5   Colombia

Microdata Samples for Four National Censuses: 1964, 1973, 1985 and 1993

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Introduction

The ethnic and ecological diversity of Colombia makes it an exceedingly interesting laboratory for studying compelling demographic issues of contemporary Latin America and beyond (Flórez Nieto, 2000). In terms of population size the third largest country in the region, Colombia is fortunate in constructing and preserving large census microdata samples for each of the four national censuses taken since 1964. In terms of scholarship, as measured by number of citations in *Population Index*, Colombia ranks fourth in Latin America, behind Mexico, Brazil and Peru in a cluster with Argentina, Costa Rica and Cuba.

There is widespread agreement that on the whole Colombian censuses are of good quality, approaching the highest standards in Latin America, such as those of Argentina, Costa Rica, and Chile. Colombia is one of the few countries in Latin America where both pre- and post-enumeration surveys are regularly carried out. Beginning with the census of 1964, the Colombian statistical agency Departamento Administrativo Nacional de Estadística (DANE) has conducted post-enumeration surveys—and published the results.

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Under-enumeration rates for Colombian censuses fall in a range of 2-12% (Potter and Ordoñez, 1976; DANE, 1990; Flórez, 2000). Political violence in Colombia has adversely affected enumeration coverage and quality for much of the twentieth century, but it must be noted that this problem has always been limited almost wholly to peripheral regions, affecting a tiny fraction of the Colombian population.

DANE publications demonstrate much technical sophistication and great concern with census quality, interpretation and inference. The DANE archives are impressive in terms of their organization, accessibility, and completeness. For example, a query in the computerized catalogue of the central DANE archive for documentation pertaining to the census of 1973 yields 298 reports totaling more than 5,000 pages.

Used in combination, the four census microdata sets presently available from DANE span a quarter century of cataclysmic social and economic change and comprise our most important resource for the study of the evolution of Colombian society.

A Minnesota Population Center project currently underway to integrate Colombian census microdata into a single series (Col-IPUMS) will provide compatible individual-level data for a large stratified sample of the Colombian population in five census years spanning four decades.[1] The series will constitute a resource of great utility for the study of long-term social change in Colombia, and a model for other Latin American countries. Even should the Minnesota paradigm for integrating census microdata not catch on elsewhere, the Colombian databank will still be of great value for understanding the dramatic transformations occurring in Latin America at the end of the twentieth century. The Colombian census microdata integration project may assist a people determined to reconstruct a country troubled by guerrilla warfare, banditry, drug smuggling and the erosion of human rights. Fear of violence has isolated Colombia from the international scholarly community almost as effectively as a political blockade. The Col-IPUMS project may help circumvent

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the problem by providing high quality census microdata over the internet.

Source Material

Machine-readable census microdata survive for Colombian censuses taken in 1964, 1973, 1985, and 1993. Over time the collection has improved in terms of the density and quality of the samples as well as in the sophistication of the questions asked and in the technical merit of data processing.

The 1964 dataset consists of a two percent sample of individuals. The census of that year was tabulated by hand, but a sample of exactly every 50th person was drawn to permit more detailed anaylsis of specialized topics. A copy of this sample was provided to the Centro Latinoamericano de Demografía (CELADE) in Santiago as well as research institutions in Colombia. In the late-1970s, as the result of the flooding of the DANE data processing center, DANE's original machine-readable copy of the sample was lost. All surviving samples for 1964 derive from the CELADE copy, as far as I have been able to determine.

The 1973 census was processed entirely by computer. DANE's virgin data-tape for this census was lost in the infamous flood of the late-1970s, but not before tabulations were completed, a five-percent sample of households was drawn (and given to CELADE), and, most importantly, a complete copy of the original microdata was deposited with the Centro de Estudios sobre Desarrollo Económico (CEDE) of the Universidad de los Andes in Bogotá. All currently extant copies of sample microdata for this census derive from the CELADE copy. The Col-IPUMS project proposes to develop a new, higher-density sample from the Universidad de los Andes tape. In the meantime, the five percent sample drawn in the 1970s continues to be available from DANE.

The 1985 census used long and short enumeration forms. Both were digitized and still survive. The long forms, approximately ten percent of all private dwellings, constitutes the sample currently held by CELADE and available from DANE. Gossip has it that this sample should be tested for robustness, because the sample was drawn, that is the decision

on   the use of the long form, was made in the field at the initiative of the enumerator. The Col-IPUMS project proposes to test the robustness of the sample using both long- and short-form microdata.

The   1993   census   microdata,   with   considerable documentation, are available for purchase on CDROM, along with many other products derived from this census. The CD contains a 100% "sample" of the Colombian population in that year.

Electronic Formats

All Colombian census microdata samples are available as ASCII text files from DANE. Compressed, the entire lot of 35,000,000 cases will fit on a single CD.

Variable Availability

In 1993, the Colombian statistical agency conducted the sixteenth national census of population and fifth of housing. Since 1964 there has been a remarkable constancy in many of the concepts used in enumerating the Colombian population and in the   information   collected   (Table   5—1).   While   *de facto* enumeration was the norm through 1973, in 1985 a *de jure* system was   adopted.   The geographic location of the enumerated population is usually specified by a series of six variables, from major   administrative   division   (departments)   to   minor   and various   types   of   geographical   classification.   Housing information is collected on a wide variety of topics, from building materials of walls and floors to the availability of electricity, water supply, sewage and garbage services—for a total of approximately one dozen dwelling characteristics. Information on the population typically includes almost two dozen questions: four of a personal nature (age, sex, marital status and relationship to the head householder), three on employment, four on education, seven on migration, and six on fertility and mortality.   Recent censuses have sought to collect

information on disabilities. Ethnicity is also becoming an area of interest since 1993.

Confidentiality Provisions

All requests for census microdata must be approved by the Departamento Administrativo Nacional de Estadística and a confidentiality agreement must be signed.

Data Access

The Colombian census microdata and corresponding codebooks are available from the Colombian Statistical Agency, DANE, upon petition. Once the Col-IPUMS integration project is completed, Colombian microdata will be distributed electronically, similar to procedures currently deployed by the Minnesota Population Center to distribute United States census microdata.

Publications Using these Data

Colombian census microdata have been rarely used as the source for publications. From a search of *Population Index*, only three publications were found which use Colombian census microdata: Schultz's study of migration (1988), Olinto Rueda's study of rural population dynamics (1989), and Ordoñez's study of rural population and the family (1986).

Research Possibilities

Nonetheless, once integrated into a single database, it is expected that there will be a substantial increase in the use of Colombian census microdata. The following paragraphs suggest some of the most obvious topics of investigation.

Women in the Workforce

The place of women in the workforce is currently one of the most controversial subjects in the study of Latin American women and gender issues more broadly. Some critics would deny any validity at all to Latin American censuses regarding

Table 5—1. Summary of Availability of Data for the Columbian Censuses, 1964-200n*

	1964	1973	1985	1993	200n*
Enumeration: *de facto*	X	X	de jure	de jure	de jure
Sample size	349,563	777,753	2,644,275	32,020,610	
Sampling fraction	2%	4%	10%**	100%	
Geographic Information					
Department	X	X	X	X	X
Municipality	X	X	X	X	X
Locality	X	X	X	X	X
Rural area	X	X	X	X	X
Urban area	X	X	X	X	X
Class of settlement	.	X	X	X	X
Housing Characteristics					
Occupied	X	X	X	X	X
Number of households	X	X	X	X	X
Number of persons	.	X	X	X	X
Number of rooms	X	X	X	X	X
Type of Housing	X	X	X	X	X
Owner/Tenant	.	X	X	X	X
Toilet facilities	X	X	X	X	X
Shared	X	X	X	X	X

Table 5—1. Summary of Availability of Data for the Columbian Censuses, 1964-200n* (Continued)

	1964	1973	1985	1993	200n*
Housing Characteristics (Continued)					
Kitchen	X	X	X	X	X
Cooking Fuel	.	X	X	X	X
Water Supply	X	X	X	X	X
Electricity	X	X	X	X	X
Telephone	.	.	.	X	X
Wall materials	X	X	X	X	X
Floor materials	X	X	X	X	X
Garbage collection	.	X	.	X	X
Personal Characteristics					
Relationship to head	X	X	X	X	X
Sex	X	X	X	X	X
Age	X	X	X	X	X
Marital Status	X	X	X	X	X
Economic Status, Employment, Ethnicity					
Disabilities		X	X	.	X
Ethnicity				X	X
Occupation	X	X	X	X	
Economically Active	X	X	X	X	X

Table 5—1.   Summary of Availability of Data for the Columbian Censuses, 1964-200n* (Continued)

	1964	1973	1985	1993	200n*
Education					
Literacy	X	X	X	X	X
School Attendance	.	X	X	X	X
Level of Education	X	X	X	X	X
Years of Schooling	X	X	X	X	X
Migration					
Birthplace	X	X	X	X	X
Department of Birth	X	X	X	X	X
Municipality of Birth	X	X	X	X	X
Country of Birth	.	X	X	X	X
Year of Arrival	.	.	X	.	X
Residence					
Department of	X	X	X	X	X
Municipality of	X	X	X	X	X
Country of Residence	X	X	X	X	X
Residence 5 years before***					
Department	.	.	X	.	X
Municipality	.	.	X	.	X
Country	.	.	X	.	X

Table 5–1.   Summary of Availability of Data for the Columbian Censuses, 1964-200n* (Continued)

	1964	1973	1985	1993	200n*
Fertility/Mortality					
Children Ever Born	.	X	X	X	X
" by sex	.	.	X	X	X
Children Currently Alive	.	X	X	X	X
" by sex	.	.	X	X	X
Children Abroad	.	.	X	X	.
" by sex	.	.	X	X	.
Last Birth Alive	.	.	X	X	X
Month and Year	.	X	X	X	X

* Provisional, pending final approval of enumeration form and date for the 2000-round national census.

** The 1985 enumeration used long and short forms for 9.4 and 90.6% of the population, respectively. Both sets are available to the project.

***In 1964 and 1973, this question refers to duration of residence.

women's labor. They argue that questions on work were designed with males in mind, based on an advanced economy model where jobs were stable, hours standardized, tasks routinized, and work calendars unvarying (Wainerman and Recchini de Lattes 1981; Gomez 1981; León 1985; Aguilar 1985; Bustos and Palacios 1994; Safa 1994). While such criticisms are justified to some extent, solutions to many of these objections may be found in the multiple questions on work presently available in microdata census samples, not only in the case of the United States (Sobek 1997), but also for many Latin American countries, including Colombia (McCaa 1998).

My analysis of the Colombian census microdata for 1973 and 1985 based on an ad hoc "integration" reveals a twenty percentage-point increase in formal labor force participation for women in only twelve years. The pattern is particularly striking for married women, for whom one factor alone—higher levels of education—accounts for over half the increase (results derived from a rough integration of a small set of key variables for two censuses with no regional or geographical detail). Comparing these results with IPUMS-derived data for the United States from 1880 to 1990 shows that by 1985 Colombian married women had attained participation patterns by age that closely paralleled those for married women in the United States in 1970. In both cases some 40% of married women aged twenty-five through forty worked in the formal labor force.

In the United States, over the three decades from 1940 to 1970, a great transformation occurred in the rate of married women in the workforce. In Colombia, only twelve years were required for a similar change to occur. Even more surprising in the Colombian case is that after education the second most important factor for explaining change for married women was not declining fertility, poverty (using an index based on public services available to the household), or even spouse's position in the workforce, but rather the husband's own educational attainments. A logistic regression model of these variables reveals that the greater a husband's education, the more likely that wife worked in the formal labor force—even after taking into account her own level of schooling (McCaa 1998).

Microdata on formal labor force participation according to classic definitions offer valuable insights on women's entry into

capitalist wage-labor markets. Then too, microdata analysis permits the researcher to take into account the entire household economy, such as the presence and work situation of a spouse, children, or other individuals, whether related or not. The integrated public use samples for Colombia will enhance the original data by constructing composite household indicators of labor force participation. The hierarchical organization of the proposed census series, with individuals identified within household contexts, is well suited to the study of the household economy.

The determinants of female labor force participation and child labor are particularly compelling issues in Colombia, yet their study through time and across space is impossible with aggregate data. Integrated public use microdata series allow researchers to take control of the data, to move beyond the frustrations of changing technical definitions to focus on substantive issues of model development and hypothesis testing. Microdata are particularly salient where intellectual orientation and ideology ride roughshod over empirical evidence.

Demography of Violence

The Colombian death rate from violence—at some 80 per 100,000 population in the 1980s—ranks as one of the highest in the world for a country not at war (Pecaut 1997). One of the goals of the Colombian census integration project is to standardize place-codes at the district level so that the demographic effects of violence may be studied at local as well as regional levels. While sampling error will be too great to study individual localities, with a uniform coding scheme it will be possible to develop appropriate aggregates. Integrated census microdata can be used to measure the effects of violence on types of communities, families, households, and individuals through time (Murillo-Castaño 1991; Ruíz and Rincón 1996). The Colombian statistical bureau (DANE) is integrating geographic codes in the Colombian census microdata to ensure consistency in the coding of small places.

The integrated database includes variables on orphanhood, widowhood, and child mortality. The 1993 census was designed to measure a wide range of physical disabilities.

Since that year, the Colombian census question on employment includes a special response for the disabled and a decision has already been made to retain this option for the 2000-round enumeration. The widely repeated allegation that one-in-forty Colombians is a refugee may be tested with census microdata at both the national and local levels, but sustained research on this subject awaits resolution of inconsistent geographical codes for minor civil divisions—one of the principal aims of the Col-IPUMS integration project.

Emigration and Immigration

In terms of international population movements, Colombia is primarily a country of emigration, with the United States constituting the principal destination country. Since 1985, Colombian censuses request information on mother's number of children resident abroad. Questions on retrospective migration also tap into movements to and from the United States. Coupling these data with the IPUMS-USA databank will make it possible to compare Colombians resident in the United States with those resident in Colombia. The hierarchical structure of both datasets facilitates the study of individuals in their family and household contexts, so that it will be possible, for example, to study the correlates of unmarried Colombian fathers or mothers, whether they reside in the United States or Colombia.

Fertility

From the early 1960s to 1997, the Colombian total fertility rate declined from an average of 6.8 children to 3.0. This astonishingly rapid transition has elicited a great deal of scholarly attention (Puyana 1985; Flórez Nieto 1996), so much so that one might conclude that little work remains to be done—but this would be wrong. The Colombian PUMS, once suitably integrated, will permit the study of differential fertility patterns during a period of great fertility decline, and the relative impact of occupational class, region, education, size of locality, family structure, and a host of other variables at the individual, family or community level. The richness of these data will greatly enhance our ability to analyze the determinants of fertility decline in a developing country, and this may in turn lend

insight into fertility control in late-developing regions. For women of child-bearing ages, Colombian censuses from 1973 consistently report children ever-born, children currently alive, and the last born child's date of birth and survival status. In addition, the integrated microdata series will incorporate a set of fully compatible links between mothers and their children, and this will eliminate the most onerous aspect of one of the most widely used methods of fertility research, the own-child method.

Life Course Analysis

Changes in the timing of major life-course transitions—such as leaving school, leaving home, starting work, marrying, and establishing a separate household—have been studied in Colombia using retrospective survey data (Flórez Nieto 1989; Flórez Nieto and Hogan 1990; Flórez Nieto, Echeverri Perico, and Bonilla Castro 1990). While these studies have yielded valuable insights on the dramatic changes taking place in Colombia, our understanding of these processes would be vastly enriched by the analysis of all Colombian regions. Gutierrez de Pineda's path-breaking study of the Colombian family with her four typologies of the Andean, Black, Santanderan, and Antioqueñan cultural forms has never been put to the empirical test of nation-wide probability samples (Gutierrez de Pineda 1968). The integrated microdata series will provide the opportunity to test her models through a cohort analysis of the timing of change and differences by regions and among sub-populations, such as migrants and non-migrants, more educated or less, and the like.

Aging and Population Projection

Demand for more sophisticated population projections increases as populations age (Banguero and Castellar 1993). A new multi-dimensional method for projecting populations and households requires input data that are readily derived from integrated public use samples (Vaupel, Yi and Zhenglian 1997). The Colombian PUMS will be designed to provide the necessary data for this new multi-dimensional projection method.

Expert Users

Prof. Carmen Elisa Florez is one of Colombia's most distinguished demographers and a most active researcher in the use of Colombian census microdata. In addition to consulting on the census of 1985 and working in various technical capacities at DANE, she has published a large number of both analytical and technical studies using Colombian microdata. Prof. Susan De Vos is one of the most accomplished researchers in the United States in the use of Latin American census microdata. She has years of experience struggling with incompatible census definitions, including the Colombian microdata.

Dirk Jaspers Faijer has almost twenty years experience at CELADE, having risen through the ranks from "associate expert" (San Jose, Costa Rica) to "chief of division for training on population" (Santiago, Chile). Lately, he has been responsible for the development of CELADE's REDATAM initiative, a personal computer software package for emergency needs and local administrators to analyze large volumes of census microdata very quickly and display the results as tables, graphs or maps. The CELADE census microdata library, which includes the Colombian census microdata, is under his direct supervision.

Data Expansion

The Col-IPUMS project proposes to model the Colombian census microdata samples on the Integrated Public Use Microdata Series (IPUMS) created at the University of Minnesota (Ruggles and Menard 1995). To the extent feasible coding schemes will be made entirely compatible with emerging international standards (United Nations 1998, 1998). The Colombian samples, once integrated into a single databank with uniform codes and documentation and released into the public domain, will constitute a rich source of quantitative information on long-term. The integrated Colombian PUMS and its thoroughly integrated documentation will be distributed over the Internet using the system developed at the University of Minnesota for United States census samples (http://www.ipums.org).

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