

PI- 036173

ARCHIVO
IDESPO
UNA



UNIVERSIDAD NACIONAL
FACULTAD DE CIENCIAS SOCIALES
INSTITUTO DE ESTUDIOS SOCIALES EN POBLACIÓN (IDESPO)

**MODERN ECONOMIC GROWTH, HUMAN
CAPITAL AND DEMOGRAPHIC TRANSITION**

Dr. Héctor Pérez Brignoli

HEREDIA, COSTA RICA

2002

PI-036173
00C-272



UNIVERSIDAD NACIONAL

UNIVERSIDAD NACIONAL

FACULTAD DE CIENCIAS SOCIALES

INSTITUTO DE ESTUDIOS SOCIALES EN POBLACIÓN (IDESPO)



MODERN ECONOMIC GROWTH, HUMAN CAPITAL AND DEMOGRAPHIC TRANSITION

mod. 6.5.02

Dr. Héctor Pérez Brignoli

HEREDIA, COSTA RICA

2002

Modern economic growth, human capital and demographic transition (first draft)



Héctor Pérez-Brignoli
Universidad Nacional
IDESPO

I. Modern economic growth. Definitions and explanations

In 1971, when Simon Kuznets received the economics Nobel Prize, he summarized the basic characteristics of modern economic growth:

“A country’s economic growth may be defined as a long-term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technology and the institutional and ideological adjustments that it demands.” (Kuznets, 1973, p.247)

Modern economic growth is the result of the history of capitalism and the industrialization that started in Western Europe and later expanded to other countries, now part of the developed world. This vast process of economic, social and cultural changes needs to be distinguished from other societies in the past, and in today’s world. On a detailed quantitative inquiry about the characteristics of modern economic growth, Angus Maddison wrote:

“The most remarkable characteristic of capitalism development has been a sustained rising movement of productivity and real income per head, result of the combination of innovation and accumulation. In this sense, capitalism is very different from precedent social orders, where social institutions and property were used to preserve the equilibrium and could not permit the risk inherent to change.” (Maddison, 1991. p. 11)

David Landes goes one step further to describe precisely the peculiarities of this change:

“These substitutions made the Industrial Revolution. They yielded a rapid rise in productivity and, with it, in income per head. This growth, moreover, was self-sustaining. In ages past, better living standard has always been followed by a rise in population that eventually consumed the gains. Now, for the first time in history, both the economy and knowledge were growing fast enough to generate a continuing flow of improvements.” (Landes, 1998. pp.186-187)

Now, let us complement this perspective remembering that the conceptualization of the vast process of changes mentioned has been essential in the works of authors like Marx, Weber, Durkheim, Pareto and Parsons. In different ways, these authors contributed to the theory of modernization, one of the foundations of contemporary sociological thought. From Sombart, Pirenne and Schumpeter to Braudel and K. Polanyi, economic history of the first half of the twentieth century has been devoted to describe and explain the long-term dynamics of this process, emphasizing actors, timing, path dependency and basic characteristics of the structural change. In one way or another, the history of the social sciences during the twentieth century, can be seen as a continuous quest for a better understanding of the multiple dimensions of changes triggered by modern economic growth.

We can concentrate now in the causes of modern economic growth according to the growth theories developed after the Second World. (Sen, 1970; Arrous, 1999; Stern, 1991) The Keynesian growth model, known as the Harrod-Domar model, and the Neo-classical model associated to Robert Solow were formulated at a high level of abstraction. Both models were looking for long-term equilibrium solutions for determinant factors of the output growth rate. In spite of animated theoretical controversies and the increasing sophistication of the models the proposed theories were unable to explain two fundamental aspects of economic growth. First, most of the time, technical progress was presented as an unexplained “residual” or, simply put, as a exogenous variable. Second, in the real world, per capita income rates of growth diverged and no trend to convergence (as was predicted by

theory) was observed. Population growth was always considered very important but it was taken as an exogenous variable.

This situation changed during the 1980's due to the work of Paul Romer and Robert Lucas. The great novelty was the inclusion of two sectors of accumulation: the physical capital and the human capital. The notion of human capital was taken from the classical works of T.W. Schultz (1961) and G. Becker (1993) and, assimilated to the general level of abilities and knowledge of every person. Human capital was a result of both formal education and the continuous process of learning by doing. The inclusion of human capital allowed the consideration of technical progress as an endogenous variable within a general analytical model. Lucas (1988, p.39) wrote:

“There are two kinds of capital, or state variables in the system: physical capital that is accumulated and utilized in production under a familiar neoclassical technology, and human capital that enhance the productivity of both labor and physical capital, and that is accumulated according to a ‘law’ having the crucial property that a constant level of effort produces a constant growth rate of the stock, independent of the level already attained.”

The following text of Romer clearly illustrates the new conceptualization of technology:

“New growth theory started on the technology-as-public-good path and worried about where technology came from, but it soon backed up and reconsidered the initial split that economist make in the physical world. New growth theorist now start by dividing the world into two different types of productive inputs that can be called “ideas” and “things.” Ideas are nonrival goods that could be stored in a bit string. Things are rival goods with mass (or energy). With ideas and things, one can explain how economic growth works.”(Romer, 1996. p.204)

Undoubtedly, the theory of growth has developed greatly in the formulation of the right questions to understand the dynamics of capitalist development. However, it is also obvious that to explain specific cases we have to add more variables and look for path dependency aspects. When we try to observe how “things” and “ideas” interact in the real world, we confront a serious identification problem. Beyond the aggregated level, there are other factors, which also determine the output growth rate in the long term like physical infrastructure, income distribution and the availability of natural resources (Stern, 1991).

According to Douglas C. North: “the economic history is about the performance of economies through time” (North, 1994.p.359). He proposed an explanatory analytical model to understand economic change through time. It is well known that North's approach focus in the structure and change of institutions, including property rights (individual and social incentives of each system), state organization and ideologies that influence perception of the real world in changing objective situations. (North, 1981 and 1991)

In a hierarchical explanatory model, the institutional change conceptualized by North would provide the independent variables that determine economic growth in the long-term. The factors explored by different version of growth theory would operate as intermediate variables. A summary is presented in the following table:

Dependent Variables	Intermediate Variables	Independent Variables
Modern economic growth	Technical progress Population Accumulation of physical capital Accumulation of human capital Physical infrastructure Income distribution Natural resources	Institutional change « The relationship between the basic institutional framework, the consequent institutional change; and the path dependent nature of economic change... »*

* North, 1991, p. 108.

As it was mentioned earlier, population growth is included in the growth models as an exogenous variable and all the authors renounce to consider demographical factors as part of the explanation. Let us note, for example, Robert Lucas' position:

"I will be abstracting altogether from the economic of demography, taking population growth as a given throughout. This is a serious omission, for which I can only offer the excuse that a serious discussion of demographic issues would be at least as difficult as the issues I will be discussion and I have neither the time nor the knowledge to do both. I hope the interactions between these topics are not such that they cannot usefully be considered separately, at least in a preliminary way." (Lucas, 1988. p.6)

On the other hand, North says that his proposal "will contribute to our understanding of the complex interplay between institutions, technology and demography in the overall process of economic change" but immediately recognizes that "we certainly have not pull all the pieces together yet." (North, 1994. p.366)

The main objective of this paper and the session 53 of the XIII International Conference of Economic History is indeed, to try to pull at least some of the pieces together.

II. Demographic Transition and human capital in the "second economic revolution."

According to Kuznets, modern economic growth inaugurated a "new epoch in world history." Since the end of the XIX century, historians have used the concept of industrial revolution to emphasize the importance and novelty of changes. Douglas C. North prefers to talk about a "second economic revolution" characterized by the continuous interaction between science and technology. (North, 1981) Since the 1950's, the demographic changes that accompany this new era of human history are known as the process of "demographic transition." Transition refers to the slow and pronounced decline in mortality, later followed by a similar movement in fertility. During the transition, demographic growth accelerates originating a "demographic explosion", which also opens a new chapter in human history. (Chesnais, 1988; Bengtsson-Ohlsson, 1994)

Historical Demography has contributed to the knowledge of this process, mainly in Western Europe (Coale-Watkins. 1986). Also, historical demography has enlightened how "ancien régime" --or pre-transitional-- demographic systems worked. (Livi-Bacci, 1991). However, the relationships between demographic and economic change have been suggested scarcely. Historians have tended to view both processes as simultaneous, without worrying much to explain, in a systematic way, their connections.

The economic analysis of fertility from the New Home Economics, mainly developed by Gary Becker (1993), focus in individual/family decisions, which determine the demand for children. This perspective has been very influential. However, as Easterlin (1978) noted when he proposed the integration of economic and sociological analysis, the levels and fluctuations of fertility have never been an outcome of pure economic decisions. In demography, cultural and ideological factors modify the strict economic calculation in terms of costs and benefits. (North, 1981) For this same reason, the explanations about the decline of fertility during the demographic transition are complex, and each case demands a particular combination of explanatory variables (Tilly, 1978; Chesnais, 1986, pp.379-389).

Mortality decline has been explained in terms of a combination of factors: improvements in public health, medical advances, nutritional and food supply improvements, and even spontaneous changes in the virulence of pathogens. (Chesnais, 1986. pp. 83-89). A much more specific relation between mortality decline and economic changes is found in some authors. Fogel (1997) attributes 90% of the decline in mortality rates in France and England, from 1775 to 1850, to improvements in average nutritional status. These improvements are directly related to changes in agricultural production and food supply. After 1850, the explanatory effect of this factor is reduced to 50%. Ronald Lee (1978, p. 168) considers that between 1705 and 1784, in England it was precisely "the shift in the demand for labor [which determined] the equilibrium levels for fertility and wages, and the equilibrium time-path for population, while changes in mortality determine the timing and amplitude of fluctuations about the

equilibrium level or trend." But, between 1250 and 1750, "the exogenous change in mortality [...] did appear to account for virtually all the variation in population and wages?"

Varied and interesting model examples of the relations between population and economy can be found in the collective volume edited by Bengtsson and Saito (2000). These papers were originally presented at the XII International Congress of Economic History.

The relationships between human capital and demographic variables constitute another research area important to study the connections between population and economy. We have already mentioned, in section I, that the accumulation of human capital is considered, nowadays, as a strategic variable to explain modern economic growth in the long-term. Now, we will try to specify the principal connections that can be expected.

The concept of human capital refers to every person's aggregate of abilities and knowledge; therefore, it includes formal education and also the continuous process of learning by doing along lifetime. Physical and emotional health are also important because they have an influence in the efficient use of the available human capital.

In general, we can expect an important influence of education on variables that affect mortality and morbidity, such as, hygienic practices, public health measures and the care of personal and familiar health. In a similar manner, we can expect direct effects of education in the use of contraceptive methods and, in the development of expectations about the desired number of children and their future. However, it seems that these direct effects could not fully explain the accumulation of human capital, as it is understood in Lucas and Romer growth models. At least, if we want to use these models to explain the history of industrial capitalism in the last 250 years.

During the demographic transition we can also expect the following effects. First, the increase in life expectancy and improvements in the general health level allow a much more prolonged and intensive use of the available human capital. The rise of age at retirement, savings in lost labor days and in premature retirements due to illnesses also account for these effects. Then it is possible to enter the job market later and more time is dedicated to formal education. In the mean term, generations become more and more educated. Second, it is necessary to note the effects of a gradual fertility decline. Families with fewer children can finance a prolonged education under the expectation of higher future incomes. At the same time, women can diminish the time devoted to domestic activities and enter into the labor market. Third, we should underline an impact already noted by Lucas (1988, p. 40): "at each skill level people are more productive in high human capital environments". The development of these centers of high concentration of human capital generate pressures that attract migration.

Simply put, demographic transition allowed the development of a "virtuous cumulative circle" in favor of human capital. The empirical verification of these propositions poses various problems. Simple simulation models can be used to have comparative evaluations of the impact of mortality decline in the length of labor life. Much more difficult is the measure of the effects in the improvement of individual health over labor returns. In the contrary, educational and schooling statistics are relatively abundant. A critical aspect in any research of this kind is the careful definition of the geographical domain of coverage, despite the fact that the majority of the demographic and educational data are available at a national level. A regional approach would be desirable and would allow us to observe the internal population movements.

These ideas can also be useful to understand the existence of "perverse cumulative circles" in many developing countries. In these cases, both the rapid and belated demographic transition accelerate the population change but the positive cumulative effects on human capital are either completely lost or inefficiently employed. There are various reasons for that. First, the initial level of human capital is very low, with low rates of literacy and even lower rates of functional literacy. Second, due to the rapid demographic growth, the required investments in education and infrastructure are too elevated and difficult to achieve. Therefore, the active population grows poorly educated and is later condemned, in important proportions, to unemployment or underemployment in the informal economy. On the other

hand, the educational effort cannot be limited to children and young people only. Adult education is important by itself and, also because “irrational attitudes, as well as ignorance and lack of skills, also has an additional instrumental value, as a means of increasing the effectiveness of child education.” (Myrdal, III, p. 1622).

III. Human capital, social capital and cultural capital

Although human capital is measured basically throughout the years of formal education, the aspects of quality and contents of instruction are also very important. As we will see right away, the full consideration of these aspects has extended the notion of human capital in two directions: social capital and cultural capital. (Woolcok, 2001)

The high education of an individual is useless if he or she cannot interact with other individuals. Indeed, the maximization of individual creative potential only can occur in an adequate context of relations and social norms. Is precisely, this context of networks, norms, and interactions that sociologists as James Coleman (1988) and political scientists like Robert Putnam (2000) have denominated “social capital.” Undoubtedly, this topic is crucial despite the strong objections generated from an economics perspective (see the negative comments from Arrow and Solow in Dasgupta and Serageldin, 2000). In my view, North’s ideas about institutional change are better formulated and more operational than the notion of social capital, covering more or less the same themes.

School instruction and training “have not only the purpose of teaching intellectual skills and scientific knowledge, but also of indoctrinating pupils with the dominant cultural values.”(Boserup, 1990, p.138). At this point, the notion of “cultural capital” proposed by Pierre Bourdieu as an essential component of social reproduction, seems pertinent. The intergenerational transfer of patrimony cannot be understood adequately without simultaneous consideration of demographic, economic, social and cultural dimensions.

At the end of this discussion it is perhaps convenient to return to a classical, but somewhat forgotten concept: the formation cost of an adult (Sauvy, 1957, chapter XXIII) Nowadays, the subject draws to ask also for the cost of maintenance of the retired population.

IV. Conclusions

Hopefully, I have demonstrated the existence of significant relationships between human capital and demographic transition within the context of modern economic growth. Of course, it is also clear that this paper is only the beginning of a quest that has to be more systematic and profound.

References

- Arrous, Jean. 1999. *Les théories de la croissance*. Paris, Editions du Seuil.
- Becker, Gary. 1960. “An Economic Analysis of Fertility”, in *Demographic and Economic Change in Developed Countries*. Princeton University Press, NBR series. Pp. 209-213.
- Becker, Gary. 1993. *Human capital: a theoretical and empirical analysis, with special reference to education*. Chicago, The University of Chicago Press. 3rd. edition. 1st ed. 1964.
- Bengtsson, T. and Ohlsoon, R. 1994. “The Demographic Transition Revised” in Bengtsson, T. (ed.) *Population, Economy and Welfare in Sweden*. Berlin, Springer Verlag.
- Bengtsson & Saito. 2000. (editors). *Population and Economy. From hunger to modern economic growth*. Oxford, Oxford University Press.

- Boserup, Ester. 1990. *Economic and Demographic Relationships in Development*. Baltimore and London, The John Hopkins University Press.
- Chesnais, Jean Claude. 1986. *La transition démographique*. Paris, Ined.
- Coale, A.J. and Watkins, S. 1986. (ed). *The Decline of Fertility in Europe*. Princeton, Princeton University Press.
- Coleman, James. 1988. "Social Capital in the Creation of Human Capital". *American Journal of Sociology*, vol. 94 (Suppl.), pp. 95-120.
- Dasgupta, P. and Serageldin, I. 2000. (ed.) *Social Capital: A Multifaceted Perspective*. Washington DC, The World Bank.
- Easterlin, Richard. A. 1978. "The Economics and Sociology of Fertility: A Synthesis." In Tilly, Charles. 1978. (ed.). *Historical Studies of Changing Fertility*. Princeton, Princeton University Press.
- Fogel, Robert. 1997. "New Findings on Secular Trends in Nutrition and Mortality: some implications for population theory." in *Handbook of Population and Family Economics*. Edited by Rosenczweig and Stark. Amsterdam, Elsevier.
- Kuznets, Simon. 1973. "Modern Economic Growth: Findings and Reflections." *The American Economic Review*, vol. 63-3, pp. 247-258.
- Landes, David S. 1998. *The Wealth and Poverty of Nations*. New York, Norton.
- Lee, Ronald D. "Models of Preindustrial Dynamics with Applications to England" in Tilly, Charles. 1978. (ed.). *Historical Studies of Changing Fertility*. Princeton, Princeton University Press.
- Livi-Bacci, Massimo. 1990. *Historia minima de la población mundial*. Barcelona, Ariel.
- Lucas, Robert E. 1988. "On the mechanics of economic development". *Journal of Monetary Economics*, 22, pp. 3-42.
- Maddison, Angus. 1991. *Historia del desarrollo capitalista. Sus fuerzas dinámicas*. Barcelona, Ariel
- Myrdal, Gunnar. 1968. *Asian Drama. An Inquiry into the Poverty of Nations*. New York, Pantheon.
- North, Douglas C. 1994. "Economic Performance Through Time". *The American Economic Review*, vol. 84-3, pp. 359-368.
- North, Douglas C. 1991. "Institutions". *Journal of Economic Perspectives*, vol. 5-1, pp. 97-112.
- North, Douglas C. 1981. *Estructura y cambio en la historia económica*. Madrid, Alianza Editorial.
- Putnam, Robert. 2000. *Bowling Alone: The Collapse and Revival of American Community*. New York, Simon and Schuster.
- Romer, Paul M. 1996. "Why, Indeed, in America? Theory, History, and the Origins of Modern Economic Growth." *The American Economic Review*, vol. 86-2, pp. 202-206.
- Romer, Paul M. 1994. "The Origins of Endogenous Growth". *Journal of Economic Perspectives*, vol. 8-1, pp. 3-22.
- Sauvy, Alfred. 1957. *Tecnic General de la Población*. Madrid, Aguilar.
- Schultz, Theodore. 1961. "Investments in Human Capital." *The American Economic Review*, vol. 51-1, pp. 1-17.
- Sen, Amartya. 1970. (ed.). *Growth economics*. London, Penguin Books.
- Stern, Nicholas. 1991. "The determinants of growth". *The Economic Journal*, 101, pp. 122-133.
- Tilly, Charles. 1978. (ed.). *Historical Studies of Changing Fertility*. Princeton, Princeton University Press.
- Woolcok, Michel. 2001. "La place du capital social dans la compréhension des résultats sociaux et économiques", in *La contribution du capital humain et social a une croissance économique durable et au-bien etre*. Rapport du Symposium International, Ottawa, DHRC and OCDE.