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Cuban and Uruguayan Life Expectancy. Decomposing the differences Between and Within countries.

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Short Abstract

Cuba and Uruguay are two of the most advanced Latin American countries in the Demographic Transition, standing out among the countries with the highest life expectancies in the region (77.9 and 75.7 for both sexes respectively in 2006).

However, both countries have behaved differently in regard of this indicator´s trend. While the Uruguayan females have caught up the Cuban females´ survival, Cuban males have steadily shown an advantage in respect of Uruguayan males, who are still far from them. Which are the causes of death that explain the similarities observed among Cuban and Uruguayan females and the disparities between Cuban and Uruguayan males?

Using age-specific causes of death we will explain the evolution of life expectancy at birth (1987 to 2008) within and between countries by sex through the decomposition of the differences in life expectancy (Shkolnikov et al 2001). Vital Statistics data provided by the National Statistic Offices and the Public Health Ministries of both countries are used.

Extended abstract

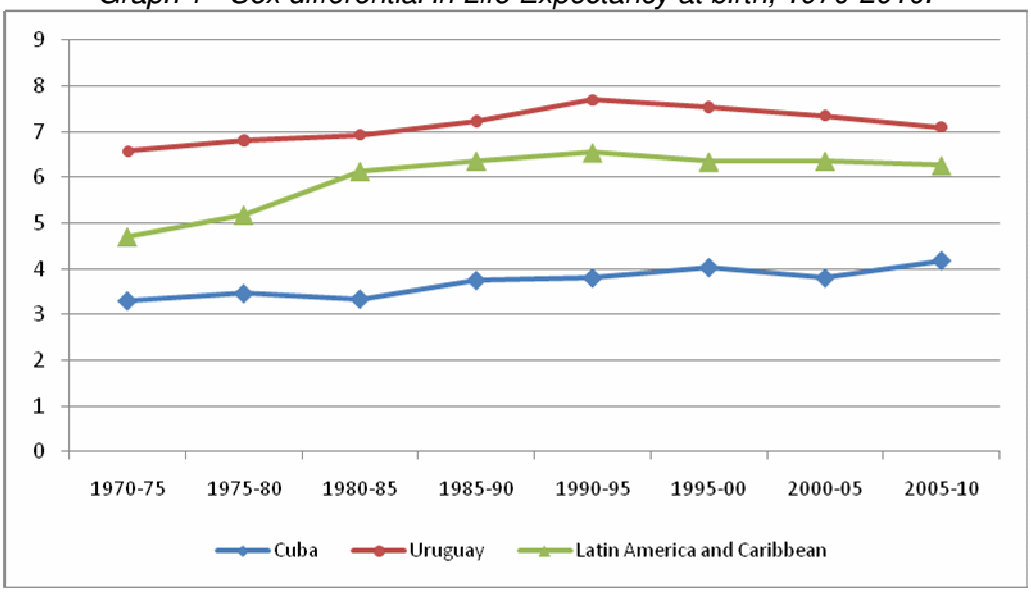
Introduction

Cuba and Uruguay are two of the countries considered to be at the most advanced stages of Demographic Transition in Latin America and the Caribbean (Chackiel 2004). Cuban female life expectancy was 80.02 years old in 2006[1] and male's life expectancy was 76.00 years old (ONE 2009). Uruguayan life expectancy was 79.52 years old for females and 72.12 for males, on the same year (INE 2010). However, both countries have reached these figures coming from very different backgrounds.

[1] This value corresponds to the last three years life table available (2005-2007).

An important difference between both countries is observed in their life expectancy´s sex differential. While the Latin American sex gap in life expectancy at birth has increased since 1970, the Cuban sex gap has been kept at very low levels -around 3 to 4 years-. In contrast, the Uruguayan sex gap´s trend has always been very high around 7 and 8 years, closer to the values observed in developed countries (Graph 1).

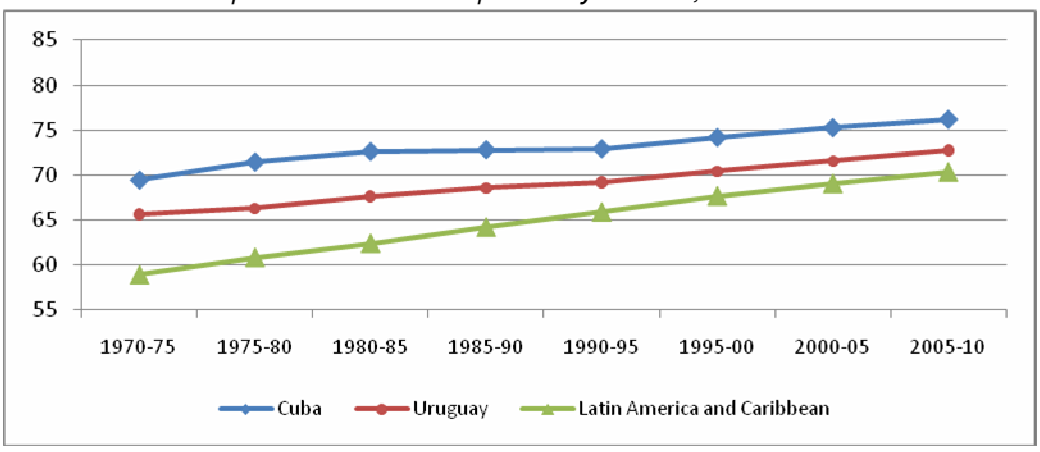
Graph 1 - Sex differential in Life Expectancy at birth, 1970-2010.



Source: Estimations from United Nations Population Division - ECLAC 2009.

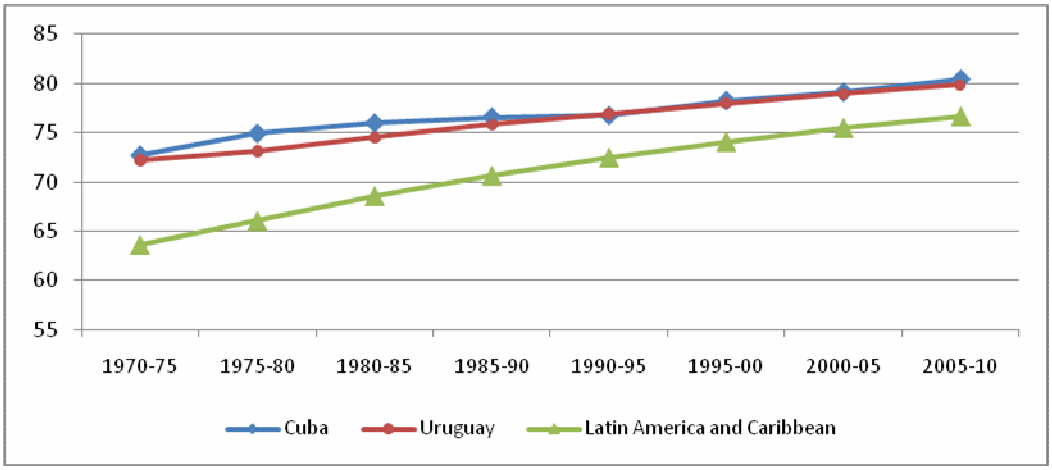
Males have shown over the period an increase in life expectancy, with Cuban males having four years ahead of their counterparts from Uruguay (Graph 2). The Cuban females, who first used to be in a better position than the Uruguayan females, recently lost their advantage over the Uruguayans, or in other words Uruguayan females caught them up (Graph 3).

Graph 2 - Males life expectancy at birth, 1970-2010.



Source: Estimations from United Nations Population Division - ECLAC 2009.

Graph 3 - Females life expectancy at birth, 1970-2010.



Source: Estimations from United Nations Population Division - ECLAC 2009.

Uruguayan females narrowed the differences with Cuban female life expectancy due to their steady increase along the period, except for the period 1990-1995, where the reduction of both countries gap is mainly explained by the stagnation observed in this indicator for Cuba.

Objectives

We aim to decompose de differences observed in the following issues:

1 – **Sex differential** for each country for two selected periods, named 1987 and 2008.

CUBA

a) $e^{Cuba}_{females}(1987) - e^{Cuba}_{males}(1987)$

b) $e^{Cuba}_{females}(2008) - e^{Cuba}_{males}(2008)$

URUGUAY

a) $e^{Uruguay}_{females}(1987) - e^{Uruguay}_{males}(1987)$

b) b) $e^{Uruguay}_{females}(2008) - e^{Uruguay}_{males}(2008)$

2 – **Time differential** for each sex in each of the selected countries.

CUBA

a) $e^{Cuba}_{females}(2008) - e^{Cuba}_{females}(1987)$

b) $e^{Cuba}_{males}(2008) - e^{Cuba}_{males}(1987)$

URUGUAY

a) $e^{Uruguay}_{females}(2008) - e^{Uruguay}_{females}(1987)$

b) $e^{Uruguay}_{males}(2008) - e^{Uruguay}_{males}(1987)$

DIFFERENCES WITHIN COUNTRIES

3 – **Countries differential** for each sex in each of the selected periods.

FEMALES

a) $e^{Cuba}_{females}(1987) - e^{Uruguay}_{females}(1987)$

b) $e^{Cuba}_{females}(2008) - e^{Uruguay}_{females}(2008)$

MALES

a) $e^{Cuba}_{males}(1987) - e^{Uruguay}_{males}(1987)$

b) $e^{Cuba}_{males}(2008) - e^{Uruguay}_{males}(2008)$

} DIFFERENCES BETWEEN COUNTRIES

Data

We will use Cuban life tables from the National Statistic Office and Uruguayan Life tables from the Population Program from the Faculty of Social Sciences estimated for 1985 to 2006. In addition, age and cause of death-specific mortality rates for the same period, provided by the Public Health Ministries of both countries, will be used to decompose the effect of age and causes of death in the differences in life expectancy at birth.

Methods

We will apply the decomposition method (Shkolnikov, Begun and Andreev 2001) to determine the role of age and cause specific-death rates over the differences observed in different values of life expectancy.

The differences of two life expectancies by age are first described by:

$$e^2_x - e^1_x = \sum_{y=x}^{W} {}_n\varepsilon_y$$

where ε is the contribution to the overall difference between the life expectancies (population 2-population 1) produced by the difference in mortality in the age group *y* and *y+n.*

ε is obtain from:

$${}_n\varepsilon_y = \frac{1}{2l^1_x}\left[l^1_y\left(e^1_y - e^2_y\right) - l^1_{y+n}\left(e^1_{y+n} - e^2_{y+n}\right)\right] - \frac{1}{2l^2_x}\left[l^2_y\left(e^2_y - e^1_y\right) - l^2_{y+n}\left(e^2_{y+n} - e^1_{y+n}\right)\right]$$

where *x* is the initial age group; *y* are exact age; *n* length of the age interval; *W* the last age and *l* are the survivors at each age.

Then cause-specific mortality rates (j) are also decomposed and multiplied by $({}_n\varepsilon_y)$:

$${}_n\varepsilon_{y,j} = \frac{{}_nM^1_{y,j} - {}_nM^2_{y,j}}{{}_nM^1_y - {}_nM^2_y} \times {}_n\varepsilon_y$$

Where ${}_nM_{y,j}$ is the central death rates in the population (1 or 2) for the age group *y, y+n* and the cause of death *j*; and ${}_nM_y$ are the central death rates for the total causes of death.

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