Documentation for

GDP Per Capita by Purchasing Power Parities

for countries and territories

Gapminder Documentation constitutes work in stepwise progress.
We welcome all sorts of comments, corrections and suggestions through e-mail to the author.

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promoting sustainable global development
by increased use and understanding of statistics.
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ABBREVIATIONS

GDP	Gross Domestic Product
GNI	Gross National Income
ICP	the International Comparison Program
LCU	Local Currency Units
PPP	Purchasing Power Parities
UNSTAT	United Nations Statistical Division
WDI	World Development Indicators

1. **Introduction**

This is the documentation for the Gapminder compilation of Gross Domestic Product (GDP) per capita by Purchasing Power Parities (PPPs). The data is used in the interactive graph *Gapminder World* available at:

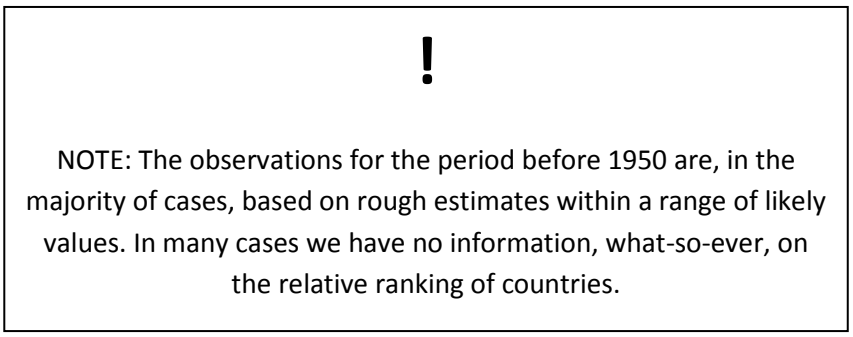
www.gapminder.org/world

This written documentation is accompanied by an Excel-file, which includes both the detailed meta-data, as well as the actual observations. This Excel-file will henceforth be referred to as the "Excel-file". The Excel file, as well as this document, are both available at:

www.gapminder.org/downloads/documentation/gd001

The goal has been to include as many countries and territories as possible. A guiding principle has been to use the most transparent and well-documented source whenever possible; however, preference was also given to sources with as wide coverage of countries and territories as possible.

The main purpose of the data is to produce graphical presentations that display the magnitude of income disparities in the world over time. Therefore, we have also included very rough estimates for countries and territories for which reliable data were not available. These estimates can only be taken as an indication of the order of magnitude for the indicator. Furthermore, we have not been able to make sure that every single observation is based on the best estimates available. Hence we discourage the use of this data set for statistical analysis and advise those who require more exact data to investigate the excel-file, filter out the guesstimates, and look for additional sources, when appropriate.



There are at least two purposes for including very rough estimates:

a) Rough estimates give a starting point for a discussion of the data. Unrealistic estimates become more apparent if they are displayed in a format that is both accessible to many as well as easy to assess. This, we hope, might elicit comments and criticism from others, which would help us to improve the data step by step.

b) We want to display the broad patterns of development of the world. Hence, the observations before 1900 (or even 1950) are less concerned with describing the relative

position of individual countries. Rather, we want to display our best guesses for the development of the world as a whole.

The dataset is continuously updated, with each version given a version number. Hence the occasional reference in the following text to "the previous version". The present version is not fully "polished", but we deemed it better to upload the documentation as it is, rather than not at all. The most important shortcoming due to this is that the references sometimes are a bit cryptic, e.g. "e1862", but all these numbers are listed in reference section at the end.

1.1 The countries included in the dataset

For a discussion on what countries and territories we try to cover, and how we try to handle border changes and the like, see the document "Countries and Territories in Gapminder World". The basic principle, however, is to get estimates for the geographical areas corresponding to the present borders.

To be succinct, we will hereafter jointly refer to all countries and other types of geographical entities and territories as "countries", irrespectively of their statehood status. The inclusion of any area in this data set does not, in any way, imply a stated opinion of Gapminder on the legal status of the area.

It is not always clear to what extent certain semi-autonomous or disputed territories also are included in the data for their "mother country", so there may be some "double counting" in these instances.

1.2 Basic principles

The data in this dataset is based on GDP per capita, in fixed 2005 prices, and is adjusted for Purchasing Power Parities (PPPs), as calculated in the 2005 round of the International Comparison Program (ICP).

The PPP rates could be considered as an estimate of what the exchange rates would have been if one dollar would buy the same amount of goods and services in every country. The PPP rates are based on price comparisons between countries. The estimations of the PPP rates for 2005 are described in International Comparison Program (2008).

Our starting point is the relative income levels for 2005, as implied by the ICP data. We then link these levels to the national real growth rate for each country, taken from other sources. This means that cross-country comparisons for years far away from 2005 contain large compounded errors. Hence, we have tried to integrate cross-country comparisons for earlier years to the extent possible to iron out the most blatant inconsistencies for the earlier years. This means that we in many cases had to adjust the national growth rates, in order to make the series fit more than one cross-country comparisons.

The unit of measurement for GDP per capita is quite abstract in the sense that (international) dollars mainly have a meaning in terms of what they can buy. Hence, our main interest is not the absolute *level* of incomes as such, but rather the *relative* incomes of countries.

We have two principal ways of making all the observations comparable. The first option is to use the real growth rates of each country as they are given by the national sources, and link these series to cross-country data for one benchmark year, as they are given by some international comparison. This is illustrated in Figure 1 below, where 2005 has been chosen as the benchmark year. *Y* is the GDP per capita. In this case the relative positions of countries are a residual for all years except the benchmark year. This method is the method used by Maddison (2003) and several others.

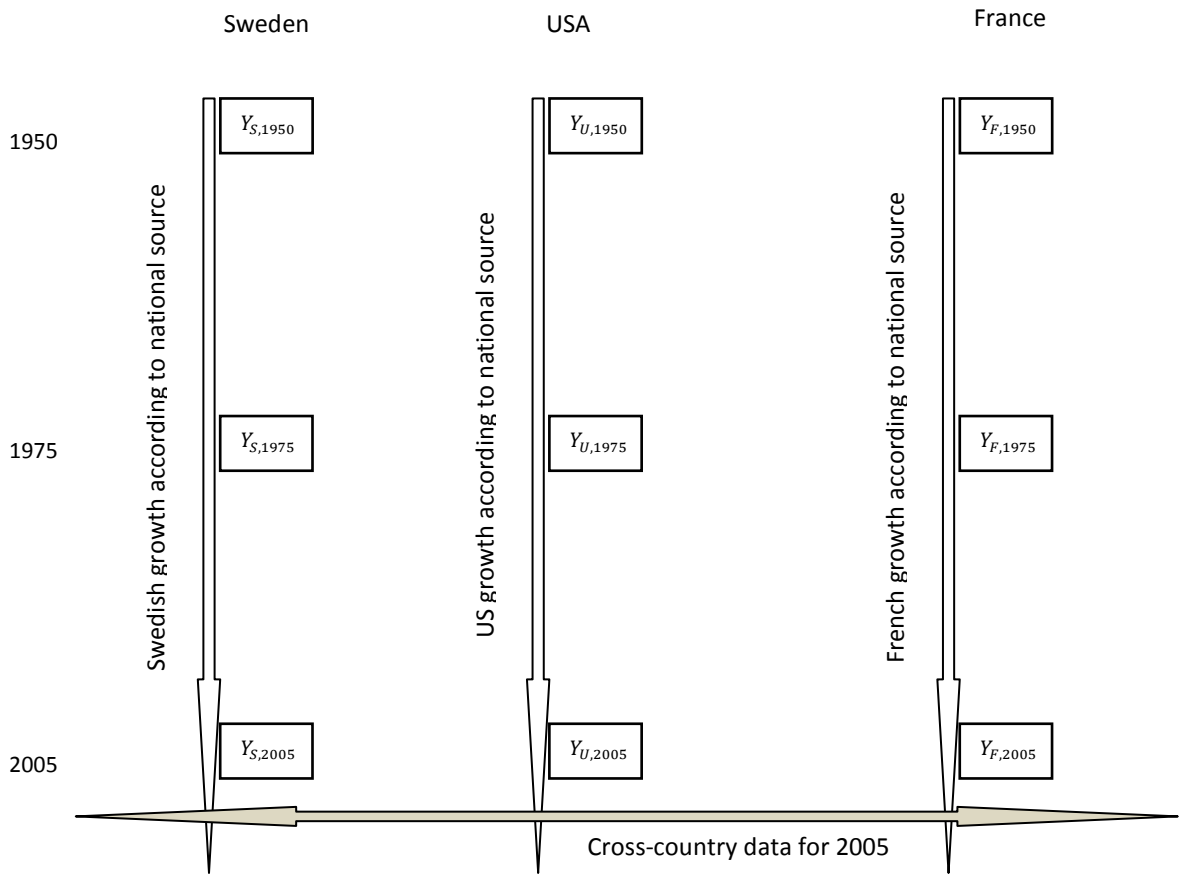


Figure 1.Illustration of the use of one benchmark year.

The second option is to use the relative positions of the countries for each year as given by a sequence of cross-country comparisons. We then link the real growth rate of one chosen country to these cross-country comparisons. This is illustrated in Figure 2 below, where the U.S. has been chosen as a bench-mark country. In this case the real growth rates are a residual for all countries except the benchmark country (e.g. the U.S. in the figure below).

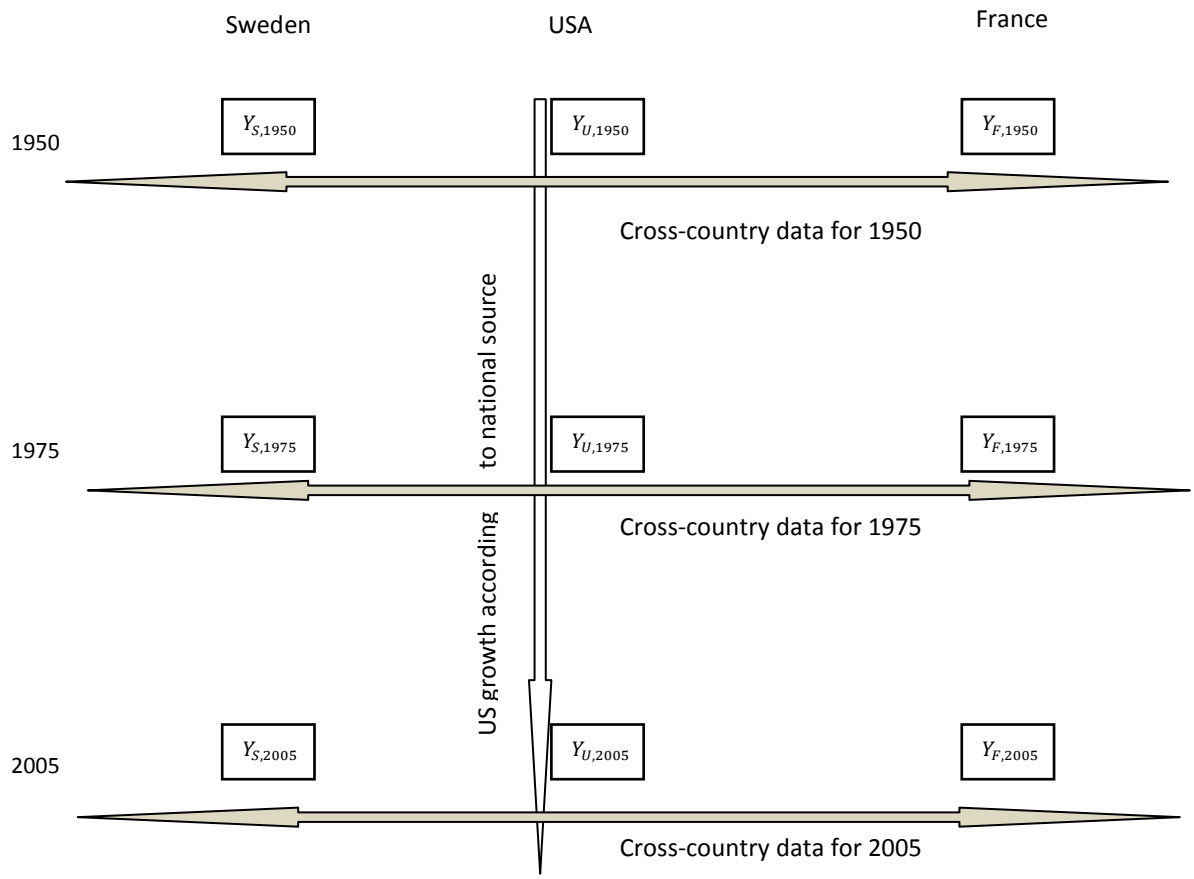


Figure 2.Illustration of the use of one benchmark country.

The choice of method does not make any difference to the results if all the observations are calculated in the same way and if all the relative prices are the same. However, since this almost never is the case, the choice of method matters for the outcome. Furthermore, when we use a fixed benchmark year, i.e. the first method, we are likely to compound the errors as we go back in time from the benchmark year. One alternative solution is to combine the two methods, e.g. by taking some average. The Penn World Tables (Heston et al, 2006) integrate aspects of this method, although they too mainly use the national growth rates.

The relative positions of countries for a given year are more visible than the magnitudes of the growth rates in the graphical presentations we use. Since the data availability for cross-country comparisons is exceptional for one specific year, 2005, we choose to rely on that year as a benchmark year. Whenever possible we utilised earlier cross-country comparisons, and adjusted the growth rates to fit the multiple benchmark years. However, earlier cross country comparisons are rare, so to a large extent we had to rely on national growth rates, eventhough cross-country comparisons is the preferred method.

1.3 Overview of the work process

Our starting point is the ICP data for GDP per capita for 2005 recalculated with the ICP PPP rates. Other sources provide national real growth rates. In many cases we have to link several such national sources together.

In a case where two national sources, *Z* and *W*, have been linked at year *s*, the GDP per capita for country *i* in year *t,* becomes:

$$Y_{i,t} = I_{i,2005} * \frac{Z_{i,s}}{Z_{i,2005}} * \frac{W_{i,t}}{W_{i,s}}$$

$I_{i,2005}$ is the GDP per capita by PPP provided by the ICP. It is calculated by ICP as the GDP per capita in local prices, $n_{i,2005}$, multiplied by the price-ratio $PPP_{i,2005}$, so that $I_{i,2005} = n_{i,2005} * PPP_{i,2005}$. $Z_{i,t}$ is the real GDP per capita as provided by the source Z, and $W_{i,t}$ is the real GDP per capita as provided by the source W.

2. Compiling data for the benchmark year 2005

The first step is to find GDP per capita data for the benchmark year 2005, using the PPP of 2005. ICP provides GDP per capita data for 144 countries. These 144 observations are the "official" ICP data, based on direct price information. The 144 countries exclude Burundi which had price data, but no GDP data.

The ICP also supplies estimates for a number of countries, in addition to the 144 official observations. These ICP estimates are based on a regression analysis that uses the GDP per capita of ICP as the dependent variable. The independent variables were Gross national Income (GNI) per capita, by exchange rates (the Atlas method) and Gross enrolment in secondary school. They refer to this model as "model 6", and the results were:

ICP model 6: Ln(GDP per capita PPP) = 0,3404 +

+ 0,6994*Ln(GNI per capita, exchange rate)

+0,2292*Ln(Secondary School Gross Enrolment)

The predicted values from this model were used for countries lacking official ICP data, but which had observations for the two independent variables. Some countries lacked GNI per capita. For those countries an alternative model was used, using GDP per capita, by exchange rates instead, referred to as "model 7":

ICP model 7: Ln(GDP per capita PPP) = 0,1987 +

+ 0,7147*Ln(GDP per capita, exchange rate)

+0,2422*Ln(Secondary School Gross Enrolment)

For more details see International Comparison Program (2008), p. 164 ff. A more ambitious attempt of modelling is described in World Bank (2008).

The official ICP figures are likely to vary a-lot in quality. However, the only specific note we found so far is that the data for China is less robust. This will be discussed in greater detail further on in this document.

2.1 Extending the 2005 data to more countries

For countries that did not even have estimates from the ICP we did our own, even rougher, estimates, based on a number of alternative sources: (a) The (old) homepage of UNSTAT; (b) Maddison on-line; (c) CIA world fact book (most of their data had to be extrapolated or interpolated to 2005); (d) Rough estimates provided by the World Bank.

Each of these sets of data had to be adjusted to be comparable to the ICP data. We deal with each of the data sources below in order of priority. The order of priority is mainly based on whether the data is based in the prices of 2005 and on the degree of coverage. Hence, Maddison only comes second despite the fact that he uses data based on PPPs rather than exchange rates, as UNSTAT does.

a) UNSTAT

The homepage of the UN statistical division, unstats.un.org , provide data on GNI per capita by exchange rate in prices of 2005. The indicator is called "GNI, per capita GNI - US Dollars" in the list on the homepage. Note that we use a slightly different data set from UNSTAT for the time series. To keep them apart we call the data-set we use here for "UNSTAT I" and the dataset we use for the time series "UNSTAT II".

There were other possible sources of GNI per capita by exchange rate that we also could have used. One such source is the World Development Indicator (WDI). Another related source is a special PDF from the World Bank that had included slightly more countries than the WDI.

The World Bank data was not fully consistent with the UNSTAT data. For some countries the difference was larger than 30%. However, a couple of rough regressions did not reveal any systematic differences between the sources. We choose to use the UNSTAT data, since they had the best coverage.

The unit of measurement in the UNSTAT data is quite different from the ICP data, i.e. GNI instead of GDP and exchange rate instead of PPPs. Hence we need to adjust the data to make them (somewhat) comparable, essentially by doing a simpler version of the ICP model:[1]

[1] Some of the models used by ICP are "constrained" in the sense that they force the predicted value for the U.S. to be a certain value. This is done by indexing the variables and forcing the constant to be zero. We have not done that. The difference between our unconstrained and a constrained model is, in any case, not very big.

Gapminder model (1): Ln(GDP per capita, by PPP)=

$= \propto + \beta$ *Ln (GNI per capita, by exchange rate) + unmeasured factors

In this model we use the observations for which we had both ICP (non-estimated) data and UNSTAT data. This gives us 144 observations in total. The results are shown in Table 1 below. The observations and predicted values are shown in Figure 3 below.

	Coefficients	*p-value*	*Lower 95%*	*Upper 95%*
$\propto$	2,51	0,00	2,33	2,70
β	0,77	0,00	0,75	0,79
R^2	98,48			

Table 1: Estimation results for "Gapminder model 1". Number of observations: 144.

There was a systematic difference between the two series in the expected way, i.e. using exchange rates systematically implies a lower relative position for poorer countries. A few of the predicted values differed from the actual values with a factor of two, i.e. the predicted values were almost twice the actual values (as for Iran) or almost half the actual values, as for (the unadjusted values for) Congo, Dem. Rep. In the majority of cases the deviation were less than +/- 25%.

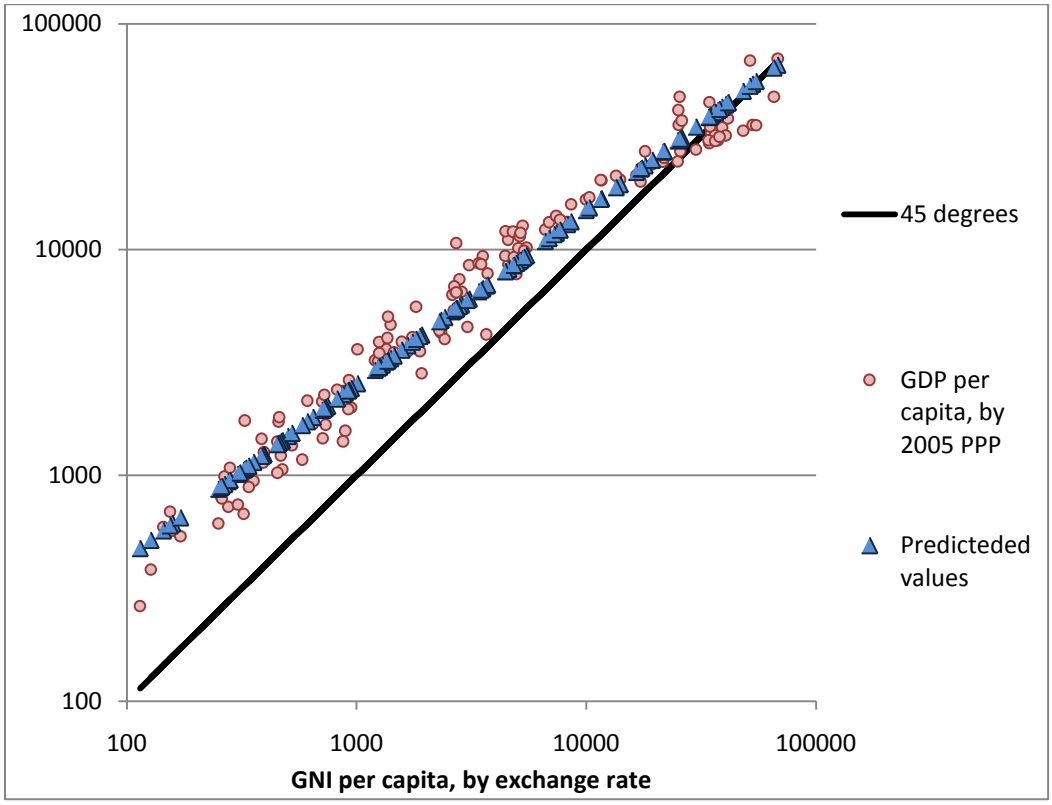


Figure 3: Actual and predicted values for "Gapminder model 1".

The final step was to use the model above to adjust the data of UNSTAT. This adjusted data could be used to fill in the gaps for the countries which had UNSTAT data, but no ICP data.

b) Maddison

Maddison (2008 I), which we henceforth refer to as "Maddison online", provides data for GDP per capita, by PPP, in the prices of 1990, and using PPP data from 1990. The main difference from the ICP data is accordingly that Maddison use PPP data from the 1990 benchmark and expresses his data in 1990 prices.

To adjust the data we use the following regression:

Gapminder model (2): Ln(GDP per capita, by PPP, ICP)=

$= \propto + \beta$ * Ln (GDP per capita, by PPP, Maddison)

+ unmeasured factors

In this model we use the observations for which we had both ICP (non-estimated) data and the data of Maddison. We also include a number of countries which are not included in the final dataset (e.g. former countries). This gives us 133 observations in total. The results are shown in Table 2 below. The observations and predicted values are shown in Figure 4 below.

	Coefficients	*p-value*	*Lower 95%*	*Upper 95%*
$\propto$	-0,06	0,82	-0,56	0,44
β	1,04	0,00	0,98	1,10
R^2	94,94			

Table 2: Estimation results for "Gapminder model 2". Number of observations: 133.

The model does not reveal any systematic differences between Maddison and ICP, which is not that surprising since both series use PPPs. We could perhaps have expected that the 15 years of inflation between 1990 and 2005 would have meant higher nominal values in Maddison in a more systematic way. This "inflation effect" seems to have been drowned in the general noise stemming from very different PPP ratios in 2005. However, the direction of the change is in the expected direction, i.e. the 2005 data is on average higher.

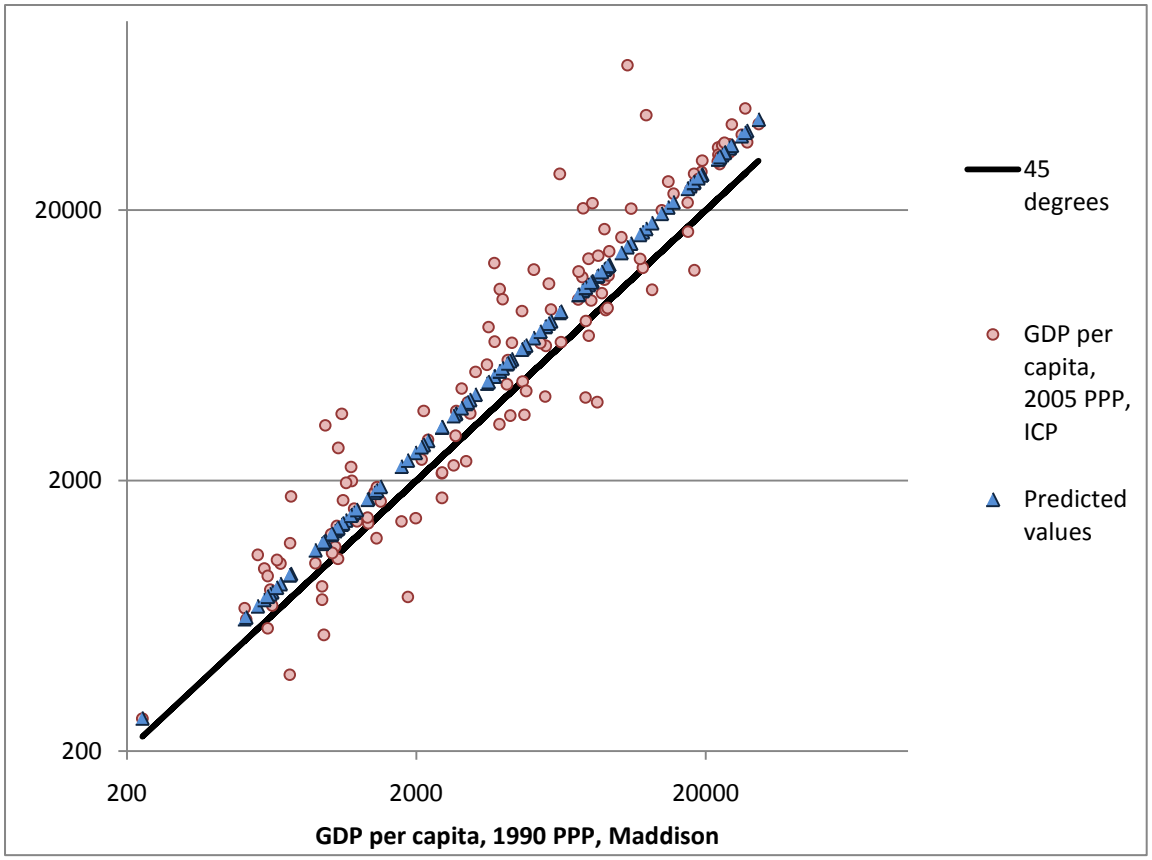


Figure 4: Actual and predicted values for "Gapminder model 2".

Figure 4 illustrates the size of the revisions in the PPP rates for 2005 in the ICP, compared to the earlier PPP rates used by Maddison and others. The biggest differences are found among major oil-exporters, e.g. Qatar for which the 2005 data is more than 6 times as high as the 1990 data and almost 5 times as high as the predicted values. This, however, is the biggest outlier (it is represented by the dot most high up in the graph).

We use the model, despite all these short comings, due to a lack of better alternatives. Hence, we used the model above to adjust the data of Maddison. This adjusted data could be used to fill in the gaps for the countries which had Maddison data, but no ICP or UNSTAT data.

c) CIA World Fact Book

The CIA World Fact Book 2008 has data for GDP per capita (PPP), although we were unable to find the exact definition and sources for these data. Accordingly, we do not know the extent by which the figures are comparable across countries or with the ICP data.

Furthermore, for many countries the data referred to years other than 2005. Sometimes we were able to find data for 2005 in older issues of the fact book (2006 and 2007), that are available from the homepage of the University of Missouri University Libraries. For the

remaining countries we had to interpolate or extrapolate to get data for 2005. Occasionally we had national growth rates which we could use to extrapolate to 2005. In most cases we simply had to assume that the level was unchanged.

Even though we had no information on how the CIA data differed from ICP we did a regression similar to the earlier ones[2]:

Gapminder model (4): Ln(GDP per capita, by PPP, ICP)=

$= \propto + \beta$ * Ln(GDP per capita, by PPP, CIA)

+ unmeasured factors

We include all the overlapping observations, which gives us 142 observations. The results are shown in Table 3 below. The observations and predicted values are shown in Figure 5 below.

	Coefficients	p-value	Lower 95%	Upper 95%
$\propto$	-0,461	0,05	-0,927	0,0049
β	1,0498	0,00	0,9969	1,1027
R^2	95,74			

Table 3: Estimation results for "Gapminder model 4". Number of observations: 142.

The regression does not reveal any systematic differences; although, again, there are substantial differences for many countries, as can be seen below. We use the model anyway out of principle, to get estimated values for the missing countries.

[2] The observant reader will note that there is no "Gapminder model 3". The present numbering only reflects a certain degree of "path dependency" when it comes to the labelling of our Excel sheets, it does not reflecting any deeper mysteries than that.

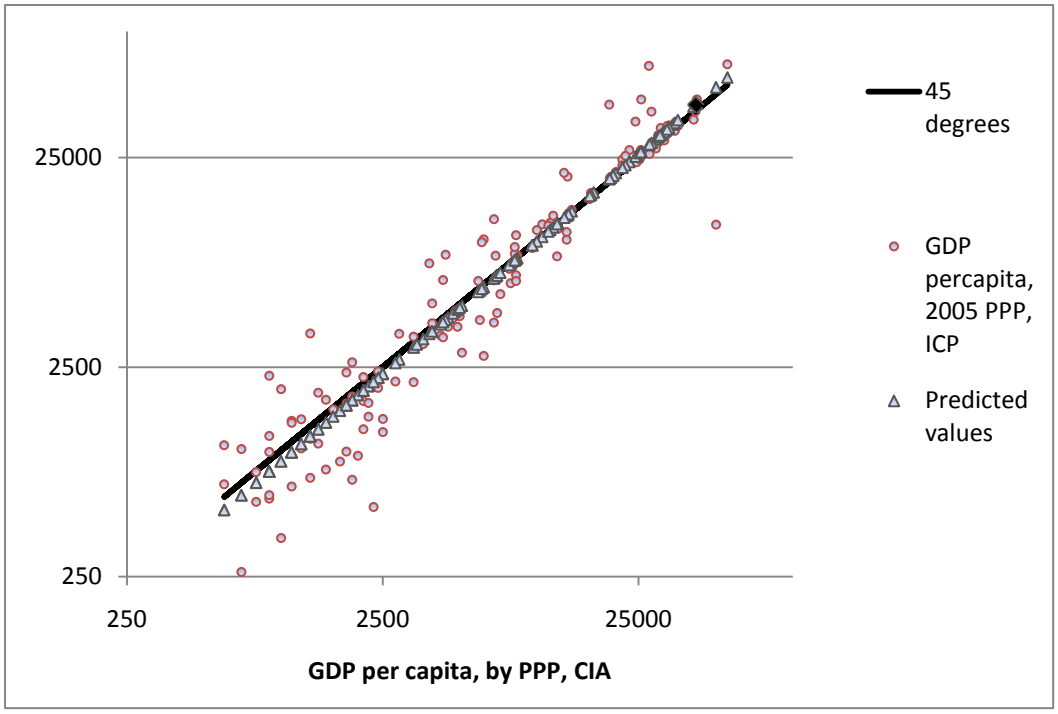


Figure 5: Actual and predicted values for "Gapminder model 4".

d) Rough estimates by the World Bank

For the remaining countries we used the rough estimates available in the PDF of the World Bank (World Bank, 2005). Similar to the UNSTAT data above, it was expressed in GNI per capita, in exchange rates (Atlas method), in the prices of 2005.

In the case of Isle of Man the source provided a rough estimate of the relative income ranking of the country. In that case we used the geometric average of the country with one rank higher and the country with one rank lower.

In a few remaining countries the World Bank only provided an estimate of which income group the country belonged to, as displayed in Table 4 below. The World Bank also provided an average income level for each income group. Hence, we used the average level for the corresponding country.

Income group	Definition	Estimated average income
Low income	$875 or less	$580
Lower middle income	$876 to $3 465	$1 918
Upper middle income	$3 466 to $10 725	$5 625
High income	$10 726 or more	$35 131

Table 4: The income groups used by World Bank (2005). All incomes are in US $ per year, by exchange rates.

The World Bank estimates use in principle the same measurement as the UNSTAT data above, i.e. GNI per capita by exchange rate in 2005 prices. Hence, we re-used Gapminder model 1 to adjust the data, even though the estimates in question are so rough so that it really does not make much difference.

e) Other methods

Some figures seem problematic, e.g. since they imply levels below what could reasonably be considered the starvation level. In other cases we had reasons to believe that the benchmark figure had to be adjusted. In all of these cases we made different ad hoc adjustments. These are described in the notes for specific countries.

3. Linking real growth series to the values of 2005

The next step is to link national real growth in GDP per capita to the levels we have calculated for 2005. We use a variety of sources for these time series, which we will describe below. In many cases we had to link different sources to each other.

When data at the country level were unavailable, we used the growth rate of a larger group of countries to which the country belonged. This often was the case for new countries that had emerged from a larger former state, such as Croatia emerging from Yugoslavia. Another regional growth rate that we occasionally used was the aggregated regions in Maddison on-line. When we use the same regional growth rates for several countries we preserve the relative positions between of these countries as they were at the first year for which we have data.

When we did not even have regional data, we used the growth rate of a neighbouring country that was judged to have had a similar development. In some cases we simply assumed that the GDP per capita had been exactly the same as in the neighbouring country.

Countries with large oil incomes create special problems, which will be discussed in detail further on. If there was no other solution at hand we simply added a rough guesstimate for a year sometime before the year of the oil discovery. Finally, for a few countries we found no growth data at all, even though we had GDP data for the benchmark year from the ICP. In these cases we only include data for 2005.

We checked whether there were any major discrepancies in the growth patterns of the different sources, before linking sources to each other. When the discrepancies were large we had to make a judgement on what growth pattern made most sense. In most cases this judgement had to be of a rather ad-hoc character. These decisions, as well as some other minor corrections or adjustments, is documented in the Excel file, in the column "Other Footnotes".

3.1 Sources for the growth rates

We use a variety of sources for the national growth rates. Many of these sources are regularly revised. Hence, when data for new years became available it is common that also previous years

are adjusted. Ideally we would like to revise our whole dataset as these adjustments become available. However, for practical reasons, we normally adjust only the latest years in our dataset.

The main data sources are described below, in their approximate order of priority.

a) Maddison on-line is our main source for long-term growth.

b) Barro & Ursúa (2008) have updated the data of Maddison, using more recent estimates. They revise the figures of Maddison in some cases and they also filled some of the gaps or interpolations made by him. Whenever there were a major difference between them and Maddison, we used Barro and Ursúa, otherwise we continued using Maddison.

c) From the homepage of UNSTAT we used the per capita GDP in current U.S. dollars, deflated with the implicit price deflators in national currency. We call this data-set "UNSTAT II", to separate it from the one we used for the cross-country data for 2005. We have used two different revisions of the UNSTAT data, one from 2008 and one from 2009.

d) From the Penn World Table, mark 6.2, we used real GDP per capita, in Laspeyres Constant Prices (RGDPL).

e) The IMF provides the "World Economic Outlook database", which also includes projections for rhe GDP per capita data.

f) From the World Development Indicators 2008 we used the GDP per capita, PPP, in constant 2005 international $.

g) From the World Development Indicators 2008 we also used data for GDP per capita, in constant local currency units. These were used when WDI lacked data expressed in PPPs, but had data available in local currencies. The *level* of these observations differed, of course, from the WDI data expressed in constant PPPs, but the *growth rates* were the same. Since we are only using the growth rates, the difference in level is of no importance.

h) The homepage of Eurostat (the statistical agency of the EU) provided "GDP per inhabitant in purchasing power standards", which we used for a few countries. Purchasing power standards is essentially the same as PPPs.

i) For a few countries we took data directly from their national sources (e.g. the home pages of the national statistical offices or some other specific publication). The national sources include the St. Helena Development Agency (2008), FEPS (2007), the Isle of Man Treasury (2008) and INSEE (2008). Sometimes the data was expressed in current prices, in which case we deflated the figures with the available price index.

j) Maddison (2003) provides some additional data that are not found in his on-line data base. Former countries and aggregated regions are cases in point where there was only data in the printed publications. Sometimes the tables only provided data for total GDP and population, so we had to do the divisions ourselves.

In many cases the printed tables in Maddison only provided data for a few benchmark years, e.g. for 1950, 1973, 1990 and 2001. However, the source that we liked to link this data with went back to somewhere between 1950 and 1973. In those cases we linked the data from Maddison (2003) and the subsequent source at 1973, but included the earliest year available in the subsequent source. As usual we checked that the two sources were not totally inconsistent with each other for the overlapping years. In some cases they were indeed totally inconsistent, which mean that we did not use Maddison (2003).

3.2 Adjustments of the growth rates to accommodate more than one benchmark

We included figures based on cross-country comparisons for other years than 2005. These figures were based on various methods, described further on. However, whenever we added an estimate for a country for another year than 2005 we had to adjust the national growth rates so that it fitted both of the benchmark years (on some rare occasions did multiple benchmark year figure fit the levels implied by the national growth rate).

One quick and extremely rough way of handling this is to use the original growth rates of Maddison, but adjust it proportionally.

What we do, to be more precise, is the following: $X_{t,i}$ is the value implied by the unadjusted growth rate for year *t* for country *i* and $Y_{t,i}$ is the new value for year *t* , for country *i*, that we want to calculate. First we decide on what we want the new value for the first benchmark year to be. Say that the first benchmark year is 1820, so we denote the new value for this year $Y_{1820,i}$. Then we calculate an adjustment factor: $K_i = \frac{Y_{1820,i}}{X_{1820,i}}$. We then use this adjustment factor to calculate the new values for all subsequent years:

$$Y_{t,i} = X_{t,i} * K_i * \left(\frac{1}{K_i}\right)^{\left(\frac{t-1820}{2005-1820}\right)}$$

In this example the second benchmark year is 2005, but this is not always the case. This method mean that $Y_{2005,i} = X_{2005,i}$, as it should be. "Adjusted" data are noted in the sources in the Excel file as "National data, adjusted".

Note that the adjustment of the growth is not based on any assessment of the growth rate itself, but only comes from what is implied by the levels at the benchmark years. Given the graphical format of Gapminder we judged it to be more important to assess the relative positions of countries at a given time, as well as avoiding too inconsistent "jumps" from one year to another, rather than to preserve the precise growth rate, which is hard to see in the graph.

4. Cross-country comparisons for other years than 2005

We tried to utilise cross-country comparisons whenever possible. Sometimes we used studies that estimated the cross-country relationship for a group of countries at specific years. In other cases we considered it necessary to make our own guesstimates for the cross-country, since the levels implied by the growth rates were deemed to be unrealistic.

More and more attempts for cross-country comparisons (by PPPs) has become available for the early 20th century and before. Some of these (for the 20th century) rely on some sort of national account and price data. The majority, however, are estimates that utilise a variety of indicators. The most common ones are real-wage data for various categories of the labour force, combined with labour shares in the primary and secondary sectors. Various production indexes are also often used.

In addition to this we can use a range of even more indirect information to assess changes in living standards, such as heights, inventories of inheritances, consumption/sales of specific goods, mortality responses to economic stress, contemporary descriptions of how ordinary people, as well as the elite and the poor lived. For modern times satellite data on night time lightning has also been utilised.

4. 1 Guesstimated levels for early years

For several countries we lacked any specific data for the 19th century, for these countries we had to make some kind of guesstimates.

As starting point we made a number of assumptions:

a) *A lower bound at $275 for all periods.* We assume that no country fall below $275 per capita for any sustained period. Pritchett (1997) assumes a lower bound of GDP per capita of $250 (1985 prices). He bases this figure on a number of arguments. First, if we look at the data we actually have, there is no country, at any point in time, that has had a lower income than that for any sustained period of time. Second, this corresponds to a level below the extreme poverty line. Third, a country where a majority had such an income would, in all likelihood, face a significant population decrease. [3] We do not observe this to happen for any sustained period of time (although there are some historical examples of this).

   $250 in 1985 prices would be even higher if expressed in 2005 prices, which is what we use. Hence, we use $275 as our lower bound. Still, our dataset contains observations that fall below this limit for a couple of years. Guinea Bissau and Lesotho do exactly this around 1950.[4]

[3] Pritchett bases this proposition on a demographic model and an estimation including incomes and infant mortality.

[4] The unadjusted figures for Congo, Dem. Rep., are below 275$ for the years 1999-2007. With our adjustments the figures are just above 275$.

b) *A higher bound at $2000 for the early 19th century.* We assume that in the early 19th century no country had yet reached the level of a middle income country, as we define it today. The poorest middle income country in 2005 in our dataset is Vietnam, which had an income of $2142 in that year. Hence, we set the upper bound for the early 19th century at $2000. All available evidence also support the idea than the UK and the Netherlands were the two richest economies at the beginning of the 19th century. Hence, their incomes (slightly above $2000) could be taken as an upper bound for the early 19th century.

c) *Industrialisation had started to lift the incomes of some countries in the early 19th century.* A number of countries had started to industrialise in the early 19th century. These countries displayed rising incomes and they started to surge ahead. Hence, they were at least somewhat richer than the rest of the world even at this point in time. United Kingdom and Holland were the leading early examples of this.

d) *There was no sharp drop in incomes during the 19th century.* We assume that there was no *general* long-term collapse in incomes during the 19th century, for any region. Some specific countries, for which we have national growth data, display a drop in income for some periods.

   However, the data and information we have reviewed so far gives us no reason to assume that long-term income collapse was a persistent or general pattern in the 19th century, for any regions. Hence, we will assume that there was no sharp drop in incomes in the countries for which we have no country data. There are exceptions in a couple of individual cases, which are either based on country-specific data or was something we had to assume in order to avoid unreasonable values in 1800.

The assumptions above are, in principle, the only things we would like to display in the graph for the countries for which we lack specific data. Ideally, we would like to show a "cloud" of some sort that illustrates the range of likely values for this early period. However, the software does not permit that at this stage. Hence, we still need to assign an actual figure to each individual country. Furthermore, if we assign the same number to a large group of countries they will not be visible in the graph, since they would be in the exact same place in the graph. Such a picture would also, in all likelihood, communicate a too equal distribution of incomes.[5] Hence, we need some principle for assigning actual numbers to each country, even if by necessary it would be a very arbitrary principle.

One starting point for any guesstimate would be the guesstimate Maddison offers for the average income in all regions in the world back to at least 1820. Rather than using the *growth rates* of the relevant regions we base our figures on the regional average *level* for the relevant region. However, we do two adjustments to these regional levels.

[5] Even though, as Pritchett, 1997, has argued, the gaps between the richest and the poorest countries at this time were reasonably much smaller than today.

Firstly, we need to adjust for the fact that the data of Maddison is based on PPP data from the 1990 benchmark-round and that he express his data in 1990 prices. Hence, we use the predicted values from the "Gapminder model 2", i.e. we do the same adjustments as we did with the Maddison data we used for 2005. These adjustments are likely to be immensely much smaller than the "uncertainty range", but in the name of consistency we do them nevertheless.

Secondly, we multiply each observation with an arbitrary "spread-out factor" that adjusts the regional average up or down with an arbitrarily assumed percentage. This is done to avoid having a large number of bubbles in exactly the same place. These spread-out factors are mostly assigned in a totally arbitrary way. Sometimes we roughly base the spread-out factor on the relative position within the region at some later year for which we have data. This is just a convenient way to assign the spread-out factor. It does not mean that we believe that a fixed ranking of countries is a reasonable assumption.

Some other times we base the spread-out factor on some quick reading of the historical or geographical condition of the country, e.g. a land-locked area with a desert climate that, to our understanding, lacked any centralised political structure, was assigned a lower value. Again, this was just a convenient way of assigning values. A more careful literature review in the future might give us a somewhat more firm standing in coming updates. We document all these considerations in the Excel sheet.

Furthermore, the assumptions we made above, in combination with the fact that the position of *some* countries are based on national growth rates, implies specific constraints for the spread-out factors. These constraints are discussed below.

We use adjusted regional averages for 1820, 1913 and 1950, depending on the data availability for the individual countries.[6]

In a number of cases the adjusted average for 1913 implied a negative growth between 1913 and 1950 (the first available national observation). Since we had no reason to assume that there actually was negative growth,[7] we instead choose to not include that imputed value. Instead we used an interpolated value, assuming exponential growth between 1820 and 1950. We also used interpolated values for 1913 in the few cases where the implied growth rates between 1820 and 1950 actually were negative (see Section 4.3). For some oil rich countries we also added an additional observation, for the year of the first oil-exploration, based on regional averages. That will be discussed in more detail below.

To summarise, what we want to end up with is $Y_{t,i}$, the adjusted value for country *i,* in the year *t*, and it is calculated in the following way:

$$Y_{t,i} = S_i * e^{\alpha} * {X_{t,r}}^{\beta}$$

$X_{t,r}$ is the regional average for region *r*, in year *t*, taken from Maddison. α and β are the estimated coefficients in "Gapminder model 2". S_i is the "spread-out factor" for country *i*.

[6] 1950 was only used for the republics of the former USSR.

[7] Since these values for 1913 only were based on regional averages, which in themselves were based on guesstimates, the growth rate implied from these values carries no real weight.

In some cases we assigned our own guesstimates, without using the regional averages of Maddison. We then based it on a general assessment of the relative position of the country, and the general assumptions we made above. Countries that did have national growth rates going back to the 19th century were also checked against the general assumption above, as well against any other information we had. In several cases the levels implied by the growth rates were deemed to be too unrealistic. In those cases we also made guesstimates for the levels.

All these guesstimates, as well as other adjustments, are described for each observation in the excel file. For some countries are also described in further detail in the following section.

5. Details for specific countries

Here follows some specific details for some of the guesstimates and adjustments we made. Far from all adjustments are discussed here, but all adjustments are described in the excel-file.

5.1 Germany

E1795 offer a couple if estimates for 1500-1850. We choose to use the estimate that assume an increase in labour input per capita (consistent with the theory of the "industrious revolution"). This estimate imply, compared with his other estimates, a higher German growth 1600-1850, and a lower level for all years 1500-1850.

This estimate deviates the least from what Maddison had assumed (the main deviation is that Maddison did not assume a declined income in 1500-1600).

The reason for choosing this specific estimate is that it is also consistent with the levels implied by the model of van Zanden (e1598).

E1795 also concludes that Madisons growth rates 1800-1850 must be too high. Hence we use the e1795 estimate for 1800 and earlier, but we link it to Maddison on-line in 1850. We also delete Maddison's observation for 1820 (so that Maddison starts at 1830). The growth for 1800 to 1830 is hence implied by the e1795 growth between 1800 and 1850, and the Maddison growth between 1830 and 1850.

5.2 The US, Netherlands and United Kingdom

The level of the US in the early 20th century has been adjusted upwards, based on cross country comparison with United Kingdom in 1910. This required an adjustment of the growth rate in the US so that it becomes 0,4 percentage point lower than previously assumed (i.e. by Maddison).

Netherlands were also adjusted based on cross—country comparisons in both 1910 and in 1820. Smaller adjustments have also been made to the UK. The main implications of these adjustments are that in the new data the UK pass Netherlands by 1800, and the US pass UK by the late 19th century.

5.3 Sweden

Growth before 1800:

Edvinsson (e1604) offer yearly estimates for 1720-1800, based on estimates for a number of benchmark years. Yearly fluctuations were based on harvest assessment, marriage rates etc. We are unable to display each individual year (due to technical reasons). Instead a Hodrick Prescott filter was used for 1720-1790, and a selection of benchmark years was picked.

Schön (e1761, forthcoming) outlines the growth pattern from 1570 to 1800. The estimate for 1570 by Schön and others are based on a special survey done 1571. This survey was done as a preparation for the "Elvsborgs Ransom" that had to be paid to Denmark. This was then compared with estimates for 1800.

The detailed movements between 1540 and 1800 in Schön were based on:

- Real wages of unskilled labour in Stockholm ca 1500-
- Real wages of agricultural day labourers 1730-
- Urbanisation, which show similar long term pattern as the otehr source
- Harvests (from Edvinsson) 1665-1820 – also display similar patterns as the wages

After 1800 real wages and GDP per capita moves fairly well in parallel over the long run (but not with respect to short term fluctuations), so this is an argument for their reliability.

The patterns these indicators display are:

- 1540-1600 falling incomes
- Stagnant for some time (?)
- 1600-1690: increase
- 1690-1700s first decades (during the Nordic war): a drop

Our movements for 1570 to 1720 were guestimated based on these pattern in Schön for a selection of benchmark years.

The value in 1800

The growth 1800-2000 was based on Krantz and Schön. If we use these growth rates (with Maddison for 2000-2005), in combination to the 2005 ICP benchmark we arrive at $813 in 1800. This level might be too low, for several reasons. First, as usual, for comparisons of the levels in 1800 the growth rates linked at the distant 2005 is not very reliable, especially of the growth series for different countries have been done with different methodologies.

James Reis (E1886) compares Scandinavia (Sweden, Denmark, Norway, Finland) with Mediterranean (Spain, Portugal, Greece, to some extent Southern Italy) in the 19th century using a variety of indicators.

- Real wages, which show no consistent differences between the two regions (but both lower than England)

- The share of meat production in agriculture: it is higher in Scandinavia
- Agricultural production (for which tha data is a bit shaky): Scandinavia is generally higher
- Rough estimate of GDP per capita from agricultural data & share agriculture (very shaky): Scandinavia higher
- Heights data: Scandinavia higher
- Consumption of luxuries: not consistent, but Scandinavia generally better
- Mortality: Scandinavia better.

Something he does not mention, though, is the low level of urbanisation in Sweden. His estimate of the GDP per capita in 1850 is that the Mediterranean countries were poorer than Scandinavia, with Greece as the poorest country. The Swedish value of $813 imply that Sweden was much poorer than most of Europe, including the Mediterranean countries, which is highly inconsistent with the assessment.

There are numerous studies of the living standards in Sweden in the 18th and 19th century (see for example, E1821 Morell; Bengtsson & Dribe (e1887); Hallén (2009), Gadd (2000)). These are based on various sources such as inventories, travel accounts, heights, real wages, consumption data, production data, mortality responses to economic stress. The pattern that emerge is that the property less, might have lived, on average, roughly at the "subsistence" (of Robert Allen, 2009), some might have lived below, and some lived above. The farmers, on the other hand, seemed to clearly have lived above this level. They might have, at the very least at the respectability income (of Robert Allen), probably higher.

We can use this to do some back of the envelope calculation of the average incomes. In 1750 farmers accounted for about 80% of the rural population, crofters (torpare) some 10%, and the property less/poor (backstugesittare / inhyse) some 10%. On top of that there was of course also an urban and rural upper class. The share of farmers decreased during the next century, and the property less increased.

If we assume that subsistence corresponds to the modern poverty line (presently at 1.25$ per day), and respectability some 2-3 times that amount (according to Allen), and that the upper classes (assumed to be a few percent) to have 20 times subsistence. Even though the results are sensitive to our assumption, we really have to make rather extreme assumptions to get as low as 813 $. 1000$ seem to be the lowest we can get, under reasonable assumptions.

Here is one back of the envelope calculation. Her we assume that subsistence incomes equals 1$ per day, which really at the low side. In 2005 international dollars it is typically set at 1.25$ for *extreme* poverty.

	Share of population	Incomes (measured in multiples of subsistence)	Various
Upper class	2%	20	
Farmers	78%	3	
Property less	20%	1	
Weighted average			2,94
Subsistence in $			1$ / day
Days per year			365
GDP per capita			1073,1$

Finally, comparisons of inventories in Sweden with those in Canada and France (Hallén) indicate that Swedish farmers had about the same level of inventories.

All in all this could be taken as arguments for that applying the Krantz & Schön growth to the 2005 ICP benchmark implies a too low level. Hence, we made a guesstimated adjustment to the level in 1800 so that Sweden still among the poorest in Europe, but less of an extreme outlier in this respect. Hence, we adjust it up to 1100, rather than 813.

5.4 The rest of Scandinavia

Sweden in 1820 is still relatively low, compared to what Maddison assumed, despite our upward adjustments. This makes the relative position of the Scandinavian countries unrealistic. To maintain the original cross-country relation in 1820 we adjusted 1820 for Denmark and Norway with the same amount as Schön implicitly did.

Norway was probably poorer or roughly similar to Sweden before the oil boom. PWT (that use earlier benchmarks) indicate that Norway passed in the 70s. The adjusted series are consistent with this.

For Finland we did no such adjustment since the relationship seemed reasonable (just slightly poorer than Sweden).

5.5 Ireland

For Ireland we made guestimates for the great famine in 1840s. A crop failure for the main crop (potatoes) has been described as the main reason, so it seem likely that the famine were reflected in a corresponding income drop.

How big income drop should we assume? A starting point could be Maddison's guestimates for teh great leap famine in China: he assumed a 20% drop in incomes at the lowest point. Excess mortality in Ireland was larger than in China (12% vs 3%), (O Gráda, "Famine, a short history") so the drop could be assumed to be larger than in China.

We base our guesstimates for the yearly movements on a quick reading of the chronology of the disaster.

Year	*Chronology*	*Assumptions for data*
1844		Interpolated value from Maddison trend
1845	September: a strange disease struck the potatoes	Assume halfway down to 1846, i.e. we used the interpolated value between 1844 and 1846.
1846	Following spring, people planted even more potatoes	30% down from 1844
	(Fall) harvest: almost the entire crop had been wiped out	
	The first starvations started	
1847	The harvest improved somewhat	Somewhat higher than 1845
1848-49	A relapse to a second period of famine. Diseases are spreading.	Assume similar values as in 1846
1849	Worst period of disease (Cholera)	
1850	Harvest was better	Higher than before
1851		Almost back on trend
1852		Interpolated value from Maddison trend

5.6 Greece

E1844 offers an estimation of the cross-country ratio of Greece in 1913 to Lebanon (as well as Turkey). We use this ratio to get a benchmark for Greec in 1913. This benchmark implies a lower level than what the growth of Maddison combined with the 2005 benchmark implies.

The estimates of James Reis (e1886) discussed above show Greece as being the poorest of the countries included in his assessment, with a GDP pc estimated as 51% of Denmark and Sweden. Lowering the 1913 Greece level brings the 1850 values more in line with this picture.

5.7 The rest of the west

In addition to the countries above we also added or revised the pre-1800 data for a number of other western countries. The details of these observations are given in the excel file.

There were a number of additional western countries for which we found no new pre-1800 information. The Maddison data, which we used in previous versions, offered pre-1800 growth series for many of these countries. These observations were briefly assessed in light of the countries for which we have revised. We deleted any of these observations if the Maddison data implied movements or relative levels that were thought to be too inconsistent with what seemed reasonable.

5.8 China

Much has been written about the Chinese development.

Let us start with the sources for cross-country comparisons for China in various years:

- The official ICP PPP level for 2005. This is widely believed to underestimate the GDP per capita since price data from rural areas are poorly represented (which means that the cost of living in China is underestimated). Estimates cited in e1866 suggest that GDP are underestimated with 10-20%.
- A new PPP estimate for (ca.) 1935 (e1860). It sets China at 8,75% or 11,1% of US in 1935 (depending of type of PPP used). We have also re-estimated US (based on new PPP estimates in 1910), that gives higher figures for US. We will use these new estimates.
- E1867 (van Zanden) give a rough estimate for the level of China in the late 18th century, in relation to UK in 1800 (roughly 50% of UK in 1800). The estimate is based on model that utilise real wages and structural shares in the economies. The early 19th century Chinese level has been lively debated. The traditional view has been that China was much poorer at the eve of 1800 than Europe (this view is reflected in the data of Maddison). The revisionist view of Pommeranz (2000) claimed that the most developed part of China (the Yantze-delta) were on par with England and Holland. The new estimates of van Zanden and others are the most careful ones so far and takes sort of a middle road: China was on par with the periphery of Europe (and the Yangtze were richer than the periphery), but even the Yangtze were behind England and Netherlands.

The evidence on the change over time in China includes the following:

- 1950-2009: there are sveral sources. Maddison assume lower growth than the World bank, for various reasons.
- 1937-50: the guestimates of Maddison –this must be the weakest link in the growth series
- 1929-1937: the growth used by Madison
- 1915-1935: various growth rates discussed by e1858. The traditional estimate by Yeh is the lowest (0.33%). A newer estimate by Rawski is much higher (1.1-1.2%), which utilise estimates of the agricultural sector which exhibits higher growth than what Yeh assumed. E1858 also offer a more conservative estimate, where the relatively high agricultural growth is assumed away (0.53%). The average growth in China during these years is largely driven by the Yangtzedelta and Shanghai, plus the Manchu region.
- 1870-1929: the guestimates by Maddison – displaying a small, but positive, growth
- 1740-1930: various real wage data in e1796, e1869, e1811. They display a downward trend 1740-mid 1800. A deep dip occur during Taiping (only in the Beijing data though). After that the trends are somewhat inconsistent, but they do not imply much lower levels in 1900 compared to 1800. Bengtson & Dribe also cite evidence that there was a small deviation in living standard between late 18th century and early 20th
- Estimates of rural incomes in kcal food (e1854) between 1750 and 1920. This shows an *increase* of 40%. It is not clear, however, how comparable these estimates are.

- Long term trends before 1800: E1856 offer estimates of agricultural productivity in 1600 and 1800: this shows only a week drop.
- There are also some more indirect evidence. Age heaping peaks for those in school age during Taiping (e1811), but improves quickly thereafter. Heights drops during the Taiping rebellion, but continue to drop in late 19th century.

It is difficult to make a coherent story of all these evidence. Here are the problems, and hwo we choose to tackle them:

Problem 1:

If we use the unadjusted level in 2005 from ICP together with the growth in WDI, then this imply a extremely low GDP per capita in 1950 – which is not so realistic. We choose to accept the suggested upward adjustment for 2005 (with 20%). In addition we chose to use the lower growth rate of Maddison, rather than the higher rate suggested by WDI and others.

Problem 2:

The level suggested by the 1936 benchmark is much higher than the level in 1950, i.e. we get a much bigger drop during the war than Maddison assumed. This seems less of a problem though, since that link probably was tentative anyway and a drop to 50% of the pre-war level is not much bigger than the drop experience by Netherlands during the war.

It is more surprising that the level imply that China did not regain its prewar level until the 80s. Maybe that is true, I really do not know.

We accept the 1936benchmark and hence assume a larger war drop than Maddison did. There are different estimates for the 1936 cross-country comparison, but the higher PPP estimate imply more reasonable relations 1800-1930s, so we use that one.

Problem 3:

The "benchmark" for the 18th century indicates a large drop until the 1930s. The wage data do not indicate such a large drop (some even indicate an increase).

Furthermore, it indicate that China regained its 18th century income level very late. We can link the data in different ways. The way that produce the highest 1800 estimate imply that China regained its 18th century incomes in the late 1980s.

These two problems pushes us to adjust the data in a way that produce a somewhat lower estimate for 1800 then what a direct application of the van Zanden model would yield (van Zanden also indicated that the estimate used assumptions on the "high side"). We use the China/UK ratio of van Zanden for 1740, since this year constitute a "peak" in the wage data movement. Instead of linking it to the UK data we use (based on Broadbury and others) we link it to the level of UK implied by the unadjusted rates of Maddison. The Maddison 1800 level of UK is lower than the level we use. Hence, applying the van Zanden China/UK ratio to this UK level yields a lower level for China as well.

Both these adjustments give us a lower Chinese estimate for 1800, which hopefully gives us a less unrealistic drop during the 1800s drop.

We get rough guestimates of the movements up to 1870 "inspired" by the movements of real wages, including a strong drop during Taiping (which is supported by indirect evidence, e.g. the age heaping and heights).

5.9 South Korea

E1860 offers a new 1935 benchmark for Korea (comparing Korea, Taiwan, Japan, US and China). The new benchmark imply that North and South Korea are adjusted downwards in 1935 (we also made a minor upward adjustment of Taiwan). For South Korea we just accepted the 1935 level as well, as the existing 2005 benchmark level, and adjusted the 1935-2005 growth rate accordingly. We also made an ad hoc upward adjustment to the 1870 level, the unadjusted 1870 level was unrealistically low compared to the subsistence level.

5.10 North Korea

For North Korea the situation is more difficult. The available data (whether from Maddison or anyone else) all suffer from the lack of primary data.

Maddison (in Maddison 2001, page 208-209) bases his growth estimates on the following:

- He cites one source that claim that "in 1940 North Korean GDP per capita was nearly 50 percent higher than in the South"
- Hence he find it reasonable "to suppose that 1950 North Korean per capita GDP was at least as high as in the South"
- He cites another source that claim that North Korea developed more rapidly than the south for many years after partition
- Hence, he assumes that "per capita GDP was the same in the North as in the South from 1950 to 1973".
- He also assumes no progress 1973 to 1991.
- Thereafter he uses another source he sites. This implies falling GDP per capita, which is consistent with the ending of Soviet aid.

We only found one other source of information for the development of North Korean living standards: Pak et al (2010, e1781). They analyse a large dataset of the heights of North Korean refugees. They find:

- The cohorts born 1935-44, which grew up before the partition, were somewhat taller than South Koreans at the same time
- After that there has been very few changes
- Whereas the South Koreans have become taller with each birth cohort.
- Hence, it is only in the first cohorts that north Koreans were taller than south Koreans
- This contradicts the view that North Korea was more prosperous than the south during the first two decades after the partition.

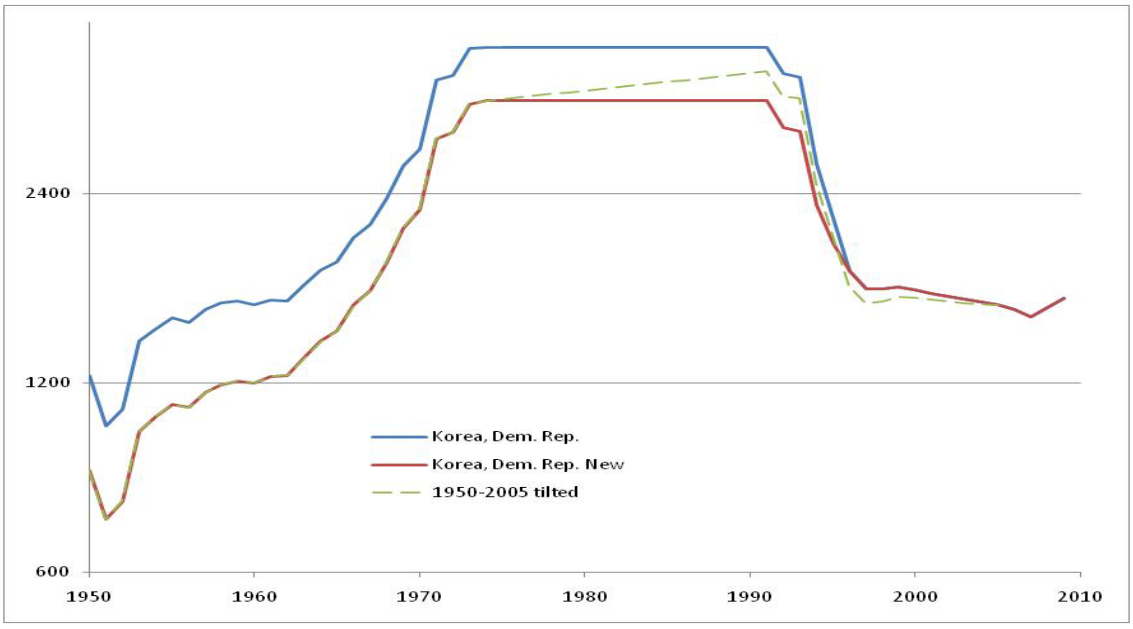
This, very indirect, piece of evidence, suggest that the assumptions of Maddison overestimate the growth in North Korea 1950-1973.

If we adjust North Korea down in 1935 in the same way we did with South Korea we get a few problems. First, the growth after partition will be even larger. We will ignore this problem. Secondly, we get a positive growth rate in the 1970s, rather than the zero growth Maddison assumes (the series we would get is the green dotted line in the figure below).

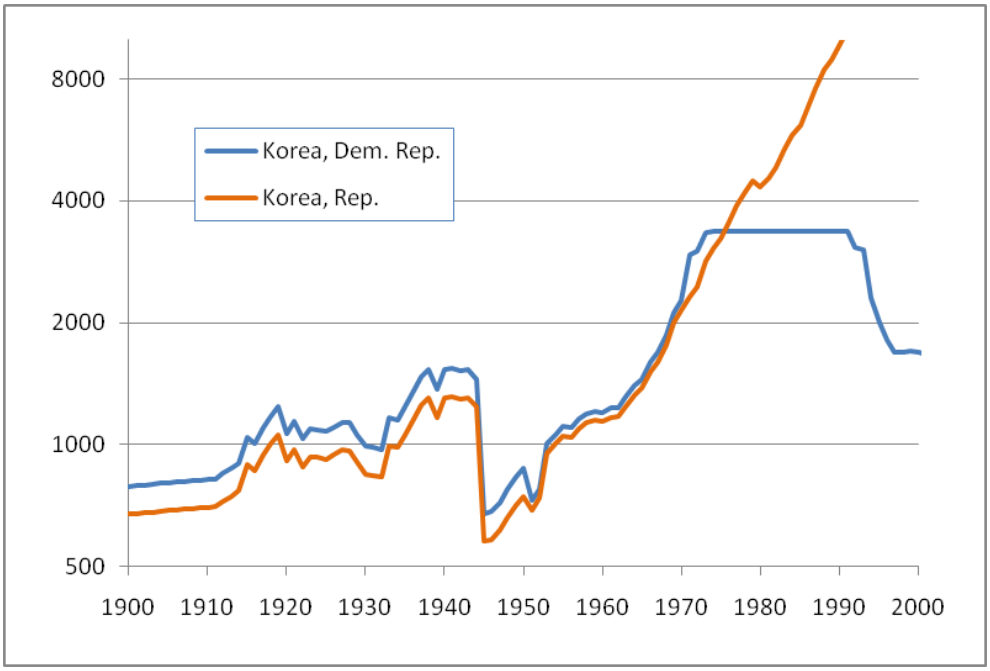
What we do is:

- We guestimate a level in 1950 so that the North is somewhat richer than South. Just to use something we use the North-South ratio we had in the previous version. Hence the ratio is: (North Korea 2005 * North Korean growth in Maddison 1950-2005) / (South Korea 2005 * South Korean growth in Maddison 1950-2005).
- Before 1950 we use the growth rate of South Korea
- We keep the benchmark level of 2005 (i.e. based data from UNSTAT) even though it is very uncertain estimate
- We use Maddison for the growth of North Korea 1950-2005, but we adjust it to fit the 1950 and 2005 levels.
- The period 1973-2005 poses special problems since adjusting the growth rate up would imply positive growth during the 70s. This is probably a very bad representation of the changes.
- Hence we do ad-hoc values for 1973-2005, in order to preserve the zero growth for the same period as Maddison did.

The figure below show the old (version 8) series for North Korea (the blue line), the adjusted series without any ad hoc correction (the green dotted line) and the adjusted series with ad hoc corrections (the red line). It is the last one that we use in our dataset.



The figure below show the series we use for both North and South Korea. It goes without saying that the present estimates of North Korea is very rough, and might very well be improved even with the present scarce data.



5.11 Japan

For 1935 E1860 offers benchmark level data (expressed in relation to US, China etc). However, this level fits quite well with the level implied by the movements 1935-2005 in Maddison on-line. Hence, there is no need to adjust this level.

For 1870 we made an ad hoc adjustment. The level was adjusted up (vis-a-vis level implied by Maddison on-line) in order to be closer to the "lagging parts" of Europe. The reasons for these adjustments are: (a) e1868 concludes that real urban wages in Japan was on-par with the lagging parts of Europe. (b) e1870 suggest that agricultural production at the beginning of the Meiji may be underestimated (and hence that the subsequent growth is somewhat overestimated).

Other sources on the subject are E1855 (Ma) who finds that the welfare ratios of unskilled labourers in 1750-1884 are a third of what they were in the UK. This implies a living standard above abject poverty, but still not much more than in Turkey or Java, i.e. it is quite similar to the lagging parts of Europe. With the new guesstimate Japan ends up on the same level as Turkey.

E1854 (Allen) finds that wages in Japan in the 19th century were lower than in the UK, but similar to the wages on the continent.

5.12 Myanmar

The new ICP 2005 PPP data for Myanmar pose especially large problems. The new ICP GDP per capita for Myanmar is only about a third of what it was in Maddison. If we combine that with the growth rates of Maddison we get extremely low figures for earlier years, below what we

consider the subsistence level. The levels get especially low around 1950, when the country makes a sharp dip. However, the GDP per capita is also very low at other points in time, including all observations in the 19th century.

Both the level and growth rates of Myanmar seem to be highly problematic. We have found the following additional sources:

Anne Booth (E1872), which describes the economic history of the country.

- There is scattered evidence that the country were better off than India during the colonial era
- The income drop in the 1930s were larger than in many other countries
- The 1990s were characterised by a dual exchange-rate (which make cross country comparisons more problematic
- There was growth in the 1990s, but it might be overestimated

E1877 (Asian development bank)

- They make informal estimates of the growth rates in the 1990s which is lower than the official growth rates (i.e. the one used by World Development Indicators)
- The official growth rate does not match changes in energy use, fertiliser use etc, which indicates lower growth rates

E1879 (2006), which states the following:

- Official growth estimates for some of the years in the 1990s is 12%
- The IMF prediction and EIU prediction much lower

E1880 (2006), which states the following:

- It is one of the most distorted economies in the world
- The GDP per capita statistics is unreliable (more than 10%)
- An IMF mission in 2003 found 0% growth

E1881 (2007), which states the following:

- In 2003-2005 there was an economic downturn
- In 2005 and on the economy picked up again
- There is no sizeable middle- or working class
- In 1997 poverty rate was 23% in 2001 the poverty rate had increased to 32%

E1882 (2009), which also find the official growth rate in the 1990s doubtful

E1873, which construct an equilibrium model for the exchange rate. They end up with an equilibrium rate of 400-500 LCUs /$. This differ from the official rate, as well as from the black market rate of 1111 LCUs /$.

CIA world fact book

- A major banking crisis in 2003 caused 20 private banks to close; private banks still operate under tight restrictions, limiting the private sector's access to credit.
- The US, EU etc have sanctions on Myanmar. These affected the country's fledgling garment industry, isolated the struggling banking sector, and raised the costs of doing business with Burmese companies
- The global crisis of 2008-09 caused exports and domestic consumer demand to drop. Remittances from overseas Burmese workers - who had provided significant financial support for their families - slowed or dried up as jobs were lost and migrant workers returned home.

These conclusions of these publications could be summed up as follows.

*The official growth rates for the 1990s are highly unreliable – and they are likely to be overestimated.*1990s high growth (E1872; E1877; E1879; E1880; E1881; E1882). The descriptive economic history of the 90s talk of serious problems that are not consistent with very high growth rates, e.g. the banking crisis of 2003-2005 that were followed by a slowdown (e1881 and CIA world fact book). There are various informal growth estimates. They are not very consistent with each other, but they all display lower growth than the offical figures. These include estimates based on data on energy use, fertiliser use etc and the IMF mission that found zero growth in 2003.

Poverty data display increase 1997-2001 (e1881) from 23% to 32%. There is not necessarily a conflict between this and high positive growth if the inequality is growing. However, inequality has to grow very sharply to accommodate for both extremely high growth (some 40% increased incomes) and increased poverty.

The high growth, if combined with the benchmark level of 2005, implies an unreasonable low level for most of Myanmar's history. Lower growth implies much more reasonable income levels for earlier years. Somewhere between 1994 and 1997 (depending on whether we use the growth of Maddison, WDI or the WEO of IMF) the level drop below 365$, and were much below that level for all years for which we have growth data. 365$ implies that, even under perfect equality, no one could afford even the basic nutritional requirements.

The 2005 benchmark from ICP are based on an unreliable estimate, and it might be (somewhat) underestimated. The ICP benchmark is based on a regression model X that utilise GDP per capita by exchange-rate, plus school enrolment. Hence, no price data from Myanmar is used. Accordingly, the quality of the data for GDP per capita *by exchange-rate* is crucial for the quality for the final data.

However, Myanmar had a multiple exchange-rate system with a very large gap between the public official rate (some 5 LCUs/$) and the private "free-rate" (some 1100 LCUs/$). It appears as if the free rate has been used for calculating the GDP per capita data used in the ICP model.

The multiple e-rate system means that no exchange-rate corresponds to a market equilibrium rate. E1873 estimated an equilibrium rate of 400-500 LCUs /$, i.e. less than half the level of the free-rate used in the ICP model.

The ICP model is supposed to take care of various biases, so in principle it could also accommodate such exchange-rate distortions. However, it is not certain that these type of distortions occur in a systematic way (so that the model could accomadte for that). Multiple exchange-rates might be rare, in which case they are hardly taken care of by the model. In any case E1880 judge that "Myanmar is one of the most distorted economies in the world", which would mean that Myanmar even in the best case would be an extreme outlier.

What we can do is to use the IMF equilibrium rate (rather than the free rate) to calculate Myanmar's GDP per capita expressed in exchange-rate $. This value can then be entered into the ICP model. First we should note two things. Firstly, we tried to recreate the results in the ICP model for Myanmar (as well, as a test, for Bahamas). In both cases we got results that were ca 20% higher than by ICP. We are not sure about the reason for this. Secondly, e1873 use the new exchange-rate to recalculate the international trade -part of GDP. GDP per capita then becomes some 10% higher.

Anyhow, the results of various calculations are:

Original benchmark	831 $
Original benchmark upgraded with 10%	914 $
Re-estimate with the ICP model, using the new exchange-rate, adjust down with 20%	1309 $
Re-estimate with the ICP model, using the new exchange-rate, adjust down with 20%, adjust upwith 10%	1455 $
Re-estimate with the ICP model, using the new exchange-rate	1588 $
Re-estimate with the ICP model, using the new echange-rate, adjust up with 10%	1746 $

Earlier versions of PWT (PWT 5.6) include PPP estimates for Myanmar (going up to -1989). In contrast to ICP they are based on some kind of price data (living costs in the capital city) which are entered into a model (e1236). These price data surely has many shortcomings, but ICP model utilise no price data at all. The PWT imply a much higher level than the ICP. Furthermore, the poverty rates mentioned earlier (23% and 32%) are really on the low side for a country with a GDP per capita as low as 831$.

Finally, most of our sources seem to agree that Myanmar is the poorest (or at least amongst the poorest) in South East Asia.

What we did was the following:

- We used a much lower growth rate for the 90s and on. The exact rates chosen are highly arbitrary. We used the estimates of CIA (the CIA estimates for earlier years were taken from index mundi). The online data at CIA fact book and index mundi for overlapping years were not fully consistent, and the CIA fact book is, in any case, not very transparent.
- For the years before the first CIA data we just took the growth rate of Maddison and divided it with 3.5. (1991-2002). This decreases the growth by about the same amount as the other informal estimates do.

- To get the levels for 2005 we used the PWT 5.6 level to US in 1988 (1989 was an outlier, the years before 1988 gave similar results as 1988). This gives us a level of 1169 in 2005. This is within the range of estimates we did above. It also implies that the country is one of the poorest in the region in the 2000s. It also implies that the country was better-off than India in colonial times.

5.13 India, Pakistan and Bangladesh

We found several sources that have studied the incomes for "United India" (India, Pakistan and Bangladesh) in the 19th century: e1853 (Allen), e1796 (Allen), e1883 (Roy), e1885 (Broadbury & Gupta).

The growth rates of Maddison imply very low levels in the 19th century and before: just slightly above subsistence and significantly lower than Europe (including the lagging part of Europe.

There seem to be no consensus (yet) on the income levels in this period. Real wages calculated with subsistence baskets display levels that are much lower than in the UK, but not that dissimilar than "rest of west". This would contradict the very low levels implied by the Maddison series.

On the other hand, the wages expressed in silver were much lower in Asia (both in China & India). E1885 argues that this reflect low purchasing power of non-food items (this argument would in principle also apply for China). In addition to this E1853 cites travel accounts from the 18th century that portrait the situation for farmers as being very poor. These latter arguments are more in line with the levels implied by Maddison.

As a "compromise" we make a small upward adjustment of the level in 1870. We only adjust the country that had the lowest level of the three, India. With this adjusted data the three countries still display very low incomes, but less extremely so. There seem to be no consensus on the relative level of Pakistan, Bangladesh and India, so we leave their relative position as they are.

We also have some new information for the earlier development. Real wages, expressed in grains, display a somewhat negative trend since at least 1600 (although wages expressed in silver display a slightly positive trend) (e1853 & e1885). Roy (e1883) try to assess the Bengal GDP per capita for 1722-1881 which points to a constant level during the period.

Maddison already assume slightly negative growth 1700-1800s. We keep these data, as they are consistent with most of the evidence above. We continue this trend backwards to 1600-1700, based on the same evidence.

5.14 Turkey

The level in 1913 (used as a benchmark year for the early 20th century) could potentially be calculated in several ways.

Pamuk (e1844) offer observation for turkey for 1820, 1870, 1913, 1950, 1973 and 2000. These both imply growth rates, as well as cross-country comparisons to US and other countries. The growth rates are more or less identical to the growth rate of Maddison. One way to arrive at a 1913 estimate is to link the 1913-2005 growth rate of Maddison or Pamuk (more or less the same) to the level in 2005.Then we arrive at estimate D in the table below.

We can also use the cross-country ratio of e1844 to the US for 1913 (i.e. the new US estimates we use from now on). Then we arrive at estimate C below. We can do a similar thing with the cross-country ratios to Lebanon (estimates A & B).

As can be seen in the table, the estimates based on cross-country comparison in 1913 (estimates A, B and C) is much higher than estimate based on the 1913-2005 growth rates. There are probably two factors that explain this. First, Pamuk took Madison's estimates as a starting point. The estimates of Maddison, in turn, are not based on the ICP benchmarks for 2005. The new ICP estimate for 2005 put Turkey at a 28% lower level then what Maddison does. Hence, if we link the growth rates to the ICP level (which is what we use for Turkey in 2005) it makes Turkey look much poorer for all previous years. Secondly, we have adjusted up US for the early years of the 20th century, which pull up any estimates that utilise the 1913 levels.

We choose a mid road between these estimates. We link the growth of Maddison not to the 2005 value we actually use (the ICP value), but to the level implied by the Maddison 2005 Turkey/US ratio (i.e. Turkey 2005 in Maddison * USA 2005 from ICP/ USA 2005 from Maddison). This gives us estimate D below. This is the estimate we use for Turkey 1913. We still US the ICP estimate for Turkey 2005, so the growth 1913-2005 has to be adjusted to fit these both values.

		Turkey in 1913
A	Based on cross-country ratio to Lebanon in 1913 (e1844, high estimate)	$2 351
B	Based on cross-country ratio to Lebanon in 1913 (e1844, low estimate)	$2 221
C	Based on cross-country ratio to the US in 1913 (e1844) (The US level is the new, revised observation)	$1 913
D	What we use	$1 700
E	Based on the Turkish growth rate 1913-2005 (Maddison or Pamuk) linked to the Turkish level of 2005 (based on the ICP data).	$1 227

5.15 The Middle East

E1844 offers estimates for a large number of Middle-Eastern countries for the 19th century. He, at least partly, bases his estimate on a cross-country comparison. We compared his country ranking with the ranking that resulted from the growth rates previously used linked to the 2005 ICP estimate. In three cases the 19th century ranking differs strongly: Syria, Iran & Iraq. For all three cases the 2005 ICP cross-country levels differed significantly from what earlier cross-county comparisons implied for 2005, so this probably explain much of the difference.

In these three cases we made new guesstimates estimates for 1820. We based our guestimates on the levels of the countries that were closest in the ranking of the e1844. However, to avoid having to adjust the 1820-2005 growth rates too much we compromised and put the level somewhere in between.

E1799 gives alternative estimates for Palestine, Jordan, Lebanon and Syria. However, he arrives at a relative ranking that is quite similar to e1844. The big difference is that he assumes a lower absolute level than e1844 in the early 1800s. E1844, in turn, display slightly lower levels than we do (i.e. after adjusting the data with gapminder model 2, to make the unit 2005 i$). E1799 base

his low estimates mainly on qualitative accounts (e.g. travel accounts), which has its own problems. Urban real wages, on the other hand (e1843), display much smaller differences between various parts of the Ottoman regions and the gap to Europe is mainly dominated by the leading UK and NL cities.

The heights, finally, where as high as "core" Europe, but this might have reflected food composition e.g. more milk(e1806). However, the lack of consumption of such things is part of what e1844 refer to when describing the low level of living standards. Hence, the wage data and the height data would be in favour of the somewhat higher estimates of e1844, and the ones we use.

We looked at the relative positions of e1799 and e1844 when we choose the spread-out factors for the middle-eastern countries for which we use regional averages.

5.16 Guinea Bissau

The ICP level for 2005 of Guinea Bissau, combined with Maddison growth rate 1950-2005 imply an unrealistically low level in 1950. The Maddison benchmark for 2005 was 40% higher than the new ICP benchmark (which we use). Hence, we adjusted the 1950 figure up with 40%, which still imply an extremely poor country. The country displayed a sharp growth in 1950-1970 so we chose to adjust the growth rate down for those years only.

5.17 Congo, Dem. Rep.

It is believed that the ICP figure for Congo, Dem. Rep., for 2005 is underestimated.[8] The level of 264 international dollars (PPP) is below the level we assumed was the lowest possible (i.e. 275$, which is below the 1$ per day level). Furthermore, the official growth rates during the 1990s imply that the country had incomes below this very low level during the seven years 2000-2006. In figure 6 below the GDP per capita of Congo, Dem. Rep. is displayed together with the second poorest country in the world, Liberia. The pink line is the assumed lowest level possible (275$).

Such figures seem quite implausible, since that implies that even if the incomes were distributed perfectly equal within the country, everyone in the country were subject to famine conditions for a decade. The conditions in the country are without doubts horrendous, but incomes on that level would, in principle, starve the entire population. That has not been observed.

[8] Jerven (in press).

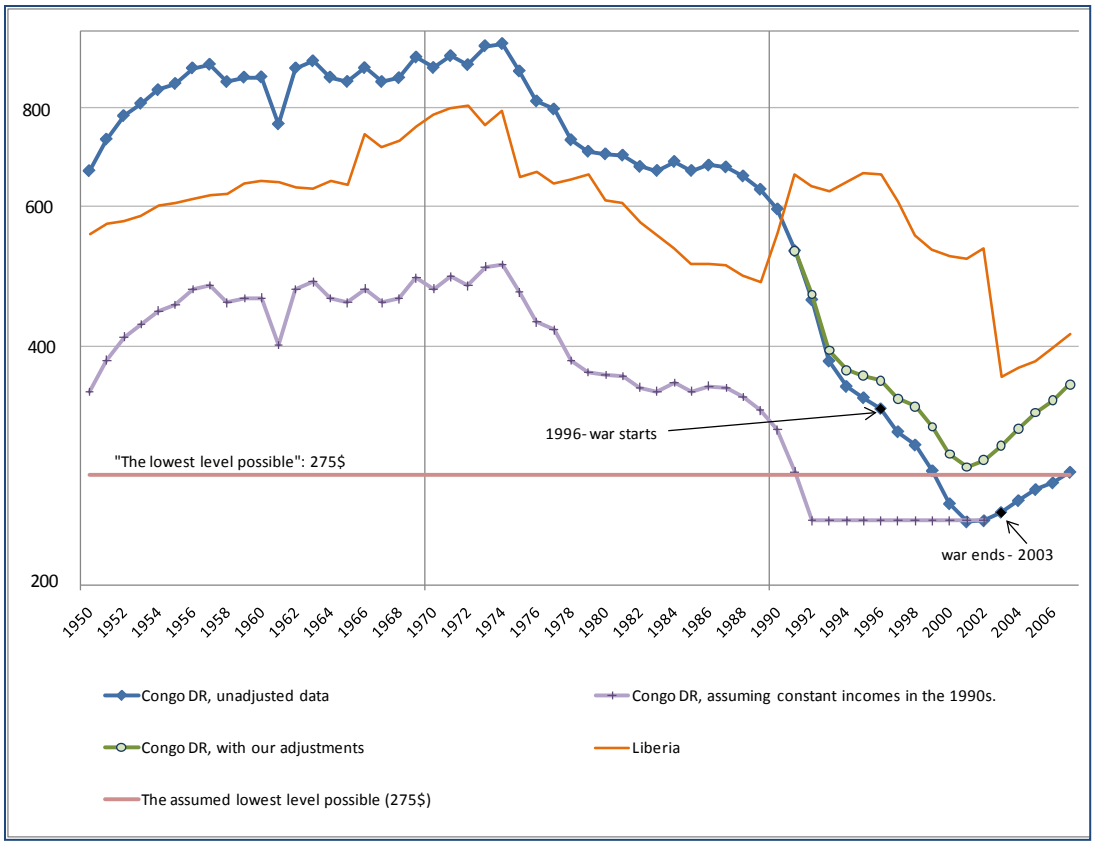


Figure 6. GDP per capita for Congo, Dem. Rep., and Liberia (the second poorest country)

In addition, a recent paper (Henderson et al, 2009) calls for a reinterpretation of the growth rates of Cong DR in the 1990s. They estimate the growth rates in the 1990s from changes in night lights as measured from space. Their results, taken at face value, imply that the incomes were stagnant 1992-2002, rather than the sharp fall implied by the official data. Since the growth rates we use are linked to the level of 2005, this would imply that the country were subject to catastrophic famine conditions for almost two decades. To illustrate this we added the GDP per capita for Congo in figure 6, as it would have been if the incomes were constant in the 1990s.

The assessment in Henderson et al, though, is that the truth is somewhere between what the estimates based on night lights say and the official growth rates. That would mean that there was a fall in the 90s, but that this was less dramatic than implied by the official data. This drop in incomes is also plausible given the devastation from the war 1996-2003.

Considering the problems with accepting the low levels and the evidence that the collapse in income might have been smaller, we decided to adjust the ICP figure for 2005 upwards with 25%. We also decided to adjust the growth rate from 1991 to 2007, rather than to adjust the whole series upwards with 25%. What we did was to keep the values until 1991 as they would have been with the unadjusted ICP figure for 2005 and the national growth rates. From 1991 to 2007 we used the same adjustment formula as described in the beginning of this section.

The function used is:

$$Y_t = X_t * 1{,}25 * \left(\frac{1}{1{,}25}\right)^{\left(\frac{t-2005}{1991-2005}\right)}$$

X_t is the original value for year *t* and Y_t is the new value for year *t*. The new adjusted data is also included in figure 6.

After 2007 we used unadjusted growth rates. The choice of 2007 for the ending of the growth adjustments was an arbitrary choice. However, it has little effect on the relative position of the country.

5.18 Oil-rich economies

There are a few high income economies that are largely based on their oil incomes. Hence, their growth pattern is highly linked to this one income source. It is accordingly reasonable to assume that the income level before their oil discovery was significantly lower.

However, in many instances our data does not go back to the year of the oil discovery. If we use the adjusted regional average for 1820 and 1913 (as we do for several other countries), then the graph software would automatically interpolate linearly between 1913 and the first year with data. The graph would then display a very sharp surge in growth after 1913, which is very unrealistic.

To avoid this we add an observation, based on the regional average, for the year of the first oil exploitation. Since Maddison does not provide regional averages for these years we use the adjusted regional average for 1913, extrapolated with the regional growth rate from 1820 to 1913. With "adjusted regional average" we mean, as before, the regional average adjusted with Gapminder model 2, multiplied with the "spread out factor" for the country.

The "year of oil discovery" was based on a quick reading of on-line country guides e.g. the Country Guides of the Library of Congress (2008). A more careful reading of the history of these countries will probably lead to adjustments in future updates of this dataset.

There is also a general problem with oil rich countries. The different sources are often very inconsistent with each other for these countries. It is easy to see a number for reasons for this. Oil-incomes could be accounted for in very different ways. Furthermore, most of these countries have a very large foreign work force. This foreign work force might, or might not, be included in the total population that is used to calculate the per capita production. All this taken together means that oil-rich countries should be treated with particular care.

References

We have not yet have the time to finalise the reference list. Hence, additional references have been added at the end of this list, in the form of a table. Several of the references in the table is probably already included in the list that starts right below. The references in the table have not been spelled checked at all, and there is the risk that some authors have not been included. We hope to fix that in the future.

Allen, Robert; Bengtsson, Tommy; Dribe, Martin (2005); "Introduction" in "Living Standards in the Past – New perspectives on well-being in Asia and Europe"; edited by Allen, Robert; Bengtsson, Tommy; Dribe, Martin

Barro, Robert & Ursúa, José (2008); "Macroeconomic crises since 1870", downloaded April 2009 from: www.economics.harvard.edu/faculty/barro/files/MacroeconomicCrisesSince1870_Brookings_08_0507.pdf The data in the paper was downloaded from: www.economics.harvard.edu/faculty/barro/data_sets_barro

Chen, Shaohua & Ravallion, Martin (2008), "China is poorer than we thought , but no less successful in the fight against poverty", The World Bank Policy Research Paper 4621

CIA (2008), "CIA World factbook 2008", Downloaded 2008-11-04 from: https://www.cia.gov/library/publications/the-world-factbook/fields/2004.html The page was last updated on 23 October 2008.

CIA (2007), "CIA World factbook 2008", Downloaded 2008-11-04 from: http://www.umsl.edu/services/govdocs/wofact2007/fields/2004.html The page was last updated on 15 May, 2007.

CIA (2006), "CIA World factbook 2006", Downloaded 2008-11-04 from: http://www.umsl.edu/services/govdocs/wofact2006/fields/2004.html The page was last updated on 13 June, 2006.

Deaton, Angus & Heston, Alan (2008), "Understanding PPPs and PPP-based national accounts", NBER Working Paper 14499

Eurostat (2008), “Regional gross domestic product (PPS per inhabitant), by NUTS 2 regions “, downloaded 2008-11-20 from: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/t_reg/t_reg_eco&language=en&product=REF_TB_regional&root=REF_TB_regional&scrollto=0

FEPS (Fiscal and Economic Policy Steering Group, States of Guernsey) (2007), “Strategic Economic Plan produced by the Fiscal and Economic Policy Steering Group for inclusion in the Government Business Plan (Billet XVIII, 2007)”. Downloaded November 2008 from http://www.gov.gg/ccm/navigation/government/government-business-plan/

Henderson, Storeygard and Weil (2009), ”Measuring Economic Growth from Outer space”, Working Paper, July 21

Heston, Alan; Summers, Robert and Aten, Bettina (2006), “Penn World Table Version 6.2”, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, September 2006. Data downloaded 2008-10-21 from http://pwt.econ.upenn.edu/php_site/pwt62/pwt62_form.php

INSEE (Institut national de la statistique et des etudes économique) (2008), “Tableau Économique de La Réunion". All pdf-files marked with "INSEE-RÉUNION - TER 2008-2009"; downloaded 08-11-12 from: www.insee.fr/fr/insee_regions/reunion/themes/dossiers/ter/ter2008_resultats_economiques.pdf and http://www.insee.fr/fr/insee_regions/reunion/themes/dossiers/ter/ter2008_evolution_prix.pdf Available at this homepage: http://www.insee.fr/fr/regions/reunion/default.asp?page=themes/dossiers/ter/ter_economie.htm

International Monetary Fund (2009), “World Economic Outlook database. October 2009”; downloaded 2009-12-16 from: http://www.imf.org/external/pubs/ft/weo/2009/02/weodata/download.aspx

International Monetary Fund (2010), “World Economic Outlook database. April 2010”; accessed 2010-04-21 from: http://www.imf.org/external/pubs/ft/weo/2010/01/weodata/download.aspx

International Comparison Program (2008), “Global Purchasing Power Parities and Real Expenditures. 2005 International Comparison Program”, http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf

Isle of Man Treasury (2008), “Isle of Man National Income Accounts 2006/07”. Downloaded 08-11-18 from: www.gov.im/lib/docs/treasury/economic/income/nationalincome200607.pdf Available at: www.gov.im/treasury/economic/data/income.xml

Jerven, Morten (in press), “The African growth evidence”, African Affairs

Krantz, Olle & Schön, Lennart (2007), “Swedish Historical National Account 1800-2000”, Lund Studies in Economic History 41. The data was downloaded 2009-04-17 from http://www.ehl.lu.se/database/LU-MADD/National%20Accounts/default.htm

Library of Congress (2008), “Library of Congress country studies”. Downloaded November 2008 from: http://memory.loc.gov/frd/cs/

Maddison, Angus (2003), “The World Economy – Historical Statistics”

Maddison, Angus (2008 I), “Historical Statistics for the World Economy: 1-2006 AD”, Downloaded 2008-10-21 from www.ggdc.net/maddison/ Last update according to homepage: October 2008

Maddison, Angus (2008 II), “Explanatory Background Note on Historical Statistics”, http://www.ggdc.net/maddison/Historical_Statistics/BackgroundHistoricalStatistics_09-2008.pdf Downloaded: 2008-10-21 from http://www.ggdc.net/maddison/

Pritchett, Lant (1997), ”Divergence, Big Time”, Journal of Economic Perspectives; Vol. 11; No. 3

St. Helena Development Agency (2008) "St Helena Sustainable Development Plan 2007 – 2010”. Downloaded 2008-11-04 from www.shda.co.sh/pages/st_helena_facts_and_figures.html.

UNSTAT (2008 I), “Basic data selection”, data downloaded 2008-11-02 from: http://unstats.un.org/unsd/snaama/selectionbasicFast.asp

UNSTAT (2008 II), “Downloads”, data downloaded 2008-11-10 from: http://unstats.un.org/unsd/snaama/dnllist.asp

UNSTAT (2009 II), “Downloads”, data downloaded 2009-12-17 from: http://unstats.un.org/unsd/snaama/dnllist.asp

Zanden, Jan Luiten van (2005?), ”Simulating early modern economic growth”, Working Paper, downloaded 2009-04-17 from: http://www.iisg.nl/research/jvz-simulating.pdf

World Bank (2005), “GNI per capita 2005, Atlas method and PPP”, summary note from the WDI, downloaded November 2008 from: http://siteresources.worldbank.org/ICPINT/Resources/Atlas_2005.pdf

World Bank (2008), “Estimations of PPPs for non-benchmark economies for the 2005 ICP round” Downloaded November 2008 from: http://siteresources.worldbank.org/ICPINT/Resources/non-benhmark.pdf

World Development Indicators 2008 on-line (2008). Downloaded 2008-10-23 from: http://publications.worldbank.org/WDI/

Short name	Title of publication	Publication year	Authors of publication
Allen (2009)	The British industrial revolution in global perspective	2009	Allen, Robert
Barro & Ursúa.	"Macroeconomic crises since 1870", downloaded April 2009 from: www.economics.harvard.edu/faculty/barro/files/MacroeconomicCrisesSince1870_Brookings_08_0507.pdf The data in the paper was downloaded from: www.economics.harvard.edu/faculty/barro/data_sets_barro	2008	Barro, Robert & Ursúa, José
Broadbury (e1788).	British economic growth, 1300-1850: some preliminary estimates	2009	Broadberry, Stephen; Campbell, Bruce; Klein, Alexander; Overton, Mark; van Leeuwen, Bas
CIA	"CIA World factbook 2006" (or 2007 or 2008), Downloaded 2008-11-04 from: http://www.umsl.edu/services/govdocs/wofact2006/fields/2004.html The page was last updated on 13 June, 2006.	2006	CIA
CIA fact book 2008.	"CIA World factbook 2006" (or 2007 or 2008), Downloaded 2008-11-04 from: http://www.umsl.edu/services/govdocs/wofact2006/fields/2004.html The page was last updated on 13 June, 2006.	2006	CIA
CIA world factbook, previous editions (accessed through Index mundi).	"CIA World factbook 2006" (or 2007 or 2008), Downloaded 2008-11-04 from: http://www.umsl.edu/services/govdocs/wofact2006/fields/2004.html The page was last updated on 13 June, 2006.	2006	CIA
CIA world factbook.	"CIA World factbook 2006" (or 2007 or 2008), Downloaded 2008-11-04 from: http://www.umsl.edu/services/govdocs/wofact2006/fields/2004.html The page was last updated on 13 June, 2006.	2006	CIA
e1781	Hieght and living standards in North Korea, 1930s-1980s	2010	Pak et al
e1793.	Estimating GDP per capita for the Ottoman Empire in a European Comparative Framework, 1500-1820	2009	Pamuk, Sevket
e1794.	Italian GDP 1300-1913	2009	Malanima, Paolo
e1795.	German economic growth, 1500-1850	2009	Pfister, Ulrich
e1796.	Wages, prices and living standards in China, 1738-1925: in comparison with Europe, Japan, and India	2009	Allen, Robert; Bassino, Jean-Pascal; Ma, Debin; Moll-Murata, Christine; van Zanden, Jan Luiten
e1799	Estimates of Palestine's, Jordan's Lebanon's and Syria's per capita GDP from 1802-1950	2009	Schein
e1806	Tall and shrinking muslims, short and growing europeans: the long-run welfare development of the middle-east, 1850-1980	2009	Stegl & Baten
e1811	Evolution of the living standards and Human capital in China in 18-20th century: evidence from real wage and anthropometrics	2009	Baten et al
e1821	An ancien régime or 19th century subsistence crisis in Sweden? An interpretative review	2009	Morell
e1843.	Real wages and standards of living in the Ottoman empire	2002	Özmucur, Süleyman; Pamuk, Sevket
e1844.	Estimating economic growth in the Middle East since 1820	2006	Pamuk, Sevket

e1851.	Comparing productivity in the Netherlands, France, UK and USA, ca 1910: a new PPP benchmark and its implications for changing economic leadership	2010	Frankema, Ewout; Smits, Jan Pieter; Woltjer, Pieter
e1853.	India in the great divergence	2007	Allen, Robert
e1854	Real wages in Europe and Asia: a first look at the long-term patterns	2005	Allen, Robert
e1855	Japanese wages and living standards in 1720-1913: an international comparison	2004	Bassino & Ma
e1856	Agricultural productivity and rural incomes in England and the Yangtze delta, c. 1620 - c. 1820	2004	Allen, Robert
e1858.	Economic growth in the lower Yangzi region of China in 1911-1937: a quantitative and historical analysis	2008	Ma, Debin
e1860.	Real gdp in pre-war east asia: a 1934-36 benchmark purchasing power parity comparison with the US	2007	Ma, Debin; Fukao, Kyoji; Yuan, Tangjun
e1866.	New PPP-based estimates of renminbi undervaluation and policy implications	2010	Subramanian, Arvind
e1868.	Japanese unskilled wages in international perspective, 1741-1913	2005	Bassino, Jean-Pascal; Ma, Debin
e1869.	Wages, prices, and living standards in China, Japan, and Europe, 1738-1925	2005	Allen, Robert; Bassino, Jean-Pascal; Ma, Debin; Moll-Murata, Christine; van Zanden, Jan Luiten
e1870.	The growth of agricultural output and food supply in meji Japan: economic miracle or statistical artifact	2006	Bassino, Jean-Pascal
e1872	The Burma development disaster in comparative historical perspective	2003	Booth, Anne
e1873	Efficiency costs of Myanmar's multiple exchange rate regime	2008	Hori, Masahiro & Wong Yu Ching
e1877	Asian development outlook 2010	2010	Asian development bank
e1879	Myanmar. Challanges galore but opposition failed to score	2006	Than
e1880	Myanmar's human and economic crisis and its regional implications	2006	Matthews
e1881	Myanmar. The future takes form - but little change in sight	2007	Pedersen
e1882	Myanmar in 2008. Weathring the storm	2009	Than
e1883	Economic conditions in early modern Bengal: a contribution to the divergence debate	2010	Roy, Tirthankar
e1885.	The early modern great divergence: wages, prices and economic development in Europe and Asia, 1500-1800	2006	Broadberry, Stephen; Gupta, Bishnupriya
e1886.	How poor was the European periphery before 1850? The mediterranean vs Scandinavia. in "Mediterranean response to globalisation before 1950", edited by Pamuk, Sevket & Williamson, Jeffrey.	2000	Ries, James
e1887	New evidence on the standard of living in Sweden during the 18th and 19th centuries: long-term development of the demographic response to short-term economic stress among landless in Western Scania	na	Bengtsson, Tommy & Dribe, Martin
Edvinsson (e1604).	Annual estimates of Swedish GDP in 1720-1800.	2005	Edvinson, Rodney
Eurostat	"Regional gross domestic product (PPS per inhabitant), by NUTS 2 regions ", downloaded 2008-11-20 from: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/t_reg/t_reg_eco&language=en&product=REF_TB_regional&root=REF_TB_regional&scrollto=0	2008	Eurostat
FEPS (2007)	"Strategic Economic Plan produced by the Fiscal and Economic Policy Steering Group for inclusion in the Government Business Plan	2007	FEPS (Fiscal and Economic Policy

	(Billet XVIII, 2007)". Downloaded November 2008 from http://www.gov.gg/ccm/navigation/government/government-business-plan/		Steering Group, States of Guernsey)
Gadd (2000)	Det svenska jordbrukets historia. Bd 3	2000	Gadd, Carl-Johan
Hallén (2009)	Överflöd eller livets nödtorft	2009	Hallén, Per
ICP - adjusted	"Global Purchasing Power Parities and Real Expenditures. 2005 International Comparison Program", http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf	2008	International Comparison Program
ICP estimate - model 6.	"Global Purchasing Power Parities and Real Expenditures. 2005 International Comparison Program", http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf	2008	International Comparison Program
ICP estimate - model 7.	"Global Purchasing Power Parities and Real Expenditures. 2005 International Comparison Program", http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf	2008	International Comparison Program
ICP.	"Global Purchasing Power Parities and Real Expenditures. 2005 International Comparison Program", http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf	2008	International Comparison Program
IMF (2010).	"World Economic Outlook database. April 2010"; accessed 2010-04-21 from: http://www.imf.org/external/pubs/ft/weo/2010/01/weodata/download.aspx	2010	International Monetary Fund
INSEE (2008), adjusted	"Tableau Économique de La Réunion". All pdf-files marked with "INSEE-RÉUNION - TER 2008-2009"; downloaded 08-11-12 from: www.insee.fr/fr/insee_regions/reunion/themes/dossiers/ter/ter2008_resultats_economiques.pdf and http://www.insee.fr/fr/insee_regions/reunion/themes/dossiers/ter/ter2008_evolution_prix.pdf Available at this homepage: http://www.insee.fr/fr/regions/reunion/default.asp?page=themes/dossiers/ter/ter_economie.htm	2008	INSEE (Institut national de la statistique et des etudes économique)
Isle of Man Treasury (2008)	"Isle of Man National Income Accounts 2006/07". Downloaded 08-11-18 from: www.gov.im/lib/docs/treasury/economic/income/nationalincome200607.pdf Available at: www.gov.im/treasury/economic/data/income.xml	2008	Isle of Man Treasury
Krantz & Schön (e1888).	Swedish Historical national accounts 1800-2000	2007	Krantz, Olle; Schön, Lennart
Maddison (2003)	"The World Economy – Historical Statistics"	2003	Maddison, Angus
Maddison on-line.	"Historical Statistics for the World Economy: 1-2006 AD", Downloaded 2008-10-21 from www.ggdc.net/maddison/ Last update according to homepage: October 2008	2008 I	Maddison, Angus
O Gráda, "Famine, a short history".	Famine, a short history	2009	O Grada, Cormac
Penn World Tables 5.6.	Penn World Tables 5.6.		
Pommeranz (2000)	The Great divergence	2000	Pomeranz, Kenneth
PWT.	"Penn World Table Version 6.2", Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, September 2006. Data downloaded 2008-10-21 from http://pwt.econ.upenn.edu/php_site/pwt62/pwt62_form.php	2006	Heston, Alan; Summers, Robert and Aten, Bettina
Schön (e1761).	Swedish historical national accounts 1571-1850 - a discussion of GDP benchmarks and early economic growth	2009	Schön
St. Helena	"St Helena Sustainable Development Plan 2007 – 2010". Downloaded	2008	St. Helena

Development Agency (2008)	2008-11-04 from www.shda.co.sh/pages/st_helena_facts_and_figures.html.		Development Agency
UNSTAT I.	"Basic data selection", data downloaded 2008-11-02 from: http://unstats.un.org/unsd/snaama/selectionbasicFast.asp	2008 I	UNSTAT
UNSTAT II - adjusted.	"Downloads", data downloaded 2009-12-17 from: http://unstats.un.org/unsd/snaama/dnllist.asp	2009 II	UNSTAT
van Zanden (e1598).	Simulating early modern economic growth	2008	van Zanden, Jan Luiten
van Zanden (e1836).	Early modern economic growth. A survey of the European economy, 1500-1800	2001	van Zanden, Jan Luiten
van Zanden (e1867).	The long road to the industrial revolution. The European economy in a global perspective, 1000-1800	2009	van Zanden, Jan Luiten
WDI (lcu).	"World Development Indicators 2008 on-line", Downloaded 2008-10-23 from: http://publications.worldbank.org/WDI/	2008	World Bank
World Bank (rough estimate)	"GNI per capita 2005, Atlas method and PPP", summary note from the WDI, downloaded November 2008 from: http://siteresources.worldbank.org/ICPINT/Resources/Atlas_2005.pdf	2005	World Bank