Economic growth: when is it balanced and sustainable?

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There is a challenge for any scholar writing about a specialized field to a general audience. Every discipline has its own terminology and concepts that themselves stem from the writers and discourse of its own intellectual history. This challenge is special in the case of economics because it plays such an important role in our world so one ought not hide behind technical jargon. Moreover, everyone has some knowledge of and indeed personal experience within an economy. Economic words have their own meanings in general discourse, but these meanings are almost always less precise. Dialogue can be especially challenging when writing to an audience of ecclesiastics because the Church is in-the-world-but-not-of-the-world, whereas economics in both its substance and dominant ethics is decidedly worldly.

Yet, the need for dialogue is absolutely clear, and perhaps no other topic underscores this as much as the topic of economic growth. Economic growth – together with employment – has become a nearly universally agreed upon goal among policy makers in every country. It is something assumed in wealthy economies and a much-desired goal among the poorer countries. And yet, for both Catholics and non-Catholics, the questions of whether it is balanced among peoples and whether it is sustainable become paramount questions in a world threatened by climate change and increasing polarization. There is a tension among three presumptions in the general population. The first is that economic growth is absolutely necessary, the second is that growth is either not beneficial to those who need it or unsustainable, and the third is that growth alone is not enough.

The words of Pope Francis epitomize this tension, insisting that sustainability and equity must be essential guiding principles of any growth. Rejecting the idea of unlimited growth and insisting on *sustainability*, he writes, "It is based on the lie that there is an infinite supply of the earth's goods, and this leads to the planet being squeezed dry beyond every limit. It is the false notion that "an infinite quantity of energy and resources are available, that it is possible to renew them quickly, and that the negative effects of the exploitation of the natural order can be easily absorbed." (LS, 106) Similarly, while accepting that growth is necessary, he insists that it needs to be *balanced* to include all people, "Growth in justice requires more than economic growth, while presupposing such growth: it requires decisions, programs, mechanisms and processes specifically geared to a better distribution of income, the creation of sources of employment and an integral promotion of the poor which goes beyond a simple welfare mentality." (EG, 204)[1] Once again, it is not only the Church that has these concerns. It is telling that in 2015, when the United Nations' "Millenium Development Goals" expired, they were replaced by the "Sustainable Development Goals", a broader list of development goals that included poverty, gender equity, and environmental sustainability among many such goals.

In this chapter, I will start with some necessary clarification of terminology, discuss the past empirics and current theories of growth, and finally address the extent to which and conditions under which growth is balanced, sustainable, and worthy of pursuit.

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[1] Pope Francis, *Evangelii Gaudium*, 2013 https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Terminology

A first step is to define what we mean by economic growth, balanced growth, and sustainable growth, respectively. Strictly speaking, *economic growth* at the level of the country refers to a growth in the productive capacity of a country or national income, typically measured by real gross domestic product (GDP) or gross national income (GNI), which equals the growth in the sum of the market value of all final goods and services produced and all earnings to both workers and owners of assets. "Market value" means that goods and services are valued at the prices that people paid for them. These values are "real" in the sense that they are net of a misleading measure of growth that could otherwise come from overall growth in prices, i.e., inflation. Typically, economic growth can come from two forces, a growth in the overall workforce or population, and a growth in average incomes (per worker or per capita). The latter is typically the primary focus because it relates more closely to overall living standards and economic welfare, and indeed economic growth in per capita terms is often short-hand for growth. But population growth is an important consideration too because it is often accused of undermining environmental sustainability in popular theories, but plays a more nuanced role in the serious study of population.

The question of whether growth is *balanced* is an important question to growth economists, both in theory and empirically. Economists' idea of balanced growth from a mathematical perspective where all segments of the economy grow at a constant rate, so that key ratios remain constant. For example, balanced growth could have sectors of the economy growing at the same rate, or capital income/capita and labor income/capita growing at the same rates as well; the former grows because capital is accumulated at a rapid rate, while returns on capital (or interest rates) are relatively stable, the latter grows because wages and labor productivity grow over time. The Church surely views the issue of "balanced" from a justice perspective, of whether the increase in income is fair in that all segments of the economy benefit from growth. There is a particular concern for marginalized groups, the poor, the rural, the agrarian, etc. Indeed, the Church's concern with "balance" in the economy would largely be understood in economic terms as "inclusive growth", where all populations benefit, or an even stricter criterion of "pro-poor growth", in which poor populations disproportionately benefit in order to reduce inequalities in the economy.

Lastly, the issue of sustainability is important. *Sustainability* could be viewed from (at least) two perspectives. Sustainable growth could mean growth that is in harmony with the natural environment, or even protecting and improving the environment, rather than harmful to it. A somewhat weaker criterion is that sustainable growth is growth that is not so harmful to the environment that it eliminates the possibility of continued growth. One can see from the above quotes of Pope Francis that he has both in mind when he cautions that our current growth is unsustainable.

What do we know about economic growth?

There is a lot we know about economic growth, and at the same time, many, many open questions. I will start by reviewing what we know.

The first thing we know about economic growth is that persistent growth in per capita income, the type that improves living standards, is a relatively recent phenomenon. Looking back at history

from the standpoint of the last 18th century, Thomas Malthus, the famous Anglican priest and demographer/economist, observed the historical lack of growth in living standards. His theory posited that despite continual increases in mankind's capacity to produce, living standards for the working masses continually hover at a level barely satisfying subsistence. He blamed population growth, which increase the demand for food whenever the capacity to produce food increased, and he argued that the exponential nature of population growth would always be more powerful than any growth in capacity to feed the population.

Since then, a great deal of historical economic research has verified that Malthus' theory – both his predictions for living standards and the role of population growth in stabilizing income – had been overwhelmingly correct for thousands of years. Historians are able to measure living standards directly using detailed data on wages and prices, and indirectly using things like life expectancy and height, since health is greatly impacted by income when people's primary expenses are food, clothing, and shelter. Living standards in 4th century Egypt were not too different from those in England in 1750, India in 1950, or Jerusalem at the type of Christ. European incomes were highest in the mid-14th century, just after great famines and the bubonic plague had wiped out much of the population of Europe.

All of these time periods are very different than the world we live in today, however, and it is an interesting irony of history that Malthus' predictions were beginning to fail precisely in the time (the end of the 18th century) and place (Manchester) that he wrote his famous work (published in 1799). Since then, the global population has grown over 8-fold an exponentially to its current level of nearly 8 billion people, far beyond even the most optimistic predictions among Malthus' followers for what would be "sustainable" by the earth. At the same time, however, our productive capacity for food, and income more generally, has grown even faster. Global income has increased roughly 120-fold over the same period. This rapid growth has led to a dramatic an increase in material living standards for most of the world. For example, world income per capita has increased roughly 15-fold and food is also plentiful. Indeed, obesity has now become a larger health issue than hunger in most countries.

The second key point is that economic growth is the most powerful engine we know of for increasing material living standards and lowering poverty. Indeed, the past 50 years have witnessed the most dramatic reduction in poverty that the world has ever known, the driving force has been the growth miracle economies of Asia, starting with the Asian Tigers of Hong Kong, Singapore, South Korean, and Taiwan in the 1960s, and followed by countries like Indonesia, Malaysia, Thailand in the 1970s, and China, India, and Vietnam in the 1980s and 1990s. Consequently, the absolute number of people living in ultra-poverty (i.e., on less than roughly $2.25/day in real terms) has fallen from roughly 1.5 billion to roughly 700 million today with vast majority of the reduction coming from these countries.

A third key point related to this is the tragic consequences of centrally-planned economies for economic growth and poverty, especially in comparison to market-based economies. Multiple clear "natural experiments" abound. At the time of division of Korean, North Korea contained the industrial center of the country (Pyongyang), but South Korea pursued a market-based economy, whereas North Korea pursued central planning, and 65 years later, average incomes in South Korea are nearly 20 times higher. Consider the division of Taiwan and mainland China, where the former

pursued a market-based economy after losing the civil war and fleeing to Taiwan. Average income in Taiwan grew much faster before China moved away from central planning, and remains roughly three times as high today. Consider China before and after Mao, who was the architect of their central planning approach. In the 28 years under Mao from 1950 to 1978, average incomes failed to double, while in the 28 years after Mao it quadrupled. Again, this is growth that impacts poverty. Under "the Great Leap Forward", Mao's central planning attempt to forcefully industrialize between 1958 and 1962, the Chinese economy collapsed with too few resources in agriculture. This man-made famine was disastrous and rivals the second World War in terms of its death toll. Similarly, North Korea has suffered repeated famines, and both famine and malnourishment remain pressing problems and risks for North Korea to this day.

A fourth key point is the form that growth takes, which is decidedly not balanced along many dimensions. Economies undergo what we call "structural transformation": agriculture shrinks as a share of the economy, while the service sector increases. The industrial sector (i.e., manufacturing, mining, construction) typically increases over a period of industrialization and then later declines as the economy deindustrializes. These patterns are not uniform across all economies, but they are quite pervasive and understandable. The first reason for this is a trend in relative demand: agriculture (e.g., food) is needed for survival and requires much of economic efforts at low incomes, but as countries get wealthier their demand becomes satiated and shifts toward other goods. The second is a trend in supply: typically, productivity growth in agriculture and manufacturing is faster than in services. The technology we use to grow food is substantially different in the United States today than it was a century ago, but the technology for giving haircuts or trying lawsuits is largely unchanged. Hence, the relative price of services like haircuts, lawyers, and higher education, and healthcare rise relative to the prices of food, cars, and computers, and increasingly more resources are used to produce the former. Even within sectors, we see shifts, however: for example, higher education and healthcare are increasingly purchased as a country gets wealthier, while the share of transportation or retail services decline.

Moreover, when the share of agriculture doesn't shrink it is often because technology does not spread to this sector and many workers stay employed in subsistence agriculture using traditional methods. This leads to large income gaps between agricultural workers and industrial workers, rural workers and urban workers, and within cities those who work in the formal, high productivity sector, and those who live in peri-urban slums and often work in the informal sector. Thus the imbalances in economic growth can lead to genuine gaps in standards of living, especially when the economy doesn't respond flexibly to these forces of change.

A fourth key point is the driving engine of growth. What changed around 1800 was the advent of the Industrial Revolution, which started around in England, spread then to Western Europe and North America in the 19th century, then in the 20th century increasingly to Southern and Eastern Europe, then Latin America, and East Asia, and is gradually spreading into Africa now in the 21st century. But how do economists understand the Industrial Revolution? Clearly, the start of the Revolution involved the use of machinery and power to mass produce goods using the factory system. But the idea that amassing capital alone is the engine of growth is a fallacy. An increase in capital without a corresponding increase in know-how leads to diminishing returns – each additional unit of capital leads to less and less additional output. Eventually, people would need to spend all of their time making machines. The cost of producing the capital exceed the additional

output that the capital provides, and so this type of growth is not sustainable because it quickly peters out.

Indeed, mass production requires many different smaller revolutions, like revolutions in transportation and shipping like canals, railroads, automobiles, aircraft to bring goods to markets and services, revolutions in telegraphs, telephones, and the internet in order to communicate, market, and manage supply chains. Revolutions in business and organizational techniques and finance. Revolutions in chemicals, metallurgy, materials science, medicine, and electronics in order to produce new goods and services. All of this requires innovation.

A core reason that innovation is such a strong engine for economic growth is because the ideas that come from innovation are *non-rival*. Capital and labor are rival. My use of a laptop prevents you from simultaneously using it, and if I work on typing this paper, I cannot simultaneously be teaching my students. But your use of the knowledge in this chapter does not diminish my own knowledge, nor prevent me from using my knowledge. Indeed, the same knowledge can even be sparking new ideas in each of us simultaneously.

Moreover, we can also immediately see one of the central reasons that markets are so important for growth. Sometimes innovation happens accidentally, but generally it is intentional and in response not only to a perceived human need but a perceived ability to earn money from it. The existence of markets and profit motives therefor drive both the development of technologies (i.e., innovation) and drive the spread of new technologies. The cell phone is a clear recent example. The profit motive has led to its invention, rapid improvement (from flip phone to smart phone), and its spread across the globe. Samsung learned from Apple, who in turn learns from Samsung and other companies. And the pace of innovation and the spread of new technologies has increases. All of this happened at a rate much faster than for earlier innovations like the steam engine, railroad, and even electricity.

A fifth key point is that population has both positive and negative impacts on growth. Whereas Malthus saw population growth as a detriment, since more people simply leads to less rival resources (land, capital) per person, today's growth economists appreciate that larger populations lead to more innovators, more learning from one another, and faster rates of technological progress. Growth also depends on the degree to which ideas are shared, e.g., the openness of the economy to things like trade and foreign investments, and the level of education and technical training in an economy. All of these are things that economists emphasize as important for growth.

Is growth sustainable?

With a better understanding what economic growth is and the forces behind growth, we can now address the extent to which it is sustainable.

First, we can see that the idea that the finiteness of the material world necessarily limits growth is based on a misunderstanding of the economy as being made of material things. Certainly, there is a theoretical limit to the amount of a material good like food that we can grow or produce, regardless of innovation, since the matter in the universe is finite. Still, our discussion and understanding of economic growth implies important caveats to this claim. First, much of

economic growth, especially as economies become wealthier and move away from agriculture in industry, is immaterial. The value of services produced is only a function of the productivity and labor required for them. Second, growth is the *value* of what is produced, and we might increasingly produce things of greater value. This could be true even for material goods. Truffles require less matter but are valued much more than potatoes. Many goods, like a book or computer, are valued for the immaterial ideas and technologies that are present in them. Few economists would argue that the material finitude of the universe limits growth conceptually, at least not the way we measure things.

Second, one can see that the above argument strongly hinges on the value people are willing to pay for various goods and services. Are truffles really of more value than potatoes? They are certainly not more valuable on the basis of nutritional content and less able to sustain life. But on the margin, truffles are scarcer, and those who buy them are willing to pay more for them than for potatoes which are quite abundant. Yet, there is this general sense that unbalanced nature of economic growth leaves us increasingly willing to spend on luxuries rather than necessities, and these may be of less inherent value. Moreover, there is the issue that of the many things for which we are willing to pay large amounts of money, e.g., everything from abortions to cigarettes to high cholesterol foods, many are clearly harmful to our well-being. Willingness to pay may be the most reasonable rule of thumb by which to value goods and services, and I believe it is, but one can see the pitfalls in the approach.

Third, it is true that our measures of growth are flawed in that we don't properly account for the depletion of natural resources like nonrenewables or clean air, even using the primitive prices/willingness to pay approach.

We can also evaluate the role of nonrenewables in growth more generally. Sometimes the unsustainability of a reliance on nonrenewables can be exaggerated because people ignore the power of innovation. In the middle of the 19th century, the economist Stanley Jevons warned that the coal mines would run out. As coal became scarcer, more coal was discovered and a rising price of coal was an important incentive in this discovery. Moreover, innovation has led to newer sources of energy as the economy moved to oil and natural gas, and increasingly carbon-free sources like nuclear, hydroelectric, wind and solar. Over 160 years later, we still have coal and still rely on it. Even today in lower income countries, economic growth involves moving away from dirty firewood technology as a source of heat to relative clean energy sources.

I have emphasized the role of profit motives and technology, but I am weary of overemphasizing these. First, there are economic costs to both running out of renewables and to innovation, and these costs also involve substantial risk. To the extent that we rely on nonrenewables, we do so because doing so is deemed cheaper than innovating, so costs will increase as we deplete renewables and they will do in uncertain fashion. We cannot be sure if and when renewables will run out, nor can we have certainty that our innovation efforts will be successful. Moreover, the carbon emissions from burning fossil fuels are the primary cause of climate change, and the costs of climate change are also still uncertain but estimated to be large and not easily or quickly reversible.

Yet there is a still more important reason that I should not overemphasize the role of profits and innovation. As Pope Francis writes:

> Their behaviour shows that for them maximizing profits is enough. Yet by itself the market cannot guarantee integral human development and social inclusion. At the same time, we have "a sort of 'superdevelopment' of a wasteful and consumerist kind which forms an unacceptable contrast with the ongoing situations of dehumanizing deprivation", while we are all too slow in developing economic institutions and social initiatives which can give the poor regular access to basic resources. We fail to see the deepest roots of our present failures, which have to do with the direction, goals, meaning and social implications of technological and economic growth. (LS, 109)[2]

Pope Francis correctly points out the choice between the direction that technologies take as a moral choice and not one a choice that can be left to market forces or profit motives. This moral imperative is never so clear as when it comes to climate change. As a discipline, economics agrees with the pope that profit motives can distort decisions, and this would be the case even if prices were to correctly reflect values. The reason is that without intervention, pollution itself is not priced or costly to the producer, and it can unfortunately be highly profitable. When only profits are considered those making decisions can therefore rely too much on nonrenewables and pollute too much. Economists emphasize the inefficiencies, but Pope Francis also correctly points out the injustice of pollution and climate change as another dimension that needs to be addressed. The burden of pollution and climate change disproportionately impacts the poor, who generally live nearest to pollution outlets and whose livelihoods are more impacted by climate change because they live in areas that are already warmer, and rely more heavily on agriculture. There are even islands that are projected to fully disappear because of rising sea levels from the polar ice caps melting as temperatures rise. With all this together, a *laissez faire* approach to climate change is indeed a dangerous approach.

The other forces behind economic growth are also at play in considering the impacts of growth on pollution. Although the unbalanced transition from agriculture to industry can be bad for the environment, but the disproportionate growth of the service sector is environmentally friendly because services are not only less material intensive but also less energy intensive. Similarly, the increased urbanization that accompanies population growth is also environmentally friendly.

In light of broader pollution beyond carbon emissions, our view of growth's impact on the environment in the richest economies is more positive, even beneficial. For example, although the United States remains a high polluter, emissions of NO_X, SO_3, carbon monoxide, particulate matter, lead, and other poisons have all fallen over the past 50 years. Again, multiple forces are at play. First, like services, clean air, clean water, and health more generally are luxury goods, so that willingness to spend on these things increases disproportionately as people become richer. Second, this increasing desire for a clean environment plays out in the political economy. Recognizing that market forces are insufficient to govern pollution, the United States established the Environmental Protection Agency in 1970 to regulate pollution. Since then, population has increased by over 50%, miles driven by over 200%, and real gross domestic output by more than 250%, yet energy

[2] Pope Francis, *Laudato si',* 2015 https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

consumption has only increased 40% and aggregate emissions have (other than CO_2) have declined by 50%.[3]

This all happened through a combination of government regulations, innovation, and market forces. As gas prices rose, smaller and more fuel-efficient car technologies were developed and marketed. With government emissions testing, manufacturers introduced catalytic converters. Now we see electrical cars, which are subsidized initially, and they can be completely emission free when the electricity they use is generated using clean technologies. A combination of regulations and innovation have similarly lead to the development of energy-efficient LED light bulbs, lead-free gasoline and paints, and even cleaner incinerator emissions.

Can growth be balanced?

I have already touched on some ways in which the nature of the driving forces of growth are inherently imbalanced. Beyond this, are there other ways in which we might worry that growth can be unbalanced?

For example, if the incomes of the wealthy, i.e., those who own the bulk of the capital stock, were to grow at a rate faster than the incomes of workers, this would lead to increasing inequality and increasing wealth inequality. The well-known economist, Thomas Piketty, has argued that this will happen as long as the return on savings, r, exceeds the growth rate of wages, g.[4] Another example, if the incomes of rich countries were to grow faster than those of the poor this would lead to increasing inequality across nations.

What is the evidence of this? To start, the spread of the Industrial Revolution certainly caused great growth but also great divergence in incomes.[5] Global inequality increased substantially during the 19th century, for example. This was largely the result of the Industrial Revolution not occurring uniformly in all places at the same time. Those countries experiencing the Revolution, grew rapidly, and those stuck in traditional agrarian or feudal production did not. Even within countries, there was great regional variation, and this caused the greatest increase in global inequality. In addition, there were capitalists that were increasingly wealthy, while the wages of workers rose much more slowly.

In the rich economies of the 20th century, growth was much more balanced along many dimensions with interest rates remaining relatively stable, wages increasing proportionately with the rest of the economy, and roughly two-thirds of income going to workers and one-third going to the owners of land and capital.[6] Moreover, the combination of the world wars and the Great Depression

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[3] Environmental Protection Agency, *Our Nation's Air: EPA Celebrates 50 Years,* 2020 https://gispub.epa.gov/air/trendsreport/2020/#growth

[4] See Thomas Piketty, *Capital in the Twenty-First Century*, Harvard University Press, 2014, ISBN 978-0674430006

[5] This is studied in depth by François Bourguignon and Christian Morrisson (2002), "Inequality among World Citizens: 1820-1992" *The American Economic Review*, Vol. 92, No. 4. (Sep., 2002), pp. 727-744.

[6] These long-appreciated patterns are known as Kaldor's stylized facts after Kaldor, Nicholas (1961). "Chapter 10: Capital Accumulation and Economic Growth". In Lutz, Friedrich; Hague, Douglas (eds.). *Capital Accumulation and Economic Growth*. MacMillan and Co. Ltd. pp. 177–222. Standard theories reproduce this and confound Piketty's theoretical claims, since they predict this stability even though the interest rate exceeds the growth in wages because

destroyed a great deal of old wealth. The wealth and wage distributions within these economies both narrowed in the first half of the 20th century, and inequality fell. Much has been attributed to policies like public education, minimum wages, unionization, and progressive taxation, but it is difficult to pinpoint the precise roles these each played.

Over the past 40 years we have seen several new patterns of increasing inequality. First, there is a reversal and an expansion of the distribution of wealth. This expansion is driven not by the old historic wealthy families, but by new wealth and families arising. Although Piketty associates this widening distribution with the fall of capital taxation, the best evidence notices the rising inequality even among capitalists and therefore attributes it to increased variation in the rates of return among capital owners (e.g., Elon Musk's Tesla has had much higher growth returns than the Ford family's Ford Motor Company). Both Tesla and Ford are publicly traded, so open to anyone with wealth to buy, but some wealthy people are willing to bear more risk than others, and these either win or lose. Meanwhile, the retirement funds that most normal people hold are diversified across many, many assets, and so they grow at average rates of return.

Second, we have seen a decline in the incomes of less educated workers relative to more educated workers. This is attributed to both technological change (e.g., robotics) with favors high skill workers but replaces low-skilled workers and globalization and the new competition for work that less educated workers in advanced economies face from the poorer countries.

Third, the share of income going to workers has fallen globally, especially in the first decade of the 20th century. There are many potential culprits, including rising profit margins, rising concentration, rising power of firms over workers on various fronts, the falling price of capital equipment like computers, and globalization. The jury is still out as to what has caused this and whether it will continue.

Nevertheless, looking internationally, we have seen a convergence across nations since World War II as poor nations have caught up to wealth nations. Again, the original divergence in the 19th century was caused by some countries entering the Industrial Revolution, while others did not, but in the 20th and 21st centuries, the vast majority of countries have entered the modern economy. Since growth is driven by technologies and ideas, the poor countries have had an advantage in catching up. It is much easier to adopt new existing technologies than to invent them on your own, and this has allowed many poor countries to grow rapidly. The more engaged economies are in the global economy, the more readily they can learn and adapt these existing technologies and catch up. Those who haven't are the ones stuck in subsistence farming and other traditional production and engaged not only in little global trade but little trade within their economies.

Moreover, it turns out that differential growth rates across countries are the most powerful forces in explaining global inequality. Whereas they previously led to divergence, they now lead to convergence. Hence, it certainly appears that growth can be balanced in this fashion.

However, there is an additional question of whether growth is balanced in the sense of being inclusive and/or pro-poor.

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capitalists do not save all of their income. The growth in assets equals the growth in wages leading to stability in these income shares.

Again, thinking of the growth of countries, the general answer to the question is that the rising sea of growth tends to lift all boats, but there is a great deal of important nuance to this answer. First, the claim is not that growth increases *everyone's* incomes, *all of the time*. Instead, what we observe is that over long periods of times, the incomes of all segments of society tend to rise with growth. In countries that have grown, the poor today (e.g., the poorest 20% of society or even the homeless) are better off materially, healthier, and live longer than the poor were 50 years.

Second, there are episodes of growth, even rapid growth, in which poverty stubbornly persists or even increases. Not all growth is created the same. The nature of economic growth can lead to geographic disparities in growth. Agriculture requires land and so it entails more geographically disperse production and living. The natural tendency of countries to transition out of agriculture as they grow can lead to concentrated regions of production and population, including increased urbanization. Moreover, the roles of ideas, interaction, markets, trade, and specialization make cities centers of innovation and growth, but this can leave rural areas behind. Conversely, natural resource booms can lead to high profits without the creation of very many high paying jobs, so they can concentrate income not only geographically but strongly among the owners of these resources. For example, in Angola, a larger oil producer, rising oil prices in the 2000s yielded rapid growth and real income per capita in Angola doubled over this decade, but the fraction of people living in poverty was relatively stable over these years. When oil prices fell, and the economy lost some of its earlier gains after 2014. But by 2018, however, average real incomes were three times as high as they had been in 2000, but poverty was 50% higher than it had been in 2000, with nearly 1 in 3 people living below the ultra poor line of $2.15/ day. The spatial patterns of growth can matter for whether growth is pro-poor more generally, as aggregate growth can be driven by some booming regions (often capital or coastal regions) while more peripheral regions get left behind. Unequal growth rates within a country can be a particularly big issue when mobility is low within the country, and investments, both public and private, are uneven. Angola's oil industry is heavily concentrated but much of the country remains in subsistence agriculture, and these regions benefit little from the oil industry and capital city. Finally, government policy can impact things as well.

These forces are at play in understanding differential experiences with poverty reduction during growth. Countries like Mali and Ethiopia have seen much more rapid drops in poverty than Angola, in part because the government has invested in poverty and food security programs. Neighboring countries and former Soviet republics, Armenia and Georgia have also grown rapidly in this century. But Armenia implemented a social safety net earlier than Georgia, and its poverty rates fell more rapidly. China's decline in poverty has been widespread across the country, despite much more rapid growth in the east and south of the country, because it has had economic policies targeting regional development and has invested heavily in infrastructure projects like public schools, high speed roads, and electricity grids throughout the country. Finally, corruption can be another source of the growth being disequalizing and with its benefits concentrated among the few and with private interests getting in the way of policies that would better serve the common good. Corruption plays a big role in Russia's poverty, and yet crony capitalism has not prevented dramatic poverty reduction in China. In fairness, our knowledge of growth is not so advanced that we can always be sure of which policies to pursue and when, and sometimes government policies, even well-intended policies, can do more harm than good.

Is growth good?

I started this chapter by stating that growth is a nearly universal goal among policy makers across the world, but perhaps the most fundamental question the Christian must ask is whether this ought to be the case. Growth can have ambiguous impacts on the environment and may or not be a balancing force in society. Empirically, long run economic growth and urbanization have accompanied a decline in religiosity across many societies. Is economic growth something good to pursue? As both societies and individuals, are we gaining the world, but losing our souls?

Again, the answer is necessarily nuanced. The first thing is the materials goods of this world and even the immaterial economic goods (and services!) that we produce are at best only good instrumentally. Money and the things it can buy are good servants but poor masters. The ultimate good is a fullness of life, a life of virtue in communion with God and neighbor and in right relation with all of creation. Work plays an important role in this good life, as through work, we express our love for others by using our gifts to serve God and neighbor. This may seem far afield from economic life, but as Christians we should strive to be conscious of this wider goal, discerning it in all of our day-to-day actions. We must ask, as societies and individuals, the extent to which economic actions serves this goal. In many cases, the answer must be "no". There are goods we dare not consume, purchase, or produce, and technologies we ought not develop or utilize. Sometimes these answers must be not only individual decisions but societal decisions.

And yet in many situations, the benefits of broad economic growth toward this end are clear. We are not disembodied souls. Our bodies need nourishment, and although they can be exaggerated, striving for health is to pursue a natural good. For the poor across many centuries, the challenges of securing necessities like food, clothing, and shelter occupied much of our efforts. When infants don't die from a lack of health care, clean water, or food, this is undeniably good. In many parts of the world, such problems of scarcity are still relevant, and so, while discernment is still needed, growth for the poor and in poorer nations is overwhelmingly good. There can be great benefits of living day-to-day, including a recognition of our utter reliance on God, something reflected in the Lord's Prayer, but at the same time, securing these things can leave our spirits free to focus on the greater, spiritual goods that are more perfectly human.

Yet, the role of growth surely goes beyond necessities as well. Man is not merely a body but a rational, spirit as well, and building up societies through the art, literature, music, scientific knowledge, and invention. The Lord did not want us to be part of a stagnant world but "desired it to be lived in" (Is 45:18). Indeed, the command to till the soil and have dominion over the earth, is a command to use our gifts (and do so while respecting the earth!) Surely, many have gifts in these areas, and they are called to use them judiciously. The question to ask is not whether to do so, but how we should do so. As we expand our labor-saving technologies, physical work is becoming less necessary but ought it still play a role? This is a relevant consideration in societies where obesity itself is an increasing problem. Combined time spent working whether market labor or in the household has trended down secularly in most countries. The imaginary future in the children's movie Wall-E, where people sloth has become a prison for them and made them less authentically human is becoming less imaginary.

Now, artificial intelligence opens up the new trend of replacing our mental work as well. How will we spend our time? Humor, beauty, and merriment are surely part of God's plan for sanctity, and so leisure no doubt plays a role, but just as "idle hands are the devil's workshop" (Proverbs, 16-27), idle minds face their own temptations. Drugs, the dark side of social media, depression are all common in leisure societies, while family meals and prayer do not seem to be priorities despite more available time. How we spend our time depends on our virtues and value. Rich societies are not stronger in the theological virtues, nor even in the natural virtues.[7] And yet, even the research of secular Nobel laureate economists is reaching a consensus on their importance. Angus Deaton, together with his wife, economist Anne Case, has demonstrated that deaths of despair, those that stemming from drug and alcohol abuse and suicides have expanded, especially among the working class, despite economic growth.[8] The late Robert Fogel said that addressing the inequities in our society's distribution of spiritual goods is where the next great revolution for equality must occur.[9] James Heckman's research goes even further, identifying immaterial assets such as character formed in early childhood family relationships as being instrumental for understanding even material inequality and poverty.[10] However, families are not as easily redistributed as money, nor ought they be. These are the conclusion of secular, even agnostic, economists. Surely as Christians we ought to be able to at least appreciate these insights. Returning to the last line of Pope Francis quote above: "We fail to see the deepest roots of our present failures, which have to do with the direction, goals, meaning and social implications of technological and economic growth" (LS, 109).

There is not only temptation, however, but also opportunity. Whether we choose to do so, there is more time to spend with loved ones, including our parents, grandparents, children, and friends. There are real world problems like poverty and environmental degradation that need more of people's time and effort to address. New needs will also arise; as the population ages the "care economy" will surely grow. And there are new opportunities as well. For example, more time and access to information make lifelong learning a genuine option for people today. When traditional work of the body and mind is less necessary to provide for our bodily needs, how do we best use this newfound time to continue serving God and man? This is not a question that economists, businessman, and innovators are used to asking but it is what these market actors should be asking. It is the question we all should be asking of ourselves for our career choices, our social lives, and our private lives as well. We should be asking it increasingly, as these are the real areas for future growth!

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[7] Richer societies do tend to have lower crime and stronger rule of law, but such relationships are not automatic nor even necessarily causal. Reverse causality may be just as important.

[8] Anne Case and Angus Deaton, *Deaths of Despair and the Future of Capitalism,* Princeton University Press: Princeton, NJ, 2021, 336 pages

[9] Fogel, Robert William. *The Fourth Great Awakening & the Future of Egalitarianism*, University of Chicago Press: Chicago, IL, 2000, 383 pages

[10] James H. Heckman, "Schools, Skills, and Synapses", *Economic Inquiry, 46 (1), 2008, 289-324*