

Demography, Technology, and All Other Things Considered

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The editors of this volume have asked us to take a long view of the world economy—and of a country closer to our minds and, for that matter, our hearts too. In many ways, this is a privilege, at least to those of us that are hammered daily with news and studies of the latest wiggle of the economic cycle. What do we care about the decades to come? Well, we definitely should, at least for the sake of our progeny (and hopefully of our old age). Moreover, within a generation, we will be approaching 2050 and this is not a long time span. In fact, most of us are likely to recall the election of Ronald Reagan, Mrs. Thatcher's backbreaking response to the British economic malaise and the end of Old Labor, Mr. Deng's opening of China, and the onset of the Mexican debt crisis, the first in a series that spanned the next decade and a half. On the technology front, the first PCs are a generation old (including Steve Jobs prescient integration of Xerox PARC's inventions in a single machine). And so is the Supreme Court decision in 1980 that permitted genetically altered life forms to be patented, a ruling contemporaneous with the momentous invention of a Polymerase Chain Reaction technique (PCR), and which allowed for the multiplication of DNA sequences in vitro; transgenic animals were invented just a year later. Both launched the biotechnology revolution.

I recount this timeline to illustrate two points. First, as we look forward, a generation seems to be a very long time. But looking backwards it appears to be quite short. The apparent illusion or asymmetry becomes most relevant for slow-moving phenomena, such as the dynamics of human population growth and many of its far-reaching economic implications. Second, some events—but not many—have consequences deep into the future, such as

China's arrival on the world stage or the turn to market-based incentives as the pillar of economic policymaking following the Reagan-Thatcher accession. While technological forecasting is a tough job, far more difficult is to judge which innovations are truly revolutionary, in the sense that they will bring a radical transformation in our work and lifestyles in the decades to come. I do not doubt that the Internet and hand-held devices will fall in this category. Despite Robert Gordon's protestations,¹ if correctly measured, this cluster of technologies and services will in all probability have far-reaching effects on productivity and the organization of work, the distribution of information, power and income, and society's overall well-being. Further, and this is not of minor consequence, for most of the world's poor, mobiles—increasingly with access to the Internet—are the only multipurpose technology which they can afford, and of which they are increasingly making productive use. As we progress through the 21st century, major consequences should also result from the ability to isolate, identify and recombine genes, thus making the available gene pool a primary resource.

This serves as background to the twin themes at the center of the global debate surrounding the problems of growth and distribution: the arguably dire long-term growth prospects for the more advanced economies, and a structural worsening in the distribution of wealth and income, the latter resulting from Thomas Piketty's central inequality thesis (the tendency for the rate of return on capital to dominate the rate of economic growth).

I would initially like to consider the consequences of observable demographic trends. This is one fundamental phenomenon affecting all major economies

in a number of significant ways. Here we take a “narrow” view, looking at it purely from a long-term growth perspective.

Table 1 presents the average annual growth rates of the working-age population (between 15 and 64 years old) of the world, the more developed and the less developed regions, and a select group of countries. The periods considered were retrospectively the two 30-year intervals from 1950 to 2010, and from 2010 through 2050, initially two 20-year intervals and a last 10-year stretch (to test if the trend was accelerating or otherwise). Here it is worth calling attention to two important regularities: first, the consistently falling rates over time; and second, the fact that this phenomenon is common to all regions.

A relevant corollary follows: Demography will be a drag on growth globally, taking away nearly 1 percent in 2010-30 and another 0.5 percent in 2030-50 on average. For the more developed regions, a significant amount has already been shaved off; and for the rest of the world, the most substantial growth-related losses still lay ahead.

- For the U.S., the greatest demographic friction will be felt in the next couple of decades, with labor contributing just 0.27 percent per year to overall economic growth. If long-term productivity (measured in terms of GDP per working-age population) grows at a rate of 1.7 percent a year, a pace to which many developed countries have converged in recent years, the U.S. economy average annual expansion will oscillate around 2 percent.² Interestingly, the U.S. will show one of the most resilient demographic dynamics among developed economies, in large measure because of significant net immigration flows (the largest globally, followed by Canada and the U.K.), that may continue unabated.
- In Europe, the U.K. has demonstrated similar demographic behavior, driven again by net immigration, though labor growth tailed

off many decades ago. Germany, for its part, will be facing a sharply shrinking labor force that will not be offset by productivity gains any larger than other advanced economies—which does not bode well for its future. It will in fact progressively lose relative economic weight on the continent (together with Italy and Spain, among others).

- In Asia, Japan is the best-known case of an ageing society and adverse demographic trends at least since the 1980s. The long-term stagnation experienced by the country is in no small measure due to the 1.4 percent yearly slowdown in labor force growth between 1950-80 and 1980-2010. The coming years do not bode well either, and it gives additional legitimacy to the claim that reforms—certainly the ones necessary to increase female labor force participation—are essential if the country is to avoid continuous long-term stagnation.
- Russia is also facing a dire demographic future, one akin to Japan’s. Beginning this decade, labor force growth will turn significantly negative, a phenomenon that will deepen in the outer years of the 2030-50 period. The economy is entering a period in which labor will contribute to arrest growth by over 1 percent per year.
- In view of its size and economic importance, China presents the most worrisome picture, with a downward shift of nearly 1.9 percent in the contribution of the labor force to growth since the 1980-2010 period. To what extent the contraction of the labor force will affect China’s economic performance is unclear, and will depend, as in all other cases, on the productivity response of the economy. Yet, China is in the midst of economic reforms reigning in capital augmentation and stimulating consumption and other related expenditures. With the decrease in investment rates, capital-labor ratios might equally come down and adversely affect labor productivity, adding (downward) pressure on economic growth.

- India for its part will also have shaved off 1 percent of its growth rates in the next two decades, compared to its post-1980 record, significantly leveraged by a spate of successful economic reforms. Yet the population drag will be most relevant in the outer years, but to a lesser extent than China, with India in fact still benefitting from a positive rate of expansion in its labor force and one that is far better educated.
- Brazil, the final BRIC, is also being dragged down by its population dynamics. Excess demand for labor in services and low productivity leading to high unit costs, explains *in part* a faltering economic performance and an arrest in potential GDP.

Two additional facts stand out. First, the demographic drag on growth seems quasi universal and quite significant among large developed and emerging economies, with the U.S. being the sole real exception. Second, Japan is not alone in the reversal of demographic “fortune”—the active labor force will be shrinking in a number of other countries in the coming decades, with not only

Russia and Germany (France being the continental exception in Europe), but also China and Brazil, among others, keeping company.

If the demographic considerations above sound over-deterministic, to an extent they are. A number of uncertainties remain beyond the endogenous elements of population dynamics, including immigration and other policies that have a direct effect on the size, age and skill-composition of the working-age population, as well as on the labor market (as in the case of Germany’s Hartz reforms of the early 2000s targeted at increasing labor force participation). Still, a reversal of slow-growth phenomena among advanced economies would depend on the technology leader—the U.S. in the foreseeable future—pushing the productivity frontier out at a faster rate, and the other advanced economies following suit.

How probable is that? Well it depends on the productivity impact of new technologies. However, one need not be a skeptic of technological progress to question the magnitude of the long-term ramifications on labor productivity of the two breakthrough innovation clusters of the 21st century:

TABLE 1: AVERAGE ANNUAL GROWTH RATES OF WORKING AGE POPULATION (15-64) WORLD, DEVELOPED AND DEVELOPING REGIONS, AND SELECTED COUNTRIES - 1950-80, 1980-2010, 2010-2030, 2030-50

Regions and Countries	1950-1980	1980-2010	2010-2030	2030-2050	2040-2050
World	1.81	1.86	0.93	0.49	0.41
More Developed Regions	1.17	0.38	- 0.26	- 0.24	- 0.25
Less Developed Regions	2.16	2.25	1.17	0.60	0.50
U.S.	1.34	1.07	0.27	0.45	0.45
Japan	1.56	0.13	- 0.82	- 1.11	- 1.01
U.K	0.22	0.42	0.13	0.11	0.16
Germany	0.35	0.15	- 0.78	- 0.82	- 0.70
Russia	1.14	0.30	- 0.82	- 0.75	- 1.01
China	1.90	1.80	- 0.06	- 0.75	- 0.70
India	1.95	2.26	1.27	0.44	0.24
Brazil	2.89	2.12	0.68	- 0.24	- 0.48

Source: Own Calculations with data drawn from United Nations Department of Economic and Social Affairs/Population Division, World Population Prospects: The 2012 Revision, Volume I: Comprehensive Tables, New York, 2013.

those built around mobility/Internet and those of the biotech revolution. Even if they have a sizeable impact, it is unlikely that GDP per working-age individuals will advance far beyond today's pace. Gaining 0.2 to 0.3 percent—a considerable jump—would still mean that the U.S. potential GDP would not expand much above 2 percent a year, potentially reaching an annual rate of 2.5 percent in the outer years in the most optimistic technological scenario. This is how things could play out for the U.S., the most dynamic of the developed economies. The others will be converging to a long-term growth rate of just 0.5 to 1.5 percent, as their working-age population continuously shrinks, depending on the extent of an outward shift of the productivity frontier.

Whatever the case may be, the social fabric will be strained in an environment characterized by a fast ageing population and increasing old-age dependency ratios (of those aged above 65 to the cohort aged 15-64), growing demands on public services, higher taxes and lower (public and private) savings rates.³ This will not be helped by a combination of lower growth rates and very likely a higher return on capital, as savings will be drained by pensions and public services, reaffirming Piketty's prediction of a more unequal distribution of wealth and income.

The story for Brazil and other emerging and developing economies will only in part be different, insofar as the demographic dynamics do not fundamentally diverge, with the reduction in the rate of growth of the working age population following a similar step function behavior (when examined by comparing long periods as in Table 1). What is specific to those countries is their distance to the technology frontier, which could still translate into higher than average catch-up growth.⁴

To what extent is this going to be a quasi-exogenous or "unconditional" process, in the sense that the inter-country productivity and income differentials will lead technology and capital to automatically percolate down in search of higher returns or new opportunities (the ultimate reflection of inherited

endowments)? Or, will this flow depend in large measure on the quality of economic policies, in addition to country-specific factors? Undoubtedly there are elements of both, but if by convergence one understands the progressive narrowing of the income per capita gap—and not simply labor productivity levels in manufacturing—most emerging and developing countries will have an uphill battle to narrow the very significant differences in levels of labor productivity.

These differences reflect a broad set of factors. They range from firm-specific characteristics as they relate to workers and management skills and levels of competence, to the intensity of efforts in innovation and product differentiation, to the broader issues related to economy-wide factors. The quality of infrastructure to the overall business environment, including issues related to taxation, regulation and the quality of government are also important factors. In this regard the evidence is overwhelming: Good policies and institutions matter, and they matter most the farthest away a country is from the frontier.

However, they matter not only in the sense that firms in open and supportive environments perform better in domestic and export markets, learning from competitors, suppliers and buyers, and thus profiting from new business methods, practices and technologies. Policies and institutions also influence—and often determine—the cross-sectoral allocation of resources. Erratic macroeconomic management and distortionary microeconomic interventions can bring about long-term adverse effects on productivity by redirecting the flow of resources away, for example, from manufacturing into rent-seeking activities and less productive sectors. In so doing, they artificially accelerate the long-term trend for industry to recede (as did agriculture) and services to gain a higher share of GDP.

This phenomenon of precocious ageing of manufacturing resulting from misguided policies—ranging from an overvaluation of the exchange rate, ad hoc protectionism, discretionary incentives

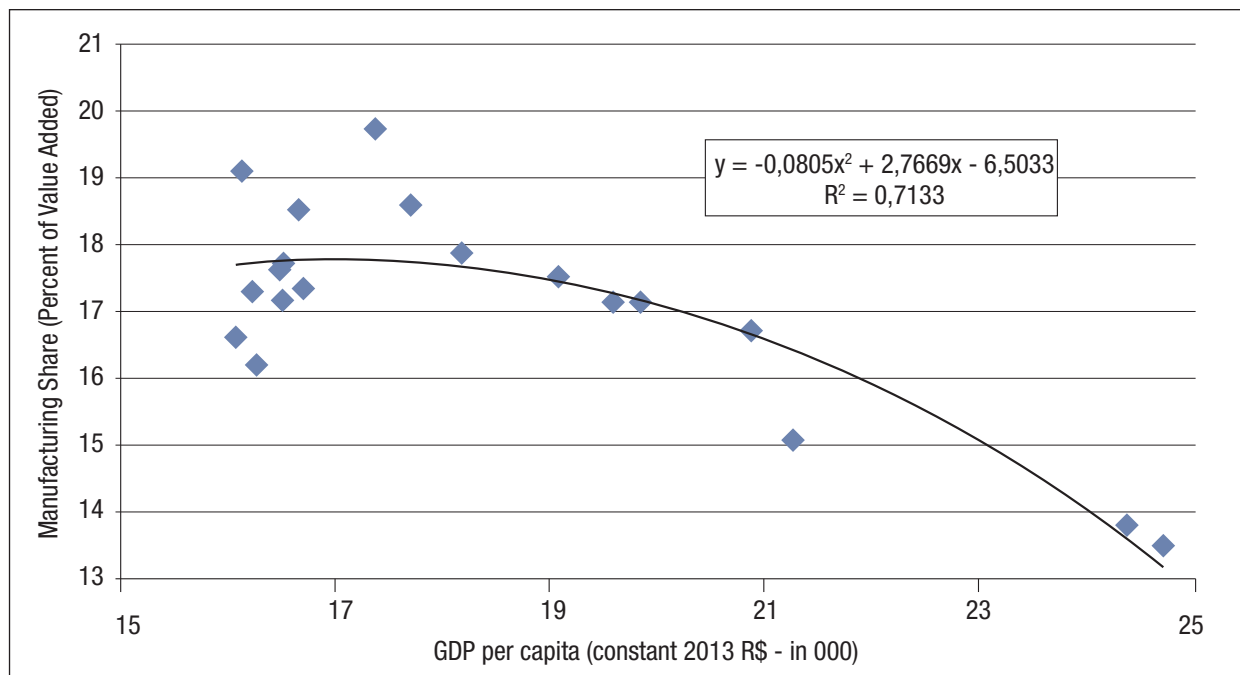
and price controls that ultimately harm sectors with strong comparative advantage—seem to lie behind Brazil’s regression in recent years (Figure 1). To the extent that manufacturing still stands at the center of innovation and productivity gains, the premature loss of substance will no doubt affect the ability of the country to move at sufficient speed towards the technology frontier in the coming years. It is no coincidence that economic growth rates have petered off while manufacturing has ceased to be an engine of growth. It will take major reforms for the country to aim once again to catch up with the technology leader in the coming decades to partly compensate for its demographic dynamics. With total factor productivity expanding at a rate between 0.5 and 1 percent in the bonanza period of the 2000s and possibly turning negative in 2012-14, and the economy facing a more adverse demography already reflected in high unit labor costs, the country is in a low growth trap made worse by a slowdown in its working-age population.

The challenges posed by the two revolutionary clusters of technology organized around major advances in information technology and life sciences, and

the stream of new products and services which will in all likelihood bring implications for the economy and society beyond what we can currently envision, will make the ascent steeper for all followers, including Brazil. What is now required are policies which simultaneously encourage catch-up innovation and their dissemination in the economy. For large middle-income countries manufacturing will remain instrumental in creating, adapting and disseminating innovations for years to come. Yet, manufacturing is being reinvented with advanced services, and protection from the forces of competition and the winds of innovation will not help. To the contrary: In an interconnected world, such policies should facilitate access to people, information, ideas and products. The globe is becoming an enormous “hack space” with firms, organizations and individuals coming to share tools and knowledge. Countries need to adapt and profit from this fact—not fight it.

The story of a long string of policy mistakes hitting previously vibrant and relatively sophisticated manufacturing sectors is hardly exclusive to the Brazilian experience. One should thus be beware that unconditional convergence is not a given

FIGURE 1: BRAZIL - MANUFACTURING INDUSTRY AND GDP PER CAPITA 1995-2013



Source: Own calculations based on IBGE and Ipea data.

anymore in times of demographic headwinds, more intense competition in world markets, and a less accommodating social and political environment in advanced countries. Emerging and developing economies will need to redouble their efforts at reform and openness. Misguided policies, if systematic, will bring about long-term effects that may trap these economies in a low-level equilibrium from which they will need to lift themselves by their bootstraps, with little help from the outside. Developed economies will then have their own problems to deal with. Convergence will become a mirage for years to come.

References

- Gordon, Robert. 2012. "Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds", NBER Working Paper 18315. <http://www.nber.org/papers/w18315.pdf>
- Moody's Investor Services. 2014. "Population ageing will dampen economic growth over the next two decades." https://www.moody's.com/research/Moodys-Aging-will-reduce-economic-growth-worldwide-in-the-next-PR_305951
- Nuño, Galo, Pulido, Cristina, and Ruben Segura-Cayuela. 2012. "Long-run Growth and Demographic Prospects in Advanced Economies." Bank of Spain Occasional Papers 1206.

Endnotes

1. Gordon (2012)
2. For a more detailed discussion, see Galo Nuño et al. (2012).
3. A 1 percent rise in the old age dependency ratio is estimated to lead to a 0.5-1.2 percent decline in the average savings rate as noted in Moody's Investors Services (2014).
4. What may also be different is the prediction regarding growing inequality at least over the medium term. In contrast to countries with a social-democratic tradition, some emerging economies such as Brazil had as point of departure already very unequal distribution of income. Thus significant improvements in education, in the context of a tight labor market partly driven by the new demographic dynamics, combined with cash transfers for the poor, could mean not only lower poverty levels but a less unequal income distribution. This is in a nutshell the recent Brazilian experience. Is this benign trend sustainable over the longer term? It is still an open question. China's point of departure, on the other hand, was a great measure of equality borne out of the 1949 Revolution, Deng's reforms were accompanied by a concentration of wealth in the hands of a new class of entrepreneurs and well-connected individuals. The Chinese shift towards growth being driven by domestic consumption and families being protected by a more comprehensive social safety net (combined with an overt fight against corruption) is in fact a massive experiment in the social engineering of arresting inequality. Both the Brazilian and Chinese stories may still show that Piketty's prediction may not be foolproof.