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THE LEVEL AND DISTRIBUTION OF GLOBAL HOUSEHOLD WEALTH*

James B. Davies, Susanna Sandström, Anthony Shorrocks and Edward N. Wolff

The *level* of average household wealth in all countries is estimated via the determinants of assets and debts for 39 countries which have balance sheet or survey data. The *distribution* of wealth in all countries is inferred from information on the pattern of wealth ownership for 20 countries (covering 59% of world population). Combining the level and distribution figures suggests that median global wealth was PPP$8,635 in the year 2000, and that PPP$518,361 was needed to belong to the top percentile. The top decile owned 71% of world wealth and the global Gini value was 0.802.

The world distribution of income has recently been the subject of much attention. Available evidence suggests that global income inequality is high and not trending down over time (Bourguignon and Morrison 2002; Milanovic 2002, 2005). Indeed, in some regions both poverty and income inequality appear to be on the increase. Given these findings, interest naturally turns to global disparities in other dimensions of economic status, resources or wellbeing, of which one of the most important is household wealth. In recent years the number of countries with good wealth data has increased and it is now possible to try to estimate the global distribution of household wealth, which is the goal of this article.

The core data for this exercise are provided by national wealth distribution data that are available for 20 countries. These countries include the largest and richest countries in the world and together account for 59% of the world's population and, we estimate, 75% of its wealth. While it is interesting to look at the distribution of wealth just for these countries, and we do provide those results, our main focus is on an estimate of the full global distribution of wealth. This requires imputation of both wealth levels and distribution to the countries with missing data. Much of the article is occupied with the development and application of those imputations. We find that the global distribution of wealth so estimated is quite close to that for the 20 core countries – yielding a Gini coefficient of 0.802 for example in comparison with 0.796 for the core group.

Estimating the global distribution of wealth involves two stages. First, the average wealth *level* in each country is established. This is done by using national household balance sheet (HBS) data, and survey data where there are no HBS numbers, and then extending the wealth figures to nations with neither kind of data by using regression based imputations. The second stage requires the *shape* of the distribution to be computed for each country. Again there are countries with direct data (the 20 referred to above), and others for which the pattern must be estimated by using the best

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available proxies. Our ultimate aim is to produce household wealth distribution estimates on a per adult basis for the year 2000.[1] This paper focuses almost exclusively on figures based on purchasing power parity (PPP) exchange rates. Davies *et al* (2008) reports results from earlier work using official exchange rates and a less sophisticated method of imputing wealth levels to countries with missing data. The global wealth inequality figures are higher there than here, because without PPP exchange rates there is no adjustment for the lower cost of living in poor countries. The sensitivity of results to the choice of exchange rates is discussed below, in Section 4.

This article establishes, first, that there are very large inter-country differences in the level of household wealth. The US is the richest country in aggregate terms, with wealth estimated at PPP$ 201,319 per adult in the year 2000. At the opposite extreme among countries with wealth data, India has per adult wealth of $12,201 in PPP terms. Other countries show a wide range of values. Even among high income OECD countries the figures range from $70,461 for Finland, and $79,585 for New Zealand, to $172,461 for the UK. We also find that the wealth to income ratio rises with income or wealth, meaning that in poor countries the relative shortfall of wealth is greater than that of income. This is a noteworthy result since the risks, capital market imperfections and lack of social safety nets that people face in poor countries mean that personal assets seem to be most lacking where they are most needed.

International differences in the *composition* of wealth are also examined. Some regularities are evident but also country-specific differences – such as the strong preference for liquid savings in Japan and some other countries. Real assets, particularly land and farm assets, are more important in less developed countries. This reflects not only the greater importance of agriculture, but also an immature financial sector (that is currently being addressed in some of the rapidly growing developing countries) and other factors such as inflation risk. Among rich nations, there is significant variation in the importance of financial assets and share-holding.

Concentration of wealth within countries is high. Gini coefficients for wealth typically lie in the range of about 0.6–0.8. In contrast, most Gini coefficients for disposable income fall in the range 0.3–0.5. The mid value for the share of the top 10% of wealth-holders in our core country-level data is 51%, again much higher than is common for income.

The article finds that global wealth-holding is highly concentrated, much higher than in the case of income. The share of the top 10% of adults in 2000 is estimated to be 70.7% and the Gini coefficient to be 0.802. The share of the bottom half is just 3.7%. Although inter-country differences are greater than in the case of income, we find that intra-country inequality is so much larger in the case of wealth that it accounts for a larger share of global inequality than it does for income, according to the Gini coefficient. Thus the principal reason for the high global inequality of wealth may be the long-recognised high inequality of wealth within countries.

The remainder of the article is organised as follows. The next Section describes what can be learned about household wealth levels and composition across countries using

[1] Although HBS data are available annually in many countries, wealth distribution data typically come from surveys that are conducted at intervals of three or more years and whose results are available only with a significant lag. The year 2000 provides us with a reasonably recent date and good data availability.

household balance sheet and survey data. Section 2 presents our results on the determinants of wealth levels, and assigns household wealth figures to the 'missing countries'. Section 3 reviews the available evidence on the pattern of wealth distribution, and then performs imputations for other countries. In Section 4 the data on levels and distributions are combined to construct the global distribution of household wealth. Conclusions are drawn in Section 5.

1. Wealth Levels and Composition in Countries With Data

This Section assembles data on wealth levels and composition for as many countries as possible. These data are of independent interest but are also used in the next Section to impute per capita wealth to countries that lack wealth data. The exercise begins by taking inventories of household balance sheet (HBS) and sample survey estimates of household wealth levels and composition: see the appendices in Davies *et al.*, (2009), for details on sources.

1.1. *Household Balance Sheet (HBS) Data*

As indicated in Table 1, 'complete' financial and non-financial balance sheet data are available for 19 countries. These are all high-income countries, except for the Czech Republic, Poland and South Africa, which are classed as upper middle-income by the World Bank.[2] We term the data complete if they adequately cover each of financial assets, liabilities and non-financial assets.[3] Sixteen other countries have financial balance sheets but no information on real assets. This group is less biased towards the rich world since it contains six upper middle income countries and three lower middle income countries.

Regional coverage in HBS data is not representative of the world as a whole. Such data tend to be produced at a relatively late stage of development. Europe and North America, and the OECD in general, are well covered but low-income and transition countries are not.[4] In geographic terms this means that coverage is sparse in Africa, Asia, Latin America and the Caribbean. Fortunately for this study, these gaps are offset to an important extent by the availability of survey evidence for the largest developing countries: China, India and Indonesia. Also note that while there are no HBS data for Russia, complete HBS data are available for two European transition countries and financial data for eight others.

[2] The World Bank (WB) classification is used throughout the article except that Brazil, Russia and South Africa were moved from the lower middle-income category to higher middle-income and Equatorial Guinea from low to lower middle-income. These changes were prompted by the fact that the WB classifications seems anomalous compared to the Penn World Table GDP data that were used for the year 2000.

[3] There are some national differences in asset coverage, particularly for non-financial assets. The figures for each country with a complete balance sheet here include both owner-occupied housing and consumer durables. There is some variation in coverage of other real estate. See appendices I and II of Davies *et al.* (2009) for more detail.

[4] Goldsmith (1985) prepared 'planetary' balance sheets for 1950 and 1978 and found similar difficulties in obtaining representative coverage. He was able to include 15 developed market economies, two developing countries (India and Mexico) and the Soviet Union. This produces a total of 18 countries, one less than the number of countries for which we have complete HBS data for the year 2000.

Table 1

Coverage of Wealth Levels Data (Year 2000)

		High income		Upper middle income	Lower middle income	Low income	Cumulative % of world population
Complete financial and non-financial data							
Household Balance Sheets	North America Canada US	Europe Denmark Finland France Germany Italy Netherlands Portugal Spain UK	Asia-Pacific Australia Taiwan Japan New Zealand Singapore	Czech Republic Poland South Africa			15.3
Survey data					China	India Indonesia	56.0
Incomplete data							
Financial Balance Sheets	Switzerland	Austria Belgium Greece Slovenia Sweden	Korea Slovakia	Croatia Estonia Hungary Latvia Lithuania	Bulgaria Romania Turkey		59.5
Survey data: non-financial assets				Mexico			61.1
Number of countries with wealth partly or fully estimated by regression method		18		28	36	46	95.2
Number of countries with wealth imputed by mean value of group		33		17	22	9	100.0

The asset composition of household balance sheets in different countries reflects influences such as market structure, regulation and cultural preferences (IMF, 2005). For most countries, non-financial assets account for between 40 and 60% of total assets, with higher shares in the Czech Republic, New Zealand, Poland and Spain (Davies *et al.*, 2009, Table 2). Housing assets constitute a considerable share of non-financial assets. These assets include both owner-occupied housing and rental property. In a few countries, for example Italy and Spain, the large increase in real estate prices in the late 1990s results in a share of housing in non-financial assets exceeding 80%. The US is an outlier in its high share of financial assets (67% of total assets), which is related to the strength of its financial markets and importance of private pensions as well as strong stock market performance in the 1990s.

The composition of financial assets can be examined not only for the 19 countries with complete balance sheets but also the 16 countries with only financial balance sheets. There are striking differences across countries when financial assets are disaggregated. At 53%, liquid assets are a large part of the financial portfolio in Japan; they are also high in most of the European transition countries, averaging 61% across the ten countries in this group. The preference for liquidity in Japan has a long history, but also reflects the poor performance of real estate and shares in the 1990s (Babeau and Sbano, 2003). The share of financial assets other than liquid assets or equities is particularly high in Australia, the Netherlands, South Africa and the UK, averaging 58% of total financial assets. This high share may be partly due to the importance of pension fund claims in these countries. Italy has a low share of liabilities (3% of total assets), which is also found in survey data. Poland and the Czech Republic again have low debt ratios, reflecting the under-development of mortgage and consumer credit in these transition countries.

1.2. *Survey Data*

In order to check the HBS data and to expand our sample, especially to non-OECD countries, household wealth survey data were also consulted.[5] Country coverage is broader than in HBS data. Most importantly, wealth surveys are available for the three most populous developing/emerging market countries: China, India and Indonesia. These three countries, together with Mexico in the case of non-financial assets, are used in regressions in Section 2 that provide the basis for wealth level imputations for our 'missing countries'.

Like all household surveys, those of wealth are affected by sampling and non-sampling errors. The high skewness of wealth distributions makes sampling error important. Non-sampling error is also a problem due to differential unit response –

[5] In the next Section, where we must provide a single estimate for the wealth level in each country, we use HBS data, where available, in preference to survey data. While HBS data are of course also subject to error, a country's wealth survey results can be, and normally are, used as an input in creating HBS estimates. Since the HBS estimates benefit from *additional* inputs of information and data from other sources, they should, in principle, dominate wealth survey estimates. The Survey of Consumer Finance (SCF) in the US is of such high quality, however, that it is not clear whether HBS or survey data should be preferred (Bertaut and Starr-McCluer, 2002, pp. 181–218). Fortunately for our purposes, HBS and SCF estimates of total household wealth in the US in 2000 are very similar (see below). Our results would differ little if the SCF had been used to establish the US wealth level.

wealthier households are less likely to respond – and under-reporting, especially of financial assets. Both sampling and non-sampling errors lead to difficulties in obtaining an accurate picture of the upper tail of the wealth distribution (Davies and Shorrocks, 2000, pp. 605–76; 2005). In order to offset these effects an increasing number of surveys over-sample wealthier households. This is the practice in the US Survey of Consumer Finances for example as well as in surveys in Canada, Germany and Spain.[6] Over-sampling at the upper end has not been adopted in the major developing countries represented here but these countries have much higher response rates than are seen in the developed countries and China and India have large samples, helping to reduce sampling error.[7]

Aside from the US – whose sophisticated Survey of Consumer Finance succeeds in capturing most household wealth – surveys usually yield lower totals for financial assets compared with HBS data, principally due to the lower response rate of wealthy households and under-reporting by those who do respond.[8] (See Appendix III of Davies *et al.*, 2009 for a comparison of wealth estimates from household balance sheets vs. surveys.) In contrast, survey totals for the most important non-financial asset, owner-occupied housing, are more accurate (Davies and Shorrocks, 2000, p. 630).

As reported in Davies *et al.* (2009, Table 3), non-financial assets bulk larger in surveys than in HBS data, reflecting both the relative accuracy of housing values in survey data and the importance of non-sampling error in the case of financial assets. There are differences in the relative importance of reported financial and non-financial assets in developed and developing countries. The two low-income countries in our sample, India and Indonesia, have very high shares of non-financial wealth. This reflects both the importance of land and agricultural assets and the lack of financial development. In contrast, China does not stand out as having a high share of non-financial assets. One reason is that the value of housing is reported net of mortgage debt in China. Another is that there is no private ownership of urban land. And of course there has been rapid accumulation of financial assets by Chinese households in recent years. The ratio of liabilities to total assets is particularly low in India and Indonesia. Again poorly developed financial markets help to explain this phenomenon. Italy also stands out as having a very low share of liabilities. This low share likely reflects the relative lack of mortgage loans in Italy compared to other OECD countries.

Combining the balance sheet and survey data, there are major international differences in asset composition. Real property, particularly land and farm assets, are more

[6] The SCF design explicitly excludes people in the Forbes 400 list of the wealthiest Americans, which again helps to reduce the effects of sampling error; see Kennickell (2006, pp. 19–88).

[7] See Deaton (1995) on the high response rates to surveys in developing countries in general. As reported in Davies and Shorrocks (2005), response rates in the 1991–2 Indian AIDIS were 95.7% and 94.6% in rural and urban areas respectively. The sample size in the 2002 survey in China was 16,035, and in the 1991–2 survey in India it was 57,031.

[8] Statistical organisations fight these forms of non-sampling error through their survey technique and questionnaire design. Once the results are in, it is also possible to try to correct for these errors. Particularly ambitious efforts have been made in the Italian SHIW survey. Brandolini *et al.* (2004) use records of the number of contacts needed to win a response to estimate the differential response relationship, which allows reweighting. They also use results of a validation study comparing survey responses and institutional records to correct for misreporting of selected financial assets. Finally, this study also imputes non-reported dwellings owned by respondents (aside from their principal dwelling).

important in less developed countries, while financial assets are more important in rich countries. There are also major international differences in the types of financial assets owned. Savings accounts are favoured in transition economies and some rich Asian countries, while share-holdings and other types of financial assets are more evident in rich Western countries. Debt is also less important in developing and transition countries than in the more developed countries (with the notable exception of Italy).

1.3. *Wealth Levels From Household Balance Sheet and Survey Data*

When wealth levels are compared across countries, one of the first issues to be confronted is the appropriate rate of exchange between currencies. In comparisons of consumption or income there is widespread agreement that international price differences should be taken into account via the use of PPP exchange rates.[9] This procedure seems appropriate for wealth holdings also if the focus of attention is, say, the bottom 95% of wealth-holders, for whom domestic prices are the main determinant of the real value of their assets. However, a large share of wealth is held by households in the top few percentiles of the distribution. People in this category, and their financial assets, tend to be internationally mobile, making exchange rates more relevant for international wealth comparisons among the rich and super-rich.

This article follows the convention of using PPP exchange rates to compare countries; unless otherwise stated, all wealth figures are expressed in PPP US dollars for the year 2000. Selected comparable figures on an exchange rate basis are presented in footnotes and appendices. They are also discussed in detail in Davies *et al.* (2008) which places more emphasis on the upper tail of the distribution.

Table 2 summarises information on the per capita wealth and income of countries with complete household balance sheet or wealth survey data (data for individual countries are given in Davies *et al.* (2009)). Of the 19 countries that have complete HBS data, the US ranks first with per capita wealth of $143,727 in 2000, followed by the UK at $128,959, Japan at $124,858, the Netherlands at $121,165, Italy at $120,897 and then Singapore at $113,631. South Africa is in last place, at $16,266, preceded by Poland at $24,654 and the Czech Republic at $32,431. The overall range is rather large, with per capita wealth in the US 8.8 times as great as that of South Africa. The (unweighted) coefficient of variation (CV) among the 19 countries is 0.440.

The next column shows GDP per capita. In the group of 19 countries with HBS data, the US again ranks first, at $35,619, and South Africa last, at $8,017. However, the range is much smaller than for net worth per capita. The ratio of highest to lowest GDP per capita is only 4.4, and the coefficient of variation (again among the 19 countries) is 0.301. These results are a first indication, which our full results confirm, that wealth is more unequally distributed across countries than is income. Note that while it is well known that wealth is more unequal than income *within* countries, that common

[9] There is, however, some disagreement about the *type* of PPP exchange rates that should be used. We follow common practice and use the Penn World Table PPP rates, which are based on the Geary-Khamis method. This method has many practical advantages, including desirable adding-up properties. The leading competitor is the method proposed by Elteto, Koves and Szulc (EKS), which has been used by the OECD and Eurostat to compare income across their member countries. See Neary (2004) for a discussion of the theoretical basis for the Geary-Khamis method.

observation does not imply anything about differences across countries. Column four shows personal disposable income per capita for the same group of countries. The US again ranks first, at $25,480, South Africa is again last, at $4,691, and the ratio of highest to lowest is 5.4, slightly higher than for GDP per capita. The coefficient of variation is 0.331, again slightly higher than that of GDP per capita. The fifth column shows real consumption per capita, whose dispersion is intermediate between that of GDP and disposable income. All in all, the per capita variation of net worth is much greater than that of GDP, disposable income or consumption.

Differences across countries are even more pronounced in survey data due to the inclusion of China, India and Indonesia. Of the 13 countries with the pertinent data, the US again ranks first in net worth per capita, at $143,857, followed by Australia at $101,597 and Japan at $91,856. In this group, India and Indonesia occupy the bottom two positions, at $6,513 and $7,973, respectively. China appears to be about twice as wealthy as India, having per capita net worth of $11,267. Note that the PPP adjustment has a proportionately greater impact on the figures for developing countries. Using official exchange rates, all three countries have much lower per capita wealth: India is at $1,112, Indonesia at $1,440 and China at $2,613. Hence inequality in wealth between countries is greater using official exchange rates, as reflected in the CV of 0.612 shown in the Table versus 0.440 on a PPP basis. In the survey data, as in the HBS data, the range in per capita wealth is much larger than that of per capita GDP, disposable income, or consumption. The ratio of highest to lowest is 22 for wealth per capita, 13 for both GDP and disposable income, and 17 for consumption. The coefficients of variation for the income and consumption variables are again smaller than for wealth, and higher using official exchange rates than PPP rates.

How large are the differences in the picture that one gets from HBS vs. survey data? There are 10 countries that have both types of data. For these countries the (simple) average of mean per capita PPP wealth is $98,364 in HBS data and $74,579 in survey data, a difference of 24%. (The difference is 25% using official exchange rates.) The correlation between HBS and survey means is just 0.62 on the PPP basis, although it rises to 0.83, using official exchange rates. The difference in means and the imperfect correlation are, we believe, largely a result of the uneven quality of survey evidence across countries. Given the latter, it seems clear that an approach in which one simply aggregated national survey data to estimate the world distribution of wealth would be inadequate. Since more consistent information is available, in the form of HBS data, in establishing wealth levels by country the latter should be used as far as possible. That is the approach followed in estimating the global distribution of wealth later in this article.

2. Estimates of Wealth Levels and Composition for all Countries

The next step is to generate per capita wealth values for the remaining countries of the world. As explained below, regressions run on the 39 countries with HBS or survey data enable part or all of wealth to be estimated for many countries. This yields a total of 148 countries with observed or estimated wealth, covering 95.2% of the world's population in 2000. Separate imputations are made for the 81 countries that make up the remaining 4.8%, as explained later in this Section.

The purpose of the empirical exercise reported in this Section is to predict wealth levels in countries where wealth data are missing. This imposes certain limitations. Most importantly, the independent variables in our regressions need to be available not only for the countries with wealth data, but also for most of those without such data – otherwise we would not be able to impute wealth to the 'missing countries'. Fortunately, this limitation does not prevent us from estimating a sensible empirical model of personal wealth levels across countries.

2.1. *Empirical Specification*

The basic life-cycle model (LCM) under certainty and perfect capital markets, and without government, provides a useful starting point for our empirical model.[10] Suppose that intertemporal preferences and the ages of starting work and retiring were the same everywhere but that length of life, L, varied internationally. Assume also that the real interest rate r was zero and that growth rates of both labour income and population, g and p respectively, were constant but differed across countries. For simplicity assume that workers are all employed full-time and have exogenous earnings. Then, mean wealth would be determined by g, p, L, and mean earnings, y. In steady-state we would have:

$$W = f(g, p, L)y \tag{1}$$

(Modigliani and Brumberg, 1980; Modigliani 1988.) A strong prediction of the LCM is that L will have a positive effect here. The growth rates g and p have a mild negative effect in the simple LCM.[11] The model can be extended to a world with government by redefining r and y as net of taxes and transfers.

While (1) takes us some way, it does not provide the entire basis for an empirical specification. Ideally one should take into account international differences in the age of retirement, for example. This is unfortunately impractical since the data are not available on a consistent basis for enough countries. But what of the role of the interest rate and that of public pensions? The impact of r in the LCM is complex and ambiguous. Also, empirical work finds conflicting, and often insignificant, impacts (Modigliani, 1988). Since we also do not have good data on r for a large set of countries we do not attempt to include it in our regressions. Pensions are a different matter. In the simplest version of the LCM, where consumption is constant over the lifetime and $r = g = p = 0$, y can be replaced in (1) by $y - b$, where y is net of pension contributions

[10] As far as we know, there have been no previous regression-based studies of the determinants of international wealth differences. Part of the original motivation for the LCM was to explain international differences in saving and wealth (Deaton, 2005). Results for international differences in saving have been mixed, but the life-cycle framework has proven useful in studying saving at the micro level (Browning and Crossley, 2001) and wealth distribution in macroeconomics (Cagetti and De Nardi, 2008). The LCM is fruitful in the present application in part because one of its central predictions, that wealth should increase with longevity (assuming this translates into longer retirements), holds here statistically.

[11] Steady-state saving will increase with both g and p, but the wealth to income ratio (W/y) tends to decline mildly with g and p. The reason is that there is, for the most part, a positive relationship between wealth and age in the LCM (the working period of rising wealth is longer than retirement and also early retirees have relatively high wealth). Higher p increases the relative number of young people, reducing W/y. Higher g increases both the relative wealth and labour income of the young but the effect of this on average income tends to be stronger than that on mean wealth, so again W/y tends to fall.

Table 2

Wealth per Capita from Household Balance Sheet and Survey Data (Year 2000)

	US$ per capita at PPP exchange rates				US$ per capita at official exchange rates			
	Wealth*	Real GDP†	Personal disposable income‡	Real Consumption†	Wealth*	GDP†	Personal disposable income‡	Consumption†
Household balance sheet data								
Mean	84,955	22,519	13,482	14,240	74,890	19,434	11,530	12,239
Median	90,906	23,917	12,798	15,197	70,916	21,425	11,915	12,708
Coefficient of variation	0.440	0.301	0.331	0.319	0.612	0.527	0.524	0.521
Highest wealth: US	143,727	35,619	25,480	24,313	143,727	35,619	25,480	24,313
Lowest wealth: South Africa	16,266	8,017	4,691	5,210	5,977	2,946	1,724	1,914
Survey data								
Mean	59,349	20,311	12,338	13,072	53,251	17,983	10,911	11,588
Median	61,218	23,917	12,798	15,197	45,176	20,338	11,557	12,708
Coefficient of variation	0.667	0.512	0.551	0.530	0.836	0.669	0.707	0.671
Highest wealth: US	143,857	35,619	25,480	24,313	143,857	35,619	25,480	24,313
Lowest wealth: India	6,513	2,684	1,916	1,406	1,112	458	327	240
Ratio high/low: HBS	8.8	4.4	5.4	4.7	24.1	12.1	14.8	12.7
Ratio high/low: survey data	22.1	13.3	13.3	17.3	129.4	77.8	77.9	101.4
China/US: survey data	12.8	9.3	13.2	13.0	55.1	40.0	56.8	56.1

*See Davies *et al.* (2005, Appendix II) for sources of HBS and survey data. Figures have been adjusted to year 2000 values using the real growth rate per capita.
†*Source*: Penn World Table Version 6.1.
‡*Source*: The Economist Intelligence Unit.

and b is the (constant) pension received in retirement. Public pensions thus have a direct negative effect on private wealth. However, in more complex versions of the LCM, and especially if impacts on age of retirement are taken into account, the effect of public pensions becomes ambiguous (Gale, 1998.) Nevertheless, although the evidence is mixed, several good empirical studies suggest a significant effect of pensions on wealth within a country.[12] We tested for a similar effect internationally in the work reported below, but no significant impact was found.

It must also be recognised that the steady-state assumption is a poor approximation in some cases, for example transition countries. Further, capital and other markets are not perfect. Access to financial institutions and products varies across countries, as do housing market institutions and the ease of mortgage finance. While (1) may provide a preliminary basis for our work, these additional effects also need to be taken into account. We do this by introducing a dummy variable for transition countries and introducing variables that may reflect relevant capital market differences, as discussed below.

One approach here would be to simply regress log W on the 'LCM variables' shown on the right-hand side of (1), with some allowance for transition countries and capital market imperfections. We can do that for the 23 countries that have data on both financial and real wealth. However, there is one country (Mexico) with data on real assets alone and 15 countries with good data on financial assets and liabilities. It would be unfortunate to exclude these countries, especially since they include a higher proportion of transition and middle-income countries. This raises the possibility of running separate regressions for real vs. financial wealth. How does that square with the framework we have been developing?

The simple LCM is silent on the division of wealth between different kinds of assets.[13] A naïve hypothesis would be that the various assets would be held in the same proportion in different countries. In this world one *could* run separate regressions for different asset groups but there would be no benefit since each regression would estimate the same coefficients except for scale. Furthermore, there could be a cost if measurement error in the dependent variable declines in importance with aggregation, as seems likely here. We ran separate regressions on real assets, financial assets and liabilities using the same variables and found that the hypothesis of a common structure was, in fact, strongly rejected. Further, as we see below, there are grounds for introducing non-common variables in these regressions and they perform well empirically. In this situation, as shown by Kennan (1989), there would be aggregation bias if a single equation were run for W. Since this cannot be done for the full sample of 39 countries in any case, our preferred approach is to run three separate regressions.

To give a behavioural basis to the three equations approach one must move beyond the simple LCM and think about differences in asset characteristics, including risk and

[12] See Gale (1998) for a summary, as well as Bottazzi *et al.* (2006) and Gale *et al.* (2007) on more recent work.

[13] If current income is low people may be net borrowers in the LCM, which implies holding some debt. This is the only prediction from the LCM regarding wealth composition, and even this prediction does not say much, since those with negative net worth could have assets as well as debts, so that their net borrowing may differ from their debt.

return. There is a literature on optimal portfolio selection in a life-cycle context. It finds that the intuitive idea that people should hold a less risky portfolio as they age is correct, at least beyond the middle working years, under plausible assumptions (Benzoni *et al.*, 2007; Gomes *et al.*, 2008.) Here that might suggest, e.g., that countries with higher population growth should have a higher ratio of financial to non-financial assets, assuming that financial assets are riskier.[14] The *amount* that people will save depends on the menu of risks and returns on different assets. One cannot generally decompose savings decisions into an 'LCM decision' of how much to save and a portfolio allocation decision. This indicates that in a more general version of the LCM risk elements would affect mean wealth.

One of the most important personal assets, housing, is held for consumption as well as investment purposes. With perfect markets this need not affect mean wealth. Households can rent or borrow freely to keep housing equity in line with life-cycle saving plans. However, in the real-world mortgage finance is not so flexible and tax or other institutions may favour owner-occupation. In this context, impacts on mean wealth can come from the housing market. For example, if the consumption demand for housing is inelastic, mean wealth may tend to be higher where housing is more expensive.

Because errors in our three equations are likely to be correlated, we use the seemingly unrelated regressions (SUR) technique due to Zellner (1962), see Greene (1993, pp. 486–99). This involves stacking equations and estimating via generalised least squares. While OLS estimates are consistent, SUR provides greater efficiency, with the gain in efficiency increasing with the correlation of the errors across the equations and decreasing with the correlation of the regressors used in the different equations. Since we have an equal number of observations for financial assets and liabilities but fewer observations for non-financial assets and since we believe errors are more likely to be correlated between financial assets and liabilities than between the latter variables and non-financial assets, we have applied SUR here only for financial assets and liabilities.

2.2. *Wealth Regressions*

Table 3 shows our main regression results. For comparison we show single-equation regressions for *log W* as well as our three equations for asset subgroups. In each case we show the preliminary specification (*a*) and the final specification (*b*). The two specifications mainly differ in that variables that were insignificant in (*a*) are not used in (*b*). However, in a few cases variables that were insignificant in (*a*) become significant when other insignificant variables are omitted and are retained in the (*b*) regressions.

Our first four regressors try to capture the four LCM variables *y*, *L*, *g* and *p*.[15] We initially used personal disposable income per capita for *y* and it performs well.

[14] Benzoni *et al.* (2007) emphasise that the optimal share of risky assets is hump-shaped over the life-cycle when cointegration of labour and stock returns is recognised. Whether a fast growing country would have a higher overall ratio of risky assets in their model therefore depends on the shape and peak age of this hump.

[15] Various specifications were tried for public pensions, including the replacement of *y* by $y - b$ in line with the simple LCM. The $y - b$ variable performed distinctly worse than *y* alone. When pension variables were introduced independently they were insignificant in all our equations. (This may be partly explained by the fact that the variable was not available for many of the low and middle income countries in our sample.) Given these findings, we do not report regressions including a public pension variable here.

However, this variable is not available for many of our 'missing countries' and so cannot be used to perform the intended imputations. In Table 3 we therefore report results using real per capita consumption[16] to play the role of y – it is highly correlated with y in-sample and its use has only a small impact on the estimated coefficients. This variable is significant at the 1% level in all our equations. Interestingly, while the estimated coefficients are insignificantly different from unity in most cases, for non-financial assets the coefficient is significantly less than 1. The coefficient is very close to 1 for financial assets and equals 1.199 for liabilities. These aspects are important, since in our imputations financial assets will increase roughly in proportion to income but non-financial assets will rise less and liabilities slightly more than in proportion to income.

For L we use life expectancy in 1980, attempting to capture conditions when the average adult of 2000 was in the middle of working life and forming expectations about his/her likely length of life and retirement. This variable is highly significant for total wealth and for non-financial assets. It is also significant at the 5% level for both financial assets and liabilities. The negative sign of the liabilities coefficient suggests that higher wealth is achieved partly through greater assets and partly through lower debts.

The growth rates g and p are each significant in just one of the (b) specification regressions in Table 3. Per capita GDP growth is retained in the financial assets regression but while population growth is significant for total wealth, it is not retained in the (b) specification of any of the three asset-specific equations. This general lack of significance may reflect the fact that, as mentioned earlier, the impact of these variables on W/y is expected to be mild on the basis of the LCM.

Turning to the additional variables, we used the (log of) population density as a proxy for house prices, expecting a positive impact on non-financial assets, which is indeed found. (The variable is also highly significant for total wealth.) Significant positive effects are found for the market capitalisation rate in the financial assets regression and domestic credits available to the private sector in the liabilities regression (both again in logs). These effects are consistent with better functioning of capital markets leading to their greater use. The urbanisation (% urban) and phone participation (% with phones) variables were included as they could affect ease of access to financial products. These variables were expected to have positive effects on both financial assets and liabilities. This expectation was correct for liabilities, but not for financial assets.

Finally, we have two dummies – one for cases where the data source is a survey rather than HBS data and the other for transition countries. The survey dummy is only significant in the financial assets regression but there it is highly significant and also has a large negative coefficient. This means that if the data source is a survey, mean financial assets will tend to be much lower than if the data are from national balance sheets. We use this result to adjust upwards the estimates of mean financial assets in both the wealth levels and distributional calculations reported below for China, India and

[16] Real consumption per capita is from Penn World Tables 6.1 and is based on National Accounts (NA) data, in which most forms of consumption are measured on the basis of current purchases. An important exception is housing consumption, which is measured by the value of housing services consumed. This means that the item includes rents or, in case of home owners, imputed rents. See Commission of the European Communities *et al.* (2001, Ch. IX, Section D).

Table 3

Regressions of Wealth Components

	Log wealth		Log non-financial wealth		Log financial wealth		Log liabilities	
Independent variables	(1*a*)	(1*b*)	(2*a*)	(2*b*)	(3*a*)	(3*b*)	(4*a*)	(4*b*)
Constant	−3.031*	−2.408***	−2.919**	−1.765**	−4.237**	−4.547***	−5.726**	−3.131*
	(1.508)	(0.680)	(1.130)	(0.634)	(1.718)	(1.133)	(2.197)	(1.693)
Log real consumption per capita	0.907***	0.886***	0.580***	0.681***	0.940***	1.040***	1.241***	1.199***
	(0.182)	(0.067)	(0.159)	(0.083)	(0.201)	(0.138)	(0.273)	(0.222)
Life expectancy in 1980 (*L*)	0.073**	0.063***	0.103***	0.075***	0.043	0.044**	−0.058*	−0.069**
	(0.028)	(0.015)	(0.028)	(0.017)	(0.027)	(0.021)	(0.035)	(0.028)
Average GDP per capita growth 1990–2000 (*g*)	−0.010		−0.048		0.114**	0.143***	−0.086	
	(0.050)		(0.047)		(0.046)	(0.036)	(0.061)	
Average population growth 1990–2000 (*p*)	0.192	0.174**	0.117		0.073		0.343*	
	(0.161)	(0.075)	(0.097)		(0.166)		(0.207)	
Log population density	0.134***	0.117***	0.134***	0.117***				
	(0.035)	(0.023)	(0.034)	(0.029)				
Log market capitalisation rate	0.013				0.403***	0.405***		
	(0.103)				(0.096)	(0.084)		
Log domestic credits available to private sector							0.831***	0.702***
							(0.179)	(0.147)
Urban population (% of total)	−0.003				0.002		0.017**	0.017**
	(0.007)				(0.006)		(0.008)	(0.008)
Fixed line and mobile phone subscribers (per 100 people)	−0.002				0.006		0.021***	0.015**
	(0.004)				(0.005)		(0.006)	(0.006)
Survey dummy	−0.093		0.061		−1.331**	−1.639***	1.061	
	(0.415)		(0.251)		(0.542)	(0.431)	(0.681)	
Transition dummy	−0.470	−0.430**	−0.537**	−0.533***	0.135		0.719*	
	(0.320)	(0.156)	(0.245)	(0.179)	(0.325)		(0.402)	
R^2	0.990	0.989	0.981	0.978				
'R^2'					0.968	0.966	0.960	0.953
RMSE	0.212	0.182	0.233	0.227	0.377	0.385	0.483	0.519
Sample size	22	22	23	23	38	38	38	38

Note. The non-financial regressions use Ordinary Least Squares and a sample consisting of 19 countries with HBS data and 4 with survey data. The financial assets and liabilities regressions use the Seemingly Unrelated Regression (SUR) method and a sample consisting of 35 countries with HBS or financial balance sheet data and 3 with survey data. Standard errors are given in parentheses. Significance: * 10% level; ** 5% level; *** 1% level. R^2 is not a well-defined concept in generalised least squares, so as is customary the fraction of the variance in the dependent variable that is 'explained' in each regression is referred to as 'R^2' here.
Sources. (*a*) Life expectancy in 1980, GDP per capita growth, population growth, market capitalisation rate, availability of domestic credit, urban population and fixed line and mobile phone subscribers are from World Development Indicators 2005–2008. (*b*) Real consumption is from PWT 6.1. See Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.1, Center for International Comparisons at the University of Pennsylvania (CICUP), October 2002. (*c*) Data for Taiwan is from the National Statistical Office's website.

Indonesia. The transition dummy has a highly significant, but smaller, negative impact on non-financial wealth and total wealth. In contrast to the survey dummy, we believe the transition dummy is telling us something about the real-world – that the values of non-financial assets in transition countries are depressed, perhaps due to incomplete housing markets and under-developed housing finance.

2.3. *Estimated Wealth Levels*

Table 4 summarises the wealth levels obtained for the world and its regions. HBS data are used where available (see Table 1); corrected survey data are used for China, India and Indonesia. Financial assets and liabilities are imputed for 110 countries, and non-financial assets for 125 countries, using the regressions described in the previous section. For the 81 countries that lack any data, the mean per capita wealth of the appropriate continental region (6 categories) and income class (4 categories)[17] were assigned. This imputation is admittedly crude but better than simply disregarding the excluded countries. It allows us, in the end, to assign wealth levels to 229 countries.

Table 4 provides both per capita and per adult numbers, each weighted by their respective population weight. For the world as whole in 2000, net worth was estimated to be $26,738 per capita and $44,024 per adult. North America accounted for 27% of world household wealth, much more than its 5% share of world population and greater than its 24% share of world GDP. The 'rich Asia-Pacific' group and Europe show a similar pattern, with wealth shares much greater than their population shares and larger than their shares of world GDP. Given these results, it is not surprising to see that between-

Table 4

Average Wealth and Income by Region (Year 2000) (PPP$)

Region (number of countries)	Share of world population (%)	Wealth per capita	Wealth per adult	Share of world wealth (%)	GDP per capita	GDP per adult	Share of world GDP (%)
North America (5)	5.2	138,417	193,147	26.8	34,947	48,765	23.6
Latin America and Caribbean (46)	8.6	19,713	34,031	6.4	7,683	13,262	8.6
Europe (48)	12.0	62,918	83,336	28.2	16,444	21,780	25.7
Africa (56)	13.4	4,324	9,336	2.2	2,242	4,842	3.9
China	20.6	12,819	19,056	9.8	3,844	5,713	10.3
India	16.8	6,718	12,021	4.2	2,684	4,802	5.9
Rich Asia-Pacific (17)	4.0	101,924	135,572	15.3	23,247	30,912	12.1
Other Asia-Pacific (55)	19.5	9,808	18,054	7.2	3,911	7,206	10.0
World (229)	100	26,738	44,024	100	7,675	12,633	100
World between-country Gini coeff.		0.583	0.533		0.503	0.448	

Note. The world between-country Gini coefficient is the Gini inequality value computed using the per capita (or adult) wealth (or income) figures for 229 countries weighted by population size.
Source. Authors' calculations.

[17] Our regional calculations treat China and India separately due to the size of their populations. The regional breakdowns also distinguish the high income subset of countries in the Asia-Pacific region (a list which includes Japan, Taiwan, South Korea, Australia, New Zealand and several Middle Eastern states) from the remaining (mainly low-income) nations.

country inequality, as shown by the Gini coefficient, is higher for wealth than GDP (0.583 vs. 0.503 respectively on a per capita basis). Note also that between-country wealth inequality is lower using the per adult basis (which gives a Gini coefficient of 0.533), reflecting the fact that the difference between wealth per capita and per adult is greater in poor countries, which have a higher proportion of children in their populations.

The rich Asia-Pacific group includes Hong Kong, which has the highest mean wealth in the world on per capita basis and the second highest on a per adult basis according to our estimates – $175,191 per capita and $228,675 per adult, or 5.2 times the world average per adult (Davies *et al.*, 2009, Appendix VI). This group also includes Japan and Singapore, both at 3.6 times the world average per adult. Europe contains both very high wealth countries, such as Luxembourg (the first place country per adult, with wealth 5.7 times the world average), the UK (3.9 times the world average) and the Netherlands and Italy (3.6 and 3.4 times the world average respectively), as well as low wealth countries such as Moldova (29% of the world average), the Ukraine (43%) and Albania (47%).

Lower down the scale, China and India collectively accounted for 37% of world population in the year 2000 but only 16% of world GDP and 14% of the global wealth. China's net worth per adult was $19,056 (43% of the world average) and India's was $12,021 (27%). Latin American and the Caribbean had 9% of the world's population and GDP but 6% of world wealth. Among this group, the wealthiest countries include Barbados (3.4 times the world average per adult), Puerto Rico (2.8 times) and Trinidad and Tobago (2.1 times). The less affluent countries in this group include Haiti (18% of the world average), Bolivia (19%) and Honduras (27%).

Africa and 'other Asia-Pacific' countries together accounted for 33% of the world population but only 14% of world GDP and 9% of global wealth. Almost all countries in the other Asia-Pacific group have net worth per adult below the world average, except for Lebanon positioning itself just above the mean. Yemen (5%) and Cambodia (10%) are the least wealthy countries in this group. With the notable exception of Mauritius and the Seychelles (2.4 and 1.1 times the world average per adult), the African nations are all below average in per capita wealth and include South Africa (66% of the world average), Zimbabwe (39%), Kenya (22%), Uganda (13%), Tanzania (5%) and Nigeria (3%).

3. Wealth Distribution Within Countries

In order to estimate the global distribution of wealth we need estimates of the distribution within countries. We start by assembling estimates for countries with hard data. We then perform imputations for the remaining countries. The resulting estimates are intended mainly as an input into our global calculations but also have some independent interest, as we bring out in the discussion.[18]

As indicated in Table 5, information on the distribution of wealth across households or individuals can be assembled for 20 countries. One set of figures was selected for

[18] Country-level wealth inequality statistics could potentially be used as regressors in studies e.g. of economic growth or political stability. They may also be useful in the assessment of the success of financial systems and public policies to encourage personal wealth. However, restraint should be shown in the use of our country-level estimates where they are imputed rather than based on hard data.

Table 5

Wealth Shares for Countries With Wealth Distribution Data (%)

			Share of lowest										Share of top					
Country	Year	Unit	10%	20%	25%	30%	40%	50%	60%	70%	75%	80%	90%	10%	5%	2%	1%	0.5%	0.1%
Australia	2002	household	−0.1	0.2		1.6	4.4	8.9	15.4	24.4		36.9	55.2	44.9	31.0				
Canada	1999	family				1.0	3.0	6.0	11.0	19.0		30.0	47.0	53.0					
China	2002	individual	0.7	2.8		5.8	9.6	14.4	20.6	28.9		40.7	58.6	41.4					
Denmark	1996	family	−14.4	−17.3		−18.1	−18.1	−17.6	−15.8	−10.5		1.3	23.6	76.4	56.0		28.8	22.2	11.6
Finland	1998	household	−0.9	−0.9		−0.3	2.2	7.4	15.0	25.0		38.6	57.7	42.3					
France	1994	adult											39.0	61.0			21.3		6.3
Germany	1998	household	−0.3	−0.2		0.3	1.5	3.9	9.0	18.9		34.0	55.7	44.4					
India	2002–3	household	0.2	1.0		2.5	4.8	8.1	12.9	19.8		30.1	47.1	52.9	38.3		15.7		
Indonesia	1997	household	0.0	0.4		1.3	2.8	5.1	8.5	13.5		21.1	34.6	65.4	56.0		28.7		
Ireland	1987	household	0.0	0.2		2.5	6.6	12.2	18.9	28.5		40.4	57.7	42.3	28.7		10.4		
Italy	2000	household					7.0					36.2	51.5	48.5	36.4		17.2		
Japan	1999	household	0.5	2.1		4.8	8.7	13.9	20.7	29.8		42.3	60.7	39.3					
South Korea	1988	household	0.5	1.8		4.0	7.4	12.3	18.9	27.9		39.9	56.9	43.1	31.0		14.0		
New Zealand	2001	econ. unit											48.3	51.7					
Norway	2000	household	0.1	0.7		2.6	5.8	10.4	16.4	24.2		34.6	49.6	50.5					
Spain	2002	household			2.1			13.2			34.7		58.1	41.9			18.3	13.1	5.6
Sweden	2002	household	−5.7	−6.8		−6.9	−6.6	−4.8	−0.6	7.1		19.9	41.4	58.6					
Switzerland	1997	family											28.7	71.3	58.0		34.8	27.6	16.0
UK	2000	adult						5.0			25.0		44.0	56.0	44.0	31.0	23.0		
US	2001	family	−0.2	−0.1		0.2	1.1	2.8	5.6	10.1		17.4	30.2	69.8	57.7		32.7		

Note. The data are reported as in the original sources and may contain rounding errors
Source. Davies *et al.* (2009 Appendix II C).

each nation, with a preference for the year 2000, *ceteris paribus*. In most countries there is only one suitable data source. Where there was a choice we assessed sources in terms of how comprehensive their population and asset coverage were, the unit used (adults being preferred to families or households) and how well they dealt with sampling error, particularly as it affects the upper tail.[19] To assist comparability across countries, a common distribution template was adopted, consisting of the decile shares reported in the form of cumulated quantile shares (i.e. Lorenz curve ordinates) plus the shares of the top 10%, 5%, 2%, 1%, 0.5% and 0.1%.

The data differ in various respects. The unit of analysis is most often a household or family but in one case (China) the unit is individuals – of any age, and for France and the UK it is an adult individual. New Zealand uses the 'economic unit', defined as an unpartnered adult or a couple. Distribution information is sometimes reported giving all decile shares, together with the shares of the top 5% and 1%. But this pattern is far from universal. In some instances information on quantile shares is very sparse. On other occasions, wealth shares are reported for the top 0.5% or even the top 0.1%, as in the cases of Denmark, France, Spain and Switzerland.

The most important respect in which the data vary across countries is the manner by which the information is collected. Household sample surveys are employed in 15 of the 20 countries.[20] Survey results are affected by sampling and non-sampling error, as discussed earlier. Non-sampling error tends to reduce estimates of inequality and the shares of the top groups because wealthy households are less likely to respond, and because under-reporting is particularly severe for the kinds of financial assets that are especially important for the wealthy – for example, equities and bonds.

Other wealth distribution estimates derive from tax records. The French and UK data are based on estate tax returns, while the data for Denmark, Norway and Switzerland originate from wealth tax records. These data sources have the advantage that 'response' is involuntary and under-reporting is illegal. However, under-reporting may occur nonetheless and there are valuation problems that produce analogous results.

Wealth tax regulations may assign to some assets a fraction of their market value and omit other assets altogether. There are also evident differences in the way that debts are investigated and recorded. For most countries the bottom decile of wealth-holders is

[19] In the US for example, we have used the SCF, which is purpose-designed to estimate the distribution of wealth. It has comprehensive asset and population coverage and a sophisticated strategy for dealing with the upper tail. Estate-tax based estimates are also good in the upper tail, but are subject to a range of possible biases and do not cover the middle or bottom of the distribution (Kopczuk and Saez, 2004). The Panel Study of Income Dynamics (PSID) collects wealth data but it cannot compete with the SCF in estimating the overall distribution of wealth especially since there is no oversampling of the upper tail (Juster and Smith, 1999). The situation in the UK and Germany is somewhat similar, both having panel studies (BHPS and SOEP respectively – see Sierminska *et al.*, 2006) with similar limitations to the PSID. For the UK we use estate-multiplier data, which is good in the upper tail and is on a per-adult basis. For Germany we have used the EVS survey conducted by the federal statistical office. The EVS has a large sample, strong weighting procedures and detailed asset coverage (Hauser and Stein, 2006).

[20] The list of countries differs a little from that used in Sections 1 and 2. Here the desire is to exploit distributional information for as many countries as possible, so countries with data considerably earlier than 2000 were added: Ireland (for 1987) and Korea (for 1988). In the absence of any better alternative for the two countries, we take the shape of the wealth distribution from the late 1980s to be a guide for the distribution in the year 2000. Sweden was also added since its distributional detail is of interest, although the mean from this source was not judged sufficiently reliable to be used in our levels estimates. The Netherlands was dropped due to insufficient distributional detail.

reported as having positive net wealth but in Sweden the bottom three deciles each have negative net worth and in Denmark this is true for the bottom four deciles. These negative shares appear to result partly from measurement problems (Klevmarken, 2006; Davies *et al.*, 2009).

Table 5 shows that estimated wealth concentration varies significantly across countries but is generally very high. Comparisons of wealth inequality often focus attention on the share of the top 1%. That statistic is reported for 11 countries, a list that excludes China, Germany and the Nordic countries apart from Denmark. Estimated shares of the top 1% range from 10.4% in Ireland to 34.8% in Switzerland, with the US towards the top end of this range at 32.7%.[21] The share of the top 10%, which is available for all 20 countries, ranges from 39.3% in Japan to 76.4% in Denmark.

The differences in wealth concentration across countries in Table 5 are attributable in part to differences in data quality. In the case of survey data it is important to oversample in the upper tail to get the best possible estimates of top wealth shares. However, this is done in a minority of cases – just Canada, Germany, Spain and the US in the data used here. In the absence of oversampling in the upper tail, Davies (1993) concludes on the basis of evidence for Canada and the US that the share of the top 1% may be under-estimated by about 5–10 percentage points (Davies, 1993, pp. 168–71 and p.176). The surprisingly low top shares seen here in some countries, for example Ireland, may reflect this phenomenon.[22]

As evident from Table 5, the available sources provide a patchwork of quantile shares. In order to move towards an estimate of the world distribution of wealth, more complete and comparable information is needed on the distribution in each country. To achieve this, missing cell values were imputed using a programme developed at UNU-WIDER which constructs a synthetic sample of 1,000 observations that conforms exactly with any valid set of quantile shares derived from a distribution of positive values (e.g., incomes) (Shorrocks and Wan, 2009).[23] To apply this 'ungrouping' programme,

[21] The sampling frame for the US survey excludes the Forbes 400 richest families; adding them would raise the share of the top 1% by about two percentage points; see Kennickell (2006, p. 20). Note also that this estimated share is higher than that found in estate-multiplier data for the US. See Kopczuk and Saez (2004) who report a share of the top 1% of adults in the US in the year 2000 of 20.8% using estate-tax data. There are differences in asset coverage between the SCF and the estate-multiplier estimates, as well as problems of tax evasion and avoidance in the estate-tax data. In addition the SCF uses a family rather than adult unit. As discussed by Kopczuk and Saez, it is widely believed that the SCF provides a better snapshot of the distribution of wealth than the estate-multiplier data at a point in time. However, the estate-multiplier data, which go back to 1916, have no rival in attempts to trace the evolution of the US wealth distribution over long spans of time.

[22] Low top shares are also seen in some of the data we have rejected for countries with multiple sources. Shares of the top 10% of 45% and 64% are seen in the UK's BHPS for 2000 and the PSID (US) for 2001 respectively (Sierminska *et al.*, 2006, Table 7), figures that are both lower than the estimates seen in our Table 5. Neither the BHPS nor the PSID over-samples the upper tail, whereas Table 5 shows estate-tax based data for the UK, which do not have a sampling problem in the upper tail, and SCF data for the US, which over-sample the upper tail carefully. The German SOEP for 2002 shows higher top shares than the EVS used in our Table 5 but the SOEP results are distorted by the fact that most financial assets and non-housing debt are only recorded for values exceeding 2,500 euros, which exaggerates inequality (Sierminska *et al.*, 2006).

[23] The first stage of the procedure fits a Lognormal distribution to the reported data and generates an equal-weighted synthetic sample of 1,000 observations which is approximately consistent with the recorded quantile shares. The second stage adjusts the values of the observations within each quantile until the quantile shares for the synthetic sample exactly match the true figures. Although other theoretical functional forms tend to provide a better initial fit to wealth distributions, particularly in the upper tail, the second stage 'stretching' procedure improves the accuracy of the Lognormal-based sample so much that the outcome is as good as, if not better than, the usual alternatives.

the negative wealth shares reported for Denmark, Finland, Germany and Sweden were discarded, together with the zero shares reported elsewhere, thus treating the cell values as missing observations.

The 20 countries for which wealth distribution data are available include China and India and, hence, cover a good proportion of the world population. They also include most of the large rich countries and, therefore, cover most global wealth. However, the fact that the list is dominated by OECD members cautions against extrapolating immediately to the rest of the world.

For most countries lacking direct wealth distribution data, the pattern of wealth distribution was estimated using income distribution data recorded in the World Income Inequality Database (WIID) dataset, on the grounds that wealth inequality is likely to be correlated – possibly highly correlated – with income inequality across countries. The WIID dataset covers 144 countries and has multiple observations for most of them. Where possible, data was chosen for *household income per capita* across *individuals* for a year close to 2000, with first priority given to figures on disposable income, then consumption or expenditure. 85% of the income distributions conform to these criteria. Figures for gross incomes added a further 7%, leaving a residual 8% of countries for which the choices were very limited. The 'ungrouping' programme was then used to generate quantile shares for income (reported in Lorenz curve form) according to the same template employed for wealth distribution.

The common template applied to the wealth and income distributions allows Lorenz curve comparisons for each of the 20 reference countries listed in Table 5. In every instance, wealth shares are lower than income shares at each point of the Lorenz curve: in other words, wealth is unambiguously more unequally distributed than income. Furthermore, the ratios of wealth shares to income shares at a given percentile are roughly similar across countries, suggesting that income inequality can be used to generate an imputation for wealth inequality when wealth distribution data are not available. Thus, in our imputations, the ratio of the Lorenz ordinates for wealth compared to income is taken to be constant across countries. These constant ratios (14 in total) correspond to the average value recorded for the 20 reference countries. This generates estimates of wealth distribution for 124 countries to add to the 20 original countries which have direct evidence of wealth inequality.

The group of 144 countries with actual or estimated wealth distribution data differs slightly from the group of 150 nations which have figures for mean wealth derived from actual data or the regressions of Section 2. Distributional evidence is more common for populous countries, so the group of 144 now includes Cuba, Iraq, Myanmar, Nepal, Serbia, Sudan and Uzbekistan and covers 96.6% of the global population. For the rest of the world not covered by WIID data, the default of disregarding the remaining countries was again eschewed in favour of imputing a wealth distribution pattern equal to the (population weighted) average for the corresponding region and income class.

4. World Distribution

In this Section we present our estimate of the global distribution of wealth on a PPP basis. Subsequently we test the sensitivity of this estimate to the use of PPP rather than official exchange rates and to the use of imputed data. The latter exercise allows us to

present an estimate of the distribution of wealth for just the 20 countries, with 59% of the world's adult population, that have hard data. First, however, we consider the choice of unit to be used in these exercises.

The interpretation of data on personal wealth distribution depends on the underlying population deemed to be relevant. Are we interested in the distribution of wealth across all individuals, adult persons, or households or families? When examining the analogous issue of global income distribution, it is common practice to assume (as a first approximation) that the benefits of household expenditure are shared equally among household members and that each person should be weighted equally in the overall distribution. However, the situation with wealth is rather different. Personal assets and debts are typically owned by named individuals and may well be retained by those individuals if they leave the family. Furthermore, while some household assets, especially housing, provide a stream of communal benefits, it is highly unlikely that control of assets is shared equally by household members or that household members will share equally in the proceeds if the asset is sold. Membership of households can be quite fluid (for example, with respect to children living away from home) and the pattern of household structure varies markedly across countries. These aspects all argue for the use of an individual unit rather than the household or family. There is an additional, practical, reason for not using households, which is that the number of households is unknown for most countries, whereas adult population data are readily available. Finally, those under about 20 years of age have little formal or actual wealth ownership and should therefore likely be set aside. Thus, despite the fact that most of the datasets listed in Table 5 are constructed on a family or household basis, our goal is to estimate the distribution of global wealth on a per-adult basis.

In estimating the global distribution we assume, in effect, that the shape of the adult distribution of wealth at country level is the same as that of a family or household-based distribution. Adult and household distributions would indeed have the same shape if children held insignificant assets, the number of adults per household did not vary systematically with wealth and wealth were equally divided among adults in a household. Children do have little wealth. However, wealthier households on average have more adults; although there has been a trend towards more equal division of assets within marriage, equal division is not universal. Studies have looked at what happens when, starting with adult data, one 'pairs up' a portion of adults into couples and measures inequality on a family basis. This reduces inequality among married people but increases measured inequality between singles and couples. The effects are to an extent offsetting but the net effect is to reduce measured inequality somewhat.[24] This

[24] Wolff and Marley (1989) compared the share of wealth held by the top percentile of adults in US estate-multiplier data with a *lower-bound* estimate of the share held by the top percentile of families, derived from the estate-multiplier data via assortative mating assumptions. As reported by Wolff (2002, p. 82), they found a share for the top 1% of adults of 19.1% vs. 12.7% for families in 1976. Atkinson and Harrison (1978, p. 248) found a smaller effect using UK data – a maximum decline from 30.8% to 25.6% in the share of the top 1% in going from an adult to family basis. Frick *et al.* (2007) compare individual and household distributions of wealth using the 2002 German SOEP survey. (It is very unusual for wealth survey data to allow such a comparison.) Gini coefficients are 0.787 for individuals and 0.734 for households, but this again gives an upper bound on the difference that interests us. The Frick *et al.* calculation is on a per capita basis, which gives lower inequality for households than would be obtained with the conventional equal weighting of households.

impact should be borne in mind in interpreting our estimate of global wealth inequality.

4.1. *Global Distribution*

In order to get an estimate of the global distribution of wealth the national wealth levels derived in Section 2 were combined with the wealth distribution data derived in Section 3. Specifically, the ungrouping programme was applied to each country to generate a sample of 1,000 synthetic individual observations consistent with the (actual, estimated or imputed) wealth distribution. These were scaled up by mean wealth, weighted by the adult population size of the respective country and merged into a single dataset comprising over 200,000 observations. The complete sample was then processed to obtain the minimum wealth and the wealth share of each percentile in the global distribution of wealth. The procedure also provides estimates of the composition by country of each wealth percentile, although these are rough estimates given that the population of each country is condensed into a sample of 1,000, so that a single sample observation for China or India represents more than half a million adults.

Tables 6 and 7 summarise our estimates of the distribution of wealth across the global population of 3.7 billion adults. Only $8,635 was needed in order to belong to the top half of the world wealth distribution in the year 2000 but to be a member of the top 10% required at least $89,569 and membership of the top 1% required more than $518,364 per adult. This latter figure is surprisingly high, given that the top 1% group contains 37 million adults and is therefore far from an exclusive club. The entrance fee has no doubt grown higher still in the period since the year 2000. The figures for wealth shares show that the top 10% of adults owned 70.7% of global household wealth, so that the typical member of this group had 7.1 times the average global holding. The corresponding figures for the top 5% and top 1% are 56.7% (11.4 times the average) and 31.6% (31.9 times the average), respectively. This contrasts with the bottom 30% of the distribution, which collectively owned just 1% of global wealth. Thus the top 1% owned about 32 times as much as the bottom three deciles.

Table 7 gives wealth Gini coefficients for the larger countries and for the world as a whole. As mentioned earlier, wealth distribution is unambiguously more unequal than income distribution in all countries which allow comparison. The wealth Gini coefficient estimates for individual countries in Table 7 range from a low of 0.547 for Japan to the high values reported for Brazil (0.784) and the US (0.801). Switzerland, whose distribution is based on hard data with good detail in the upper tail, has a Gini coefficient of 0.803 (Davies *et al.*, 2009, Appendix IV) The US and Switzerland have Gini coefficients close to the global wealth Gini of 0.802. Note that as is true within countries, the global figure is considerably higher than the values computed for the global income distribution. Milanovic (2005, p. 108) reports a Gini coefficient of 0.642, for example, for the world distribution of income in 1998 on a PPP basis.

Table 6 provides the regional representation in the various wealth quantiles. The top end of the global wealth distribution is dominated by North America, Europe and the rich Asia-Pacific countries, with Europe having 35% of the members of the top decile and North America and rich Asia-Pacific each contributing just above 20%. The North

Table 6

Global Wealth Distribution per Adult in 2000 (regional details based on PPP exchange rates)

	Decile									Top			Adult population (million)	Adult population share (%)
	1	2	3	4	5	6	7	8	9	10%	5%	1%		
World wealth shares (%)	0.1	0.3	0.6	1.1	1.6	2.4	3.8	6.3	13.1	70.7	56.7	31.6		
Minimum wealth (PPP$)	0.5	735	1,837	3,658	5,802	8,635	13,022	20,884	36,944	89,569	172,236	518,364		
Adult population proportions by region (%)														
North America	1.5	2.8	3.9	3.5	3.9	3.8	4.8	6.0	9.1	21.7	25.5	39.1	225.7	6.1
Latin America and Caribbean	10.8	9.1	8.7	7.2	6.8	7.0	8.2	8.7	8.8	6.5	5.9	5.9	302.9	8.2
Europe	9.1	9.2	9.7	9.8	9.7	11.9	14.3	17.8	22.2	35.2	36.5	31.4	550.6	14.9
Africa	33.1	19.0	14.4	9.0	6.3	5.6	5.2	4.3	3.4	1.6	1.2	1.0	376.3	10.2
China	4.3	13.0	11.8	30.5	36.9	36.9	33.5	31.5	24.1	5.3	2.3	0.0	842.1	22.8
India	18.4	21.9	25.3	19.6	17.0	15.9	14.3	11.6	7.9	2.5	1.2	0.0	570.6	15.4
Rich Asia-Pacific	0.2	0.6	1.2	1.4	1.9	2.2	2.7	5.4	12.8	21.1	22.7	18.9	183.3	5.0
Other Asia-Pacific	22.6	24.4	24.8	19.0	17.5	16.8	17.0	14.8	11.7	6.1	4.6	3.8	646.1	17.5
World	100	100	100	100	100	100	100	100	100	100	100	100	3,697.5	100

Source. Authors' calculations.

Table 7

Global Wealth Distribution in 2000 (country details based on PPP exchange rates)

	Quintiles					Top			Adult population (million)	Population share (%)	Mean wealth per adult (PPP$)	Wealth share (%)	Median wealth per adult (PPP$)	Gini
	Q1	Q2	Q3	Q4	Q5	10%	5%	1%						
US	3.7	6.8	7.1	9.8	27.5	19.4	23.3	36.8	202.9	5.5	201,319	25.1	41,682	0.801
Japan	0.1	0.9	1.5	3.6	21.3	14.1	15.8	12.0	100.9	2.7	157,146	9.7	93,152	0.547
Germany	3.5	1.0	1.6	2.6	8.9	7.0	8.9	3.9	64.8	1.8	115,325	4.6	39,709	0.667
UK	0.4	1.2	1.7	2.0	6.7	5.9	5.8	6.4	43.9	1.2	172,461	4.6	77,439	0.697
Italy	0.0	0.3	0.8	2.6	8.9	5.8	5.5	5.4	46.4	1.3	150,327	4.3	80,043	0.609
China	17.3	42.3	73.8	64.9	29.4	5.3	2.3		842.1	22.8	19,056	9.9	10,411	0.550
Spain	0.1	0.6	0.8	1.0	6.1	3.6	3.5	1.4	32.2	0.9	117,837	2.3	72,483	0.570
France	0.3	1.1	1.6	3.0	6.0	3.5	3.9	5.9	44.4	1.2	126,360	3.4	36,975	0.730
India	40.3	44.9	32.9	25.9	10.3	2.5	1.2		570.6	15.4	12,021	4.2	4,809	0.669
Canada	0.6	0.7	0.5	1.0	3.3	2.3	2.2	2.3	22.8	0.6	120,326	1.7	45,850	0.688
Brazil	8.0	5.9	4.8	5.3	4.3	1.8	1.6	1.4	104.2	2.8	27,559	1.8	6,046	0.784
Taiwan	0.0	0.2	0.5	0.8	2.7	1.7	1.8	1.9	15.5	0.4	143,405	1.4	62,867	0.655
South Korea	0.2	0.8	1.3	2.5	4.2	1.6	0.9	0.8	33.2	0.9	58,314	1.2	33,038	0.579
Australia	0.4	0.3	0.3	0.2	2.4	1.6	1.7	1.3	13.7	0.4	126,635	1.1	75,027	0.622
Netherlands	0.0	0.2	0.3	0.6	2.2	1.4	1.7	1.6	12.0	0.3	159,910	1.2	71,441	0.650
Mexico	3.1	2.8	2.6	3.6	3.1	1.2	1.1	1.1	56.1	1.5	34,879	1.2	9,731	0.749
Argentina	0.8	0.9	0.9	1.4	2.4	1.2	1.1	1.2	23.3	0.6	71,115	1.0	20,264	0.740
Russia	6.7	6.3	5.7	6.9	3.5	1.0	0.8	0.6	107.5	2.9	20,005	1.3	7,438	0.699
Indonesia	11.1	9.5	6.3	5.1	1.7	0.9	0.7	0.7	124.4	3.4	13,642	1.0	3,838	0.764
Turkey	2.2	2.2	2.1	2.5	2.0	0.7	0.5	0.4	40.4	1.1	27,657	0.7	9,100	0.718
Thailand	2.0	2.1	2.0	2.6	2.2	0.7	0.6	0.4	40.2	1.1	30,344	0.7	10,101	0.710
Pakistan	5.0	5.3	4.4	2.4	1.2	0.4	0.3	0.2	68.0	1.8	12,390	0.5	4,643	0.698
Viet Nam	3.0	3.0	2.6	2.4	1.0	0.3	0.2	0.1	44.0	1.2	14,613	0.4	5,684	0.682
Bangladesh	6.2	5.7	3.6	1.9	0.5	0.1	0.1		66.5	1.8	7,734	0.3	3,304	0.660
Nigeria	11.6	1.6	0.5	0.2	0.0				51.4	1.4	1,423	0.0	434	0.736
World	100	100	100	100	100	100	100	100	3,697.5	100	44,024	100	8,635	0.802

Note. Countries are listed according to the number of members of the global top wealth decile. Estimated figures in italics.
Source. Authors' calculations.

American share rises rapidly in the upper tail, to 39% in the top percentile, overtaking Europe whose share declines to 31%.

The middle half of the distribution is the domain of China, which supplies a third of the membership of deciles 4–8. In contrast, India is concentrated at the lower end of the global wealth distribution; the membership share is almost a quarter (21.9%) for the bottom three deciles and then declines monotonically with wealth right up to the top tail. The membership pattern of India is roughly similar to that of Africa.

Residents of Latin America and the Caribbean are spread across the entire global distribution, reflecting the great inequality of wealth-holding in that region. Taken as a whole, Asia-Pacific countries apart from China and India are also quite evenly spread, although there is high polarisation, with rich Asia-Pacific countries occupying the top end and the lower income countries (especially, Indonesia, Bangladesh, Pakistan and Vietnam) being found in the lower tail.

Table 7 provides more details for those countries that have either high wealth (more than 1% of global wealth or more than 1% of members of the world top wealth decile) or else adult populations exceeding 45 million. A country's ranking in the global top wealth decile depends on a combination of three factors: population size, mean wealth and wealth inequality. The US heads the list, with 19.4% of the world's top decile and 36.8% of the top percentile. Large population, high mean wealth and high wealth inequality all reinforce each other in the US case to produce this result. Japan comes a strong second to the US, with 14.1% of the top decile and 12.0% of the top percentile. This strong performance reflects not only Japan's population size but also its high personal saving rate and resulting high household asset levels. Germany, the UK and Italy follow Japan with 7.0, 5.9 and 5.8% of the top decile respectively, accounting for more than half of the 35.2% population share of Europe in the top global decile. Note also that Italy, like Japan, has very low representation in the bottom half of the world distribution and, in particular, relatively fewer members than the US, Germany or the UK. This reflects, in part, the remarkably low level of household debt in Italy.

Table 7 also reports figures for median wealth across countries, which reflect variations in both mean wealth and inequality. One interesting observation is that median wealth rarely exceeds 50% of mean wealth. In addition, the rank order of countries changes significantly when medians are used instead of mean values. Of the countries listed in the Table, the US ranked first in mean wealth per adult, followed by the UK, Japan and then Italy. However, of this group, Japan ranks first in terms of median wealth per adult, followed by Italy, the UK and then the US. Indeed, Japan's median wealth was more than double the figure for the US although its mean wealth was 22% lower.

Missing from Table 7, of course, are the world's smaller countries, some of which are of special interest. (See Davies *et al.* (2009, Appendix IV) for details on all countries.) For example, some of the countries with very high wealth rankings have much less spectacular income rankings. Hong Kong and Ireland are examples of this. Also, some countries rank very high in per capita income but are not close to the top of the wealth rankings. This is perhaps most notable for the Nordic countries: Norway, Sweden, Denmark, Finland and Iceland. A possible explanation is that strong public infrastructure and social programmes in these countries make it less necessary for people to build up personal assets than in countries where there is less public wealth and social insurance.

4.2. *Sensitivity of Global Estimate to Assumptions and Imputations*

We need to check the sensitivity of the global estimate to some key assumptions and to the use of imputed data. In checking the latter aspect we will examine the distribution of wealth for just the 20 core countries for which we have hard data.

We begin by checking the sensitivity of our results to the use of PPP rather than official exchange rates. The first two rows of Table 8 show global estimates prepared on these alternative bases. By lowering the wealth levels of poorer countries, the shift from PPP to official exchange rates leads to a significant rise in measured inequality. The share of the top decile increases from 70.7 to 85.1% and the share of the top percentile from 31.6 to 40.1%. The world Gini coefficient jumps from 0.802 to 0.892, now far exceeding the figure recorded for any individual country. The use of official exchange rates may thus be viewed as magnifying wealth level differences across countries and ensuring that inter-country variations make a greater contribution to global wealth inequality.[25]

In contrast, Table 8 shows that the assumptions used during the course of our analysis have very little impact on global wealth distribution. Rows 3–5 report the PPP figures corresponding to row 1 after omitting countries for which data has been imputed from region-income group averages. Row 3 discards those with imputed wealth levels; row 4 those without income distribution data (and hence no way of estimating wealth inequality); and row 5 those with either form of imputation. The results show that the regional-income group imputations affect less than 6% of the global adult population and less than 3% of global wealth, so it is perhaps not surprising to discover no discernible impact on the global wealth distribution.

The last two rows take an even more extreme position, excluding all countries except the 20 nations listed in Table 4 which have wealth distribution data. Restricting attention to these 20 countries loses 25% of the world's wealth and 41% of the world's adults. Nevertheless, the figures in row 6 for our core group of 20 countries are little different from the row 1 benchmark, with a top 1% share of 31.7% compared to 31.6%, for example, and a Gini coefficient of 0.796 compared to 0.802.

The final row 7 keeps the same 20 core countries but discards the 'true' wealth distribution figures, replacing them instead with the estimate derived from income distribution data that was applied to most countries. Comparing rows 6 and 7 suggests that the estimation procedure reduces wealth inequality at the very top of the distribution, with the share of the top 1% falling from 31.7% to 27.4%. However, the share of the top two quintiles rises and the share of the bottom three quintiles falls, suggesting a shift towards greater inequality. The combined impact is evidently small, with the world Gini coefficient changing from 0.796 to 0.801. Overall, it seems that our method of estimating wealth distributions from income distributions and the other estimation and imputation procedures used during the course of our study, have little impact on the global wealth inequality figures. The impact is certainly less than the change induced by switching from PPP figures to official exchange rate valuations,

[25] The particular approach to estimating PPPs used in the Penn World Tables, the Geary-Khamis method, may also have an effect on our results. While it is widely used in the study of international differences in income this method produces smaller estimated differences in living standards between rich and poor countries than some other popular methods, for example the EKS method used by the World Bank (United Nations, 2007.) Using PPPs based on the Geary-Khamis method likely leads to lower estimates of world wealth inequality than would be obtained using the EKS method.

Table 8

Global Wealth Distribution Under Alternative Assumptions

						World wealth shares									
						Quintile					Top				
	Number of countries	Adult population (million)	Share of adult population (%)	Wealth per adult ($)	Share of wealth (%)	Q1	Q2	Q3	Q4	Q5	10%	5%	1%	Gini
(1) All countries, PPP valuations	229	3,697.5	100	44,024	100	0.4	1.7	4.0	10.1	83.9	70.7	56.7	31.6	0.802
(2) All countries, official exchange rates	229	3,697.5	100	33,995	100	0.1	0.5	1.4	4.2	93.8	85.1	70.6	40.1	0.892
Excluding regional average imputations for:														
(3) average wealth level	148	3,540.8	95.8	45,047	98.0	0.4	1.7	4.0	10.1	83.8	70.7	56.5	31.6	0.801
(4) wealth distribution	144	3,596.8	97.3	44,623	98.6	0.4	1.7	4.1	10.1	83.7	70.6	56.6	31.6	0.801
(5) average wealth level and distribution	129	3,491.1	94.4	45,494	97.6	0.4	1.7	4.1	10.1	83.7	70.6	56.5	31.5	0.801
Countries with wealth distribution data:														
(6) using reported wealth distributions	20	2,171.1	58.7	56,450	75.3	0.5	1.9	4.0	10.0	83.6	69.9	55.7	31.7	0.796
(7) imputing from income distributions	20	2,171.1	58.7	56,450	75.3	0.3	1.3	3.7	10.6	84.1	69.4	54.0	27.4	0.801

Source. Authors' calculations.

which is a conceptual distinction rather than an assumption adopted for computational convenience.

Other respects also lead us to believe that our estimates of the top wealth shares are reasonable. The survey data on which most of our estimates are based under-represent the rich and do not reflect the holdings of the super-rich. This suggests that our estimated shares of the top percentile and top decile, for example, may err on the low side. A rough idea of the possible size of the error is given by the total wealth of the world's billionaires reported by Forbes magazine for the year 2000, which was $2.16 trillion. This represents 1.7% of our figure of $125.6 trillion (at official exchange rates) for total world household wealth. Thus if our estimates erred so badly as to exclude all the world's billionaires, the shares of the top percentile and top decile would be depressed by less than two percentage points.

As discussed in Davies *et al.* (2008), a further check was accomplished by fitting a Pareto distribution to the upper tail of our estimated global wealth distribution (based on official exchange rates). The Pareto distribution approximates the upper tail of both income and wealth distribution data at the national level well and is a remarkably close fit to our global distribution in the range from $250,000 to $5 million. While the fit deteriorates at $10 million, it gives us added confidence in the quality of our estimated distribution up to this point, which covers all but a very small percentage of the world's population.

5. Conclusion

This article has found that the global distribution of household wealth is highly concentrated. Using PPP valuations, we estimate that the top 10% of adults in the world owned 71% of household wealth in the year 2000 and that the Gini coefficient for global wealth holdings was 0.802. Measured wealth inequality is higher still if international comparisons are based on official exchange rates, which is appropriate if attention is focused on the rich and super rich: the share of the top decile rises to 85% and the Gini coefficient becomes 0.892. These statistics indicate that the world's wealth distribution is considerably more unequal than its income distribution, for which Milanovic (2005) reports Gini coefficients of 0.642 and 0.795 on PPP and exchange rate bases, respectively. The estimated distribution is little altered if we restrict attention to the 20 core countries with hard data that have 59% of the world's adult population. For this core group the Gini coefficient of wealth is 0.796 on a PPP basis.

This study began by assembling information on household wealth levels and portfolio composition for as many countries as possible. Wealth levels vary widely and we find that the wealth/income ratio for countries rises with income or wealth, so that international wealth differences are greater, relatively speaking, than those for income. Also, we find that the correlation of national income and wealth, while strong, is not perfect. The wealthiest countries include some, such as Ireland and Hong Kong, that rank significantly lower according to per capita income. Similarly, some countries with very high incomes, such as the Nordic group, rank much lower according to wealth. This finding calls attention to the fact that while greater wealth is desirable *ceteris paribus*, it may not be a blessing if higher personal wealth is due to pure asset price inflation (e.g. house prices) or if the higher wealth is needed to compensate for

deficiencies in public infrastructure, pensions or social insurance programmes. The relatively low ranking of the Nordic countries may therefore be viewed as a positive reflection of high quality public services and programmes.

Wealth composition was seen to vary, not only with the stage of development, but across countries at similar income levels. These variations may be explained in terms of institutional and traditional differences, varying importance of public pensions and other factors. The importance of both financial assets and borrowing rises sharply with per capita income and with financial market development. Conversely, household balance sheets in poor countries remain dominated by land and other tangible assets.

Using regression analysis and other imputation methods, mean wealth levels were assigned to countries lacking adequate wealth data. This generates estimated wealth levels for 229 countries and a snapshot of what Milanovic (2005) and others refer to as 'international inequality', that is inequality *between* countries. On a PPP basis, wealth per adult for most countries fell between the figure of $12,021 for India and $201,319 for the US in the year 2000. The between-country Gini coefficient for wealth per adult was 0.533 compared to 0.448 for GDP per adult.

Having obtained estimates of wealth level by country, details of the shape of the wealth distribution were assembled for as many countries as possible. The data covered 20 countries, which together account for 59% of the world population in 2000 and, we estimate, 84% of global wealth. Wealth inequality varies widely across these countries but is always greater than income inequality. The group includes all the populous rich countries along with the largest developing nations, China, India and Indonesia. It allows us to study the relation between wealth distribution and income distribution, and to generate rough estimates of wealth inequality for 124 countries that have income distribution data but no wealth distribution data. Simple imputations of wealth inequality were applied to the remaining countries, which comprised less than four % of the world population. Combining the wealth distribution estimates with the wealth level numbers and, weighting by population, then yielded our estimates of the world distribution of wealth.

Our estimate of 0.802 for the world wealth Gini coefficient is high, both compared to the Gini values for many countries and compared to Gini values that have been estimated for the world distribution of income. However, it is interesting to note that some countries have similarly high values of wealth Gini coefficients. Among countries with hard data these include the US at 0.801 and Switzerland at 0.803. According to the Gini coefficient, therefore, such countries contain within their borders about the same level of wealth inequality as is seen in the world as a whole.

Our results also allow us to comment on the relative importance of between- vs. within-country wealth inequality. As reported earlier, between-country differences in wealth per adult yield a Gini coefficient of 0.533 on a PPP basis. Adding within-country differences pushes the Gini coefficient to 0.802, suggesting that within-country differences are a very important component of world wealth inequality. This impression is confirmed by comparison with the world income distribution results of Milanovic (2005), which show a between-country Gini coefficient of 0.531 and a full Gini coefficient of 0.641 in 1998 (for a common sample of countries over the years 1988–98). The Milanovic results thus show between-country income inequality equal to 83% of total inequality, which is much greater than the 71% obtained here for wealth.

We have discussed the regional aspect of global wealth distribution as well, pointing out the dominance of North America, Europe and the rich Asia-Pacific countries in the top global percentiles. The popular press sometimes suggests that high wealth individuals from emerging market economies – especially China, India and Russia – are already strongly represented among the world's rich. Our figures indicate that at least as of the year 2000 the emerging market economies did not supply a significant share of the top 1% of global wealthholders. With the possible exception of China they appear unlikely to do so for some time.

While this article makes a start in estimating the world distribution of wealth, it is clear that there are gaps in the data and significant concerns about data quality in some countries. Globally, there is great room for improvement in the study of household wealth. Household balance sheets and wealth surveys need to be generated in many more countries. These are completely lacking in Latin America and almost totally absent in Africa. The development of financial institutions and property rights are key aspects of economic growth and human development. Without the relevant data it is impossible to see what progress is being made. Improvements in data quality, particularly in survey data, must also occur. The task is far from hopeless, however, and great strides have been taken in several countries. The fact that regular wealth surveys are conducted in the two largest developing countries, China and India, is encouraging. As balance sheet studies spread and as more and better surveys are conducted, a better picture will emerge of the level, composition and distribution of household wealth around the globe.

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