Comparing PWT8.0 with PWT7.1

This document aims to clarify why the version 8.0 of the Penn World Table (PWT) is showing different data than version 7.1. In what follows, 7 refers to PWT7.1 and 8 refers to PWT8.0. We focus mostly on comparisons of relative prices (i.e. purchasing power parities (PPPs) divided by the exchange rate) because methodological changes in how these relative prices are computed are driving the differences in other variables. In both 7 and 8, the data on expenditure at national prices (current and constant) is drawn from the United Nations National Accounts Main Aggregates Database, so this is only a source of differences between the two versions insofar as the basic data have been revised between the data released in late 2011 and late 2012 by the UN.

1. Methodological comparison

Before going into detail about differences in data, it is useful to briefly outline the methodological differences between 7 and 8, as well as compare these (where relevant) to the methodology employed by the World Bank in its 2005 ICP benchmark. The following table is but a summary overview; see the description of PWT7.1, *The Next Generation of PWT* (available at www.ggdc.net/pwt) and the ICP 2003-2006 Handbook for further details.[1]

Table 1, Methodology in PWT7, PWT8 and ICP2005

	PWT7.1	PWT8.0	ICP 2005
Aggregation methods	Geometric average of GEKS and CPDW for aggregating basic headings to CIG, GK for aggregating CIG to GDP^e	GEKS for aggregating basic headings to CIG and GK for aggregating CIG (and XM) to GDP^o	GEKS for aggregating basic headings to GDP; maintaining regional fixity
Concepts of consumption	Actual individual consumption & government collective consumption	Household consumption & government consumption (collective & individual)	Actual individual consumption & government collective consumption
Basic heading data	China consumption prices reduced by 20%; adjusted wage basic headings	China consumption prices reduced by 20%; adjusted wage basic headings	ICP 2005 basic headings
Relative price data	2005 ICP benchmark and post-adjustment indexes (non-benchmark countries)	All ICP benchmarks (1970, 1975, 1980, 1985, 1996 & 2005) and OECD/Eurostat benchmarks	2005 ICP benchmark

---

[1] There is no specific technical documentation for 7; the technical documentation for PWT6 will be relevant in many cases, supplemented with the documentation of PWT7.

|			
PPPs other than 2005	Extrapolated using National Accounts prices	Interpolation between ICP benchmark years, extrapolation using National Accounts prices otherwise	n.a.
PPP base	USA=1 in every year	USA in 2005=1	USA=1 (only 2005)
CIG weights	UN National Accounts	UN National Accounts	ICP benchmark
Country coverage	189	167	145

Notes: CIG: consumption, investment and government; GEKS: non-additive price aggregation method, average of Fischer indexes; CPDW: country-product-dummy (weighted) method, expenditure-weighted regressions; GDP^e: aggregate of CIG prices.

2. Comparing 2005, benchmark countries

We start the comparison at the most detailed level, namely the relative prices for consumption, investment and government in 2005 for the 145 countries that participated in the 2005 ICP benchmark round. A list of all countries in 8 and their benchmark participation is included as Appendix Table 1. Both 7 and 8 use the same data, namely the basic heading parities and expenditures from the ICP program. The parities have been more consistently adjusted for productivity differences across countries in 7 and we use this in 8 too. Following Deaton and Heston (2010), 7 introduced alternative price estimates for China, reducing the consumption basic headings by 20 percent. In 8, we use these as our main data for China, with official data provided as part of the technical guide and programs.

Investment prices

Figure 1, Price level for investment in 2005, PWT7.1 vs. PWT8.0
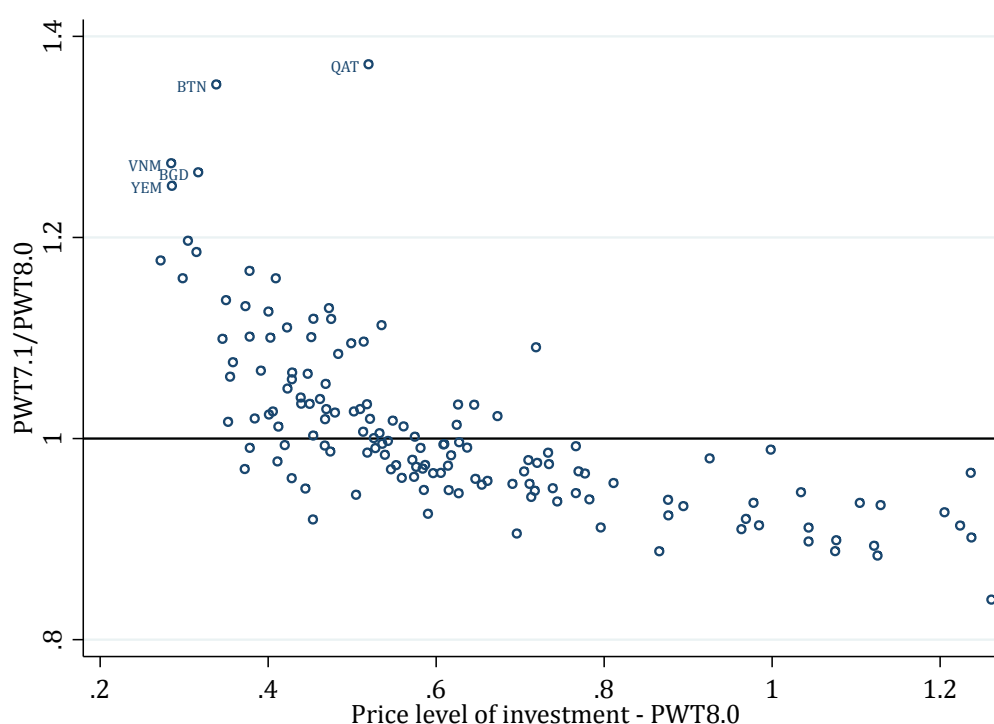
In both 7 and 8, the investment price level is an aggregate of the same investment basic headings from ICP 2005. The main difference is that 7 uses a geometric average of a GEKS index and an expenditure-weighted CPD index, while 8 uses only a GEKS index.

Figure 1 shows the relative difference between 7 and 8 for different values of investment prices in 8. On average, the estimates in 7 tend to show higher investment price levels for countries with the lowest price levels and vice versa for countries the highest price levels. For some countries, the differences are large, up to 37 percent higher. By far most countries are in a ±10 percent band, though. All these differences are due to the difference in index number methods. As we discuss in more detail in the User Guide on the PWT website, countries at very different levels of development, tend to have very different expenditure patterns (i.e. budget shares). In those cases, changes in index number methods will have a much larger effect on the resulting prices, reflecting to a degree the uncertainty inherent in these price comparisons.

Consumption and government prices

PWT7.0 changed the concept of consumption from household consumption (HC) expenditure to actual individual consumption (AIC) expenditure. The difference is that AIC is equal to HC plus individual consumption expenditure (IC) by the government. This is government consumption that can be traced to individuals, such as health and education spending. Government in 7 is only collective consumption (CC) expenditure.

Conceptually, AIC is the preferable household consumption concept because it is not sensitive to differences in funding mechanisms across countries. Countries where more of health and education spending is government-funded would have lower HC than countries where more is privately funded, while it would leave AIC unchanged. There are two downsides, though, to the move from HC to AIC initiated in 7. First, the main source of National Accounts data for 7 and 8, the UN National Accounts Main Aggregates Database, only distinguishes HC and GC, not AIC and CC. While for many OECD countries, AIC and CC data can easily be obtained, this is much harder for the full range of countries covered in PWT. So while we would be able to give a more comparable cross-country overview of consumption in 2005 if we were to use AIC and CC, the time series might well suffer. Second, the price data for HC in ICP is more reliable than that for IC as HC health and education spending is explicitly priced, while IC is based on input costs with a (fairly rough) productivity adjustment. Based on these considerations, we have therefore chosen to return to HC and GC. As a result, the price levels for consumption and government will be different in 8 than in 7, though the impact on the GDP^e price level should be small.

Figure 2, Price level in 2005 for actual individual consumption (AIC) versus household consumption (HC) expenditure
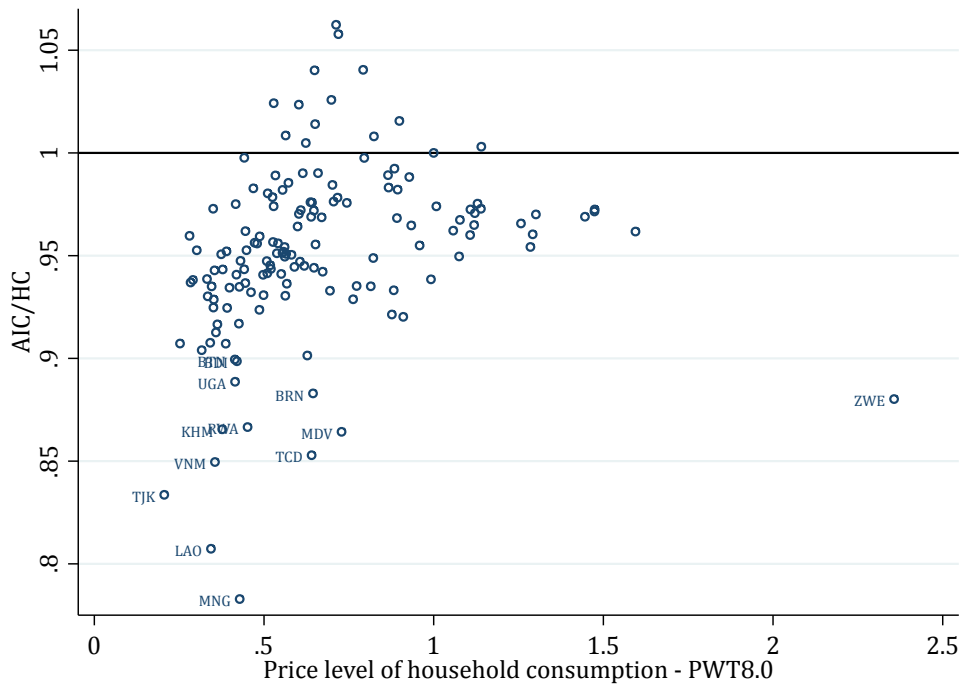

Figure 2 compares the price level of household consumption according to the two different concepts. We used the same method for computing the AIC price level as for computing the HC price level. The AIC price levels in 7 will also be different because of the different index number method used (see Table 1 and Figure 1). For most countries, the difference between AIC and HC is small, plus or minus 5 percent. For 10 countries though, the AIC price level is more than ten percent smaller than the HC price level and these countries are labeled in the figure (see Appendix Table 1 for a correspondence tables of country names and ISO codes). They are predominantly low-income countries, such as Laos and Mongolia, where price levels of education and health services are much lower than price levels of other consumption goods. This could well be true, but might also reflect a still relatively ad-hoc productivity adjustment of relative wages. More research into this issue would be useful.

Figure 3, Price level in 2005 for collective consumption (CC) versus government consumption (GC) expenditure
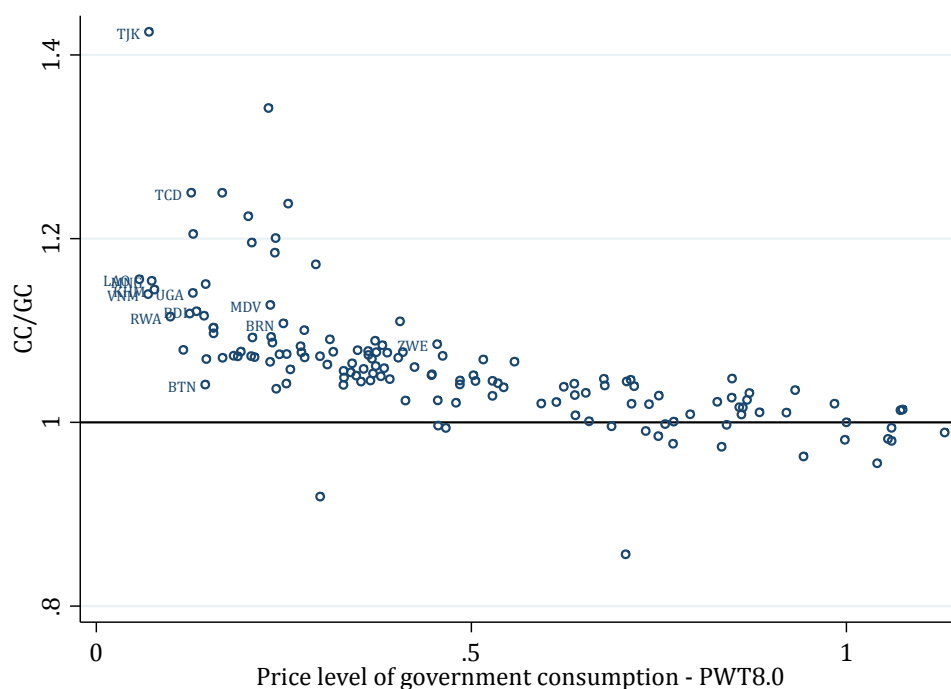

The flipside of the often-lower AIC price levels in Africa is higher CC price levels, as Figure 3 illustrates. And because IC makes up, on average, a higher share of GC (50%) than of AIC (14%), the differences in Figure 3 are more pronounced than in Figure 2. Since there is variation in the importance of IC for total GC and in the degree to which IC prices differ from HC or CC prices, the 10 countries that had particularly low AIC price levels are not all outliers in Figure 3.

GDP^e price levels – PWT7.1 vs. 8.0

Given the price levels of household consumption (C), investment (I) and government consumption (G), we turn to overall domestic absorption (GDP^e price levels). Figure 4 plots the difference between the GDP^e price level in 7 and 8 against the price level in 8. At this level, it does not matter whether IC is allocated to household or government consumption. To recap from Table 1, there are three sources of differences: first, a different index number method is used for constructing price levels of C, I and G (highlighted for I in Figure 1); second, 7 has wider country coverage, which would affect reference prices in the GK system; and third, in 8 we estimate a single GK system including prices of exports and imports, so that the price level of GDP^e in the US is not equal to one.

Figure 4, Price level in 2005 for GDP[e] PWT7.1 vs. PWT8.0
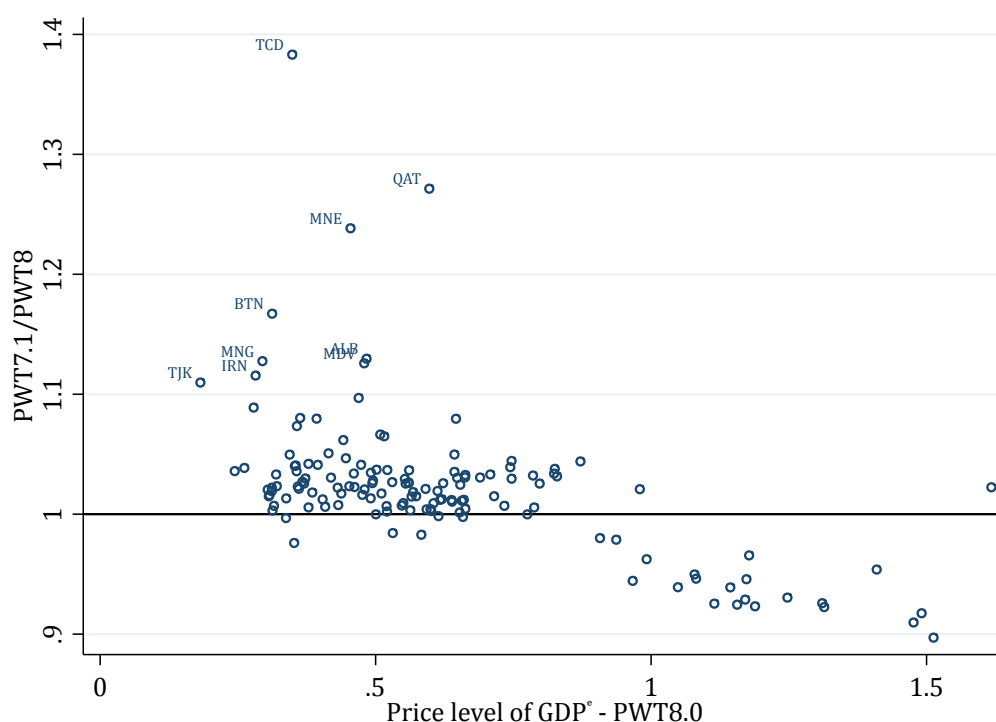
Especially for the countries with lower price levels, there are considerable differences between 7 and 8. At those low price levels, 7 usually shows a (much) higher price level than 8, while the reverse is the case at higher price levels. Chad (TCD) is the most extreme example: its price level in 8 is 35 percent of the USA, while in 7, it was 48 percent. As mentioned above, comparing countries at very different levels of development, such as Chad to the US, is an inherently uncertain endeavor as their economic structure and expenditure patterns are so different. Again though, the large majority of countries is in the ±10 percent range. As we show in the User Guide, the comparison with ICP PPPs shows much larger differences, where most countries are in the ±20 percent range.

3. Comparing 2005, non-benchmark countries
While the 2005 ICP round was historical for covering more countries than ever before, namely 146, PWT has long aimed to provide a more comprehensive country coverage. This can sometimes be done on the basis of participation in earlier ICP rounds but in other cases, non-ICP sources have been used to estimate prices of household consumption, investment and government consumption. In 7, this has led to a coverage of 189 countries, still 21 countries shy of the 210 countries for which the United Nations provide National Accounts estimates, but more than the 167 countries that at some point participated in an ICP round.[2] In 8, we have decided to limit the core dataset to those 167 countries to be able to present a simpler and more transparent methodology. As a result, countries such as Algeria, Cuba and United Arab Emirates are no longer covered in 8.

---

[2] This refers to 167 still-existing countries, ignoring the former country of Yugoslavia.

For the countries that are not in the 2005 benchmark but which are covered in both 7 and 8, 8 follows a different approach. In 7, the GDP price level for non-benchmark countries is estimated based on post adjustment indexes (i.e. cost-of-living adjustments for expats). In 8, household consumption, investment and government consumption price levels from the most recent available benchmark are extrapolated to all other years using relative price changes and then included in subsequent aggregations along with the benchmark countries.

Figure 5, Price level in 2005 for GDP^e of countries not in the 2005 ICP benchmark, PWT7.1 vs. PWT8.0
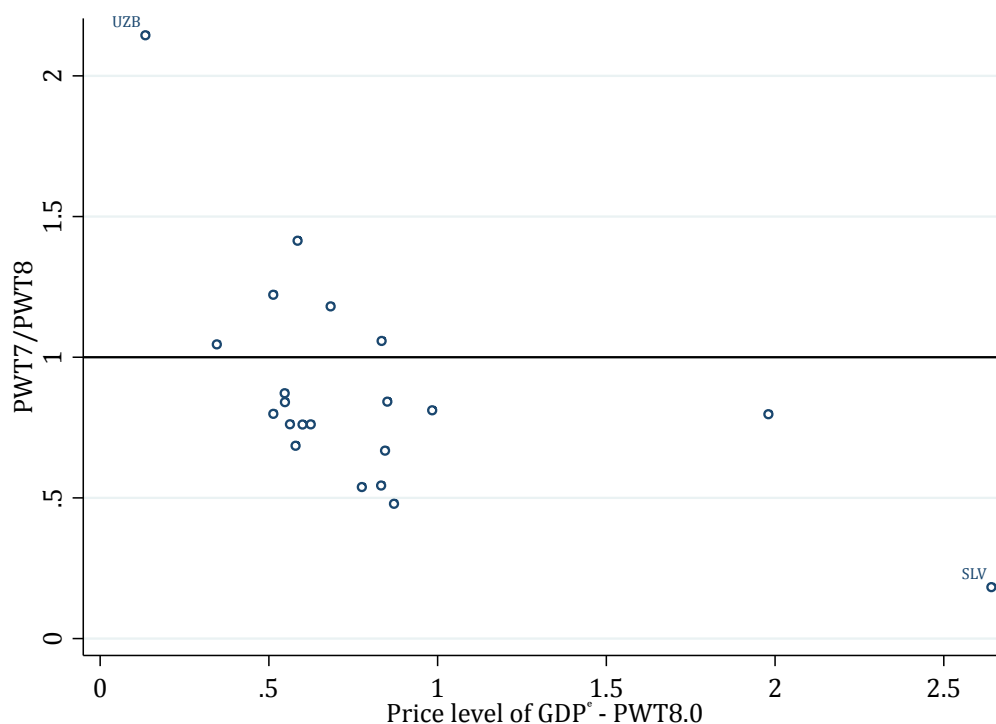
Figure 5 shows what these different methods imply for the overall price level. Given the methodological differences, it is no surprise that the differences are larger than Figure 4 showed for the countries that did participate in the 2005 ICP round. In particular Uzbekistan and El Salvador are large outliers. To some extent, this is a problem that will resolve itself in time as all these countries are likely to be part of the 2011 ICP round.

4. Comparing 1970

While the data for 2005 are mostly based on the 2005 ICP round, the data for 1970 in 8 are mostly based on extrapolations starting from the first ICP round that country participated in. So, for instance, India was part of the 1970 ICP round, Brazil first participated in 1975, Russia in 1996 and China only in 2005. In contrast, the data for 1970 in 7 are all based on extrapolations from the 2005 benchmark.

Figure 6, Price level in 1970 for GDP^e, PWT7 vs. PWT8 classified by first benchmark year
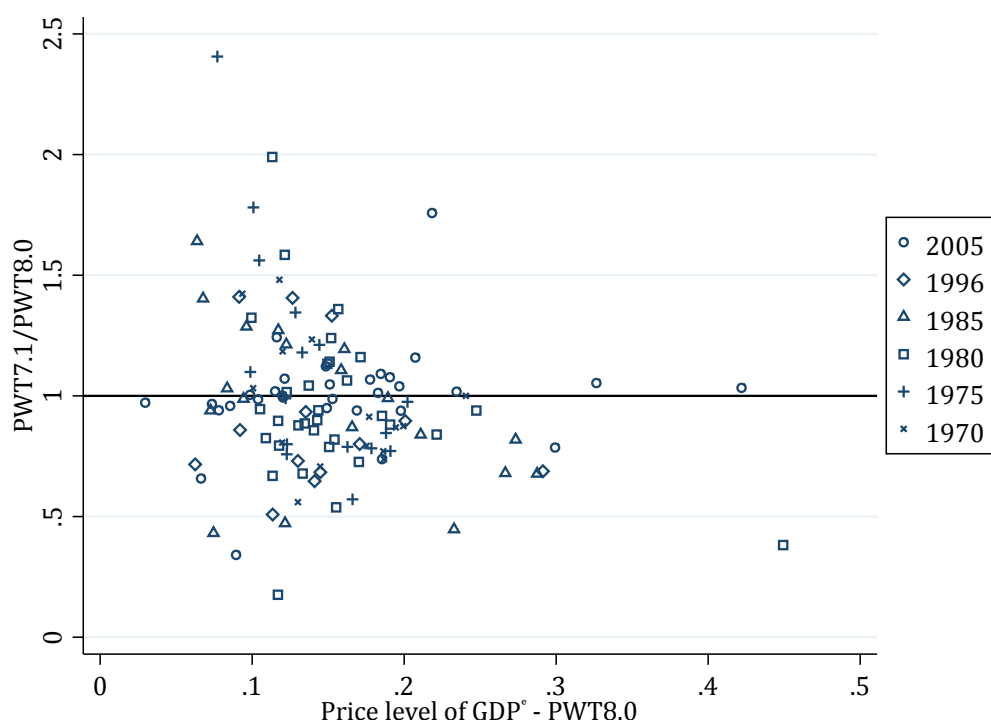
Note: The 35 countries with a price level ratio larger than 2.5 or a price level in PWT8.0 larger than 0.5 have been excluded for expositional ease.

Figure 6 compares the GDP^e price level in 1970 from 7 and 8. Note that in 8, the 1970 price level is expressed relative to the USA price level in 2005, and the price levels from 7 have been rescaled to match (for reference, in 1970, the GDP price level of the USA is equal to 0.24). Figure 6 distinguishes countries depending on the ICP round the country first participated in. So, for instance, the 1970 ICP round covered 16 countries and in Figure 6 these are marked by a cross (x). For these countries, the 1970 price level in 8 is calculated based on the 1970 ICP round, while in 7, this is based on the 2005 ICP round, extrapolated to 1970 using relative price changes from the NA.

All countries that participated in benchmarks before 2005 would be expected to have a different price level in 8 than in 7, because the extrapolation methodology is different. For countries that first participated in 2005, 7 and 8 use the same procedure, namely extrapolating using the relative price changes from the NA. However, as Figure 4 showed, 7 and 8 do not show the same price levels in 2005 either. To illustrate the effect of the different price level estimation methodology for earlier years, we take the 2005 price levels from 8 and compute the 1970 price level in the same way as 7, namely by extrapolation using NA price changes and using the same NA data. We refer to this as 'PWT7 (simulated)'.

Figure 7, Price level in 1970 for GDP^e, simulated PWT7 vs. PWT8 classified by first benchmark year
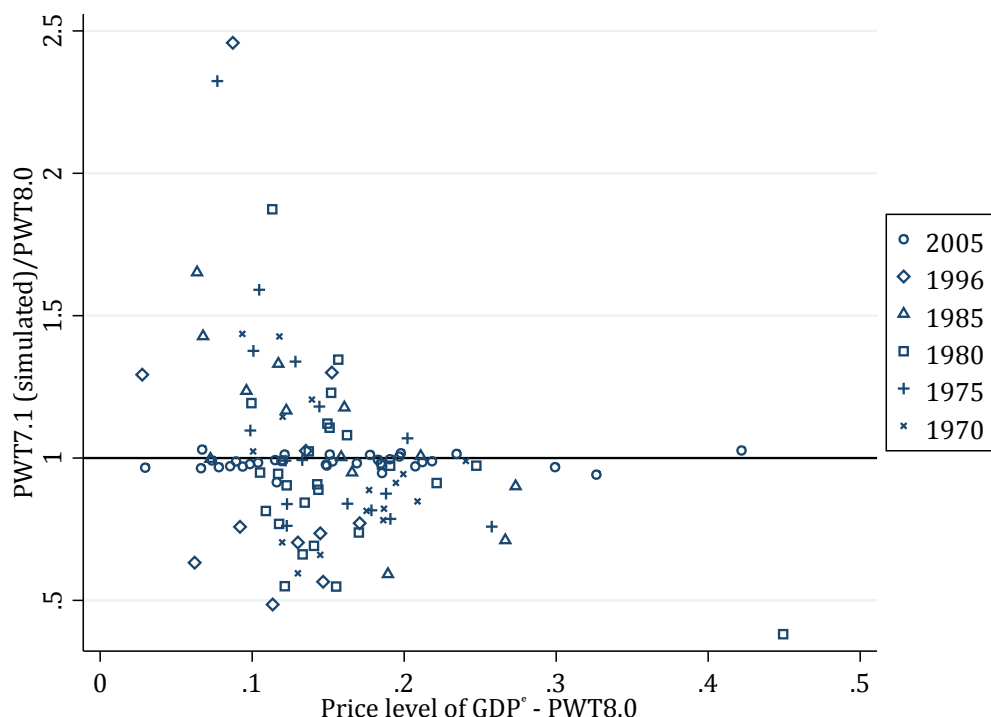
Note: PWT7 (simulated) is calculated by extrapolating the PWT8 2005 price levels for household consumption, investment, and government consumption to 1970 using the National Accounts deflators from PWT8 and aggregating to the GDP price level. One country with a price difference larger than 2.5 has been excluded.

In Figure 7, the countries that only participated in the 2005 ICP round are now all very similar in PWT8.0 or PWT7.1 (simulated), though there are some minor differences (-5% to +5%) since the price levels of other countries also have an effect in the aggregation of CIG prices in earlier years. The countries that did participate in earlier ICP rounds are often still quite different, but the standard deviation of the differences is reduced by more than half. Such a large reduction in variation is even seen when removing the countries which first participated in the 2005 benchmark. This implies that a large fraction of the differences in the earlier years between GDP^e price levels in 7 and 8 is due to the change in index number methods, with a somewhat smaller role for the new extrapolation methodology.

5. Price and income levels in the G-20

For cross-country growth regressions, the comparison of Figures 4 through 8 is most relevant as every country matters. Another set of researchers will be most interested in the larger economies and how their relative price levels and incomes have changed over this period in 7 and 8. For that reason, we look in some more detail at the G-20 economies.[3] The countries in this group are shown in Table 3, together with the ICP rounds they participated in. Many of the countries in this group participated in numerous ICP rounds, with a number participating in all six rounds since 1970. In what follows, we will compare 7 and

---

[3] The European Union is 'country' number 20 in the G-20; we therefore only list 19 countries.

8 first in 2005 and then in three other years, 1970, 1990 and 2010, based on their GDP^e price levels. Note that OECD and European Union (EU) countries have more frequent benchmark comparison, with the OECD publishing PPPs every three years and the EU's Eurostat publishing annual PPP comparisons. These are used in PWT, see the *User Guide* for more details.

Table 2, G-20 economies and ICP round participation

Country	ISO code	ICP round participation
Argentina	ARG	1980, 1996, 2005
Australia	AUS	1985, 1996, 2005
Brazil	BRA	1975, 1980, 1996, 2005
Canada	CAN	1980, 1985, 1996, 2005
China	CHN	2005
France	FRA	1970, 1975, 1980, 1985, 1996, 2005
Germany	DEU	1970, 1975, 1980, 1985, 1996, 2005
India	IND	1970, 1975, 1980, 1985, 2005
Indonesia	IDN	1980, 1996, 2005
Italy	ITA	1970, 1975, 1980, 1985, 1996, 2005
Japan	JPN	1970, 1975, 1980, 1985, 1996, 2005
Korea, Republic of	KOR	1970, 1975, 1980, 1985, 1996, 2005
Mexico	MEX	1975, 1980, 1996, 2005
Russia	RUS	1996, 2005
Saudi Arabia	SAU	2005
South Africa	ZAF	2005
Turkey	TUR	1985, 1996, 2005
United Kingdom	GBR	1970, 1975, 1980, 1985, 1996, 2005
United States	USA	1970, 1975, 1980, 1985, 1996, 2005

Table 4 shows the GDP price level in 2005 for 7, 8, ICP 2005 and the OECD. It illustrates that a range of methodological differences (again see Table 1) can have considerable effects. The clearest is China, where 7 and 8 use lower basic heading prices than in ICP 2005. But even in countries such as Brazil and South Africa, 7 and 8 show a considerably different price level than ICP 2005. This also reflects changes made in PWT7 to the ICP 2005 basic headings, namely to do a more uniform productivity adjustment for basic headings where relative wages were used. Despite using the same basic heading data in 8 as in 7, there are still notable differences, for instance in the case of France and Germany, which are due to the different aggregation methods used.

Table 3, GDP^e price levels in 2005 of G-20 economies based on PWT7, PWT8 and ICP 2005 (US=1)

Country	PWT7	PWT8	ICP 2005	OECD
Argentina	0.47	0.49	0.44	
Australia	0.98	1.07	1.06	1.06
Brazil	0.63	0.65	0.56	
Canada	0.96	1.01	1.00	1.00
China	0.34	0.34	0.42	0.42
France	1.10	1.19	1.15	1.15
Germany	1.07	1.12	1.12	1.08
India	0.30	0.31	0.33	
Indonesia	0.37	0.39	0.41	
Italy	1.03	1.10	1.09	1.08
Japan	1.14	1.20	1.18	1.18
Korea	0.77	0.77	0.77	0.77
Mexico	0.67	0.67	0.65	0.65
Russia	0.43	0.44	0.45	0.45
Saudi Arabia	0.68	0.67	0.64	
South Africa	0.75	0.77	0.61	0.61
Turkey	0.68	0.66	0.64	0.62
United Kingdom	1.10	1.19	1.18	1.16
United States	1.00	1.00	1.00	1.00

Note: the column OECD shows all countries for which the OECD publishes PPP numbers, regardless of whether these have been estimated under OECD auspices.

Table 5 shows the relative price levels across the years where, consistent with 8, the USA in 2005 is set equal to 1. As the OECD also publishes a time series of GDP PPPs for this period, these have also been added. Note that the OECD methodology is a hybrid of PWT7 and 8: since 1995 the PPPs are based on repeated benchmarks while before 1995, they are extrapolated using relative price changes from the NA. As a result, OECD PPPs for the early years will resemble 7 more closely, as the table demonstrates. In contrast, the use of original benchmark data in 8 leads to higher price levels in 1970 in a number of the richer economies, such as Germany and France, and lower price levels in poorer countries, such as India and Indonesia. These patterns and their implications are discussed in more detail in the "Next Generation of PWT" paper by Feenstra, Inklaar and Timmer. Finally, for 2010 8 is closer to the OECD than 7 as 8 is based on OECD and Eurostat benchmark data for that year or the closest available year. So in that regard, the methodology introduced in 8 brings us closer to the current approach of international organizations and is, at the same time, consistent in this approach over time.

Table 4, Price levels of GDP in 1970, 1990 and 2009 for G-20 economies, PWT7, PWT8 and OECD (USA in 2005=1)

Country	1970			1990			2010		
	PWT7	PWT8	OECD	PWT7	PWT8	OECD	PWT7	PWT8	OECD
Argentina	0.17	0.45		0.63	0.94		0.68	0.69	
Australia	0.18	0.21	0.19	0.75	0.79	0.78	1.32	1.55	1.54
Brazil	0.09	0.12		0.42	0.48		1.18	1.23	
Canada	0.23	0.25	0.22	0.76	0.78	0.78	1.21	1.37	1.31
China	0.14	0.12		0.20	0.18	0.31	0.55	0.61	0.65
France	0.17	0.20	0.19	0.81	0.98	0.90	1.24	1.29	1.29
Germany	0.17	0.21	0.17	0.80	0.98	0.85	1.16	1.20	1.19
India	0.13	0.09		0.28	0.31		0.41	0.41	
Indonesia	0.13	0.10		0.33	0.25		0.75	0.74	
Italy	0.14	0.19	0.14	0.78	0.91	0.82	1.18	1.17	1.19
Japan	0.14	0.18	0.15	0.85	1.06	0.95	1.38	1.44	1.41
Korea	0.10	0.14	0.11	0.49	0.58	0.56	0.80	0.79	0.79
Mexico	0.12	0.12	0.12	0.35	0.38	0.37	0.76	0.74	0.70
Russia				0.51	0.22		0.71	0.61	0.58
Saudi Arabia		0.07		0.60	0.59		0.71	0.82	
South Africa	0.16	0.15	0.10	0.55	0.55	0.40	0.92	0.91	0.76
Turkey	0.15	0.12	0.13	0.51	0.42	0.45	0.90	0.73	0.73
United Kingdom	0.16	0.18	0.15	0.76	0.86	0.78	1.05	1.14	1.12
United States	0.24	0.24	0.24	0.72	0.72	0.72	1.11	1.11	1.11

6. Database variables

The transition from 7 to 8 also brings a revision of variables and variable names. There are a number of principles underlying these changes:

- Some variables are still in the database, but have been renamed. For instance, there is still a variable measuring GDP at current prices, converted to US dollars using the PPP for domestic absorption, i.e. GDP^e. However, because 8 also has GDP at current prices, converted to US dollars using a PPP for GDP^o, the naming had to be adjusted. So the variably known in 7 as tcgdp is now cgdpe, where cgdp refers to real GDP converted using current PPPs and the e refers to an expenditure-side PPP.

  Note that even though cgdpe in 8 is similar in description to tcgdp in 7, there is a difference in definition in this variable and some others. In 7, the price levels are defined so that the US is equal to 100 in every year. In 8, the price levels are all defined relative to the US in 2005, so pl_gdpe for the US in 1970 is equal to 0.24, reflecting the fourfold increase in US prices between 1970 and 2005. Variable cgdpe thus accounts for US inflation and yields data that is comparable in magnitude over time.

- Some variables are new. So in addition to cgdpe (real GDP, converted using the current PPP^e), there is now cgdpo, which is real GDP converted using the current PPP^o.

- Some variables have been dropped because they are easily derived. In 7, you could find data on population, GDP and GDP per capita. Given that GDP per capita is GDP divided by population, we decided to drop the GDP per capita variable.

- Some variables have been dropped to avoid confusion. In 7, there were three different constant prices GDP per capita measures, two of which were based on a (fixed-weight) Laspeyres index and one based on a chained index. In 8,

we only include constant-price GDP series computed using a chain index (the Fischer). Since chained indices are more suitable to represent growth in economies with a changing composition over time, we decided to drop the fixed-weight series. This also implies dropping the shares of C, I and G at constant prices, since those shares have no clear economic meaning for chained series.

- 7 included a number of variables that used alternative methods that could be used for gauging the sensitivity of PWT estimates. For instance, variable p was based on a GK aggregation of C, I and G price levels, while p2 used a (geometric) average of the GEKS and CPDW methods. In 8, we decided not to have a core dataset with a range of variables based on alternative methods. Instead, we have chosen to provide the Stata data and do-files that allow a user to generate alternative PWT datasets based on different choices. For instance, a different index number method could be chosen; the official rather than adjusted series for China could be used; or data for only a single benchmark year could be used, as in 7 and earlier versions of PWT.

In the appendix tables below, we provide one table of overlapping variables (Table A2); one showing PWT7.1 variables that have no direct counterpart, but which can (in some cases) be constructed using PWT8.0 variables (Table A3); and one listing all the variables that are new in PWT8.0 (Table A4).

Table A1, List of countries, ISO-codes and benchmark participation

Country	ISO	1970	1975	1980	1985	1996	2005
Albania	ALB					x	x
Angola	AGO						x
Antigua and Barbuda	ATG					x	
Argentina	ARG			x		x	x
Armenia	ARM					x	x
Australia	AUS				x	x	x
Austria	AUT		x	x	x	x	x
Azerbaijan	AZE					x	x
Bahamas	BHS				x	x	
Bahrain	BHR					x	x
Bangladesh	BGD				x	x	x
Barbados	BRB				x	x	
Belarus	BLR					x	x
Belgium	BEL	x	x	x	x	x	x
Belize	BLZ					x	
Benin	BEN				x	x	x
Bermuda	BMU					x	
Bhutan	BTN						x
Bolivia	BOL			x		x	x
Bosnia and Herzegovina	BIH						x
Botswana	BWA			x	x	x	x
Brazil	BRA		x	x		x	x
Brunei	BRN						x
Bulgaria	BGR					x	x
Burkina Faso	BFA						x
Burundi	BDI						x
Cambodia	KHM						x
Cameroon	CMR			x	x	x	x
Canada	CAN			x	x	x	x
Cape Verde	CPV						x
Central African Republic	CAF						x
Chad	TCD						x
Chile	CHL			x		x	x
China	CHN						x
Colombia	COL	x	x	x			x
Comoros	COM						x
Congo, Dem. Rep.	ZAR						x
Congo, Republic of	COG				x	x	x

Appendix Table 1 (continued)

Country	ISO	1970	1975	1980	1985	1996	2005
Costa Rica	CRI			x			
Cote d`Ivoire	CIV			x	x	x	x
Croatia	HRV					x	x
Cyprus	CYP						x
Czech Republic	CZE					x	x
Denmark	DNK		x	x	x	x	x
Djibouti	DJI						x
Dominica	DMA					x	
Dominican Republic	DOM			x			
Ecuador	ECU			x		x	x
Egypt	EGY				x	x	x
El Salvador	SLV			x			
Equatorial Guinea	GNQ						x
Estonia	EST					x	x
Ethiopia	ETH			x	x		x
Fiji	FJI					x	x
Finland	FIN			x	x	x	x
France	FRA	x	x	x	x	x	x
Gabon	GAB					x	x
Gambia, The	GMB						x
Georgia	GEO					x	x
Germany	DEU	x	x	x	x	x	x
Ghana	GHA						x
Greece	GRC			x	x	x	x
Grenada	GRD				x	x	
Guatemala	GTM			x			
Guinea	GIN					x	x
Guinea-Bissau	GNB						x
Honduras	HND			x			
Hong Kong	HKG			x	x	x	x
Hungary	HUN	x	x	x	x	x	x
Iceland	ISL					x	x
India	IND	x	x	x	x		x
Indonesia	IDN			x		x	x
Iran	IRN	x	x		x	x	x
Iraq	IRQ						x
Ireland	IRL		x	x	x	x	x
Israel	ISR			x		x	x
Italy	ITA	x	x	x	x	x	x
Jamaica	JAM		x		x	x	
Japan	JPN	x	x	x	x	x	x
Jordan	JOR					x	x
Kazakhstan	KAZ					x	x
Kenya	KEN	x	x	x	x	x	x

Appendix Table 1 (continued)

Country	ISO	1970	1975	1980	1985	1996	2005
Korea, Republic of	KOR	x	x	x	x	x	x
Kuwait	KWT						x
Kyrgyzstan	KGZ					x	x
Laos	LAO						x
Latvia	LVA					x	x
Lebanon	LBN					x	x
Lesotho	LSO						x
Liberia	LBR						x
Lithuania	LTU					x	x
Luxembourg	LUX		x	x	x	x	x
Macao	MAC						x
Macedonia	MKD					x	x
Madagascar	MDG			x	x	x	x
Malawi	MWI		x	x	x	x	x
Malaysia	MYS	x	x				x
Maldives	MDV						x
Mali	MLI			x	x	x	x
Malta	MLT						x
Mauritania	MRT						x
Mauritius	MUS				x	x	x
Mexico	MEX		x	x		x	x
Moldova	MDA					x	x
Mongolia	MNG					x	x
Montenegro	MNE						x
Morocco	MAR			x	x	x	x
Mozambique	MOZ						x
Namibia	NAM						x
Nepal	NPL				x	x	x
Netherlands	NLD	x	x	x	x	x	x
New Zealand	NZL				x	x	x
Niger	NER						x
Nigeria	NGA			x	x	x	x
Norway	NOR			x	x	x	x
Oman	OMN					x	x
Pakistan	PAK		x	x	x	x	x
Panama	PAN			x		x	
Paraguay	PRY			x			x
Peru	PER			x		x	x
Philippines	PHL	x	x	x	x	x	x
Poland	POL		x	x	x	x	x
Portugal	PRT			x	x	x	x
Qatar	QAT					x	x
Romania	ROM		x			x	x
Russia	RUS					x	x
Rwanda	RWA				x		x

Appendix Table 1 (continued)

Country	ISO	1970	1975	1980	1985	1996	2005
Sao Tome and Principe	STP						x
Saudi Arabia	SAU						x
Senegal	SEN			x	x	x	x
Serbia	SRB						x
Sierra Leone	SLE				x	x	x
Singapore	SGP					x	x
Slovak Republic	SVK					x	x
Slovenia	SVN					x	x
South Africa	ZAF						x
Spain	ESP		x	x	x	x	x
Sri Lanka	LKA		x	x	x	x	x
St. Kitts & Nevis	KNA					x	
St. Lucia	LCA				x	x	
St. Vincent & Grenadines	VCT					x	
Sudan	SDN						x
Suriname	SUR				x		
Swaziland	SWZ				x	x	x
Sweden	SWE				x	x	x
Switzerland	CHE					x	x
Syria	SYR		x			x	x
Taiwan	TWN						x
Tajikistan	TJK					x	x
Tanzania	TZA			x	x	x	x
Thailand	THA		x		x	x	x
Togo	TGO						x
Trinidad &Tobago	TTO				x	x	
Tunisia	TUN			x	x	x	x
Turkey	TUR				x	x	x
Turkmenistan	TKM					x	
Uganda	UGA						x
Ukraine	UKR					x	x
United Kingdom	GBR	x	x	x	x	x	x
United States	USA	x	x	x	x	x	x
Uruguay	URY		x	x		x	x
Uzbekistan	UZB					x	
Venezuela	VEN			x		x	x
Vietnam	VNM					x	x
Yemen	YEM					x	x
Zambia	ZMB		x	x	x	x	x
Zimbabwe	ZWE			x	x	x	x