DEMOGRAPHIC SHOCKS: THE VIEW FROM HISTORY. DISCUSSION

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Massimo Livi-Bacci has taken us on a fascinating tour of demographic history. What lessons for developments in the world today can we draw from the story he tells? I will distinguish between three types of lessons, which I call "economic lessons," "demographic lessons," and "cultural/political lessons."

The economic lessons that we might look for would be answers to questions like the following: What are the economic implications of the demographic shocks that we are seeing? Will population aging, or slower population growth, reduce output per capita?

The demographic lessons would provide us with help in forecasting what exactly is going to happen on the demographic front. That is, what will be the behavior of population in response to the kind of shocks that we are seeing? Do we expect to see fertility rates in Europe rise back to replacement levels? Do we expect to see a stabilization in population size and/or age structure?

The cultural/political lessons would cover how countries respond to these demographic shifts and to the large immigrant flows that will likely be occasioned by them.

ECONOMIC LESSONS

The facts of demographic change in the industrialized countries are pretty well known, so I will mention just two. First, in coming decades, population and labor force will be growing more slowly than at any time in the last century; in many cases, populations will actually be shrinking.

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For example, between 2000 and 2050, the populations in both Japan and Italy are expected to shrink by 28 percent, if current fertility trends continue. The economic consequences of low or negative population growth per se are probably fairly minor. That is, it would not be hard to imagine Italy fifty years from now as a prosperous country that just happened to have 28 percent fewer people. What makes low population growth have a large economic impact is the second well-known fact: that slow population growth is accompanied by a massive change in the age structure of the population. In Italy, the median age of the population is forecast to rise from 41 years to 53 between 2000 and 2050. In the OECD as a whole, the fraction of the population ages 65 and over is forecast to rise from 12 percent in 1990 to 17 percent in 2025.

Why is this rise in the fraction of the population that is elderly so important? I want to argue that the simple answer to this question is not the right one. The simple answer is that old people have to be supported, and so more old people means a greater dependency burden. This simple answer is wrong, for at least three reasons that I can think of. First, while it is true that slower population growth means more old people, it also means fewer children, who also place a dependency burden on society. The total dependency rate—that is, the number of children and elderly, divided by the number of working-age adults—will not be all that much higher in the year 2030 than it was at the height of the baby boom in 1960. The second reason that having a lot of elderly people is not necessarily a problem in and of itself is that old people are increasingly healthy and capable of working. Simply counting the number of people above a certain age misses this phenomenon. Finally, the rise in the burden of old-age dependency currently forecast has an effect on potential consumption per capita that is small in relation to the effect of economic growth. For example, in the United States, the expected rise in the fraction of the population that is elderly over the period 2010 to 2030—that is, when the baby boom retires—will have the effect of reducing potential consumption by roughly 0.5 percent per year (Weil 1997). Given trend consumption growth of roughly 2 percent per year, this effect of aging is slightly unpleasant, but not terrible.

So a high percentage of the population being elderly is not, in and of itself, a reason to predict economic catastrophe. What raises the danger of economic catastrophe is the institutional context in which this aging is taking place. Specifically, most old people in most industrial countries are supported by the government. It does not have to be this way, of course. Old people could be supported by their families, as are children; or they could be supported by their own savings, as are the inhabitants of many of the models that economists build. But at least for now, the fact is that most elderly people are supported by public pension programs—and given the ever larger fraction of the electorate that is elderly, it is likely to stay that way.

These public pension programs pose two problems. The first problem is that, in addition to supporting dependent elderly people, public pension programs seem to do a remarkably effective job in inducing perfectly healthy people to leave the labor force at ever younger ages, which of course only worsens the fiscal problems associated with aging (Gruber and Wise 1999). The second problem is that these public pension programs are funded by distortionary taxation. As the programs get bigger, the marginal distortion associated with every additional dollar of benefits grows. In the United States, where the population is still growing, the Social Security system will be able to muddle through for the foreseeable future with only minor tinkering. But in many other countries, demographic change will rapidly push tax rates for existing public pension systems to unsustainable levels. It is really the potential burden of high tax rates to support government pension programs, rather than the fact of aging per se, that constitutes the great danger of the current demographic trends.

Unfortunately, history is not at all helpful to us in thinking about this particular economic mess. Not only is the rise in the fraction of the population that is elderly unprecedented, but retirement is also a historically new phenomenon, as is the massive transfer of resources to the elderly through the channel of government. (For the case of the United States, see Miron and Weil 1998.)

DEMOGRAPHIC LESSONS

The driving forces behind the demographic trends in the industrial world are falling mortality, to a small extent, but mostly the dramatic decline in fertility rates. In many rich countries, populations are not coming close to reproducing themselves. In the United States, the total fertility rate (TFR) in the year 2000 was 2.1 children per woman—that is, exactly the rate that leads to a population reproducing itself. In France and the United Kingdom, in the same year, the TFR was 1.7; in Germany and Japan, 1.4; and in Italy 1.2 children per woman. Some of this reduction in fertility rates is due to what demographers call the "tempo effect": If women in a country choose to delay childbearing, then a temporary reduction in the fertility rate that we measure will follow, but there will not be a long-term reduction in population growth rates. But in many countries, the period of below-replacement fertility has lasted long enough that it is now clear that more than the tempo effect is at work.

These fertility shifts are the underlying cause of the seismic shifts that we are here to talk about. So what can demographic history tell us about what to expect for the future? Specifically, does demographic history give us any reason to believe that fertility in the industrial countries will move back up to the replacement level?

The key point that I take away from Livi-Bacci's work is that

Figure 1
The Malthusian Model
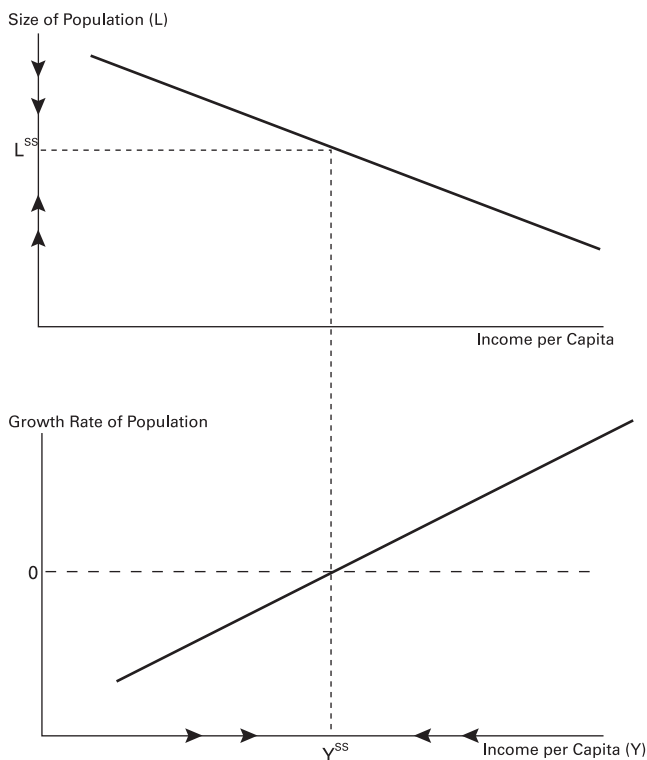
Note: ss= steady state.

traditional demographic structures were homeostatic. That is, when they were subject to shocks, they tended to rebound. If this same homeostatic tendency is still present, then this seems like good news on the fertility front. We can expect fertility rates to return to the level consistent with population replacement. But before jumping to such a conclusion, we should think about the *source* of the homeostatic tendencies in the historical populations that Livi-Bacci has studied. Here I cannot help but invoke the name of the patron saint of homeostatic population models— and the most dismal economist of them all—Thomas Malthus.

Figure 1 is a simple representation of Malthus's model. The upper panel shows the relationship between income per capita and the size of the population. For most of history, land was one of the most important

inputs into production, and a higher population meant a lower quantity of land per capita, and lower income per capita. Thus, income per capita is a negative function of the size of population. The lower panel shows the relationship between population growth and income per capita. For most of history, population growth has been a positive function of income per capita. When there was enough to eat, population grew. In times of scarcity, population shrank, either because of malnutrition or the deliberate suppression of fertility. The Malthusian model is, of course, homeostatic. Population size will adjust until income is at the level consistent with zero population growth.

Most of the demographic shocks that Livi-Bacci discusses in his paper can be understood within this simple framework. Consider first the effect of a plague or war that wipes out a significant fraction of the population. A reduction in population will raise the level of income per capita and temporarily raise the rate of population growth. Eventually, the lost population will have been replaced, income will have fallen to its pre-shock level, and the growth rate of population will return to zero. (In Figure 2 this sequence of events is shown as a movement from point A to point B and then back again to point A.)

The other shocks that Livi-Bacci discusses are those to productivity. A great example of a productivity shock is the introduction of the potato into Ireland in the eighteenth century. In our diagram, a positive productivity shock of this sort is represented by a shift outward in the curve relating income per capita to the size of the population. The initial effect of the shock is to raise income per capita and the population growth rate. Over time, higher population growth will raise the level of population to the point where income per capita is once again consistent with zero population growth. (In Figure 3, the initial increase in productivity is represented by the movement from point A to point B, and the subsequent rise in population is represented by the movement from point B to point C.) In other words, the long-run result of higher productivity will not be richer people, but rather more people at the same level of income per capita.

Is this homeostatic process still operating today? We have little reason to think that it is. First, the economic and demographic mechanisms that underlay the Malthusian model have altered radically. Up until the last century or so, higher incomes led to higher population growth. In the industrial countries there now seems to be little relation between population growth and the level of income per capita, while in the developing world the Malthusian relation seems to have inverted, so that higher income leads to lower population growth—as a famous United Nations conference concluded, "Development is the best contraceptive." (Interestingly, in much of the former communist bloc we are seeing that *lower* incomes also lead to a reduction in fertility.) Similarly, the effect of population density on the level of income per capita, shown
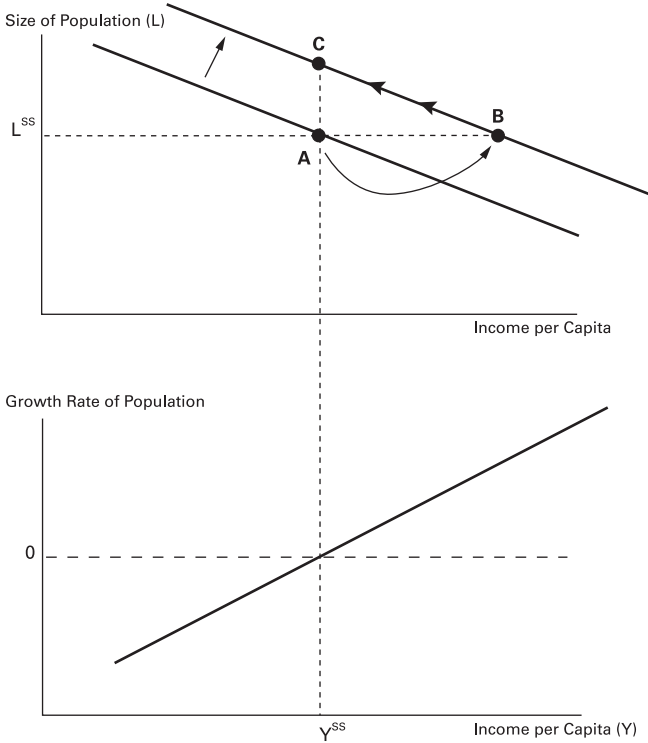
Figure 2
The Effect of a Negative Shock to Population in
the Malthusian Model
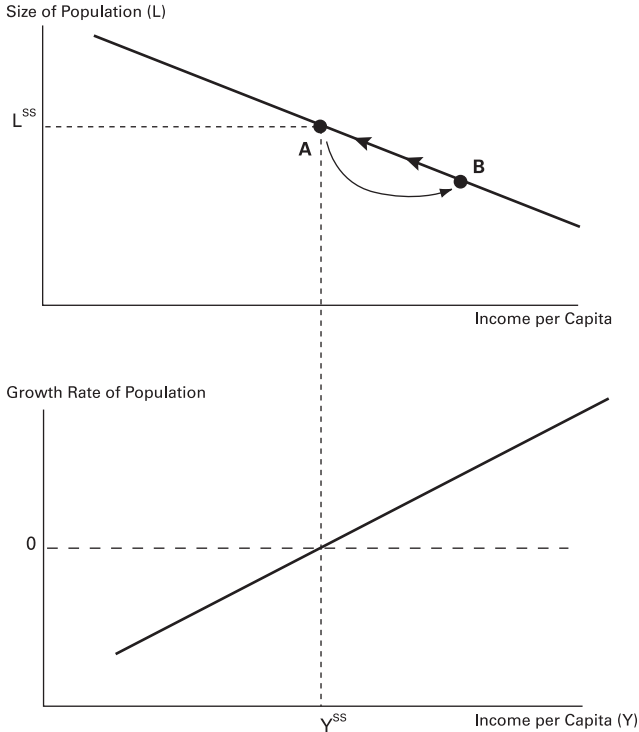
in the top panel of the Malthusian diagram, has also gone away: Land is now a relatively minor input into production, and countries that are populous relative to their natural resources, such as Japan, can get along quite well on imports.

    The second reason that the lessons of the Malthusian regime are probably not applicable today is that the nature of the shocks that impinge on the population is so different. The historical sources of shocks were plagues, wars, the discovery of new land, or improvements in productivity like the arrival of the potato in Ireland. But the "shock" that underlies the current seismic shift looks like none of these things. Rather, it is a change in preferences: People simply *want* to have fewer children. Why that is so is a fascinating question, but it is not one that is likely to be answered by looking to history.

Figure 3
The Effect of a Productivity Shock in
the Malthusian Model

Size of Population (L)

L^{SS}

C

B

A

Income per Capita

Growth Rate of Population

0

Y^{SS} Income per Capita (Y)

Once we are outside the Malthusian world, the homeostatic tenden-
cies that Livi-Bacci discusses are no longer present. There is nothing
natural about zero population growth, and, thus, no particular reason
why we should expect fertility in any country to be at or near the
replacement level.

Cultural/Political Lessons

Since I am even less qualified as a cultural or political analyst than I
am as a demographer, I will only sketch out why I think that the
cultural/political area is one where history may have some useful lessons

in thinking about current events. The issue on which I will focus is immigration, in particular in the context of Western Europe.

Failing a dramatic restructuring of public pension programs and a rise in the retirement age by something like a decade, the only way that Western Europe is going to avoid a serious demographic/economic mess is by becoming much more open to immigration. As I mentioned earlier, the coming rise in the burden of old-age dependency was caused by a dramatic fall in fertility. But this problem of aging cannot be fixed by a turnaround in fertility. The reason is simply that even if fertility did suddenly rise, the new workers thus produced would not come on-stream right away. Indeed, the immediate effect of a rise in fertility would be to worsen dependency burdens for the next two or three decades.

The only potential source of needed workers is immigration. As Livi-Bacci shows in his paper, both immigration and emigration have played a stabilizing role in European history. France after World War I, and all the Western European industrial countries after World War II, made up for population losses with immigration; Ireland after the famine of 1846 reduced excess population through emigration.

How much immigration would be required to prevent population aging from leading to an economic disaster? According to a recent United Nations report, the European Union will need 50 million to 75 million immigrants over the next fifty years. There is an ongoing debate about whether Europe can cope with such a large flow of migrants. The issues are not economic, as far as I can tell, but rather cultural and political.

It seems as if this is a question that history may be some help in answering. At a minimum, we can look to history to answer the question of whether the proposed immigrant flow is large in comparison to available benchmarks. We can start by scaling the flow against the current population of roughly 370 million. Assuming that the immigrant flow keeps this figure from declining, a total flow of 75 million immigrants will average 0.4 percent per year. Is this a large number?

In the United States, over the period 1844 to 1910, annual immigration averaged 0.79 percent of the population, and in the peak decade 1900 to 1910, annual immigration was 1 percent of the population. Proposed immigration into Europe equals only one-half of the U.S. benchmark. This strikes me as an interesting finding. Obviously there are big differences between historical flows into the United States and current flows into Europe. For example, current immigrants are arriving into a well-developed welfare state, whereas immigrants into the United States at the turn of the century were pretty much on their own. And the United States has always been culturally more tolerant of immigrants than has been Europe. Nonetheless, this simple calculation suggests that the potential shock of required immigration into Europe is not as large as is often claimed.

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