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The Future: Twenty-first-Century GDP

This book has described the origins and evolution of GDP, the measure of economic performance used all the time in the media and in the world of economic policy. GDP is a relatively modern way of measuring the size of economic output, and as we saw differs from earlier methods. For example, early definitions of “national income” did not include government spending, because governments before the late nineteenth and early twentieth century had such limited functions. Paying for war, or for the justice system, was seen as a necessary evil reducing national income, rather than a positive contribution to the economy.

Although paying for World War II was the trigger for the modern definition of GDP, after the 1930s the government also began to undertake more collective consumption and investment, spending our tax money on our joint behalf either on services and transfers, or on building roads and other infrastructure. The experience of the Great Depression had already naturally focused political attention on how fast—or not—economic output was growing, and governments wanted

both to measure and to influence it. The collection of statistics in the shape of GDP and the national accounts went hand in hand with the development of macroeconomic policy, the attempt by governments to influence growth using the tools of taxation, government spending, money, and interest rates.

The construction of GDP, along with the collection of the necessary raw statistics to do so, were not straightforward activities, even in those early days when the economy was less complex than it is now. It took decades for national accounts to be created for more than a handful of countries, and for economists and statisticians to create and refine the methods for comparing GDP over time and across countries. Adjusting GDP in dollar or nominal terms for inflation to give “real” GDP is one fundamental step. The constant improvements in the quality of products as well as the introduction of new goods and services over time have made it ever harder to calculate a meaningful general price level: today’s laptop is a vastly different machine from one bought just a few years ago for the same price, and the price of computing was infinite a few decades ago because computers did not exist. It is hard to capture this transformation in a single price index. Converting from one currency into another is another complicated task, given how significantly economies differ from one another in their structure and what consumers spend their incomes on. So international comparisons of economic performance are difficult (not that this has stopped economists from making them); and it may well be that the impression we have of the growth of different economies at different times is simply wrong.

National accounts experts have also sought to enhance their work over the decades, responding to a range of challenges in addition to these. In particular, both growing environmental

awareness and the seemingly slow progress in economic development measured by GDP per capita in many poor countries have prompted interest in alternative indicators. An old debate has been reopened, namely, whether or not a measure of welfare should replace GDP as the target for economic policy.

Economic crisis is another trigger for interest in alternative measurements. The combination of the Great Depression and World War II brought us GDP in the first place, replacing earlier notions about “the economy” and how to measure it. The crisis of the mid-1970s combined with the nascent environmental movement to prompt an initial wave of interest in new types of indicator, although these took a decade or so to come to fruition. The present crisis has breathed new life into a range of alternative approaches such as “happiness,” welfare indexes, and dashboard approaches, not to mention raising a serious question mark over the current standard method for calculating the contribution financial services make to the economy.

Is this crisis the time for leaving behind GDP and turning to some new way of understanding and measuring “the economy”? In this final chapter, I conclude that we should not be in a rush to ditch GDP. Yet it is a measure of the economy best suited to an earlier era. “GDP is a statistic designed for mass production. It’s a simple counting—the number of units made. It falls short in measuring intangible benefits. . . . Nobody ever said quantity was the spice of life,” as the Dallas Fed has put it.¹ So I also want to look at three issues that suggest we might move toward a different approach in time. The character of the economy is changing, and the way we measure it will have to change too, although exactly what the new way we think about “the economy” might turn out to be is too big a question for this book.

Those three issues are:

- the complexity of the economy now, reflected in innovation, the pace of introduction of new products and services, and also in globalization and the way goods are made in complicated global production chains;
- the increasing share of advanced economies made up of services and “intangibles,” including online activities with no price, rather than physical products, which makes it impossible to separate quality and quantity or even think about quantities at all; and
- the urgency of questions of sustainability, requiring more attention to be paid to the depletion of resources and assets, which is undermining potential future GDP growth.

COMPLEXITY

The United States in 1998 offered 185 TV channels, 141 over-the-counter painkillers, and eighty-seven brands of soft drink. These figures all represented big increases since 1970, when there had been five TV channels, five painkillers, and twenty types of soft drink. By 1998, there were 340 kinds of breakfast cereal, up from 160, and fifty brands of bottled water on offer, compared with sixteen in 1970. The number of types of personal computer had risen from zero to four hundred in twenty-eight years, the number of websites from zero to nearly five million.² Earlier, I referred to the increase in the variety of products and services that make up GDP in all the advanced economies; these specific comparisons just help indicate how dramatic the proliferation of variety has been. Indeed, variety could be considered one of the key indicators

of economic development. To be poor is to have little choice available, and the increase in possibility is the most important aspect of escaping from poverty. On this view, economic development is a combination of increasing individual capacities or skills to be able to take advantage of opportunities, and increasing the range of opportunities and choices available. Economic development is an increase in freedom. One aspect of this is the variety of goods and services available in the economy, from the trivial to the profoundly important.³

It is surprisingly hard, though, to find statistics on the number of different product types available. The Federal Reserve Bank of Dallas 1998 Annual Report, from which the figures here are taken, is one of the few estimates available even now. The main reason it is so difficult is simply that the statistics are not collected by official agencies. The surveys sent to businesses ask about volumes of output—number of pairs of shoes made by a shoe factory—and prices charged, but not number of styles. So official statistics are published as aggregate categories: “shoes.” The fact that I can choose high-tech walking boots, or running shoes that will cushion my knees and ankles, or vegan shoes, or shoes shaped to exercise my thighs as I walk, or gorgeous red high heel shoes, or ugly but ultra-comfortable sandals, or sneakers I designed myself on the vendor’s website—none of that features in the statistics.

Still, even if we haven’t been counting it, it is obvious that variety is increasing in the case of consumer goods and services we experience every day. Increasingly, we can even customize what we buy, from shoes to (famously) Dell computers—customization being the ultimate in increased variety, every item different. There is even the promise of customized medicines for fighting cancer and other diseases, drugs tailored to each individual patient’s genetic code. There

is some evidence of both the increase in variety in specific examples (such as the number of book titles published, or the number of types of breakfast cereal), and of the resulting increases in consumer welfare.

Why does this affect GDP, though? Think about a place setting for a meal. My contribution to GDP is the same whether I manufacture a knife, fork, and spoon, or three spoons. GDP just counts the number of items.

GDP underrecords growth by failing to capture fully the increase in the range of products in the economy. It is a poor way to measure innovation and customization, and the extent to which it undermeasures them is extremely large. It also fails to record at all another increasingly important category, namely, preventive goods or services. Take driverless cars for example. One of these will increase GDP by the same amount as any other kind of car, or perhaps by more if statisticians calculate a hedonic price index to adjust for its improved quality—after all, the human can sit back and relax in a driverless car. But GDP will not capture at all the benefit of a reduction in the number of accidents as driverless cars spread, assuming they live up to the high hopes that this will be the result.

In chapter 5, I noted the distinction between GDP and welfare and yet the strong link between the two. The trend toward greater choice or even customization increases the wedge between the two concepts. “We might not see faster growth rates or surges in productivity, but mass customization will pay off for America. Resources are wasted guessing what customers want. When more products are customized, we won’t squander money on clothing that sits in the closet because it doesn’t fit or compact discs with only one or two songs we really like. And goods won’t languish on dealers’ shelves. Achieving a higher standard of living with fewer de-

mands on natural and labor resources will help ease price pressures and continue this decade's good news on inflation," wrote the Dallas Fed's economists in 1998.⁴ The promises of "mass customization" they dangled before their readers' eyes in 1998 are coming to pass, including TV shows on demand so viewers, not schedulers, determine the evening's viewing; or clothing made-to-measure for the midmarket many, not just the wealthy few.

Separate statistical headaches arise from the increasing complexity of the economy, due to the fact that most goods are now "made" in global supply chains. The components will be manufactured in a number of countries, shipped around the world to be assembled in one place, and shipped back out to their destination markets. This is true of goods as apparently simple as a shirt or as sophisticated as an iPhone.⁵ China, of course, has been the main country of assembly in these global chains, but other Asian countries and their Latin American competitors Brazil and Mexico have been gaining ground.

Price indexes do not, however, capture the large price declines when outsourcing occurs, so import prices have been greatly overstated and import volumes underrecorded.⁶ In addition, trade statistics do not net out the intermediate stages: the whole value of the iPhone imported from China to the United States counts toward the U.S. current account of the balance of payments. "The traditional method of recording trade has failed to reflect the actual value chain distribution and painted a distorted picture about the bilateral trade relations. The Sino-U.S. bilateral trade imbalance has been greatly inflated," according to one study of the statistics.⁷ Value-added trade statistics are now becoming available, and their study is likely to change the big picture we hold in our minds about the shape of the world economy.

PRODUCTIVITY

If economists were to play a game of word association, the one that would leap to mind on hearing *productivity* would be *puzzle*. I already quoted Robert Solow's famous 1987 version of the productivity puzzle: "You can see the computer age everywhere but in the productivity figures." As discussed in chapter 5, the New Economy era from the mid-1990s to 2001 did see productivity growth increase in the official figures, although that has slowed down again in the postcrisis economy. But a different "puzzle" may have emerged in the United Kingdom: despite more or less zero GDP growth since 2008, employment has increased. By definition, this implies (at best) no increase in productivity.⁸

Why is productivity puzzling?

It is because of the second increasingly serious issue for GDP as a measure of the economy, namely, that the economy consists less and less of material items.⁹ It is relatively straightforward to measure economic output when you can count the number of cars or refrigerators or nails or microwave meals being shipped from factories. But how do you measure the output of nurses, accountants, garden designers, musicians, software developers, health care assistants, and so on? The only way is to count how many of them there are and how many "customers" they provide with a service, but this entirely overlooks the *quality* of the service, which is of great importance.

Just as "output" is a concept best suited to an economy made up of products rather than services, and similar, mass-produced products at that, so is "productivity." The word is used in general terms to mean efficiency or effectiveness. The actual definition used by economist is the amount of output produced per unit of inputs. Inputs are labor, capital, land,

and material resources. Usually economists are talking about labor productivity because it is easy to measure the number of workers, and much harder to measure capital. So on this definition, productivity is the amount produced per worker, or GDP per person employed (or per person-hour worked, to be more precise).

This is fine for washing machines or cartons of breakfast cereal. But only a small part of GDP in countries such as the United States and the EU nations consists of physical products. For all of us who are office workers, it will be obvious that measuring our productivity is hard, but certainly isn't well captured by our organization's revenues, adjusted for our pay rises over time to give a real-terms measure, then divided by the number of employees—which is the GDP-based approach. The quality of what we do is an intrinsic part of our "output." Or take nurses: are they more productive if they see more patients per day, or spend more time with fewer patients? It depends on the exact character of their work that day (taking samples for blood tests, or caring for someone in intensive care?), and on the outcomes of their work (does the patient get better faster? or feel more cared for?). To give another example, conventional statistics would count a musician as more productive if she gave twice as many performances by performing a Mozart concerto at double speed.¹⁰ The economist William Baumol identified this productivity challenge in the performing arts long ago, as well as its application to other services such as health care.

The same phenomenon applies in the increasingly creative digital economy. The tech guru Kevin Kelly writes:

Nobody ever suggested that Picasso should spend fewer hours painting per picture in order to boost his wealth or improve the economy. The value he added to the economy could not be

optimized for productivity. Generally any task that can be measured by the metrics of productivity—output per hour—is a task we want automation to do. In short, productivity is for robots. Humans excel at wasting time, experimenting, playing, creating, and exploring. None of these fare well under the scrutiny of productivity. That is why science and art are so hard to fund. But they are also the foundation of long-term growth.¹¹

We find it hard to think straight about productivity anyway. Kelly is comfortable with the idea of robots taking over far more of the work people currently undertake. Some economists have recently, on the contrary, been worried about increasing automation. Paul Krugman waded into the debate, on the heels of the MIT economists Erik Brynjolfsson and Andrew McAfee in their book *Race against the Machine*. Krugman wrote in his *New York Times* column: “What’s striking about their examples is that many of the jobs being displaced are high-skill and high-wage; the downside of technology isn’t limited to menial workers. Still, can innovation and progress really hurt large numbers of workers, maybe even workers in general? I often encounter assertions that this can’t happen. But the truth is that it can, and serious economists have been aware of this possibility for almost two centuries.”¹² Indeed, this first happened in the Industrial Revolution, when skilled craft workers were the most disadvantaged by the new looms and mills. So when thinking about the effect on job displacement, we dislike productivity increases.

Yet the “bots” of today are having effects similar to those of the steam-powered mills of the nineteenth century in terms of their disruption to jobs and their impact on the distribution of income. Robots are a new kind of capital equipment, and their spread will reward the owners of this capital initially. Over time, however, each person working will have

more capital with which to do their job, just as a weaver could produce more with a mechanical loom than with a hand-loom in his cottage. This translates directly into higher labor productivity and—eventually, and if workers acquire the necessary skills, and society develops the necessary tools for managing income distribution—higher wages. Mechanization or robotization is not new and unusual, no matter how clever and impressive the robots are. They are just the latest generation of capital investment, and it benefits workers to have more capital enhancing what they can do. Eventually, productive investment drives long-run economic growth and the higher incomes that come with that; how the incomes are shared is a social and political challenge. It is, in the long run, a good thing that machines or robots take over activities they can do, freeing humans for the things only they can do. This makes work much more intrinsically rewarding for very many people.

I don't think, however, that we understand how to think about what increasing productivity means, or how its benefits will be shared, when there is no "product." Increased income inequality has accompanied the productivity increases linked to digital technologies, indicating that the gains have not been all that widely shared so far. This accounts for the confusing debate under way among economists about the implications for jobs and incomes, including income distribution, of the current wave of capital investment in digital equipment and machines.

A related issue is how to account for the value of a specific type of intangible product or service, the purely digital items such as online music, search engines, apps, crowd-sourced encyclopedias or software, and so on. Many traditional activities have 'de-materialized,' for instance subscriptions to music or video streaming services rather than buying CDs or

DVDs. Sometimes this simply reflects a change of business model and the new services and prices can (in theory) be measured for GDP. Online markets such as Ebay and Marketplace have enabled secondhand sales to grow; again, measurable in theory but much harder to capture in practice. There is also the so-called ‘sharing economy’ where there is a matching service provided (for example by Uber or Airbnb). These involve prices, to the home- or car owner as well as the software platform, but again these might be harder to measure in practice than to identify in theory.

Often, though, digital goods have a price of zero, and with no market price they are not captured fully in GDP statistics. The electricity Google uses will be counted in GDP, and so will the electricity we use to go online, as will ad revenues, and Google salaries. But how would the value of free search figure in the statistics? As Erik Brynjolfsson and Adam Saunders put it, in a nod to the famous statement by Robert Solow about computers, “We see the influence of the information age everywhere, except in the GDP statistics.”¹³ So, for example, the record industry’s sales of music have declined in dollar terms, but there is almost certainly more rather than less listening to music. Some of the revenues have simply moved elsewhere (to streaming services, say), but there is a lot of free listening. The gap between what a consumer pays and the value he or she receives from the purchase is called “consumer surplus,” and the growing prevalence of zero-priced goods and services online seems to be increasing consumer surplus.¹⁴ It is another reason to think the wedge between what GDP measures and aggregate economic welfare is growing uncomfortably large. Even worse, the GDP statistics distort the true picture of the economy. For example, the U.S. Bureau of Economic Analysis estimated that consumption of Inter-

net access by Americans *declined* in real terms from the second quarter of 2011 on. This is absurd. Erik Brynjolfsson of MIT has pointed out that the information sector (software, TV and radio, movies, telecommunications, data processing, publishing) accounts for the same share in official GDP figures today as it did twenty-five years ago, at about 4 percent. He and his coauthor JooHee Oh estimate that there has in fact been a gain to consumers averaging about \$300 billion a year for a decade from access to free services online, such as Facebook, Wikipedia, Craigslist, and Google.¹⁵ Hal Varian, the chief economist at Google, reckons that free search via Google is worth \$150 billion a year to users; of course he would say that, but his calculations seem reasonable. The economist Michael Mandel has estimated that “data” or information needs to be added as a third category to the traditional distinction between goods and services. His adjustment of official U.S. GDP statistics adds 0.6 percentage points to real GDP growth in 2012, a substantial difference—remember that the power of compounding makes seemingly small differences in such numbers large in their effects after a few years.¹⁶

Official statisticians need to start thinking about how to measure better the production and consumption of “information” or digital products that clearly deliver value to consumers. Because GDP measures only monetary transactions, the new “free” business models are not being well measured, and neither are the new types of activity with zero market price but of great value to consumers. There are very many examples now, from big ones like Wikipedia, YouTube, Twitter, and Facebook, web browsers, search engines, online courses, and so on, to small ones like the countless free blogs. There have always been free but valuable activities, from public libraries to walks in the countryside; the difference now is that

nonmonetary activities are extensively intertwined with business, making the concept of the production boundary within which GDP is defined inherently blurred.

SUSTAINABILITY

The third emerging issue for the relevance of GDP—no less tricky than the first two—is that it takes account of the increase in output of goods and services over time without fully accounting for whether or not growth now comes at the expense of growth in the future. GDP statistics do include a measure of the depreciation of physical assets (“capital consumption”), but this is a narrow indicator of how far capital is being used up to consume today by reducing the scope for consumption tomorrow.

One aspect it omits is the need for the physical stock of capital (machines, transportation equipment, buildings) to grow by more than is needed just to make up for depreciation of what is there already. There needs to be additional investment just to keep pace with growth in the population, if consumption per person is to be maintained. This, after all, is what matters, rather than the total size of GDP. This is known in the economics jargon as “capital widening.” In addition, if innovation, technical progress, is taken into account, surely it is important to include some indicator of “required” additional investment in the new kinds of capital, to implement the innovation? William Nordhaus and James Tobin put it this way: “This principle [capital widening] is clear enough when growth is simply increase in population and the labor force. Its application to an economy with technological progress is by no means clear. Indeed, the very concept of national income becomes fuzzy. Should the capital widening requirement

then be interpreted to mean that capital should keep pace with output and technology, not just with the labor force?”¹⁷ It is an increasingly pressing question in a highly innovative economy.

The latest international national accounting standard, SNA2008, has tried to address some of these concerns. The United States is the first country seriously to put into practice its suggested improvements, which include counting spending on research and development as investment rather than a business cost, and estimating as well the value of investment in “artistic originals” such as Hollywood movies and music. Preliminary changes in statistical methodology along these lines led to a one-time jump in U.S. GDP of more than 2 percent in 2007, but a bigger increase of 3.4 percent was announced in mid-2013. The SNA2008 handbook explains that “many of these assets, often seen as a hallmark of the ‘new economy,’ are associated with the establishment of property rights over knowledge in one form or another.”

These questions about the treatment of investment in assets are just one dimension of sustainability, however; there are others. More often, the term *sustainability* refers to the extent to which GDP growth from year to year depletes natural resources or harms the environment in other ways. The most important amendment needed to the existing national accounts statistics is to take account of the balance between investment in new assets and the depletion or depreciation of existing assets. Without this, we can know about the current rate of economic growth but have no information about whether it could be sustained in future. The Weitzman/Oulton approach has the advantage of being a reasonably straightforward change to existing statistics. A more thoroughgoing, but also more ambitious and difficult, approach is to develop a measure of “comprehensive wealth”—all of the nation’s assets

and how they change from year to year—which would give more emphasis to environmental measures, needed for a true indicator of sustainability.¹⁸

It should be said that official statisticians have been paying increasing attention to environmental measures, ranging from CO₂ emissions and water quality to the extraction of mineral resources. In 2012, the UN Statistical Commission adopted a new international statistical standard with equal status to the System of National Accounts, the System of Environmental Economic Accounting or SEEA. Some countries have been publishing what are known as “satellite accounts” on the environment for a number of years, although it is hard to identify any direct influence they have had on economic policy debates. As long as political contests focus on economic growth, as I think they always will, a set of statistics labeled “satellite” is unlikely to be influential.

Although national statistical offices in many countries have become much more diligent in collecting environmental statistics, and people who are interested or concerned can look them up, most people are not sufficiently interested or adept with the databases. If policy decisions are to take account of the environmental impact of growth, and the extent to which current growth comes at the expense of future growth, natural depreciation also needs to be accounted for in GDP, alongside the depreciation of machines and roads.

Sustainability means that people in successive generations should have what they need to be at least as well off as we are. There are different types of assets to take into account in being able to evaluate whether the current increase in GDP is sustainable or not. One is the obvious measure of physical assets, including infrastructure; this is what “investment” in conventional GDP definitions means—subject to the capital widening issue. Natural assets are another, including obvi-

ously valuable resources such as oil deposits but also less obviously valuable ones such as clean air and a stable climate.

A third type of asset is what economists term “human capital,” or a development economist might instead label as “capabilities”—in other words, how well equipped is a people to make use of the other assets they have at their disposal? What is their level of education and practical skill, or their ability to create and innovate? Another, and perhaps related, asset is “social capital,” a hard-to-define concept that tries to capture how well people are able to organize collectively through political and other institutions to grow the economy. It overlaps with other concepts such as culture. Although it is hard to define and therefore measure, it clearly affects economic growth. To give just one example out of many, former colonies that inherited the English legal framework have grown faster and have higher incomes per head now than those that inherited the French legal framework. Legal traditions would be one of the factors contributing to social capital. Neither kind of investment, in human or social capital, is measured in conventional statistics, although spending on some “inputs,” such as education expenditure, will be counted. This is understandable when the concepts are hard to pin down precisely in the first place, but they matter. A country should not regret forgoing some increase in GDP this year for the sake of investments that will contribute to human and/or social capital.

Some governments, although not enough, calculate generational accounts that tell them the cost in the future of their spending policies and whether tax revenues will be adequate, given the age structure of the population. The World Bank has started work on measuring “comprehensive wealth,” which includes natural assets, “human capital” (the level of people’s skills and abilities), and also physical infrastructure.

An alternative approach, mentioned in chapter 5, is Martin Weitzman's Net National Product, derived from standard GDP and related statistics, which measures the country's maximum sustainable level of consumption.¹⁹ It does not include investment in or depletion of environmental stocks: for example, the U.K. national accounts include mineral oil exploration as part of gross investment but depletion of oil and gas stocks by extraction is not included in depreciation and thus NNP is overstated. But NNP could be amended to take account of this.²⁰

CONCLUSION: WHAT NATIONAL STATISTICS DO WE NEED IN THE TWENTY-FIRST CENTURY?

Public discussion of the economy refers to GDP all the time, and the term has become so familiar that nobody gives it much thought. All the complexities and challenges of constructing the statistics are submerged. It is our shorthand for how well the economy is doing.

Economic growth is essential, for reasons set out in this book. It is one of the key contributors to our well-being, although certainly not the only one. It is for this reason also politically vital. Without economic growth, there would not be enough jobs to keep the unemployment rate down to a tolerable level. It is not possible to redistribute incomes unless the economic pie is growing. Democracy itself is more fragile when growth halts.²¹ 'No growth,' desired by some, is for the rich. There is, for now, no alternative to using GDP to measure economic growth.

Of course it is a flawed measure. The later chapters of this book have spelled out some of the flaws, as well as some supplementary or alternative approaches. These include looking at the Human Development Index as a wider indicator, or

adopting “dashboards” of indicators, and some suggestions such as conducting regular time-use surveys so we can measure household production and the informal economy, or including depreciation of at least some natural assets such as oil and gas reserves.

Despite such caveats, GDP does a good job of measuring how fast (or not) the output of “the economy” is growing, and GDP growth is closely linked to social welfare. GDP struggles with measuring innovation, quality, and intangibles, but it does a better job than any currently available alternative. There are some alternatives for measuring welfare rather than output, but these two concepts are distinct and should not be muddled up. Some economists are concerned that budget cuts at national statistical offices are making it harder to get national account statistics that are of adequate quality, and they regret the diversion of resources to more fashionable indicators such as “happiness”; they would certainly argue against diluting any further the effort that goes into collecting GDP and its related statistics.

Other reforms are more urgent than asking citizens general questions about their level of well-being. The UN’s standard GDP definition should abandon the misleading FISIM construction and revert to a more straightforward approach to measuring the financial sector.

National statistical offices should either do regular time-use surveys so they can monitor the informal economy, or develop other measures of household production. There is no good rationale for ignoring it, and it is no harder to measure than illegal drugs or prostitution.

There is no need to develop new measures of “happiness” or new indicators like the ISEW or GPI (although perhaps in time the approach to “happiness” or “well-being” will become more sophisticated than it is now, and useful for policy). There are already good indicators of welfare and all the

components that go into the GDP alternatives. The HDI is a well-understood measure. Variants of the ISEW are flawed because the weights used for the various components are arbitrary, and there is no consensus about them.

A regular, official indicator of sustainability is urgently needed, however. At present, governments have nothing to tell them whether the growth their policies are delivering is coming at the expense of growth and living standards in the future. Comparisons between an individual and a whole nation are never exact (and can indeed be misleading), but just as a business needs to have a balance sheet as well as profit and loss accounts, a nation needs to keep an eye on its assets. A country has the power to influence the quantity and value of its assets in the way a business or household does not. But this is limited, and governments need to ensure that people in the future will be able to enjoy at least as high a living standard as we do now, by watching out for excessive depletion of natural resources or emissions of CO₂, or by making sure the bill future taxpayers will face for pensions and health care does not grow too much.²² The whole set of national accounts data does contain some information on stocks and assets (or debts) as well as flows of income or expenditure, but it is neither comprehensive nor straightforward to use.

The *collection* of statistics needs to be modernized. National accounts and other official economic data are collected from a range of sources, as discussed in chapter 1, but surveys of individuals and businesses form their backbone. It is almost impossible for the conventional survey methods, involving sending forms to certain businesses or setting researchers to collect information on prices from different outlets, to keep up to date when the structure of the economy changes. To give one obvious example, the spread of shopping either in “big-box” stores or online changes the way price data need to be

gathered, as prices are likely to be lower than elsewhere in both cases. The emergence of new sectors of the economy, like digital start-ups or mobile telephony, mean the collection of statistics will lag on their levels of employment and investment. And so on.

It is time to use the new technologies to start collecting data. This could be particularly important in developing countries, where the prevalence of mobile phones now offers an unprecedented opportunity to measure the economy. Just as “user-generated content” used carefully has become an important resource in disaster response, in social enterprises, and in the news media, user-collected statistics could prove a more timely and accurate data source in the future. There seem to be very few trials, however—just a handful collecting health data. National statisticians in the developed economies have perhaps not been best placed to experiment with online or mobile collection of raw data. But it might help reduce their costs, and they would probably get a more dynamic and accurate portrait of economic activity. However, it is hard for cash-strapped official statistical bodies to do this, so one possibility under discussion in their circles is whether they could develop a way of validating statistics collected by others—such as the Billion Prices Project or commercially-provided statistics—and possible giving statistically valid approaches an official seal of approval.²³

Interesting or important as reforms like these would be, however, there is a deeper question. Has GDP reached its limits because of the changed character of the economy? The definitions involved in the national accounts have become far too convoluted and complicated, and take up too much of the statistics budget—except, of course, in countries such as Greece that used to make up figures, or those African countries that have not collected the necessary raw statistics. The

databases of GDP in many countries over decades, used so often by economists to develop theories and policies, lead us to think that GDP is a natural object that we can measure with increasing accuracy. But the accuracy is spurious, and the “object” being measured is only an idea, not something with an independent existence waiting to be discovered and counted.

The U.S. Commerce Department called GDP one of the greatest inventions of the twentieth century, and so it was. There is no replacement for it on the horizon. But rather than continue down the path of making the definitions and refinements ever more complicated, statisticians and economists should think more deeply about what we mean by “the economy” in the twenty-first century.

The structure and character of the economy has changed profoundly as growth has continued over the decades. “GDP mainly measures market production,” according to the high-profile Sen-Stiglitz-Fitoussi commission looking at measures “Beyond GDP.” This gets it backward: GDP *defines* market production, which is then measured by the official statisticians. But there is no clear definition of “the economy” that would stand for all time, and around which one can measure “satellites” like the environment or housework. Rather, the economy is a fluid concept, which could and probably should be redefined. That will involve reforming GDP substantially or replacing it with a measure, or more likely a series of measures or a dashboard, suited to a new definition of the economy.

Why will a more radical rethinking of “the economy” be required at some point? For reasons like those already set out here. Above all, the economy is not primarily a physical but rather an intangible entity now. It has always been difficult enough to separate money GDP into “quantity” and “price”

components, taking account of improvements in quality and choice. This is not a meaningful exercise when quality and personalization are central to the service or aspect of the goods being supplied. Related to this kind of change in the economy, the boundary between paid work in the market and unpaid work has become fuzzier the more people contribute to voluntary value-creation (Wikipedia and Linux being the canonical examples), or draw on their “leisure” activities for their paid work (having a brilliant idea while out with friends), or mingle the two (a landscape gardener practicing new designs on family members before selling them to clients). The financial crisis has given extra urgency to the need to rethink the concept of economic value. In this final chapter, I’ve set out some important areas to consider, but this is certainly not the last word on what “the economy” consists of today.

Meanwhile, it is above all important not to confuse GDP with social welfare. The way the economy has changed has made the gap between GDP and welfare bigger than it used to be. The acceleration in the variety of products, in customization, and in the blurring of the boundary between leisure and work in many creative professions or vocations—all of these mean that GDP growth increasingly *underestimates* increases in welfare. Contrary to the popular impression that it exaggerates the improvement in our standard of living, the opposite may be true.

At present, we are in a statistical fog, without the information needed about either the negative aspects of growth when it is unsustainable and depletes the natural and other assets available for the future, or the positive aspects, when it delivers innovations and creativity. GDP, for all its flaws, is still a bright light shining through the mist.

