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NÚMERO 213

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**THE CROSS-COUNTRY DISTRIBUTION OF LIFE
EXPECTANCY IS TWIN-PEAKED**

Abstract

We show that the cross-country distribution of life expectancy for the period 1960-1997 is an evolving twin-peaked distribution with a diminishing, dynamically invariant lower peak. This may imply the presence of a health-related poverty or slow-growth trap.

Resumen

Mostramos que entre los países la distribución de la esperanza de vida para el periodo 1960-1997 exhibe dos picos, de los cuales el menor decrece siguiendo una dinámica invariante. Esto puede implicar la presencia de trampas de pobreza o de crecimiento lento que pueden estar relacionadas con la salud.

Introduction

We show that the cross-country distribution of life expectancy for the period 1960-1997 is an evolving twin-peaked distribution with a diminishing, dynamically invariant lower peak. This may imply the presence of a health-related poverty or slow-growth trap.

1. Health and income

There is a strong empirical correlation between aggregate measures of health and income. In a cross-country study, Preston (1975) showed that life expectancy is positively correlated with income, with higher levels of life expectancy achieved for equivalent levels of income in later periods. Pritchett and Summers (1996) corroborate that countries with higher incomes enjoy higher health. However, the causal relation between health and income runs in both directions. Fogel (1994) finds that increased nutrition and health account for up to a third of the economic growth in Great Britain during the last 200 years. Macroeconomic studies of economic growth such as Barro's (1991) have found life expectancy to be an important predictor of economic growth. In more recent work, Mayer (2001a) shows that health has a long-term impact on economic growth in Latin America during the period 1950-1990. Arora (1999) finds cointegration between economic growth and health in 100-125 year time series for seven advanced countries, with growth responding to the changes in health and not vice versa. There has also been intense microeconomic research on the role of health in human capital investment and returns (see Strauss and Thomas in the Handbook of Development Economics and Schultz, 1999, for excellent surveys of the micro studies). Height and weight, as indicators of population health, have been established as standard of living indicators that rival aggregate measures of income (e.g. Steckel, 1995).

The World Bank (1993), the Pan American and World Health Organizations (WHO, 1999), and other decision-making bodies are examining the policy implications of the long-term mutually causal interrelation between health and income. The importance and role of nutrition, health and longevity in productivity, education, savings, female economic participation, and the demographic window (Bloom and Williamson 1998) are under debate. A related question is how to explain that macroeconomic and long-term studies find stronger links between health and income than microeconomic studies.

The purpose of this letter is to draw attention to the fact that the cross-country distribution of life expectancy between 1960 and 1997 is a twin-peaked distribution. This is an important empirical fact that, remarkably, has not been recognized in the literature. The presence of such a qualitative dynamical feature must be explained by any comprehensive account of the interaction of health and income. The twin-peaked distribution is much more clear-cut than any that can be obtained for income, and may shed light on the convergence club dynamics that may exist in economic growth.

Life Expectancy Histograms for a Sample of 101 Countries

Figure 1. 1960

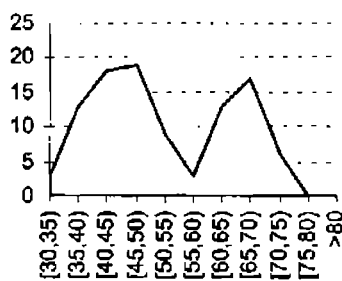


Figure 2. 1970

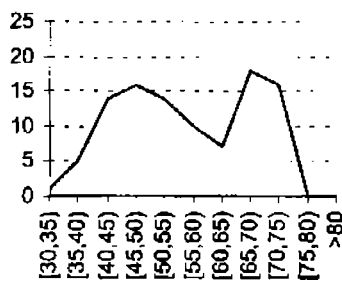


Figure 3. 1980

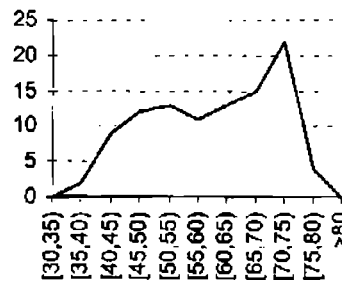


Figure 4. 1990

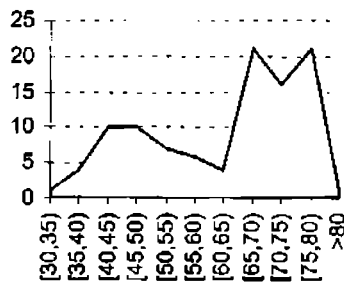
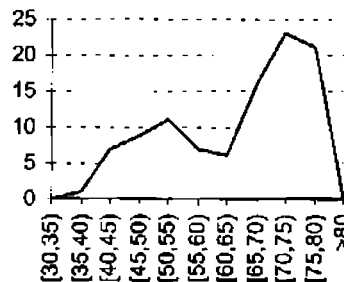


Figure 5. 1997



2. The cross-country distribution of life expectancy

Figures 1 to 5 show the histogram of average life expectancy for the years 1960, 1970, 1980, 1990 and 1997, for a balanced sample of 101 countries representing

82.8% of the world population in 1997.¹ Along the horizontal axis are found the five-year intervals used to create the histograms, while the vertical axis represents the number of countries with life expectancies in the given intervals. The sequence of histograms shows that the distribution of life expectancy is twin-peaked. The intervals used for the histogram are much finer than the distribution humps themselves, which are therefore robust to the choice of intervals.

Observing the histograms, it can be appreciated that a number of (low to middle income) countries migrated from the low to the high life expectancy humps between 1960 and 1990.² The migration was at its highest in 1980, when the two humps almost joined together. By 1990 the new set of countries with life expectancies above 65 still formed a peak that was somewhat separate from other countries by then enjoying life expectancies above 75. While the higher life expectancy peak now ranges over higher life expectancies than in 1960, a distinct low life expectancy hump nevertheless remains, peaking at life expectancies between 40 and 55 and containing more than 30 countries. The sequence of histograms is consistent with a health-related poverty or slow-growth trap. The location of the humps of the twin-peaked distribution –especially the low peak– has remained invariant and relatively stable in spite of the mobility of about a third of the sample. Mayer (2001b) gives further evidence for such a poverty trap, finding that during the periods 1960-1980, 1980-1998 low life expectancy countries grew significantly slower and even negatively.

3. Concluding remarks

The histograms for life expectancy give an encouraging picture of development in the sense that they show consistent health improvement. They point to a future in which, eventually, all or most countries will have a life expectancy greater than 65 years. However, about 30% of all countries still have a life expectancy of less than 60 years. The twin peaked distribution of health points to the possibility that these countries may be experiencing health-related poverty or slow-growth traps. An open question is whether within-country health distributions are also twin-peaked, with corresponding implications for the economics of poverty and growth.

When life expectancy is averaged over large populations, the contribution of the rich has less weight than when income is averaged, because the life expectancy

1 Life expectancies for 1960, 1970 and 1980 are the averages of the two average life expectancies given by Barro Lee in their well-known database, while life expectancies for 1990 and 1997 are taken from the World Bank web page at <http://www.worldbank.org/research/growth/GDNdata.htm>.

2 Countries in the sample with life expectancy less than 55 in 1960 and greater than 60 in 1997 were Algeria, Colombia, China, Dominican Republic, Ecuador, Egypt, El Salvador, Ghana, Guatemala, Honduras, India, Indonesia, Iran, Jordan, Malaysia, Morocco, Nicaragua, Oman, Pakistan, Peru, Philippines, Republic of Korea, Saudi Arabia, South Africa, Swaziland, Syria, Thailand and Tunisia.

of the rich is much less than proportional to their income. Thus life expectancy is a more equitable indicator of well being than income. This may explain why, although health and income are correlated, a twin-peaked distribution is evident for health but not for income. There has been recent discussion on whether twin-peaked distributions for income and other economic variables such as factor productivity exist in cross-country samples. Indeed, some studies (e.g. Quah, 1997) claim that there is an emerging twin-peaked distribution. If so, perhaps differences in health are antecedents of the ongoing income stratification.

The twin-peaked nature of the distribution of health is an important qualitative feature that may imply the presence of health-related poverty or slow-growth traps. These would explain, for instance, why macroeconomic and long-term studies, whose data span the traps, find stronger links between health and income than microeconomic studies.

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