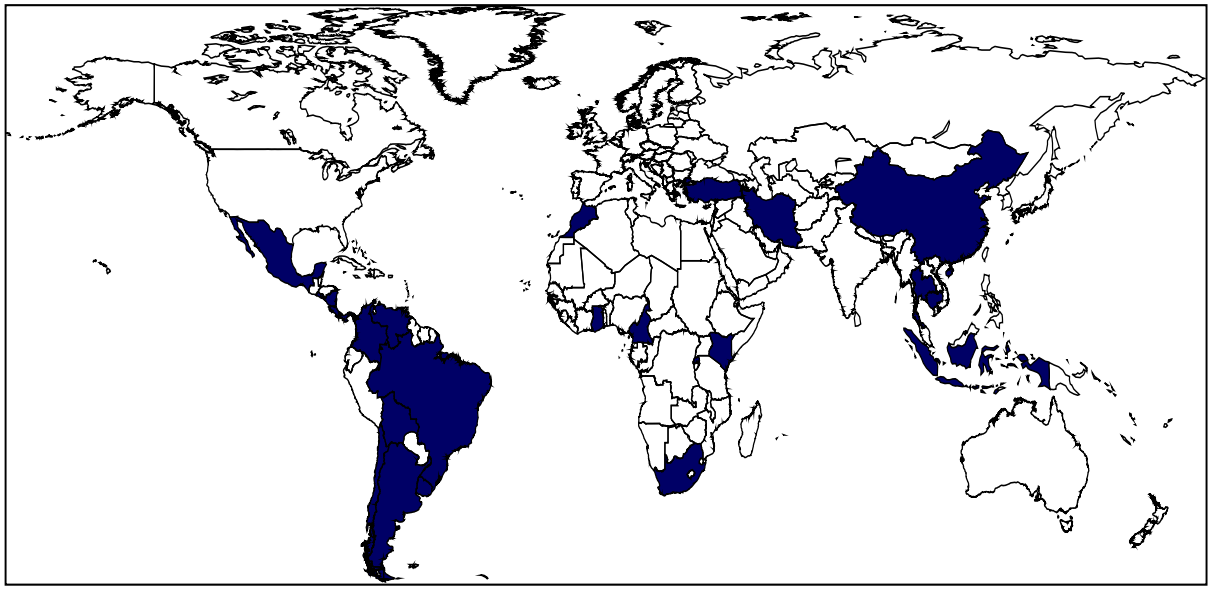
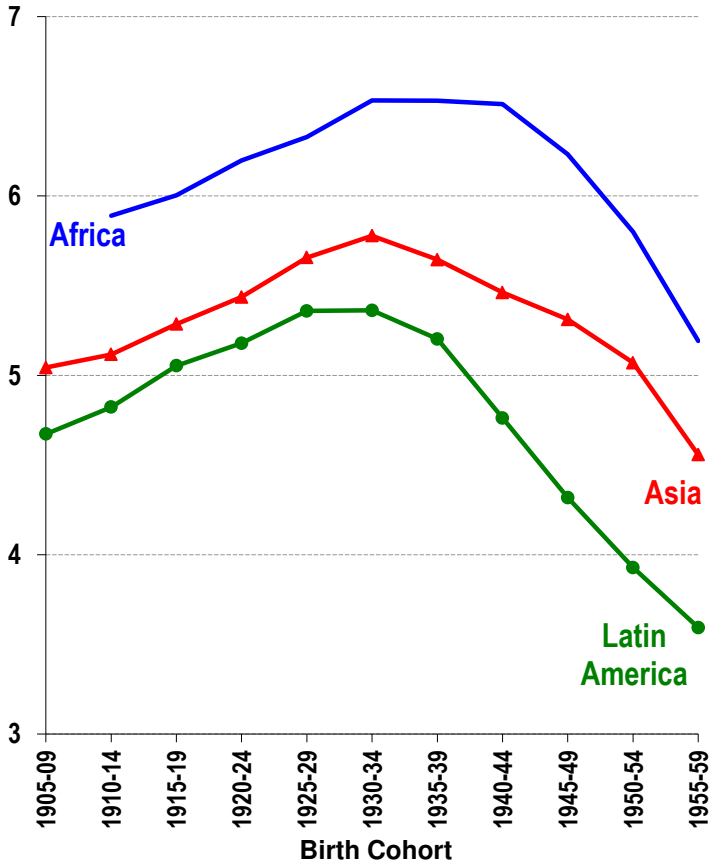
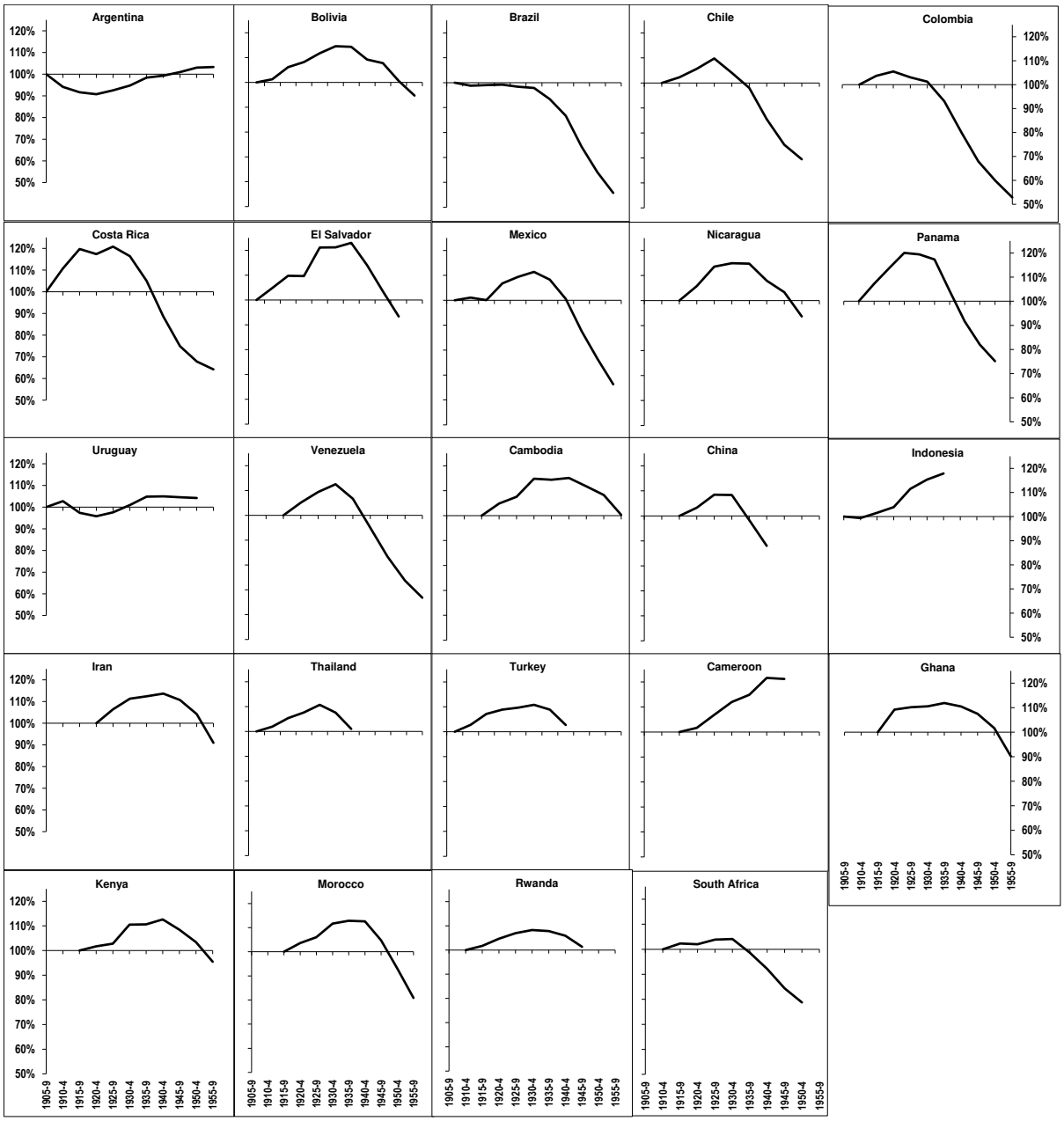


FIGURE 1. CHILDREN EVER BORN BY BIRTH COHORT. AVERAGES FOR CONTINENTS.



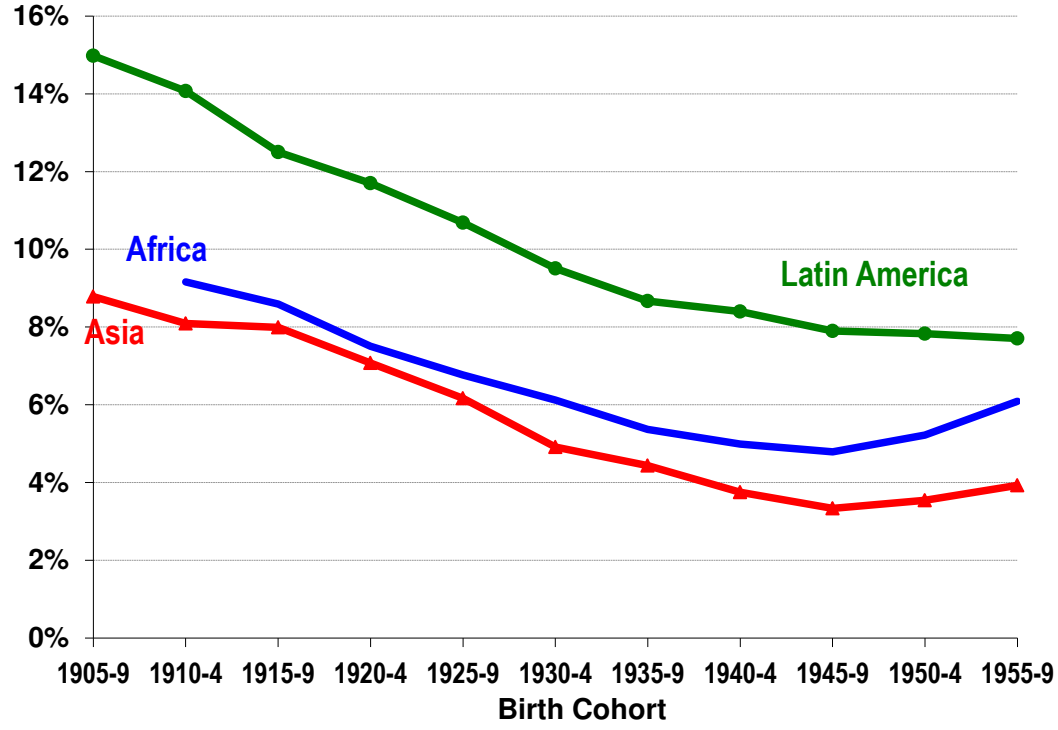
Source: IPUMS-I.

FIGURE 2. CHILDREN EVER BORN BY BIRTH COHORT AND COUNTRY. RELATIVE CHANGE



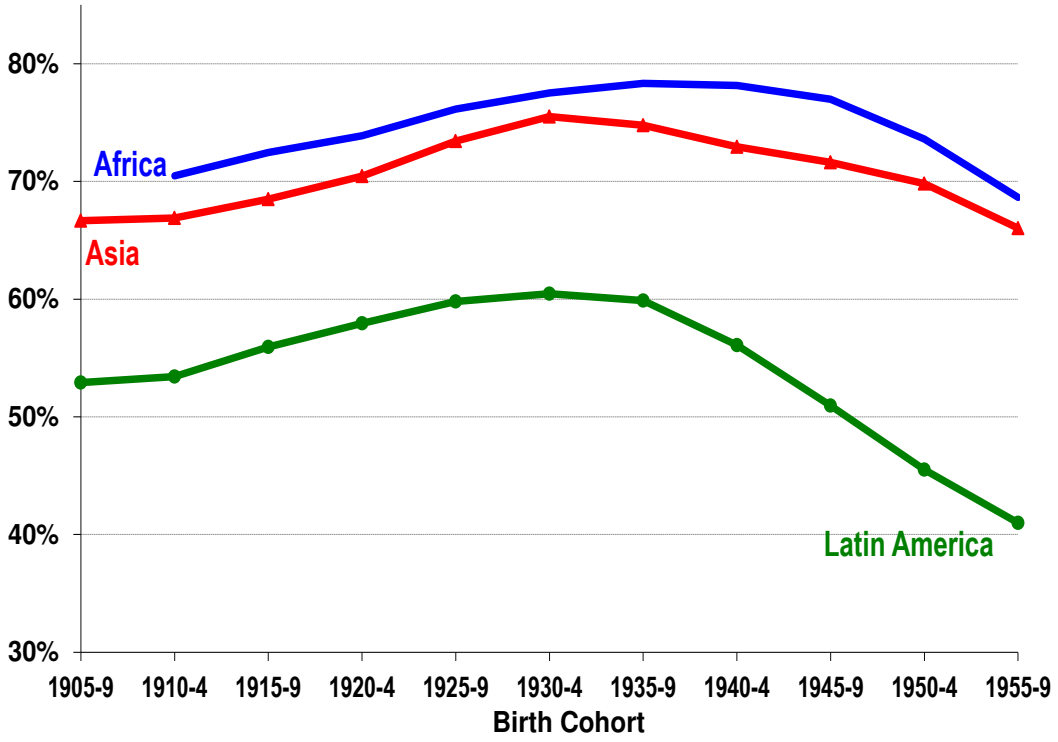
Source: IPUMS-I.

FIGURE 3. CHILDLESS WOMEN BY BIRTH COHORT AND CONTINENT



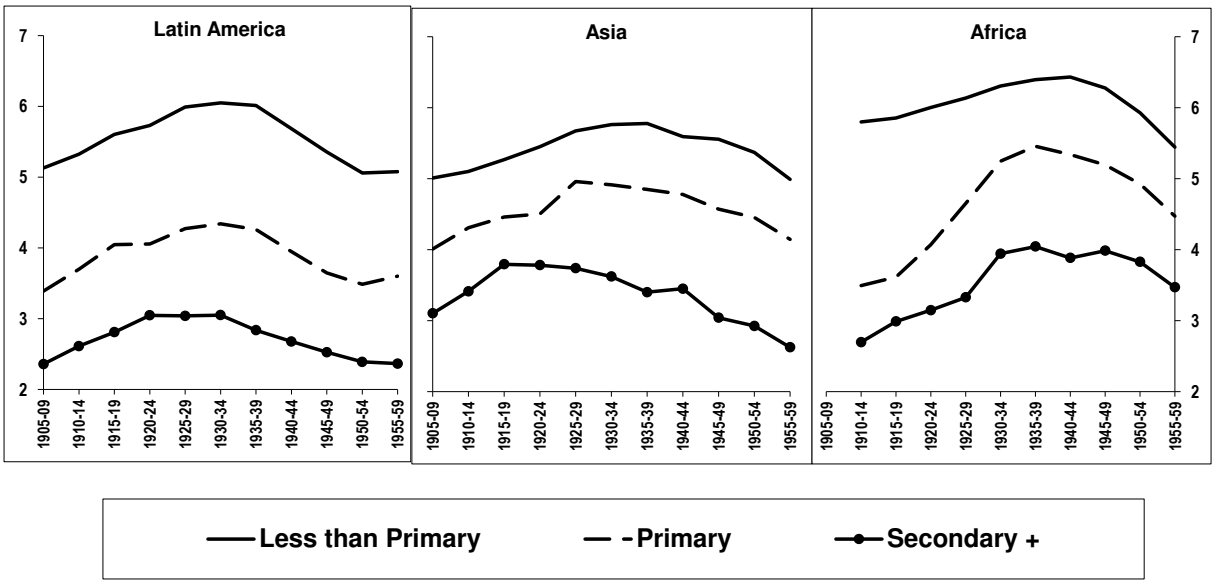
Source: IPUMS-I.

FIGURE 4. WOMEN WITH 4+ CHILDREN BY BIRTH COHORT AND CONTINENT



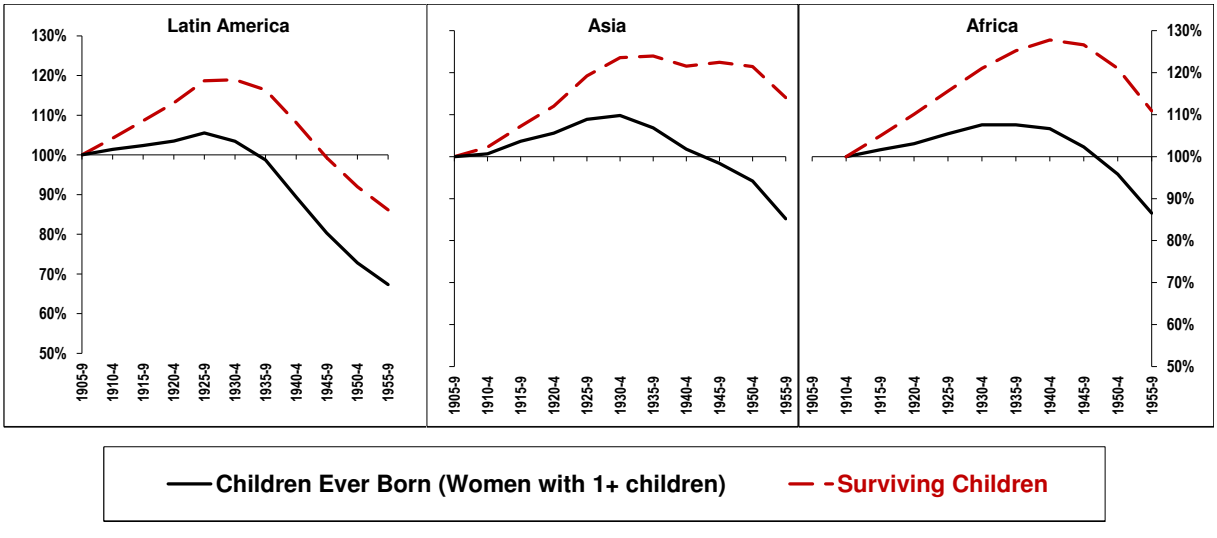
Source: IPUMS-I.

FIGURE 5. CHILDREN EVER BORN BY EDUCATION, BIRTH COHORT AND CONTINENT



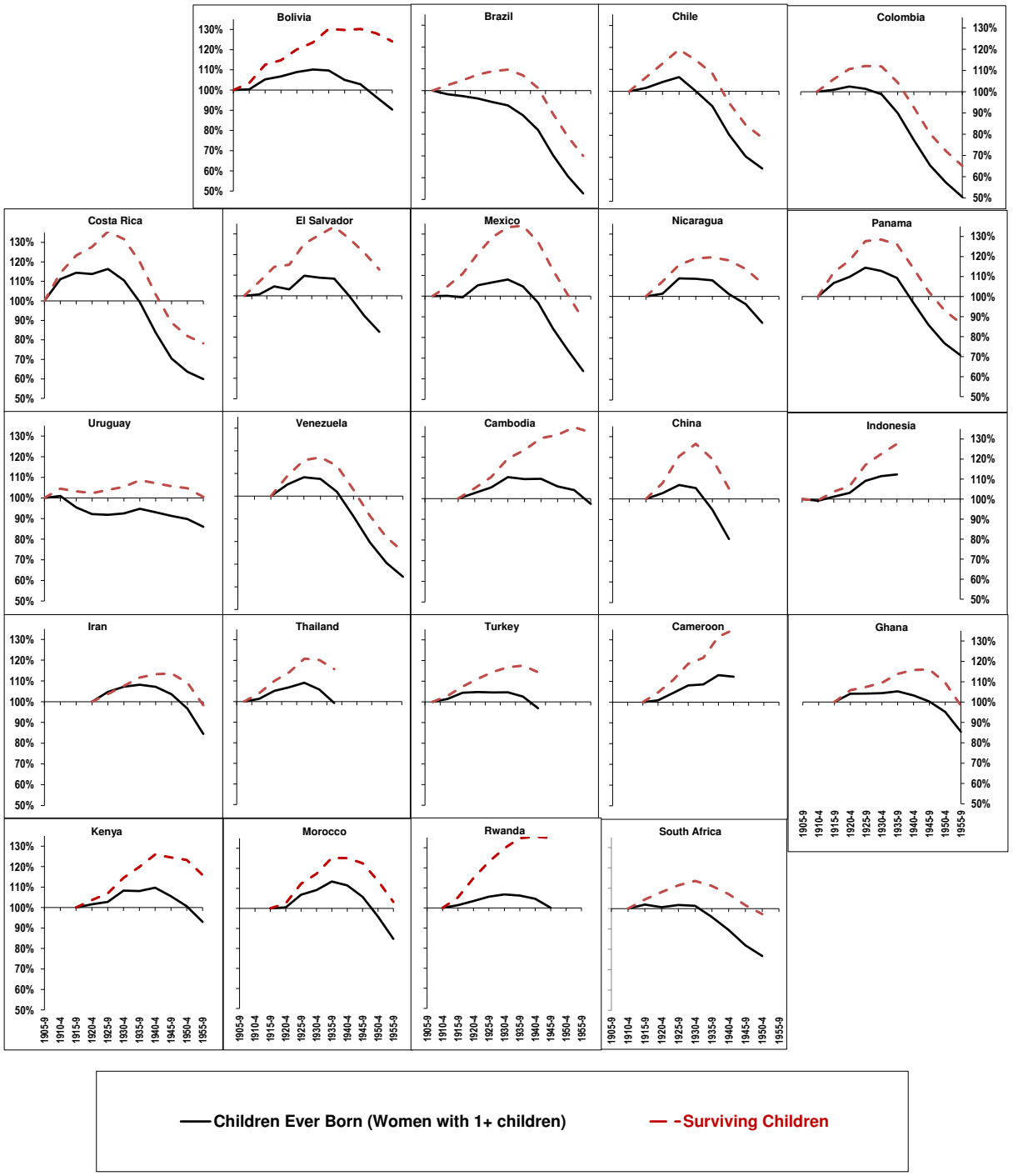
Source: IPUMS-I.

FIGURE 6. CHILDREN EVER BORN (WOMEN WITH 1+ CHILDREN) AND SURVIVING CHILDREN BY BIRTH COHORT AND CONTINENT. RELATIVE CHANGE



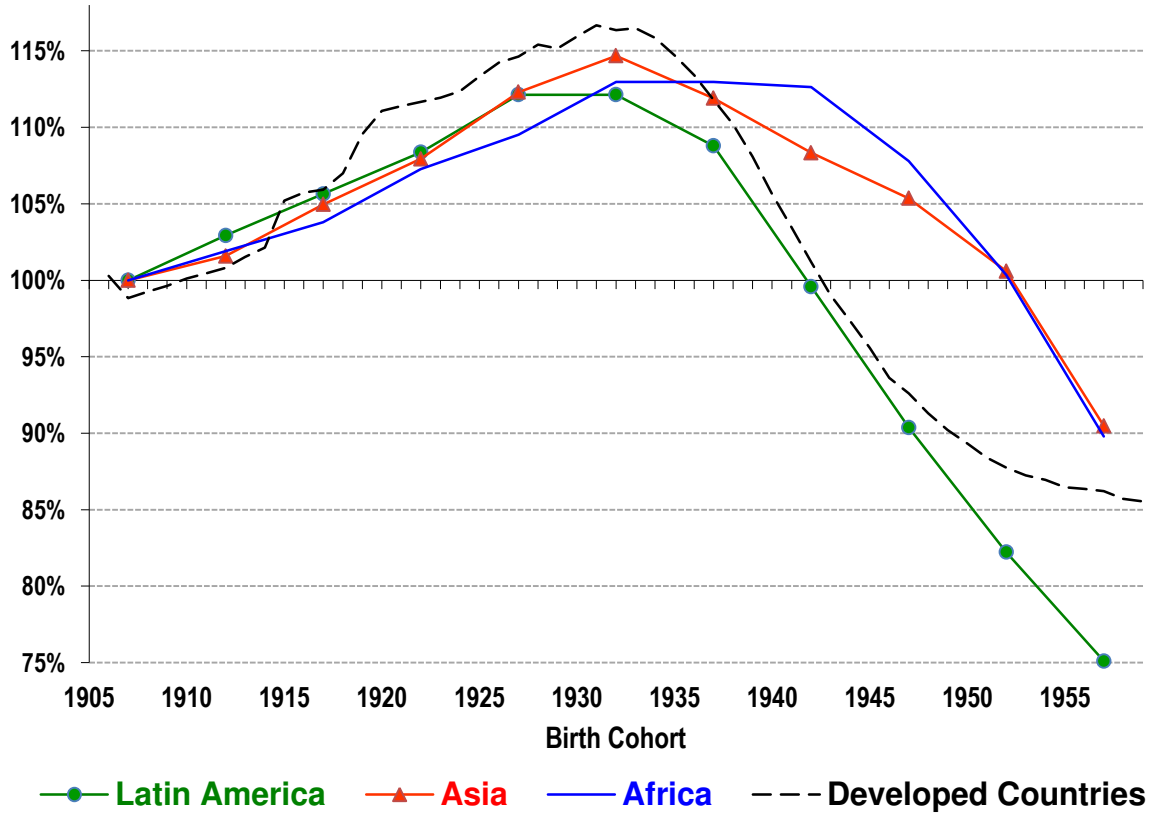
Source: IPUMS-I.

FIGURE 7. CHILDREN EVER BORN (WOMEN WITH 1+ CHILDREN) AND SURVIVING CHILDREN BY BIRTH COHORT AND COUNTRY. RELATIVE CHANGE



Source: IPUMS-I.

FIGURE 8. CHILDREN EVER BORN BY BIRTH COHORT AND CONTINENT. RELATIVE CHANGE



Source: IPUMS-I and INED database.