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An exploration of the changes in the international comparison program's global economic landscape

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ABSTRACT

The Purchasing Power Parity (PPP) rates from the 2011 round of the International Comparison Program (ICP) imply some dramatic revisions to price levels and real incomes across the world as compared to the prior 2005 round. This has important implications for many cross-country comparisons, including measures of poverty and inequality. Without presuming that either round is better methodologically, the paper tries to help the community of ICP users better understand the economic factors underlying the estimated changes in price levels across countries. Differences in domestic inflation rates have played a role, as expected. Two other factors are identified. The excess sensitivity to changes in market exchange rates suggests that the PPPs may put higher weight on internationally traded goods than do domestic deflators. Additionally, faster growing countries have seen a steeper rise in their PPP relative to market exchange rates; this can be explained by a tendency for wage increases in growing economies to lead to a higher price level. Together these factors account for over 70% of the variance in PPP changes even ignoring methodological changes. However, an independent downward drift in price levels is also evident, concentrated in the ICP's Asia region. A possible explanation lies in the Asia region's greater success (relative to other regions) in removing urban bias in the price surveys.

"How on earth do we explain these changes to counterparts, activists, students, and all those in the development community who have been using these numbers?" (Senior World Bank staff member writing to the author in 2014 soon after the release of the 2011 ICP results.)

1. Introduction

It is well understood that international comparisons of GDP at market exchange rates are deceptive about real income disparities. The main reason is that some commodities are not internationally traded, thus removing the economic mechanism for attaining price parity across borders. The expectation is that poorer countries will have lower wage rates and (hence) lower prices of non-traded goods relative to traded ones. Thus the purchasing power parity (PPP) rate differs systematically from the nominal exchange rate. The most common economic rationale is the classic Balassa-Samuelson model of a competitive market economy with mobile factors of production between the sectors producing traded and non-traded-goods.[1]

Motivated by this argument, the International Comparison Program (ICP) collects the primary price data across countries on which the ICP's PPP rates are based.[2] The easiest way to think about PPPs is to focus on the price-level index (PLI) given by the ratio of the PPP rate to the ordinary market (or official) exchange rate (MER). One can think of the PLI as a measure of how cheaply one can live in a country with the $US. The inverse of the PLI is a measure of the real exchange rate—the MER deflated by the PPP rate. This can also be thought of as the extent of the upward adjustment to GDP in switching from the MER to PPP.[3]

PPP estimates from the 2011 ICP were released in World Bank (2014).[4] Many developing countries saw substantial changes to their

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[1] This was outlined independently by Balassa (1964) and Samuelson (1964). Ravallion (2013a) discusses possible concerns about the relevance of this model to developing countries. An alternative explanation was proposed by Bhagwati (1984) based on factor endowments, leading (labor-intensive) services to be cheaper in poor countries.

[2] The ICP is also the source of price data used for the *Penn World Tables*.

[3] Note that the PLI is the ratio of GDP at MER to GDP at PPP.

[4] The data and methods used are described in World Bank (2014, 2015) and subsequent academic literature, including Deaton and Aten (2017) and Inklaar and Rao (2017). These sources also note differences with past ICP rounds, notably 2005. The latter ICP round is described in World Bank (2008a, 2008b).

real incomes. The new PPPs suggest less inequality between the rich world and poor world. Comparing the global distribution of real consumptions using the 2011 PPPs with those for 2005 (updated to 2011 prices), Inklaar and Rao (2017, p.287) find that the global Gini coefficient for 2011 falls from 0.57 to 0.51. Far less poverty is also indicated when judged relative to a poverty line with constant US purchasing power; indeed, by one estimate the new PPPs imply almost half the global poverty rate for 2011 as the old PPPs (Dykstra, Kenny, & Sandefur, 2014). Fixing the U.S. purchasing power of the international line is questionable given the higher inflation rates in developing countries (Chen & Ravallion, 2010a, 2010b). A debate ensued about the new ICP and its implications for the global economic landscape. The impact of the new PPPs on global poverty counts has been found to be quite sensitive to the level of the poverty line, as shown by Edward and Sumner (2015).[5]

There have been methodological changes in each ICP round, including changes in how the micro price data are collected in the field and how the PPP aggregates are estimated. With each new round those involved in producing the new PPPs, or advising on them, defend the methodological changes, arguing that the new numbers are more reliable. Some observers have been unconvinced, and have advocated abandoning the PPPs for major global comparisons, such as in measuring poverty.[6]

One might reasonably argue that, given the methodological changes between ICP rounds, one should at least avoid any attempt to compare the PPPs from different rounds, and take the new numbers for granted. This is essentially the position taken by the ICP itself and the World Bank's *World Development Indicators* as a prominent user of the PPPs from the ICP; with each new ICP round, the relative sizes of economies are adjusted accordingly for the new base date, with price adjustments done over time using existing national deflators. With new PPPs everything from past ICP rounds is essentially purged from the data bases.

However, users of these data naturally want to better understand what might explain the revisions (as exemplified by the quote at the beginning of the paper). This is especially so when the global economic landscape changes markedly from one ICP round to the next. It is not very satisfactory intellectually to simply say there were some methodological changes so forget about the past. There are comparability problems over time as in all areas of economic and social measurement (including household surveys, national accounts and consumer price indices). While acknowledging that there have been methodological changes, this paper also argues that we can learn something from the comparisons across ICP rounds. In the case of the ICP, there is a very large body of price quotations underlying the PPPs from each round. It would seem odd to simply cast aside all that past price data at each new round. This has motivated a series of recent papers trying to understand changes in PPPs between ICP rounds.[7]

This paper compares the PPPs from the 2011 ICP with those for 2005 and 1993, and examines how much of the variance in the changes in PPPs can be accounted for by a few macroeconomic variables. It is not assumed that one round is better than the other; the aim instead is to try to better understand the changes. The paper first shows that PLIs have been on a rising trend. This is not surprising. Once a developing economy reaches its "Lewis turning point," the Balassa-Samuelson effect will come into play over time, such that the growth comes with rising real wage rates and hence a higher relative price of non-traded goods.[8] Consistent with this hypothesis, the PLI has long been known to have a positive income gradient across countries—giving what is known as the "Penn Effect."[9] Indeed, this has been the international community's main motivation for supporting the ICP in collecting its price data. Otherwise, we will tend to under-state living standards in developing countries. By the same logic, we can also expect to see the PPP rate rising relative to the market exchange rate with sustained growth—indeed, it would surely be odd if it did not. This has been dubbed the Dynamic Penn Effect (DPE) in Ravallion (2013a) who argues that it has been a strong and stable feature of the changes in PPPs between the ICP rounds for 2005, 1993 and 1985.[10]

The DPE is an important example of a macroeconomic factor that should come into play in how the PPPs evolve over time relative to market exchange rates in developing economies. As this paper will show, for the world as a whole, the DPE is also evident in the new PPPs for 2011. It is thus comforting that this macroeconomic factor is evident across all ICP rounds so far.

But there is clearly more to the revisions implied by the 2011 ICP than just the DPE. As the paper shows, the PLI for Asia has not risen over 2005–11. This is surprising given that there was so much growth in that region, and we are seeing rising real wages rates across much of the Asia region. What else might be driving the PPPs?

To help explain the changes in the 2011 ICP, this paper formulates and tests a new hypothesis, namely that there is an implicit preference for more internationally comparable traded goods in the ICP. This can be called the hypothesis of Traded-Goods Preference (TGP). This can happen in two ways. First, the PPP is normally expressed in the currency of a specific reference country, which has almost always been the $U.S., and the PPP's weights for a given country reflect the shares of each good in the reference country as well as the country in question. (For example, using a bilateral Törnqvist index one takes the average share as the weight.) If the consumption pattern in the reference country tends to put higher weight on traded goods then this will be reflected in the implicit PPP weight. (While the weights on the various commodities are explicit, the weights on traded versus non-traded goods are implicit.)

Second, in constructing a Consumer Price Index (CPI) one wants to use goods typical of the country in question, while for a PPP one wants to use goods that are consumed in all countries and are reasonably commonly consumed. As a result, the goods lists used by the ICP are often quite different to those used by the CPIs. Furthermore, although there are exceptions, as a generalization we can reasonably expect that internationally-traded goods tend to be more comparable across countries than non-traded goods. Being internationally-traded and being comparable are not, of course, the same thing; the classic example of a nontraded good is a haircut, and this is readily comparable. However, being nontraded does often create comparability problems. An example is the foodgrain teff, the seeds of an annual grass of the same name. Teff is a food staple in Ethiopia but is rarely eaten elsewhere, so it is neither comparable nor internationally traded. Wheat, by contrast, is internationally tradable and readily comparable.

It should be noted that the first reason for TGP does not imply any fault in the ICP's methods, though there may be sensitivity

[5] See the comments on the Dykstra et al. blog post. The calculations are sensitive to the level of the poverty line; Chandy and Kharas (2014) found less impact using a higher line but still found lower poverty using the new PPPs.

[6] See, for example, Allen (2017) and the comments in Ravallion (2017).

[7] See Johnson, Larson, Papageorgiou, and Subramanian (2013), Ravallion (2013a,b), Inklaar (2013), Deaton and Aten (2017), Inklaar and Rao (2017).

[8] The Lewis turning point refers to the famous development model of Lewis (1954), which postulated that poor countries had a large rural labor surplus and that real wages only start to rise once that surplus is absorbed.

[9] The term "Penn effect" stems from the Penn World Tables (Summers & Heston, 1991), which provided the data that were used to establish this effect empirically. For evidence on the cross-sectional Penn Effect see Summers and Heston (1991), Rogoff (1996), Deaton and Heston (2010).

[10] This was confirmed by Majumder, Ray, and Santra (2015).