A "DEMOGRAPHIC TURNAROUND":

The Rapid Growth of Indigenous Populations in Lowland Latin America

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*Received 10-14-2003; Accepted Conditionally 2-14-2004;
Received Revised 5-15-2004; Final Acceptance 5-19-2004*

Abstract: In contrast to the rich scholarship documenting the traumatic post-contact destruction of indigenous populations in the Latin American tropics, little is known about their contemporary population dynamics. What accounts for the "demographic turnaround" reported for some groups? How widespread is population recovery, and what are its implications for indigenous political resurgence? We address these questions by compiling recent (post-1980) demographic indicators for over one hundred lowland indigenous populations. Despite remarkable socioeconomic and cultural diversity among these groups, we find compelling evidence that they nevertheless share a common trajectory of very rapid growth over the past two decades, especially in contrast to non-indigenous populations. We briefly review the implications of their dramatic physical resurgence and show how closer attention to this phenomenon is overdue. We discuss the relevance of indigenous societies' recovery to scholarship and praxis in the areas of health and education, cultural and political gains, and demographic theory.

INTRODUCTION

Some of the most dramatic social changes in Latin America during the past four decades have been intimately tied to the rapid and widespread decline in fertility. Although the timing and pace of Latin America's "fertility transition" have been spatially and temporally uneven, the collective demographic trajectory for the region is one of ever-slowing population growth as women have fewer and fewer children. From highs in the early 1960s of six children each and corresponding growth rates averaging almost 3 percent per year, by the late 1980s Latin America's total fertility rate (TFR) had dropped below four (Chackiel

*David Dodds, Teresa Hutchinson, and Oliver Coomes contributed greatly to this work through discussion, research assistance, and advice. We gratefully acknowledge research support to McSweeney from a Faculty Seed Grant, College of Social and Behavioral Sciences, The Ohio State University.

Latin American Research Review, Vol. 40, No. 1, February 2005

and Schkolnik 1996). Today, Cuba has the region's lowest TFR, at 1.6; Venezuela represents a middle range, at 2.8; and Guatemala's predominantly rural population maintains a relatively high TFR, at 4.4 (Population Reference Bureau 2003). Even where the fertility transition has been most gradual, as in Guatemala, the fertility apex is now considered to be long past (Brea 2003; Chackiel and Schkolnik 1996).

In this context of slower regional growth, however, we see emerging evidence of a demographic countercurrent signaling changes no less remarkable than those of the region's general fertility decline. That is, indigenous groups in Latin America's tropical lowlands appear to be experiencing high, and in some cases, rising fertility rates and accelerating growth that rivals or exceeds the rates experienced by national rural populations in the 1960s. Evidence from scattered microdemographic studies, as well as from recent national censuses, seems to indicate that lowland indigenous groups that otherwise vary greatly in size and socioeconomic orientation—from the Shipibo of Peru to Costa Rica's Guaymí—may all be growing at an extraordinary rate.[1] For many, contemporary growth appears to represent remarkable recovery from harrowing, and relatively recent, post-contact depopulation (Coimbra 1989; Picchi 2000).

The potential for individual populations to rebound from demographic crisis should not, on its own, be surprising: world history holds numerous precedents for rapid recovery following catastrophic decline (Thornton et al. 1991). What is remarkable in the case of Latin America's lowland indigenous populations is that in contrast to the well-told story of their demographic decline (e.g., Cook 1998; Davis 1977; Denevan 1992; Newson 1986), little is known about the transnational extent of their demographic recovery, not to mention its drivers, dynamics, and duration. Are the very high fertility rates reported among the Shipibo and Guaymí, for example, recent anomalies or long-term trends? Are they sustained across a larger sample of lowland populations? To what extent do lowland indigenous population dynamics converge, and how are they different from non-indigenous rural groups? What implications might a common trajectory of change have for indigenous cultures, politics, and the management of indigenous homelands?

As urgent and relevant as these questions are, they are difficult to answer. As Kennedy and Perz (2000) have recently demonstrated for Brazil, establishing a general trajectory of population change among lowland

1. By far the most comprehensive story of indigenous physical rebound comes from Brazil. Since Gomes (2000) identified a "demographic turnaround" in the late 1980s, empirical corroboration has come from state census data (Kennedy and Perz 2000), and a host of recent microdemographic studies published by the Brazilian Association of Population Studies (ABEP).

indigenous groups is hindered by the nature of the available data.[2] In theory, national censuses can offer "reliable" information about large populations over regular time intervals. But in fact, the enumeration of indigenous groups in national censuses is notoriously problematic, due to shifting definitions of "indigenous," and the underenumeration of groups that are either too remote or too urban (see also Mainbourg et al. 2002; Peyser and Chackiel 1994; Urrea Giraldo 1994). It is therefore hard to know how indigenous populations are changing *within* a given country, let alone how they compare across countries (Martins Pereira et al. 2002; Terborgh et al. 1995). In Brazil, for example, some of the so-called "growth" of the indigenous population appears to be an artifact of past undercounting of remote groups on the one hand, and on the other, social changes that have made more Brazilians willing and able to self-identify as indigenous (Baruzzi and Pagliaro 2002; Warren 2001). It therefore remains unclear just how much of Brazil's indigenous "demographic turnaround" (Gomes 2000, x) is attributable to actual physical replacement by established indigenous societies. In such cases, microdemographic studies can help by offering fine-grained, so-called "valid" data on specific populations. But despite rising online access to recent studies of this kind,[3] they remain rare for Latin America's lowland indigenous societies. Further, it is often difficult to extrapolate across these small-scale studies because of methodological discrepancies and mismatched sampling intervals (Hern 1995). As a result, demographers and anthropologists repeatedly note the need for more comprehensive tracking of Latin America's indigenous populations, and for cross-regional surveys to identify demographic trends.[4]

The theoretical and practical rewards of investigating the population dynamics of lowland indigenous groups are obvious. The vast literature on transnational indigenous political and cultural resurgence, for example, would benefit from critical insights into the synergistic dynamics of population change. In the absence of such information, the meaning of the "Return of the Indian" (Wearne 1996) has remained figurative,[5] and valid

2. Poor data availability is also symptomatic of the lack of attention to the growth of indigenous populations. As has been convincingly shown for Nicaragua (Gould 1998) and Brazil (Gomes 2000; Warren 2001; Garfield 2001), there have been strong political and epistemological motives among bureaucrats and theorists alike for overlooking indigenous demographic resurgence.

3. For example, studies are available on the websites of the Brazilian Association of Population Studies (ABEP), the Centro Latinoamericano y Caribeño de Demografia (CELADE), and Brazil's Instituto Socioambiental.

4. See Peyser and Chackiel (1994), Urrea Giraldo (1994), and others (Roosevelt 1994; Martins Pereira et al. 2002).

5. In several recent volumes on indigenous movements, for example, indigenous political and cultural revival is not tied to any evidence of populations' physical status or

concerns over cultural endangerment are misleadingly expressed in the language of physical extinction (e.g., Stonich 2001). Indigenous groups themselves require a more accurate picture of their demographic similarities in order to better plan for common health, educational, and territorial needs (Kennedy and Perz 2000). Demographic theory would also be enriched by a better picture of the many different trajectories of change embedded within Latin America's seemingly unidirectional demographic transition. Further, the region's indigenous demographic experience would bear critical comparison with, and conceptualization alongside, the experience of North America's Indian populations.

The purpose of this paper is to draw attention to these issues by reviewing and analyzing the evidence for recent demographic recovery among Latin America's lowland indigenous populations. We focus on lowland indigenous groups rather than highland populations for two reasons. First, the demographic histories of relatively small and scattered lowland populations are very different, and generally less well known, than those of highland societies such as the Aymara of Bolivia or Quiché Maya of Guatemala, who have had more intense and sustained contact with dominant Iberian culture (Denevan 1992; Wearne 1996). Although decimated by disease and mistreatment early in the colonial period, highland populations began to recoup relatively early; in Bolivia, Ecuador, Peru, and Guatemala, highland indigenous groups now account for at least 40 percent of the total national population (Peyser and Chackiel 1994). In contrast, estimating the size and dynamics of more remote and less-documented lowland populations, either pre- or post-contact, has proved more difficult and contentious (for a recent example, see Heckenberger et al. 2003). In many Latin American countries, it is estimated that lowland groups remain minority populations even in regions where they occur in the greatest densities (Maybury-Lewis 2002).

Second, popular discussion of the demographic trajectory of lowland groups has long been dominated by a narrative of demographic decline and/or extinction (Brantlinger 2003). This discourse remains remarkably influential, particularly where it dovetails with concerns over the loss of neotropical biodiversity (Gomes 2000). Yet the narrative, which typically conflates physical and cultural well-being, has not been empirically scrutinized, and may now be well out of date.

To better grasp empirically the *actual* demographic trajectory of lowland indigenous groups, we attempt to reconcile the patchy and incomplete data collected among these populations over the past twenty

recovery. In most cases, in fact, the topic is contextualized in relation to ethnic groups' population shrinkage *relative* to rapid colonization of indigenous territories by outsiders (Garfield 2001; Maybury-Lewis 2002; Van Cott 1994; Warren and Jackson 2002).

https://doi.org/10.1353/lar.2005.0012 Published online by Cambridge University Press

years (ca. 1980–2000) to form a preliminary picture of their recent demographic histories and futures. Although far from comprehensive, our review represents, to our knowledge, the most inclusive and contemporary comparative regional survey of lowland indigenous demographic dynamics for Latin America, which we hope will serve as a baseline on which future research might build.

We begin by describing the availability of recent demographic data on Latin America's self-identifying lowland groups and the methods and rationale we used to reconcile and analyze data spanning a tremendous diversity of lowland indigenous societies—ranging from remote Huaorani villages in Ecuador to the lobster-harvesting Miskito communities of Honduras's north coast. We do not differentiate groups on the basis of livelihood strategy, acculturation level, size, or socioeconomic status. We recognize that this approach is a departure from demography's explanatory prioritization of socioeconomic variables. Instead, we draw from Greenhalgh and other theorists who argue for the greater importance of multi-scaled cultural and political processes in understanding fertility outcomes (Greenhalgh 1995; Kertzer and Fricke 1997). A "political economy of fertility" (Greenhalgh 1995, 13) approach appears particularly relevant in lowland indigenous contexts, where recent studies point to common ethnocultural, political, and territorial forces shaping birth rates across diverse lowland groups (e.g., Sainz de la Maza Kaufmann 1997; Arias-Valencia 2001).

We then review our findings in light of more general demographic processes in Latin America. We outline the relevance of our findings to four areas of theory and praxis, with particular attention to the political ramifications of indigenous groups' demographic changes and to insights for demographic theory. The paper concludes by identifying several key questions raised by the research that require further conceptual and empirical investigation.

DEMOGRAPHIC RESEARCH ON LOWLAND INDIGENOUS POPULATIONS IN LATIN AMERICA

The Availability of Demographic Data

Establishing a reliable trajectory of recent change among lowland indigenous groups in Latin America is hindered not only by the "difficulty of access to the communities, different languages, and lack of written records" (Salzano and Callegari-Jacques 1988, 58), but by the shifting scholarly and political interests in indigenous demographics. In the 1960s and 1970s, the collection of microdemographic data was a common part of the ethnographic research that was driven by questions in population biology, behavioral anthropology, and cultural ecology.

These studies also reflected the urgency to record "vanishing" societies experiencing the devastating cultural and epidemiological impact of accelerated modernization, particularly in Brazil (see Davis 1977). This body of research drew particular attention to what would prove to be the population nadirs of many rainforest societies (Gomes 2000).

By the 1980s, scholarly interest in indigenous peoples was shifting increasingly away from in-depth demographic investigation towards issues of identity and cultural survival, often in a context of territorial invasion and associated biodiversity loss (Vidal 1982; Gomes 2000). The collection of vital rates and other positivist elements of traditional ethnography tended to be replaced, rather than complemented by, new interests in representation and positionality. With the noteworthy exception of the remarkable longitudinal studies of Early and Peters (1990, 2000), Hill and Hurtado (1996), and Coimbra et al. (2002), the past two decades have seen relatively few demographic analyses of Latin America's lowland indigenous societies by anthropologists, and even fewer comprehensive surveys by demographers.

Instead, information on indigenous populations since the 1990s has come from a variety of new sources, including public health and family planning studies (e.g., Bertrand et al. 1999; Fort 1992; Terborgh et al. 1995); improved census data (e.g., Allais 1994; Peyser and Chackiel 1994; Salazar 2001); and, increasingly, from indigenous federations' own population registries (see Azevedo 2002).

Today, at the close of the UN's International Decade of the World's Indigenous Peoples (1995–2004), most Latin American countries have at least a rough idea of the percentage of self-identified indigenous people in their populations. But population counts on their own remain problematic for establishing a picture of the key forces and patterns of demographic change (Grenand et al. 1995; Kennedy and Perz 2000; Mainbourg et al. 2002). What is needed, therefore, is a comprehensive picture of lowland populations' vital rates in order to speak to their recent population history, the potential for future growth, and cross-regional commonalities or differences.

Methods

We sought out reliable, comparable demographic indices from as many lowland groups as possible. In particular, we targeted studies that offered information on vital rates such as fertility, mortality, and age structure. In general, the most consistently available data included total or completed fertility rates (TFR and CFR, respectively),[6] the share of

6. The Total Fertility Rate is the average number of children that would be born alive to a woman by the end of her child-bearing years, assuming that she conforms to the

the population under age fifteen,[7] and infant mortality rates (IMR).[8] Combined, these basic indices allow for minimal but adequate estimates of a population's recent demographic history, its current level of replacement, and its potential for future growth. Fertility estimates and age structure data are particularly reliable because they can be collected in one-time surveys of both large and small samples, do not rely on prior estimates of total population size, and adjust for variable age-sex distributions. Death rates, in contrast—like any time-dependent measure, including migration or birth rates—are generally less reliable because they are influenced by the inherent demographic variability of small populations (Hern 1995).

We identified potentially useful studies through several online databases.[9] Except for the purchase of three unpublished dissertations, all the data were available free of charge on the Internet or through the Ohio State University Library system. Sources included health surveys, dissertations, ethnographies, state censuses, and NGO reports. Where an article or report cited earlier work, we consulted the original source whenever possible. We considered published and unpublished sources in English, Spanish, and Portuguese.

We combed over 1,000 sources and included in our survey only the twenty-five that met the following criteria. First, we looked for data reliability, judged by the study's demographic orientation, clear methodology, and adequate sample size. Following Bentley et al. (1993), we set a minimum total census of 50 individuals for age structure data, and a minimum of 50 women interviewed for reliable TFR estimates; we accepted CFR estimates from samples with as few as five women. Second, the studies had to be contemporary—that is, to reflect demographic conditions since 1980. Third, the indigenous group or groups represented needed to be self-identifying as such; in most studies, this distinction

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age-specific birth rates of her predecessors. The Completed Fertility Rate—also known as the Mean Completed Family Size (MCFS)—measures the average number of children ever born alive to women by the end of their child-bearing years (usually forty-five years of age or older). Note that the term "rate" is inaccurate: neither measure assumes a fixed time component.

7. As with any age-based measure, however, the percentage under fifteen years should be considered approximate given the widely-reported problems with age estimation among populations where birth records are rarely kept (see Bentley et al. 1993; Hern 1995).

8. The infant mortality rate measures the number of deaths of infants under one year of age per 1,000 live births in a given year.

9. These included the *Anthropological Index*, *Anthropological Literature*, *Human Relations Area Files*, *Social Sciences Citation Index*, the *Population Index* (Princeton), and *Lexis/Nexis*. We also drew from the websites of ECLAC (Chile), ABEP (Brazil), FUNAI (Brazil), and Macro International's *Demographic and Health Surveys*.

was implicit. Several studies combined data from multiple lowland groups into a single measure; these were included. Fourth, we confined our studies to populations with historic homelands in the lowland tropics. We therefore omitted a large literature on "indigenous" groups in which upland and lowland populations could not be distinguished (e.g., CONAPO 2001; Peyser and Chackiel 1994).

In all, our survey includes information on over one hundred lowland populations in ten countries (see table 1). As table 1 shows, the survey's coverage is far from ideal. The survey is temporally biased to the early 1990s, and geographically biased towards rural Amazonian groups. Further, data coverage for the one hundred populations we include is patchy. In only rare cases were all desired demographic indices (TFR, CFR, IMR, and age structure data) available; for most of the populations included, only one or two indices were available.

Because the studies vary considerably in terms of their purpose, methodologies, and the spatial and temporal scales at which the data were collected, our first step was to reconcile findings into a single dataset amenable to cross-cultural comparisons. A key challenge was to minimize the sample bias produced when combining large-scale, "reliable" census data with fine grained, longitudinal, but "valid" information from microdemographic studies of small groups (for discussion of this issue, see Kennedy and Perz 2000). We therefore aggregated observations only after considerable data exploration. For example, national census data from Peru offered reliable age structure and CFR estimates for about forty ethnicities (INEI 1994); Venezuela's 1992 census (OCEI 1993) included geographically detailed age structure data for some twenty-nine lowland groups. These data therefore had the potential to add greatly to the size and heterogeneity of our sample. If we included each ethnicity as a separate observation, however, we risked biasing our sample due to the high interdependence of indices from groups that are closely related through residence, culture, and time—a challenge also known as "Dalton's Problem" (see Bentley et al. 1993). We therefore sought to aggregate the most similar populations. For Venezuela, this meant combining age structure data by ethnic group (n = 29), rather than by residence (by state, or by rural versus urban).[10] For Peru, however, data analysis suggested that the greatest differences in demographic indices lay not at the level of the ethnic group, but rather at the level of *departamento* (n = 3). Therefore, we

10. For the Venezuelan data, we found no significant difference in the share of population under fifteen between rural and urban indigenous populations. Nor did we find any significant difference in age structure across the eight lowland states (Kruskal-Wallis p = 0.39). Significant differences did emerge *between* the 29 ethnic groups, however (Kruskal-Wallis p = 0.01), so the Venezuela data are aggregated at that level.

*Table 1 Indigenous Populations Included in Survey**

Region/Country	Year(s) of Study	Total Census[1]	Women Sampled[2]	Source
Mexico and Central America				
Mexico				
Maya (Yucatec)	1992–93	316	84	Kramer (1998)
Maya (Yucatec)	1989	1,450	30	Daltabuit and Leatherman (1998)
Belize				
Maya (Mopán)	1985–86	117	117	Fink et al. (1992)
Honduras				
Tawahka	1994–97	1,030	189	McSweeney (2002)
Garífuna	1997	660	66	Dodds (1998a)
Miskito[3]	1992	431	77	Dodds (1994)
Miskito[4]	1997	959	87	Dodds (1998a)
Pech	1997	322	47	Dodds (1998a)
Costa Rica				
Guaymí, Huetar, Bribri-Cabécar	1992–93		320	Sainz de la Maza Kaufmann (1997)
South America				
Colombia				
Cubeo, Desano, Tukano, Puinave	1993–94	3,635		Piñeros-Petersen and Ruiz-Salguero (1998)
Emberá (Chamibida)	1996–97	116	55	Arias-Valencia (2001)
Emberá (Eyabida and Dobida)	1996–97	118	54	Arias-Valencia (2001)
Wayú and Arhuaco	1993–94	3,040		Piñeros-Petersen and Ruiz-Salguero (1997)
Zenu	1996–97	99	76	Arias-Valencia (2001)
Venezuela				
Akawayo	1992	807		OCEI (1993)
Añu	1992	17,437		OCEI (1993)
Arawak	1992	248		OCEI (1993)
Baniva	1992	1,150		OCEI (1993)
Baré	1992	1,209		OCEI (1993)
Eñepa	1992	3,133		OCEI (1993)
Guajibo	1992	11,064		OCEI (1993)
Jodi	1992	643		OCEI (1993)
Kariña	1992	11,141		OCEI (1993)
Kuiva	1992	373		OCEI (1993)
Kurripako	1992	2,806		OCEI (1993)
Máku	1992	345		OCEI (1993)

Table 1 Indigenous Populations Included in Survey (continued)*

Region/Country	*Year(s) of Study*	*Total Census*[1]	*Women Sampled*[2]	*Source*
Mapoyo	1992	177		OCEI (1993)
Pemon	1992	18,871		OCEI (1993)
Piapóko	1992	1,331		OCEI (1993)
Piaroa	1992	11,103		OCEI (1993)
Puinave	1992	773		OCEI (1993)
Pume	1992	5,414		OCEI (1993)
Saliva	1992	79		OCEI (1993)
Sanima	1992	2,058		OCEI (1993)
Warao	1992	23,957		OCEI (1993)
Warekena	1992	409		OCEI (1993)
Wayuu	1992	168,037		OCEI (1993)
Yanomami	1992	7,069		OCEI (1993)
Yavarana	1992	317		OCEI (1993)
Yekuana	1992	4,408		OCEI (1993)
Yeral	1992	731		OCEI (1993)
Yukpa	1992	807		OCEI (1993)
Peru				
Various[5]	1992	35,083	1,335	INEI (1994)
Various[6]	1992	3,247	141	INEI (1994)
Various[7]	1992	58,534	2,315	INEI (1994)
Shipibo-Conibo	1983–84	1,445	386	Hern (1992)
Brazil				
Bakairí	1989	394	75	Picchi (2000)
Cinta Larga (Mã, Kaki, Kabã)	1979–84	<80	7	Salzano and Callegari-Jacques (1988)
Gavião	1982	176		Salzano and Callegari-Jacques (1988)
Kaiabi	1999	758	90	Pagliaro (2002)
Machusi	1980	598	27	Salzano and Callegari-Jacques (1988)
Pacaás Novos	1981	392	16	Salzano and Callegari-Jacques (1988)
Panará (Kren Akarore)	1993	140	24	Baruzzi et al. (1994)
Sateré-Mawé	1982	638	12	Salzano and Callegari-Jacques (1988)
Suruí	1984–88	401		Coimbra (1989)
Ticuna	2000	37,000		Martins Pereira et al. (2002)

Table 1 Indigenous Populations Included in Survey (continued)*

Region/Country	*Year(s) of Study*	*Total Census*[1]	*Women Sampled*[2]	*Source*
Xavánte[8]	1977–90	570	570	Coimbra et al. (2002)
Xavánte[9]	1993–97	825	146	Guimarães de Souza and Santos (2001)
Yanomama (Mucajai)	1983–87	361		Early and Peters (1990)
Yanomama (Xiliana)	1983–96	319		Early and Peters (2000)
Ecuador				
Huaorani	1996–97	161	30	Lu (1999)
Paraguay				
Northern Ache	1977–94	537	144	Hill and Hurtado (1996)

NOTES:

* Missing data reflect the lack of complete information for all groups.

1. "Total census" refers to the total number of individuals accounted for in the study's derivation of demographic indices. The number may correspond to a village population, total ethnic group, or random sub-sample of a defined population.
2. "Women sampled" refers to the total number of women that researchers reported interviewing to derive fertility estimates (either TFR or CFR).
3. Within the community of Belen, Gracias a Dios.
4. Within the community of Cocobila, Gracias a Dios.
5. Department of Ucayali, including: Achuar, Aguaruna, Arabela, Bora, Candoshi-Murato, Capanahua, Chamicuro, Chayahuita, Cocama-Cocamilla, Huambisa, Huitoto-Meneca, Huitoto-Muiname, Huitoto-Murui, Mayoruna-Matses, Occuna, Orejón (Maijuna), Piro (Yine), Pastaza Quichua, Secoya, Shipibo-Conibo, Ticuna, Urarina, Yagua.
6. Department of Madre de Dios, including: Amarakaeri, Arasaire, Ese Ejja, Kichwaruna, Machiguenga (Matsign), Piro, Pukirieri, Shipibo-Conibo, Toyoeri.
7. Department of Loreto, including: Amahuaca, Campa-Ashaninka, Campa del Ucayali, Campa Pajonalino, Cashibo-Cacataibo, Cashinahua, Cocama-Cocamilla, Culina, Pior, Sharanahua-Marinahua, Shipibo-Conibo, Yamináhua.
8. Within the Xavánte Reservation of Pimentel Barbosa, Mato Grosso.
9. Within the Xavánte Reservation of Sangradouro/Volta Grande, Mato Grosso.

aggregated the Peru observations at this level into three population-weighted CFR and age structure estimates.[11]

To account for the different years and time periods over which data were collected, we conducted analyses with samples divided into two time periods (1980–1989 and 1990–2000; shorter time increments would have reduced observations to analytically impractical levels) and with a combined sample (1980–2000). We also combined "period" (longitudinal) and "cohort" (cross-sectional) measures in estimates of total fertility to

11. For the Peru data set, we found the greatest difference in age structure to lie not between ethnicities, but between the three *departamentos* of residence (Ucayali, Loreto, Madre de Dios). The difference between departmental CFR was also significant (Kruskal-Wallis, $p = 0.08$).

maximize the number of observations, following Bentley et al. (1993). Very few studies included *both* TFR and CFR estimates, since researchers chose *either* to interview women of child-bearing age *or* women past their child-bearing years. The two indices therefore represent virtually non-overlapping populations and are considered separately.

Data compatibility issues were compounded when we attempted to compare country level (national and rural) indicators with those of indigenous populations. Because of potentially rapid changes in national vital rates over the past two decades, it was important that national indicators be as contemporaneous as possible with information from indigenous groups in corresponding countries. Unfortunately, state-level censuses only occasionally matched the year of the indigenous studies, so in many cases we relied instead on other sources for national and rural rates (e.g., ECLAC 2002). For some countries, rural data for the necessary time period were simply not available. Occasionally, rural data were available at the finer spatial scales of *departamento* or *municipio*. We chose not to use these data because we could not, across all countries, control for the varying percentages that the nested indigenous populations comprised within these sub-regional populations.

We used STATA 7.0 software for data analysis. Summary statistics are reported as mean values ± the standard error of the mean (within a 95 percent confidence interval). Difference-of-means/medians tests were used to identify differences across categories of indigenous groups, and between indigenous groups and rural and/or national populations. Where observations were distributed normally, we used one-way ANOVAs and t-tests; in the case of non-normal distributions we used non-parametric methods, including the Mann-Whitney U test for paired samples and the Kruskal-Wallis test for three or more samples. Our minimum standard for significance was $p = 0.1$ (at the 10 percent level).

ANALYSIS OF DEMOGRAPHIC DATA FROM LOWLAND INDIGENOUS GROUPS, 1980–2000

Fertility

We encountered reliable TFR estimates for fifteen indigenous populations that ranged in size from 54 to 3,635 individuals (mean size = 845), in six countries. The mean TFR was 7.5 ± 0.4 (median = 7.9; range: 3.9–10.5). That is, women sampled were likely to have almost 8 live births by the end of their child-bearing years, given current age-specific birth rates. The highest and lowest TFR values were recorded concurrently in two related populations in Colombia: Eyabida and Dobida Emberá women had over 10 children, while Chamibida Emberá women had fewer than 4. Overall, the distribution of TFR values was close to normal (skew = -0.3). TFR estimates did not vary significantly by the number of women sampled, nor by time period (pre/post 1990; t-test $p = 0.7$).

Our data set includes sixteen reliable CFR estimates. We found that the mean CFR for all indigenous populations was 7.46 ± 0.3 (n = 16; range: 5.4–10). That is, the roughly 2,050 indigenous women aged over forty-five years whose birth histories are captured in the studies we surveyed had given birth to an average of 7.5 children. No differences emerged across time periods: an unequal t-test suggests no significant differences between completed fertility values measured before or after 1990 ($p = 0.2$).

Notably, the mean CFR value did not differ significantly from the mean TFR value (t-test $p = 0.74$), despite the fact that the two indices were derived from virtually separate sets of observations. Further, no significant differences emerged when we compared indigenous TFR or CFR estimates by country, region (e.g., Mexico and Central America versus South America), population size quartiles, nor, as mentioned, by time period (table 2). In short, we found no way to draw out significant differences in fertility measures among the indigenous populations sampled.

We then looked at TFR values for *non*-indigenous rural and national populations and found no significant differences across the seven countries for any time period (table 3). That is, just as cross-country comparisons revealed no significant differences in fertility rates of indigenous groups, neither did cross-country comparisons of rural and national rates. Once we combined all country-level indices into aggregate "rural," national," and "indigenous" populations, however, strong differences emerged among them. For example, between 1980 and 2000, indigenous women had significantly more children then their rural or national counterparts (table 3, a, b, and c). It is particularly noteworthy that when compared separately, rural and indigenous groups' TFRs differed significantly (t-test $p = 0.000$), given that the majority of lowland indigenous people are considered rural. Further, aggregate indigenous TFR measures appeared lower in 1980–89 than in the subsequent decade, suggesting a widening differentiation in fertility between indigenous groups and their non-indigenous rural neighbors. CFR data show similar patterns (table 3, d, e, and f).

Infant Mortality Rates

Fertility data are limited in what they alone can tell us of indigenous population trajectories. For example, high fertility combined with high rates of early childhood death results in little net growth.[12] Thus information about deaths within a population—especially infant mortality—is particularly useful in clarifying the overall demographic effect of

12. Women may have increased fertility if infant death rates are high owing to early termination of breastfeeding and resumption of ovulation (Wood 1994); or women may choose to have many children to offset perceived mortality risks.

*Table 2 Contemporaneous Fertility Indicators, Comparing Aggregate Samples from Lowland Indigenous, Rural, and National Populations (Various Years, 1980–2000).**

	TFR**			CFR**		
	Indigenous	Rural	National	Indigenous	Rural	National
Mexico				7.50	7.70	5.90
Belize				8.40		
Honduras	8.67	6.35	4.74	7.93		
Costa Rica	6.50	3.70	3.20			
Colombia	7.08	4.30	3.00			
Peru	8.32	6.25	3.45	7.62	7.35	5.55
Brazil	7.54	4.57	2.92	6.60	6.40	4.60
Paraguay	8.47	6.10	4.70			
Kruskal-Wallis p =	*0.38*	*0.16*	*0.21*	*0.5*	*0.28*	*0.53*
Central America	7.95	5.55	4.31	7.93	7.20	5.75
South America	7.20	5.03	3.25	7.00	7.03	5.23
Unequal t-*test* p =	*0.45*	*0.44*	*0.04*	*0.10*	*0.78*	*0.41*

NOTES:
* Missing data reflect the lack of available information for a given country.
** Unweighted means.

high fertility. Unfortunately, reliable mortality indices are rare in the literature that we surveyed. Infant mortality rates were available for only fifteen indigenous populations and vary enormously—from 15 to 232 infant deaths per 1,000 births (the mean rate is 90.6 ± 17.2). In populations for which both IMR and fertility data were available, no clear patterns emerged regarding links between the two.

Some studies cited in this survey provide evidence that infant deaths have been decreasing over the past several decades in specific indigenous populations (e.g., Pagliaro 2002). Our survey suggests, however, that the decline in IMRs may be widespread. For example, infant mortality rates measured in the 1980s (mean = 161.7 ± 32.2; $n = 4$) were significantly higher than those measured after 1990 (mean = 67.4 ± 12.3; $n = 9$). Further, indigenous infant mortality rates appear to be converging with those of rural populations generally. Prior to 1990, lowland indigenous mortality rates were more than twice that of rural areas generally, and the difference was significant (Kruskal-Wallis $p = 0.01$). After 1990, the difference between the two groups decreased and lost its significance.

Age Structure

The small number of IMR observations, however, limits the conclusions that can be drawn regarding differences or commonalities across

https://doi.org/10.1353/lar.2005.0012 Published online by Cambridge University Press

Table 3 Fertility Indicators, Comparing Aggregate Samples from Lowland Indigenous, Rural, and National Populations, All Countries Combined

	All Years (1980–2000)			1980–1989			1990–2000		
	n	*mean*	*s.e.*	n	*mean*	*s.e.*	n	*mean*	*s.e.*
TFR									
Indigenous Groups	15	7.50	0.4	4	7.02	0.7	10	7.49	0.6
Rural	13	5.19	0.3	4	5.00	0.6	9	5.30	0.3
National	15	3.68	0.3	5	3.70	0.5	10	3.63	0.3
Kruskal-Wallis p =		*(a) 0.0001*			*(b) 0.03*			*(c) 0.0001*	
CFR									
Indigenous Groups	16	7.46	0.3	7	7.00	0.4	9	7.80	0.4
Rural	5	7.10	0.2	3	7.20	0.4	2	7.00	0.3
National	5	5.44	0.3	3	5.50	0.5	2	5.40	0.3
Kruskal-Wallis p =		*(d) 0.006*			*(e) 0.14*			*(f) 0.05*	

lowland indigenous mortality rates. Instead, we turn to estimates of the percentage of the population under age fifteen. This indicator of a population's youth can offer important clues about the net effect of high fertility on indigenous population structure and future growth.

Our sample contains fifty observations of indigenous age structure. The mean share of the population under fifteen for all years was 49.3% ± 0.8 (range 34–63%). Although the variance within the observations is large, they are normally distributed (skew = -0.2). The difference between populations sampled before or after 1990 did not prove to be significant (pre-1990: 51.2% ± 1.2, n = 8; post-1990: 48.96% ± 0.9, n = 42; Mann-Whitney U: $p >= 0.4$).

We did find significant differences in indigenous age structures across countries (table 4). The sharpest differences lay between the relative age of aggregated Venezuelan groups (47.2% ± 0.9 under fifteen), and the relative youth of aggregated Brazilian populations (53.3% ± 1.3 under fifteen). A similar divergence in age structures was also noted in non-indigenous populations across countries (table 4). These discrepancies suggest that for any sub-group, countries evince much greater heterogeneity in their age structures than they do in their fertility patterns.

Aggregated to the international level, however, and sorted by indigenous, rural, and national groupings, we found highly significant differences between the three groups over all time periods (table 5, a, b, and c). A separate difference-of-medians test confirms distinct differences between indigenous and rural population structures (p = 0.004). In short, as much as indigenous, rural, and national population structures differ by country, when scaled up to the level of lowland Latin America as a whole, each sub-group has more in common demographically with their international counterparts than they do as a nation.

*Table 4 Percentage of Populations Under Age 15, Comparing Aggregate Lowland Indigenous, Rural, and National Populations (Various Years, 1980–2000)**

	*Indigenous***	*Rural***	*National***
Honduras	55.0	48.5	44.9
Venezuela	47.2	42.7	36.2
Colombia	46.5	39.5	33.4
Peru	49.2	45.7	39.4
Brazil	53.3	40.4	34.6
Ecuador	55.9	39.0	37.8
Kruskal-Wallis p =	*0.007*	*0.1*	*0.03*
Central America	n.a.***	48.5	42.0
South America	n.a.***	41.8	35.9
Unequal t-*test* p =		*0.001*	*0.003*

NOTES:
* Missing data reflect the lack of available information for a given country.
** Unweighted means.
*** An insufficient number of observations for Central America precluded comparison.

THE MAGNITUDE AND IMPLICATIONS OF RAPID POPULATION RECOVERY

Summary of Findings

This survey of the demographic characteristics of more than one hundred lowland indigenous groups from the last twenty years is both partial and preliminary. Our sample is biased towards small, remote groups, and towards Amazonian populations generally. This study does, however, offer several clues indicating that Latin America's lowland indigenous populations have embarked on a shared trajectory of change. Five findings from our survey stand out.

First, fertility rates are very high—well above replacement level and, in some cases, among the highest ever recorded for contemporary populations (Hern 1995). Whether measured by TFR or CFR, it appears that many lowland indigenous women in the neotropics have had, or can be expected to have, about eight live births each. This fertility is comparable to levels experienced by rural women in Central American countries in the late 1950s and early 1960s (Guzmán 1997). For all countries included in this survey, indigenous women had significantly higher fertility—by about two births—than did contemporaneous non-indigenous rural women. Furthermore, because we derived TFR and CFR data from two virtually separate population sets, the data suggest that there is considerable convergence in fertility patterns across indigenous groups *and* that high fertility has been sustained over the past two generations or so. More careful historical reconstructions are required to assess the degree to which the high fertility of contemporary groups reflects a

Table 5 Percentage of Population Under Age 15, Comparing Aggregate Lowland Indigenous, Rural, and National Populations (Various Years, 1980–2000)

	All Years (1980–2000)			*1980–1989*			*1990–2000*		
	n	*mean*	*s.e.*	*n*	*mean*	*s.e.*	*n*	*mean*	*s.e.*
Indigenous Groups	50	49.3	0.8	8	51.2	1.2	42	48.9	0.9
Rural	12	43.4	1.2	4	46.4	1.3	8	41.8	1.4
National	18	37.2	1.0	5	40.6	1.7	13	36.2	1.1
Kruskal-Wallis p =	*(a) 0.0001*			*(b) 0.004*			*(c) 0.0001*		

general increase in indigenous women's fertility over time, as some researchers have found among specific groups (e.g., Coimbra 1989; Hern 1992; Martins Pereira et al. 2002; Pagliaro 2002).

Second, indigenous populations are very young. On average, children under fifteen years comprised almost one half (49 percent) of the populations reviewed in our survey. This share surpasses the experience of Latin America as a whole, whose population under fifteen years peaked at 43 percent in the mid-1960s, and is now estimated at 32 percent (Brea 2003). Young populations imply a heavy burden on working adults, and the potential for sustained growth even if fertility plummets. Youthful age structures typically develop under conditions of high fertility and declining mortality (particularly declining IMRs). Thus evidence of very young populations corroborates the infant mortality estimates we analyzed, and indicates that the decline in infant mortality rates noted in specific studies (e.g., Baruzzi et al. 1994; Guimarães de Souza and Santos 2001; Piñeros-Petersen and Ruiz-Salguero 1998) may apply to lowland groups more generally. Further research, however, will be required to understand why some indigenous groups have significantly younger populations than others. We found, for example, that the percent of the indigenous population under age fifteen was significantly higher in Brazil than in Venezuela. Scrutiny of the role of national policies such as vaccination campaigns would be particularly relevant here, because such programs may have influenced the timing of a population's transition to lowered mortality.

Third, the combination of high fertility and youthful populations tells a common story: after widespread and catastrophic population declines in the early to mid-twentieth century, indigenous populations in lowland Latin America appear to be experiencing a common era of remarkably rapid growth. We show the degree to which lowland indigenous societies across the region—from the Ache of Paraguay to the Yucatec Maya—are currently sharing a trajectory of well-above-replacement-level fertility and declining mortality. The data therefore appear sufficiently robust for us to draw more optimistic conclusions about the widespread nature of lowland indigenous population growth than prior studies have implied.[13] Our findings encourage us to think of high fertility and concomitant growth as an emergent characteristic of lowland indigenous groups, indicative of a transnational, pluriethnic demographic rebound.

Finally, indigenous groups' fertility rates and age structures appear to be consistently dissimilar from rural and national norms, suggesting that lowland groups are following a distinct trajectory of demographic change. Overall, then, we suggest that a new demographic narrative be added to the ongoing history of Latin America's indigenous peoples. Based on a composite picture of a wide range of groups, this survey makes the case that, *in general*, Latin America's self-identified indigenous lowland peoples, after a painful historic decline, are now experiencing a common and profound population expansion driven by high fertility and falling mortality rates. Further, while it is unclear whether demographic rebound and indigenous groups' political and cultural resurgence work in tandem, it is clear from data reviewed here that both processes have been coincident for at least the last two decades of the twentieth century.

Implications of Recent Growth

Evidence of rapid population expansion tells us little about the conditions under which Latin America's indigenous peoples live. But our findings do help to disentangle reproductive success from other concerns facing the indigenous peoples of lowland Central and South America. Below we discuss four areas of Latin American scholarship in which we feel such distinctions are important to both theory and practice. Our aim here is to briefly emphasize the complex political, social and theoretical implications of this survey's findings. We do so in part to head off the impulse to interpret evidence of population growth in terms of all-too-common binaries: as "good" or "bad" news; as "triumph" or "crisis." We assume that a period of rapid demographic expansion is likely to be as profoundly challenging to the politics, economies, and cultures of indigenous societies as were the devastating population crashes of the contact era. Indigenous societies' resilience and ingenuity in the face of this change, however, should be no less expected (see Bort and Young 2001; Urrea Giraldo 1994).

13. Hern, for example, cautiously concluded that *"at least some . . .* are experiencing high fertility and rapid population growth, . . . others have become extinct or nearly so" (1994, 131). Other researchers have been similarly cautious in interpolating a common growth pattern from a few case studies (e.g., Arias Valencia 2001; Salzano and Callegari-Jacques 1988).

Health and Education Very high fertility rates demand specific educational and health-care targeting of indigenous women and children. To date, several researchers have called attention to this issue in specific lowland or national indigenous contexts (e.g., Puertas and Schlesser 2001; Terborgh et al. 1995). But the widespread pattern of high fertility identified in this study points to the need for broader incorporation of specific health and education issues into the transnational agendas of indigenous alliances, national indigenous programs, and related development efforts. Pre- and post-natal care is particularly important in mitigating the health concerns directly associated with short birth spacing in high-fertility populations, such as the increased morbidity and mortality of mothers and children (Arias-Valencia 2001; Dufour 1994; Piñeros-Petersen and Ruiz-Salguero 1998). In several of the studies cited here, women expressed interest in spacing births further apart, if not in having fewer children altogether (e.g., Dodds 1998a). Such evidence may point to an unmet need for family planning technologies. This said, however, the logic of indigenous women's and couples' fertility decisions may not conform to Western health care orthodoxy (see Pagliaro 2002). For example, Sainz de la Maza Kaufmann (1997) found that among Costa Rica's indigenous groups, the *type* of contraceptive used by women (traditional versus modern methods), rather than contraceptive use *per se*, varied with the degree of acculturation. Fort (1992) also found that Amazonian indigenous women had a higher level of modern contraceptive use *and* higher fertility than their Andean counterparts. Clearly, the challenge is to discover how these links work in specific indigenous contexts and apply this knowledge to best meet women and children's needs in health care provision.

Land Use and Biodiversity Conservation Among the more than one hundred indigenous populations surveyed in this study, a majority reside within territories whose delineation was tied in some way to biodiversity conservation (e.g., Coimbra et al. 2002; Dodds 1998b; McSweeney 2002). To date, debates over the changing role of indigenous peoples in the management of such areas for biodiversity protection has largely occurred in the absence of reliable information on indigenous populations' demographic trajectories (see, for example, Alcorn 1993; Redford and Sanderson 2000; Schwartzman et al. 2000). Given the evidence of widespread population growth presented here, there is a clear need for conservation interests—including those within indigenous societies themselves—to engage with the implications of this complex issue. Certainly, rising internal populations may add to the pressures on the biodiverse environments that many groups inhabit. But growing populations can also lead indigenous groups to better defend their territories from outside encroachment (Bodley 1999; Kennedy and Perz 2000). Also, resource degradation is not an inevitable outcome of indigenous population increase. Indigenous groups appear to be responding to population growth in multiple, unexpected ways: by intensifying agriculture, modifying land tenure rules, and out-migrating (Bort and Young 2001; Rubenstein 2001). Many work as farm laborers, and rising numbers of others seek urban employment (see Mainbourg et al. 2002). As much as these forms of non-traditional work speak to their "proletarianization" and cultural assimilation, indigenous peoples' familiarity with *mestizo* culture can also pay unexpected cultural and environmental dividends (see Brown 1994; Urrea Giraldo 1994). For example, urban wages have been known to sustain homeland environments and communities by removing pressure on forests; remittances also fund educational opportunities that can translate into improved local stewardship of homelands and cultural revival (Guzmán et al. 2003). The challenge for indigenous groups and their conservationist allies, then, is to identify and promote these types of mutually satisfactory outcomes together.

Indigenous Politics Over the past two decades, indigenous groups' participation in municipal and department-level politics has risen markedly (Warren and Jackson 2002), and this study suggests that rising numbers will bolster this trend. But as Reed (2002) points out, rising indigenous ratios within the voting population do not guarantee a unified voting front. In larger electoral arenas, other scholars point to the limited voting power of what will long remain minority populations in many countries (Maybury-Lewis 2002). Beyond the ballot box, however, this survey suggests cause for celebration of a necessary—if insufficient—condition for cultural survival. Given that assimilation has long been a concern of native groups, the fact that a demographic swell is occurring in a climate of renewed cultural and political vigor suggests that young people have less chance than before of being "lost" to *mestizo* culture. The important advances in bilingual education across indigenous Latin America can be especially celebrated—and continued funding justified—in terms of the rising number of children to potentially benefit from these programs.

Indigenous Demographic Transition This study points to important commonalities in demographic patterns across very different indigenous groups. This finding echoes that of Shoemaker (1999) and others (Thornton et al. 1991; Thornton 1987) in their studies of historic fertility patterns among North American Indians. These authors found that despite important differences between such groups as the Seneca, Navajo, and Cherokee, all faced population nadirs by the late nineteenth century, and all experienced subsequently high fertility, which helped to catalyze their large-scale demographic recovery in the twentieth century. Evidence for a similar trend among Latin America's lowland groups—albeit a century later—begs theoretical engagement with a pan-hemispheric process that to date has gone overlooked by demographers despite its implications for understanding the ability of populations to recover from catastrophic decline.

RESEARCH IMPERATIVES

These last points lead to the ultimate question raised by this comparative review: why? What explains rising fertility among Latin America's lowland indigenous groups? The proximate determinants of high fertility appear to be clear, including early marriage, uneven contraceptive use, and high fecundity (e.g., Arias-Valencia 2001; Hill and Hurtado 1996; Lu 1999; McSweeney 2002). But what are the more ultimate determinants—the cultural, economic, and political contexts in which the ability to have many children is realized? Judging from the range of answers offered by the studies included in this survey, the issue is far from settled. Indeed, the very different theoretical and conceptual frameworks from which researchers draw are more contradictory than convergent, suggesting a compelling ground for further inquiry.

Some authors draw from demographic transition concepts to attribute the high fertility of indigenous women to their rural isolation and economic and cultural marginalization. This interpretation is supported by evidence linking high fertility among indigenous women to illiteracy, poverty, and rural residence (e.g., Terborgh et al. 1995). By this logic, a reduction in indigenous fertility rates requires poverty alleviation initiatives that combine improved access to health care (including modern contraceptives) with education, job opportunities, and social security (e.g., Bertrand et al. 1999).

These prescriptions, however, rarely consider the ways in which increased contact with non-indigenous society may work through cultural attributes to *contribute to* higher birth rates in lowland groups through the loss of social controls on fertility.[14] Consideration of cultural factors such as these is clearly essential to better understand why the fertility rates of indigenous women might differ so markedly from their comparably disadvantaged non-indigenous rural counterparts.

Similarly, demographic transition theory does not accommodate other aspects of indigenous experience, including the population nadirs that, for many lowland groups, occurred in the last century (Gomes 2000). This means that modern indigenous groups begin transition from a unique starting point—genetically, emotionally, and politically. In some

14. Fertility may increase as social norms that once limited births—including rules regarding birth spacing, abstinence, abortion, household structure, and polygyny—are broken down (e.g., Hern 1992; Shoemaker 1999).

cases, a communal memory of near-extinction appears to inspire particular strategies for "regrowing" populations (Azevedo 2000; Martins Pereira et al. 2002). Studies cited here, for example, suggest that forms of inter-ethnic marriage were used deliberately to recover group numbers (Azevedo 2002; Pagliaro 2002). Further research is required to understand the dynamics of such tactics, including the role of epidemiologic immunity, cultural syncretism, and political alliances.

Explanation for the recovery of lowland indigenous groups must also seriously consider the role of ethno-politically motivated pronatalism. Research has shown that political considerations were important to the demographic recovery of Indian groups in the United States (Shoemaker 1999; Thornton 1987). For some lowland Latin American populations, high fertility is explicitly associated with the *reconquista* of contested landscapes (Penna 1984, 1576; see also Sainz de la Maza Kaufmann 1997). Ethno-political agendas appear to inform fertility decisions through such mechanisms as community sanctions against contraception (Arias-Valencia 2001). A key research imperative in this regard is to explore women's agency. In particular, indigenous women's reproductive autonomy requires more investigation in light of the gendered disempowerment reported within some indigenous movements (Dean 2002), and the reproductive stress associated with meeting expectations regarding "ethnic continuity" (Arias-Valencia 2001, 8).

Clearly, no single explanation can account for the contemporary trajectory of Latin America's lowland indigenous groups. Tackling any of the above issues demands the conceptual integration of demographic concerns with issues that have typically been analyzed separately, including health, ethnopolitics, and conservation issues. In short, future investigations require the sort of "whole demography" approach in which reproductive behavior is placed within a social, cultural, and political economic context (see Greenhalgh 1995; Kertzer and Fricke 1997; Pagliaro 2002). Such conceptual challenges must be matched, in turn, by invigorated and expanded empirical engagement with contemporary indigenous demographic dynamics. Unlike the nineteenth-century turnaround of North American Indian populations, which can only be studied in hindsight, the opportunity now exists to collect and synthesize demographic data with lowland cultures across Latin America *during* this period of transformative change.

REFERENCES

Alcorn, Janis B.
1993 "Indigenous Peoples and Conservation." *Conservation Biology* 7 (2):424-426.

Allais, María Luisa
1994 "Censo indígena de Venezuela 1992: Metodología y resultados." In *Estudios sociodemográficos de pueblos indígenas*, edited by CELADE, 77-90. Santiago, Chile: Centro Latinoamericano y Caribeño de Demografía (CELADE).

Arias-Valencia, Maria Mercedes
2001 "Comportamiento reproductivo en las etnias de Antioquia-Colombia." *Salud Pública de México* 43 (4): 268–278.
Azevedo, Marta Maria
2000 *How Many Were They? How Many Will They Be?* Instituto Socioambiental. http://socioambiental.org/website/pib/english/whwhhow/howmany/eramseraoi.html.
2002 "Trocas matrimoniais na região do Rio Negro: Um estudo de caso de nupcialidade entre povos indígenas no Brasil." Paper presented at the XIII Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/Gerencia Navegacao.php (accessed February 2003).
Baruzzi, Roberto Geraldo, and Heloisa Pagliaro
2002 "Os índios Karajá das aldeias de Santa Isabel do Morro e Fontoura, Ilha do Bananal: Dados populacionais dos anos de 1969 e 2002." Paper presented at the XIII Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/Gerencia Navegacao.php (accessed February 2003).
Baruzzi, Roberto Geraldo, Heloisa Pagliaro, Rebeca de Souza and Silva, Vivian Schivartche, and Helena Meziara
1994 "Os índios Panará: A busca pela sobrevivência." Paper presented at the IX Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/Gerencia Navegacao.php (accessed February 2003).
Bentley, Gillian R., Tony Goldberg, and Grazyna Jasienska
1993 "The Fertility of Agricultural and Non-agricultural Traditional Societies." *Population Studies* 47:269–281.
Bertrand, Jane, Sandra Guerra de Salazar, Lidia Mazariegos, Ventura Salanic, Janet Rice, and Christine Kolars Sow
1999 "Promoting Birthspacing Among the Maya-Quiche of Guatemala." *International Family Planning Perspectives* 25 (4): 160–167.
Bodley, John H.
1999 *Victims of Progress.* 4th ed. Mountainview, CA: Mayfield Publishing Co.
Bort, John R., and Philip D. Young
2001 "The Ngobé of Western Panama." In *Endangered Peoples of Latin America: Struggles to Survive and Thrive*, edited by S. C. Stonich, 121–136. Westport, CT: Greenwood Press.
Brantlinger, Patrick
2003 *Dark Vanishings: Discourse on the Extinction of Primitive Races, 1800–1930.* Ithaca, NY: Cornell University Press.
Brea, Jorge A.
2003 "Population Dynamics in Latin America." *Population Bulletin of the Population Reference Bureau* 58 (1): 1–38.
Brown, Michael F.
1994 "Beyond Resistance: Comparative Study of Utopian Renewal in Amazonia." In *Amazonian Indians from Prehistory to the Present*, edited by A. Roosevelt, 287–314. Tucson: The University of Arizona Press.
Chackiel, Juan, and Susana Schkolnik
1996 "Latin America: Overview of the Fertility Transition, 1950–1990." In *The Fertility Transition in Latin America*, edited by J. M. Guzmán, S. Singh, G. Rodríguez and E. A. Pantelides, 3–26. Oxford: Clarendon Press.
Coimbra, Carlos E. A., Jr.
1989 "From Shifting Cultivation to Coffee Farming: The Impact of Change on the Health and Ecology of the Suruí Indians in the Brazilian Amazon." PhD diss., Department of Anthropology, Indiana University, Bloomington.
Coimbra, Carlos E. A., Jr., Nancy M. Flowers, Francisco M. Salzano, and Ricardo V. Santos
2002 *The Xavánte in Transition.* Ann Arbor: The University of Michigan Press.
CONAPO
2001 *Comportamiento reproductivo de la población indígena.* Mexico: Consejo Nacional de Población (CONAPO). http://www.conapo.gob.mx/ (accessed July 2003)

Cook, Noble David
1998 *Born To Die: Disease and New World Conquest, 1492–1650*. Cambridge, United Kingdom: Cambridge University Press.
Daltabuit, Magalí, and Thomas L. Leatherman
1998 "The Biocultural Impact of Tourism on Mayan Communities." In *Building a New Biocultural Synthesis: Political Economic Perspectives on Human Biology*, edited by A. H. Goodman and T. L. Leatherman, 317–337. Ann Arbor, MI: University of Michigan Press.
Davis, Sheldon H.
1977 *Victims of the Miracle: Development and the Indians of Brazil*. Cambridge, United Kingdom: Cambridge University Press.
Dean, Bartholomew
2002 "State Power and Indigenous Peoples in Peruvian Amazonia: A Lost Decade, 1990–2000." In *The Politics of Ethnicity: Indigenous Peoples in Latin American States*, edited by D. Maybury-Lewis, 199–238. Cambridge, MA: Harvard University Press.
Denevan, William M., Ed.
1992 *The Native Population of the Americas in 1492*. 2nd ed. Madison, WI: Wisconsin University Press.
Dodds, David J.
1994 "The Ecological and Social Sustainability of Miskito Subsistence in the Río Plátano Biosphere Reserve, Honduras: The Cultural Ecology of Swidden Horticulturalists in a Protected Area." PhD diss., Department of Anthropology, University of California, Los Angeles.
1998a "Informe preliminar sobre demografía de tres pueblos indígenas en la Reserva Biósfera del Río Plátano." Online working paper, Population Institute for Research and Training (PIRT), Indiana University. http://www.geocities.com/dj_dodds/other_docs.htm (accessed August 2004).
1998b "Population Growth and Forest Cover Change in the Río Plátano Biosphere Reserve, Honduras." Online working paper, Center for the Study of Institutions, Population, and Environmental Change (CIPEC), Indiana University. http://www.cipec.org/research/demography/dodds_ppr.html (accessed September 1999).
Dufour, Darna L.
1994 "Diet and Nutritional Status of Amazonian Peoples." In *Amazonian Indians from Prehistory to the Present*, edited by A. Roosevelt, 151–176. Tucson: The University of Arizona Press.
Early, J. D., and J. F. Peters
1990 *The Population Dynamics of the Mucajai Yanomama*. San Diego: Academic Press.
2000 *The Xilixana Yanomami of the Amazon*. Gainesville, FL: The University Press of Florida.
ECLAC
2002 *Boletín Demográfico No.70: América Latina y el Caribe: Indicadores seleccionados con una perspectiva de género*. Economic Commisssion for Latin America and the Caribbean (ECLAC). Available at http://www.eclac.cl/mujer (accessed July 2003).
Fink, A.E., G. Fink, H. Wilson, J. Bennie, S. Carroll, and H. Dick
1992 "Lactation, Nutrition, and Fertility and the Secretion of Prolactin and Gonadotrophins in Mopan Mayan Women." *Journal of Biosocial Science* 24:35–52.
Fort, Alfredo L.
1992 "Fertility and Reproductive Behavior in Peru: Andes Mountains and the Amazon Basin." *Estudios demograficos y urbanos (Mexico)* 7 (20–21): 327–358.
Garfield, Seth
2001 *Indigenous Struggle at the Heart of Brazil*. Durham, NC: Duke University Press.
Gomes, Mercio P.
2000 *The Indians and Brazil*. Translated by J. W. Moon. Gainesville, FL: University Press of Florida.
Gould, Jeffrey L.
1998 *To Die in this Way: Nicaraguan Indians and the Myth of Mestizaje 1880–1965*. Durham, NC: Duke University Press.

Greenhalgh, Susan
1995 "Anthropology Theorizes Reproduction: Integrating Practice, Political, Economic, and Feminist Perspectives." In *Situating Fertility: Anthropology and Demographic Inquiry*, edited by S. Greenhalgh, 3–28. Cambridge, United Kingdom: Cambridge University Press.
Grenand, Pierre, Francoise Grenand, and Sara Pimpaneau
1995 *The Situation of Indigenous Peoples in Tropical Forests, Part II: Regional Studies: Equatorial America*. Edited by Serge Bahuchet (Online report). http://lucy.ukc.ac.uk/Sonja/RF/Ukpr/Report26.htm (accessed February 2003).
Guimarães de Souza, Luciene, and Ricardo V. Santos
2001 "Perfil demogáfico da população indígena Xavánte de Sangradouro-Volta Grande, Mato Grosso (1993–1997), Brasil." *Cadernos de Saúde Pública* 17 (2): 355–366.
Guzmán, Héctor M., Carlos Guevara, and Arcadio Castillo
2003 "Natural Disturbances and Mining of Panamanian Coral Reefs by Indigenous People." *Conservation Biology* 17 (5): 1396–1401.
Guzmán, José Miguel
1997 "A Rapid Look at the Fertility Transition by Zone of Residence in Central America and Panama." In *Demographic Diversity and Change in the Central American Isthmus*, edited by A. R. Pebley, and L. Rosero-Bixby, 41–55. Santa Monica, CA: Rand.
Heckenberger, Michael J., Afukaka Kuikuro, Urissapá Tabata Kuikuro, J. Christian Russell, Morgan Schmidt, Carlos Fausto, and Bruna Franchetto
2003 "Amazonia 1492: Pristine Forest or Cultural Parkland? [with supporting online materials]." *Science* 301 (5640): 1710–1714 (19 September).
Hern, Warren M.
1992 "Polygyny and Fertility Among the Shipibo of the Peruvian Amazon." *Population Studies* 46:53–64.
1994 "Health and Demography of Native Amazonians: Historical Perspective and Current Status." In *Amazonian Indians from Prehistory to the Present*, edited by A. Roosevelt, 123–50. Tucson, AZ: University of Arizona Press.
1995 "Micro-ethnodemographic Techniques for Field Workers Studying Small Groups." In *The Comparative Analysis of Human Societies: Toward Common Standards for Data Collection and Reporting*, edited by E. F. Moran, 129–47. Boulder, CO: Lynne Rienner Publishers.
Hill, Kim, and A. Magdalena Hurtado
1996 *Ache Life History: The Ecology and Demography of a Foraging People*. New York: Aldine de Gruyter.
INEI
1994 *Perú: Resultados Difinitivos: Comundiades Indígenas (Tomo I)* vol. 3, *Censos Nacionales 1993*. Lima: Instituto Nacional de Estadistica e Informatica (Direccion Nacional de Censos y Encuestas).
Kennedy, David P., and Stephen G. Perz
2000 "Who Are Brazil's *Indígenas*? Contributions of Census Data Analysis to Anthropological Demography of Indigenous Populations." *Human Organization* 59 (3): 311–324.
Kertzer, David I., and Tom Fricke, eds.
1997 *Anthropological Demography: Towards a New Synthesis* Chicago, IL: The University of Chicago Press.
Kramer, Karen L.
1998 "Variation in Children's Work among Modern Maya Subsistence Agriculturalists." PhD diss., Department of Anthropology, The University of New Mexico, Albuquerque.
Lu, Flora E.
1999 "Changes in Subsistence Patterns and Resource Use of the Huaorani Indians in the Ecuadorian Amazon." PhD diss., Department of Ecology, University of North Carolina at Chapel Hill.
Mainbourg, E. M. T. , M. I. Araújo, and Iolene Cavalcante de Almeida
2002 "Populações indígenas da cidade de Manaus inserção na cidade e ligaçao com a cultura." Paper presented at the XIII Encontro Nacional de Estudos Populacionais

of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/GerenciaNavegacao.php (accessed February 2003).

Martins Pereira, Nilza de Oliveira, Antônio Carlos Florido, and Marcos Zurita Fernandes

2002 "População residente em terras indígenas: Características básicas censitárias 1991 e 2000." Paper presented at the XIII Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/GerenciaNavegacao.php (accessed February 2003).

Maybury-Lewis, David, ed.

2002 *The Politics of Ethnicity: Indigenous Peoples in Latin American States*. Cambridge, MA: Harvard University Press.

McSweeney, Kendra

2002 "A Demographic Profile of the Tawahka Amerindians of Honduras." *Geographical Review* 92 (3):398-414.

Newson, Linda

1986 *The Cost of Conquest: Indian Decline in Honduras Under Spanish Rule*. Dellplain Latin American Studies, No. 20. Boulder, CO: Westview Press.

OCEI

1993 *Censo indígena de Venezuela, 1992*. Caracas: República de Venezuela, Oficina Central de Estadística e Informática (OCEI).

Pagliaro, Heloisa

2002 "A recuperação demográfica dos povos indígenas do Brasil: A experiência dos Kaiabi do Paque Indígena do Xingu-Mato Grosso." Paper presented at the XIII Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/Gerencia Navegacao.php (accessed February 2003).

Penna, Túlio

1984 "Por que demografia indígena brasileira?" Paper presented at the IV Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/GerenciaNavegacao .php (accessed February 2003).

Peyser, Alexia, and Juan Chackiel

1994 "La población indígena en los censos de América Latina." In *Estudios sociodemográficos de pueblos indígenas*, edited by CELADE, 27–48. Santiago, Chile: Centro Latinoamericano de Demografía (CELADE).

Picchi, Debra

2000 *The Bakairí Indians of Brazil*. Prospect Heights, IL: Waveland Press Inc.

Piñeros-Petersen, Marion, and Magda Ruiz-Salguero

1998 "Aspectos demográficos en comunidades indígenas de tres regiones de Colombia." *Salud pública de México* 40 (4):324–329.

Population Reference Bureau

2003 *World Population Data Sheet*. Washington, DC: Population Reference Bureau.

Puertas, Benjamín , and Marita Schlesser

2001 "Assessing Community Health Among Indigenous Populations in Ecuador with a Participatory Approach: Implications for Health Reform." *Journal of Community Health* 26 (2): 133–147.

Redford, K. H., and Steven E. Sanderson

2000 "Extracting Humans from Nature." *Conservation Biology* 14 (5):1362–1364.

Reed, Richard

2002 "New Rules for the Game: Paraguayan Indigenous Groups and the Transition to Democracy." In *The Politics of Ethnicity: Indigenous Peoples in Latin American States*, edited by D. Maybury-Lewis, 309–328. Cambridge, MA: Harvard University Press

Roosevelt, Anna

1994 "Amazonian Anthropology: Strategy for a New Synthesis." In *Amazonian Indians*, edited by A. Roosevelt, 1–29. Tucson, AZ: University of Arizona Press.

Rubenstein, Steven

2001 "Colonialism, the Shuar Federation, and the Ecuadorian State." *Environment and Planning D: Society and Space* 19: 263–93.

Sainz de la Maza Kaufmann, Marta
1997 "Contraception in Three Chibcha Communities and the Concept of Natural Fertility." *Current Anthropology* 38 (4): 681–687.
Salazar, Elizabeth Solano
2001 La población indígena en Costa Rica según el censo 2000. Instituto Nacional de Estadística y Censos. http://www.ccp.ucr.ac.cr/noticias/simposio/pdf/solano.pdf (accessed July 20, 2003).
Salzano, Francisco M., and Sidia M. Callegari-Jacques
1988 *South American Indians: A Case Study in Evolution, (Research Monographs on Human Population Biology, No. 6).* Oxford: Clarendon Press.
Schwartzman, Stephan, Daniel Nepstad, and Adriana Moreira
2000 "Arguing Tropical Forest Conservation: People Versus Parks." *Conservation Biology* 14 (5):1370–1374.
Shoemaker, Nancy
1999 *American Indian Population Recovery in the Twentieth Century.* Albuquerque, NM: University of New Mexico Press.
Stonich, Susan C., ed.
2001 *Endangered Peoples of Latin America: Struggles to Survive and Thrive.* Westport, CT: Greenwood Publishing Group.
Terborgh, Anne, James E. Rosen, Roberto Santiso Gálvez, Willy Terceros, Jane T. Bertrand, and Sheana E. Bull
1995 "Family Planning Among Indigenous Populations in Latin America." *International Family Planning Perspectives* 21 (4): 143–166.
Thornton, Russell
1987 *American Indian Holocaust and Survival: A Population History Since 1492.* Norman, OK: University of Oklahoma Press.
Thornton, Russell, Tim Miller, and Jonathan Warren
1991 "American Indian Population Recovery Following Smallpox Epidemics." *American Anthropologist* 93 (1):28–45.
Urrea Giraldo, Fernando
1994 "Pobladores urbanos redescubiertos: Presencia indígena en cuidades colombianas." In *Estudios sociodemográficos de pueblos indígenas*, edited by CELADE, 365–390. Santiago, Chile: Centro Latinoamericano de Demografía (CELADE).
Van Cott, Donna Lee, ed.
1994 *Indigenous Peoples and Democracy in Latin America.* New York: St. Martin's Press.
Vidal, Lux
1982 "Demografia dos grupos étnicos minoritários: Índios." Paper presented at the III Encontro Nacional de Estudos Populacionais of the Associação Brasileira de Estudos Populacionais (ABEP). http://www.abep.org.br/usuario/GerenciaNavegacao.php (accessed February 2003).
Warren, Jonathan W.
2001 *Racial Revolutions: Antiracism and Indian Resurgence in Brazil.* Durham, NC: Duke University Press.
Warren, Kay B., and Jean E. Jackson, eds.
2002 *Indigenous Movements, Self-Representation, and the State in Latin America.* Austin, TX: University of Texas Press.
Wearne, Phillip
1996 *Return of the Indian: Conquest and Revival in the Americas.* Philadelphia, PA: Temple University Press.
Wood, James W.
1994 *Dynamics of Human Reproduction: Biology, Biometry, and Demography.* New York, NY: Aldine de Gruyter.