

Demographic transition in Latin America

Héctor Pérez-Brignoli
Universidad de Costa Rica

1. The demographic transition is a long period of structural changes between two stages of "demographic equilibrium". Both, pre- and post transitional phases have an almost null population growth and an age structure with a dependency ratio close to 0.6. A combination of high fertility and mortality rates lead during the pre-transitional phase to a growth rate close to zero while in the post-transitional phase a similar rate is reached through a combination of low fertility and mortality rates. The proportion of people in the 15-64 age group is quite similar in both phases but the composition of the dependency ratio numerator radically changes. In the pre-transitional phase the 0-14 age group is much larger than the 65+ age group while in the post-transitional phase the weight of both groups is similar and close to 20%. The process of demographic transition is the great transformation leading from one phase to the other. A rapid increase of the population based in deep changes and interactions between mortality and fertility is the distinctive mark of the whole process. In terms of the historical record of human societies this big transformation is absolutely new. The current explanation model doesn't include migrations in spite the fact that the European demographic transition included a strong process of overseas emigration. Moreover, the explanation of mortality changes refer to improvements in nutrition, public health, hygienic practices and medicine. Fertility change depends on a deep modification in individual and group behavior and values that lead to control the number of actual and desired births. All these societal changes had been summarized under the notion of "modernization". This is handy but compromise any serious explanation of a very complex and deep transformation both at the macro and micro level. Global and historical visions of the modern world have included demographic transition as an aspect of the industrial revolution and the urbanization process; however, the specific connection between the modern economic growth and the demographic variables still requires a rigorous consideration. In the Latin American case it is symptomatic that recent and important reference works like the *Cambridge Economic History of Latin America* (2006) or the praised Bulmer-Thomas synthesis (*The Economic History of Latin America since Independence*, Cambridge University Press, 1994) only include some very general indications about the population growth in the 19th and 20th centuries; the interest in population aspects is limited to the calculation of economic indicators per-capita. The integration of demographic transition in global historical visions of the world in the 19th and 20th centuries is still an open and important task.

2. Our data base includes annual demographic series for the following countries: Costa Rica (1750-2000), México (1895-2000), Chile (1850-2000), Cuba (1900-2000), Guatemala (1880-2000), Argentina (1870-2000), Uruguay (1895-2000) and Venezuela (1885-2000), and the population size after 1800 for Argentina, Brasil, México, Chile, Colombia, Venezuela, Uruguay, Cuba, Costa Rica, Guatemala and El Salvador. Sufficient data for Perú, Bolivia, Ecuador, Paraguay, República Dominicana, Haití,

Honduras and Nicaragua are not available but our country sample is representative enough of the whole region. The most important data we lack are vital statistics for Brasil before 1950. In spite of these limitations we attempt to offer a general view of the Latin American demographic transition during the 19th and 20th centuries. After 2000 and closing in 2050, we also present demographics indicators from the most recent demographic projections made by CELADE. This complement is important in order to complete the observation of the demographic transition in the long term.

3. Let start with the growth of total population and the evolution of the annual growth rate (graphs 1, 2 and 2). The first graph shows the trends for the whole region since 1800. The annual growth rates are a better illustration than the population sizes: the increase was slow but steady all along the 19th century, strongly accelerated between 1920 and 1960 and declined after in a regular way. The projections after 2000 are based this linear decline and show that by 2050 the Latin America population will probably stabilize close to a figure of 800 millions of inhabitants. We can see these general trends with more nuances and better data at the country level in graphs 2 and 3. Most interesting here is the bell shape of the growth rates curve and the observation of two moments, the summit, expressing the time of maximum growth, and the fall toward zero. Argentina reached the summit circa 1900, Cuba in the 1920's and Uruguay in the second half of the 19th century. The three are good examples of early summits which means early demographic transitions. In the other cases (México, Costa Rica, Chile, Colombia, Venezuela, Guatemala y El Salvador) the peak came in the 1950's and 1960's. A zero growth rate is only visible in Cuba and Uruguay at the beginning of the 21st century; in all other countries that will probably appear after 2050. Something to note, beyond these trends, is the absolute level of the rates. Most of the cases start with annual rates over 1% and at the summit reach 3%. Foreign immigration into Cuba, Argentina and Uruguay help to explain these earlier summits as well as the level of the rates. On the other hand, later summits, in the 1950's and 1960's are the pure product of natural increase. Some cases show strong oscillations in the population growth during the 19th century. In Cuba these fluctuations were related to the ups and downs of the sugar economy, the slave trade (the abolition was enacted in 1886) and the wars (1868-78, 1895-98). The fall of the Mexican population growth to zero between 1910 and 1921 was related to the death toll and the demographic impact of the Revolution.

4. The availability of long demographic series for Argentina, Cuba, Costa Rica, Chile, México, Uruguay, Venezuela, El Salvador y Guatemala, gave us the opportunity to obtain estimations of the mortality, fertility and age structure before 1950 using the Inverse Projection elaborated by Ronald D. Lee. After 1950, the indicators were completed with official data and CELADE estimations. The output data are showed in graphs 4, 5, 6 and 7. A discussion follows.

5. The expected behavior of the total fertility rate clearly appears in the 200 years long series of Costa Rica: oscillating rates between 5 and 7 but around a constant average until the 1960's, then a sharp decline toward an average of 2 by the first years of the 21st century. This general pattern appears in all the other cases but we note some important national differentiations. In Argentina, Cuba and Uruguay, the fertility peak shows at the

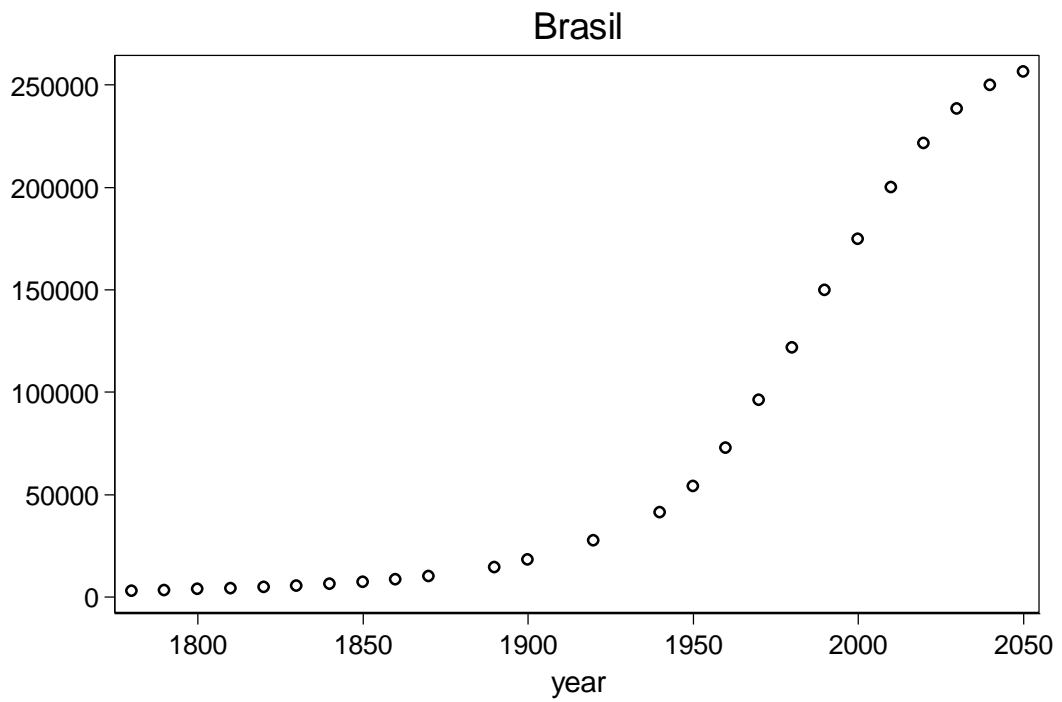
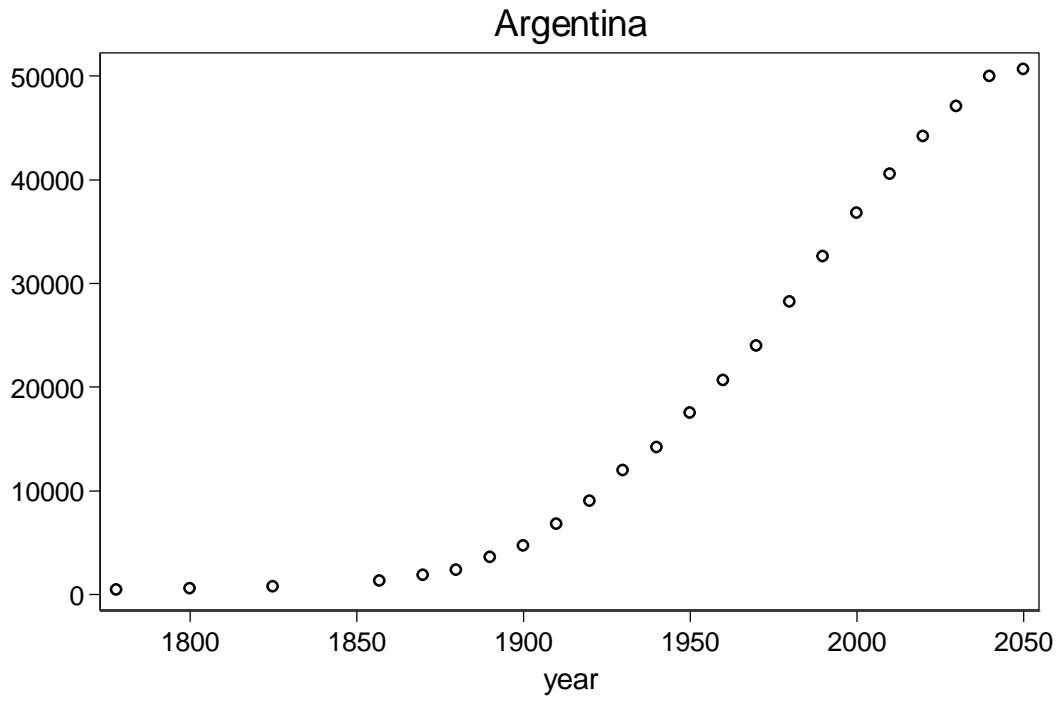
end of the 19th and the beginning of the 20th centuries, followed by a gradual decline in "steps" during the 20th century. The Cuban case calls again for a special attention due to the sharp decline in the total fertility rate; by 1982 it already was under the level of replacement. Guatemala shows an opposite picture because fertility decline is only visible in the projected data; around 2000 the total fertility rate had still a high level of 4.6.

6. The evolution of the life expectancy at birth (both sexes) is presented in graph 5. Again, the Costa Rican case, and in a certain way the Chilean case, show the entire trajectory. During the 19th century the life expectancy oscillates around an average value of 37 years; since 1900 it regularly increases -the oscillations gradually disappears- reaching the threshold of 60 years in the 1950's; at the beginning of the 21st century the life expectancy approaches 80 years. Similar patterns can be observed in Chile, Venezuela and Mexico excluding the period of the Mexican revolution. In the 1910's the life expectancy in Mexico drops to less than 20 years due to the combined death toll of the war and the Spanish flu. In Argentina, Cuba and Uruguay the threshold of 60 years was reached before the 1950's, which reflects, in comparative terms, an early mortality decline. On the other hand, Guatemala and El Salvador show an opposite picture because the 60 years line was only achieved in the 1980's.

7. The combined evolution of mortality and fertility can be studied using the Ansley J. Coale's diagrams of the "demographic space of growth". This is presented in graph 6. Only Argentina and Uruguay show similarities with the European demographic transition, that is, a gradual decline in fertility and mortality along the growth rates range of 0, 1 and 2%. All other cases expand over the ranges of growth of 2, 3 and 3.5%, while fertility decline is clearly belated. A gradual mortality decline and flamboyant fertility during at least 40 years (between 1940 and 1980) seems to be one the specific features of Latin American demographic transition.

8. The evolution of the age structure of population is presented in graph 7. During the transition the population ages, the active people (15-64) relatively increase while the proportion of young people (0-15) declines; on the other hand, the proportion of old people (65+) grows. A key point is the intersection between the proportions of 0-15 and 65+; when this point is achieved can be said that the post-transitional phase has arrived. In Latin America only Cuba has actually experienced this situation, all the others will probably arrive to that point around 2050. On the other hand, Guatemala and perhaps other countries not included in the sample like Honduras, are far away from that intersection. The fall of the dependency ratio that follows the fertility decline opens a window of opportunity for investments in human capital but, as it is show in the graphics, the trend will reverse in the course to the post-transitional phase.

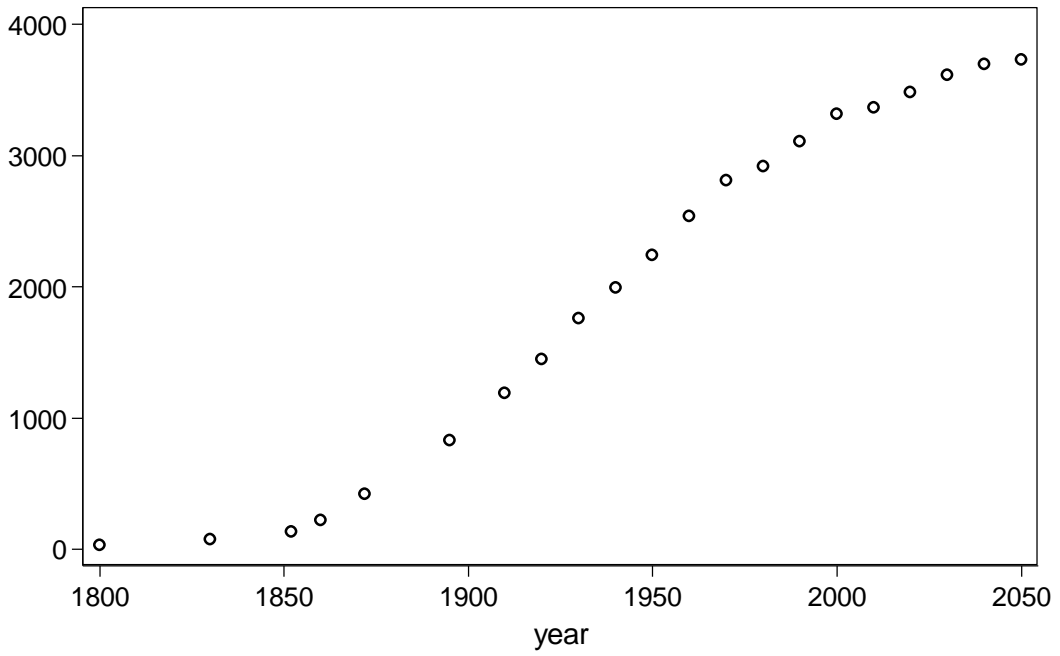
Graph 1: Population Size, 1800-2050



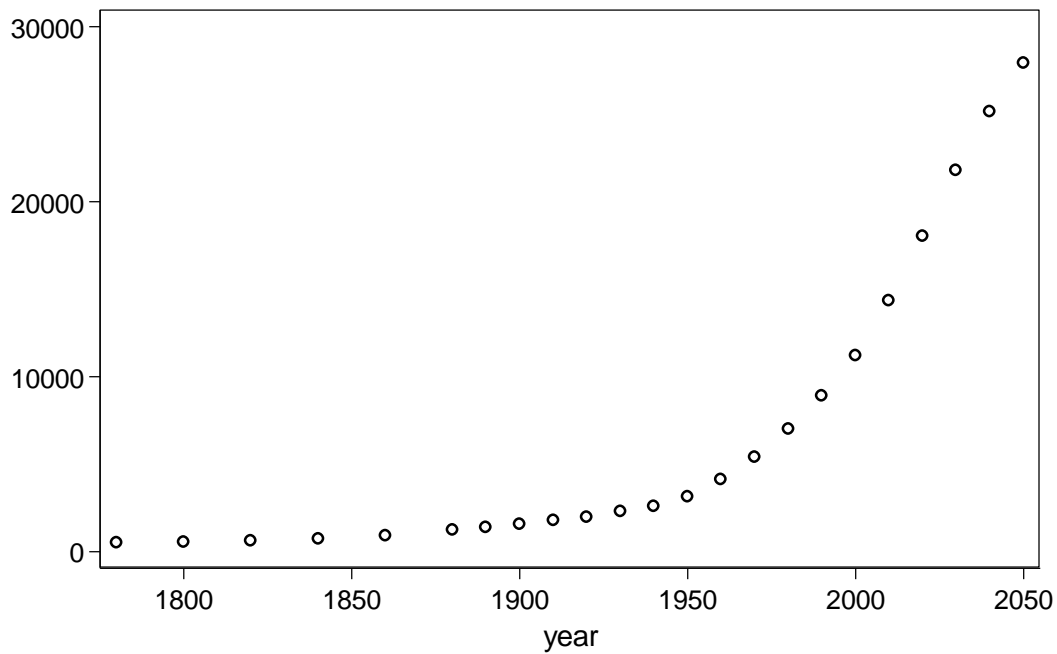
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Uruguay

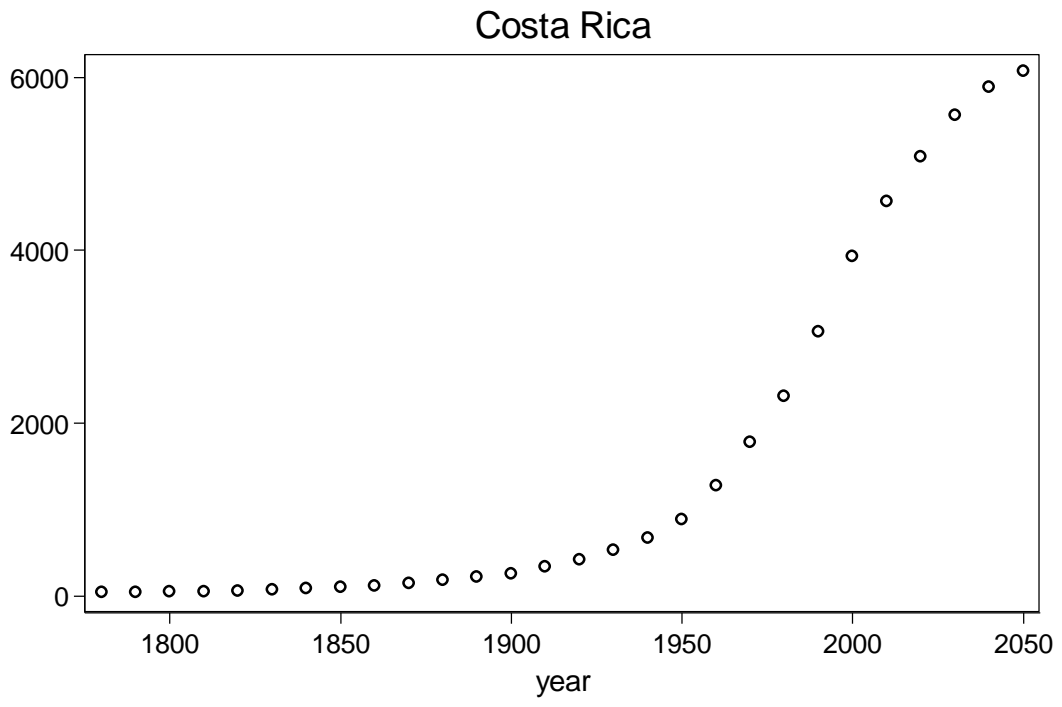
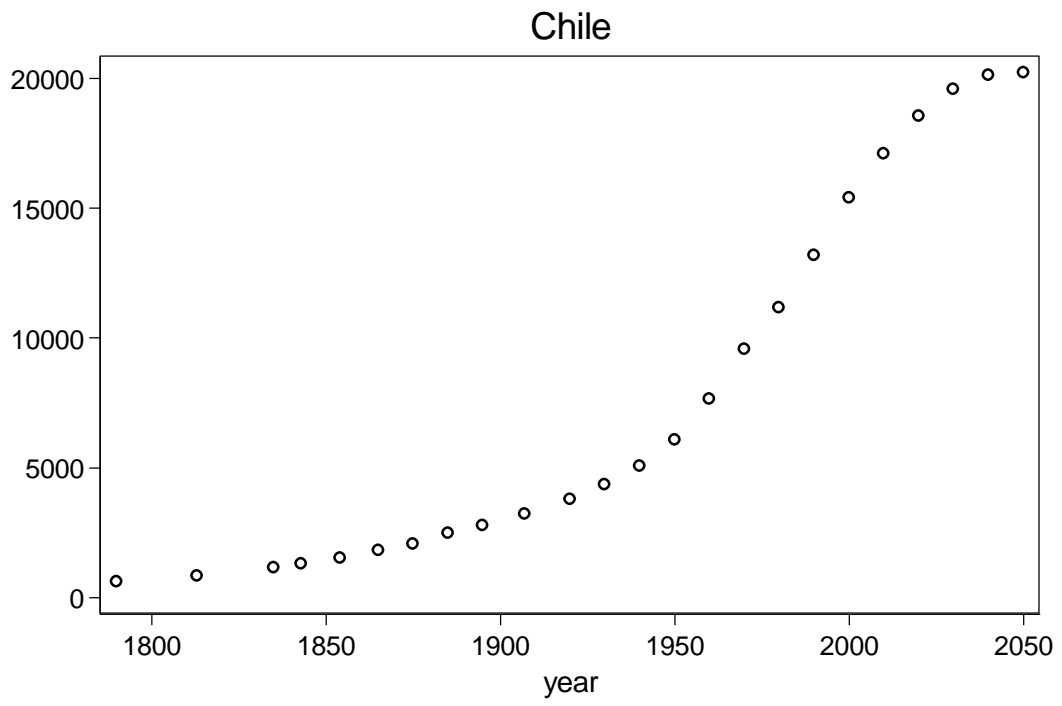


Guatemala



México

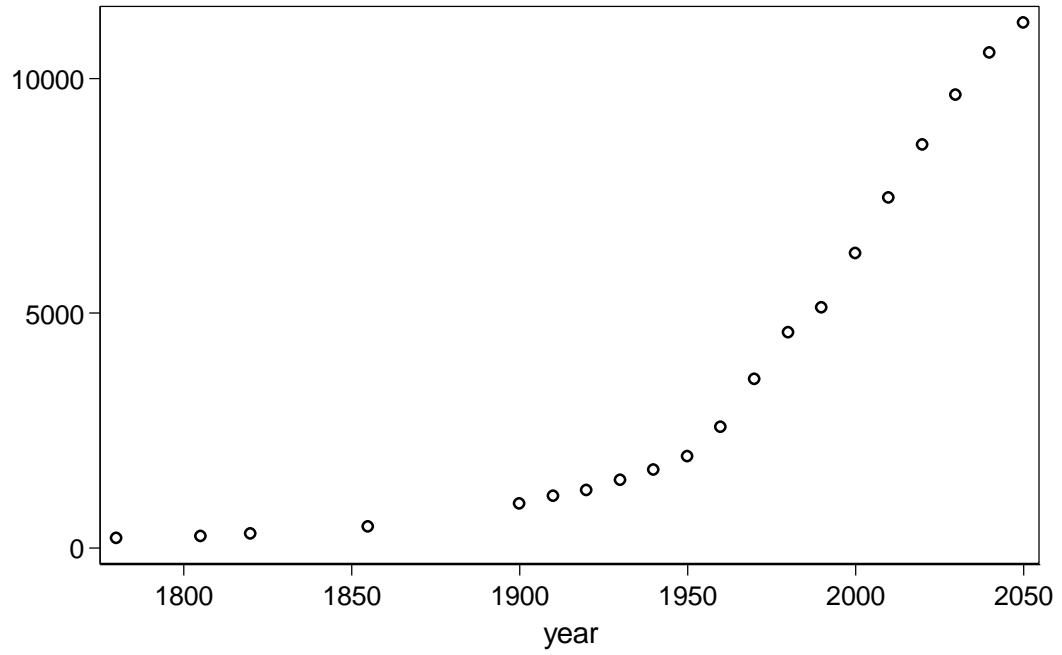




Colombia



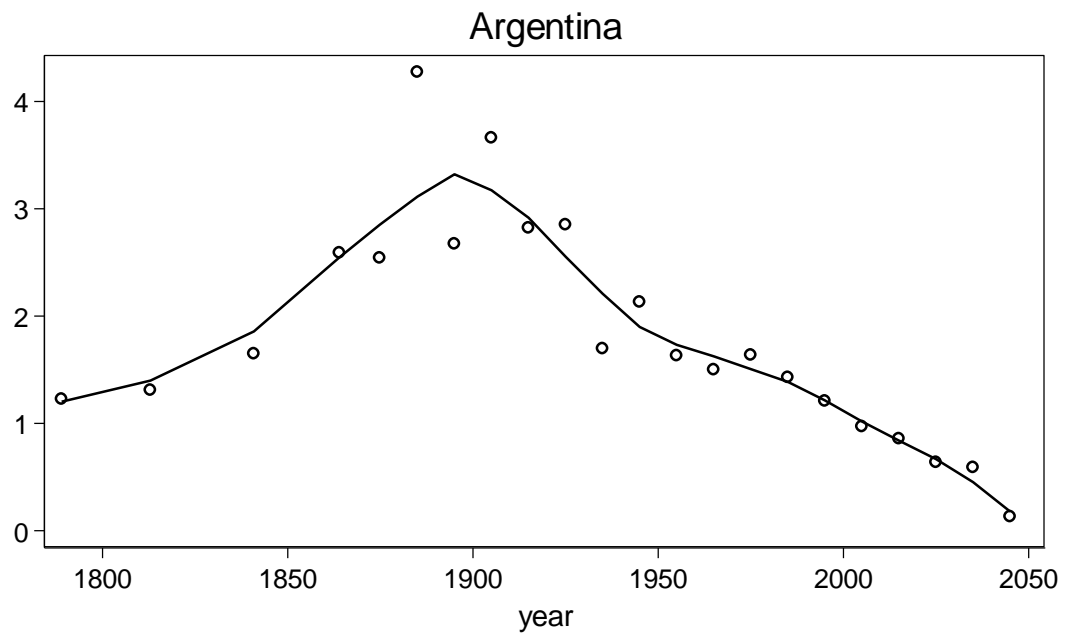
El Salvador



Venezuela

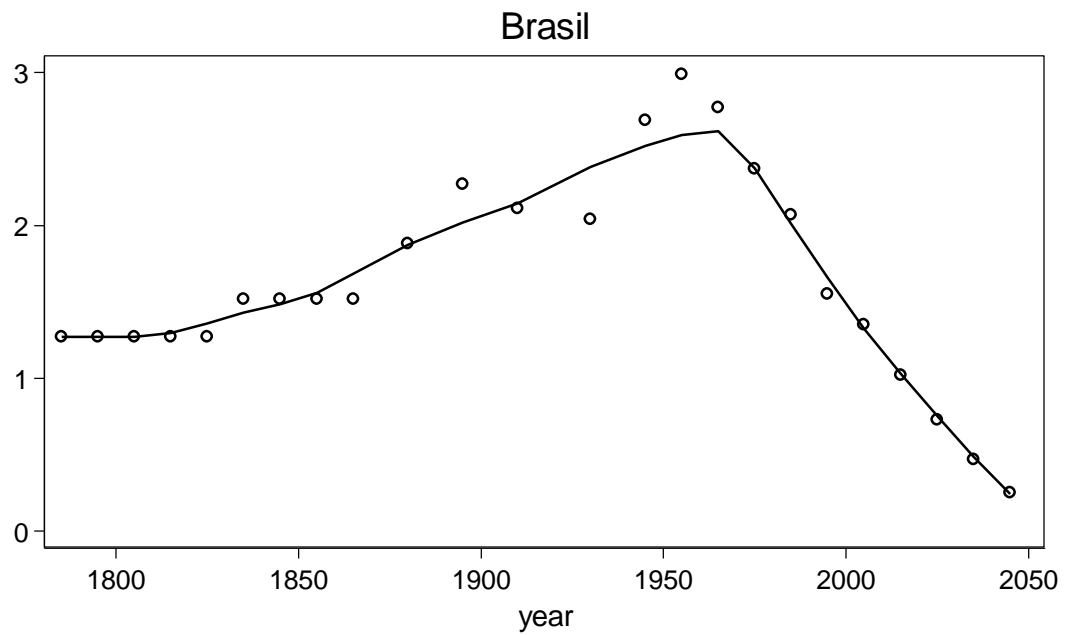


Graph 2: Annual rates of population growth, 1800-2050



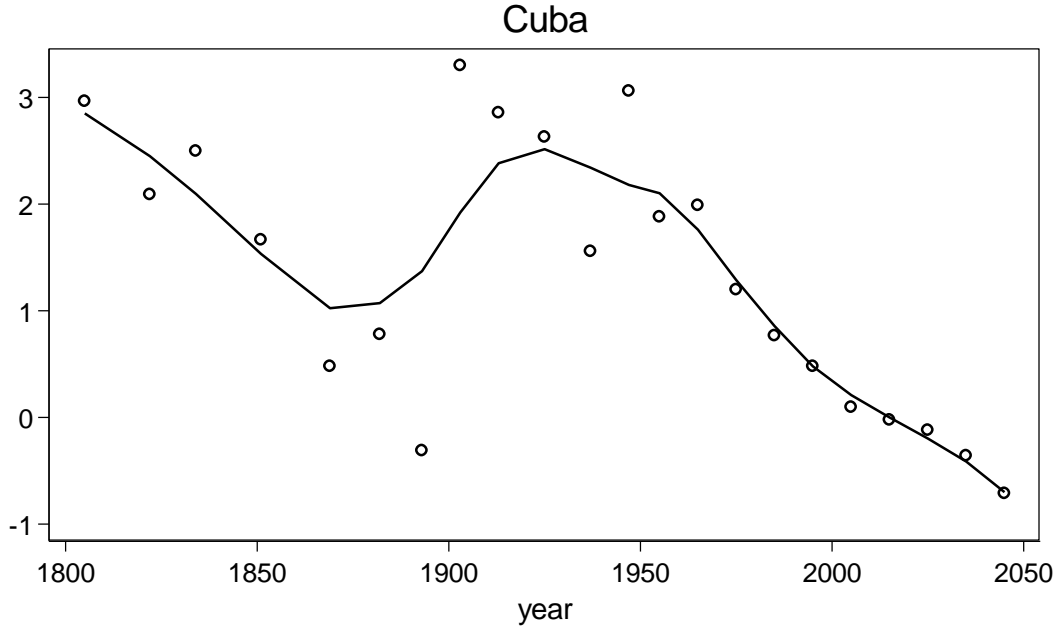
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Trend (Locally weighted regression) and observed rates

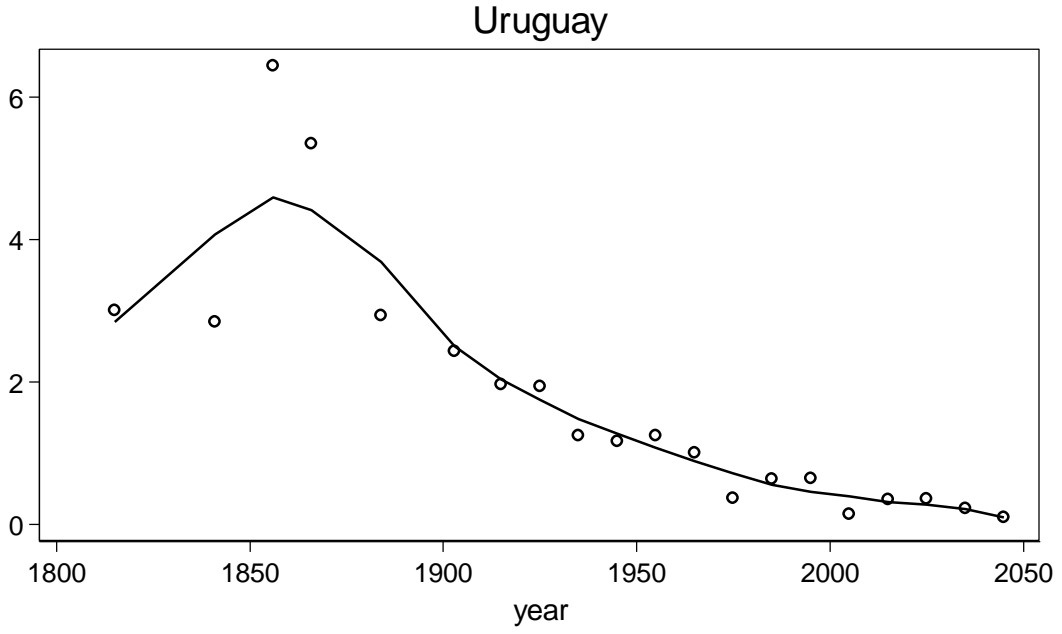


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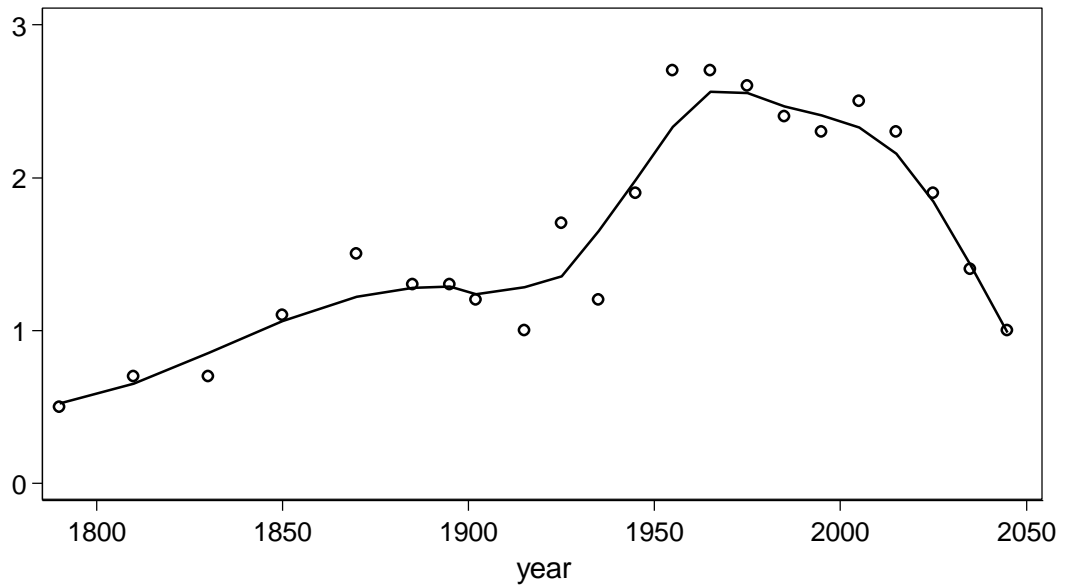


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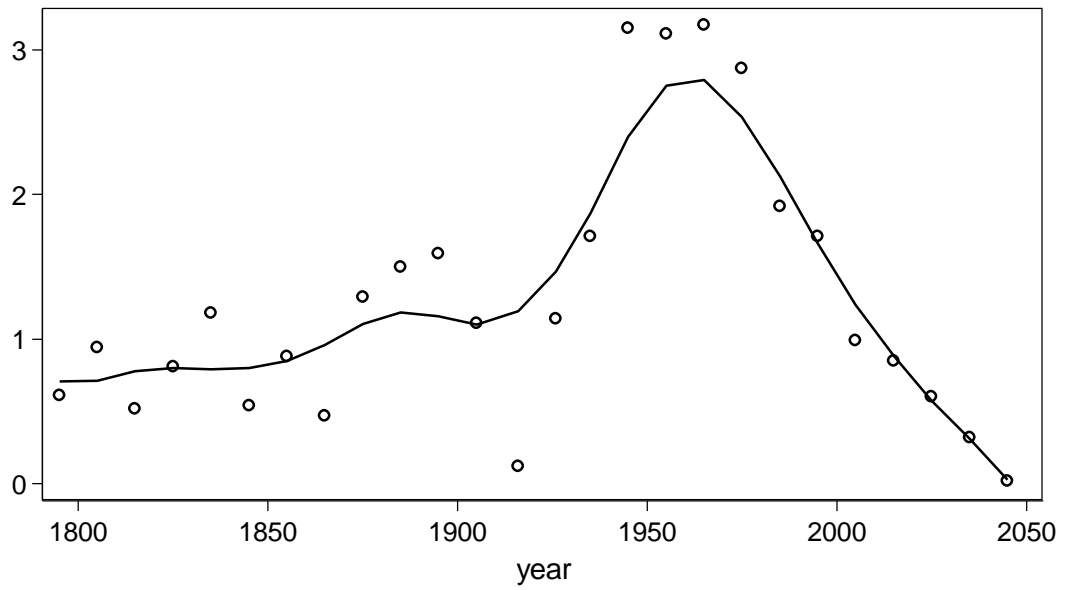
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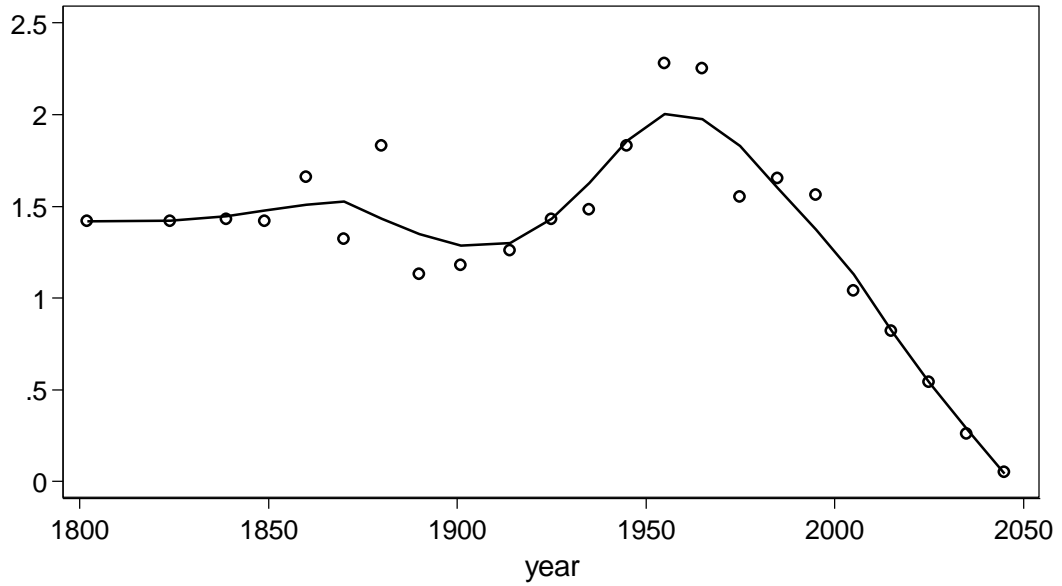
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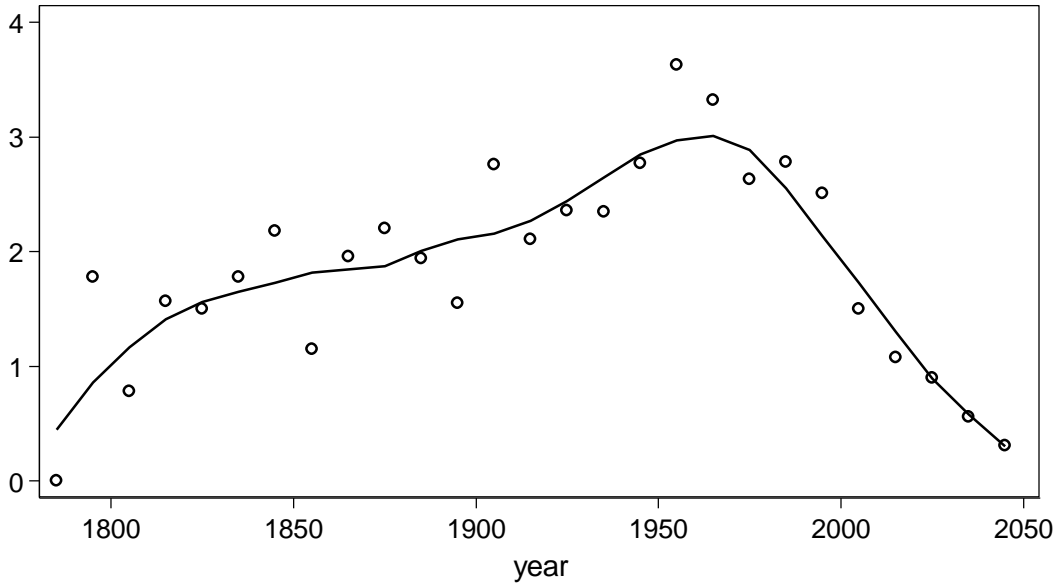
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Chile



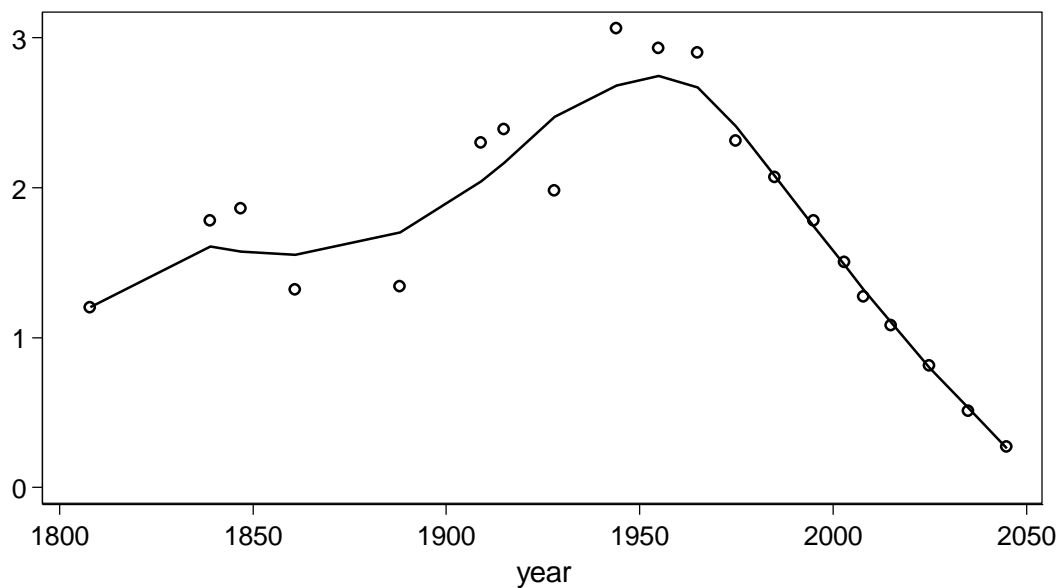
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Trend (Locally weighted regression) and observed rates

Costa Rica



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Trend (Locally weighted regression) and observed rates

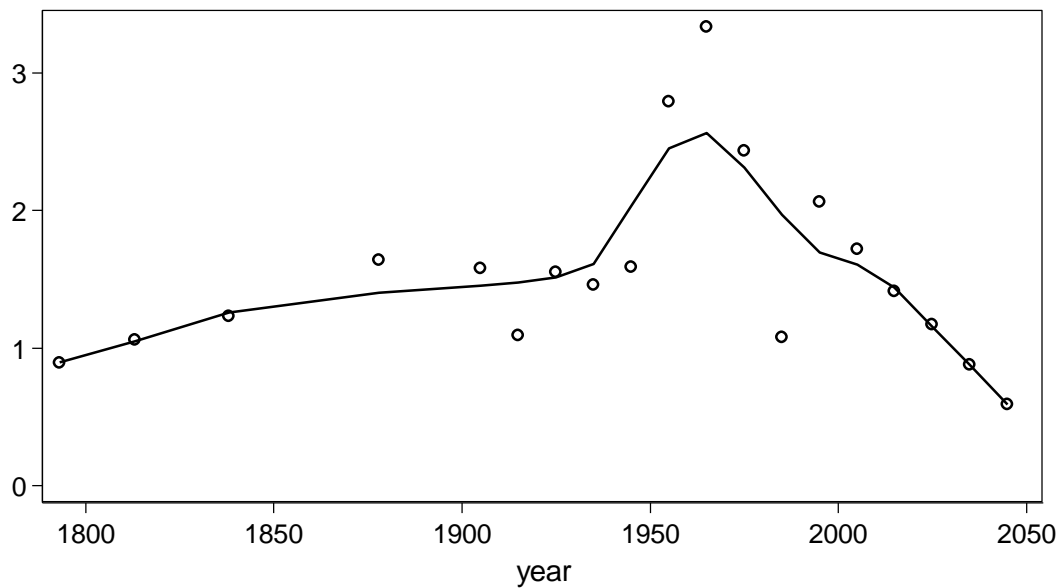
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Trend (Locally weighted regression) and observed rates

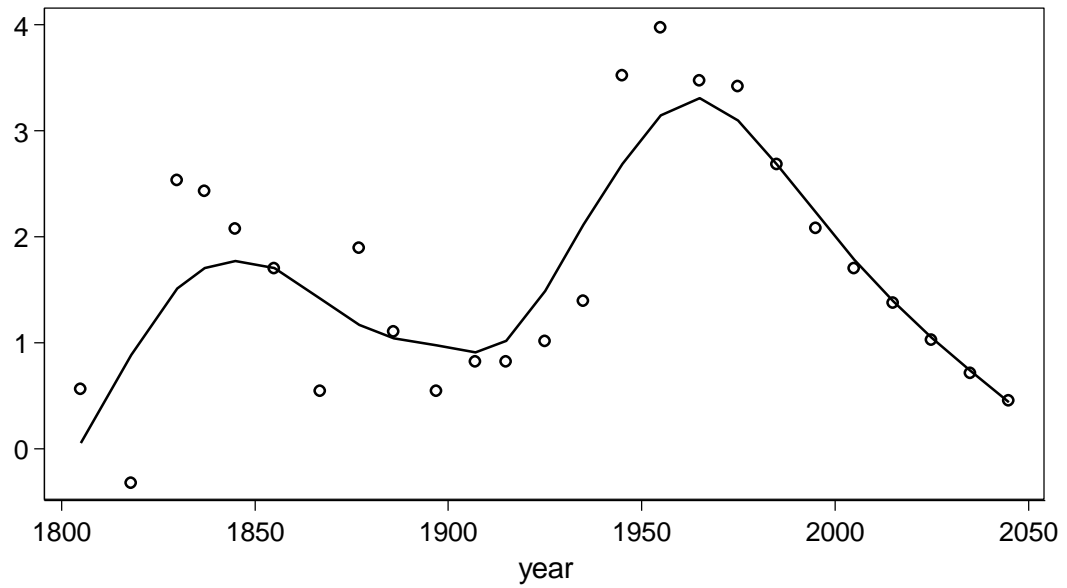
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Trend (Locally weighted regression) and observed rates

Venezuela

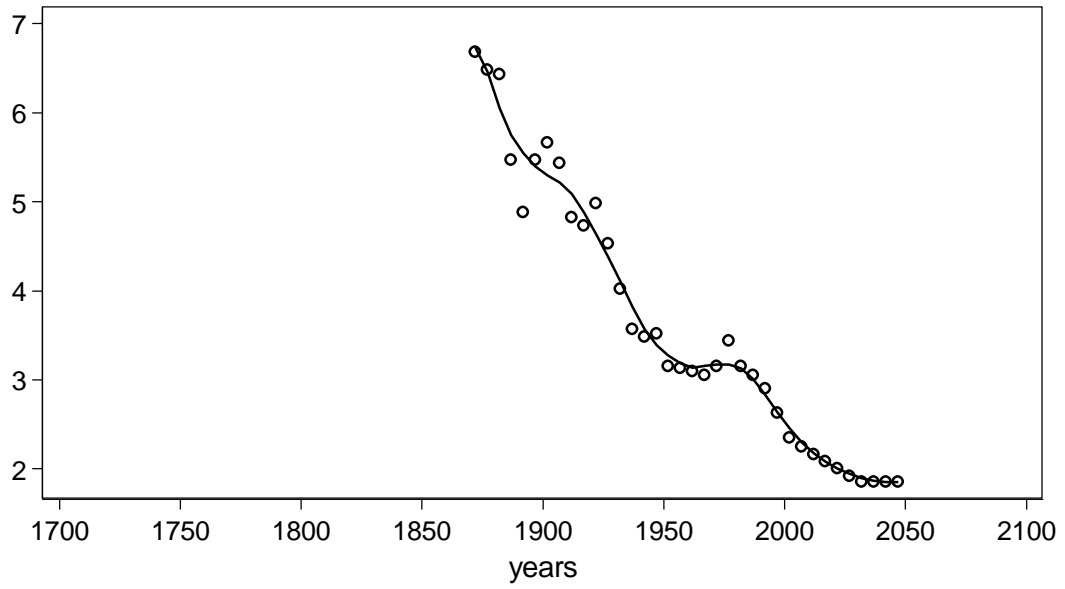


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Trend (Locally weighted regression) and observed rates

Graph 4: Total fertility rates

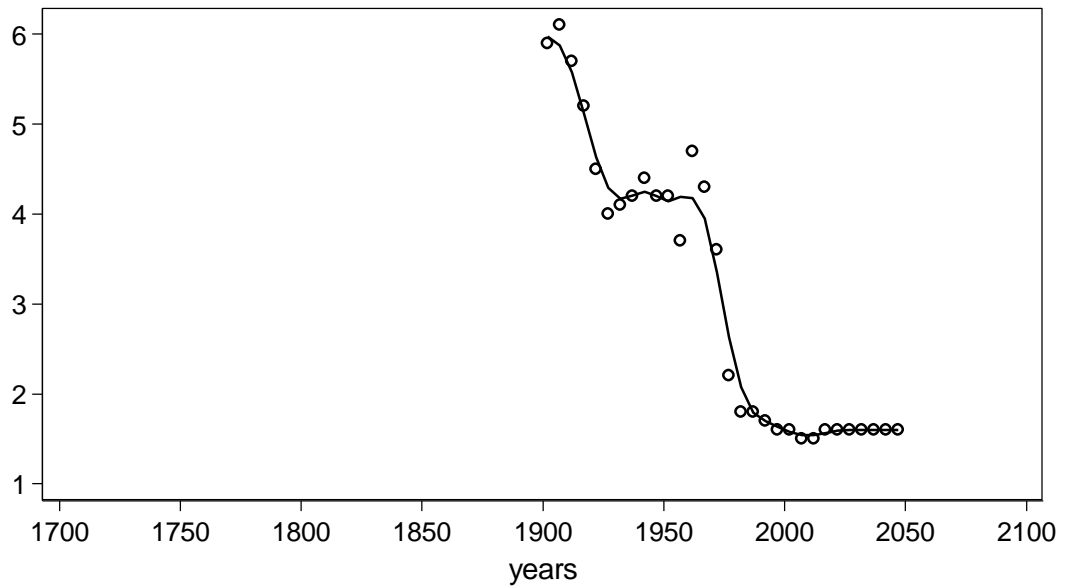
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Trend (Locally weighted regression) and observed rates

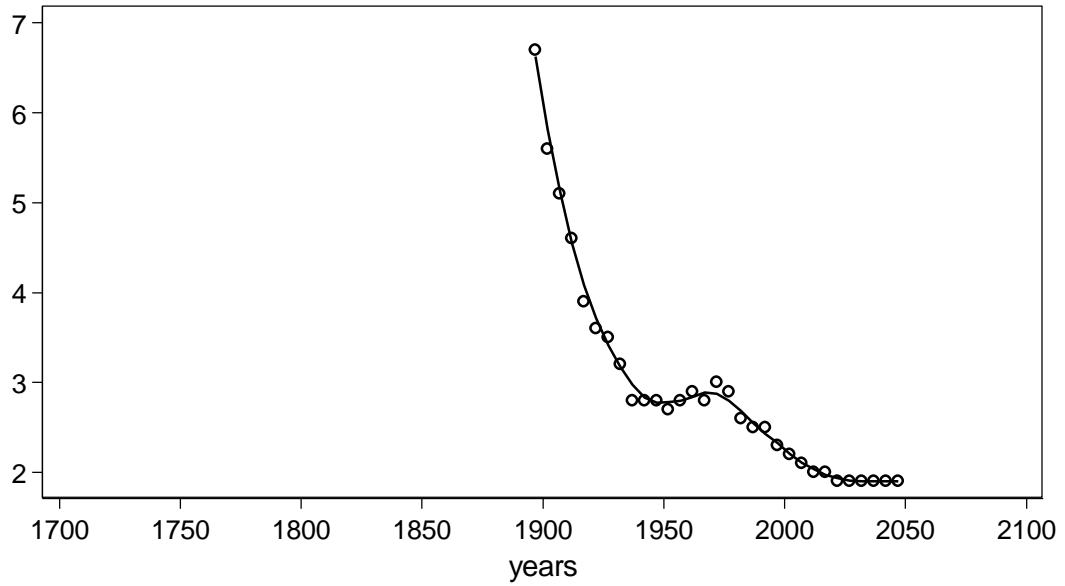
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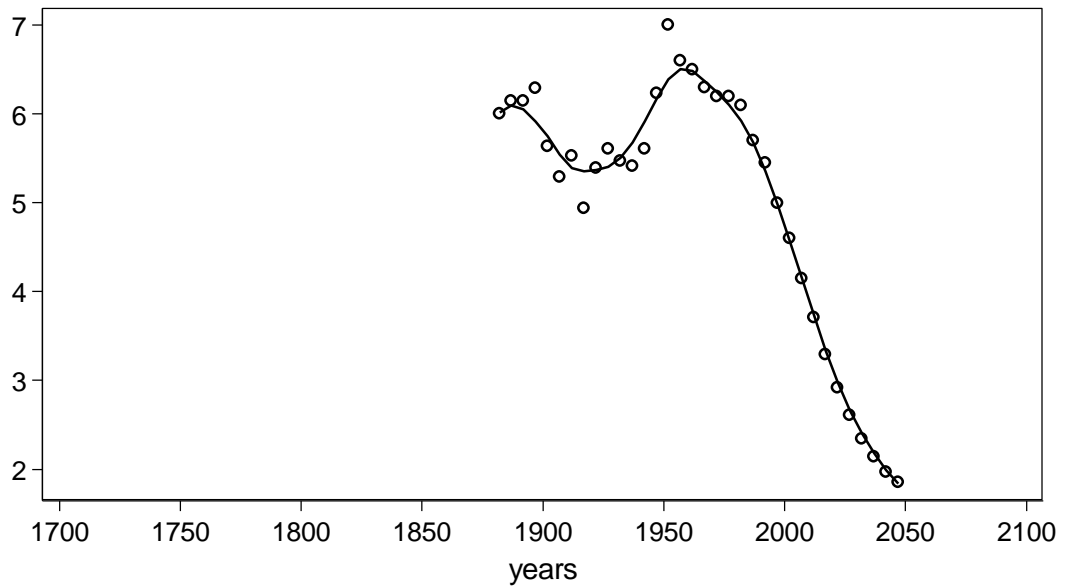
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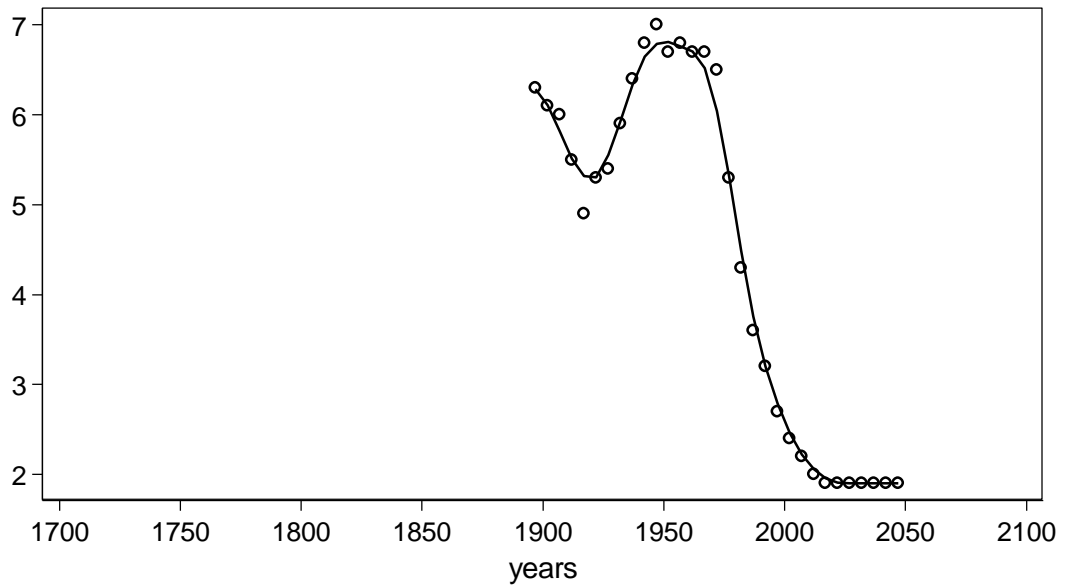
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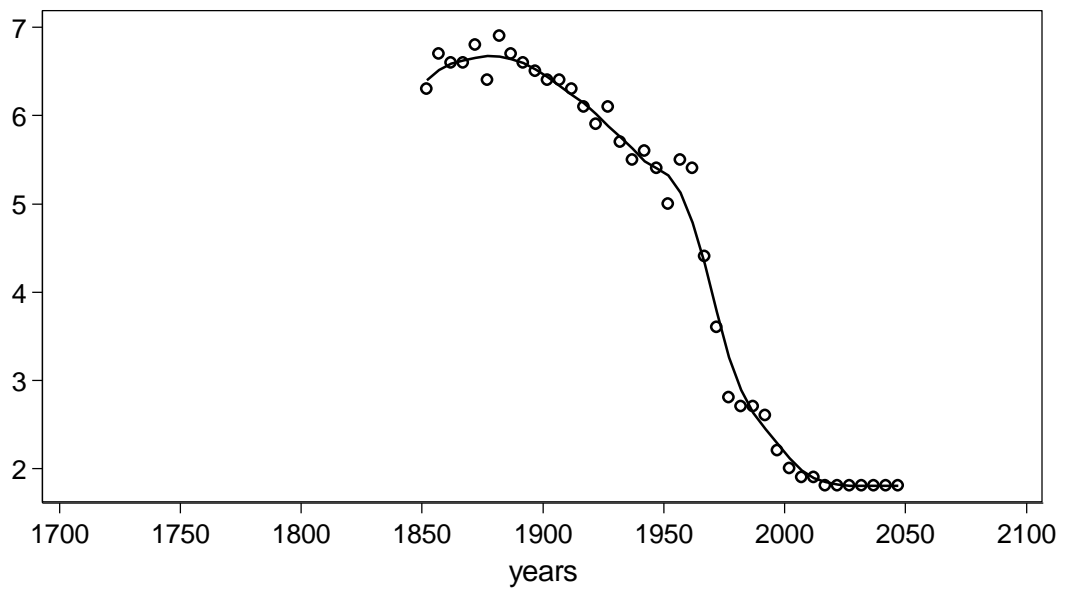
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Trend (Locally weighted regression) and observed rates

Chile



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Trend (Locally weighted regression) and observed rates

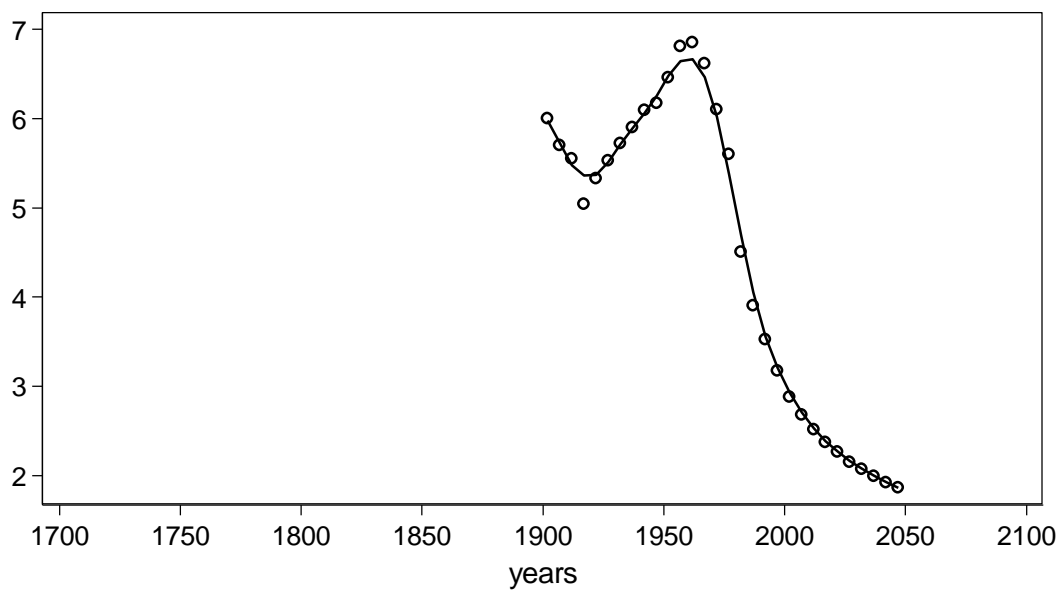
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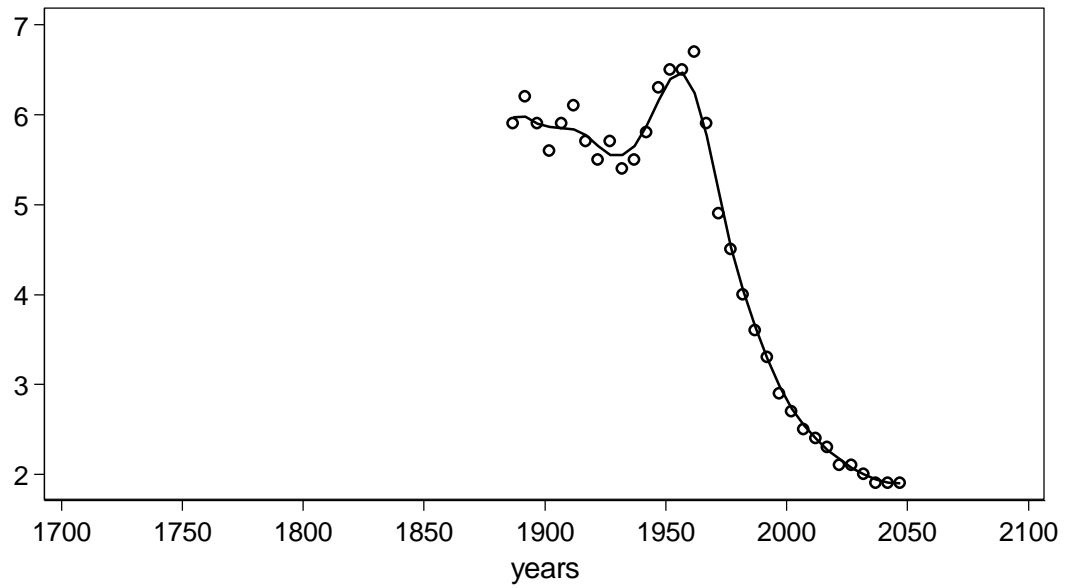
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Venezuela

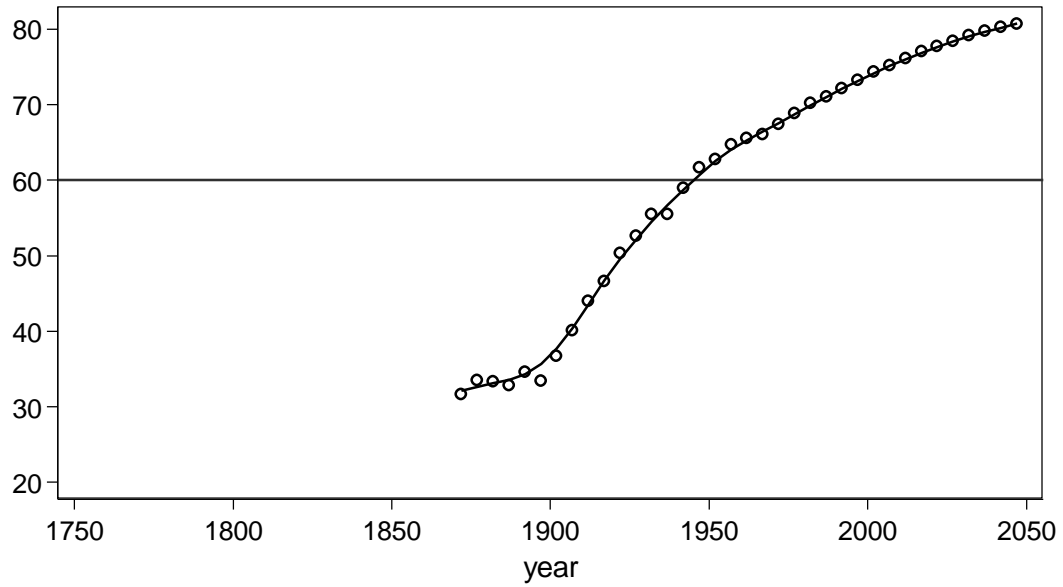


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Trend (Locally weighted regression) and observed rates

Graph 5: Life expectancy at birth

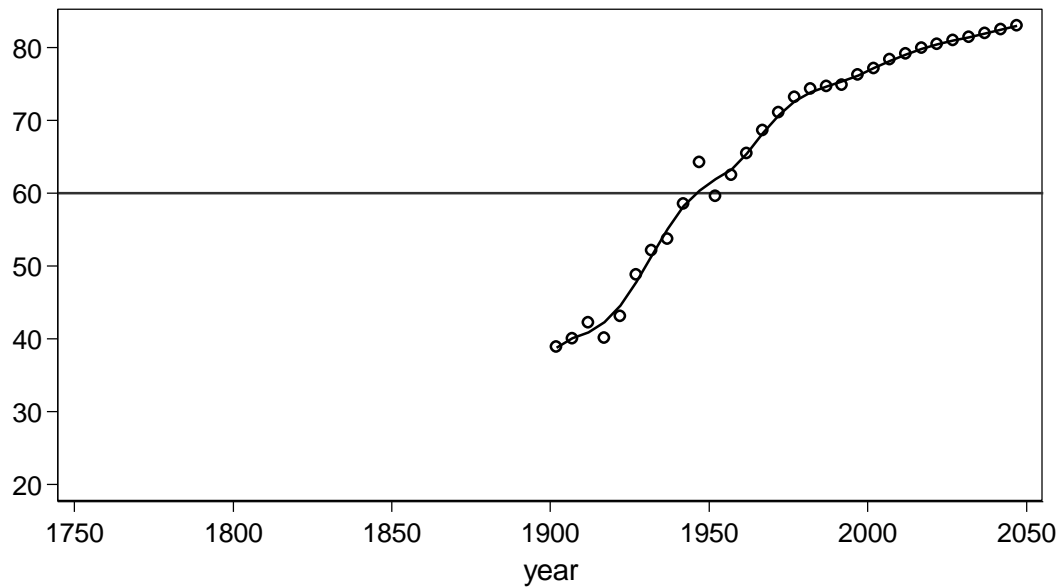
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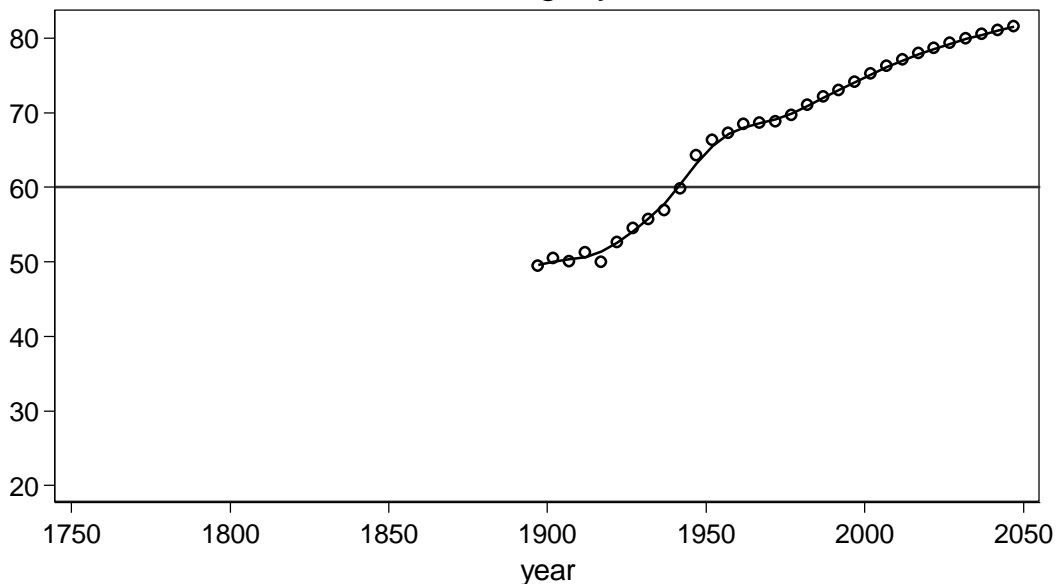
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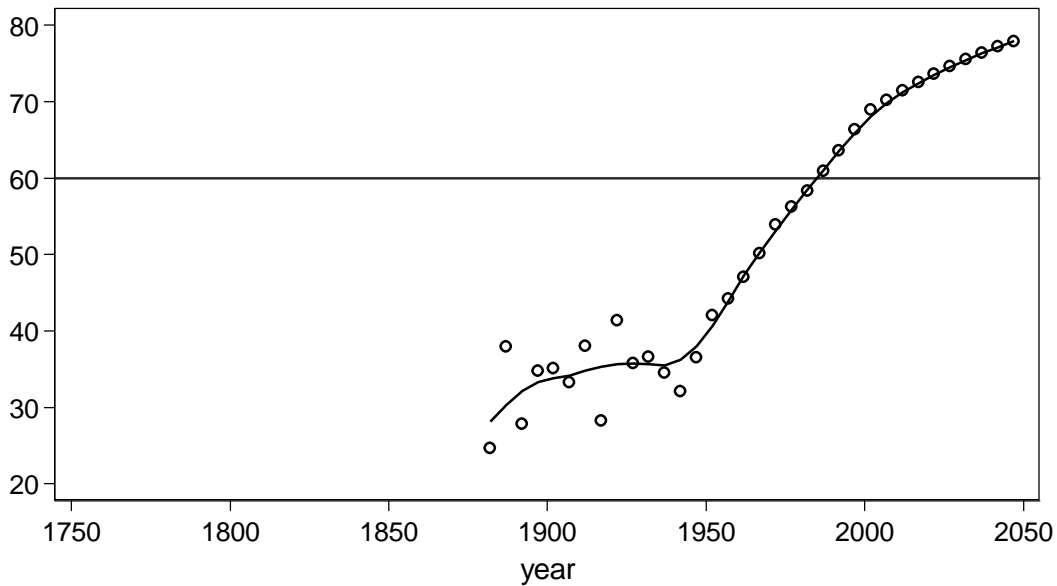
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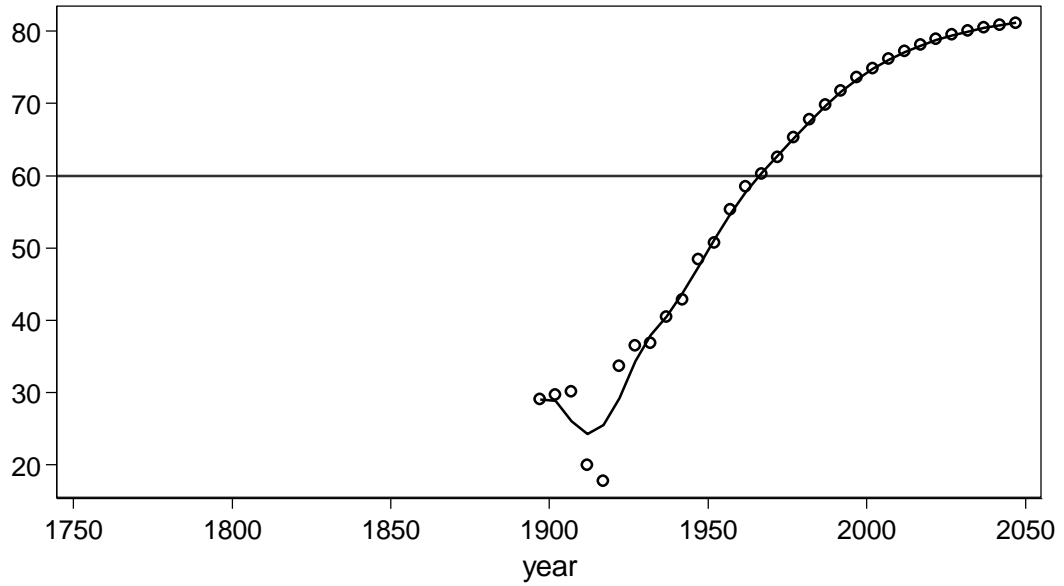
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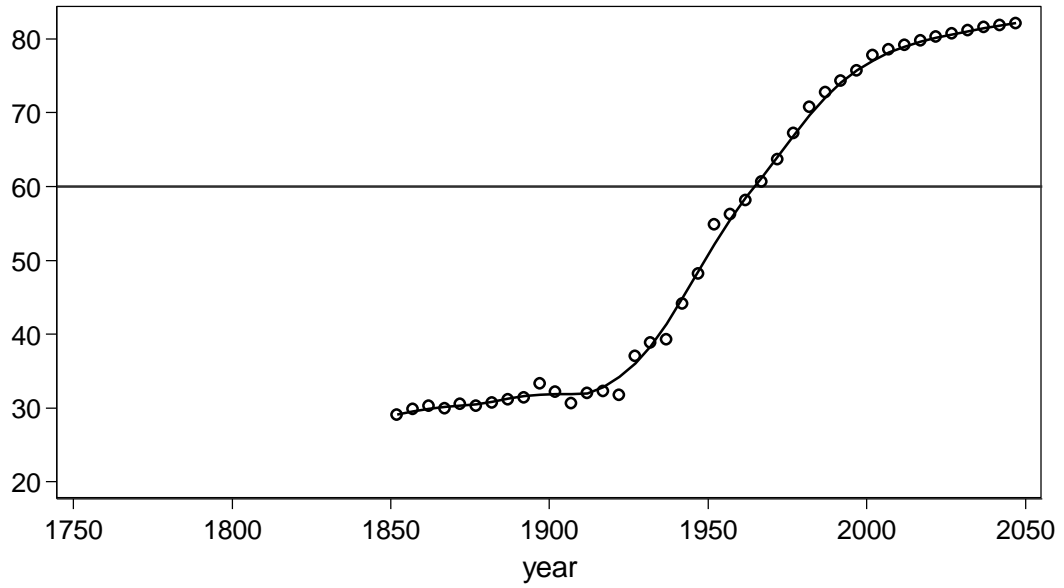
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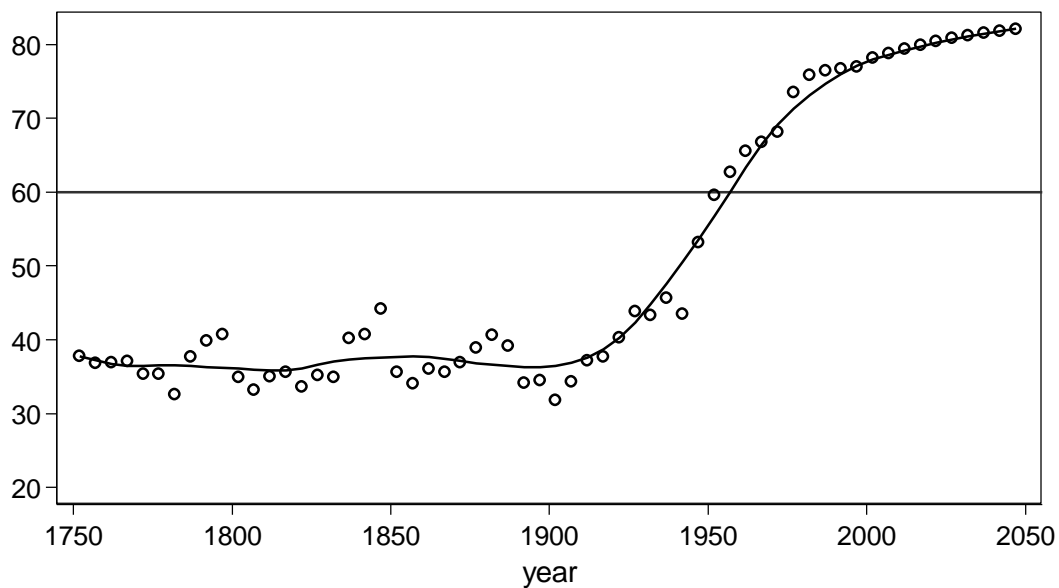
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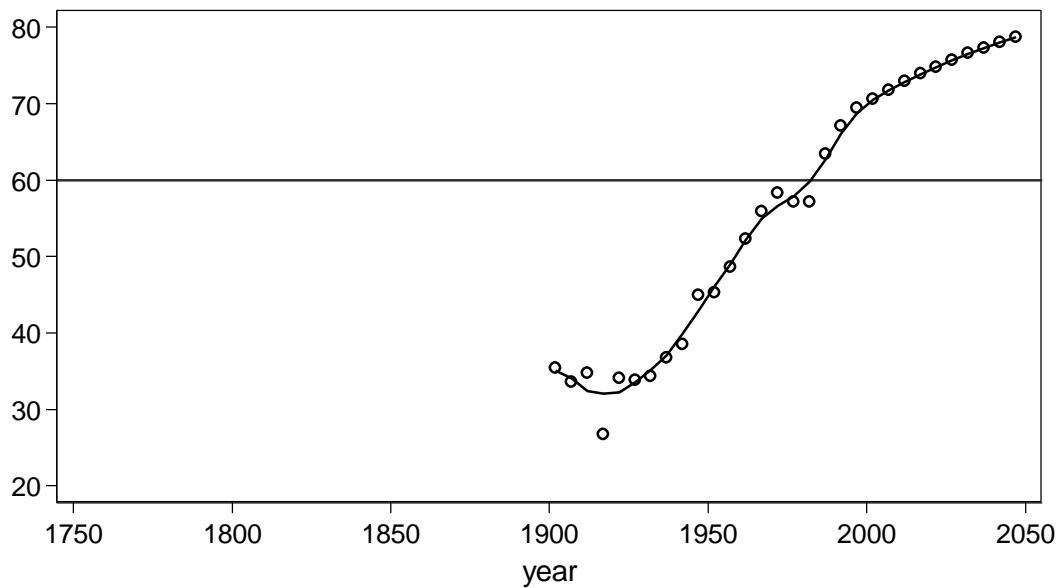
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Trend (Locally weighted regression) and observed values

El Salvador



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Trend (Locally weighted regression) and observed values

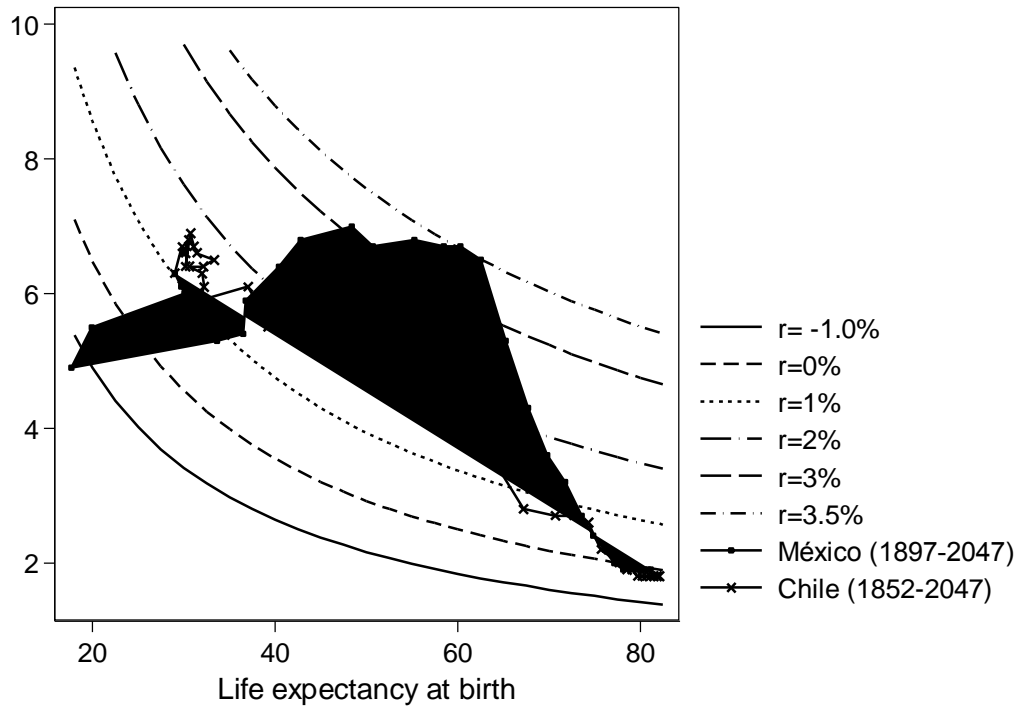
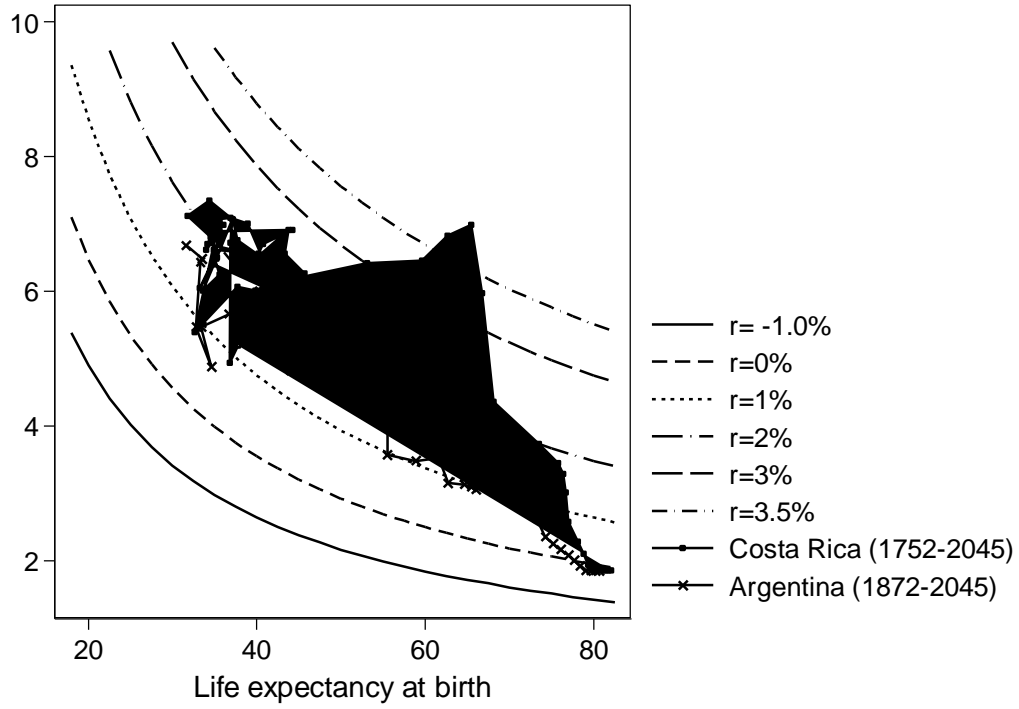
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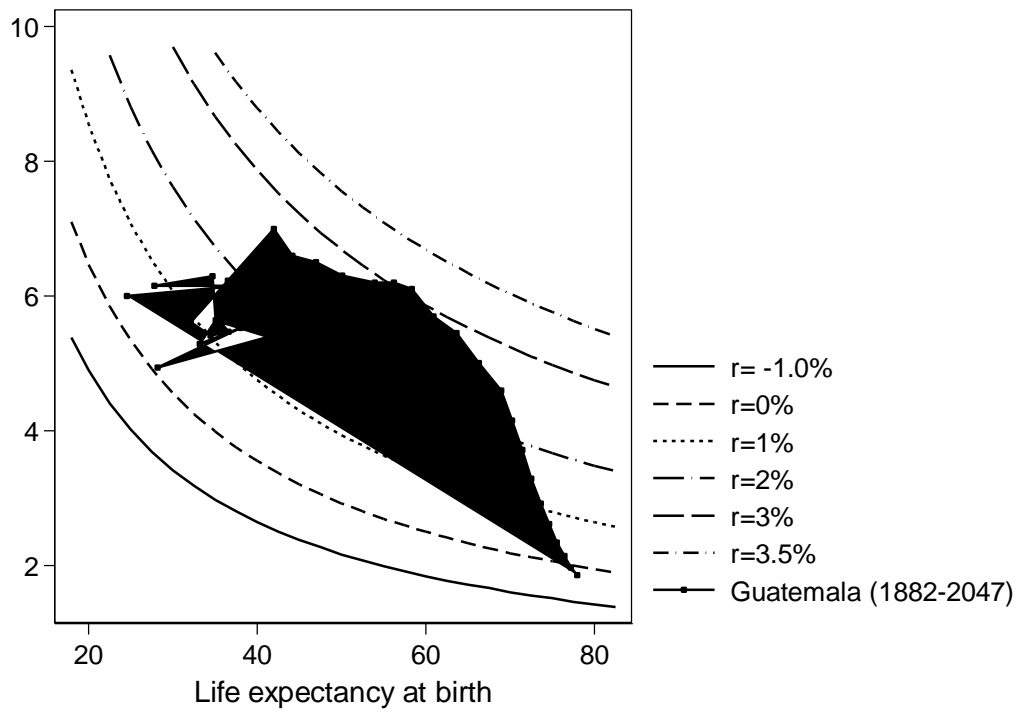
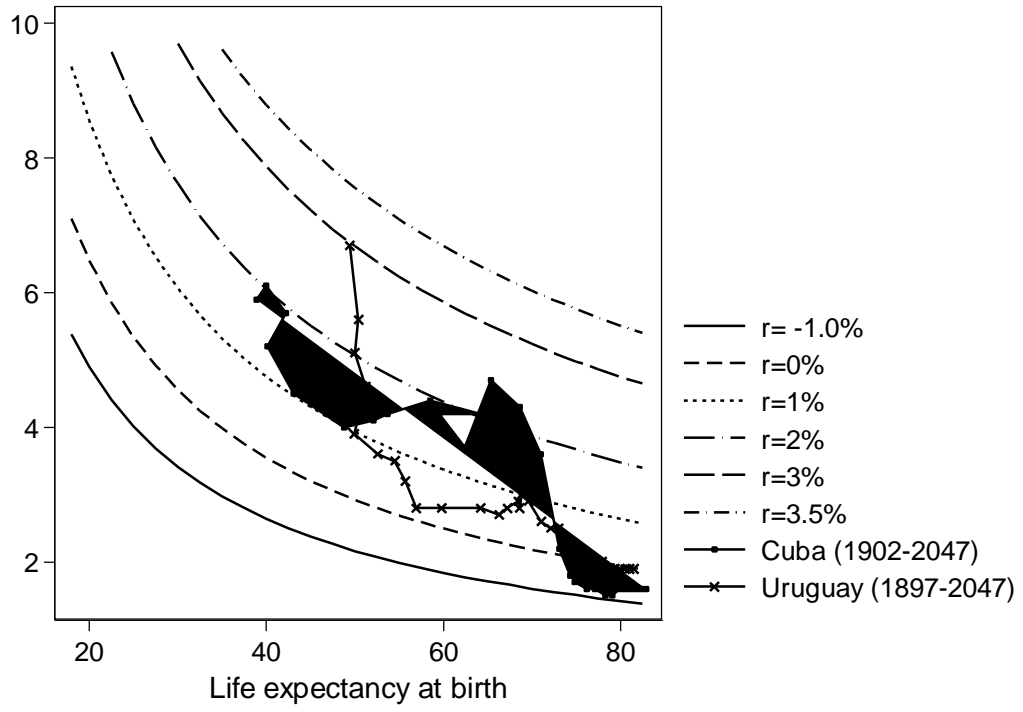


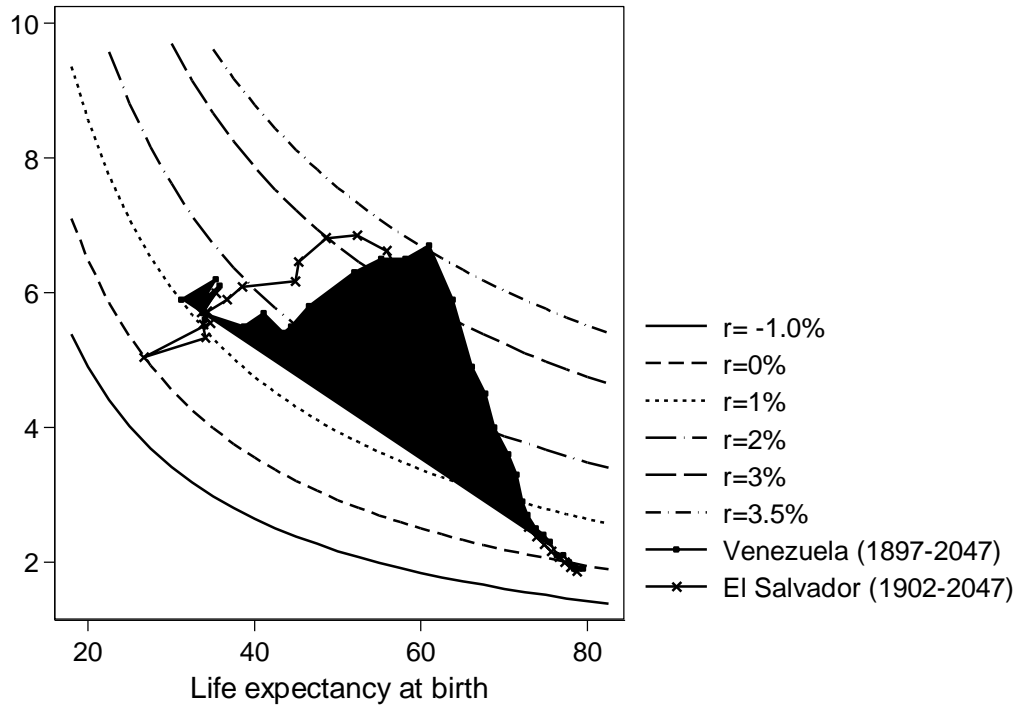
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Trend (Locally weighted regression) and observed values

Graph 6: The space of demographic growth

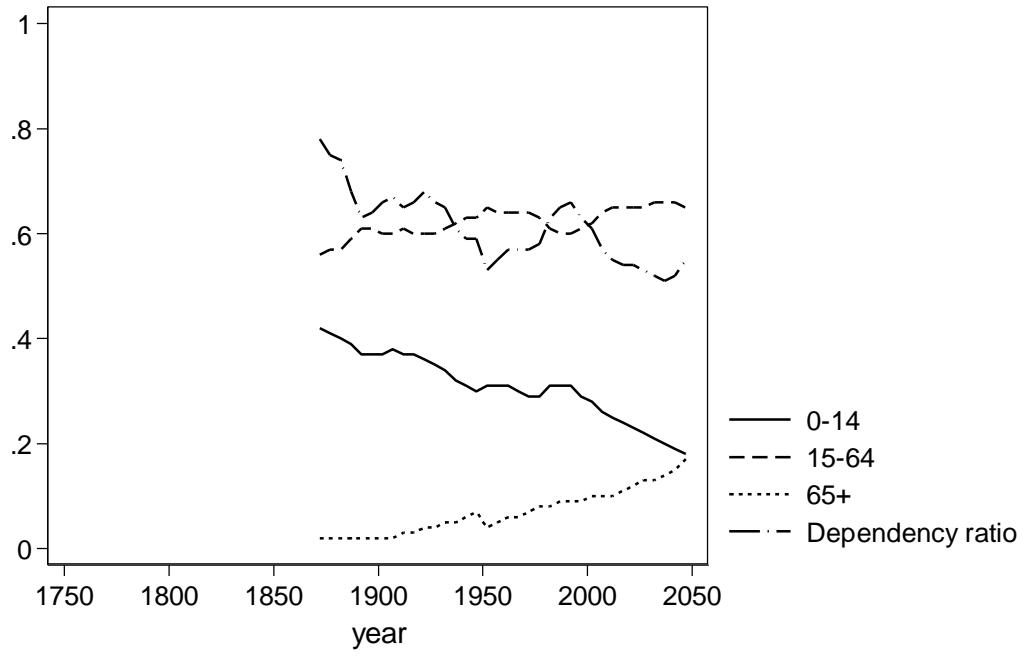




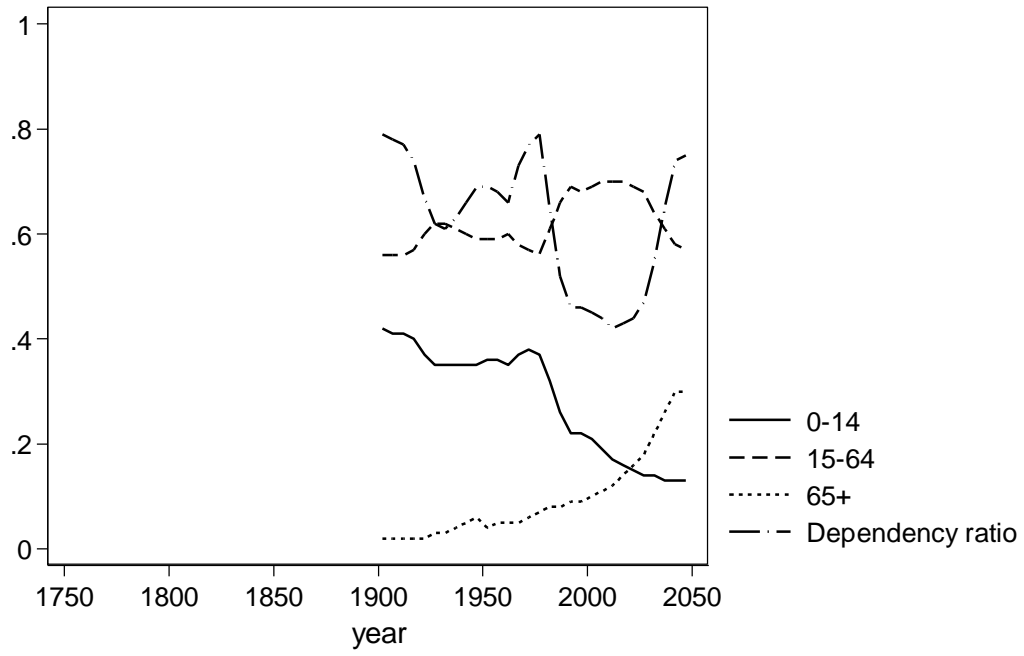


Graph 7: Age structures and dependency ratios

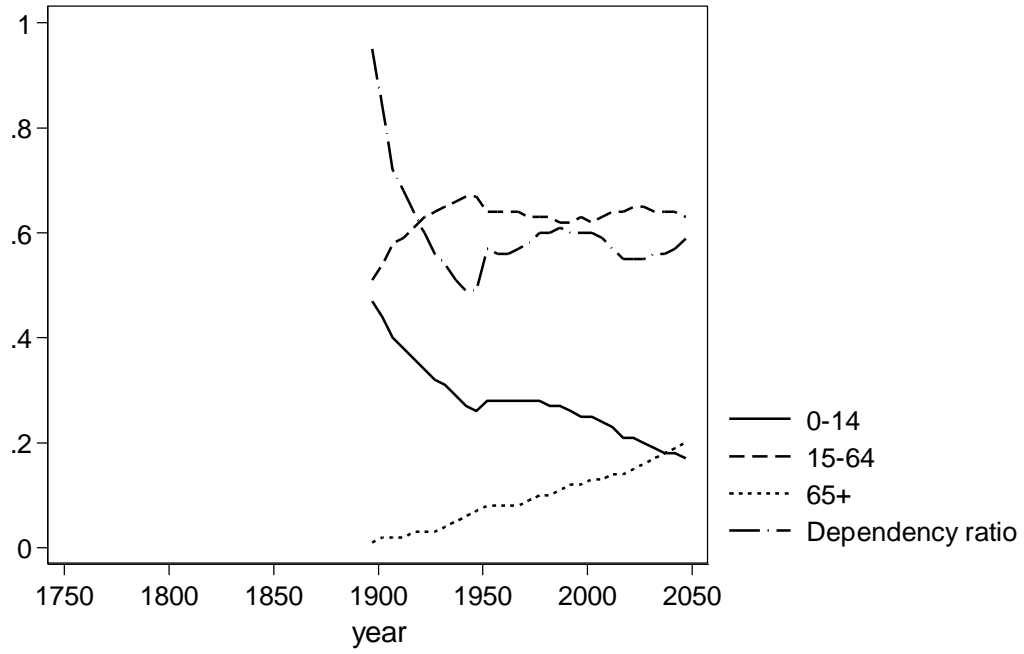
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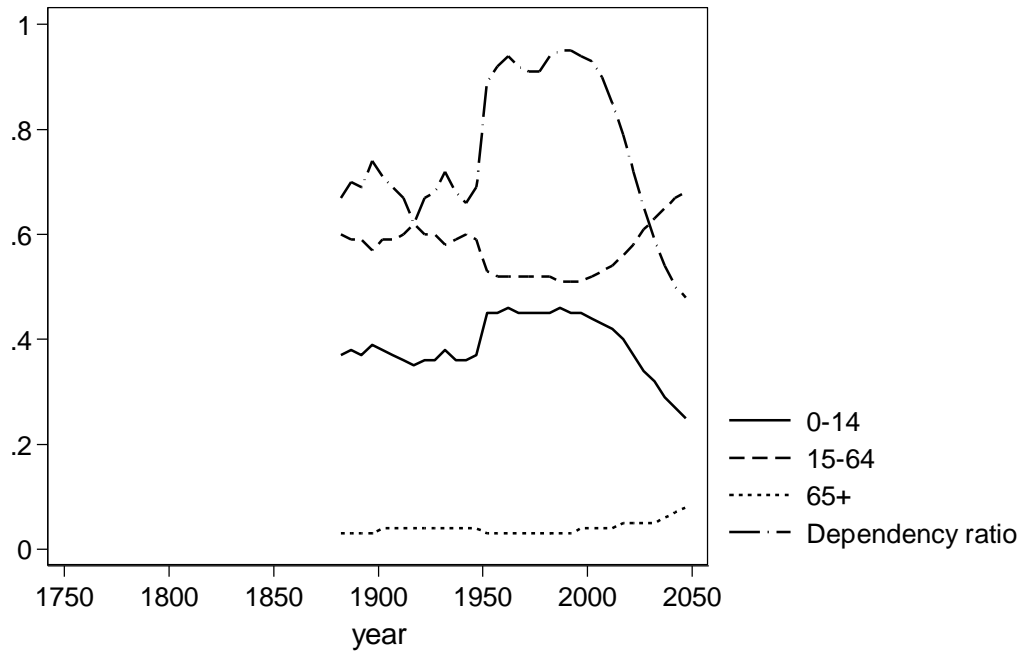
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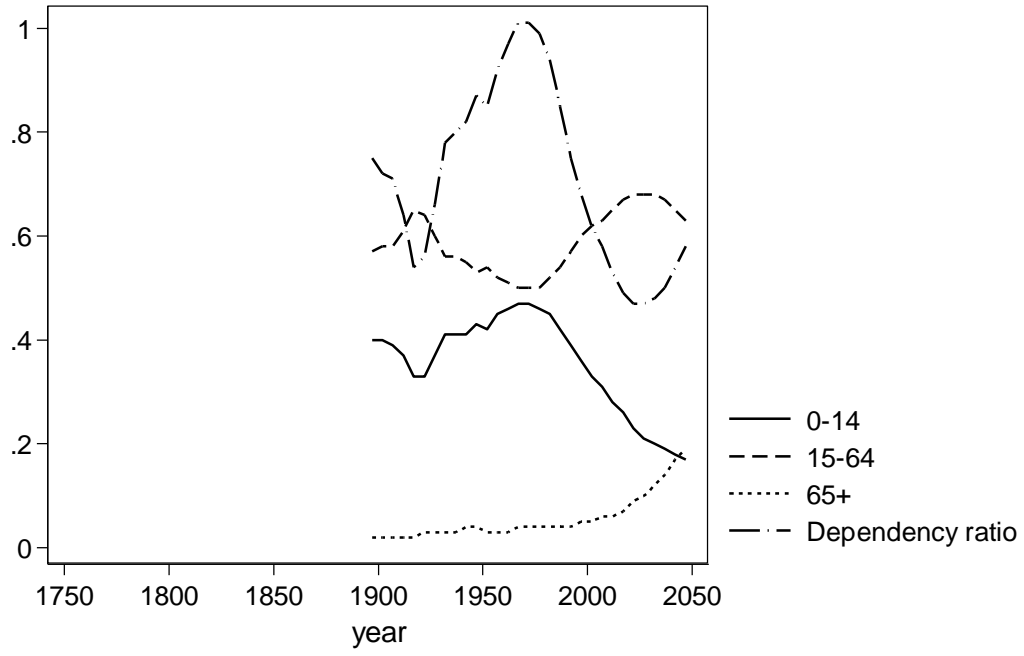
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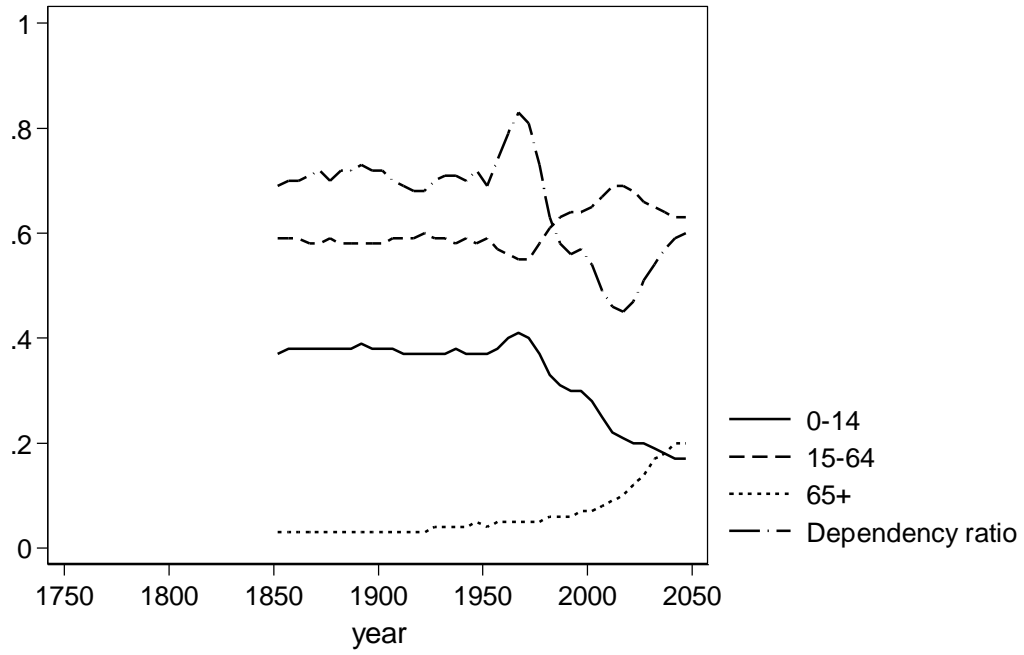
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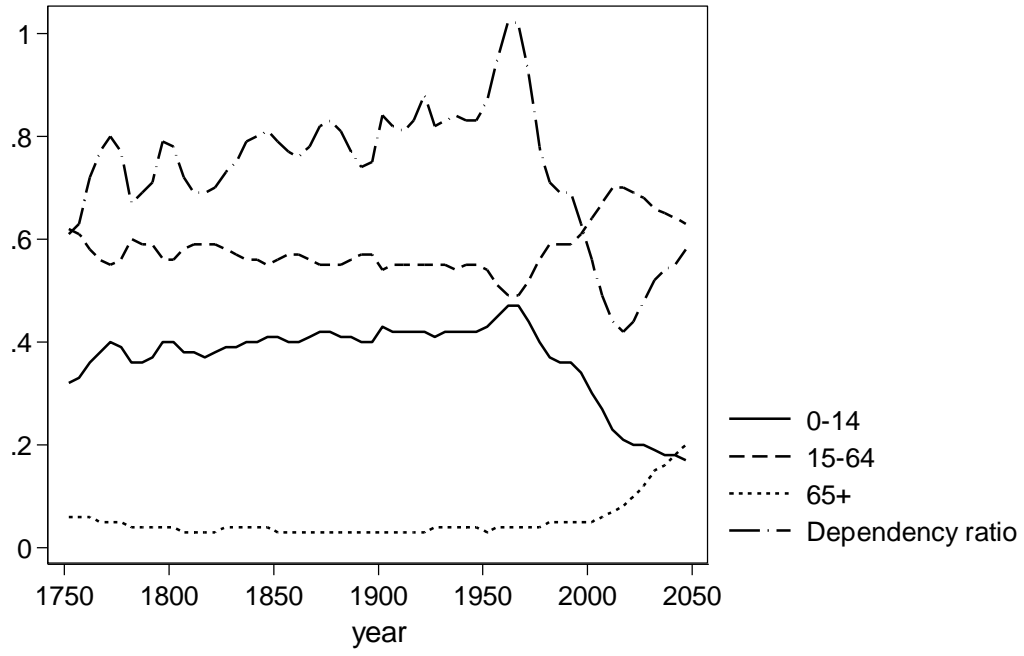
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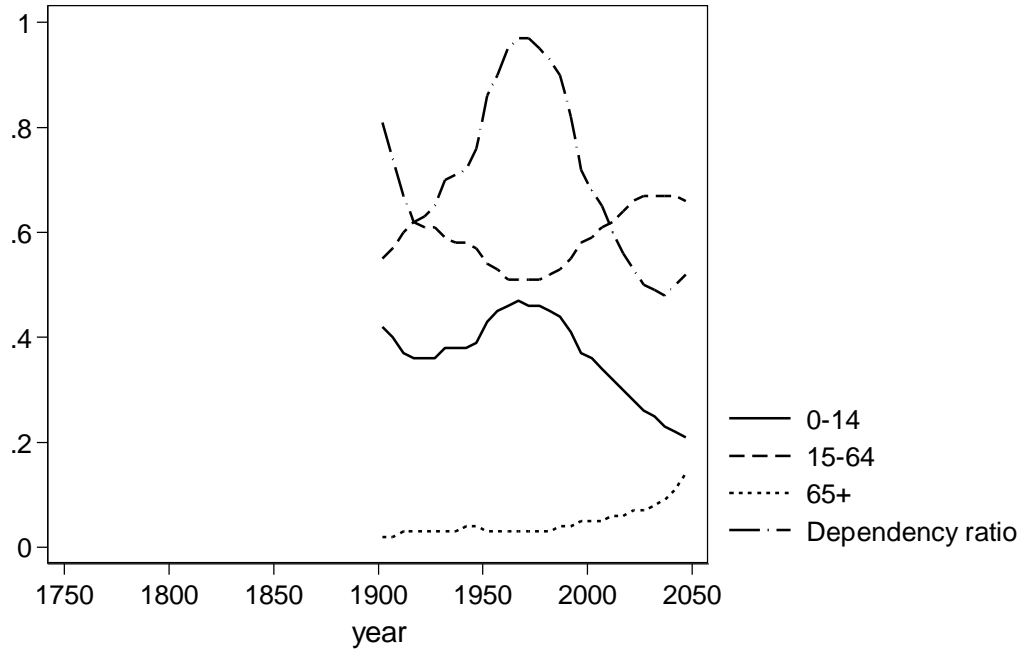
Chile



Costa Rica



El Salvador



Venezuela

