

Review of Income and Wealth
Series 0, Number 0, Month 2021
DOI: 10.1111/roiw.12520

GDP, WELLBEING, AND HEALTH: THOUGHTS ON THE 2017 ROUND OF THE INTERNATIONAL COMPARISON PROGRAM

BY ANGUS DEATON

Princeton University
University of Southern California
NBER

AND

PAUL SCHREYER*

OECD

In March 2020, the International Comparison Project published its latest results, for the calendar year 2017. This round presents common-unit or purchasing-power-parity data for 176 countries on Gross Domestic Product and its components. We review a number of important issues, what is new, what is not new, and what the new data can and cannot do. Of great importance is the lack of news, that the results are broadly in line with earlier results from 2011. We consider the relationship between national accounts measures and health, particularly in light of the COVID-19 epidemic which may reduce global inequality, even as it increases inequality within countries. We emphasize things that GDP cannot do, some familiar—like its silence on distribution—and some less familiar—including its increasing detachment from national material well-being in a globalized world where international transfers of capital and property rights can have enormous effects on GDP, such as the 26 percent increase in Ireland’s GDP in 2015.

JEL Codes: E01, E31, O57

Keywords: purchasing power parities, GDP and well-being, international comparison program

1. INTRODUCTION

In early March, 2020, just as the world was going into lockdown in the face of the COVID-19 pandemic, the International Comparison Program¹ (ICP)

Note: The authors are co-chairs of the Technical Advisory Group (TAG) for the 2017 round of the International Comparison Program (ICP). This document was prepared in a personal capacity and is not an official document of the ICP. Nevertheless, we are grateful to other members of the TAG for their insights and discussions over many years. The authors’ views do not necessarily reflect those of the OECD or its Members. We thank three anonymous referees and the editor of the *ROIW*, Prasada Rao, for helpful comments.

*Correspondence to: Paul Schreyer, OECD Statistics and Data Directorate; 2, rue André Pascal, 75016 Paris (Paul.SCHREYER@oecd.org).

¹The ICP (<https://www.worldbank.org/en/programs/icp>) is led by the World Bank. The Eurostat-OECD PPP Programme (<http://www.oecd.org/sdd/purchasingpowerparitiespppsdata.htm>) constitutes a region of the ICP and delivers the relevant data for its members. For a general discussion of PPPs see Deaton and Heston (2010).

© 2021 International Association for Research in Income and Wealth

completed its most recent set of results, for 2017 (World Bank, 2020). The ICP is one of the world's largest statistical initiatives, whether by cost, geographical coverage (176 countries in 2017), institutional involvement or longevity (it began in 1968). From its start, the ICP has aimed to yield internationally comparable—common unit—comparisons of Gross Domestic Product (GDP) and its main components. Not surprisingly, the new results received less attention than normal, a timely reminder, if one were needed, that material wellbeing comes second when there is a threat to health. GDP omits much that is central to people's wellbeing.

Yet GDP remains one of our more important and useful measures and any more comprehensive measure of wellbeing is impossible without the national accounts, properly interpreted and adjusted. GDP measures run alongside other measures—currently health-related measures—in assessing the consequences of the pandemic and, as seen from the statistical offices of the OECD, the demand for information about GDP and its components has risen dramatically since the beginning of the pandemic in March 2020. The ICP is distinct in focusing on national accounts aggregates that are internationally comparable, removing the gross distortions that can come from using market exchange rates to convert national accounts. Without it, it would be impossible to make like-for-like international comparisons of material living standards and of poverty rates.

Still, GDP leaves much undone even beyond health. If we want to use the ICP to look at distribution, at who gets what, at poverty or inequality, it must be combined with other data, typically from household surveys. Less obviously perhaps, GDP not only leaves much uncounted, but includes transactions that have little to do with material wellbeing, making it dangerous to make uncritical international comparisons across countries.

In this brief account, we highlight the most important new findings, as well as using the new estimates to highlight what the numbers do not tell us, as well as some areas where, in the absence of careful interpretation, they can be seriously misleading.

2. IMPORTANT NEW FINDINGS

Figure 1 shows what is arguably the headline result of ICP2017, that the Chinese economy is now as large or a little larger than that of the United States. In terms of market exchange rates, which take no account of the fact that prices are lower in China, China is much smaller than the US. The new result confirms the same finding of ICP2011, the first round to document the comparable sizes of the two economies. Indeed, price levels in most countries are lower than in the US, so that for all of the countries in Figure 1, their GDPs are larger in purchasing power parity dollars than in market dollars. World GDPs are closer to one another when adjusted for price level differences.

A key finding of the 2017 results is that they are not very different from what we would have expected if we had extrapolated the 2011 results using national GDP growth rates and the relevant national price indexes, such as CPIs and price deflators of GDP. This may seem like a non-result, and an odd thing to emphasize,

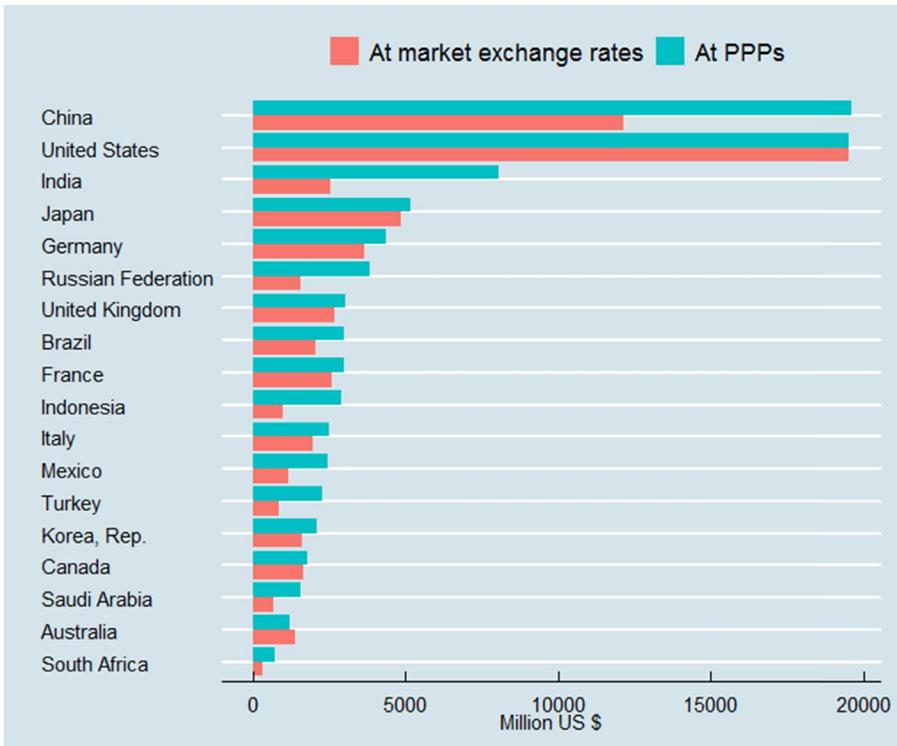


Figure 1. Sizing Up G20 Economies

Source: World Bank (2020).

but it is in sharp contrast to results in previous years. The 2011 results for consumption and income did not line up with the levels that would have been expected by applying growth rates to the results of the preceding round in 2005. Nor did ICP2005 line up well with extrapolations from the previous round in 1993.² We will return to the consequences of these discrepancies below when we discuss distributional issues. To be sure, discrepancies *are* present,³ and some of them can be explained by revisions to 2011 source data, smaller methodological changes between the two rounds and systematic structural changes in economies. But, importantly, no regional or other pattern is discernible, conveying a picture of

²Even under perfect conditions and error-free measurement, extrapolated and benchmark results need not line up exactly as established by Krijnse *et al.* (1984). Discrepancies arise in particular when patterns of expenditure are very different between countries, when data quality is weak or when there are important methodological changes such as in the way regions are linked (Diewert, 2013). For a discussion, see Deaton and Aten (2017) and Inklaar and Rao (2017). Note that the Penn World Table incorporates an adjusted version of ICP 2005 based on the methodological harmonization by Inklaar and Rao (2017).

³Appendix F, Table F1 in World Bank (2020) compares extrapolated results of the 2011 ICP data to new benchmark results and finds, for instance, that China is 19 percent and India 16 percent larger in ICP 2017 than in the extrapolation from 2011.

overall, albeit noisy, stability. For instance, whether extrapolated or benchmark data are used makes no difference to the level of cross-country inequality in GDP per capita as measured by the Gini coefficient.

This inter-round stability in the ICP is important if economists and commentators are to trust and use its results and the instability of the previous two rounds was a cause of much consternation and of misinterpretation, for example about changes in global poverty. The statistical procedures in 2017 closely followed the procedures used in 2011, a deliberate decision that was taken early in the preparation for the 2017 round. This was in contrast to earlier rounds where new methods—typically improved methods—were introduced in each round. Of course, the world changes, and there are new statistical challenges in each round—COVID-19 will undoubtedly bring more for the next round, and has already postponed data collection—so there is always a tension between using better methods and ensuring stable results.

We believe that the consistency between ICP 2017 with ICP2011 marks a new maturity and stability in the program. In future rounds, the ICP plans to move to a rolling data program, where new data are collected and incorporated on a continuous basis, and this should further guarantee the consistency over time that users require and expect.

3. AN IMPORTANT ITEM THAT IS NOT INCLUDED: HEALTH OUTCOMES

GDP includes health *expenditure*, but it tells us nothing about health *outcomes*—a notable example of an important component of well-being that is omitted and one that is of obvious salience during a pandemic. The US spends more than twice as much on healthcare per capita as do OECD countries on average, and only slightly less than twice as much as a share of GDP, 16.9 percent versus 8.8 percent, OECD (2019), but has the lowest life expectancy of any of the rich countries; see Figure 2 below. Beyond that, Covid-19 has shown that almost all countries, rich and poor, are willing to save lives by giving up GDP in order to reduce infection and mortality. This is true in the short run by accepting lock-downs and possibly in the longer run, too: building more resilient health care systems and infection-proofing economies will imply foregoing some productivity and GDP growth in return for safety and longer-term well-being. Somewhat paradoxically, infection-proofing—a defensive expenditure to take us back to where we were before—will count as part of GDP, and like repairs after a hurricane, will raise GDP above what it otherwise would have been. Production has increased, but our ability to consume and invest is no larger than what it was before.

There is a strong cross-country association between mortality, morbidity and GDP per capita (Preston, 1975; Deaton, 2003, 2013; Mackenbach and Looman, 2013; Shkolnikov *et al.*, 2019), so that people in poor countries live shorter lives than people in rich countries (mostly because of higher infant and child mortality), while the world's richest countries enjoy a life expectancy that today averages almost 80 across the OECD region (Figure 2). Of course, there are many exceptions, poor countries with relatively high life expectancy (Rwanda, Bangladesh) as well as rich countries with relatively low life expectancy (Equatorial Guinea, USA).

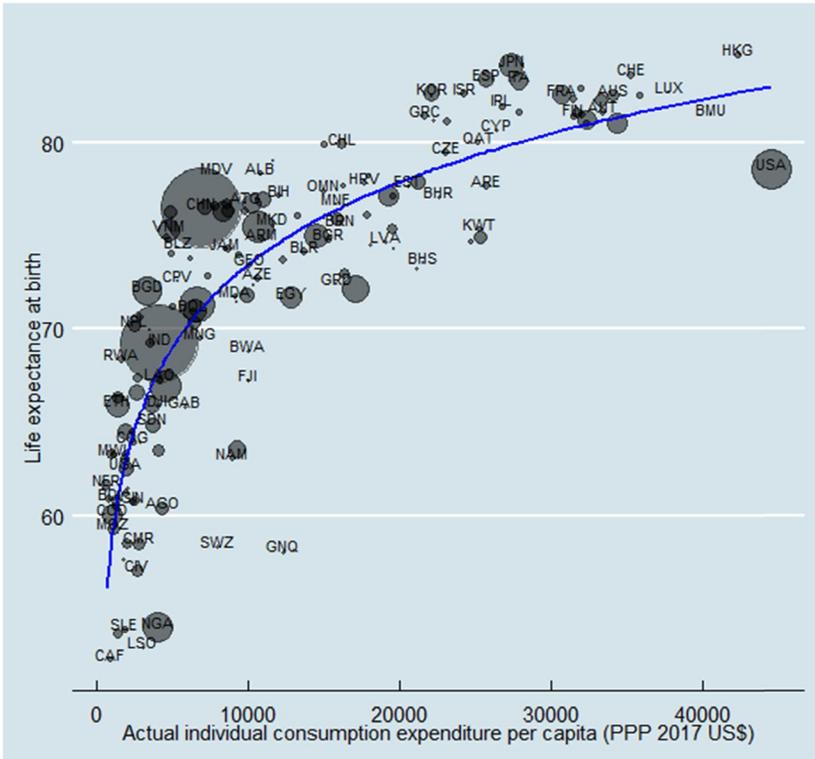


Figure 2. Life Expectancy at Birth and Actual Individual Consumption per Capita, 2017
 Note: the areas of the circles are proportional to population of each country.
 Source: World Bank (2020), World Bank (2021).

High GDP per capita doesn't guarantee low morbidity and mortality: wealthier is not automatically healthier.

The COVID-19 virus and its associated mortality is further altering the relationship between per capita GDP and mortality. Rich countries have many advantages—better health systems, greater ability to substitute electronic for physical contact, and higher wealth to fall back when income falls—but, at least up to the time of writing (April, 2021) and being mindful of measurement problems in low income countries, there is a strong *positive* relationship across countries, as well as across regions within at least some countries, between per capita GDP and COVID fatalities per million inhabitants.⁴ (Note that this is in sharp contrast to what is happening *within* countries or regions, where poor people are more likely than rich people to die from the virus.)

⁴See <https://ourworldindata.org/grapher/total-confirmed-deaths-of-covid-19-per-million-people-vs-gdp-per-capita>

COVID appears to have first spread along trade routes (Wuhan, Milan, Paris, London, New York) bringing the disease to some of the world's richest cities, cities where people live close together and have a great deal of contact with one another. The cross-country correlation between per capita GDP and per capita mortality is falling over time, as richer places bring the disease under control, as the disease spreads to poorer places, and as the full impact of the pandemic becomes clear in countries where reporting of mortality is weak.

In the end, the familiar pattern of health and wealth may possibly reassert itself, especially if rich countries are more successful in vaccination, but it is too early to be sure and the pandemic may leave a permanent mark on the global relationship between health and wealth, as well as on global inequality. It would certainly be a mistake to point to the long-term positive correlation between GDP and life expectancy and argue that with economic growth re-established, health will look after itself. GDP per capita is not a short-cut measure of the health status of the population. And high levels of GDP per capita did nothing to protect countries against fatalities in the pandemic, and may not protect countries against large losses of income as a result of the pandemic, either directly because people cannot work, or because of government responses in the form of lockdowns. The IMF, in its October 2020 report,⁵ forecast a positive 1.9 percent growth in 2020 for China, as opposed to a 4.3 percent *decline* for the US and a 9.8 percent decline for the UK. African per capita GDP is forecast to contract by 2.6 percent, compared with 5.8 percent for "advanced countries" and 8.3 percent for the Euro area. These forecasts, if they or numbers like them come to pass, may actually reduce inequality between countries, Deaton (2021).

Health apart, there are many other aspects of the quality of life that GDP does not capture: social interaction, clean air, work-life balance, democracy, safety, happiness.⁶ These were never designed to be captured by GDP as has been repeatedly noted since the inception of national accounts (Kuznets, 1934). Indeed, many supplements to GDP have been proposed to provide a perspective on these broader dimensions, ranging from Nordhaus and Tobin's *Measure of Economic Well-being* (Nordhaus and Tobin, 1972) to the UNDP's *Human Development Index*.⁷ French President Nicolas Sarkozy raised the choice, use and communication of key societal indicators to a new political level by commissioning the Stiglitz-Sen-Fitoussi Report (Stiglitz et al., 2009) which brought strong new impetus to the *Beyond GDP* agenda including the *OECD's Better Life Initiative*.⁸ In short, the wise use of GDP and of all PPP measures must start from the realization that important aspects of well-being do not go through the market and supplementary indicators are necessary.

⁵International Monetary Fund (2020).

⁶Nor is GDP, or for that matter, household consumption a gauge for the sustainability of environmental, social and economic conditions over time. For comprehensive overviews of the institutional and academic debate around (Beyond) GDP see Jorgenson (2018), Fleurbaey and Blanchet (2013), Schreyer (2016) or Hoekstra (2019).

⁷See <http://hdr.undp.org/en/content/human-development-index-hdi>

⁸See OECD (2020a) and Stiglitz et al., (2019).

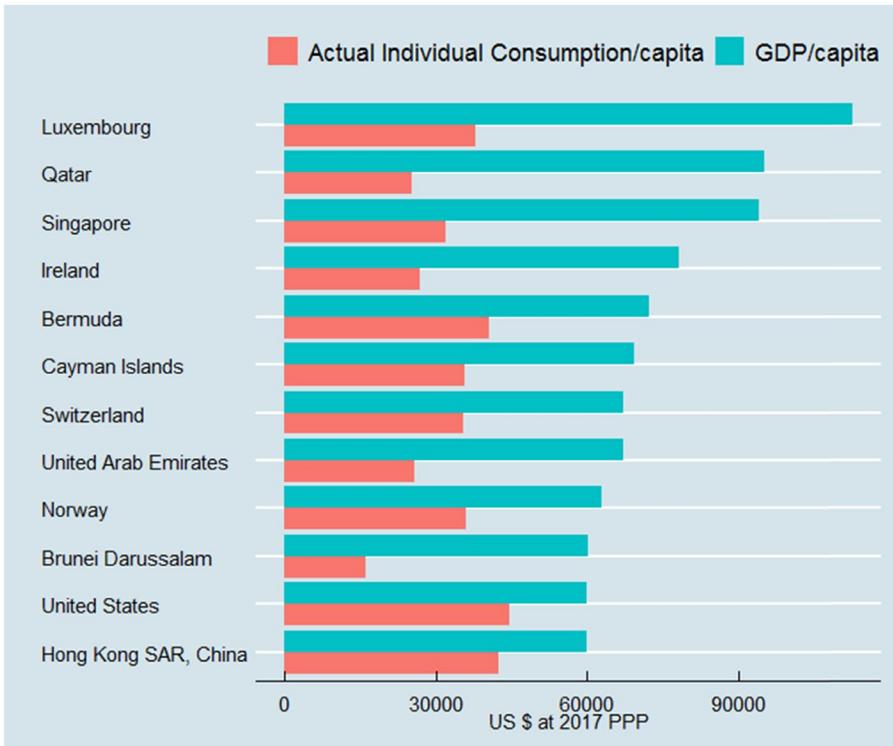


Figure 3. Top 12 Countries by GDP per Capita in ICP 2017

Source: World Bank (2020).

4. GDP, EVEN IN INTERNATIONAL DOLLARS, CAN BE MISLEADING

If our main concern is material well-being, consumption⁹ per capita is a better choice than GDP per capita. While the two measures correlate, they do so imperfectly, and the differences can sometimes be of great importance. Some of this is familiar, for example that the share of consumption in GDP is much smaller in China than in America. A less familiar case comes from Figure 3, which shows the top 12 countries ranked by GDP per capita in the 2017 round of the ICP.

The United States apart, all of them fall into two categories: they are either *investment hubs* (defined as economies where the stock of foreign direct investment is 150 percent of GDP or more) or *resource-based* countries (defined as economies where resource rents account for 10 percent of GDP or more). In both

⁹Consumption is measured here as *Actual Individual Consumption* (AIC) which factors in the value of health services, education and housing services that are provided to households for free or at reduced costs. AIC thus paints a more accurate picture of household's material living standards than a simple measure of household consumption expenditure. That said, many authors have argued that consumer durables that are treated as current consumption expenditure ought to be recognized as investment products so as to better gauge the flow of services they provide beyond the accounting period (see for instance Diewert and Shimizu 2019).

cases, consumption is a relatively low share of total GDP, typically because profits account for a much larger part of national income than wages and salaries. Over time, profits will contribute to the income of at least *some* households in the country and, in turn, their consumption. But at any given moment GDP per capita includes amounts that are not part of people's current material well-being. Even more sharply, the income from stocks of foreign-owned capital are part of Gross *Domestic* Product, because it originates within the country, but are not part of Gross *National* Income because it is not owned by nationals.

We note that, when the ICP calculates price indexes for the components of GDP, and depending on the method for doing so, the components measured in PPP-terms are no longer guaranteed to add to total GDP. As is usually the case with index numbers, not all desirable properties can be simultaneously achieved. This is the case in ICP2017 for actual individual consumption, so that we cannot strictly refer to the *share* of AIC in GDP. Nevertheless, the *ratio* of AIC to GDP with both in PPP-terms remains a useful indicator of the extent to which GDP is accounted for by AIC.

Ireland provides an interesting example. Attracted in large part by low corporation tax rates, several large multinational corporations relocated their economic activities, including intellectual property assets, to Ireland so that income generated from the use of intellectual property now contributes to Irish GDP. In 2015, there was a spectacular example where Irish real GDP *increased by 26 percent in a single year*, mainly driven by multi-national firms' transfer of intellectual property assets into Ireland. In contrast, per capita disposable income of Irish households grew at "only" 4.6 percent in real terms and GNI at constant market prices by 13.6 percent.¹⁰ Globalization, digitalization, a well-educated labor force and an attractive tax regime are all at work together in the Irish case. There is also substantial evidence that profit shifting via a variety of channels such as transfer mis-pricing, can lead to very high profit rates, and GDP, in investment hubs.

Exactly how GDP and GNI differ can be bewilderingly complex. For example, it depends on whether headquarters are set up in the country or not. If an affiliate is set up in an investment hub but headquarters remain abroad, GNI should not be affected by profit shifting behavior: suppose the affiliate delivers some overpriced services to the headquarters, then profits will show up in the GDP of the investment hub but not its GNI because the System of National Accounts imputes an income flow back to the headquarter country even if profits are reinvested in the affiliate and not actually transferred back. If, moreover, headquarters are set up in the investment hub whose profits are artificially inflated, no such imputation happens. GNI will remain high, in line with GDP, unless profits are actually transferred abroad as dividend payments—then GNI would be reduced.¹¹

GDP is gross *domestic* product, meaning it was produced in the country, but not necessarily owned by its residents. We have already seen this in the case of Ireland. Another point is that *domestic* product counts workers where they

¹⁰See <https://www.cso.ie/en/releasesandpublications/in/nie/in-mgnicp/>.

¹¹In this case one might ask why the whole operation was undertaken in the first place. One answer may be that there are bilateral agreements that stipulate non-taxation of transferred profits in the receiving country if profits have already been taxed, however low, in the sending country.

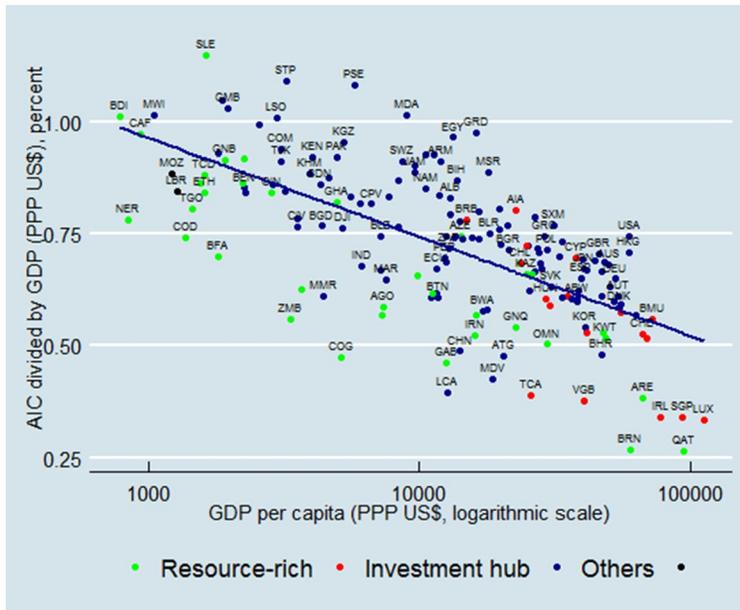


Figure 4. The Relationship Between Consumption and GDP, 2017
 Source: Authors' calculations, based on World Bank (2020).

produce, not where they live. About 180,000 people work in Luxembourg, but live in France, Germany or Belgium; these workers commuting across the border are not counted as part of Luxembourg's 600,000 or so resident population although they are counted as part of its workforce of which they constitute some 40 percent (Eurostat, 2018). If cross-border commuters were added to the resident population, overall GDP per capita would be smaller by some 20 percent. A more accurate picture of the income accruing to the resident population is again GNI/resident person. In 2017, this was 36 percent below GDP/resident person in Luxembourg (though still among the highest in the OECD).

Resource-rich countries point to another issue with GDP, that it is measured *Gross*, not *Net* as neither depletion or deterioration nor discoveries of natural assets are reflected.¹² Indeed, for a fuller picture of sustainability of economic activity, accounts need to be taken of the stocks of wealth¹³—natural, produced, financial—and their change over time that reflects additions (such as investment or new discoveries) as well as deductions (such as depreciation, deterioration or depletion).

The top 12 league table illustrates another general point. Consumption rises with GDP but less so in investment hubs and resource-rich countries where consumption per capita is systematically less than what would be expected for the size of GDP per capita; Figure 4 illustrates and shows for each country the ratio of

¹²The notion of “Net” here is broader than its usage in the national account which strictly refers Net as Gross minus depreciation produced assets (or “consumption of fixed capital” in jargon).

¹³See for instance Arrow *et al.* (2004).

AIC to GDP. Note that low consumption per unit of GDP reflects both an economic reality (likely triggered by relatively high profits as opposed to wages and salaries) as well as the impacts of profit shifting, which can increase GDP in investment hubs relative to other jurisdictions. Either way, when we are interested in material wellbeing, we need to place a greater focus on measures on the economic situation of households (see for instance OECD, 2020b). Fortunately, such data can be found in the national accounts for virtually all countries,¹⁴ (though not always in as timely a fashion as GDP) and can be compared internationally with the help of PPPs though it must be enriched by distributional information, because averages are oblivious to which households are getting what.

5. CAN WE CHECK THE ICP NUMBERS USING PROXIES, LIKE LIGHT OMITTED AND SEEN FROM SPACE?

The discussion of the previous section makes it clear that there are many different animals in the National Accounting menagerie, each different from the other, each with its own uses, each with its own measurement strengths and weaknesses, which is even true when the underlying concepts appear to be very similar. There is no single measure of national income, of national economic activity, or of national economic growth. GNI is different from GDP, and NNI is different from either. As the Irish example shows, if we are interested in the resources available for people's consumption, we may want to work with disposable income, or with actual consumption. If we want to exclude publicly provided consumption, we need household final consumption. If we are interested in production, we need to measure gross output, including intermediate production, which is excluded from GDP, because GDP measures value added, not output.

Beyond these conceptual differences, there are also differences between real and nominal, and, most relevantly for the ICP, between using domestic market prices, or one of the several available constructs of international prices.

All of these concepts can be used to measure growth, something that is often the main focus of interest.

There is no such thing as *true* GDP, *true* national income, *true* economic activity, or *true* economic growth. The different concepts all exist for a reason, usually because they measure different things, all of which we might be interesting for some purposes. To say that one of them, or some hybrid, is the true national income, is like saying a Shetland pony is the true horse, or that the grey wolf is the true dog, or that the number of ivory-billed (or even pileated) woodpeckers in a forest is the true measure of the forest's fauna.

All of this hardly bears repeating, yet there is a growing recent literature that works with proxy measures that, it is argued, are useful for cross-checking national accounts measures, including those in the ICP. This literature is motivated by the evident difficulties of measuring national accounts, especially in poor countries that lack well-funded statistical offices or the data infrastructure on which well-funded offices rely. In these circumstances, there is a role for proxies that might give

¹⁴See, for instance, OECD (2020b).

us new or different insights. One such, with a long history, is to use the share of food in household disposable income as a proxy for household living standards, a suggestion that goes all the way back to Engel in the 19th century, see Ålmas (2012) for a recent example.

A more recent proxy for economic activity is a measure of light intensity, collected from satellites in space. Light intensity has the advantage of being measured in the same way for all countries. Its measurement is most likely independent of the way countries measure their national accounts, useful in any cross-check. Henderson *et al.* (2012) show how the lights data can “illuminate” various issues, while recognizing that lights will vary with a number of factors—such as the number of hours of daylight, the local temperature, the fraction of lighting that comes from electricity, and the shares of consumption and investment in GDP. Indeed, lighting could easily be more closely related to gross duplicated output—intermediate production uses power too—than to GDP, which excludes duplication. This is a serious problem for the lights measure, that we do not know what concept or set of concepts it is supposed to proxy.

Beyond that, and because there is no “true” measure of national income, or of national economic activity, light (or the food share) cannot be a *correct* measure to adjudicate whether “true” income is better measured by GDP at market or at international prices, as in and Pinkovskiy and Sala-i-Martin (2020), notwithstanding the fact that statistical correlations can be helpful in imputing or nowcasting missing values. GDP at market prices and GDP at international prices are two different things that are used for different purposes.

We have a great deal of sympathy for those who have been frustrated by the changing measures in successive editions of the International Comparison Program, but we cannot use proxies to assess their reliability without understanding how the proxies relate to the many different concepts in the national accounts.

6. WHAT DOES THE ICP TELL US ABOUT GLOBAL INEQUALITY?

The ICP cannot inform us about the distribution of income *between households within countries*, but it addresses two other key aspects of global distribution. First, the ICP is instrumental in the construction of the World Bank’s estimates of extreme poverty that paint a picture of the number and geographical distribution of the world’s poorest (Atamanov *et al.*, 2020). Second, by accounting for price level differences between countries, the ICP provides us with appropriate measures of inequality *between countries* of average consumption measured at common prices. Figure 5 speaks to this point.

World inequality in consumption between countries would be significantly exaggerated were distributional measures to be based on market exchange rates, with a Gini coefficient of 0.64 as opposed to 0.47, an enormous difference. The price of consumption is lower in poorer countries, so we grossly exaggerate global inequality if we use market exchange rates. And this is not to speak of the fact that exchange rates sometimes move quickly and with large swings in a way that has nothing to do with the global distribution of living standards. As it turns out, the international distribution of per capita consumption *as measured here* has become

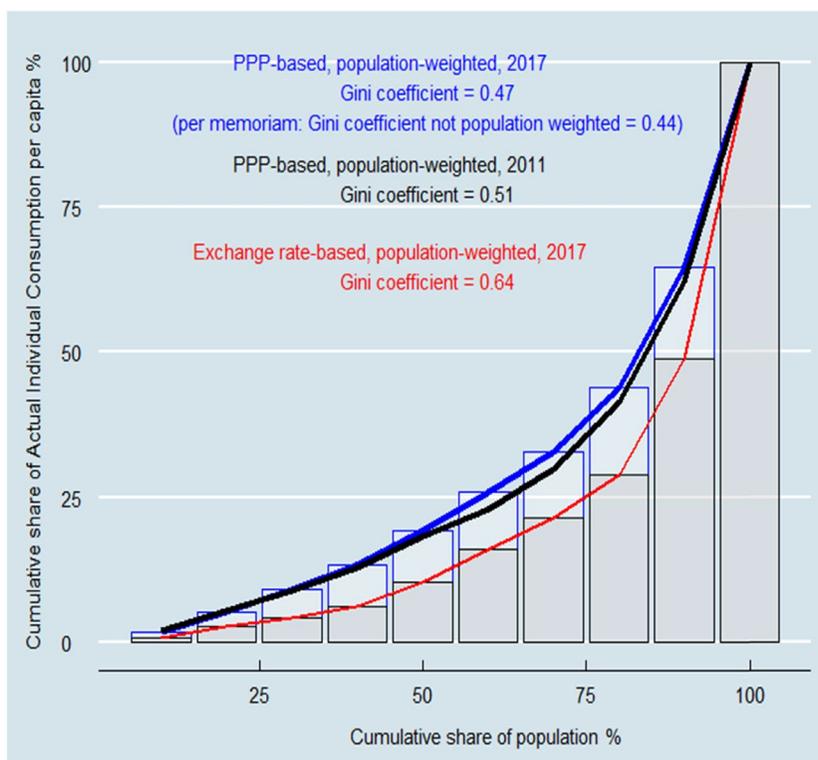


Figure 5. Between Country Distributions are More Equal in PPPs than in Exchange Rates
 Source: Authors' calculations, based on World Bank (2020).

somewhat more equal between 2011 and 2017, with a Gini of 0.47 versus 0.51. This is related to the upward revisions to both India and China compared with 2011 extrapolations, especially India. These estimates use population weights for each country so that the Lorenz curves and Gini coefficients would be accurate for the world as a whole if everyone in each country had the mean country consumption.¹⁵ Of course, each person in each country does not have the same consumption, so that, if we are interested in the global distribution of income between individuals, or households, these data need to be supplemented with data from household surveys, as is done, for example, by Milanovic (2016).

When thinking about distribution we should recognize some of the difficulties that the ICP faces in tabulating the whole world. How those difficulties are handled has been responsible for some of the disconcerting changes between ICP rounds, especially between ICP1993, ICP2005, ICP2011, and ICP2017, with 2005 something of an outlier. There are many methodological challenges, but one of the most severe is how to make accurate and meaningful comparisons between

¹⁵The unweighted consumption based Gini coefficient that treats each country as one household is smaller.

very different countries, countries at different levels of development, or countries with very different patterns of relative prices, of consumption, government expenditure, and investment. The European statistical authority, EUROSTAT, calculates PPPs for the countries in the EU, and those numbers are used to set financial transfers between countries, so their importance goes beyond the curiosity of academic researchers. The countries involved in the EU comparisons are all relatively advanced, and have relatively similar patterns of GDP and of relative prices. But that is most definitely not true when we move to much poorer countries, for example in Africa, or when we try to compare prices in Japan, Bolivia, Yemen, and Chad, just to take four wildly different countries.

The ICP works at a regional level, so that Eurostat and the OECD gather data for the EU and OECD, the African Development Bank for Africa, the Asian Development Bank for Asia, and so on. Once each region has collected its data, the regional offices calculate a set of PPPs (and the associated PPP-based accounts) for their region. Those estimates avoid at least some of the extreme problems of comparing very different places. But if we want to know about *global* inequality, or living standards in India or Peru relative to the US, which go into the global poverty estimates, all of the regions need to be somehow glued together into a single global table of accounts, and it is those numbers, in the World Development Indicators, or in successive versions of the Penn World Tables, that most users start from. Yet this is not always the best thing to do, and for users interested in a region, the regional numbers within the global table are likely preferable.

The “gluing-together” stage of the ICP construction leaves the within-region accounts alone, but calculates prices for each regional block that are used to bring them into a common set of units; think of these prices as “tectonic” shifters that move whole continents up or down to bring them into a single set of accounts. Calculating these tectonic factors is not straightforward and there are several different ways of doing so, and estimates of global inequality, such as those in Figure 5, are sensitive to the details, because we are moving all the countries of Africa, or all the countries of Asia, closer to or further away from Europe and North America.

Most informed commentators now agree that the tectonic procedure used for the 2005 round—which used a few countries in each region to give the continental prices—was inferior to the procedure used in 2011 and 2017—which used information from all the countries in all regions. The result was that the world was made artificially unequal in 2005 compared with earlier estimates, an inequality that shrank markedly in 2011, and was maintained in 2017, as is seen in Figure 5. As we noted at the outset, this stability is likely to be maintained into the future, in part because of a deliberate decision to limit methodological changes in the future, but also because of a commitment to move to a program of annual estimates in the post-COVID world, see Deaton and Aten (2017) and Inklaar and Rao (2017) for full discussions.

7. CONCLUSION

In the times of Covid-19, as at other times, GDP is carefully watched—policy-makers need to know where market activity is heading and what is happening to

jobs and income. But the limits of GDP are equally worth repeating lest we forget about vulnerable parts of the population, the fact that there are sometimes large elements of GDP that are irrelevant for the median (or sometimes even *any*) consumer and that GDP does not capture many things that people care about, health outcomes being a prominent example. There is little prospect and indeed no need to turn GDP into a measure of well-being. We also need to understand just how GDP is measured, the difficulties in doing so, and how many other useful measures are included in the national accounts. But strong supplementary indicators are needed as is a consistent view of material well-being around the globe. The next revision of the System of National Accounts has taken up the challenge of embarking some way down this avenue.¹⁶ And the ICP continues to provide a great service to analysts, policy-makers and the public alike.

REFERENCES

- Álmas, I., “International Income Inequality: Measuring PPP Bias by Estimating Engel Curves for Food,” *American Economic Review*, 102(1), 1093–117, 2012.
- Arrow, K. J., P. Dasgupta, L. H. Goulder, G. Daily, G. M. Heal, P. Ehrlich, S. Levin, K-G. Maler, S. H. Schneider, D. A. Starrett, and B. Walker, “Are We Consuming Too Much?,” *Journal of Economic Perspectives*, 18(3), 147–172, 2004.
- Atamanov, A., C. h. Lakner, D. G. Mahler, S. K. T. Baah, and J. Yang, “The Effect of New PPP Estimates on Global Poverty: A First Look,” World Bank Global Poverty Monitoring Technical Note; The World Bank, 2020. <http://documents.worldbank.org/curated/en/191631589896884566/pdf/The-Effect-of-New-PPP-Estimates-on-Global-Poverty-A-First-Look.pdf>.
- Deaton, A., “Health, Inequality, and Economic Development,” *Journal of Economic Literature*, 41(1), 113–58, 2003.
- , *The Great Escape*, Princeton University Press, Princeton, NJ, 2013.
- , “COVID-19 and Global Income Inequality,” *LSE Public Policy Review*, 1(4), 2021. http://www.princeton.edu/~deaton/download.html?pdf=International_income%20inequality_and_COVID_v3_March5_figures.pdf.
- Deaton, A. and B. Aten, “Trying to Understand the PPPs in ICP2011: Why are the Results So Different?,” *American Economic Journal: Macroeconomics*, 9(1), 243–64, 2017.
- Deaton, A. and A. Heston, “Understanding PPPs and PPP-Based National Accounts,” *American Economic Journal: Macroeconomics*, 2(4), 1–35, 2010.
- Diewert, W. E., “Methods of Aggregation above the Basic Heading Level: Linking the Regions,” in F. A. Vogel and D. S. P. Rao (eds), *Measuring the Real Size of the World Economy: The Framework, Methodology and Results of the International Comparison Program*, World Bank, Washington, DC, 169–96, 2013.
- Diewert, W. E. and C. Shimizu, “*Measuring the Services of Durables and Owner Occupied Housing*,” *Discussion Paper 19-02*, School of Economics, University of British Columbia, Vancouver, BC, 2019.
- Eurostat, “Statistics on Commuting Patterns at Regional Level,” *Statistics Explained*, 2018. <https://ec.europa.eu/eurostat/statistics-explained/pdfscache/50943.pdf>.
- Fleurbay, M. and D. Blanchet, *Beyond GDP: Measuring Welfare and Assessing Sustainability*, Oxford University Press, New York, 2013.
- Henderson, J. V., A. Storeygard, and D. N. Weil, “Measuring Economic Growth from Outer Space,” *American Economic Review*, 102(2), 994–1028, 2012.
- Hoekstra, R., *Replacing GDP by 2030*, Cambridge University Press, New York, 2019.
- Inklaar, R. and D. S. P. Rao, “Cross-Country Income Levels Over Time: Did the Developing World Suddenly Become Much Richer?,” *American Economic Journal: Macroeconomics*, 9(1), 265–90, 2017.
- International Monetary Fund, *World Economic Outlook: A Long and Difficult Ascent*, 2020. <https://www.imf.org/en/Publications/WEO/Issues/2020/09/30/world-economic-outlook-october-2020>.

¹⁶See <https://www.oecd.org/sdd/theoecdstatisticsnewsletter-allissues.htm>.

- Jorgenson, D. W., "Production and Welfare: Progress in Economic Measurement," *Journal of Economic Literature*, 56(3), 867–919, 2018.
- Krijnse Locker, H. and H. D. Faerber, "Space and Time Comparisons of Purchasing Power Parities and Real Values," *Review of Income and Wealth*, 30(1), 53–83, 1984.
- Kuznets, S., *National Income 1929–1932: A Report to the US Senate*, 73rd Congress, U.S. Government Printing Office, Washington, DC, 1934.
- Mackenbach, J. P. and C. W. N. Looman, "Life Expectancy and National Income in Europe, 1900–2008: An Update of Preston's Analysis," *International Journal of Epidemiology*, 42, 1100–10, 2013. <https://doi.org/10.1093/ije/dyt122>.
- Milanovic, B., *Global Inequality: A New Approach for the Age of Globalization*, Harvard University Press, Cambridge, MA, 2016.
- Nordhaus, W. and J. Tobin, "Is Growth Obsolete?," in Nordhaus, W. & Tobin, J., *Economic Research and Prospect*, Vol. 5: Economic Growth, NBER, Cambridge, MA, 1972.
- OECD, *Health at a Glance 2019: OECD Indicators*, OECD Publishing, Paris, 2019. <https://doi.org/10.1787/4dd50c09-en>.
- _____, *How's Life? 2020 Measuring Well-being*, OECD Publishing, Paris, 2020a. <http://www.oecd.org/statistics/how-s-life-23089679.htm>.
- _____, *Household Dashboard*, OECD Publishing, Paris, 2020b. <https://www.oecd.org/sdd/na/household-dashboard.htm>.
- Pinkovskiy, M. and X. Sala-i-Martin, "Shining a light on Purchasing Power Parities," *American Economic Journal: Macroeconomics*, 12(4), 71–108, 2020.
- Preston, S. H., "The Changing Relation between Mortality and Level of Economic Development," *Population Studies*, 29(2), 231–48, 1975.
- Schreyer, P., "GDP," in M. D. Adler and M. Fleurbaey (eds), *The Oxford Handbook of Well-being and Public Policy*, Oxford University Press, New York, 21–46, 2016.
- Shkolnikov, V., E. Andreev, R. Tursun-zade, and D. A. Leon, "Patterns in the Relationship Between Life Expectancy and Gross Domestic Product in Russia in 2005–15: A Cross-Sectional Analysis," *The Lancet Public Health*, 4(4), E181–8, 2019. [https://doi.org/10.1016/S2468-2667\(19\)30036-2](https://doi.org/10.1016/S2468-2667(19)30036-2).
- Stiglitz, J., M. Durand, and J.-P. Fitoussi, *Beyond GDP: Measuring What Counts for Economic and Social Performance*, OECD Publications, 2019. <https://www.oecd.org/publications/beyond-gdp-9789264307292-en.htm>.
- Stiglitz, J., A. Sen, and J.-P. Fitoussi, *Report by the Commission on the Measurement of Economic Performance and Social Progress*, 2009 https://www.economie.gouv.fr/files/finances/presse/dossiers_de_presse/090914mesure_perf_eco_progres_social/synthese_ang.pdf.
- World Bank, *Purchasing Power Parities and the Size of World Economies: Results from the 2017 International Comparison Program*, World Bank, Washington, DC, 2020. <https://doi.org/10.1596/978-1-4648-1530-0>. <https://openknowledge.worldbank.org/bitstream/handle/10986/33623/9781464815300.pdf>.
- _____, *World Development Indicators*, online data base, Washington, DC, 2021. <https://datatopics.worldbank.org/world-development-indicators/>