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Global and Country Poverty Rates, Welfare Rankings of the Regions and Purchasing Power Parities: How Robust Are the Results?

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Abstract

This four-part study examines the sensitivity of poverty estimates, regional composition of the 'extremely poor' population, and regional rankings to the Purchasing Power Parities (PPPs) used. The first part compares PPPs that use the price information collected by the ICP but follow a different methodology and, also, from a procedure that avoids the need for price information altogether. The second part examines sensitivity of poverty rates, poverty trends and regional composition of the poor to PPPs. The paper reports a high degree of sensitivity of the results to alternative methodologies, though it also reports evidence of convergence of the alternative sets of poverty rates over the period between the two ICP rounds, 2005 and 2011. In the third part, the study finds that PPPs and inequality, both, have a positive effect on poverty. Finally, the paper proposes a methodology that uses the price and expenditure information and a welfare criterion due to Sen (1976) to rank regions, and examines the sensitivity of the rankings, and their temporal changes, to PPP. The results point to the need for high quality, item wise price and expenditure information across countries, improved PPP methodologies, explicit incorporation of inequality in the welfare measure, and more sensitivity analyses in cross country welfare comparisons with respect to PPP.

Keywords: Poverty Rates, Purchasing Power Parity, Penn Effect, Price Indices
JEL Classification: D12, D63, E31, I31, I32

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1. Introduction

The year 2015 has seen the publication of two important documents. The first is the publication of the final results of the 2011 International Comparison Project (ICP) on Purchasing Power Parities (PPPs)[4] and the second is the 'global count of the extreme poor in 2012' by researchers based in the World Bank[5]. PPPs play a crucial role in poverty calculations, since they determine the poverty line in local currencies from the international poverty line, usually denominated in US $. The sensitivity of poverty estimates to the PPPs used becomes an important issue. As 2015 is also the terminal year of the UN Millennium Development Goals (MDG), and poverty eradication figures prominently as a MDG, there has been a spate of studies estimating poverty rates using a variety of assumptions and data sets. These include, besides Ferreira et al. (2015), Chandy and Kharas (2014), Jolliffe and Prydz (2015), Kakwani and Son (2015), Edward and Sumner (2014, 2015) and World Bank (2015b). While nearly all the cross country comparisons of poverty rates and income levels have been based on the 2005 and 2011 ICP PPPs, the issue of sensitivity of the estimates to PPPs is examined exclusively with reference to these two sets of ICP PPPs only, not any other. For example, Jolliffe and Prydz (2015) use the 2011 PPP conversion factors on the national poverty lines that defined the earlier $1.25 line in 2005 PPPs to construct the 2011 poverty line. Inklaar and Rao (2015) go backwards by using the methodology used in ICP 2011 to construct counterfactual PPPs in 2005. The main reason for lack of evidence on non ICP PPPs is the fact that the required information collected on a global scale by the ICP was not publicly available to researchers, so that independent construction of non ICP PPPs was not possible. The situation has now changed with the willingness of the ICP to share the information widely – see, for example, Clements and Lan (2007) and Inklaar and Rao (2015). The availability of such information allowed the present study to provide evidence, quite uniquely, on the sensitivity of the poverty estimates to both the ICP and non ICP PPPs.

[4] World Bank (2015a).

[5] Ferreira et al. (2015).

Evidence on the latter is a point of departure from the previous literature. The present study builds on an earlier study [Majumder, Ray and Santra (2015)] that provides a methodology for constructing PPPs that does away with the need for price information altogether. It asks and answers the question: if we do have and use the price information, how do the PPPs compare with the non-price based PPPs and the ICP PPPs, and how do they affect the global and country poverty rates?

The 'eradication of extreme poverty and hunger' has figured prominently as one of the principal UN Millennium Development Goals (MDG) over the period, 1990-2015. The target was to "halve, between 1990 and 2015, the proportion of people living on less than $1.25 a day". It is appropriate, therefore, that in this terminal year of the MDG, papers and reports have started to appear on progress, or lack of it, on this important indicator of global economic welfare[6]. The continued importance of the goal of sharply reducing 'extreme poverty' is underlined by the fact that the recently formulated Sustainable Development Goals (SDG) have placed as top priority the goal of 'eradicating extreme poverty for all people everywhere' by 2030. Further evidence of the importance of the poverty issue for the international community is evident from the setting up by the World Bank's Chief Economist, Kaushik Basu, of a new 'Commission of Global Poverty'[7]. According to United Nations (2015), 'extreme poverty' defined as referring to those living on less than $1.25 (at 2005 PPP) a day has declined from 50% in 1990 to 14% in 2015 - "in 1990, nearly half of the developing world lived on less than $1.25 a day; this proportion dropped to 14% in 2015" (p.4). This is by any measure remarkable progress, though much work is still left to be done to reduce the figure to 0 by 2030. According to Ferreira et al. (2015, Table 8), the progress has been still more impressive with a poverty rate of 12.8% reported by them in the year, 2012. Ferreira et al. (2015)'s estimates[8] are somewhat more optimistic than those reported by Jolliffe and Prydz (2015, Table 3) who report a comparable figure of 14.5 % in 2011 at 2005 PPPs in line with the United Nations (2015) report. The poverty rates reported by Jolliffe and Prydz (2015) and Ferreira et al. (2015) are strengthened by their finding that their estimated rates in 2011 are quite robust to the use of

[6] See, for example, United Nations (2015), Ferreira et al. (2015).

[7] See the announcement in http://www.worldbank.org/en/news/press-release/2015/06/22/world-bank-chief-economist-sets-up-new-commission-on-global-poverty.

[8] See, however, Reddy and Lahoti (2015) and Subramanian (2015) for a critical review of the methodology and estimates in Ferreira et al (2015). See, also, Reddy and Pogge (2007) for an earlier criticism of the concept of the international poverty line on the ground "that (it) is not adequately anchored in any specification of the real requirements of human beings… and is neither well defined nor appropriate for poverty assessment".

alternative combinations of PPPs and the corresponding poverty lines. The ICP PPPs have been fluctuating wildly between rounds to prevent much confidence in the numbers. Chen and Ravallion (2010) noted, when the 2005 PPPs came out, that the 'developing world is poorer than we thought'. The reverse occurred when the 2011 PPPs came out with Dykstra, Kenny and Sandefur (2014b) commenting that 'global poverty fell almost half on Tuesday". In an attempt to reconcile these wild gyrations, Jolliffe and Prydz (2015, p. 30) point out that "a consistent approach to global poverty estimation that includes incorporating the 2011 PPP data leads to poverty estimates that are close, but slightly higher, than those based on 2005 PPP extrapolations". However, using a different methodology for estimating poverty rates, based on the 'weighted average of equivalent poverty lines of 66 countries in Asia and Sub-Saharan Africa with weights proportional to their population' and using the 2011 PPP, Kakwani and Son (2015) report that the number of poor was drastically reduced in Asia, but increased in Sub-Saharan Africa compared to that obtained using the 2005 PPPs. Kakwani and Son (2015)'s empirical finding underlines the importance of PPPs in estimating poverty rates[9].

A working definition of the PPP is provided in World Bank (2013, p. 19) , namely, that "*it represents the number of currency units required to purchase the amount of goods and services equivalent to what can be bought with one currency unit of the base or reference or numeraire country*". PPPs are required in a range of cross country comparisons that include, besides poverty calculations, real expenditure, inequality and real GDP comparisons. The most prominent use of PPPs has been in the calculation of poverty rates. For example, the implementation of the international poverty line (IPL), typically denominated in US dollars, requires the use of PPPs to convert the IPL to local currencies. The importance of PPPs in cross country welfare comparisons has been recognised in several recent contributions. These include Edward and Sumner (2015), Gelb and Diofasi (2015), Inklaar and Rao (2015), Majumder, Ray and Santra (2015) and Ravallion (2015). These contributions come in the wake of attempts by Rambaldi, Rao and Ganegodage (2010), Rao, Rambaldi and Doran (2015), McCarthy (2013), Pelagatti (2010), Ravallion (2013a, 2013b) and Inklaar (2013) to provide alternative dynamic PPP mechanisms that interpolate PPPs between two benchmark years[10].

[9] Kakwani and Son (2015) use a global poverty line of $1.80 at 2011 PPP against the World Bank's global poverty line of $1.90. The concept of 'equivalent poverty lines' on which this study is based is defined by the authors as those that produce the same poverty rates in 2005 and 2011.

[10] See, also, Clements and Lan (2007) for an earlier study that provides further evidence on the importance of PPPs by 'comparing PPP-based cross-country incomes from the Penn World Table with those derived from prevailing exchange rates'.

The central role that PPPs play in poverty comparisons has given rise to the International Comparison Program (ICP) that periodically updates the PPPs based on price and expenditure data obtained from the various countries. The ICP has increased significantly in scope and coverage, and its importance in international welfare comparisons is recognised by the fact that it is now centrally directed from the global office of the World Bank. The last two ICP rounds were conducted in 2005, published in World Bank (2008), and in 2011, published in World Bank (2015a). There were several methodological and price informational differences between ICP 2005 and ICP 2011 that have been noted in Ravallion (2015)[11]. The reader is referred to World Bank (2013) and World Bank (2015a) for details on the methodology and the nature of price information collected in ICP 2005 and ICP 2011, respectively[12]. Inklaar and Rao (2015) explain the large shift in the world income distribution, especially the larger revisions to income in the lower income countries, by the differences in the measurement methodology and price sampling methods between ICP 2005 and ICP 2011.

Notwithstanding the central role that PPPs play in welfare comparisons, that is widely recognised in the above cited literature, there has not been many attempts to systematically study the sensitivity of poverty estimates to the PPPs used in the calculations. The examination of sensitivity of the poverty estimates has been more with respect to the poverty line, much less with respect to the use of different PPPs, especially those estimated outside the ICP framework. Yet, the same international poverty line may have quite different national poverty line cut offs in the different countries if we vary the PPPs. Whatever evidence that does exist on the sensitivity of poverty rates to PPPs is limited to the use of the ICP 2005 and ICP 2011 PPPs. In the light of questions raised on the accuracy of both these ICP PPPs, it is significant that there has been no attempt, as far as we are aware, to examine the robustness of the poverty estimates to the use of non ICP PPPs. With the exception of Majumder, Ray and Santra (2015), there are hardly any estimates of PPPs available in the literature other than those provided by the ICP. As already noted, one possible reason for that is the lack of access, until recently, by

[11] See, in particular, Section 4 of Ravallion (2015) that highlights the role of price information in arriving at PPP estimates. The quality of the price information used in the two ICP rounds has been the subject of some controversy in the literature- see, for example, Deaton and Aten (2014), Ravallion (2014), Jolliffe and Prydz (2015), and Inklaar and Rao (2015).

[12] See, in particular, World Bank (2015a, pages 5-6) for a description of the significant methodological differences between ICP, 2005 and ICP, 2011.

researchers to the international price and distributional data required for estimation of PPPs outside the ICP framework. The situation is now easing with the willingness and cooperation of the World Bank to make available the price and expenditure information collected by the ICP, along with projects such as those reported in Dykstra, Dykstra and Sandefur (2014a), and Lahoti, Jayadev and Reddy (2015) to construct data bases that allow independent verification of the PPPs and the poverty estimates put out by the World Bank. Such an exercise constitutes one of the main motivations of this study.

The present study fills a significant gap in the literature by providing a range of estimates of PPPs, other than the ones made available by the ICP, that could be used in cross country welfare comparisons including poverty rates. The comparison between the ICP and non ICP PPPs is of interest because of questions that have been raised on both the quality of the price data and the way they have been used to construct the ICP PPPs. For example, the 2005 price information had an 'urban bias'[13] in the prices collected that may have led to an upward bias in the estimated PPPs. The methodology based on 18 'ring countries' used in the 2005 ICP exercise has also been criticised in the recent literature[14]. Though the 2011 ICP is generally considered to be superior with respect to both the methodology and the quality of the price data, Ravallion (2014) argues that doubts remain on the 2011 ICP as well, especially, due to the much lower weightage given to items such as Food in the ICP than that implied by the national household surveys. While the focus of the exercise by Majumder, Ray and Santra (2015) was on PPPs, the focus of the present study is on poverty rates. Note, however, that similar to the above study, the PPPs use the Indian Rupee as the base or the numeraire currency, and the international poverty lines corresponding to the various PPPs are specified in Rupees rather than the US dollar.

Another contribution of this study is to propose a methodology for welfare ranking of regions using the price and expenditure information collected by the 2011 ICP. We extend the procedure, proposed in Sen (1976), to show that the PPPs have wider use than in poverty comparisons by using the estimated PPPs to provide a partial welfare ranking of the principal ICP regions. In doing so, we move from the intra country context of the welfare ranking of

[13] See, for example, Majumder, Ray and Sinha (2012) for evidence on rural urban differences in PPP within a country, and Majumder, Ray and Sinha (2015b) for the similar evidence in the cross country context.

[14] See Deaton and Aten (2014).

Indian states in Majumder, Ray and Sinha (2015a), where the methodology was applied, to the world context of regional rankings that use the PPPs to convert the national prices to a common unit. As described later, the counterfactuals in the rankings exercise involve each region facing the other regions' prices, besides their own. In widening the use of PPPs beyond poverty comparisons, the present study is in line with the recent attempts to look at 'shared prosperity' that are concerned with the welfare of the 'bottom 4 deciles' in addition to those living below the poverty line[15].

The plan of the rest of the paper follows the three segments that the study can be partitioned into: (a) comparison of the ICP 2005 and ICP 2011 consumption PPPs (based on actual individual consumption) with four other non ICP PPPs in the same years; (b) comparison of the poverty rates between the alternative sets of PPPs; and (c) introduction of the methodology for the welfare ranking of the ICP regions in the two ICP years (2005, 2011) and presentation of the rankings themselves. Section 2 presents briefly the framework for calculation of the four non ICP PPPs, Section 3 discusses the data and Section 4 compares the ICP consumption PPPs with the others. Section 5 reports and compares the poverty rates corresponding to the different sets of PPPs. In keeping with the motivation of this study, this section also reports and compares the regression estimates of poverty rates on gross domestic product and PPP under alternative PPPs. Section 6 focusses on the welfare rankings of the regions, and Section 7 concludes the paper.

2. The ICP, Price Based and the Non Price based PPPs and Constructing the Corresponding International Poverty Lines

Since the methodologies used by the ICP to estimate the PPPs in 2005 and 2011 have been described in detail in World Bank (2013, 2015)[16], we restrict our description to the procedure used to estimate the non ICP PPPs.

[15] See, for example, Basu (2006), Cruz, et al. (2015) and World Bank (2015b). .

[16] See, also, Diewert (2010) for description of the methodological improvements in ICP, 2005 over the previous rounds.

2.1 The Price based Non ICP PPPs

2.1.1 The Tornqvist and Fisher Indices

The two price based PPP indexes that have been used in this study are the multilateral and superlative price indexes of the Gini-Elteto-Koves-Szulc (GEKS) type that have been described in Diewert (2005) and in Deaton and Dupriez (2011).

The two price indices used are[17]: Tornqvist and Fisher.

Denoting *c* as the reference country, *d* as the comparison country, and *n* as the good, the Tornqvist index is given as a weighted geometric average of the price relatives of each good, with the weights being the average of the budget shares in *c* and *d*. The latter are denoted by s_n^c (reference country) and s_n^d (comparison country).

$$ln\ P_T^{cd} = \frac{1}{2}\sum_{n=1}^{N}(s_n^c + s_n^d)\ ln\ \frac{p_n^d}{p_n^c}\,. \tag{1}$$

The Fisher index is defined as the geometric mean of the Paasche and Laspeyres price indices. It is given as follows.

$$ln\ P_F^{cd} = 0.5 \times ln\ [\ \sum_{n=1}^{N} s_n^c\ \frac{p_n^d}{p_n^c}\ ] - 0.5 \times\ ln\ [\ \sum_{n=1}^{N} s_n^d\ \frac{p_n^c}{p_n^d}\ ]\,. \tag{2}$$

The GEKS PPP price index for country *c* in country *l*'s currency units is given by

$$\text{Tornqvist:}\quad P_T^c = \left(\prod_{j=1}^{M} P_T^{lj}\ P_T^{jc}\right)^{\frac{1}{M}}, \tag{3}$$

$$\text{Fisher:}\quad P_F^c = \left(\prod_{j=1}^{M} P_F^{lj}\ P_F^{jc}\right)^{\frac{1}{M}}. \tag{4}$$

M is the total number of countries, *N* is the total number of commodities, and India is chosen as the numeraire country, l, in this study.

The 2005 ICP data set that is made available to us contains very limited price information, much less than in case of 2011 ICP. The data on prices of items in local currencies was limited

[17] To save space, we have omitted a detailed description of these price indices. Details are available in Diewert (2005), who argues that these price indices can be given a regression model interpretation by demonstrating that they are special cases of the Country Product Dummy model used in international price comparisons.

to only the 18 'ring countries' that have been listed in World Bank (2008). Consequently, the scope for applying the two price indices based PPPs was limited to the 18 'ring countries'. However, we did have access to the PPPs at the level of basic headings that were aggregated as an expenditure share weighted average to obtain an estimate of the PPP of all the countries listed in the 2005 ICP data set. As we report and discuss later, we therefore had three sets of price information based non ICP PPPs, one of which was limited to the 18 ring countries, that provided a useful comparison with the 2005 ICP PPPs.

2.1.2 The Country Product Dummy (CPD) index

The CPD method was originally proposed by Summers (1973) in the context of missing price information on cross country data and has been used in the ICP rounds. The procedures are described in detail in many subsequent papers [e.g. Rao, 1995 and Diewert, 2005].

Let p_{nc} represent the price of item *n* in country *c* (*n=1,2,…N; c=1,2,…,M*). The basic statistical model underlying the CPD method can be stated as:

$$p_{nc} = a_c b_n u_{nc}, \tag{5}$$

where a_c and b_n are unknown parameters to be estimated from price data and u_{cn} are independently and identically distributed random variables, assumed to follow *Lognormal* $(0, \sigma^2)$.

The above equation can be expressed as a regression equation in logarithmic form for each price observation corresponding to commodity *n* in country *c* as

$$\ln p_{nc} = \alpha_c + \gamma_n + v_{nc},$$

or

$$y_{nc} = \ln p_{nc} = \alpha_1 D_1 + \alpha_2 D_2 + ... + \alpha_M D_M + \eta_1 D_1^* + \eta_2 D_2^* + ... + \eta_N D_N^* + v_{nc}, \tag{6}$$

where D_c *(c=1,2,…,M)* and D_n^* *(n=1,2,.....,N)* are, respectively, country and commodity dummy variables and v_{nc}'s are random disturbance terms which are independently and identically (normally) distributed with zero mean and variance σ^2.

Under complete price information comparisons of price levels between two countries *c* and *d*, represented by PPP_{cd} can be derived as:

$$PPP_{cd} = \frac{a_d}{a_c} = \prod_{n=1}^{N} \left[\frac{p_{nd}}{p_{nc}} \right]^{1/N} \tag{7}$$

It is identical to the EKS (Elteto-Koves-Szulc) index used in the OECD and Eurostat comparisons for prices at the basic heading level.

2.2 The Non-Price or Behavioural or Counterfactual PPPs[18]

The procedure is due to Coondoo, Majumder and Chattopadhyay (2011) and was proposed in the single country context to estimate spatial prices in India. It is based on the estimation of Engel curves on a single cross section data. The counterfactual PPPs presented here allow a clean comparison with the ICP PPPs and the price based PPPs, since the procedure does not need to use the controversial price information collected in the ICP 2011 round. Moreover, as this study illustrates, the published World Bank data does contain the disaggregated expenditure information (by items and by expenditure classes) at country level required to implement the procedure to calculate the alternative set of PPPs[19].

The use of estimated Engel curves to construct price indices has a rich history. The idea can be traced back to Costa (2001) and Hamilton (2001) who used it to investigate and correct the 'biases' in official consumer price indices. Recent applications include Almas (2012) to estimate the consequence of 'PPP bias' on real income comparisons between countries, and Almas, Kjelsrud and Somanathan (2013) to examine the bias in calculating poverty rates in India. The procedure rests on the underlying assumption of Costa (2001) and Hamilton (2001) that (a) there is a stable Engel relationship[20] at the household level between the budget share of food and per capita household expenditure, (b) a household's budget share of food is a measure of that household's welfare and (c) that equal food shares between households, corrected for household compositional and demographic characteristics, denote equal welfare.

The present exercise follows Almas (2012) in adopting a preference consistent, 'complete demand systems' based estimation of Engel curves on cross country data that embodies the preference PPP link that is a central feature of this paper. The methodology is based on the fact

[18] We have provided here a brief description of the procedure- see Majumder, Ray and Santra (2015, Section 5) for more details.

[19] Note, however, that for the fuller utilisation of the benefits of this procedure, one requires access to the distributional data contained in the unit records of the various countries' household surveys that was not available to us. The reader has to keep this in mind when evaluating the estimates of the behavioural and non-price PPPs presented later.

[20] The empirical support for the idea of a stable Engel relationship between countries can be traced back to Houthakker (1987).

that the PPP can be viewed as a True Cost of Living Index that is defined below. The general cost function underlying Quadratic Logarithmic (QL) systems, (e.g., the Quadratic Almost Ideal Demand System (QAIDS) of (Banks, Blundell and Lewbel, 1997) is of the form:

$$C(u,p) = a(p).exp(\frac{b(p)}{(1/ln\,u)-\lambda(p)}), \quad (8)$$

p is the price vector, $a(p)$ is a homogeneous function of degree one in prices, $b(p)$ and $\lambda(p)$ are homogeneous functions of degree zero in prices, and u denotes the level of utility[21]. The budget share functions corresponding to the cost function (8) are of the form

$$w_i = a_i(p) + b_i(p)\,ln\left(\frac{x}{a(p)}\right) + \frac{\lambda_i(p)}{b(p)}\left(ln\frac{x}{a(p)}\right)^2, \quad (9)$$

x denotes nominal per capita expenditure and *i* denotes item of expenditure.

The corresponding True Cost of Living Index (TCLI) in logarithmic form comparing price situation p^1 with price situation p^0 is given by

$$ln\,P(p^1,p^0,u^*)=[ln\,a(p^1) - ln\,a(p^0)] + \left[\frac{b(p^1)}{\frac{1}{ln\,u^*}-\lambda(p^1)} - \frac{b(p^0)}{\frac{1}{ln\,u^*}-\lambda(p^0)}\right], \quad (10)$$

u^* is the reference utility level. Note that "price situation" refers to the prices prevailing in a particular country in a given year.

The procedure for estimating PPP for *R* countries, taking country 0 as base[22], involves three stages.

Stage 1: a set of item-specific Engel curves relating budget shares to the logarithm of income are estimated for each country *r = 0, 1, 2…R* as follows.

$$w_{ij}^r = a_i^r + b_i^r lnx_j^r + c_{ir}(lnx_j^r)^2 + \varepsilon_{ij}^r, \quad (11)$$

i denotes item, *j* denotes income category (or household)[23], ε_{ij}^r is a random disturbance term and a_i^r, b_i^r, c_i^r are parameters that contain the price information on item *i* in country *r*.

[21] Equation (8), and the ones following, should have a country subscript that we have omitted to simplify the exposition.

[22] In the calculations reported later, we take India as the base country, 0.

[23] For all countries the counterfactual PPPs are based on data by income categories (rural and urban combined), as provided by the World Bank on its website.

Stage 2: $a(p^r)$, *r = 0, 1, 2…,R* is estimated from the following equation obtained by equating equations (9) and (11):

$$\hat{b}_i^r - \hat{b}_i^0 = lna(p^0)(2\hat{c}_i^0) - lna(p^r)(2\hat{c}_i^r) + e_i^r \; ; \qquad r = 1, 2, \dots, R. \tag{12}$$

Here e_i^r is a composite error term, which is a linear combination of the individual errors of estimation of the parameters a_i^r, b_i^r, c_i^r and p^0 denotes the price vector of the base country.

Stage 3: Using the normalization $b(p^0) = \lambda(p^0) = 1$, the money metric utility u_j^0 of the *j*-th income group of the base country (India) that has nominal per capita income $x_j^0 \left(= C\left(u_{j,}^0 p^0\right)\right)$ is obtained from (8) as:

$$\frac{1}{ln\, u_j^0} = \frac{1}{ln\frac{x_j^0}{a(p^0)}} + 1. \tag{13}$$

Again, using the expression in (8) for country *r*, income group *j*, and (13), $b(p^r)$ and $\lambda(p^r)$, *r = 1, 2…, R;* are estimated from the following regression equation[24]:

$$\frac{1}{ln\left(\frac{x_j^r}{\widehat{a(p^r)}}\right)} = \frac{1}{b(p^r)}\left(\frac{1}{ln\frac{x_j^0}{\widehat{a(p^0)}}} + 1\right) - \frac{\lambda(p^r)}{b(p^r)} + \; error. \tag{14}$$

To estimate (14) we take *j* as decile (percentile) group so that the data are ordinally comparable across countries.

The PPPs are then estimated as TCLIs from equation (10) for a given reference level of utility u^* (taken to be the one corresponding to the median level income of the base country, India). It may be emphasized that $a(p^r), b(p^r)$and $\lambda(p^r)$ are estimated as composite variables and no explicit algebraic forms for these functions are assumed. This confers the advantage that the estimated PPPs are not dependent on a priori specified particular functional forms such as, for example, the specification proposed by Banks, Blundell and Lewbel (1997).

2.3 Constructing the International Poverty Lines

One of the earliest attempts at constructing an international poverty line (IPL) in order to quantify absolute world poverty in 1985 is due to Ravallion, Datt and Walle (1991). The

[24] The regression set up arises because $\widehat{a(p^r)}$ and $\widehat{a(p^0)}$ are estimated values. See Coondoo, Majumder and Chattopadhyay (2011) for a detailed description.

international poverty line proposed in that study was based on the national poverty lines of 33 countries, both developing and developed, converted to US dollars at the then PPPs, yielding an approximate figure of 1 $ a day per person, which was quite close to the then Indian poverty line at PPP dollars. Since then, the procedure has changed and is now the mean of the national poverty lines of the 15 poorest countries, nearly all of whom are in Africa, converted to US dollars at the PPPs relevant to that year. As explained in Ferreira, et al. (2015), the poverty line is updated temporally so as to maintain the purchasing power of the IPL through time. If PL_t^j and PL_0^j denote, respectively, the national poverty lines (in PPP dollars) in country *j* (=1…, 15) in initial year, *0*, and year, *t*, respectively, then the temporal updating of each country's poverty line is as follows:

$$PL_t^j = PL_0^j \times \frac{CPI_t^j}{CPI_0^j} \times \frac{PPP_0^j}{PPP_t^j} \tag{15}$$

CPI is temporal price deflator, and PPP is the purchasing power parity of country *j*. The international poverty line in year *t* is, then, the mean of the national poverty lines (PL_t^j) in that year. While we follow this procedure to make our poverty estimates comparable with those in the literature, as we argue below, the new IPL does not maintain the purchasing power of the national poverty line in each country. We provide estimates in support of this point.

Let us choose a budget share (w_k^j) weighted geometric mean for CPI in country *j*. Then,

$$\frac{CPI_t^j}{CPI_0^j} = \prod_{k=1}^{n} \left(\frac{p_{kt}^j}{p_{k0}^j}\right)^{w_k^j} \tag{16}$$

For simplicity, let us assume that the budget shares, w_k^j, are time invariant.

Let us similarly choose the PPP as the δ_k weighted geometric mean of the price relatives in country *j* and the US. Then, it follows that

$$\frac{PPP_0^j}{PPP_t^j} = \prod_{k=1}^{n} \left(\frac{p_{k0}^j}{p_{k0}^t}\frac{p_{kt}^{US}}{p_{k0}^{US}}\right)^{\delta_k} \tag{17}$$

Substituting (13) and (14) in (12), we get

$$PL_t^j = PL_0^j \times \prod_{k=1}^{n} \left(\frac{p_{kt}^j}{p_{k0}^j}\right)^{w_k^j} \times \prod_{k=1}^{n} \left(\frac{p_{k0}^j}{p_{k0}^t}\frac{p_{kt}^{US}}{p_{k0}^{US}}\right)^{\delta_k}. \tag{18}$$

Let us define $$\Phi_t^j = \prod_{k=1}^{n}(\frac{p_{kt}^j}{p_{k0}^j})^{w_k^j - \delta_k} \quad (19)$$

Then, (15) can be rewritten as

$$PL_t^j = PL_0^j \times \Phi_t^j \times \prod_{k=1}^{n}(\frac{p_{kt}^{US}}{p_{k0}^{US}})^{\delta_k} \quad (20)$$

Consider two special cases:

Case 1: $w_k^j = \delta_k$ for all *k*.

We have:

$$PL_t^j = PL_0^j \times \prod_{k=1}^{n}(\frac{p_{kt}^{US}}{p_{k0}^{US}})^{\delta_k}. \quad (21)$$

In other words, the US PPP $ denominated poverty line in country *j* will change over time exactly in line with US inflation.

Case 2: $\frac{p_{kt}^j}{p_{kt}^0}$ is free of *j*, i.e. the price ratio of item *k* between years, *t* and *0* is the same for all countries, and $w_k^j = w_k$ for all *j*.

We then have:

$$PL_t^j = PL_0^j \times \Phi \times \prod_{k=1}^{n}(\frac{p_{kt}^{US}}{p_{k0}^{US}})^{\delta_k}, \quad (22)$$

$$\Phi = \prod_{k=1}^{n}(\frac{p_{kt}}{p_{k0}})^{\theta_k} \text{ and } \theta_k = (w_k - \delta_k).$$

In other words, the US PPP dollar denoted poverty line of country *j* will move in line with US inflation times a mark-up, Φ. This mark-up becomes 1 under the assumption of Case 1 when the poverty line in each country alters in line with US inflation.

More generally, it can be readily verified from (17), that $PL_t^j \gtreqless \overline{PL_t}$,

according as: $$J\,(PL_0^j) \gtreqless \sum_{j=1}^{J}\{\Phi_t^j\}\, PL_0^j. \quad (23)$$

$\overline{PL_t}$, which is the mean of the national poverty lines of the fifteen poorest countries in year t, is the IPL in that year. Hence, only if the budget share, w_k^j, equals δ_k, for all j, so that $\Phi_t^j = 1$ for all countries in comparison year, *t*, will the mean of the temporally updated national poverty lines, namely, the IPL coincide with each country's national poverty line.

In general, therefore, the national poverty lines will not maintain their purchasing power at the new IPL[25]. This is confirmed by Tables 1 and 2 which provide the ratio of the national poverty lines to the IPL in 2005 and 2011, respectively, under the alternative PPPs, including the ICP PPP. In several cases, the ratio is quite far from one. The last 5 columns in each table show how much out of sync the national poverty lines in several countries are from that implied by the PPP converted IPL in that country's currency. It is useful to note that while there is general agreement between the ICP, Tornqvist, Fisher and CPD PPPs on the nature of the discrepancy between PL_t^j and $\overline{PL_t}$, this is not the case with the counterfactual PPPs. Tables 1 and 2 also report the IPLs in 2005 and 2011, respectively, estimated as the mean of the national poverty lines (in PPP Rupees) in these two years. It is worth noting that while in 2005 the IPL corresponding to the ICP PPPs was well above the IPLs corresponding to the other PPPs, it falls in line in 2011. This may reflect the methodological problems with ICP, 2005 that have been well documented in the literature. The poverty lines corresponding to the Fisher, Tornqvist and CPD PPPs are much closer to one another than to the poverty line based on ICP PPPs. Note, also, that notwithstanding the much narrower information base on which the non-price or counterfactual PPP s were constructed, the IPL implied by these behavioural PPP s requiring no price information is quite close in both years to that corresponding to the Fisher price index based IPL. We will return to this issue when we report the sensitivity of the PPPs to the estimation procedure in Section 4.

Table 1, Table 2 here

3. Data Base

The study was based on two data sets. The first was constructed from a variety of data sources, mostly from information published by the World Bank on its website. The estimation of the counterfactual PPPs was performed on information collected from these published data sources. The details of this data have been provided in Majumder, Ray and Santra (2015, Appendix A). The information on GDP deflators required to interpolate the PPPs on the way to updating the national poverty lines and the per capita GDP was also sourced from the published data and

[25] This point on the international poverty line has also been noted by Klasen et al (2015), and Reddy and Lahoti (2015).

has been fully described in Appendix B of Majumder, Ray and Santra (2015). The ICP PPPs in 2005 and 2011 that were compared with the other PPPs were obtained from World Bank (2008) and World Bank (2015a), respectively. Appendix A of the present paper lists the sources of the additional data sets used in the present study.

The price information required to construct the Tornqvist and Fisher price indices on the way to calculating the price based PPPs was made available by the ICP group in the World Bank. While the prices at the level of individual items for each of the participating countries is available for the ICP, 2011 round, such information is only available for 18 'ring countries' in ICP, 2005. In case of the former, we constructed the prices at the level of basic headings by aggregating the item prices taking the expenditure share as weights. The Tornqvist and Fisher price indices were then calculated at the level of basic headings and, from them, the price based PPPs. In case of the ICP, 2005, however, such calculations were only possible for the 18 ring countries. However, in calculating the poverty rates, we interpolated the Tornqvist and Fisher PPPs backwards from 2011 to 2005 using the CPI as is commonly done in the literature- see, for example, Inklaar (2013)[26]. In case of the ICP 2005 data set, we used the PPPs at the level of basic headings to construct PPPs at the country level as an expenditure share weighted average of the basic headings PPPs. This allowed another point of comparison with the published ICP PPPs.

The counterfactual PPPs for 2011 are marginally different from the ones reported in Majumder, Ray and Santra (2015, Table 5)[27]. Unfortunately, the WB website does not provide the information required to repeat the calculations in 2005. Consequently, the 2005 behavioural or counterfactual PPPs were obtained by interpolating the 2011 figures backwards using the GDP deflators. Note, also, that the WB website does not provide the disaggregated expenditure information required to calculate the counterfactual PPPs for all the ICP participating countries.

4. The Alternative Sets of PPP Estimates

[26] In contrast, we used the GDP price deflator in the poverty GDP regressions.

[27] The earlier figures were based on 2010 data, as was available from the WB website. In this paper we have used 2011 data, obtained by adjusting the 2010 data by appropriate price indices.

Table 3 presents the alternative sets of 2005 PPP estimates including the published ICP 2005 consumption PPPs. For only the 18 ring countries, the ICP, 2005 PPP estimates can be compared with the Tornqvist and Fisher PPPs calculated on the price information collected in the ICP, 2005 round. The ICP PPPs are larger than the Tornqvist and the Fisher PPPs in nearly all the ring countries and, in some cases, the difference is quite large. This is particularly so for some of the poorer African countries in the ring. The issue seems more to do with the quality of the price information in 2005 than with the ICP methodology itself. Note, however, that there is reasonable closeness between the Tornqvist and Fisher PPPs.

Table 3, Table 4 here

Table 3 allows a comparison between the alternative 2005 PPPs for only the ring countries for whom the price information is available. Table 4 provides a more comprehensive picture by presenting the 2011 Tornqvist, Fisher and CPD PPPs for all the ICP countries using the prices at item level collected in this round. The comparable ICP PPPs and the Engel curve based counterfactual PPPs in 2011 are also presented for comparison. This table also presents the counterfactual, Fisher, Tornqvist and CPD PPPs in 2005, using the CPI deflators[28] to work backwards from the 2011 PPP estimates. A comparison between the three sets of Tornqvist, Fisher and CPD PPPs in 2005 is also of interest, since it throws some light on both the relative quality of the price information collected in the two years, and also on the accuracy of the interpolation used to update PPPs between the ICP years. Table 4 shows that in both the ICP rounds the Tornqvist, Fisher and CPD PPPs agree more with each other than with the ICP PPPs, though all of them are based on the same price information. As noted in Majumder, Ray and Santra (2015), the 2011 counterfactual PPPs are generally higher than the 2011 ICP PPPs for many countries in most of the regions, but the reverse is the case for several African countries. Table 4 extends this observation to the 2011 Tornqvist, Fisher and CPD PPPs, which are generally lower than the 2011 counterfactual PPPs in the Asian context as well[29].

Figure 1, Figure 2, Figure 3 here

[28] To keep the calculations simple, the interpolation did not incorporate the 'dynamic Penn' effect that Ravallion (2013a) argues can be quite significant.

[29] Note, however, that the quality of the counterfactual PPPs depends on the ability of the aggregate data to capture the shapes of the Engel curves. Estimates based on household level data would yield more plausible results.

The differences between the alternative sets of 2011 PPPs is brought out clearly in Figures 1-3 which show the scatter points between Tornqvist and Counterfactual PPPs, between Fisher and Counterfactual PPPs, and between Fisher and Tornqvist PPPs, respectively. Each figure shows the linear fitted line to the scatter points and the 45-degree line that serves as a benchmark case of equality between the two PPPs. Figures 1 and 2 show that the price based PPPs are generally lower than the non-price PPPs, though there are several countries where the reverse is the case. Figure 3 confirms the near identical picture between Fisher and Tornqvist by showing that the 45-degree line passes through, or close to, nearly all the scatter points. Further insight into the nature of the difference between the PPPs is presented in Figures 4 and 5 which show the fitted relationship between the real per capita GDP at ICP PPP and at counterfactual PPP in 2005 and 2011, respectively. As before, the 45-degree line shows the benchmark case of equality. Both the figures suggest that the per capita GDP at ICP PPP is generally larger than at counterfactual PPP, but the divergence at the lower end is much larger in 2011 than in 2005. The Figures also show that there is some evidence of convergence between the two per capita GDPs s at the richer end of the spectrum in 2011, but not in 2005.

Figure 4, Figure 5 here

5. Poverty Rates and their Sensitivity to PPPs

5.1 Global, Regional and Country Poverty Rates

Table 5 reports the head count poverty rates in 2005 and 2011 for the various countries under the alternative international poverty lines, reported in Tables 1 and 2, and the corresponding PPPs reported in Table 4. The poverty rates were calculated using the latest version of the PovcalNet software that is put up on the World Bank website[30]. The counterfactual PPP based poverty rates could only be calculated for those countries for whom the necessary disaggregated expenditure information is available on the World Bank Consumption Data Base, 2010[31] to allow calculation of the counterfactual PPPs.

Table 5 here

[30] See http://iresearch.worldbank.org/PovcalNet/. Please note that the poverty rates are computed using the poverty lines reported in Table 1 and Table 2 and the corresponding Consumption PPPs reported in Table 4 (instead of the default poverty rate and the GDP PPP's pre-set in the PovcalNet webform) - see Appendix A for more details on how the PovcalNet program was used to generate the poverty rates reported in Table 5.

[31] See http://datatopics.worldbank.org/consumption/detail.

The following empirical features are worth noting from Table 5.

(a) All the PPPs agree that, in both years, Africa had the highest poverty rate followed by South Asia.

(b) Four of the five PPPs agree that the poverty rate increased in Africa between 2005 and 2011, the exception being the CPD PPPs which registered virtually no change at all in African poverty. However, the poverty rates based on the Tornqvist, Fisher and Counterfactual PPPs recorded a much larger increase in poverty rates in Africa than those based on the ICP PPPs. In fact, there is remarkable agreement on this between these three non ICP poverty rates, but not with the ICP or CPD PPP based poverty rates. The above feature is also true for East Asia and the Pacific, but to a much smaller extent than in Africa. In fact, in a significant departure from the other PPPs, the CPD PPPs suggest a sharp decline in the overall poverty rates in East Asia and the Pacific between 2005 and 2011.

(c) As the international poverty lines corresponding to the alternative PPPs moved closer to one another over 2005- 2011 (see Tables 1,2), so did the corresponding poverty rates in Africa, though at a higher level of poverty.

(d) South Asia is an interesting case since while the ICP and CPD PPPs based poverty rates show a sharp decline between 2005 and 2011, the remaining non ICP PPPs show an increase over the same period. Since the ICP and CPD poverty rates started from higher values, there is some narrowing of the differences between the poverty rates in 2011.

(e) In both Africa and South Asia, the ICP PPP based poverty rates in 2005 are much larger than those implied by the Counterfactual, Tornqvist and Fisher PPPs.

(f) A country by country examination suggests that in 2005 the counterfactual poverty rate exceeds the other poverty rates in case of most countries, because of the large discrepancies in the PPPs. The sharp divergence is somewhat reduced in 2011, but the pattern is essentially the same. However, the ICP poverty rate exceeds the Tornqvist and Fisher poverty rates in case of most countries.

(g) The last row of Table 5 summarises the overall picture of non-robustness of poverty rates to PPPs by showing how much out of step the five alternative PPP based world poverty rates are with one another. For example, while the ICP PPPs recorded a small decline between 2005 and 2011, and the CPD PPP s recorded a larger decline, the remaining three PPPs recorded marked increase in poverty.

A possible explanation of the above features lies in Tables 1 and 2 which report the five international poverty lines in 2005 and 2011, respectively. With most of the 'extreme poor' living very near the poverty line, a small change in the poverty line can have a significant impact on the poverty rates, and this explains feature (g) above. With the poverty lines moving closer to one another in 2011, so do the poverty rates from employing the ICP, counterfactual, Tornqvist and Fisher PPPs.

The results in Table 5 establish considerable sensitivity of the poverty rates to the use of ICP vs price based non ICP PPPs and the corresponding international poverty lines in 2005, but they also show a fair degree of robustness in 2011. This is consistent with the problems with ICP methodology and the quality of price information in 2005 that have been widely noted in the literature, and the fact that the 2011 ICP has been free of such criticisms. What this sensitivity exercise shows is that the decline in the ICP poverty rates between 2005 and 2011 that the present estimates suggest is not as robust a result as would appear from Jolliffe and Prydz (2015), and Ferreira et al (2015).

The counterfactual or behavioural PPPs are based on much less information and consequently need much less resources than the price based PPPs. The fact that, in the poorest continent, Africa, it yields poverty rates that are in line with the Tornqvist and Fisher based PPP s in 2005 and 2011, and with the ICP based PPPs in 2011, suggests considerable potential for future application of these behavioural PPPs, especially for the poor countries.

Table 6 here

Table 6 presents the regional composition of the 'extremely poor' population, defined as living below the IPLs presented in Tables 1 and 2, corresponding to the alternative sets of PPPs, in 2005 and 2011. In both years, the overwhelming majority of this population resided in Africa and Asia. This is true of all the PPPs. Note that Africa's population share of the 'extreme poor' increased sharply between 2005 and 2011 on all the 5 PPPs. This contrasts with the decline in Asia's (East Asia and the Pacific + South Asia) share, and reasonably stable shares in case of Latin America, over this period. This table also shows that the counterfactual PPPs record a much higher share of this population residing in East Asia and the Pacific than is done by the price based PPPs.

Figures 6(a)-6(d), Figures 7(a)-7(d) here

The relationship between poverty rate and per capita GDP is shown in Figures 6(a)-6(d) (2005) and 7(a)-7(d) (2011) which present the fitted line between the two on the cross section of countries in these two years corresponding to the different PPPs. Appendix B presents the 4 graphs in the same figure- one for 2005, one for 2011. This allows easier comparison between the relationship between poverty rates and GDP. Two features stand out from these figures. First, while there is agreement between the PPPs on the inverse relation between poverty rates and a country's affluence, the rate of decline is much sharper for the three price based PPPs than for the behavioural and non-price based PPPs. Second, with improvement in the ICP methodology in 2011, its poverty GDP fitted line is much closer to the Tornqvist and Fisher lines, than in 2005, when it was consistently above them. As to be expected, the Tornqvist and Fisher lines are virtually indistinguishable from one another in both years. In both years, for most countries, the counterfactual PPPs imply higher poverty rates than that implied by the price based PPPs. The overall picture of non-robustness in the poverty rates to PPPs portrayed by Tables 4 and 5 is brought out in Figures 6 and 7.

Table 7 here

Table 7 presents the regional poverty rates under the alternative sets of PPPs in 2005 and 2011, where the regions are defined as those in Ferreira et al. (2015). The regional figures are based on available PPPs within regions. This table allows a direct comparison with the figures for 2011 at $1.90 IPL in Table 8 of Ferreira et al. (2015). Note that the figures for ICP PPP will not be identical since the poverty rates in table 7 are based on the poverty lines derived in this study and the list of countries is close but not identical between the two studies. The two sets of ICP poverty rates, namely, in Ferreira et al (2015, Table 8) and here in Table 7 compare reasonably well with one another, especially for East Asia and Pacific, and Latin America and the Caribbean. Table 7 confirms two features of Table 5, namely, the decline in poverty rates in South Asia on ICP and CPD PPPs between 2005 and 2011 contrasts with an increase in poverty on the other three PPPs, and that the picture of no change in poverty in Sub-Saharan Africa over this period based on CPD PPP contrasts sharply with a large increase in poverty in this region based on the remaining PPPs.

Table 8 here

Table 8 presents the regional composition of the 'extremely poor' population, under the alternative sets of PPPs, in 2005 and 2011, based on the poverty rates in Table 7. The regions are as defined in Ferreira et al (2015). The PPPs agree on an increase in Sub-Saharan Africa's

share of this population over this period. The price indices based PPPs also agree with ICP and CPD PPPs on a decline in South Asia's share that contrast with a slight increase in case of counterfactual PPPs.

5.2 Poverty Rates, GDP and PPP: The Regression Estimates

The contribution that a country's growth makes to poverty reduction has received much attention in the literature. For example, decomposing poverty reduction into growth and inequality components, Datt and Ravallion (1992) show on Brazilian and Indian data sets, that growth makes a quantitatively more important contribution to poverty reduction than redistribution. Assuming log normality of income distributions Bourguignon (2003) develops an econometric model for the poverty estimation equation. Considering this model, Fosu (2009) explores the extent to which inequality influences the impact of growth on poverty reduction, based on a panel dataset from 1977-2004 for Sub Sahara African and non-Sub Sahara African countries. Kalwij and Verschoor (2007) generalize the model of Bourguignon (2003) further and show that impact of GDP growth on poverty reduction is a decreasing function of initial inequality. The study which reports wide regional variation in the income elasticity of poverty, also, observes that higher rate of increase in inequality tends to exacerbate poverty, with the magnitude of this effect rising with initial income.

To provide quantitative evidence on this issue, we run cross country regressions of poverty rates on a host of country level variables including its per capita gross domestic consumption (at exchange rate) and on its PPP, besides other country characteristics. We incorporate the PPPs in the regressions equations to allow for what Ravallion (2013a) calls the 'Penn effect'[32]: a prediction that as we move from poorest to the less poor countries, the PPPs should increase and move closer to their exchange rates. This idea can be traced back to the work of Balassa (1964) and Samuelson (1964) who argued that the prices of non-traded goods tended to be lower in low income countries. Such prices tend to rise with country affluence giving rise to the 'Penn effect'.

Table 9 here

[32] Ravallion (2013a) draws a distinction between the 'static Penn effect' which relates to a cross section of countries at a point in time, and 'dynamic Penn effect' that relates to movement over time.

The regression estimates have been presented in Table 9. We have resorted to an instrumental variables regression as the error terms and the explanatory variables are likely to be correlated for the following reasons. First is the possible correlation of the error in the poverty measure (headcount ratio) with that of inequality as both these variables are based on the same survey data. Second, the unobserved time-varying characteristics affect both income and poverty, omission of which may yield a standard omitted variable bias (similar concerns were addressed in Kalwij and Verschoor (2007)). Third, the PPP may itself be simultaneously determined with the state of the income distribution in an economy (see Majumder, Ray and Santra (2015)).

The estimator employed in this study is a Generalized Method of Moments estimator and takes into account the endogeneity issues discussed above. The instruments that we use are customary in the standard literature on poverty growth and inequality (see for example Kalwij and Verschoor (2007)) and includes the lagged values of per-capita GDP, Gini and the PPP. In addition to this, we also take the growth rates of these variables from their 2005 values. Two additional instruments we use, are the logarithm of the size of the population in 2011 and its growth rate from 2005. Clearly, our choice of instruments, and the need to use lagged values, has restricted our analysis of the association between poverty growth, inequality and PPP to the latter year i.e. 2011. In order to validate the consistency of our parameter estimates we need the instruments to be orthogonal to the error terms. Thus, following Bound et al. (1995), we present an over-identification test statistic-the Hansen J-statistic in Table 9 along with our regression results. This test statistic used to validate our set of instruments, has the joint null hypothesis that the instruments are valid instruments, i.e., uncorrelated with the error term and that the instruments are correctly excluded from the estimated equation. The acceptance of the null hypotheses for all of our estimations affirms the validity of the instruments that we consider.

In keeping with the motivation of this study, Table 9 allows a comparison of the results between the alternative PPPs while controlling for the association between the poverty, growth and inequality of a country. The following features emerge from the table.

First, the magnitude of the poverty reduction effect of rising affluence as measured by the per capita GDP is generally significant across all the PPPs. Since all the variables are specified in log terms, the estimated coefficient of the GDP variable is the elasticity of poverty reduction with respect to GDP. The absolute value of the poverty reduction effect of growth are

comparable to the value of 0.84 reported by Ram (2011). It is important to strike here a note of caution to avoid drawing the conclusion that growth alone is enough to secure large poverty reductions. The regressions are run over cross section data, not panel data or data from the same country as is done in Datt and Ravallion (1992) or Fosu (2009). For a variety of historical reasons, the richer countries in our sample may be reporting lower poverty rates, and all that these regressions are picking up are these historical negative associations between aggregate consumption and poverty.

Second, the effect of PPP on poverty is, positive and generally, quite significant in Set 2, though the magnitude varies between the PPPs. In other words, between two countries at the same level of affluence and with identical other covariates, the country with higher prices will experience higher poverty. Third, and most significantly, after controlling for the other covariates, inequality has a strong, positive effect on poverty. The central message is that an effective tool in poverty reduction is redistribution and inequality reduction, and this provides solid support to the strategy of 'shared prosperity' that the World Bank has been pursuing in recent years. Finally, the F-statistics reported in the last row of Table 9 show that the restriction implied by the use of the Exchange Rate deflated (ER) per capita GDP variable (GDPPC/ER) in the poverty regression in Set 1 is rejected in favour of Set 2 which includes these covariates separately. In other words, one may get misleading estimates of the income elasticity of poverty if one confounds the effects of GDP and ER rather than specify them separately. This is analogous to the test of the restriction that the coefficient of the log change in Exchange Rates between two successive periods in Inklaar (2013, eq. 2) is one in testing for the 'dynamic Penn effect'. Note that the rejection of Set 1 regressions for all the different PPP's in favour of Set 2 regressions emphasizes the strength and significance of the PPP effect on poverty.

6. Regional Rankings and their Sensitivity to PPPs

The methodology proposed by Sen (1976) for real income comparisons between countries, and illustrated in that paper by applying it to studying regional differences in rural standard of living in India[33], is used in the present study to compare *real consumption expenditure* among the

[33] See Appendix of Sen (1976).

different regions. Following Sen (1976), we consider, as a welfare measure, the inequality corrected real *consumption expenditure*: $w^r = \mu^r(1 - G^r)$, where μ^r is *mean* of the real (PPP deflated) country *consumption expenditure*s (x^r) in region r, and G^r is the Gini inequality measure of *consumption expenditure*s in that region. To incorporate spatial differences in prices in the *consumption expenditure* comparisons the welfare measure, w^r, for region *r* is calculated not only at that region's prices (p^r)[34], but also at other region's prices, (p^s), i.e., $w^{s,r} = \mu^r(p^s)(1- G^r(p^s))$. Sen's methodology consists of constructing the matrix *W* from these spatially corrected welfare values, with the diagonal elements W_{ii} being the values of the measure, w^r , in the various regions evaluated at that region's prices, i.e.,$w^r(p^r)$, and the off diagonal elements denoting the corresponding values evaluated at other regions' prices, i.e., the $(s,r)^{th}$ element denotes $w^r(p^s)$. We adopt Sen's recommendation to rank regions from the values of the *W* matrix as follows: "if the value of the diagonal element for any region 1 is larger than the value in the same row for another region 2, then we conclude that in terms of GDP region 1 has a higher standard of welfare" [Sen (1976, p. 35)]. This gives us a "partial ordering of a complete welfare indicator rather than a complete ordering of a partial welfare indictor" (p. 32). These pair wise comparisons may not yield unambiguous rankings- for example, region *i* may have a higher welfare than region *j* with both regions' consumption expenditures evaluated at region *i*'s price, while region *j* may have a higher welfare than region *i* with both GDPs evaluated at region *j*'s price.

Figures 8(a), 8(b), 9(a), 9(b), 10(a) and 10(b) here

The Hasse diagrams are quite convenient in pictorially presenting the rankings. Figures 8(a) and 8(b) present the Hasse diagrams for 2005 and 2011 ICP PPPs[35], respectively. Figures 9(a) and 9(b) present the corresponding figures for the Counterfactual PPPs and Figures 10(a) and 10(b) present the corresponding figures based on CPD PPPs.

The region rankings and changes in the rankings are brought out clearly by the Hasse diagrams for 2005 and 2011 presented in the figures. The diagrams are based on the *W* matrix

[34] See Appendix A for description of the construction of regional prices.

[35] The rankings of regions under the ICP, Tornqvist and Fisher PPPs are identical. Therefore, from these three, we have presented the Hasse diagrams for ICP PPPs only.

(constructed using alternative PPPs)[36] and the rule "with a downward path indicating superiority in the standard of welfare" (Sen, 1976) under the assumption that all regions have the same welfare function. A comparison of the figures brings out several similarities and some sharp differences.

(a) In none of the figures is the ranking unambiguous. The ambiguity is more in case of the counterfactual and CPD PPPs than the ICP PPPs.

(b) In 2005, for the seven regions considered, all PPPs rank 'CIS' on top, followed by 'Eurostat OECD' and then by 'Latin America', which clearly dominates rest of the regions. However, while by ICP PPP 'Western Asia' has a higher rank than 'South Asia', by Counterfactual and CPD PPPs they cannot be unambiguously ranked. On the other hand, while 'East Asia and the Pacific' dominates 'Africa' by Counterfactual PPPs, they cannot be unambiguously ranked by ICP and CPD PPPs.

(c) In 2011, for the eight regions considered, by all PPPs, 'Eurostat OECD' dominates all other regions and 'Africa' is dominated by all other regions. The ICP PPP ranks 'CIS', 'The Caribbean', 'Latin America' and 'Western Asia' in 2nd, 3rd, 4th and 5th positions, respectively, whereas 'CIS', 'The Caribbean', 'Latin America' come in the 2nd position by Counterfactual PPP, and 'CIS', 'The Caribbean' come in the 2nd position by CPD PPP, but the ranking between them is ambiguous. 'Latin America' comes in the 3rd position by CPD PPP. In the next position, by ICP and CPD PPP 'South Asia' and 'East Asia and the Pacific' have ambiguous ranking and they jointly dominate 'Africa', by Counterfactual PPP 'Western Asia' joins the group of 'South Asia' and 'East Asia and the Pacific'.

(d) The Hasse diagrams reveal that, though there is weak correspondence between the poverty rankings and that based on the Sen welfare criterion which incorporates inequality and prices, with Africa and South Asia at or near the bottom in all the figures, the picture obtained from employing the latter criterion which allows for ambiguous rankings is more complex than that based on aggregate poverty rates. The policy message is to look beyond just poverty rates in assessing a country or a region's relative welfare. Intra-regional inequality that is incorporated in the Sen (1976) based welfare rankings but not in the poverty based regional comparisons clearly plays a role that needs to be recognised in assessing how the regions have performed vis-a-vis one another at a point in time and over time.

[36] The estimated *W* matrices are given in Appendix C.

7. Concluding Remarks.

This study takes place against the background of the publication of the 2011 ICP PPPs and their use in calculating global poverty rates in several recent studies. In this terminal year of the MDG and the start of the SDG, with poverty reduction figuring prominently in both sets of goals, the topic of global poverty and the estimation of poverty rates has taken on an importance of its own. The World Bank's newly set up 'Commission of Global Poverty' with its recommendation due in April, 2016 underlines this importance.

The motivation of this study is the examination of sensitivity of poverty rates to PPPs, not just ICP PPPs, at the global, regional and country levels. Since lack of public access to the expenditure and price information collected by the ICPs prevents the construction of non ICP PPPs as a counterfactual, all the poverty studies have used the ICP PPPs from either the 2005 or the 2011 rounds or both. With the ICP allowing us access to such information, this study presents for the first time non ICP PPPs that either don't use the price information at all or they do use the price information but adopt a different methodology to the 'ring country' approach of the ICP. With respect to the former, this study builds on Majumder, Ray and Santra (2015) which proposed a procedure for calculating PPP s that bypasses the need for price information. With respect to the latter, this study uses the Fisher and Tornqvist price indices along with the CPD estimation methodology to present three sets of price based PPP s that allow convenient comparisons with the ICP PPPs and the non-price based PPPs. This paper also shows how the PPPs can be used to rank regions based on a welfare criterion proposed by Sen (1976) in quite a different context.

The overall empirical finding is one of non-robustness of not only the PPPs but, more significantly, of the poverty rates and their changes between 2005 and 2011 to the PPPs used in the calculations. Of particular significance is the result that the non-robustness result holds not only between the non-price based counterfactual PPPs and the ICP PPPs, but also between the ICP PPPs and the price based PPPs all of which use the same price information in both years. There is, however, a large measure of agreement between the Fisher and Tornqvist PPPs,

and the poverty rates implied by them. The decline in global and several of the regional poverty rates between 2005 and 2011 suggested by the ICP PPPs is not a robust result. It is in contrast to increases recorded by some of the non ICP PPP based poverty rates. However, they all agree that the poverty rates in Africa increased over this period, though the ICP PPPs understate this increase in comparison with the non ICP PPPs. The other result of interest is that the divergence between the poverty rates across different PPPs was much larger in 2005 than in 2011. This study also confirms that the regional composition of the global population that can be considered 'extremely poor' is quite sensitive to the PPPs employed.

There is a general agreement between the PPPs on an inverse relation between per capita GDP and poverty rates, though the graphs show a much steeper decline, as GDP increases, in the poverty rates from price based PPPs, compared with those using the behavioural or non-price based PPPs. The graphs show that the ICP PPPs understate poverty rates in comparison with the non-price PPPs for countries other than the extremely poor countries. The regression estimates show a positive 'PPP effect' where, ceteris paribus, an increase in PPP tends to increase poverty. There is also a strong 'inequality' effect with an increase in inequality pushing up poverty rates. If we recall the result shown both analytically and empirically in Majumder, Ray and Santra (2015) that rising inequality is associated with an increase in PPP, this suggests a direct and indirect effect of inequality on poverty with the indirect effect operating via raising the national poverty lines by increasing the PPP with a consequent positive effect on poverty rates. This result provides support to the recent attempts by the World Bank to link poverty reduction with inequality reduction via measures and comprehensive strategies that deal with both.

Shifting focus from poverty rates, application of the welfare based regional rankings suggested by Sen (1976) points to a picture that is more complex and ambiguous than a straightforward poverty rate based ranking. The counterfactual PPPs portray a ranking that is still more ambiguous than that portrayed by the ICP PPPs. In each case, there has been an interesting change in the regional rankings between 2005 and 2011, though Africa does quite poorly in all the rankings in both years. As more and more reliable price information is collected and made available to researchers, the present results point to rich potential for future applications of the ranking procedure proposed by Sen (1976). This could be a useful supplement to the concept of 'shared prosperity' proposed recently, and countries are assessed not just on performance on poverty reduction but on inequality adjusted means that look beyond the poverty line. The Sen

welfare measure is superior to the concept of shared prosperity based on the mean income of the 40th percentile that has been used by the World Bank recently since (a) it takes into account inequality, and (b) in evaluating the various countries' expenditures at each other's prices, it incorporates the item wise cross country price differences that the simple use of an aggregate PPP is not able to do. In fact, one can incorporate the spirit of 'shared prosperity' in the rankings' procedure by using the mean income of the 40th percentile in the inequality corrected welfare measure.

The results of this study call for a comprehensive international strategy to the estimation of PPPs involving greater coordination between the ICP and non ICP researchers. Given the pivotal role played by prices in poverty measurement and the high sensitivity of welfare conclusions to the PPPs used, there should not only be greater effort to obtain and disseminate high quality price information, independent researchers outside the ICP should have access to the price and item wise expenditure data at the household level much more easily than is currently the case. It is important to subject the poverty estimates and their trends to rigorous sensitivity and robustness checks before they are adopted for policy use. The topic of world and regional poverty is much too sensitive and important to be treated otherwise.

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Table 1: Poverty Lines of the 15 Poorest Countries using Alternative Methods: 2005

Region	Country	National Poverty Line (Local Currency Unit)	Poverty Line in PPP (Numeraire: Indian Rupee)					Converted Poverty Line in Local Currency Unit using Mean Poverty Line in PPP (Numeraire: Indian Rupee) **CNPL (PPP-LCU)**					Ratio of **NPL(LCU)** to **CNPL(PPP-LCU)**				
		NPL(LCU)	**ICP**	**Counter-factual**	**Tornqvist**	**Fisher**	**CPD**	**ICP**	**Counter -factual**	**Tornqvist**	**Fisher**	**CPD**	**ICP**	**Counter-factual**	**Tornqvist**	**Fisher**	**CPD**
AFRICA	Chad	203.49	11.82	9.33	7.81	9.55	9.36	292.06	300.39	335.48	293.15	290.13	0.70	0.68	0.61	0.69	0.70
	Ethiopia	3.11	18.34	11.14	16.26	16.14	16.48	2.88	3.85	2.46	2.65	2.52	1.08	0.81	1.26	1.17	1.23
	Gambia, The	12.82	20.10	18.79	13.93	14.69	14.74	10.82	9.40	11.85	12.01	11.61	1.19	1.36	1.08	1.07	1.10
	Ghana	0.69	24.85	16.09	16.98	17.97	19.32	0.47	0.59	0.52	0.53	0.48	1.47	1.17	1.32	1.31	1.45
	Guinea-Bissau	355.72	20.51	NA	15.98	16.38	15.48	294.16	NA	286.61	298.96	306.71	1.21	NA	1.24	1.19	1.16
	Malawi	40.71	11.68	NA	7.95	8.44	8.47	59.12	NA	65.95	66.37	64.18	0.69	NA	0.62	0.61	0.63
	Mali	331.84	18.74	23.66	17.05	17.73	17.53	300.26	193.30	250.59	257.55	252.70	1.11	1.72	1.32	1.29	1.31
	Mozambique	9.42	13.17	16.68	8.84	9.00	9.94	12.13	7.78	13.72	14.41	12.65	0.78	1.21	0.69	0.65	0.74
	Niger	246.98	14.94	NA	10.08	9.86	11.28	280.36	NA	315.42	344.67	292.32	0.88	NA	0.78	0.72	0.84
	Rwanda	193.20	13.45	NA	13.61	14.35	12.58	243.68	NA	182.73	185.29	205.07	0.79	NA	1.06	1.04	0.94
	Sierra Leone	1946.39	22.95	NA	NA	NA	NA	1438.10	NA	NA	NA	NA	1.35	NA	NA	NA	NA
	Tanzania	253.26	8.56	11.63	6.91	6.86	7.41	501.98	300.06	471.76	508.26	456.40	0.51	0.84	0.54	0.50	0.55
	Uganda	784.64	17.25	15.33	13.58	14.25	12.99	771.46	705.46	744.20	758.13	806.51	1.02	1.11	1.05	1.04	0.97
SOUTH ASIA	Nepal	19.84	11.82	9.14	18.52	23.84	18.49	28.47	29.91	13.80	11.46	14.33	0.70	0.66	1.44	1.73	1.38
CIS	Tajikistan	1.22	26.21	6.01	12.76	13.63	12.84	0.79	2.79	1.23	1.23	1.26	1.55	0.44	0.99	0.99	0.96
MEAN			16.96	13.78	12.88	13.76	13.35										

Note: The PPPs for countries, for which the required information was not available from the World Bank website, could not be calculated.

Table 2: Poverty Lines of the 15 Poorest Countries using Alternative Methods: 2011

Region	Country	National Poverty Line (Local Currency Unit) NPL(LCU)	Poverty Line in PPP (Numeraire: Indian Rupee)					Converted Poverty Line in Local Currency Unit using Mean Poverty Line in PPP (Numeraire: Indian Rupee) CNPL (PPP-LCU)					Ratio of **NPL(LCU)** to **CNPL(PPP-LCU)**				
			ICP	**Counter-factual**	**Tornqvist**	**Fisher**	**CPD**	**ICP**	**Counter-factual**	**Tornqvist**	**Fisher**	**CPD**	**ICP**	**Counter-factual**	**Tornqvist**	**Fisher**	**CPD**
AFRICA	Chad	295.79	17.93	19.95	17.54	19.44	19.95	433.37	406.21	434.34	425.63	416.42	0.68	0.73	0.68	0.70	0.71
	Ethiopia	10.02	28.43	19.96	27.05	27.77	29.48	9.25	13.75	9.53	10.09	9.54	1.08	0.73	1.05	0.99	1.05
	Gambia, The	17.77	25.49	33.31	23.10	25.73	26.13	18.31	14.62	19.82	19.32	19.10	0.97	1.22	0.90	0.92	0.93
	Ghana	2.20	43.00	41.22	43.81	47.75	49.50	1.34	1.46	1.29	1.29	1.25	1.64	1.50	1.70	1.71	1.76
	Guinea-Bissau	478.81	30.25	NA	26.85	28.17	27.55	415.71	NA	459.21	475.40	488.11	1.15	NA	1.04	1.01	0.98
	Malawi	97.50	18.77	NA	17.62	18.14	20.03	136.45	NA	142.49	150.38	136.69	0.72	NA	0.68	0.65	0.71
	Mali	434.75	30.11	42.78	28.64	30.63	31.65	379.21	278.44	390.86	397.03	385.70	1.15	1.56	1.11	1.10	1.13
	Mozambique	18.54	17.65	31.29	16.95	18.35	18.68	27.59	16.24	28.17	28.27	27.88	0.67	1.14	0.66	0.66	0.67
	Niger	312.95	20.87	NA	17.16	17.34	20.28	393.88	NA	469.64	504.76	433.32	0.80	NA	0.67	0.62	0.72
	Rwanda	351.21	21.01	NA	24.78	27.43	23.97	439.09	NA	364.96	358.13	411.46	0.80	NA	0.96	0.98	0.85
	Sierra Leone	4365.88	38.24	27.44	37.28	40.53	40.82	2999.08	4360.21	3015.04	3012.87	3003.70	1.46	1.00	1.45	1.45	1.45
	Tanzania	474.46	12.33	21.21	12.18	12.31	13.54	1011.11	612.98	1002.94	1077.91	984.05	0.47	0.77	0.47	0.44	0.48
	Uganda	1536.78	24.79	27.89	23.75	25.72	23.61	1628.23	1510.02	1666.18	1671.73	1828.21	0.94	1.02	0.92	0.92	0.84
SOUTH ASIA	Nepal	34.96	20.59	16.16	29.06	35.27	32.81	44.60	59.28	30.98	27.73	29.92	0.78	0.59	1.13	1.26	1.17
CIS	Tajikistan	4.72	44.54	20.19	40.48	45.01	43.23	2.78	6.41	3.00	2.93	3.07	1.70	0.74	1.57	1.61	1.54
MEAN			26.27	27.40	25.75	27.97	28.08										

Note: The counterfactual PPPs could be calculated only for those countries for which the required information was available on the World Bank website.

Table 3: Comparing the ICP PPPs with the Fisher and Tornqvist PPPs for 18 Ring Countries: 2005
(Numeraire: Indian Rupee)

Region	Country	ICP 2005	Tornqvist**	Fisher**
AFRICA	Cameroon	18.114	14.549	14.143
	Egypt, Arab Rep.	0.121	0.080	0.080
	Kenya	2.102	1.703	1.762
	Senegal	18.552	15.702	15.686
	South Africa	0.295	0.230	0.237
	Zambia	172.123	114.650	120.065
EAST ASIA AND THE PACIFIC	Hong Kong SAR, China	0.470	0.332	0.342
	Malaysia	0.135	0.100	0.102
	Philippines	1.554	1.174	1.172
EUROSTAT-OECD	Estonia***	0.543	0.274	0.239
	Japan	9.510	8.831	8.831
	Slovenia***	10.023	7.681	7.851
	United Kingdom	0.047	0.042	0.042
LATIN AMERICA	Chile	25.452	20.728	21.476
	Brazil	0.101	0.068	0.068
SOUTH ASIA	Sri Lanka	2.515	2.061	2.075
WEST ASIA	Jordan	0.031	0.019	0.020
	Oman	0.019	0.013	0.013

**Based on prices at the basic headings level constructed from prices at the level of individual items.

*** These are calculated at the currencies prevailing in 2005 from the 2005 ICP data set that is made available to us . The currencies were changed after 2005, but before the 2011 ICP round.

Table 4: Alternative Purchasing Power Parities (PPPs) for 2005 and 2011
(Numeraire: Indian Rupee)

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Torn-qvist	Fisher	CPD	ICP	Counter-factual	Torn-qvist	Fisher	CPD
AFRICA	Algeria						2.06	NA	1.96	1.93	1.98
	Angola	4.37	NA	2.58	2.31	2.70	5.00	NA	3.36	2.97	3.45
	Benin	16.95	15.59	15.61	15.32	15.24	14.80	11.49	11.97	11.20	11.23
	Botswana	0.22	NA	0.26	0.26	0.25	0.29	NA	0.28	0.26	0.25
	Burkina Faso	14.90	10.81	20.69	20.72	17.53	14.55	7.73	14.88	13.84	12.53
	Burundi	26.84	NA	27.55	24.62	28.15	31.13	NA	32.71	30.49	30.52
	Cameroon	18.11	15.88	16.93	16.09	18.76	15.25	11.50	12.32	11.71	13.64
	Cape Verde	4.86	11.69	3.58	2.86	3.17	3.16	8.95	2.79	2.18	2.42
	Central Afr. Rep.	18.91	NA	25.00	23.81	23.72	17.42	NA	19.60	18.33	17.95
	Chad	17.22	21.80	26.05	21.30	21.73	16.50	14.83	16.87	15.22	14.83
	Comoros	18.03	NA	14.61	14.47	16.80	14.36	NA	11.19	10.75	12.25
	Congo, Dem. Rep.	19.33	12.36	36.21	34.68	29.49	19.71	14.71	41.62	39.60	35.07
	Congo, Rep.	21.64	38.13	25.43	23.73	24.14	35.15	30.32	20.31	18.89	19.26
	Côte d'Ivoire	20.33	27.08	20.13	17.48	21.42	15.69	19.58	14.70	12.71	15.51
	Djibouti	6.61	14.08	7.25	6.85	8.06	6.73	11.51	7.07	6.73	6.57
	Egypt	0.12	0.22	0.10	0.09	0.09	0.12	0.26	0.12	0.11	0.10
	Equatorial Guinea	26.30	NA	21.04	17.04	17.72	21.71	NA	18.29	14.54	14.82
	Ethiopia	0.17	0.28	0.19	0.19	0.19	0.35	0.50	0.37	0.36	0.34
	Gabon	26.16	82.25	33.82	29.68	32.62	23.88	56.72	23.42	21.78	22.52
	Gambia, The	0.64	0.68	0.92	0.87	0.87	0.70	0.53	0.77	0.69	0.68
	Ghana	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04
	Guinea	90.03	100.29	111.89	103.96	104.98	165.40	174.25	216.39	199.35	182.58
	Guinea-Bissau	17.35	NA	22.26	21.72	22.97	15.83	NA	17.84	17.00	17.38
	Kenya	2.10	1.85	1.58	1.53	1.58	2.37	2.29	2.05	1.95	1.96
	Lesotho	0.22	0.22	0.26	0.23	0.25	0.26	0.20	0.25	0.23	0.22
	Liberia	0.03	1.93	0.03	0.03	0.03	0.04	2.05	0.03	0.03	0.03
	Madagascar	46.56	18.47	30.10	29.84	32.48	46.31	19.43	37.90	34.87	34.22
	Malawi	3.49	NA	5.12	4.82	4.81	5.20	NA	5.53	5.38	4.87
	Mali	17.71	14.03	19.46	18.71	18.93	14.44	10.16	15.18	14.19	13.73
	Mauritania	7.64	13.05	7.37	7.37	7.26	7.40	11.08	6.64	6.41	6.16
	Mauritius	1.08	2.96	1.30	1.15	1.10	1.18	2.62	1.20	1.04	0.97
	Morocco	0.37	0.84	0.46	0.45	0.41	0.28	0.57	0.33	0.32	0.28
	Mozambique	0.72	0.56	1.07	1.05	0.95	1.05	0.59	1.09	1.01	0.99
	Namibia	0.33	0.31	0.30	0.17	0.30	0.34	0.28	0.30	0.14	0.27
	Niger	16.53	NA	24.50	25.04	21.90	15.00	NA	18.24	18.05	15.43
	Nigeria	4.74	4.48	4.48	4.50	4.13	5.18	4.85	5.03	4.91	4.46
	Rwanda	14.37	NA	14.19	13.46	15.36	16.72	NA	14.17	12.80	14.65
	São Tomé & Princ.	387.21	NA	360.27	347.68	352.17	649.08	NA	650.30	614.99	617.70
	Senegal	18.55	20.81	25.07	24.53	23.49	16.29	14.67	17.85	17.20	16.64
	Seychelles						0.50	NA	0.56	0.52	0.49
	Sierra Leone	84.80	NA	NA	NA	NA	114.18	159.14	117.10	107.71	106.96
	South Africa	0.29	0.63	0.34	0.34	0.34	0.34	0.56	0.33	0.33	0.30
	Sudan	0.08	NA	0.07	0.08	0.07	0.10	NA	0.10	0.10	0.08
	Swaziland	0.23	0.18	0.22	0.21	0.20	0.27	0.17	0.22	0.21	0.19
	Tanzania	29.60	21.78	36.64	36.93	34.18	38.49	22.37	38.95	38.54	35.04
	Togo	17.26	13.46	22.31	21.73	20.31	14.97	9.95	16.38	15.46	15.01
	Tunisia	0.04	NA	0.06	0.06	0.06	0.05	NA	0.05	0.05	0.04
	Uganda	45.49	51.20	57.80	55.08	60.41	61.99	55.11	64.71	59.76	65.10
	Zambia	172.12	90.15	160.57	150.83	145.80	166.55	96.84	164.14	161.14	156.33
	Zimbabwe	2713.80	NA	NA	NA	NA	0.04	NA	0.04	0.04	0.03

Note: NA: Required information was not available from the World Bank.

: Nonparticipating country in ICP.

*: For comparability these are calculated in terms of the currencies revised after 2005 and before 2011.

Table 4 (contd.): Alternative Purchasing Power Parities (PPPs) for 2005 and 2011

(Numeraire: Indian Rupee)

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	
EAST ASIA AND THE PACIFIC	Brunei Darussalam	0.07	NA	0.06	0.07	0.08	0.06	NA	0.04	0.04	0.05
	Cambodia	97.40	128.95	94.86	92.64	94.92	96.71	121.38	95.40	91.31	89.08
	China	0.26	0.52	0.32	0.33	0.32	0.25	0.39	0.26	0.26	0.23
	Fiji	0.10	0.16	0.08	0.07	0.08	0.08	0.13	0.07	0.06	0.06
	Hong Kong SAR	0.47	NA	0.50	0.49	0.45	0.40	NA	0.40	0.39	0.32
	Indonesia	268.71	320.93	259.12	254.34	265.28	266.38	297.69	243.25	230.56	246.33
	Iran, Islamic Rep.	175.70	NA	NA	NA	NA	Listed under 'Singleton'				
	Lao PDR	225.60	277.07	194.65	188.20	202.61	181.33	229.60	173.47	164.46	167.92
	Macao SAR	0.42	NA	0.36	0.32	0.36	0.37	NA	0.32	0.32	0.29
	Malaysia	0.14	NA	0.09	0.07	0.13	0.11	NA	0.07	0.06	0.09
	Mongolia	31.17	55.88	30.04	29.87	31.96	36.88	62.08	32.86	31.46	35.53
	Philippines	1.55	1.93	1.03	0.92	1.18	1.26	1.55	0.83	0.73	0.95
	Singapore	0.10	NA	0.09	0.09	0.08	0.08	NA	0.08	0.08	0.06
	Taiwan, China	1.45	NA	NA	NA	NA	1.08	NA	0.93	0.95	0.99
	Thailand	1.13	4.60	0.82	0.80	0.89	0.86	3.34	0.69	0.68	0.64
	Vietnam	356.82	521.54	292.24	283.07	329.88	479.06	624.59	387.04	363.13	394.88
SOUTH ASIA	Bangladesh	1.63	1.89	1.57	1.56	1.57	1.63	1.83	1.59	1.52	1.52
	Bhutan	1.17	1.99	1.13	1.11	1.10	1.12	1.75	0.96	0.94	0.97
	India	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Maldives	0.59	1.28	0.54	0.52	0.56	0.68	1.20	0.55	0.52	0.53
	Myanmar						16.38	NA	13.55	6.16	14.28
	Nepal	1.68	2.17	1.07	0.83	1.07	1.70	2.16	1.20	0.99	1.07
	Pakistan	1.31	1.85	0.98	0.94	1.19	1.67	2.26	1.22	1.21	1.46
	Sri Lanka	2.52	6.31	2.04	2.02	2.39	2.69	7.00	2.44	2.34	2.65
COMMONWEALTH OF INDEPENDENT STATES (CIS)	Armenia	11.11	26.56	14.57	14.48	14.46	10.88	22.64	12.46	11.84	12.30
	Azerbaijan	0.02*	0.06	0.02	0.02	0.02	0.02	0.06	0.02	0.02	0.02
	Belarus	46.79	375.40	80.78	78.73	82.16	109.74	564.08	122.02	114.91	123.16
	Georgia	0.05	NA	NA	NA	NA	Listed under 'Singleton'				
	Kazakhstan	3.76	16.89	4.00	3.78	3.96	5.04	17.92	4.43	4.12	4.20
	Kyrgyzstan	0.71	1.74	0.83	0.77	0.80	1.04	2.05	0.99	0.90	0.94
	Moldova	0.27	0.80	0.31	0.31	0.33	0.33	0.80	0.34	0.34	0.33
	Tajikistan	0.05	0.20	0.10	0.09	0.09	0.11	0.23	0.12	0.11	0.11
	Ukraine	0.10	0.64	0.17	0.16	0.16	0.20	0.81	0.22	0.21	0.21
EUROSTAT- OECD	Albania	3.56	1.53	4.51	4.14	4.40	3.40	1.10	3.33	3.13	3.18
	Australia	0.10	NA	0.11	0.11	0.11	0.11	NA	0.09	0.08	0.08
	Austria	0.06	NA	0.07	0.07	0.07	0.06	NA	0.05	0.05	0.05
	Belgium	0.07	NA	0.06	0.06	0.06	0.06	NA	0.05	0.04	0.04
	Bosnia and Herzegovina	0.06	0.50	0.08	0.07	0.08	0.06	0.37	0.06	0.06	0.06
	Bulgaria	0.04	0.31	0.06	0.06	0.06	0.05	0.27	0.05	0.05	0.05
	Canada	0.09	NA	0.10	0.10	0.10	0.09	NA	0.07	0.07	0.07
	Chile	Listed under South America					25.22	NA	24.60	23.18	23.72
	Croatia	0.29	NA	0.39	0.37	0.37	0.28	NA	0.30	0.28	0.27
	Cyprus	0.08*	NA	0.07	0.06	0.06	0.05	NA	0.05	0.05	0.04
	Czech Rep.	0.98	NA	1.16	1.12	1.16	0.96	NA	0.86	0.82	0.83

Table 4 (contd.): Alternative Purchasing Power Parities (PPPs) for 2005 and 2011

(Numeraire: Indian Rupee)

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
EUROSTAT- OECD	Denmark	0.64	NA	0.64	0.61	0.65	0.60	NA	0.47	0.44	0.45
	Estonia	0.05*	NA	0.04	0.04	0.04	0.04	NA	0.04	0.03	0.03
	Finland	0.08	NA	0.08	0.08	0.08	0.07	NA	0.06	0.06	0.05
	France	0.07	NA	0.08	0.07	0.07	0.06	NA	0.05	0.05	0.05
	Germany	0.07	NA	0.07	0.06	0.06	0.06	NA	0.05	0.04	0.04
	Greece	0.05	NA	0.06	0.06	0.06	0.05	NA	0.05	0.05	0.04
	Hungary	8.80	NA	10.00	9.49	9.67	8.65	NA	8.36	7.86	7.91
	Iceland	7.22	NA	9.88	9.68	9.30	9.68	NA	9.63	9.29	8.72
	Ireland	0.08	NA	0.07	0.07	0.07	0.07	NA	0.05	0.05	0.05
	Israel	0.28	NA	0.32	0.29	0.30	0.29	NA	0.24	0.21	0.21
	Italy	0.06	NA	0.07	0.07	0.07	0.06	NA	0.05	0.05	0.05
	Japan	9.51	NA	11.59	11.05	10.94	7.79	NA	6.89	6.52	6.59
	Korea, Rep.	59.55	NA	70.25	59.27	71.44	60.67	NA	51.18	42.57	52.19
	Latvia	0.02	0.13	0.03	0.03	0.03	0.03	0.12	0.03	0.02	0.02
	Lithuania	0.10	0.57	0.14	0.14	0.14	0.11	0.46	0.12	0.12	0.11
	Luxembourg	0.07	NA	0.07	0.07	0.07	0.08	NA	0.05	0.05	0.05
	Macedonia, FYR	1.46	8.90	2.05	1.98	1.88	1.39	6.45	1.53	1.46	1.37
	Malta	0.02	NA	0.06	0.06	0.06	0.04	NA	0.04	0.04	0.04
	Mexico	0.50	1.46	0.65	0.62	0.64	0.55	1.13	0.54	0.50	0.49
	Montenegro	0.03	0.22	0.04	0.03	0.03	0.03	0.17	0.03	0.03	0.03
	Netherlands	0.06	NA	0.07	0.06	0.07	0.06	NA	0.05	0.04	0.04
	New Zealand	0.11	NA	0.11	0.11	0.12	0.11	NA	0.09	0.08	0.08
	Norway	0.69	NA	0.90	0.84	0.89	0.71	NA	0.64	0.58	0.61
	Poland	0.14	NA	0.16	0.15	0.15	0.12	NA	0.12	0.11	0.11
	Portugal	0.05	NA	0.06	0.06	0.06	0.05	NA	0.05	0.04	0.04
	Romania	0.11	0.49	0.13	0.13	0.13	0.12	0.42	0.12	0.11	0.11
	Russian Federation	0.81	5.08	0.98	0.92	0.98	1.06	5.42	1.08	1.00	1.05
	Serbia	2.07	13.36	2.84	2.72	2.81	2.80	13.77	3.02	2.83	2.90
	Slovakia	0.04*	NA	0.05	0.05	0.05	0.04	NA	0.04	0.04	0.04
	Slovenia	0.05*	NA	0.06	0.06	0.06	0.05	NA	0.04	0.04	0.04
	Spain	0.06	NA	0.06	0.06	0.06	0.05	NA	0.04	0.04	0.04
	Sweden	0.67	NA	0.71	0.68	0.70	0.66	NA	0.50	0.46	0.47
	Switzerland	0.13	NA	0.12	0.11	0.12	0.11	NA	0.08	0.07	0.07
	Turkey	0.06	0.06	0.08	0.07	0.07	0.07	0.06	0.08	0.07	0.07
	United Kingdom	0.05	NA	0.06	0.06	0.05	0.05	NA	0.04	0.04	0.04
	United States	0.07	0.16	0.08	0.08	0.08	0.07	0.11	0.06	0.06	0.05
LATIN AMERICA	Argentina	0.09	NA	NA	NA	NA					
	Bolivia	0.16	0.47	0.19	0.19	0.20	0.20	0.43	0.17	0.18	0.18
	Brazil	0.10	0.28	0.15	0.15	0.13	0.11	0.22	0.13	0.13	0.10
	Chile	25.45	NA	NA	NA	NA	Listed under Eurostat-OECD				
	Colombia	78.39	218.60	98.21	101.33	91.35	81.84	171.43	82.35	83.56	71.60
	Costa Rica						24.40	NA	21.39	18.93	20.98
	Cuba						0.02	NA	0.67	1.00	0.02
	Dominican Rep.						1.38	NA	1.23	1.25	1.24
	Ecuador	0.03	NA	0.04	0.04	0.04	0.04	NA	0.03	0.03	0.03
	El Salvador						0.04	0.03	0.04	0.03	0.03
	Guatemala						0.26	0.56	0.22	0.17	0.20

Table 4 (contd.): Alternative Purchasing Power Parities (PPPs) for 2005 and 2011 (Numeraire: Indian Rupee)

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
LATIN AMERICA	Haiti						1.43	NA	1.27	1.25	0.97
	Honduras						0.71	0.79	0.61	0.61	0.62
	Nicaragua						0.61	0.31	0.50	0.47	0.54
	Panama						0.04	NA	0.04	0.04	0.03
	Paraguay	135.83	NA	165.11	167.87	165.84	155.70	NA	156.75	158.32	152.03
	Peru	0.11	0.34	0.13	0.13	0.13	0.10	0.25	0.10	0.10	0.09
	Uruguay	0.99	NA	1.00	0.89	1.03	1.11	NA	0.95	0.84	0.95
	Venezuela, RB	0.081*	NA	NA	NA	NA	0.19	NA	0.22	0.20	0.23
SINGLETON	Georgia	Listed under CIS					0.05	NA	NA	NA	NA
	Iran, Islamic Rep.	Listed under 'East Asia and Pacific'					301.04	NA	NA	NA	NA
THE CARIBBEAN	Anguilla						0.17	NA	0.15	0.12	0.14
	Antigua & Barbuda						0.14	NA	0.14	0.11	0.12
	Aruba						0.11	NA	0.11	0.11	0.09
	Bahamas, The						0.08	NA	0.06	0.06	0.05
	Barbados						0.16	NA	0.14	0.13	0.11
	Belize						0.08	NA	0.06	0.05	0.07
	Bermuda						0.13	NA	0.10	0.09	0.08
	Cayman Islands						0.075	NA	0.078	0.08	0.07
	Curaçao						0.10	NA	0.10	0.10	0.09
	Dominica						0.14	NA	0.12	0.12	0.12
	Grenada						0.14	NA	0.13	0.12	0.12
	Jamaica						4.14	9.22	4.11	4.06	4.38
	Montserrat						0.15	NA	0.15	0.14	0.14
	Sint Maarten						0.11	NA	0.10	0.10	0.10
	St. Kitts & Nevis						0.14	NA	0.14	0.13	0.14
	St. Lucia						0.14	NA	0.12	0.12	0.12
	St. Vincent & the Grenadines						0.13	NA	0.14	0.12	0.12
	Suriname						0.12	NA	0.13	0.12	0.12
	Trinidad & Tobago						0.30	NA	0.30	0.30	0.30
	Turks & Caicos Islands						0.09	NA	0.06	0.06	0.05
	Virgin Islands, British						0.08	NA	0.07	0.07	0.05
WEST ASIA	Bahrain	0.02	NA	0.02	0.02	0.02	0.02	NA	0.01	0.01	0.01
	Iraq	39.79	NA	35.48	35.61	33.41	35.88	41.93	37.75	36.86	36.47
	Jordan	0.03	0.10	0.03	0.03	0.03	0.02	0.09	0.02	0.02	0.02
	Kuwait	0.02	NA	0.01	0.01	0.01	0.01	NA	0.01	0.01	0.01
	Lebanon	70.80	NA	NA	NA						
	Oman	0.02	NA	0.02	0.02	0.02	0.01	NA	0.02	0.02	0.01
	Palestinian Territory						0.16	NA	0.14	0.13	0.13
	Qatar	0.24	NA	0.19	0.18	0.18	0.20	NA	0.18	0.17	0.15
	Saudi Arabia	0.20	NA	0.15	0.14	0.14	0.13	NA	0.13	0.13	0.12
	Syrian Arab Rep.	1.49	NA	NA	NA	NA					
	United Arab Emirates						0.20	NA	0.18	0.17	0.15
	Yemen	5.49	12.42	4.38	4.34	4.28	5.32	14.98	5.44	5.37	5.15

Table 5: Poverty Rates (%) by Country and Region under Alternative PPPs: 2005 and 2011

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
AFRICA	**Overall**	**28.97**	**23.39**	**21.40**	**22.86**	**33.84**	**35.38**	**35.94**	**34.00**	**35.96**	**33.86**
	Angola	34.24	NA	6.47	5.83	16.33	26.69	NA	11.11	10.16	14.65
	Benin	33.08	17.47	14.89	16.70	32.10	47.71	34.48	33.25	34.16	34.58
	Botswana	19.60	NA	17.10	19.02	26.65	15.25	NA	13.58	14.09	13.38
	Burkina Faso	37.00	12.29	40.97	45.16	51.01	49.55	15.17	49.75	50.45	43.88
	Burundi	64.87	NA	49.29	45.50	72.72	71.79	NA	73.59	74.11	74.29
	Cameroon	18.63	7.34	7.34	7.77	24.62	25.22	14.69	14.94	16.01	22.78
	Central African Republic	52.62	NA	53.98	54.80	67.15	61.68	NA	65.87	66.54	65.8
	Chad	43.73	46.79	52.46	45.29	61.17	34.01	31.52	34.12	33.46	32.44
	Comoros	9.57	NA	1.85	2.45	10.26	10.72	NA	4.73	5.39	8.73
	Congo, Rep.	40.63	58.89	35.73	35.60	50.49	25.53	47.54	25.78	26.2	27.17
	Côte d'Ivoire	19.52	23.18	11.65	9.84	25.34	25.36	40.15	21.84	19.72	27.63
	Djibouti	9.72	32.45	6.58	6.76	19.35	16.19	37.06	17.00	18.03	17.45
	Ethiopia	5.33	21.18	2.87	3.96	13.72	25.53	56.12	27.53	31.78	27.57
	Gabon	2.61	30.69	2.65	1.94	7.34	6.31	42.33	5.31	5.54	6.60
	Gambia, The	23.37	18.30	28.91	29.56	42.89	39.96	29.1	44.10	42.52	41.74
	Ghana	8.91	13.89	11.05	11.28	17.45	21.01	24.12	19.20	19.06	18.23
	Guinea	39.89	35.04	37.60	37.08	55.68	27.53	33.77	44.72	44.76	38.78
	Guinea-Bissau	34.27	NA	34.12	37.48	60.11	60.53	NA	65.48	67.4	68.15
	Kenya	29.93	16.85	10.27	11.14	21.40	29.73	30.23	22.39	23.8	24.12
	Lesotho	45.43	39.34	42.64	41.19	54.66	57.26	48.87	55.04	55.04	53.60
	Liberia	52.47	100.00	28.23	31.19	53.42	61.98	100	50.97	53.58	54.71
	Madagascar	69.28	7.19	23.91	27.19	52.62	77.72	28.65	67.51	67.48	66.65
	Malawi	43.00	NA	51.89	52.16	68.93	67.55	NA	69.50	71.47	67.62
	Mali	35.51	15.18	26.94	28.56	46.31	41.51	21.18	43.47	44.59	42.60
	Mauritania	7.05	18.42	2.65	3.25	8.19	8.42	24.76	5.89	6.71	6.09
	Mauritius	0.07	2.80	0.07	0.06	0.12	0.4	6.61	0.40	0.27	0.21
	Morocco	1.66	14.99	1.40	1.88	3.57	2.08	24.49	4.12	4.97	2.95
	Mozambique	59.75	33.84	67.94	70.12	77.74	65.56	36.27	66.72	66.83	66.20
	Namibia	19.25	11.51	9.33	2.24	20.09	18.86	13.23	13.90	1.55	13.12
	Niger	57.53	NA	65.98	69.79	76.23	42.19	NA	55.86	61.12	50.13
	Nigeria	43.81	31.46	28.54	31.77	41.33	47.77	46.51	45.16	48.34	43.39
	Rwanda	54.12	NA	38.66	39.25	62.21	56.73	NA	45.69	44.54	52.92
	São Tomé and Principe	26.81	NA	11.26	12.00	26.57	25.96	NA	25.04	26.39	26.49
	Senegal	22.18	18.91	24.38	26.45	39.57	33.62	30.42	37.42	39.31	37.98
	Sierra Leone	37.51	NA	NA	NA	NA	44.67	68.82	44.96	44.84	44.70
	South Africa	11.46	32.98	8.88	10.41	18.90	14.45	33.39	13.06	15.57	12.67
	Sudan (AFR)	11.26	NA	5.31	6.62	10.59	10.93	NA	11.24	13.77	8.87
	Swaziland	30.39	11.83	16.58	16.89	28.38	39.16	20.81	29.01	29.18	26.03
	Tanzania	27.45	8.27	25.25	29.28	41.01	39.75	10.84	39.24	44.68	38.13
	Togo	39.52	16.72	39.74	42.02	54.50	48.44	30.96	51.92	53.25	51.92
	Tunisia	0.83	NA	1.08	1.20	3.02	1.3	NA	1.89	1.84	1.59
	Uganda	25.62	22.27	25.04	25.93	47.67	27.94	24.05	28.91	29.15	34.49
	Zambia	56.56	22.93	43.81	43.88	53.57	61.27	39.37	59.82	62.35	61.46

Note:

1. The counterfactual, Tornqvist and Fisher PPPs could be calculated only for those countries for which the required information was available from the World Bank.
2. Poverty rates are reported only for those countries which are available in POVCALNET list and participated in both ICP rounds.

Table 5 (Contd.): Poverty Rates (%) by Country and Region under Alternative PPPs: 2005 and 2011

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
EAST ASIA AND THE PACIFIC	**Overall**	**7.34**	**22.05**	**5.41**	**7.12**	**14.57**	**8.70**	**22.84**	**7.80**	**9.46**	**8.29**
	China	7.17	24.51	6.74	8.96	16.33	9.44	24.6	9.66	11.84	9.29
	Fiji	3.02	8.97	0.25	0.20	1.34	2.73	13.71	0.94	0.82	1.33
	Indonesia	11.40	10.72	3.17	3.87	15.24	10.71	18.56	6.41	7.34	10.16
	Iran, Islamic Rep.	0.78	NA	NA	NA	NA	Listed under 'Singleton'				
	Malaysia	2.84	NA	0.30	0.15	3.05	0.16	NA	0.01	0.00	0.10
	Mongolia	0.30	2.35	0.07	0.08	0.73	0.17	4.49	0.05	0.12	0.24
	Philippines	12.58	13.71	0.64	0.50	6.70	10.14	20.94	1.55	1.22	4.53
	Taiwan, China	0.00	NA	NA	NA	NA	0.34	NA	0.00	0.34	NA
	Thailand	0.40	31.93	0.02	0.02	0.19	0.03	27.30	0.01	0.01	0.01
	Vietnam	8.34	14.87	1.39	1.62	8.72	2.26	6.86	0.82	0.89	1.28
SOUTH ASIA	**Overall**	**25.81**	**16.22**	**10.40**	**13.41**	**31.42**	**14.66**	**19.86**	**13.07**	**17.12**	**17.68**
	Bhutan	13.27	19.03	11.03	11.29	13.54	1.62	10.18	0.69	1.01	1.17
	India	28.52	15.64	12.10	15.71	35.66	16.41	18.84	15.37	20.12	20.40
	Maldives	0.04	5.74	0.00	0.00	0.07	2.93	17.38	1.45	1.57	1.64
	Nepal	37.38	41.58	4.15	1.73	15.22	10.84	28.06	2.36	1.68	2.16
	Pakistan	7.70	14.59	0.57	0.58	7.59	4.87	23.42	0.46	0.87	3.32
	Sri Lanka	1.95	28.91	0.14	0.19	2.47	1.09	39.29	0.60	0.72	1.45
CIS	**Overall**	**0.83**	**15.72**	**0.55**	**0.59**	**1.41**	**0.17**	**14.04**	**0.27**	**0.23**	**0.33**
	Armenia	1.11	13.56	1.14	1.40	4.08	0.92	24.57	1.72	2.00	2.44
	Azerbaijan	0.00	0.40	0.00	0.00	0.00	0.00	5.38	0.00	0.00	0.00
	Belarus	0.00	8.88	0.00	0.00	0.07	0.00	10.49	0.00	0.00	0.00
	Georgia	8.06	NA	NA	NA	NA	Listed under 'Singleton'				
	Kazakhstan	0.03	12.02	0.01	0.01	0.05	0.01	12.19	0.01	0.01	0.01
	Kyrgyzstan	6.49	31.76	5.20	5.20	10.96	0.42	21.48	0.29	0.27	0.38
	Moldova	3.62	38.33	2.37	2.96	3.49	0.06	9.99	0.09	0.22	0.11
	Tajikistan	0.12	30.92	2.12	2.12	7.12	1.54	33.15	2.64	1.95	3.03
	Ukraine	0.00	15.48	0.01	0.05	0.17	0.00	12.71	0.00	0.00	0.00
EUROSTAT-OECD	**Overall**	**0.84**	**10.04**	**0.83**	**0.85**	**1.21**	**1.05**	**8.72**	**0.95**	**0.96**	**0.96**
	Albania	0.11	0.00	0.03	0.03	0.44	0.46	0.00	0.41	0.46	0.46
	Australia	1.36	NA	1.36	1.36	1.36	0.67	NA	0.67	0.67	0.67
	Austria	0.13	NA	0.11	0.11	0.13	0.42	NA	0.35	0.37	0.37
	Belgium	0.34	NA	0.31	0.31	0.34	0.43	NA	0.38	0.38	0.40
	Bosnia and Herzegovina	0.04	20.63	0.04	0.04	0.18	0.06	26.7	0.06	0.06	0.06
	Bulgaria	3.43	39.41	3.60	3.60	5.04	1.87	29.68	2.04	2.04	1.99
	Canada	0.34	NA	0.34	0.34	0.34	0.34	NA	0.34	0.34	0.34
	Chile	Listed under 'Latin America'					0.94	NA	NA	0.94	0.96
	Croatia	0.00	NA	0.00	0.00	0.00	0.73	NA	0.73	0.73	0.73
	Cyprus	0.05	NA	0.05	0.05	0.05	0.03	NA	0.03	0.03	0.03
	Czech Republic	0.00	NA	0.00	0.00	0.00	0.04	NA	0.03	0.04	0.04
	Denmark	0.68	NA	0.62	0.62	0.68	1.22	NA	1.22	1.22	1.22
	Estonia	0.82	NA	0.50	0.50	0.82	1.08	NA	0.95	0.95	1.03
	Finland	0.08	NA	0.08	0.08	0.08	0.08	NA	0.08	0.08	0.08
	France	0.13	NA	0.12	0.12	0.13	0.08	NA	0.07	0.07	0.07
	Germany	0.82	NA	0.81	0.81	0.82	0.19	NA	0.18	0.18	0.18
	Greece	0.61	NA	0.60	0.61	0.70	2.17	NA	2.14	2.16	2.16
	Hungary	0.00	NA	0.00	0.00	0.17	0.05	NA	0.05	0.05	0.05
	Iceland	0.24	NA	0.28	0.28	0.28	0.32	NA	0.32	0.32	0.32

Table 5 (Contd.): Poverty Rates (%) by Country and Region under Alternative PPPs: 2005 and 2011

Region	Country	2005 PPPs					2011 PPPs				
		ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
EUROSTAT-OECD	Ireland	0.03	NA	0.02	0.02	0.03	0.50	NA	0.41	0.39	0.41
	Israel	0.67	NA	0.67	0.67	0.67	0.39	NA	0.39	0.39	0.39
	Italy	0.82	NA	0.80	0.80	0.85	1.22	NA	1.17	1.17	1.17
	Japan	0.35	NA	0.35	0.35	0.35	0.35	NA	0.35	0.35	0.35
	Latvia	1.75	17.96	1.79	1.79	2.18	1.18	17.79	1.18	1.18	1.10
	Lithuania	1.02	13.01	1.22	1.32	1.69	0.84	10.79	0.86	0.87	0.86
	Luxembourg	0.12	NA	0.12	0.12	0.12	0.32	NA	0.30	0.30	0.30
	Macedonia, FYR	0.52	28.24	0.53	0.55	1.10	0.70	46.63	1.06	1.17	0.90
	Mexico	3.72	15.26	3.73	3.93	6.26	4.70	18.51	4.42	4.50	4.43
	Montenegro	0.19	31.34	0.00	0.00	0.25	0.21	33.61	0.21	0.21	0.21
	Netherlands	0.67	NA	0.67	0.67	0.71	0.38	NA	0.38	0.38	0.38
	Norway	0.37	NA	0.37	0.37	0.40	0.21	NA	0.18	0.18	0.21
	Poland	0.62	NA	0.56	0.56	0.77	0.28	NA	0.28	0.27	0.27
	Portugal	0.47	NA	0.47	0.47	0.47	0.46	NA	0.45	0.38	0.38
	Romania	0.00	31.31	0.00	0.00	2.84	4.18	33.15	3.97	4.13	4.39
	Russian Federation (EUO)	0.17	23.23	0.15	0.15	0.46	0.04	14.59	0.04	0.04	0.05
	Serbia	0.30	24.02	0.47	0.47	0.72	0.05	28.26	0.05	0.05	0.10
	Slovakia	0.00	NA	0.00	0.00	0.16	0.30	NA	0.30	0.34	0.34
	Slovenia	0.08	NA	0.08	0.08	0.09	0.00	NA	0.00	0.00	0.00
	Spain	0.69	NA	0.68	0.68	0.72	1.53	NA	1.45	1.45	1.45
	Sweden	1.13	NA	1.09	1.09	1.14	0.64	NA	0.62	0.62	0.62
	Switzerland	0.21	NA	0.21	0.21	0.21	0.10	NA	0.10	0.10	0.10
	Turkey	0.24	0.00	0.05	0.05	1.37	0.00	0.00	0.04	0.05	0.05
	United Kingdom	0.78	NA	0.78	0.78	0.85	0.82	NA	0.81	0.81	0.81
	United States	1.00	1.33	1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00
LATIN AMERICA	**Overall**	**5.85**	**20.89**	**5.88**	**6.81**	**9.25**	**6.76**	**17.38**	**6.78**	**7.54**	**6.41**
	Bolivia	13.91	31.72	13.30	13.91	18.39	7.61	21.02	6.21	7.2	7.11
	Brazil	4.93	18.28	5.82	6.85	8.52	4.84	14.96	5.87	6.88	5.05
	Chile	0.88	NA	NA	NA	NA	Listed under Eurostat-OECD				
	Colombia	5.58	23.38	5.34	6.43	8.64	5.86	21.8	5.72	6.83	5.17
	Ecuador	7.11	NA	6.00	6.15	12.31	5.27	NA	4.2	4.57	4.80
	Paraguay	4.87	NA	4.31	5.02	7.34	4.55	NA	4.43	5.64	5.10
	Peru	6.75	30.99	5.53	6.20	11.91	3.53	19.48	2.89	3.46	3.15
	Uruguay	0.44	NA	0.20	0.18	0.67	0.25	NA	0.15	0.12	0.20
	Venezuela, RB	15.88	NA	NA	NA	NA	8.76	NA	9.44	9.34	10.45
SINGLETON	**Overall**	**NA**	**NA**	**NA**	**NA**	**NA**	**2.05**	**NA**	**NA**	**NA**	**NA**
	Georgia	Listed under CIS					12.60	NA	NA	NA	NA
	Iran, Islamic Rep.	Listed under 'East Asia and Pacific'					1.42	NA	NA	NA	NA
WORLD		**12.46**	**18.66**	**7.40**	**8.91**	**17.20**	**11.62**	**21.38**	**10.84**	**12.64**	**12.07**

Table 6: Regional Composition of Poor Population (%) under Alternative PPPs: 2005 and 2011

Region	2005 PPPs					2011 PPPs				
	ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
Africa	28.07	15.28	35.81	31.78	24.35	40.92	22.83	42.56	38.60	38.23
Commonwealth of Independent States	0.12	1.79	0.13	0.12	0.15	0.02	1.30	0.04	0.03	0.05
East Asia and the Pacific	19.53	44.62	23.83	26.06	27.61	23.15	38.73	22.48	23.37	21.28
Eurostat-OECD	1.59	7.71	2.72	2.30	1.71	2.06	5.60	2.01	1.74	1.83
Latin America	3.04	6.31	4.14	3.98	2.80	3.79	5.04	4.11	3.92	3.50
Singleton	NA	NA	NA	NA	NA	0.23	NA	NA	NA	NA
South Asia	47.65	24.28	33.37	35.76	43.39	29.79	26.45	28.76	32.30	35.07
The Caribbean						0.04	0.04	0.04	0.03	
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Note: The counterfactual, Tornqvist and Fisher PPPs could be calculated only for those countries for which the required information was available from the World Bank.

Table 7: Regional* Poverty Rates (%) under Alternative PPPs: 2005 and 2011

Region	2005 PPPs					2011 PPPs				
	ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
East Asia and the Pacific	7.34	22.05	5.41	7.12	14.57	8.82	22.99	7.80	9.46	8.29
Europe and Central Asia	1.07	16.73	0.99	1.04	2.08	1.36	14.60	1.23	1.25	1.26
Latin America and The Caribbean	6.09	20.89	5.88	6.81	9.25	6.87	16.64	7.04	7.95	6.61
Middle East and North Africa	1.60	15.41	1.42	1.80	3.72	1.70	24.83	3.85	4.48	2.92
South Asia	25.81	16.22	10.40	13.41	31.42	14.66	19.86	13.07	17.12	17.68
Sub-Saharan Africa	30.71	23.85	22.69	24.21	35.78	37.26	36.50	35.70	37.74	35.61
WORLD	**12.46**	**18.66**	**7.40**	**8.91**	**17.20**	**11.62**	**21.38**	**10.84**	**12.64**	**12.07**

***These regions are based on Ferreira et al. (2015).

Note: The regional figures are based on available PPPs within regions.

Table 8: Regional* Composition of Poor Population (%) under Alternative PPPs: 2005 and 2011

Region	2005 PPPs					2011 PPPs				
	ICP	Counter-factual	Tornqvist	Fisher	CPD	ICP	Counter-factual	Tornqvist	Fisher	CPD
East Asia and the Pacific	19.71	44.82	24.20	26.40	27.80	23.81	39.34	22.76	23.62	21.53
Europe and Central Asia	0.83	9.09	1.33	1.15	1.18	1.07	6.55	1.04	0.90	0.96
Latin America and The Caribbean	3.05	6.34	4.20	4.03	2.82	3.57	4.57	3.97	3.84	3.36
Middle East and North Africa	0.09	0.55	0.15	0.15	0.16	0.29	0.77	0.26	0.26	0.18
South Asia	48.09	24.39	33.90	36.23	43.68	30.08	26.59	29.13	32.63	35.48
Sub-Saharan Africa	28.24	14.80	36.22	32.04	24.36	41.18	22.19	42.84	38.75	38.49
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

*****These regions are based on Ferreira et al. (2015).

Table 9: IV Estimates of the Parameters of the Regressions of Poverty Rates under Alternative PPPs: 2011
Dependent Variable: ln(Poverty Rate)

Explanatory Variables		ICP		Counterfactual		Tornqvist		Fisher	
		Set 1[$$]	Set 2	Set 1[$$]	Set 2	Set 1[$$]	Set 2	Set 1[$$]	Set 2
ln(GDPPC/Exchange rate)		-0.255* (-1.660)		-0.119 (-1.095)		-0.284** (-2.013)		-0.233 (-1.615)	
ln(GDPPC)			-0.999*** (-4.577)		-0.746*** (-5.404)		-0.999*** (-4.482)		-0.905*** (-4.316)
ln(Exchange rate)			-0.217** (-2.029)		-0.064* (-1.953)		-0.218 (-1.364)		-0.208 (-1.314)
ln(PPP)		-0.018 (-0.278)	1.146*** (4.416)	0.032 (1.094)	0.826*** (5.358)	0.110 (1.415)	1.234*** (4.125)	0.083 (1.186)	1.112*** (3.995)
ln(Gini)		1.304** (2.069)	1.100* (1.959)	1.073* (1.829)	1.667*** (4.619)	2.180*** (3.179)	1.580** (2.517)	2.104*** (2.692)	1.506** (2.353)
Region Dummies[%%]	**Africa**	1.448 (0.519)	9.757*** (3.750)	0.545 (0.273)	4.904*** (4.142)	-1.885 (-0.640)	7.713** (2.495)	-2.081 (-0.630)	7.155** (2.414)
	CIS	-3.223 (-1.208)	5.993** (2.314)	0.534 (0.300)	4.874*** (4.432)	-5.506** (-2.000)	4.541 (1.512)	-5.836* (-1.918)	3.905 (1.381)
	East Asia and the Pacific	-0.949 (-0.321)	8.360*** (3.062)	-0.038 (-0.019)	4.780*** (3.971)	-5.372* (-1.779)	5.443* (1.687)	-4.245 (-1.238)	5.994* (1.856)
	Eurostat-OECD	-2.210 (-0.766)	7.475*** (2.621)	0.663 (0.343)	4.950*** (4.320)	-4.753 (-1.607)	5.918* (1.795)	-5.168 (-1.559)	5.111 (1.625)
	Latin America	-0.439 (-0.147)	8.854*** (3.120)	0.247 (0.121)	4.635*** (3.780)	-3.786 (-1.197)	6.795** (2.029)	-3.909 (-1.093)	6.201* (1.932)
	Singleton	-0.526 (-0.170)	8.951*** (3.090)	Omitted[&]	Omitted[&]	Omitted[&]	Omitted[&]	Omitted[&]	Omitted[&]
	South Asia	0.281 (0.106)	9.143*** (3.482)	0.635 (0.344)	5.279*** (4.433)	-4.088 (-1.433)	6.211* (1.937)	-4.258 (-1.351)	5.675* (1.844)
No. of Countries		77	77	52	52	74	74	73	73
Hansen J statistic (Chi-Squared P-Value)		6.370 (0.272)	6.509 (0.369)	3.120 (0.681)	4.968 (0.548)	6.379 (0.271)	7.936 (0.243)	8.104 (0.151)	10.006 (0.124)
F-statistics for testing Restriction R (Chi-Squared)		19.801***		29.205***		14.789***		13.967***	

Notes:

1. [$$] The model under **Set 1** is a restricted version of the model under **Set 2** with the following restriction (**R**): Coefficient of ***ln(GDPPC)***+ Coefficient of ***ln(Exchange rate)*****=0.**

2. Figures in parentheses are the z-statistics (*: significant at 10% level; **: significant at 5% level; ***: significant at 1% level).

3. [&] Owing to multicollinearity.

4. [%%] These regions correspond to ICP 2005 regions. Countries which are categorised in ICP 2011 under regions different from ICP 2005 regions have not been considered in the analysis (since the ICP 2005 values of the variables are used as instruments).

Figure 1

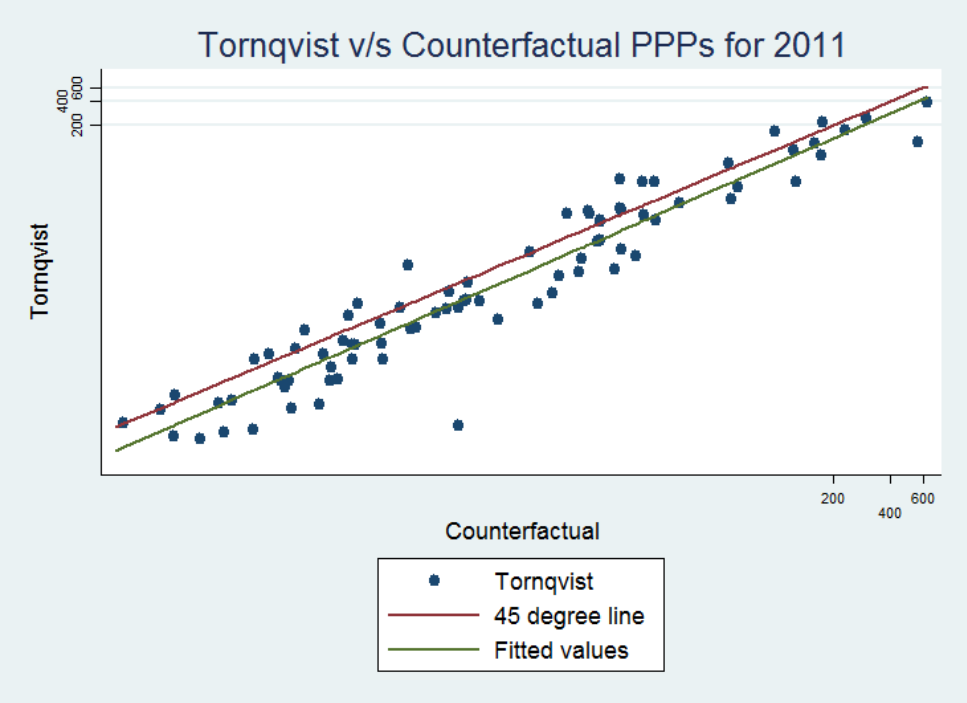


Figure 2

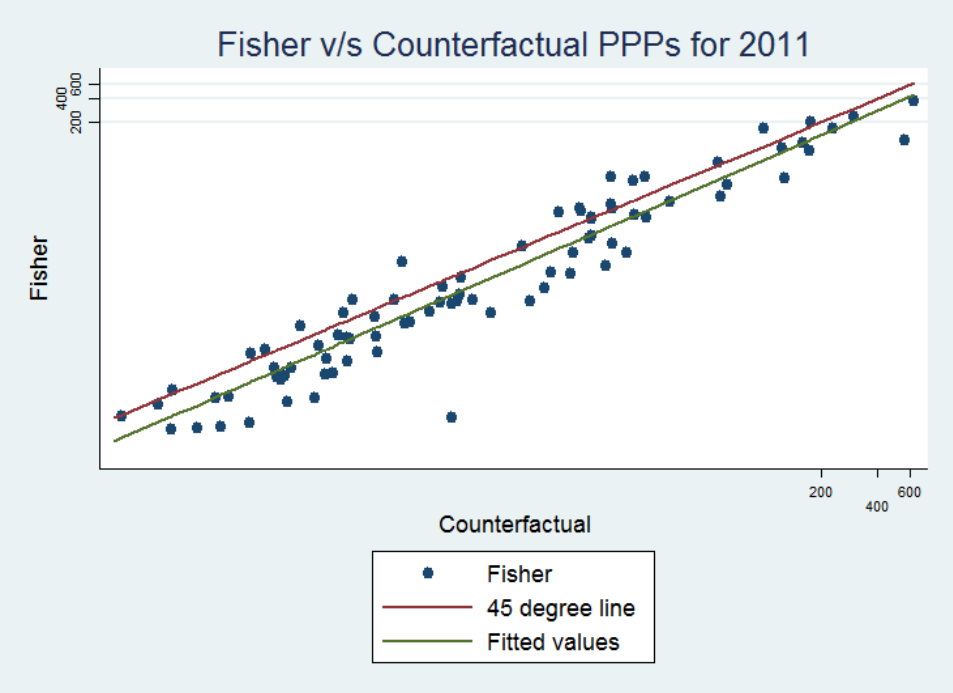


Figure 3

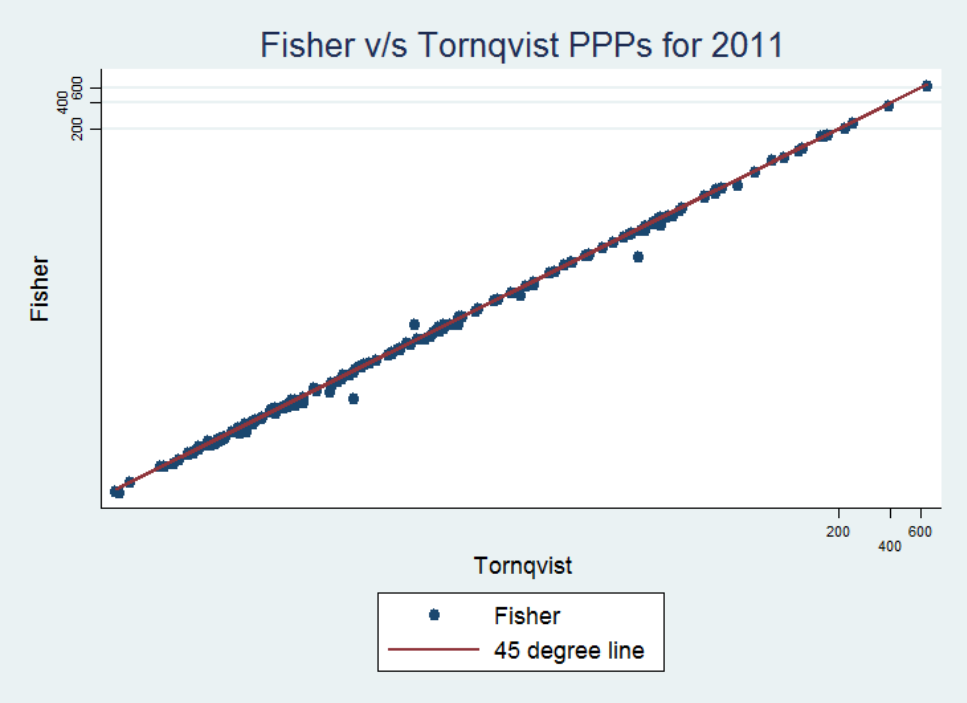


Figure 4

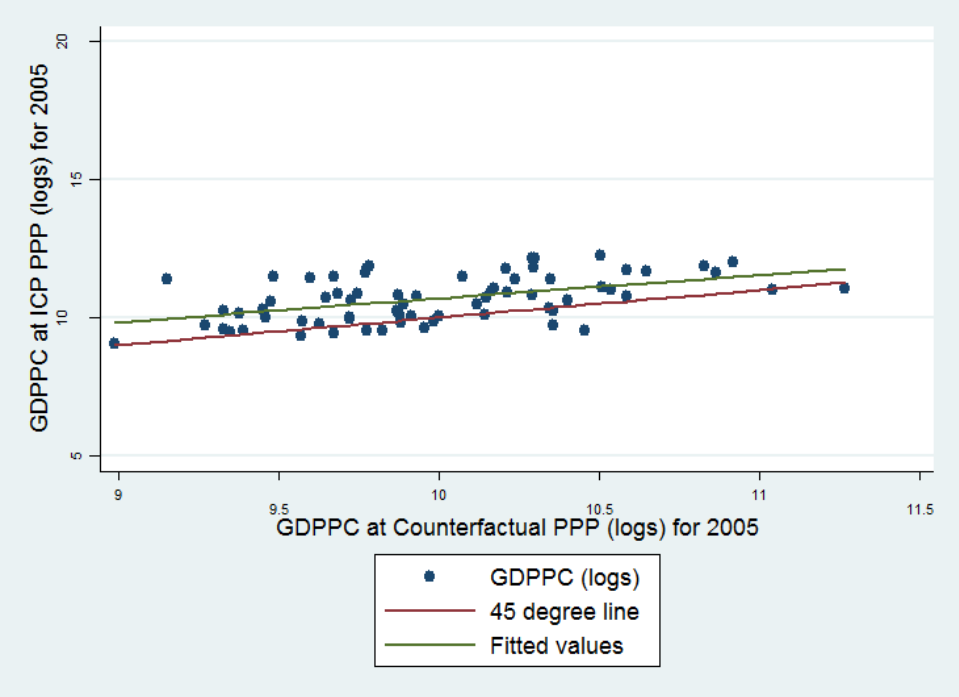


Figure 5

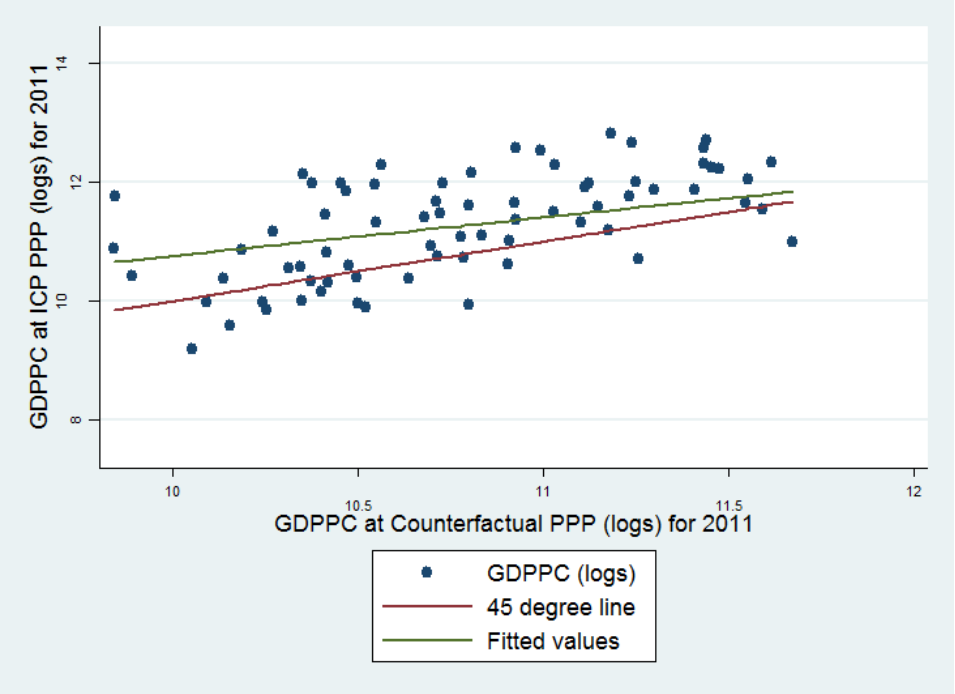


Figure 6(a)

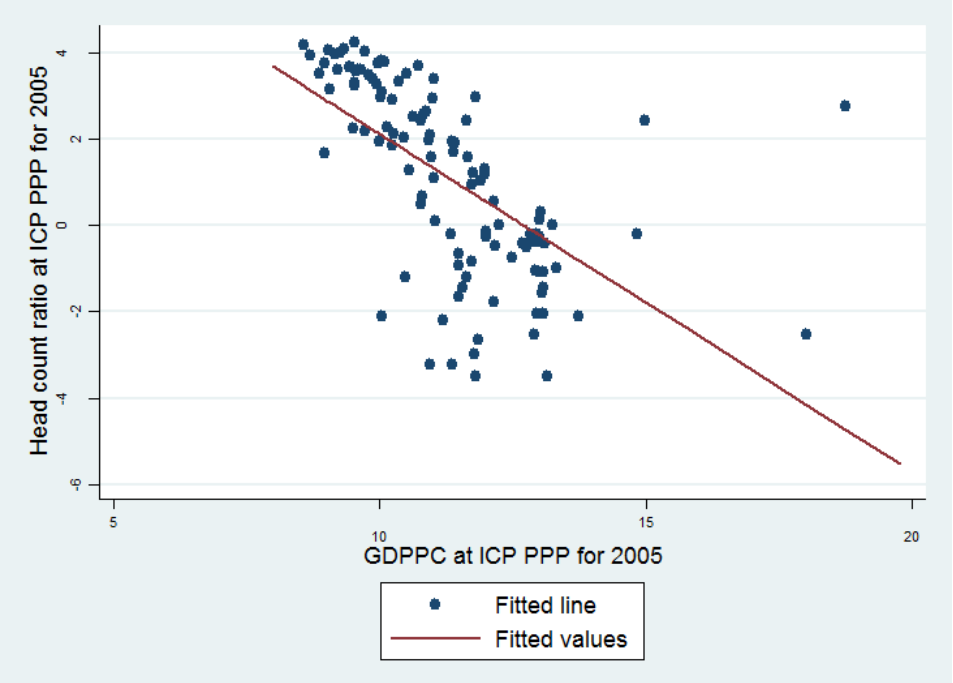


Figure 6(b)

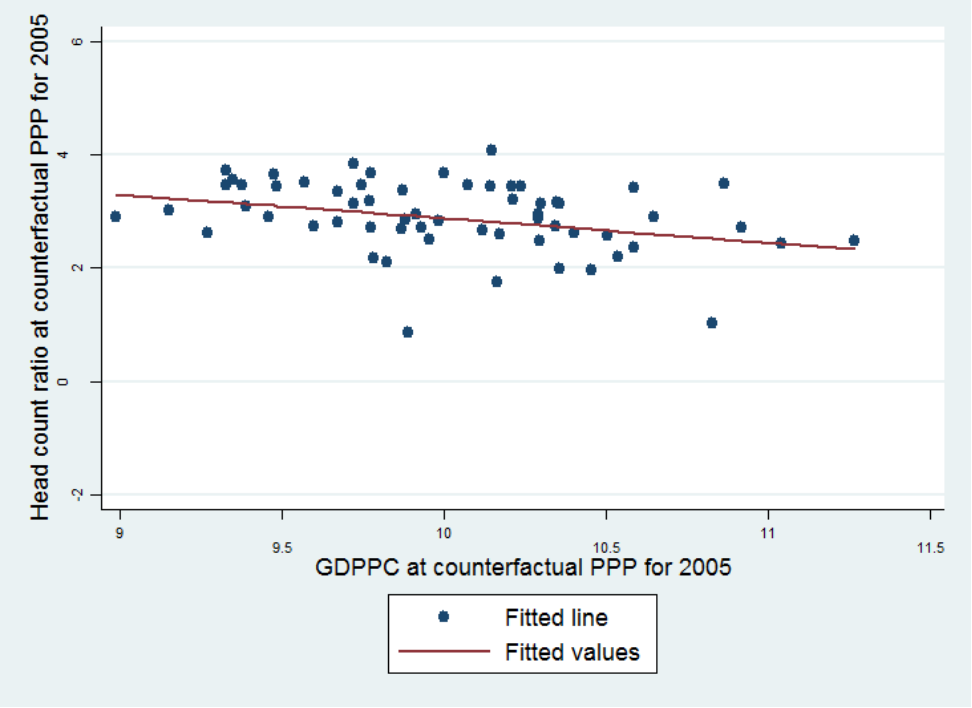


Figure 6(c)

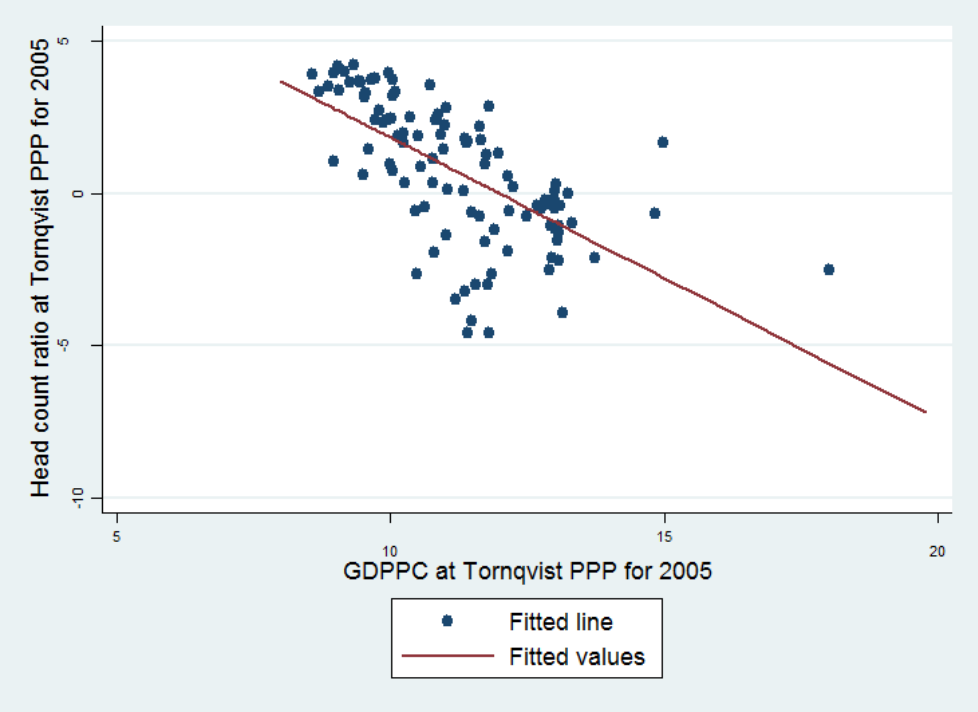


Figure 6(d)

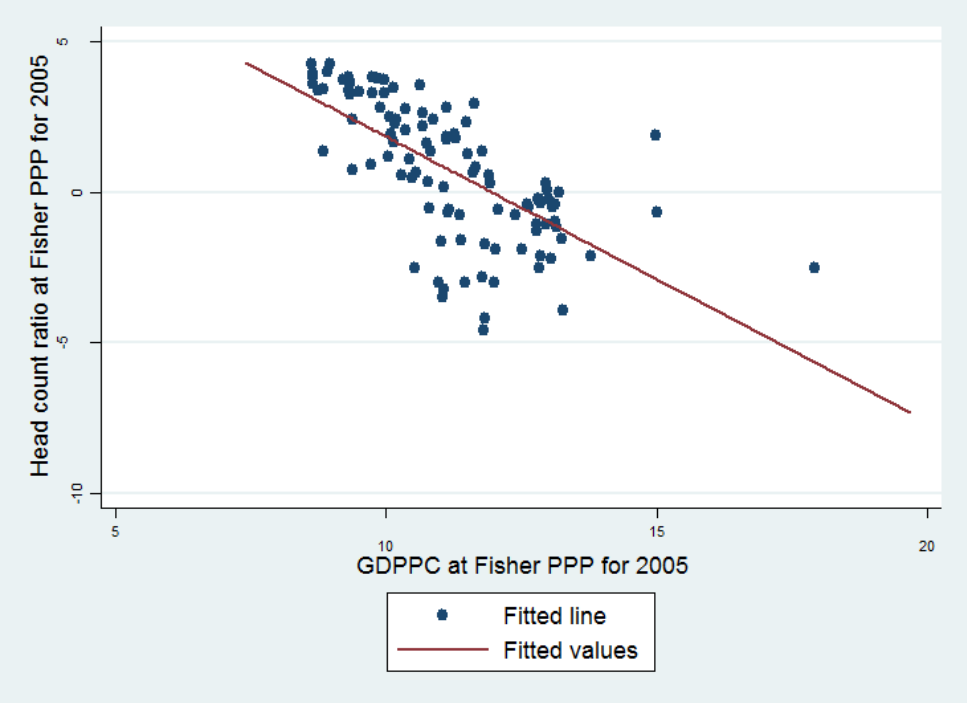


Figure 7(a)

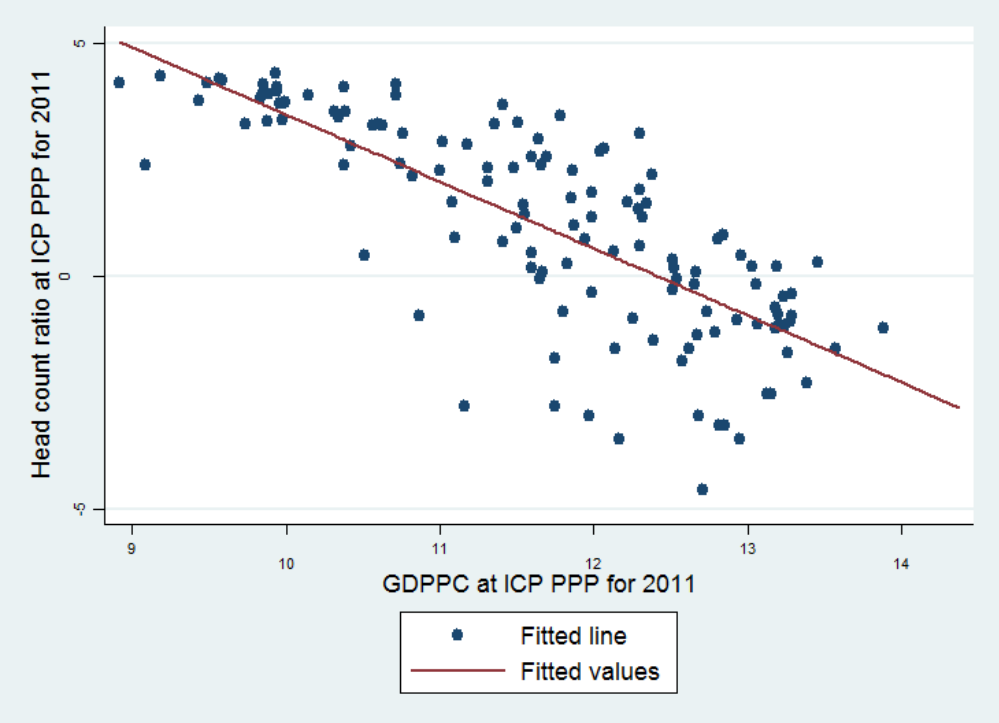


Figure 7(b)

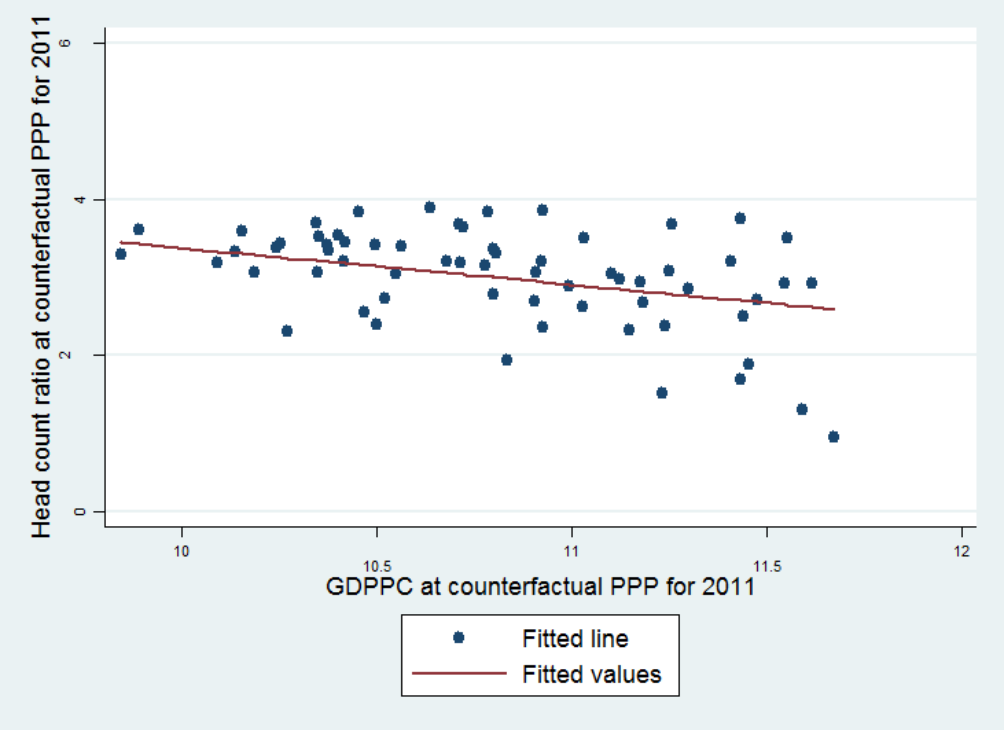


Figure 7(c)

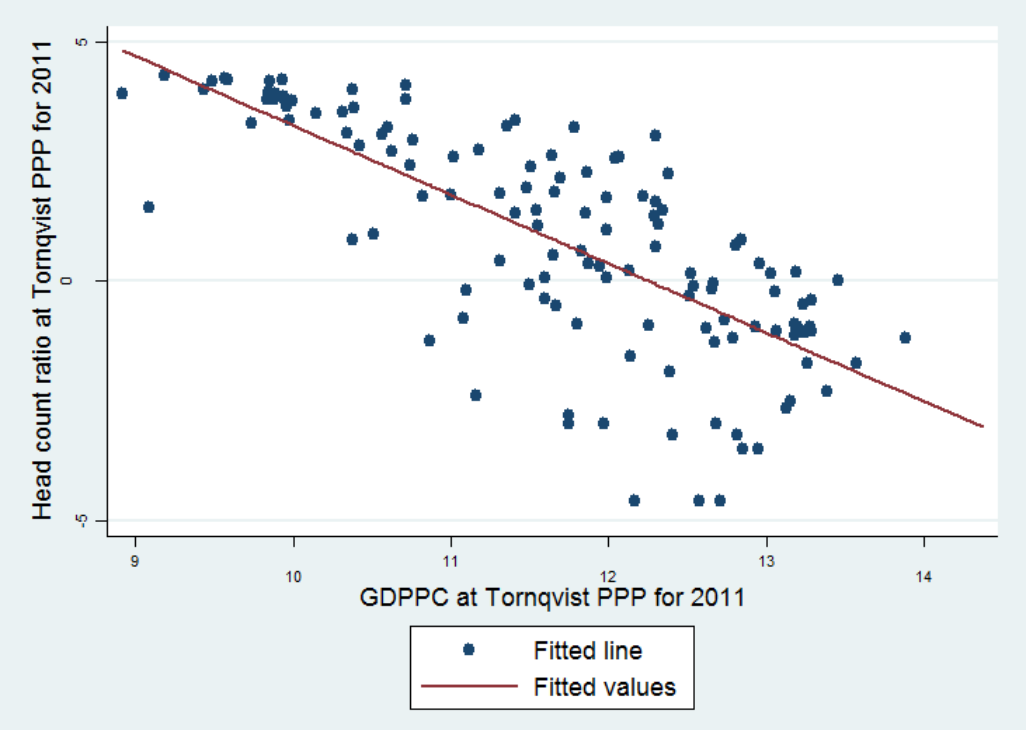


Figure 7(d)

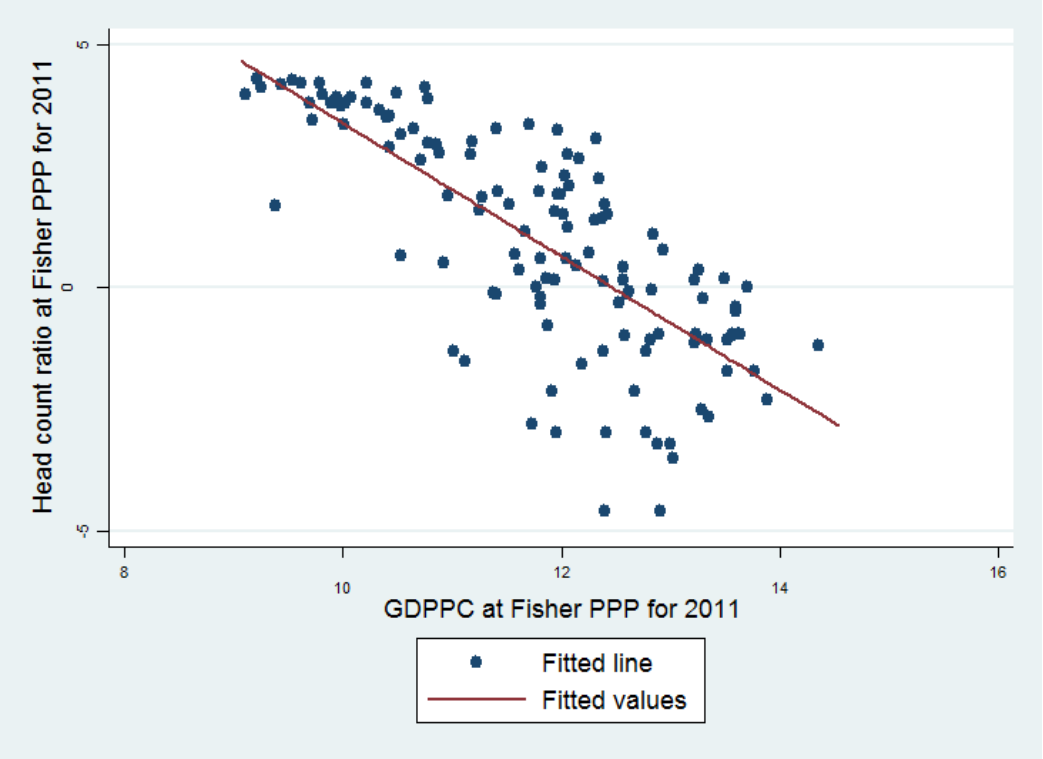


Figure 8(a): Hasse diagram for the year 2005 (using ICP PPP)

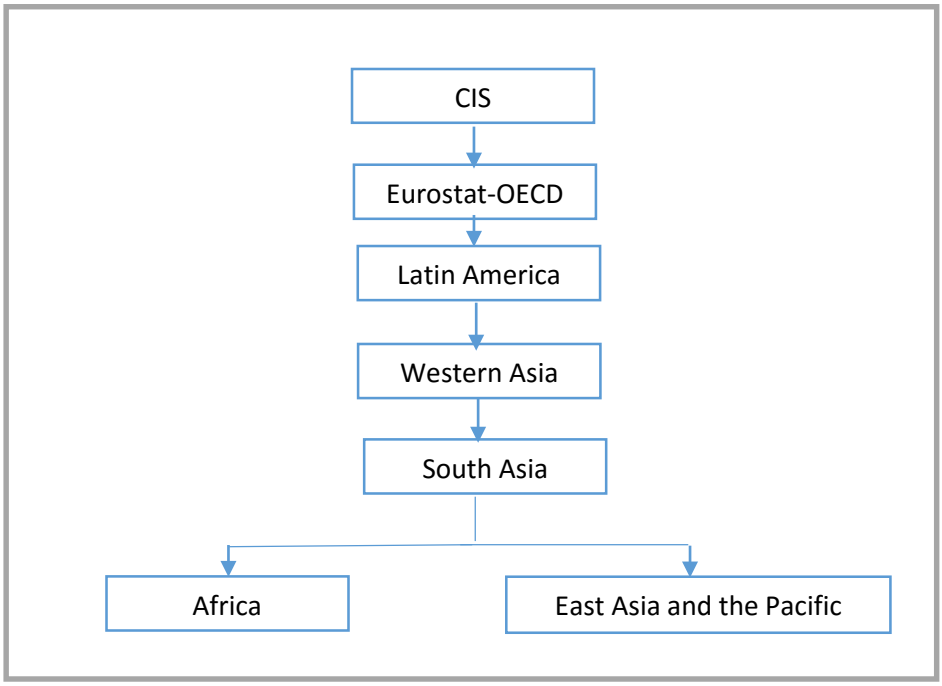


Figure 8(b): Hasse diagram for the year 2011 (using ICP PPP)

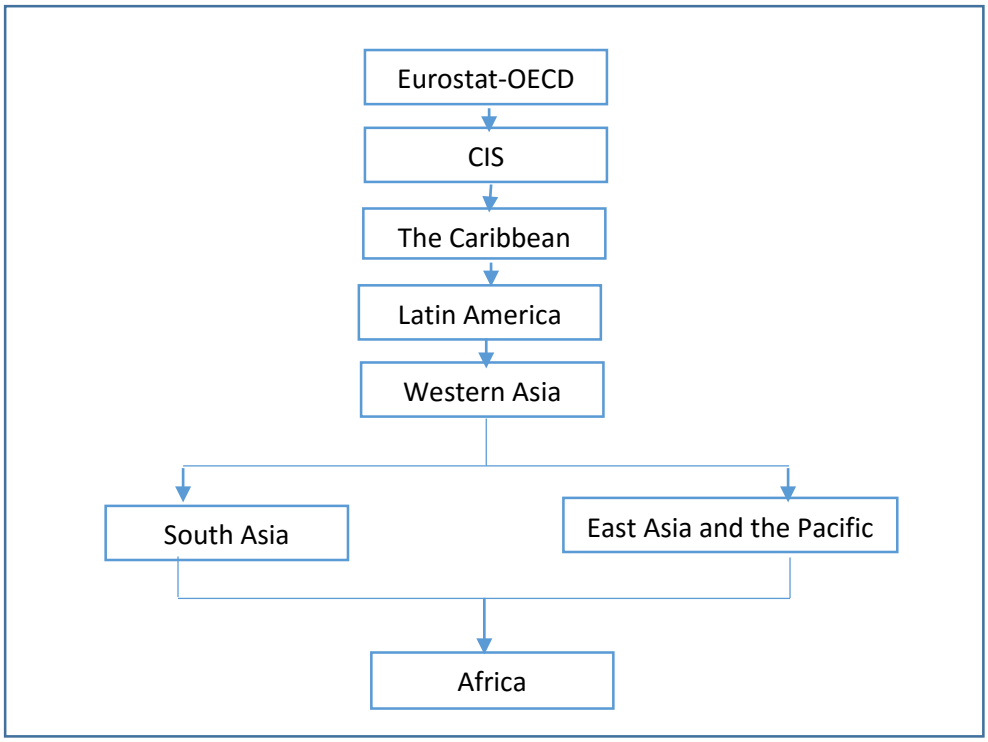


Figure 9(a): Hasse diagram for the year 2005 (using Counterfactual PPP)

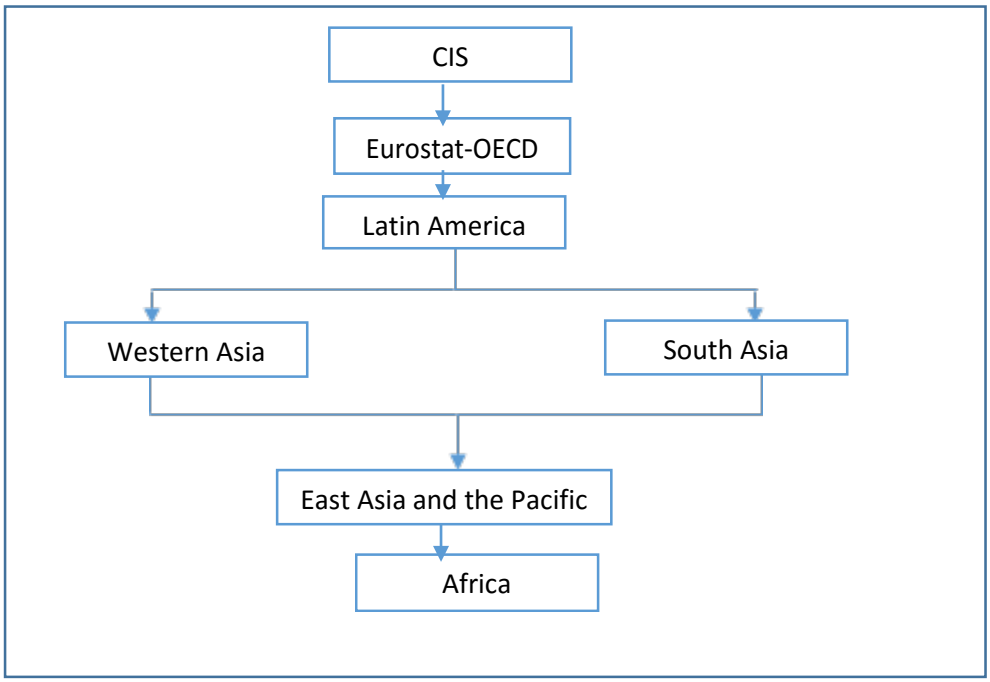


Figure 9(b): Hasse diagram for the year 2011 (using Counterfactual PPP)

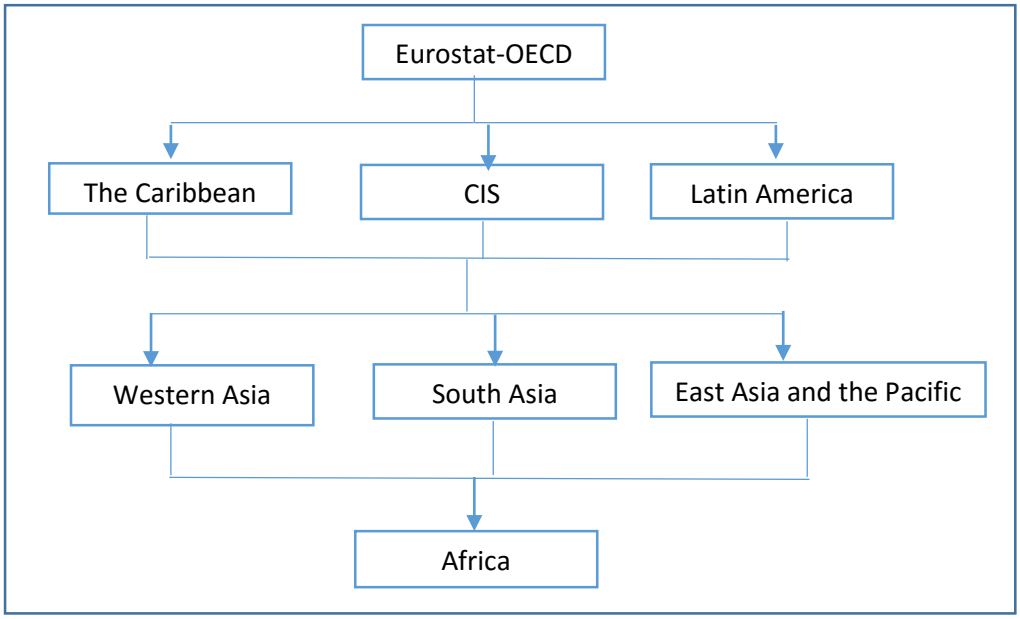


Figure 10(a): Hasse diagram for the year 2005 (using CPD PPP)

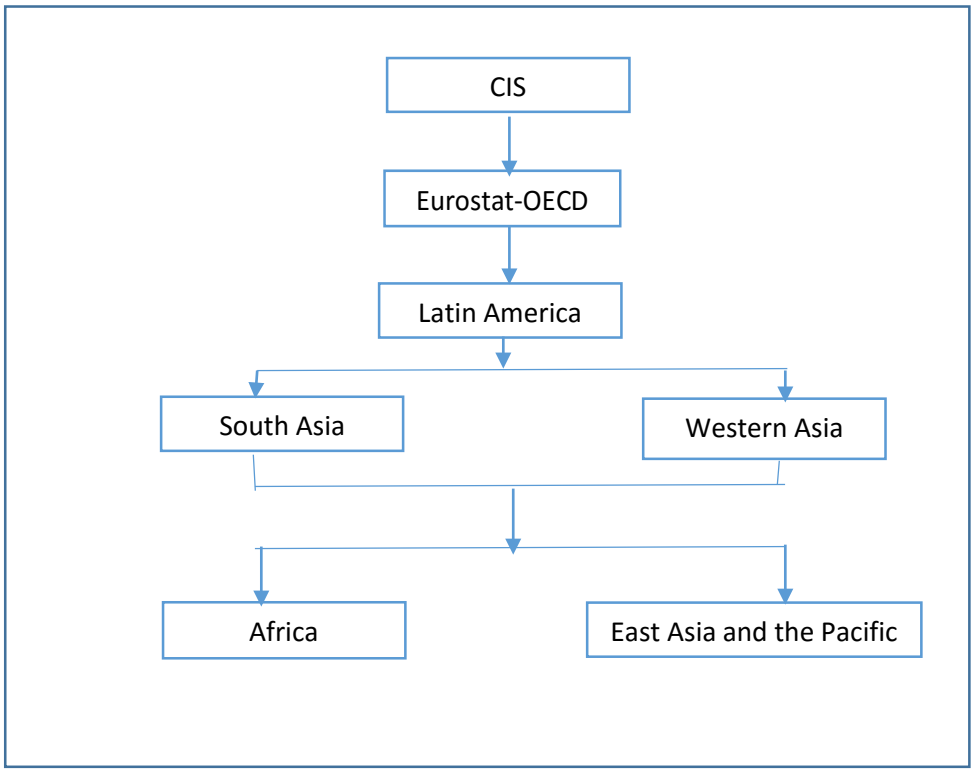
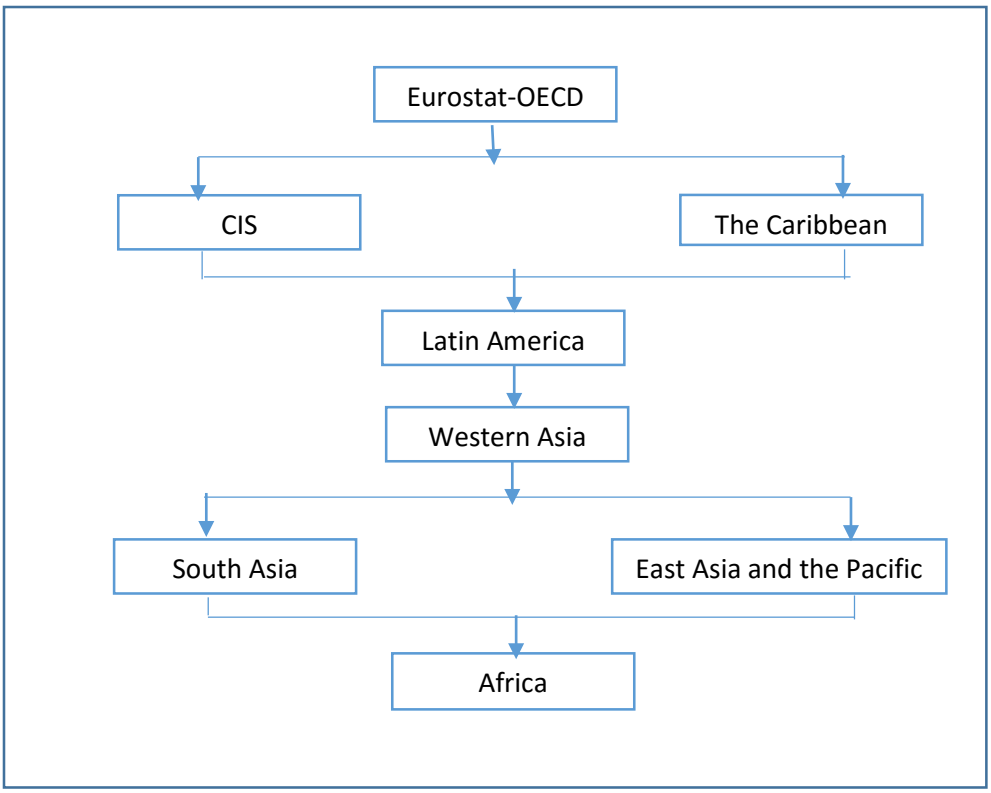


Figure 10(b): Hasse diagram for the year 2011 (using CPD PPP)



Appendix A

Data Source, Definitions of variables used, Construction of regional prices for Hasse diagrams, and Using the PovcalNet Program

Data Source

1. Global Consumption Database: Retrieved from http://datatopics.worldbank.org/consumption/home on 4/7/2015

2. Data provided by World Bank: ICP 2005 Data for Researchers and ICP 2011 Data for Researchers.

3. Country wise poverty rates: Retrieved from PovcalNet: the on-line tool for poverty measurement developed by the Development Research Group of the World Bank: http://iresearch.worldbank.org/PovcalNet/index.htm on 29/10/2015.

4. Bureau of Labour Statistics (BLS): Report 1042, Consumer Expenditures in 2011, April 2013.

Definitions of variables used:

GDPPC: Per capita gross domestic product in constant local currency units.
GDP Deflator: The GDP implicit deflator is the ratio of GDP in current International Dollar to GDP in constant 2011 International Dollar.
Exchange rate: Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market.
It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).
Inequality: GINI index [to account for missing values and procedural discrepancies, smoothed values of GINI index has been used.]
PPP: Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as U.S. dollar would buy in the United States. This conversion factor is for GDP.
Head Count Ratio: It is the percentage of poor individuals whose consumption expenditure lies below a certain "predefined" poverty line.

Construction of regional prices for Hasse diagrams

Items considered for construction of Hasse diagrams:

Rice, Other cereals, flour and other products, Bread, Other bakery products, Pasta products, Beef and veal, Pork, Lamb, mutton and goat, Poultry, Other meats and meat preparations, Fresh, chilled or frozen fish and seafood, Preserved or processed fish and seafood, Fresh milk, Preserved milk and other milk products, Cheese, Eggs and egg-based products, Butter and margarine, Other edible oils and fats, Fresh or chilled fruit, Frozen, preserved or processed fruit and fruit-based products, Fresh or chilled vegetables other than potatoes, Fresh or chilled potatoes, Frozen, preserved or processed vegetables and vegetable-based products, Sugar, Jams, marmalades and honey, Confectionery, chocolate and ice cream, Food products miscellaneous, Coffee, tea and cocoa, Mineral waters, soft drinks, fruit and vegetable juices, Spirits, Wine, Beer, Tobacco, Clothing materials, other articles of clothing and clothing accessories, Garments, Cleaning, repair and hire of clothing, Shoes and other footwear, Repair and hire of footwear, Actual and imputed rentals for housing, Maintenance and repair of the dwelling, Water supply, Electricity, Gas, Other fuels, Furniture and furnishings, Carpets and other floor coverings, Repair of furniture, furnishings and floor coverings, Household textiles, Major household appliances whether electric or not, Small electric household appliances, Repair of household appliances, Glassware, tableware and household utensils, Major tools and equipment, Small tools and miscellaneous accessories, Non-durable household goods, Domestic services, Household services, Pharmaceutical products, Other medical products, Therapeutic appliances and equipment, Medical Services, Dental services, Paramedical services, Hospital services, Motor cars, Motor cycles, Bicycles, Fuels and lubricants for personal transport equipment, Maintenance and repair of personal transport equipment, Other services in respect of personal transport equipment, Passenger transport by railway, Passenger transport by road, Passenger transport by air, Postal services, Telephone and telefax equipment, Telephone and telefax services, Audio-visual, photographic and information processing equipment, Recording media, Repair of audio-visual, photographic and information processing equipment, Major durables for outdoor and indoor recreation, Other recreational items and equipment, Garden and pets, Veterinary and other services for pets, Recreational and sporting services, Cultural services, Newspapers, books and stationery, Education, Catering services, Accommodation services, Hairdressing salons and personal grooming establishments, Appliances, articles and products for personal care, Jewellery, clocks and watches, Other personal effects, Other financial services, Other services miscellaneous.

Construction of Regional Prices

For the computation of the regional prices, we use the data provided by the World Bank on the item-wise expenditures (for the year 2005 and 2011) and their respective prices (for the year 2011 only). All prices and expenditure figures are normalized by a suitable PPP index so that they may be used for

intercountry and interregional comparisons, i.e. the price of an item '*i*', in a country '*c*' belonging to a region '*r*' denoted by $p_{ic_r}^{LCU}$ is normalized by PPP_{c_r} to obtain the normalized prices of the country given by p_{ic_r}, where PPP_{c_r} represents the purchasing power parity (which may be the ICP, counterfactual, Tornqvist or Fisher PPP) for that country in terms of the currency of a base country (India in our case). Similarly, $x_{ic_r}^{LCU}$ is normalized to x_{ic_r} where '*x*' denotes the expenditure of the item in the country. Since the prices of every item vary with the country, the region specific price for an item '*i*' is constructed using a method similar to that used in equation (1) and is given by:

$$p_{ir} = \prod_{c \in r} (p_{ic_r})^{\frac{x_{ic_r}}{\sum_{c \in r} x_{ic_r}}}$$

The total expenditure of a country 'c_r' evaluated at the price of a region 's' is given by: $\sum_i \frac{x_{ic_r} p_{is}}{p_{ic_r}}$ and is used to obtain the mean of the real (PPP deflated) country consumption expenditures and the Gini inequality measure of consumption expenditures in region *r* evaluated at the prices of region '*s*' (i.e. $\mu^r(p^s)$ and $G^r(p^s)$ respectively). As discussed in Section 6, these region specific prices are used to estimate the inequality corrected real consumption expenditure of any region, at the prices of any other region.

Using the PovcalNet Program

The PovcalNet program that is available on the World Bank website, http://iresearch.worldbank.org/PovcalNet/, uses as default the GDP PPPs, whereas we use the PPPs for 'Actual Individual Consumption' in both years. This information is contained in the Excel files, 'ICP 2005 Data for Researchers' and 'ICP 2011 Data for Researchers' that were kindly made available to us by the ICP. The country wise consumption PPP figures appear in Row 2 (under Code 02) in the spreadsheet called 'Global Aggregated PPPs' in each year's Excel file. The PPP figures were converted from the US $ base to the Indian Rupee (Re) base before use.

In our experience, the PovcalNet is working fine with the 2011 PPPs, but we encountered some problems with the version using 2005 PPPs. So, for 2011, we simply put (physically) the consumption PPPs and poverty lines in the appropriate boxes for each country to obtain the poverty rates for 2011. Since the boxes in the PovcalNet 2011 version only accept 2011 values, to get the 2005 poverty rates we inflate the 2005 poverty lines and consumption PPPs to 2011 values using a program specially written for this purpose. The boxes are then filled in with these values to get the 2005 poverty rates reported in Table 5.

Appendix B

Figure B1: (Figures 6(a) to 6(d) combined)

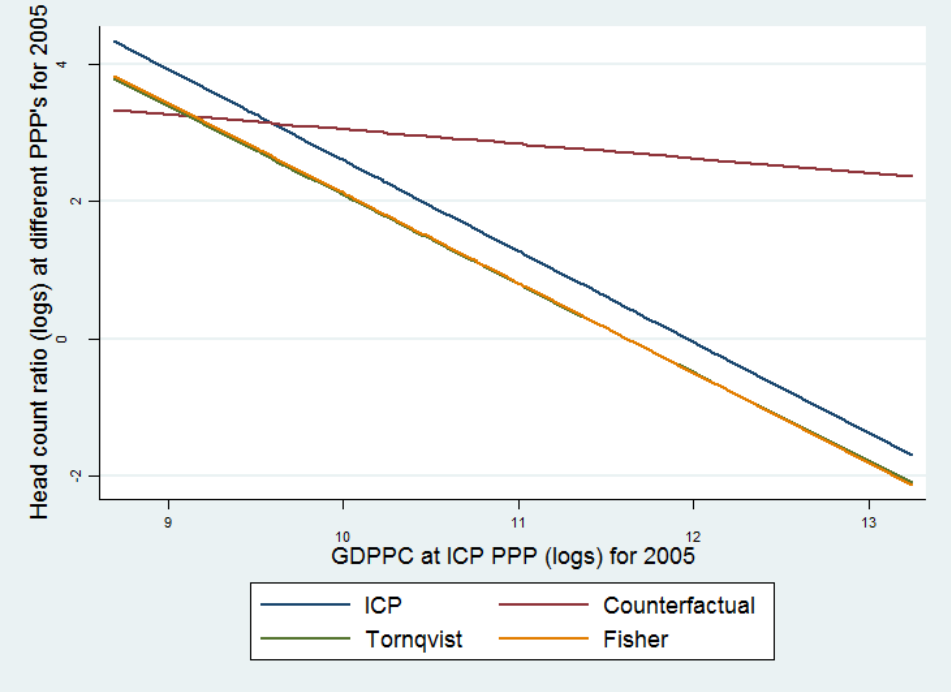
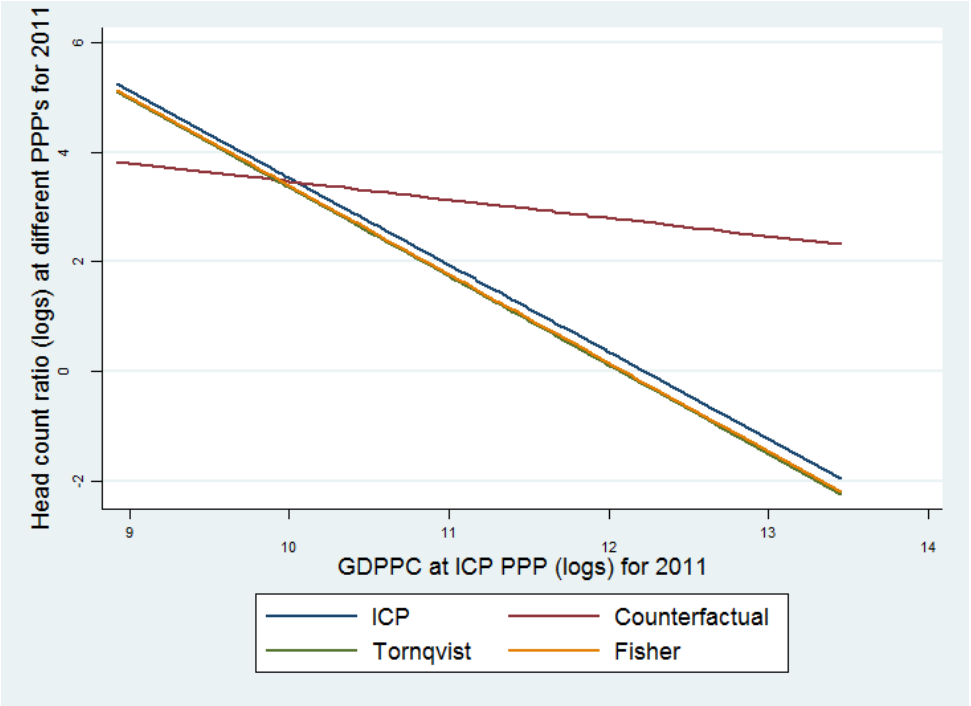


Figure B2: (Figures 7(a) to 7(d) combined)



Appendix C

The *W* matrices

Note: These matrices are row normalised by the diagonal elements, so that across a row for an off-diagonal element a value of greater than 1 would mean that the region corresponding to the off-diagonal element dominates the region corresponding to the diagonal element in terms of welfare.

ICP Consumption PPP 2005

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	Western Asia
Africa	1.00	75.83	1.15	7.88	3.05	1.37	2.11
CIS	0.02	1.00	0.02	0.13	0.04	0.02	0.03
East Asia and the Pacific	1.09	81.72	1.00	8.12	2.87	1.37	2.26
Eurostat-OECD	0.15	10.87	0.14	1.00	0.36	0.16	0.28
Latin America	0.42	24.64	0.61	3.30	1.00	0.61	0.94
South Asia	0.97	69.35	0.93	8.26	2.76	1.00	2.01
Western Asia	0.56	37.05	0.62	3.91	1.53	0.79	1.00

ICP Consumption PPP 2011

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	The Caribbean	Western Asia
Africa	1.00	6.50	2.33	10.85	4.45	1.94	5.25	3.09
CIS	0.21	1.00	0.43	1.95	0.85	0.36	1.06	0.60
East Asia and the Pacific	0.50	2.83	1.00	4.96	2.14	1.08	2.63	1.78
Eurostat-OECD	0.12	0.60	0.24	1.00	0.47	0.19	0.57	0.35
Latin America	0.26	1.46	0.64	2.47	1.00	0.57	1.39	0.82
South Asia	0.62	4.14	1.31	7.12	2.75	1.00	3.41	1.97
The Caribbean	0.21	1.23	0.50	1.88	0.85	0.46	1.00	0.67
Western Asia	0.30	1.86	0.75	2.94	1.34	0.72	1.61	1.00

Counterfactual PPP for 2005

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	Western Asia
Africa	1.00	112.33	1.41	9.34	3.98	1.55	1.83
CIS	0.01	1.00	0.02	0.11	0.04	0.02	0.02
East Asia and the Pacific	0.76	85.10	1.00	6.61	2.96	1.43	1.58
Eurostat-OECD	0.14	14.05	0.17	1.00	0.45	0.22	0.23
Latin America	0.29	24.79	0.62	2.72	1.00	0.63	0.60
South Asia	0.67	67.72	0.91	6.91	2.79	1.00	1.33
Western Asia	0.55	58.37	0.82	4.90	2.30	1.04	1.00

Counterfactual PPP for 2011

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	The Caribbean	Western Asia
Africa	1.00	4.11	2.22	9.84	4.37	1.83	4.86	2.05
CIS	0.29	1.00	0.63	2.78	1.30	0.55	1.41	0.54
East Asia and the Pacific	0.49	1.93	1.00	4.71	2.19	1.09	2.21	1.10
Eurostat-OECD	0.13	0.42	0.25	1.00	0.52	0.22	0.58	0.26
Latin America	0.27	1.02	0.68	2.34	1.00	0.55	1.28	0.52
South Asia	0.60	2.51	1.32	6.85	2.80	1.00	3.03	1.28
The Caribbean	0.24	1.00	0.56	2.23	1.05	0.54	1.00	0.53
Western Asia	0.50	1.89	1.11	4.74	2.42	1.29	2.43	1.00

Tornqvist PPP for 2005

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	Western Asia
Africa	1.00	76.07	1.15	7.75	3.05	1.38	2.12
CIS	0.02	1.00	0.02	0.13	0.04	0.02	0.03
East Asia and the Pacific	1.14	86.38	1.00	8.63	3.03	1.37	2.35
Eurostat-OECD	0.15	10.77	0.14	1.00	0.36	0.16	0.28
Latin America	0.43	25.12	0.60	3.28	1.00	0.61	0.94
South Asia	0.99	71.37	0.93	8.28	2.79	1.00	2.02
Western Asia	0.56	36.43	0.62	3.92	1.53	0.79	1.00

Tornqvist PPP for 2011

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	The Caribbean	Western Asia
Africa	1.00	6.47	2.33	10.83	4.45	1.95	5.27	3.10
CIS	0.21	1.00	0.43	1.95	0.85	0.36	1.06	0.60
East Asia and the Pacific	0.50	2.89	1.00	5.06	2.18	1.07	2.67	1.79
Eurostat-OECD	0.12	0.59	0.24	1.00	0.47	0.19	0.56	0.35
Latin America	0.26	1.48	0.63	2.49	1.00	0.56	1.37	0.81
South Asia	0.63	4.20	1.32	7.19	2.77	1.00	3.42	2.01
The Caribbean	0.21	1.23	0.50	1.87	0.85	0.46	1.00	0.67
Western Asia	0.30	1.85	0.75	2.92	1.34	0.73	1.61	1.00

CPD Consumption PPP 2005

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	Western Asia
Africa	1.00	76.03	1.15	7.70	3.04	1.38	2.12
CIS	0.02	1.00	0.02	0.13	0.04	0.02	0.03
East Asia and the Pacific	1.13	84.50	1.00	8.50	2.99	1.38	2.32
Eurostat-OECD	0.15	10.76	0.14	1.00	0.36	0.16	0.28
Latin America	0.42	24.82	0.61	3.30	1.00	0.61	0.94
South Asia	0.98	69.97	0.93	8.27	2.78	1.00	2.02
Western Asia	0.56	36.53	0.62	3.91	1.52	0.79	1.00

CPD Consumption PPP 2011

Region	Africa	CIS	East Asia and the Pacific	Eurostat-OECD	Latin America	South Asia	The Caribbean	Western Asia
Africa	1.00	6.50	2.34	10.84	4.45	1.95	5.26	3.10
CIS	0.21	1.00	0.43	1.94	0.85	0.36	1.06	0.60
East Asia and the Pacific	0.50	2.85	1.00	5.00	2.15	1.08	2.66	1.79
Eurostat-OECD	0.12	0.59	0.24	1.00	0.47	0.19	0.56	0.35
Latin America	0.26	1.47	0.64	2.47	1.00	0.57	1.38	0.81
South Asia	0.63	4.16	1.31	7.14	2.76	1.00	3.42	1.99
The Caribbean	0.20	1.23	0.51	1.85	0.85	0.46	1.00	0.67
Western Asia	0.30	1.84	0.75	2.91	1.33	0.73	1.61	1.00