# ESTIMATING THE LEVEL AND DISTRIBUTION OF GLOBAL WEALTH, 2000–2014

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This paper estimates the level and distribution of household wealth globally, as well as for regions and countries, for the period 2000–2014. The data used are mainly from household surveys and national accounts balance sheets, covering about two thirds of the world's population and over 95% of global household wealth. Lists of the most wealthy published in the media are used to adjust the upper tail. Wealth levels and distributions are imputed for countries without data. Estimated global household wealth stood at USD 251 trillion in 2014, having grown from USD 117 trillion in the year 2000. Wealth per adult in 2014 was USD 53,000. The estimated Gini coefficient of global wealth was 92.2% in 2014 and the share of the top 10% was 88.3%. Wealth inequality fell from 2000 to 2007, with the share of the top 10% falling from 89.4% to 86.5%, before rising steadily to 2014. From 2000 to 2008 the share of financial assets in gross wealth, an important driver of wealth inequality, fell from 55.2% to 50.2%, before climbing to 55.0% in 2014. Household debt rose from 13.6% of gross assets in 2000 to 16.0% in 2008, and has since fallen to 13.9%.

## 1. Introduction

Davies *et al.* (2008, 2011) provided the first estimates of the global distribution of wealth, using 2000 as the benchmark year. Since 2010 these estimates have been revised and updated in a series of reports published annually by Credit Suisse Research Institute (2010; 2011; 2012; 2013; 2014; 2015; 2016), with greater detail provided in the accompanying Databooks (Davies *et al.* 2010; 2011; 2012; 2013; 2014; 2015; 2016). The purpose of this paper is to explain the ways in which the estimation method has evolved and improved in recent years, and to summarize what we have learned about trends in the level and distribution of global wealth for the period 2000–2014.

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We study the distribution within and across nations of net worth, defined as the marketable value of financial assets plus non-financial assets (principally housing and land) less debts. Private pension wealth is included, but public pensions are not.[1] The target unit of analysis is the individual adult. No country in the world has completely reliable information on personal wealth, but the world's largest countries, including China and India, have useful wealth data, as do almost all high income countries. This makes it possible to offer relatively reliable estimates of the global distribution of wealth, despite the fact that many small countries and most low income countries do not have direct evidence on wealth.

Our procedure involves three main steps, the first two of which are refinements of the methods pioneered by Davies *et al.* (2008, 2011). The first step establishes the average level of wealth for each country. The best source for this purpose is household balance sheet (HBS) data which are now provided by 48 countries, although 25 of these countries cover only financial assets and debts (Table 1).[2] An additional four countries have household survey data from which wealth levels can be calculated. Together these countries covered 66 percent of the global population and 96 percent of total global wealth in 2014. The results are supplemented by econometric techniques that generate estimates of the level of wealth in countries that lack direct information for one or more years. In total we cover 215 countries.

The second step constructs the pattern of wealth holdings within nations. Direct data on the distribution of wealth are available for 33 countries, including all the large high income countries and the most populous developing countries—China, India and Indonesia. Inspection of data for these countries suggests a relationship between wealth distribution and income distribution which can be exploited in order to provide a rough estimate of wealth distribution for 135 other countries which have data on income distribution but not on wealth ownership.

It is well known that the traditional sources of wealth distribution data are unlikely to provide an accurate picture of wealth holdings in the top-tail of the distribution. To address this deficiency, our method in recent years has added a third important step, using information in the "rich lists" published by Forbes Magazine and others to adjust the wealth distribution pattern at the higher end of the wealth spectrum.

Implementing these procedures leaves 50 countries for which it is difficult to estimate either the level of household wealth or the distribution of wealth, or both. Usually the countries concerned are small (e.g. Andorra, Bermuda, Guatemala, Monaco) or semi-detached from the global economy (e.g. Afghanistan,

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[1]The exclusion of public pensions follows the definition of pension entitlements in the UN system of National Accounts (European Commission *et al.*, 2009). However, some authors have explored how the size distribution of household wealth would be altered if public pensions were included. See e.g. Wolff (forthcoming) who estimates that adding "social security wealth" to private augmented wealth (which includes all private pensions) would reduce the Gini coefficient for wealth in the U.S. from 0.836 to 0.701 in 2013. Bönke *et al.* (2016) perform a similar exercise for Germany. Their results indicate that adding state pensions would reduce the share of the top 10 percent of wealth holders from 54.7 percent to 40.9 percent.

[2]HBS data are better than survey data when estimating average wealth, first since they use a wider information base, including records and reporting from financial sector institutions on assets and debts. Second, household surveys suffer from non-sampling error in the form of under-reporting of asset and debt values and low response rates in high wealth groups (Davies and Shorrocks, 2000). Sections 2 and 4 provide more detail.

TABLE 1
COVERAGE OF WEALTH LEVELS DATA

| | High income | Upper middle income | Lower middle income | Low income | Cumulative % of world population | Cumulative % of world wealth |
|---|---|---|---|---|---|---|
| **Complete financial and non-financial data for at least one year** | | | | | | |
| Household balance sheets | **North America**<br>Canada<br>U.S.<br><br>**Europe**<br>Czech Republic<br>Denmark<br>Finland<br>France<br>Germany<br>Greece<br>Hungary<br>Italy<br>Netherlands<br>Sweden<br>Switzerland<br>U.K.<br><br>**Asia-Pacific**<br>Australia<br>Israel<br>Japan<br>Korea<br>New Zealand<br>Singapore<br>Taiwan | South Africa<br>Mexico | | | 15.2 | 76.9 |
| Survey data | | China<br>Uruguay | | India<br>Indonesia | 55.0 | 87.9 |
| **Incomplete data** | | | | | | |
| Financial balance Sheets | **North America**<br><br>**Europe**<br>Austria<br>Belgium<br>Cyprus<br>Ireland<br>Luxembourg<br>Malta<br><br>**Asia-Pacific** | Chile<br>Croatia<br>Estonia<br>Latvia<br>Lithuania<br>Poland | Bulgaria<br>Colombia<br>Romania<br>Thailand<br>Turkey<br>Kazakhstan | | 65.2 | 95.3 |

**Table 1** *Continued*

| | High income | Upper middle income | Lower middle income | Low income | Cumulative % of world population | Cumulative % of world wealth |
|---|---|---|---|---|---|---|
| | Norway Portugal Slovenia Spain | Russian Fed. Slovakia Brazil | | | | |
| Number of countries with wealth partly or fully estimated by regression method | 17 | 36 | 41 | 28 | 97.2 | 99.4 |
| Number of countries with wealth imputed by mean value of group | 22 | 7 | 9 | 4 | 100.0 | 100.0 |

*Source*: Table 1-1 in Davies *et al.* (2016).

Cuba, North Korea). For our estimates of the pattern of global wealth, these countries are assigned the average level and distribution of the region and income class to which they belong. This is done in preference to omitting the countries altogether, which would implicitly assume that their pattern of wealth holdings matches the world average. However, checks indicate that excluding these nations from the global picture makes little difference to the results.

The following sections describe the estimation procedures in more detail. Two other general points should be mentioned. First, our recent work uses official exchange rates to convert currencies to our standard measure of value, which is U.S. dollars at the time in question. In international comparisons of consumption or income it is common to convert currencies using purchasing power parity (PPP) exchange rates, which take account of local prices, especially for non-traded services.[3] However, in all countries a large share of personal wealth is owned by households in the top few percentiles of the distribution, who tend to be internationally mobile and to move their assets across borders with significant frequency. For such people, the prevailing foreign currency rate is most relevant for international comparisons. In addition, wealth is often used to purchase capital goods rather than consumer goods, and most capital goods are traded internationally, at official exchange rates. So there is a stronger case for using official exchange rates in studies of global wealth compared to consumption or income.[4]

The second issue concerns the appropriate unit of analysis. A case can be made for basing the analysis on households or families. However, personal assets and debts are typically owned (or owed) by named individuals, and may be retained by those individuals if they leave the family. Furthermore, even though some household assets, such as housing, provide communal benefits, it is unusual for household members to have an equal say in the management of assets, or to share equally in the proceeds if the asset is sold. Membership of households can be quite fluid (for example, with respect to older children living away from home) and the pattern of household structure varies markedly across countries. For all these reasons—plus the practical consideration that the number of households is unknown in many countries—we base our analysis on individuals rather than households or family units. More specifically, since children have little formal or actual wealth ownership, we focus on wealth ownership by adults, defined to be individuals aged 20 or above.[5]

The remainder of the paper is organized as follows. The next section outlines our methods for estimating the level and composition of wealth at the country level. Resulting estimates for the world as a whole, and trends since 2000 are discussed in section 3. Section 4 turns to estimation of the shape of the

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[3]Davies *et al*. (2008) used official exchange rates, while Davies *et al*. (2011) used PPP exchange rates. Many aspects of the estimation procedure have changed since that time, so our current results are not directly comparable with those reported in the earlier studies.

[4]Although we prefer official exchange rate results, we provide wealth per adult on a PPP basis for each country and region, and for the world as a whole, in Appendix F.

[5]In line with our choice of unit, we compare wealth per adult rather than per capita across countries and regions, and over time in the main text. However, we provide the corresponding per capita numbers in Appendix F. Note also that in our econometric work on wealth levels reported in Section 3 we use per capita rather than per adult variables, and take demographic factors into account.

wealth distribution within countries, while the results of that exercise plus the level estimates are combined in section 5 to show trends in the global and regional distributions of wealth, again for 2000–2014. The final section discusses the results in the context of the discussion provoked by Piketty (2014), and then concludes.

## 2. Estimating the Level and Composition of Wealth

For countries lacking direct data on wealth, we use econometric techniques to estimate per capita wealth levels from the 52 countries with HBS or survey data in at least one year. HBS data are used, where available, in preference to survey data, since they are based on a wider information base and are generally less affected by the non-sampling errors that affect survey data.[6] Data availability limits the number of countries that can be included in this procedure. However, we are able to provide observed or estimated wealth values for 174 countries, which collectively cover 95 percent of the world's population in 2014. There is a trade-off here between coverage and reliability. Alternative sets of explanatory variables could achieve greater country coverage, but not without compromising the quality of the regression estimates.

The regression specification and choice of variables are based on the life-cycle model (LCM). In its simplest form, with no uncertainty and a perfect capital market, the LCM predicts that mean wealth should be positively related to income per capita and longevity, and negatively related to the growth rates of both labor income and population in steady state analysis (Modigliani and Brumberg, 1980; Modigliani, 1988). The basic LCM does not provide guidance regarding differential impacts of these variables on different kinds of assets and debt. Davies *et al.* (2011) found that impacts differed for financial assets, real assets and debt, as we do here. Separate regressions are therefore run for financial assets, real assets and liabilities. Because errors in the three equations are likely to be correlated, the seemingly unrelated regressions (SUR) technique due to Zellner (1962) is applied, but only to financial assets and liabilities, since there are fewer observations for non-financial assets. In addition to allowing the main LCM variables to have different impacts on the three major wealth components, this approach also allows factors outside the highly stylized LCM that significantly affect the three components to be taken into account as well.

The estimation differs from that applied in Davies *et al.* (2011) in two respects. First, the increased availability of both HBS data and wealth surveys in the recent years has led to an expansion of the country coverage. Table 1 lists the 23 countries for which we have complete financial and non-financial balance sheet data for at least one year. These are predominantly high income countries, the exceptions being Mexico and South Africa which fall within the upper middle income category according to the World Bank. The data are described as

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[6]There is one notable exception to the rule that HBS data are preferable to survey data. In the U.S., years of research and heavy over-sampling of the upper tail have resulted in the Federal Reserve's Survey of Consumer Finance (SCF) generating a balance sheet of quality comparable that of the Flow of Funds Account (i.e. the HBS data for the U.S.) See Henriques and Hsu (2013).

complete if financial assets, liabilities and non-financial assets are all adequately covered. We list another 25 countries whose data we use that have financial balance sheets, although no details of real (i.e. non-financial) assets. This group contains nine upper middle income countries and six lower middle income countries, and hence is less biased towards the rich world. Europe and North America, and OECD countries in particular, are well represented among countries with HBS data, but coverage is sparse in Africa, Asia and Latin America. Fortunately, survey evidence on wealth is available for the largest developing countries—China, India and Indonesia—which compensates to some extent for this deficiency. Although only financial HBS data are available for Russia, complete HBS data are available for the Czech Republic and financial data are recorded for nine other former socialist countries in Europe.

While we believe that HBS data provides a superior basis to survey data for estimating asset, debt and wealth aggregates, HBS data does have some limitations (Henriques and Hsu, 2013; Alvaredo *et al.*, 2016). For some assets and debts, financial sector data do not identify household amounts, so the HBS figures are obtained as residuals. While in most large high income countries the HBS data are strictly for households, in 25 of the 48 countries with HBS data the assets and debts of non-profit organizations (NPOs) serving households are not separated from those of households. This means that HBS data slightly exaggerate household wealth in those countries.[7] These features mean that HBS data cannot be claimed to tell us the "true" value of household wealth, but it is still preferable to household survey data, which varies in quality across countries but generally underestimates household wealth and holdings of financial assets in particular.[8]

A second improvement in the estimation procedure concerns the time dimension. While Davies *et al.* (2011) estimated the level and distribution of household wealth for the year 2000 alone, our estimates now cover the period 2000—2014. This enables us to introduce a panel element in the estimation, resulting in a substantial increase in sample size. The financial assets and debts regressions now involve 330 country/year observations compared to 38 in Davies *et al.* (2011), and

[7]An indication of the possible size of the error typically introduced by including NPO wealth is provided by data for Canada, where NPOs *are* separated out. Statistics Canada's CANSIM database, table 378–0121, reports net worth of NPOs as $CDN 101.8 billion at the end of the third quarter of 2016 while the net worth of households was $CDN 10,132.7 billion. Thus, NPO wealth is only 1.0 percent of household wealth in this case. In the U.S., where NPOs are unusually well endowed, their non-financial assets are separated out in the data we use, but their financial assets are included. An indication of the error imposed is given by the fact that in 2000, the most recent year for which the relevant numbers are available, the net financial assets of NPOs in the U.S. stood at 3.2 percent of the total net worth of households and NPOs (Board of Governors of the Federal Reserve System, 2016, Table L.101.a).

[8]The shortfall of survey aggregates below HBS numbers (with the exception of the SCF in the U.S. as previously noted) has long been recognized (Atkinson and Harrison, 1978; Davies and Shorrocks, 2000; Wolff, forthcoming). Credit Suisse Research Institute (2013, pp. 17, 18) compares HFCS survey and HBS aggregates for financial assets, non-financial assets, debts, and net worth for the 15 Eurozone countries. For the Eurozone as a whole, the HFCS shortfall below HBS was 16 percent for net worth, 41 percent for debts and 67 percent for financial assets. The survey totals for non-financial assets *exceeded* the HBS figures by 15 percent overall. The high variability across countries is shown e.g. in the fact that the shortfall of financial assets ranged from 47 percent (Belgium) to 84 percent (Greece and Slovenia).

TABLE 2
REGRESSIONS OF WEALTH COMPONENTS

| Independent variables | Log financial assets | Log liabilities | Log real assets |
|---|---|---|---|
| Log consumption per capita | 1.212*** | 1.326*** | 1.066*** |
| | (0.0858) | (0.0771) | (0.133) |
| GDP per capita growth rate | −0.0122*** | | |
| | (0.00310) | | |
| Log market capitalization | 0.117*** | | |
| | (0.0357) | | |
| % Urban population | 0.00871*** | 0.00675*** | 0.00794* |
| | (0.00233) | (0.00203) | (0.00423) |
| Survey Dummy | −2.676*** | | |
| | (0.358) | | |
| Log domestic credit available in private sector | | 0.816*** | |
| | | (0.0485) | |
| Life expectancy | | | 4.546** |
| | | | (2.136) |
| Log population density | | | −0.0661*** |
| | | | (0.0194) |
| Year 2001 | 0.0194 | −0.0234 | −0.0458 |
| | (0.0938) | (0.0837) | (0.104) |
| Year 2002 | 0.208** | 0.158* | 0.0401 |
| | (0.0997) | (0.0831) | (0.1000) |
| Year 2003 | 0.356*** | 0.236*** | 0.125 |
| | (0.116) | (0.0833) | (0.106) |
| Year 2004 | 0.336*** | 0.242*** | 0.105 |
| | (0.110) | (0.0843) | (0.106) |
| Year 2005 | 0.157 | 0.104 | 0.0260 |
| | (0.100) | (0.0851) | (0.117) |
| Year 2006 | 0.235** | 0.194** | 0.0802 |
| | (0.103) | (0.0875) | (0.121) |
| Year 2007 | 0.370*** | 0.201** | 0.105 |
| | (0.117) | (0.0886) | (0.127) |
| Year 2008 | −0.106 | −0.170* | −0.167 |
| | (0.121) | (0.0981) | (0.196) |
| Constant | −2.002** | −7.423*** | −19.40** |
| | (0.785) | (0.701) | (9.645) |
| Region dummies | YES | YES | YES |
| Sample size | 330 | 330 | 132 |
| R-squared | 0.937 | 0.957 | 0.911 |
| Estimation method | SUR | SUR | OLS |

*Note:* R-squared is not a well-defined measure in Generalized Least Squares models and thus it refers to the fraction of the variance in the dependent variable that is "explained" in each regression for the financial assets and debts regressions where Seemingly Unrelated Regression (SUR) was used. *Significance*: *10% level; ** 5% level; *** 1% level.

the real assets regression now has 132 observations compared to 23 earlier. Appendix A reports which countries had observations on which variables in each year.

Table 2 shows our main regression results. The dependent variables are mean financial assets, liabilities and real assets, all in logs. Of the four core LCM explanatory variables, the population growth rate was not significant in any of the regressions and was therefore dropped. Consumption per capita (in log form) is used as a proxy for income per capita since it gives similar results and

consumption data are available for more countries than income data, which is helpful in doing imputations later. It is significant in each equation. Per capita GDP growth is significant only for financial assets and life expectancy is significant only for real assets. Additional independent variables take various real-world features into account. Market capitalization, which we take as an indicator of the level of development of financial markets, is highly significant in the financial assets regression, while domestic credit availability is similarly important in the liabilities regression. Urbanization has a positive and highly significant impact for financial assets and liabilities, likely due to the readier access to financial services in urban areas.[9] And population density has a significant negative effect for real assets, which may be due to the lower availability of land in more densely populated countries.[10]

Three sets of dummy variables are also included in the regressions. One captures whether the data source is a survey rather than HBS data. This dummy variable turns out to be negative and highly significant in the financial assets regression, indicating that the average level of financial assets tends to be much lower when the data derive from sample surveys. This finding is used to adjust upwards the value of financial assets in the wealth level estimates for China, India, Indonesia and Uruguay. We also include region-income dummies to capture any common fixed effects at the region-income level. The region-income pairs considered are North America high income, Latin America and the Caribbean upper middle and high income, Latin America and the Caribbean lower middle and low income, Europe lower middle income, Europe upper middle income, Europe high income, Asia-Pacific upper middle and high income, Asia-Pacific lower middle income, Asia-Pacific upper middle income, Africa, China and India. Finally, we include a set of year dummies to control for shocks such as the global financial crisis or time trends that affect the world as a whole. The resulting regressions are used to estimate financial assets and liabilities for 147 countries, and non-financial assets for 164 countries in at least one year.

There remain 38 countries—together accounting for 3 percent of the global adult population—for which we are unable to estimate wealth per adult because of missing data on some or all of the explanatory variables in our regressions. In order to generate wealth figures for regions and for the world as a whole, each of these countries was assigned the mean wealth per adult of the corresponding region (six categories) and income class (four categories). This imputation is admittedly crude, but better than simply disregarding the excluded countries, which would implicitly assume (incorrectly) that the countries concerned are representative of their region or the world.

For the 48 countries with HBS data we have that data up to and including 2014. However, in some cases we need to use special methods for part or all of the period 2009–2014 to get wealth estimates for the countries that do not have HBS data. This is

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[9]Urbanization has a weakly significant effect for real assets, which may reflect easier access to mortgage lending and therefore more investment in housing in urban areas.

[10]We performed two quality checks that are available from the authors on request. First, results do not vary appreciably if we omit a country from our regressions; the estimated coefficients are not sensitive to small changes in the sample. Second, results are also robust to including in our regression GDP per capita as a measure of income instead of consumption per capita.
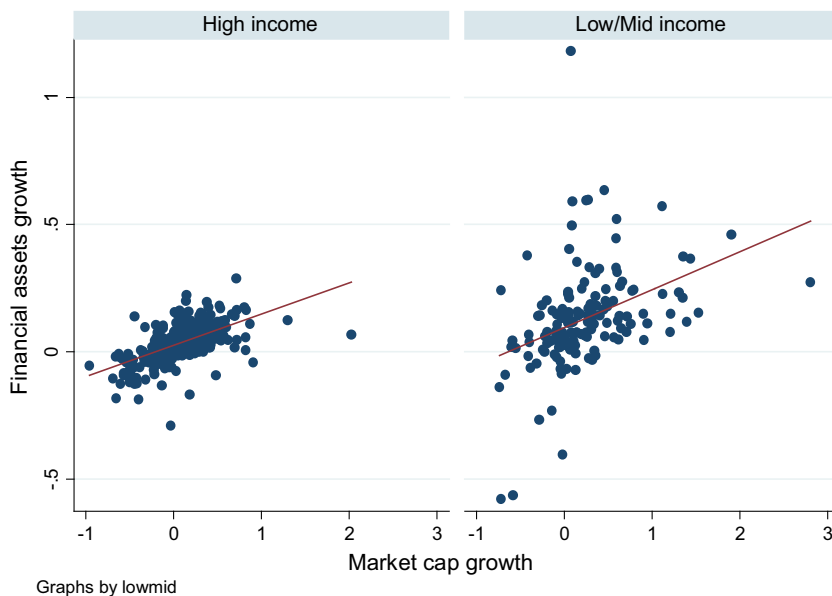
Figure 1. Financial assets vs. market cap growth by income group [Colour figure can be viewed at wileyonlinelibrary.com]

due to missing explanatory variables that prevent us from using our standard regression-based methods. In order to obtain estimates of net worth per adult and its components in these cases we update the most recent available figures for 38 countries using house price growth for non-financial assets, market capitalization for financial assets and GDP per capita growth for debts. For countries without information on house prices and market capitalization, recent growth of GDP per capita is used to project net worth per adult forwards to the current date. Specifically, we first run a simple regression of each wealth component on the corresponding variable, considering high income and low/mid income countries separately. The constant and slope are then used to assign values to wealth components missing in recent periods. Figures 1, 2 and 3 show the scatter diagrams and regression lines for the growth rates of financial assets and market capitalization, liabilities and GDP per capita, and real assets and house prices, respectively. We find that a 10 percent increase in market capitalization is associated with 1.8 percent and 1.1 percent increases in financial assets in low/mid and high income countries, respectively. A 10 percent increase in GDP per capita is associated, in turn, with 11 percent and 2.5 percent increases in debts in low/mid and high income countries respectively. Finally, a 10 percent increase in house prices is associated with 1.6 percent and 3.1 percent increases in real assets in low/mid and high income countries respectively.

## 3. Trends in Wealth Levels: 2000–2014

According to our estimates, global household wealth totaled USD 251 trillion in 2014, equivalent to USD 53,000 per adult. The corresponding values for
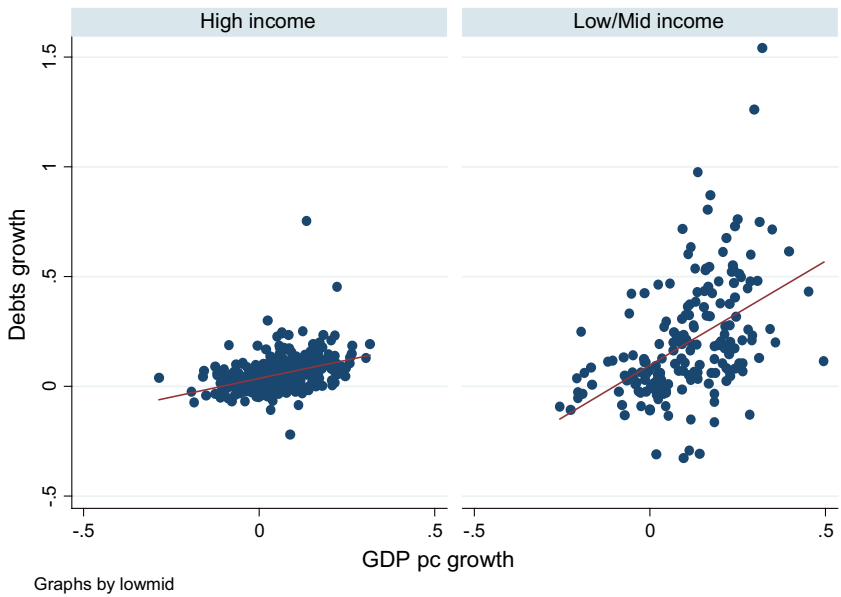
Figure 2. Liabilities vs GDP per capita growth [Colour figure can be viewed at wileyonlinelibrary.com]
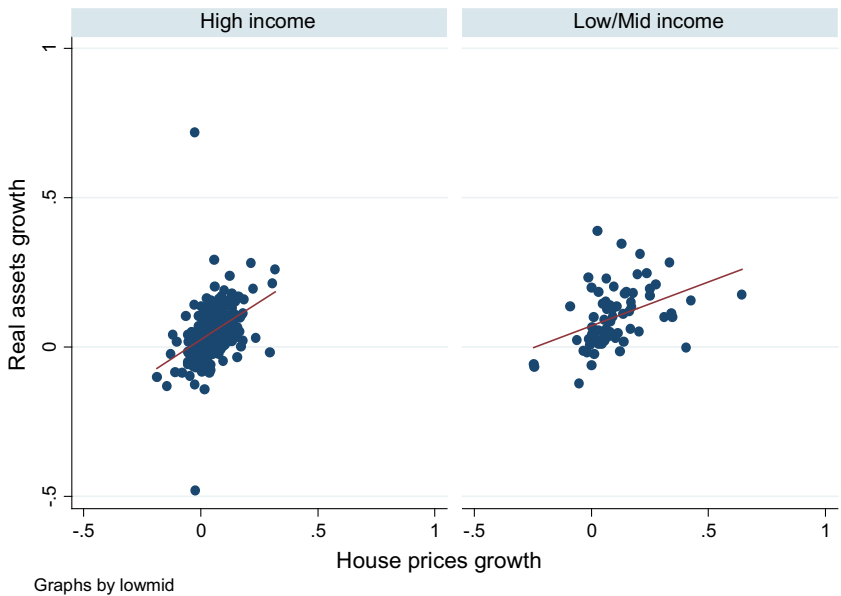


Figure 3. Real assets vs house prices growth [Colour figure can be viewed at wileyonlinelibrary.com]

the end of the year 2000 are USD 117 trillion in aggregate and an average of USD 31,700 per adult. Thus global household wealth rose by 115 percent over the 2000–2014 period and wealth per adult climbed 68 percent.
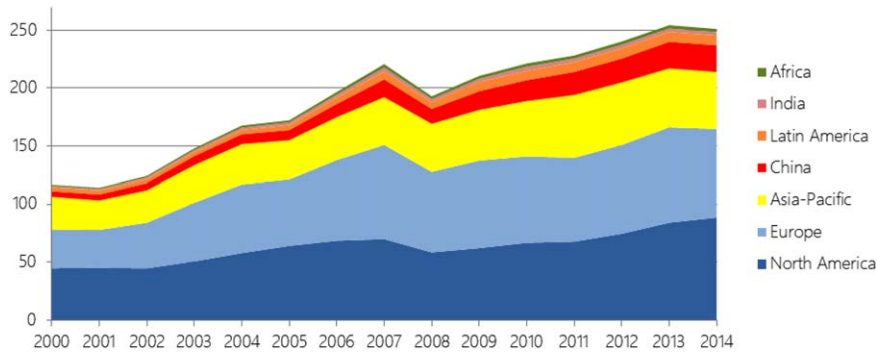
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Figure 4.  Total wealth by region (in USD trillion) [Colour figure can be viewed at wileyonlinelibrary.com]

Figure 4 displays the trend in aggregate household wealth over the period 2000–2014, showing the drop in household wealth between 2007 and 2008 caused by the global financial crisis, and the subsequent recovery to close to the peak achieved in 2007—Table B.1 in Appendix B provides the numerical values.[11] Despite the crisis, it appears that the past 15 years have been a relatively benign period for household wealth accumulation. However, the overall picture is distorted slightly by valuing wealth in terms of US dollars. Over the decade, the US dollar depreciated against most major currencies, accounting for part of the rise in dollar-denominated values. Holding exchange rates constant, the rise in wealth per adult over the 15 years is a more modest 56 percent.

The evolution of the regional concentration of personal wealth is shown in Figure 5. Europe and North America each account for about one third of global wealth in 2014. China has seen a dramatic increase in its share of global wealth;
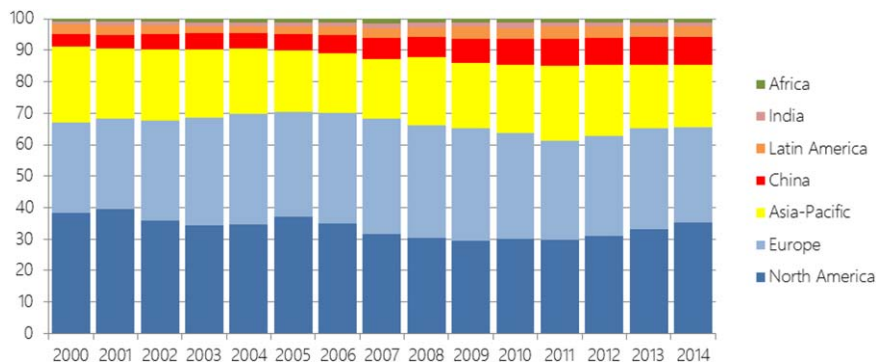


Figure 5.  Wealth share by region (in %) [Colour figure can be viewed at wileyonlinelibrary.com]

[11]Note that in this kind of figure the slope of the segments is cumulative. Thus, e.g. the slope of the top of the Europe segment reflects the change in total wealth in North America plus Europe. It might appear from the figure that total wealth fell more in Europe than in North America from 2007 to 2008, but that is not the case. Total wealth fell by 16.3 percent in North America, but only by 14.6 percent in Europe.
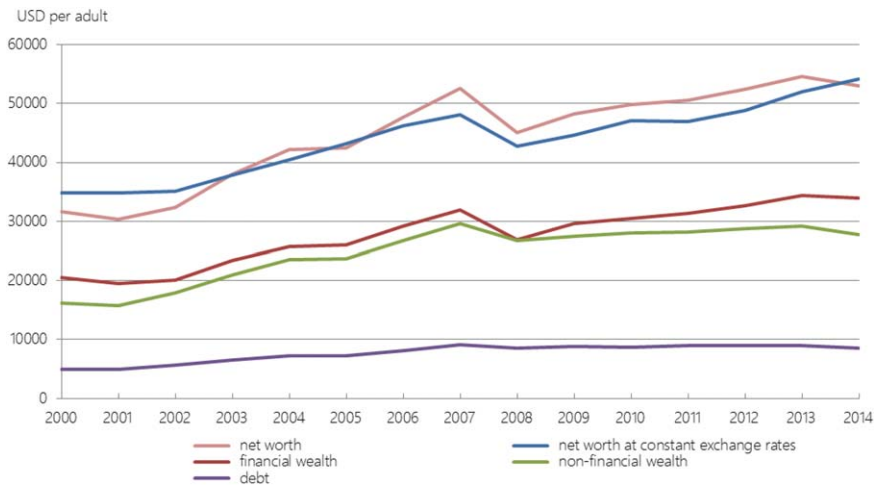
Figure 6. Global trends in wealth per adult (in USD) [Colour figure can be viewed at wileyonlinelibrary.com]

whilst residents in China held 4 percent of world wealth in 2000, the figure is 8 percent in 2014. This was almost exactly offset by the decline from 24 percent to 19 percent in the proportion of world wealth owned by Asia-Pacific residents (excluding India and China), which was precipitated by the dismal performance of Japan, whose share of world wealth almost halved from 16.5 percent in 2000 to 8.0 percent in 2014.

Another interesting dimension of personal wealth is the split between financial assets, non-financial assets and debts. Figure 6 displays the trends in each of these components, expressed in terms of the average value per adult. At the start of the millennium, financial assets accounted for 56 percent of household gross assets, but the share decreased until 2008, at which point the global wealth portfolio was split equally between financial and non-financial assets. In the period since 2008, the balance has again tipped towards financial assets, which were worth about 22 percent more than non-financial assets in 2014. On the liabilities side of the household balance sheet, average debt rose by 82 percent between 2000 and 2007, and then leveled out. It amounted to USD 8,570 per adult in 2014. Expressed as a proportion of household assets, average debt has moved in a narrow range, rising from 13.6 percent in 2000 to 16.0 percent in 2008 and then steadily declining to 13.9 percent in 2014.

The composition of household portfolios varies widely across regions. The strongest feature is the rise in the relative importance of both financial assets and liabilities with the level of development. For instance, financial assets account for 46 percent of gross assets in Europe and 71 percent in North America in 2014, but just 15 percent of gross assets in India and 30 percent in Latin America. Household debt as a percentage of gross assets is 15 percent in both Europe and North America, but only 8 percent in India, 7 percent in China and 10 percent in

TABLE 3

Wealth Shares for Countries with Wealth Distribution Data

| Country | Year | Unit | Share of lowest | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 10% | 20% | 25% | 30% | 40% | 50% | 60% | 70% |
| Australia | 2013 | household | | 0.9 | | | 6 | | 17.4 | |
| Austria | 2010 | household | −0.7 | −0.6 | | −0.2 | 0.7 | 2.7 | 6.7 | 13.3 |
| Belgium | 2010 | household | −0.1 | 0.2 | | 1.5 | 4.8 | 10.1 | 17.1 | 26.5 |
| Canada | 2012 | family | −0.2 | −0.1 | | 0.5 | 2.2 | 5.6 | 11.3 | 20 |
| Chile | 2011 | household | −1.2 | −1.2 | | −1 | 2.3 | 9.4 | 18 | 28.9 |
| China | 2010 | person | −0.1 | 0.3 | | 1.1 | 2.4 | 4.7 | 8.3 | 13.5 |
| Cyprus | 2010 | household | −0.2 | 0.3 | | 1.6 | 4 | 7.3 | 12 | 18.3 |
| Denmark | 2009 | family | −15.3 | −18.9 | | −20.2 | −20.2 | −19 | −15 | −6.8 |
| Finland | 2010 | household | −1.2 | −1.1 | | −0.7 | 1.1 | 5.2 | 11.9 | 21.5 |
| France | 2010 | household | −0.2 | −0.1 | | 0.4 | 1.8 | 5.4 | 11.6 | 20.5 |
| Germany | 2010 | household | −0.6 | −0.5 | | −0.1 | 0.8 | 2.8 | 6.5 | 12.9 |
| Greece | 2009 | household | −0.2 | 0.3 | | 2.3 | 6.4 | 12.4 | 20.2 | 30.2 |
| India | 2012 | household | −1.3 | −0.9 | | 0.1 | 1.7 | 4.2 | 8 | 13.6 |
| Indonesia | 2014 | household | −0.2 | 0.3 | | 1.4 | 3.7 | 7.4 | 13 | 21.7 |
| Ireland | 2013 | household | −3.5 | −3.5 | | −3.3 | −2.1 | 1.4 | 7.1 | 15.4 |
| Italy | 2010 | household | −0.1 | 0.1 | 0.4 | 1 | 4.1 | 9.4 | 16.5 | 25.6 |
| Japan | 2009 | household | 0.4 | 1.3 | 2.1 | 3.3 | 6.9 | 12.5 | 20.2 | 30.7 |
| Korea | 2011 | household | | −0.1 | | | 4.5 | | 15.2 | |
| Luxembourg | 2010 | household | −0.2 | 0.1 | | 1 | 3.8 | 8.5 | 14.9 | 22.8 |
| Malta | 2010 | household | 0.1 | 1.1 | | 3.5 | 7.3 | 12.5 | 19.1 | 27.3 |
| Netherlands | 2009 | household | −3.5 | −3.3 | | −2.4 | 0 | 4.9 | 12.4 | 23.5 |
| New Zealand | 2001 | tax unit | 0 | 0 | | 1 | 3 | 7 | 13 | 21 |
| Norway | 2013 | household | −5 | −5.4 | | −5.1 | −3.2 | 1.1 | 8.1 | 17.9 |
| Portugal | 2010 | household | −0.2 | 0.1 | | 1.3 | 4.1 | 8.3 | 13.9 | 21.5 |
| Slovakia | 2010 | household | 0.4 | 3.2 | | 7.8 | 13.6 | 20.6 | 28.9 | 38.9 |
| Slovenia | 2010 | household | −0.1 | 0.9 | | 3.6 | 7.8 | 13.5 | 21.5 | 31.7 |
| Spain | 2008 | household | −0.4 | 0.3 | 1.3 | 2.8 | 6.7 | 12 | 18.9 | 27.5 |
| Sweden | 2007 | adult | | | | | | | | |
| Switzerland | 1997 | family | | | | | | | | |
| Thailand | 2006 | household | | 0.5 | | | 3.5 | | 12.5 | |
| U.K. | 2014 | adult | −1 | −0.8 | | −0.1 | 1.6 | 5 | 10.8 | 19.4 |
| U.S. | 2013 | family | −0.7 | −0.5 | | | 0 | 1.1 | 3.2 | 6.9 |
| Uruguay | 2013 | household | −1.2 | −1.2 | | −1 | −0.3 | 1.9 | 6.5 | 13.9 |

| Country | Year | Unit | Share of top | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 25% | 20% | 10% | 5% | 2% | 1% | 0.5% | 0.1% |
| Australia | 2010 | household | | 62.1 | | | | | | |
| Austria | 2010 | household | | 77.1 | 61.7 | | | | | |
| Belgium | 2010 | household | | 61.2 | 44.1 | | | | | |
| Canada | 2012 | family | | 67.2 | 47.7 | | | | | |
| Chile | 2011 | household | | 56.4 | 37.6 | | | | | |
| China | 2010 | person | | 78.4 | 64.2 | | | | | |
| Cyprus | 2010 | household | | 72.4 | 56.8 | | | | | |
| Denmark | 2009 | family | | 92.8 | 69.3 | | | | | |
| Finland | 2010 | household | | 64.9 | 45 | | | | | |
| France | 2010 | household | | 67.5 | 50 | | | | | |
| Germany | 2010 | household | | 76.3 | 59.2 | | | | | |
| Greece | 2009 | household | | 56.7 | 38.8 | | | | | |
| India | 2012 | household | | 77.6 | 62.1 | | | 25.7 | | |
| Indonesia | 2014 | household | | 64.2 | 36.4 | | | | | |
| Ireland | 2013 | household | | 72.7 | 53.8 | 37.7 | | 14.8 | | |

**Table 3**  *Continued*

| Country | Year | Unit | Share of top | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 25% | 20% | 10% | 5% | 2% | 1% | 0.5% | 0.1% |
| Italy | 2010 | household | 68.9 | 62.6 | 45.7 | 32.9 | 21 | 14.8 | | |
| Japan | 2009 | household | 62.8 | 55.3 | 34.3 | 19.3 | | 4.3 | | |
| Korea | 2011 | household | | 63.9 | | | | | | |
| Luxembourg | 2010 | household | | 66.7 | 51.3 | | | | | |
| Malta | 2010 | household | | 62 | 46.9 | | | | | |
| Netherlands | 2009 | household | | 61.3 | 40.2 | | | | | |
| New Zealand | 2001 | tax unit | | 67 | 48 | | | | | |
| Norway | 2013 | household | | 68.6 | 49.5 | 35.8 | | 18.3 | | 8.3 |
| Portugal | 2010 | household | | 67.9 | 52.7 | | | | | |
| Slovakia | 2010 | household | | 48.9 | 32.8 | | | | | |
| Slovenia | 2010 | household | | 54.3 | 36.2 | | | | | |
| Spain | 2008 | household | 67.3 | 61.3 | 45 | 32.6 | 21.7 | 16.5 | | |
| Sweden | 2007 | adult | | | 67 | 49 | | 24 | | |
| Switzerland | 1997 | family | | | 71.3 | 58 | | 34.8 | 27.6 | 16 |
| Thailand | 2006 | household | | 69.5 | | | | | | |
| U.K. | 2014 | adult | | 67.8 | 48 | | | | | |
| U.S. | 2013 | family | 90.5 | 87 | 75 | | | 35.5 | | |
| Uruguay | 2013 | household | | 75.2 | 58.6 | | | | | |

*Source*: See Table 2-3 in Davies *et al.* (2016).

Africa. There are also variations in portfolios unrelated to the level of development. Some developed countries, such as Italy, have unusually low liabilities (9 percent of gross assets in 2014), while others have surprisingly high debt, for example Denmark (29 percent of gross assets).

## 4. ESTIMATING WEALTH DISTRIBUTION WITHIN COUNTRIES

To analyze the global pattern of wealth holdings by individuals requires information on the distribution of wealth within countries. Direct observations on wealth distribution across households or individuals are available for the 33 countries listed in Table 3. One set of figures was selected for each of these nations, with a preference for the most recent year, and for the most reliable source of information. Summary details are reported in Table 3 using a common template which gives the wealth shares of the top 10 percent, 5 percent, and 1 percent, together with other distributional information in the form of cumulated shares of wealth (i.e. Lorenz curve ordinates).

The data differ in a number of ways. The unit of analysis is usually a household or family, but sometimes the individual. Also, the data come from different sources. Household sample surveys are employed in the majority of countries. In these cases the wealth shares of the top groups tend to be understated, due to non-sampling error, which takes two forms (Davies and Shorrocks, 2000; OECD, 2015). First there is differential response since wealthier households are less likely to respond. Second there is under-reporting, especially of financial assets that are of greater importance for the

wealthy – for example, equities and bonds.[12] Asset coverage also differs between surveys in different countries.[13] Other published wealth distribution figures are estimated from wealth tax records (Switzerland) or with the help of register data that includes both wealth tax records and other information (Denmark, Norway and Sweden). These data are likely less subject to response bias, but may still be prone to valuation problems, in connection with pension assets and life insurance for example.

One approach to the difference in survey structure and coverage is to confine attention to "harmonized" data. It is not possible to ensure that survey methods are identical across countries, although a major effort in that direction was made by the ECB in coordinating its Household Finance and Consumption Survey (HFCS) across 15 Eurozone countries (European Central Bank, 2013a,2013b). We use the HFCS results for those countries. The asset coverage is broad, inclusive, and fully harmonized across these countries.

Another international dataset is provided by the Luxembourg Wealth Study (LWS), which began with nine countries (Sierminska *et al.*, 2006) and expanded later to 15 countries. The LWS harmonizes existing national surveys, which results in assets that are not covered in every country, such as employer-based pensions, being removed. This could be characterized as a "lowest common denominator" approach. In contrast, our approach uses all the assets found in the original surveys, in order to get the best possible information about the shape of the main body of the wealth distribution in each country. Unlike the LWS, as described above we do not rely on the surveys to establish the mean *level* of wealth in a country, and we adjust the upper tail in line with independent evidence. Unevenness of survey asset coverage across countries is offset significantly by greater uniformity in these latter respects.[14]

Table 3 shows the wealth shares for the 33 countries using distributional data that have either been published or that we have calculated from micro data. Wealth share estimates for percentiles not shown in Table 3 were generated using an "ungrouping" computer program which constructs a synthetic sample that conforms exactly to any set of Lorenz values—including negative

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[12]It is sometimes thought that error from these sources can be reduced by oversampling the upper tail. That is a misconception. Oversampling the upper tail is likely to reduce sampling error but has no bite when it comes to non-sampling error. In a cross-country study OECD (2015, p. 251) reports finding no significant relationship between the degree of oversampling and the estimated wealth shares of the top 10 percent, and also no significant relationship for the top 1 percent if the USA is omitted.

[13]For example, Australia, Canada and the U.K. all include full estimates of employer-based pensions in their surveys, and the U.S. includes defined contribution employer-based pensions. However, this is not seen outside the "Anglo-sphere". In developing countries this is a relatively minor concern, due to the relative unimportance of pension wealth. And in many European countries employer-based pensions are less important than public pensions, which are not included in our definition of household net worth. Employer-based pensions are included in our estimates of the level of financial assets in all countries, however.

[14]The LWS data are well suited to comparative studies of micro aspects of wealth holding across countries, as illustrated by Cowell *et al.* (2012). The data include Australia, Austria, Canada, Finland, Germany, Greece, Italy, Norway, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, the U.K. and U.S.

values, which were not permitted in the original utility described by Shorrocks and Wan (2009).

For most countries lacking direct wealth distribution data, an initial approximation to the pattern of wealth distribution was constructed from information on income distribution, based on the belief that wealth inequality is likely to be quite highly correlated with income inequality across countries. Income distribution data for 166 countries was compiled from the World Development Indicators of the World Bank and the World Income Inequality Database, with priority given to the most recently available year. The "ungrouping" program was then used to generate each of the Lorenz curve values required for the template employed for wealth distribution.

For the 33 countries having data on both wealth and income distribution (that is, the countries listed in Table 3), the Lorenz curves for wealth are lower everywhere than those for income, indicating that wealth is more unequally distributed. These 33 reference countries were grouped into two categories (North America and Europe vs. the rest of the world) and the average wealth to income ratios at selected Lorenz points (percentiles 10, 20, 30,..., 90) were computed for each category. Estimates of wealth distribution for the 134 countries lacking wealth distribution data were then generated by scaling up the Lorenz figures for income by the relevant average wealth-income ratios. We believe the resulting estimates are fairly good. This is suggested by Table C.1 in Appendix C, which compares the wealth distribution we report for the 33 countries with wealth and income distribution data with the estimates that would have been obtained for each of those countries if they had not had wealth survey data. In most cases the latter estimates are quite close to our reported distributions.

In order to generate regional and global wealth patterns, each country lacking income distribution data was assigned a wealth distribution pattern equal to the (adult population weighted) average of the corresponding region and income class. As before, this was done in preference to simply disregarding the countries concerned.

The global distribution of wealth requires information on the wealth level of each country to be combined with details of its wealth pattern. Specifically, the ungrouping program was applied to each country to generate a set of synthetic sample values and sample weights consistent with the (actual, estimated or imputed) wealth distribution. Each synthetic sample observation represents approximately 10,000 adults in the bottom 90 percent of the distribution, 1,000 adults in the top decile, and 100 adults in the top percentile. This is a finer division than that employed in Davies *et al*. (2011), which used 1,000 adults to represent the entire distribution within a country.[15] The wealth sample values were then scaled up to match the mean wealth of the respective country, and merged into a single world dataset comprising 1.39 million observations.

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[15]Calculations with samples of different sizes indicate that the larger sample used in our current work, and over-sampling in the upper tail, are needed in order to get a satisfactory estimate for the share of the top 1 percent or the Gini coefficient.

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TABLE 4

WEALTH PATTERN BY REGION, 2014

| Country | Adults | Mean wealth per adult | Median wealth per adult | Distribution of adults (%) by wealth range (USD) | | | | | Gini |
|---|---|---|---|---|---|---|---|---|---|
| | Thousand | USD | USD | under 10,000 | 10,000 −100,000 | 100,000 – 1 million | over 1 million | Total | % |
| Africa | 564,733 | 4,916 | 504 | 92.7 | 6.7 | 0.5 | 0.0 | 100 | 88.0 |
| Asia-Pacific | 1,124,796 | 43,780 | 2,466 | 73.5 | 17.5 | 8.6 | 0.5 | 100 | 89.7 |
| China | 1,008,608 | 22,753 | 5,065 | 66.9 | 30.1 | 2.9 | 0.2 | 100 | 81.2 |
| Europe | 583,929 | 130,419 | 12,086 | 48.0 | 26.6 | 23.7 | 1.8 | 100 | 84.5 |
| India | 783,923 | 3,918 | 660 | 95.9 | 3.8 | 0.3 | 0.0 | 100 | 86.9 |
| Latin America | 399,714 | 20,808 | 4,842 | 66.0 | 31.4 | 2.4 | 0.1 | 100 | 80.5 |
| North America | 269,627 | 328,921 | 48,191 | 33.9 | 28.5 | 32.4 | 5.2 | 100 | 85.3 |
| World | 4,735,329 | 53,048 | 2,485 | 72.1 | 19.6 | 7.7 | 0.7 | 100 | 92.2 |

*Source*: Original estimates; see text for explanation of methods.

The complete global sample may be processed in a variety of ways, for example to obtain the minimum wealth and the wealth share of each percentile in the global distribution of wealth. The distribution within regions may also be calculated, along with the number of representatives of each country in any given global wealth percentile.

The survey data from which most of our wealth distribution estimates are derived tend to under-represent the wealthiest groups and to omit entirely ultra-high net worth individuals. This deficiency does not affect our estimates of average wealth levels around the world, since these are determined by other methods. It does however suggest that figures for the shares of the top percentile and top decile are likely to err on the low side unless adjustments are made to the wealth pattern. We would also not expect to generate accurate predictions of the number and value of holdings of high net worth individuals.

This problem has been addressed by exploiting well-known statistical regularities in the top wealth tail and by making use of information on the wealth holdings of named individuals revealed in the "rich list" data published by Forbes magazine and elsewhere. The broad strategy is to use the number of billionaires reported by Forbes in each year to fit a Pareto distribution to the upper tail of each of the 52 countries listed as having one or more billionaires for at least five years. The top wealth values in the synthetic sample are then replaced by the new estimates, and the resulting "adjusted" sample for each country is re-scaled to match the mean wealth value. This sequence was repeated until the process converges, typically after a few rounds. Region-based adjustment were performed for countries with insufficient billionaire observations. For further details see Appendix D. The overall global weighted sample contains 1.39 million observations, each representing between 100 and 10,000 adults. The adjusted sample can be used to produce improved estimates of the true wealth pattern within countries, regions and the world. The minimum sample size of 100 facilitates accurate estimates of the number and value of wealth holdings up to USD 100 million at the regional and global level. Estimates above this level (as well as for individual

countries) can be obtained from onward projections based on a Pareto distribution.

## 5. Trends in Global Wealth Distribution, 2000–2014

Table 4 shows some key numbers for our estimated 2014 global and regional wealth distributions, including our estimates of wealth per adult for the world as a whole and by region.[16] Four wealth layers are identified: below USD 10,000; from USD 10,000 to USD 100,000; from USD 100,000 to USD 1 million; and above USD 1 million. These layers may be regarded as representing a wealth pyramid. For the world as a whole, there are 3.3 billion adults in the base tier. The number declines by about two thirds at each of the next two tiers, but then experiences a much sharper drop from the third group (365 million adults) to the millionaire group (32 million adults). The top group, comprises just 0.7 percent of the world's adult population but its household wealth amounts to USD 111.8 trillion, or 45.0 percent of the global total. As would be expected, the higher wealth groups are heavily over-represented in Europe and North America.

Table 4 also reports our estimate of 92.2 percent for the Gini coefficient for global wealth. This is much higher than the estimates found by others for global *income* inequality. Lakner and Milanovic (2016), for example obtain a Gini coefficient of 70.5 percent for the global income distribution in 2008 on a PPP and per capita basis.[17] The figure is also considerably higher than the 80.2 found by Davies *et al.* (2011) on a PPP and per adult basis for the year 2000, and somewhat higher than that of 89.2 found for 2000 by Davies *et al.* (2008) using official exchange rates, as we do here. The higher number reflects, in part, improved estimates of wealth holdings in the top tail.[18]

It is also interesting to get an idea of how much of global wealth inequality is due to differences between countries rather than within. The global wealth Gini coefficient in 2014 would have been 73.1 percent if all adults in each country had had equal wealth: that is if the only wealth inequality was that between countries. Comparing to our global Gini estimate of 92.2 percent one sees that between-country inequality equals 79 percent of global wealth inequality according to the

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[16]Bootstrap standard errors were computed for the wealth per adult estimates, for countries and regions in each year from 2000 to 2014, generating 95% confidence intervals shown in Appendix F. Confidence intervals computed similarly for the Gini coefficient and the wealth share of the top 10 percent, by region and year, are given in Appendix G. As discussed in Anand and Segal (2008) and Lakner and Milanovic (2016), bootstrap standard errors need to be interpreted with caution in this context as they implicitly assume random sampling from a global distribution. Lakner and Milanovic (2016) argue that such standard errors should be treated as lower bounds, and that warning would of course extend to confidence intervals.

[17]Global inequality is higher on a per capita than on a per adult basis because poorer countries tend to have a higher ratio of total to adult population. This means that their income or wealth is relatively lower, in international comparisons, on a per capita than on a per adult basis. If the Lakner and Milanovic (2016) estimates were put on a per adult basis, the gap between their Gini coefficient for income and ours for wealth would be larger than it appears here.

[18]Table C.2 in Appendix C indicates that the estimated global and regional distributions of wealth are relatively insensitive to the imputations we have made for countries with poor data. Excluding those countries for which we use region/income class averages leaves the global Gini at 92.2, while omitting all countries that do not have any form of wealth data reduces it only a little—to 90.8.

Gini coefficient.[19] This can be compared with the corresponding ratio of 74 percent for the 2011 global income distribution estimated by Milanovic (2014).[20]

Table 5 shows the shares of the wealth deciles and the top 5 percent and 1 percent, plus the minimum wealth required to be in each group, again for regions and the world as a whole.[21] The shares of the top groups are remarkably high. For example, the top 1 percent possess 49.7 percent of global wealth and the top 10 percent own 88.3 percent. Shares of the top 1 percent are highest in India and Africa, and lowest in Europe. However, the shares of the bottom deciles are lower in Europe and North America than in the rest of the world, reflecting the higher incidence of adults with very low or negative net worth in the more prosperous regions where there is ready access to consumer borrowing.

In global terms, it does not take much to be relatively high in the wealth distribution. For instance, only USD 2,485 was needed to belong in the top half in 2014 according to our estimates, and USD 74,780 was sufficient to be in the top decile. But again, there are large differences across regions. Note also that membership of the top 1 percent does not require extreme wealth. For the world as a whole the requirement is USD 745,365, and just a few million dollars are sufficient for Europe or even North America. The global top 1 percent have been faring very well as a group, but most of them are far from being in the super rich category, and many would likely not consider themselves rich in their own country context.

Figure 7 portrays the regional aspects of the world distribution of wealth in 2014 by showing what fraction of the adults in each global decile lived in each region. The comparison between China and India is the most prominent feature of this chart. China has very few representatives at the bottom of the global wealth distribution, and relatively few at the top, but dominates the upper middle section, accounting for 32 percent of the worldwide membership of deciles 6–8. China's low representation at the bottom reflects such factors as low of household debt, the broad holding of privatized housing in urban areas, and the prohibition of land sales, which helps to prevent rural wealth from becoming more concentrated.[22] The sizeable presence of China in the upper middle section reflects its population size and growing wealth. China's position in the global picture has shifted towards the right in the past decade due to its strong growth, rising asset values and currency appreciation. China now has more people in the top 10 percent of global wealth holders than any other country except for the U.S. and Japan, having moved into third place in the rankings by overtaking France, Germany, Italy and the U.K. In contrast, residents of India are heavily concentrated

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[19]The Gini coefficient does not decompose additively into between- and within-country components. Nonetheless between-country inequality remains a well-defined concept for the Gini coefficient. Note also that although the members of the generalized entropy class of inequality indexes decompose additively, they are not defined if there are negative observations, of which there are many in wealth data.

[20]Milanovic (2014, pp. 20 and 21) shows a between-country ("Concept 2") Gini of 49.4 and an overall Gini ("Concept 3") of 67.2.

[21]Corresponding data is provided for individual countries in Appendix E.

[22]Urban land belongs to the state in China, but rural people do have sufficient land ownership rights that the value of their land is most often included in estimates of wealth distribution in China, as it is here. (See Li and Wan, 2015, for discussion on this point).

TABLE 5

WEALTH SHARES AND MINIMUM WEALTH OF DECILES AND TOP PERCENTILES FOR REGIONS, 2014

| | | | | | Wealth decile | | | | | | Top | |
| Country | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10% | 5% | 1% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I Wealth shares (%) | | | | | | | | | | | | |
| Africa | −0.1 | 0.1 | 0.2 | 0.4 | 0.8 | 1.4 | 2.4 | 4.3 | 9.2 | 81.4 | 71.2 | 49.3 |
| Asia-Pacific | −0.1 | 0.0 | 0.1 | 0.3 | 0.4 | 0.7 | 1.3 | 2.7 | 9.7 | 84.9 | 69.7 | 39.7 |
| China | −0.1 | 0.3 | 0.6 | 1.0 | 1.8 | 2.8 | 4.1 | 6.3 | 11.1 | 72.1 | 61.6 | 41.5 |
| Europe | −0.8 | 0.0 | 0.1 | 0.3 | 0.6 | 1.5 | 3.6 | 8.1 | 16.3 | 70.4 | 55.6 | 31.5 |
| India | −0.7 | 0.2 | 0.5 | 0.9 | 1.4 | 2.1 | 3.1 | 4.8 | 8.3 | 79.5 | 71.8 | 56.2 |
| Latin America | 0.0 | 0.1 | 0.4 | 1.0 | 1.8 | 3.0 | 4.6 | 7.2 | 11.9 | 70.0 | 59.5 | 40.3 |
| North America | −0.4 | 0.1 | 0.2 | 0.4 | 1.0 | 2.1 | 3.5 | 6.1 | 11.1 | 76.0 | 64.8 | 41.1 |
| World | −0.5 | 0.0 | 0.1 | 0.2 | 0.4 | 0.7 | 1.2 | 2.5 | 7.2 | 88.3 | 76.6 | 49.7 |
| II Minimum wealth (USD) | | | | | | | | | | | | |
| Africa | | −1 | 52 | 145 | 287 | 504 | 871 | 1,527 | 2,904 | 7,070 | 14,522 | 58,447 |
| Asia-Pacific | | 40 | 311 | 774 | 1,466 | 2,466 | 4,110 | 7,603 | 18,794 | 84,982 | 197,691 | 614,219 |
| China | | 410 | 958 | 1,804 | 3,026 | 5,065 | 7,663 | 11,357 | 18,276 | 35,602 | 66,108 | 235,700 |
| Europe | | −2 | 600 | 2,009 | 4,764 | 12,086 | 29,662 | 70,313 | 147,980 | 299,660 | 504,761 | 1,465,491 |
| India | | 63 | 123 | 262 | 427 | 660 | 982 | 1,486 | 2,388 | 4,521 | 8,331 | 34,458 |
| Latin America | | −18 | 481 | 1,415 | 2,838 | 4,842 | 7,693 | 11,866 | 18,600 | 33,757 | 58,596 | 207,835 |
| North America | | 3,529 | 5,580 | 7,818 | 18,376 | 48,191 | 88,332 | 147,913 | 259,322 | 535,090 | 1,038,859 | 4,349,614 |
| World | | 38 | 283 | 679 | 1,349 | 2,485 | 4,611 | 8,649 | 19,400 | 74,781 | 195,661 | 745,365 |

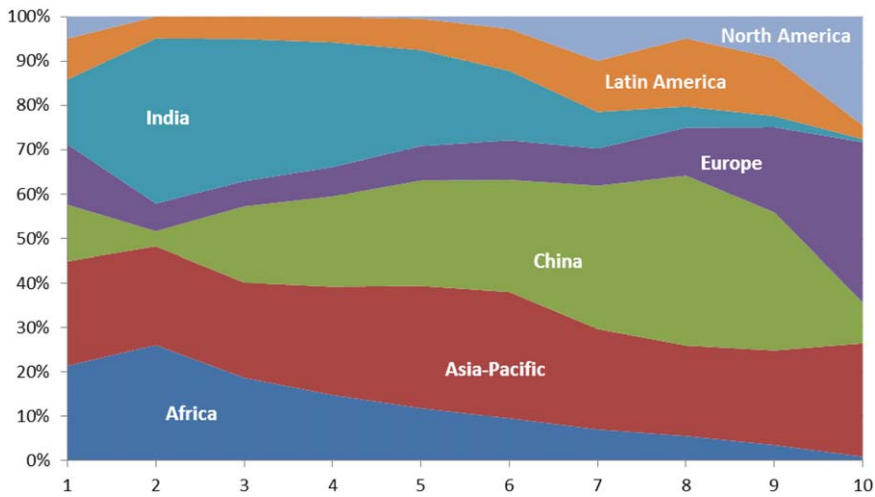*Source*: Original estimates; see text for explanation of methods.

Figure 7. Regional Composition of Global Wealth Deciles, 2014 [Colour figure can be viewed at wileyonlinelibrary.com]

in the lower wealth strata, accounting for over a quarter of people in the bottom half of the distribution. However, its extreme wealth inequality and immense population mean that India also has a significant number of members in the top wealth echelons.

Figure 7 shows that residents of Latin America are fairly evenly spread across the global wealth spectrum. The Asia-Pacific region (excluding China and India) mimics the global pattern more closely still. However, the apparent uniformity of the Asia-Pacific region masks a substantial degree of polarization. Residents of high-income Asian countries, such as Hong Kong, Japan and Singapore, are heavily concentrated at the top end: half of all adults in high income Asian countries occupy the top global wealth decile. In contrast, inhabitants of lower income countries in Asia, such as Bangladesh, Indonesia, Pakistan and Vietnam, tend to be found lower down in the wealth distribution. In fact, when high-income countries are excluded from the Asia-Pacific group, the wealth pattern within the remaining countries resembles that of India, with both regional groupings contributing about one quarter of the bottom half of wealth holders. Africa's population is even more concentrated at the bottom end: 40 percent of all African adults occupy the bottom two global wealth deciles. At the same time, wealth inequality within and across countries in Africa is so high that some individuals are found within the top global wealth decile and the highest percentile. In contrast, North America and Europe are heavily skewed toward the top tail, together accounting for 61 percent of adults in the top 10 percent, and an even higher percentage of the top percentile. Europe accounts for 34 percent of members of the top wealth percentile, a proportion that rose considerably over the decade leading up to 2014 alongside appreciation of the euro against the U.S dollar even though a decline is observed since 2010.

Table 6 provides some country detail regarding levels of wealth inequality in 2014. It classifies countries as having low, medium, high or very high inequality

based on the share of the top wealth decile, which we believe is a more robust and reliable indicator than the alternative measures, for example the share of the top percentile. We also break down the results between developed and emerging market countries.

The majority of developed countries rank as having "medium inequality", meaning a top decile share between 50 percent and 60 percent. Most of these countries would have fallen within the same band in 2000, and even as far back as 1980 (Davies and Shorrocks, 2000; Roine and Waldsentröm, 2015). So there is little evidence here of major shifts in inequality over time. The remaining developed economies in 2014 typically fall in the "high inequality" range, with top decile shares between 60 to 70 percent. This leaves Denmark, Hong Kong, Sweden, and the U.S., which qualify as "very high inequality" on account of top decile shares above 70 percent; and Belgium and Japan which just squeeze below the "low inequality" threshold share of 50 percent.

For emerging market economies, the classification appears to shift upwards by a grade or more. The majority of countries, including China, Brazil, India, Indonesia, Russia, South Africa and Turkey, qualify as having "very high inequality." According to our estimates, inequality in Russia is so far above the rest that it deserves to be placed in a separate category. The remaining emerging market nations—including Chile, Argentina and Taiwan—are classed as "high inequality," except for the United Arab Emirates and Korea, which rate as "medium inequality." Interestingly, Korea, Taiwan and the United Arab Emirates have the highest wealth per adult among emerging market countries. This hints at the possibility that wealth inequality may tend to decrease as economies mature, along the lines suggested by the Kuznets' hypothesis.

An important difference between developed vs. emerging and developing countries is that the latter tend to have higher population growth and younger populations. (China is an interesting exception. While it still has a higher population growth rate than seen in most developed countries, the population has been aging due to the one-child policy.) In his pioneering analysis, Atkinson (1971) showed that in a simple life-cycle model of saving wealth inequality rises with the rate of population growth. This is because the fraction of young people is higher in faster growing populations, and the young have relatively low wealth. Thus part of the difference in wealth inequality between the developed countries and emerging or developing countries may be due to their faster population growth.[23]

Turning to trends over time, Table 7 reports changes over the period 2000–2014. Top wealth shares increased in Africa, and to a greater extent in India and China, stayed constant in Latin America, but fell slightly in Europe and North America, and also by a fraction in the world as a whole. For the Asia-Pacific region, the evidence is ambiguous: the share of the top wealth decile declined a little, but the share of the top percentile rose. Trends shown by the Gini coefficient

[23]Because Atkinson was asking how much of wealth inequality could be explained purely by age differences he did not take into account how wealth inequality changes with age (Davies, 1999). Typically it declines with age up to mid or late middle age and then increases. It is therefore not unambiguous that overall wealth inequality must be higher if the young are a larger fraction of the population.

TABLE 6

CURRENT WEALTH INEQUALITY IN DEVELOPED COUNTRIES AND EMERGING MARKETS

| | Developed economies | | Emerging markets | |
|---|---|---|---|---|
| **Very high inequality** top decile share > 70% (U.S. c1910) | Hong Kong Sweden U.S. | Denmark | China Brazil Egypt India Indonesia Malaysia | Peru Philippines Russia South Africa Thailand Turkey |
| **High inequality** top decile share > 60% (e.g. U.S. c1950) | Austria Ireland Germany | Israel Singapore | Chile Argentina Colombia Czech Republic | Mexico Poland Saudi Arabia Taiwan |
| **Medium inequality** top decile share > 50% (e.g. Europe c1980) | Australia Canada Finland France Greece Italy | Netherlands New Zealand Norway Portugal Spain Switzerland U.K, | United Arab Emirates Korea | |
| **Low inequality** top decile share < 50% | Belgium Japan | | Slovakia Slovenia | |

are similar. We estimate that the global Gini coefficient was 92.7 percent in 2000 and 92.2 percent in 2014 (see Appendix G).[24]

Splitting the period reveals markedly different trends before and after the global financial crisis. From 2000 to 2007, inequality fell in every region except China and India, where it increased. After 2007, the shares of the top decile and top percentile both rose in every region except North America. The reduction in wealth inequality during the early period was especially pronounced in Asia-Pacific, Europe and Latin America. The subsequent increases are more consistent across regions, North America excepted.

The fall in wealth concentration in the initial years of the new century followed by a rise after the global financial crisis is consistent with the findings of others. Piketty (2014) estimated the wealth shares of two elite groups using the Forbes world billionaire data. He looked at the top 1/20 million and top 1/100 million fractiles, which had 234 and 47 members respectively in 2013. In both cases, the shares dropped sharply from 2000 to 2003 and then rose mildly, but were still below the 2000 level in 2006 (Figure 12.3, p. 436). Thereafter these shares rose every year, except for 2009 when they dropped sharply.

For the entire period since 2000, we find a net decline in the shares of the top decile, which appears at variance with the findings of Piketty. However, our results are not necessarily conflicting, since Piketty focuses on very small groups at the apex of the distribution. Previous studies have found that these elite groups have experienced more rapid wealth growth than a broader spread of wealthy individuals: in other words, inequality within the rich, has been increasing. Atkinson

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[24]The lack of trend for the world as a whole appears to hold on a PPP basis as well. The between-country Gini coefficient was 61.7 percent in both 2000 and 2014.

TABLE 7

Wealth Share of Top Decile and Top Percentile by Region, 2000–14

| top percentile | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Africa | 40.9 | 39.3 | 40.0 | 39.8 | 41.6 | 41.6 | 41.8 | 41.5 | 41.7 | 44.4 | 44.8 | 45.0 | 47.0 | 47.8 | 49.3 |
| Asia-Pacific | 37.8 | 37.2 | 36.9 | 36.7 | 36.4 | 36.1 | 36.0 | 36.1 | 36.1 | 36.6 | 36.9 | 37.6 | 38.2 | 39.1 | 39.7 |
| China | 29.9 | 30.1 | 30.4 | 30.7 | 31.2 | 31.6 | 32.3 | 33.5 | 34.9 | 35.8 | 36.8 | 37.8 | 38.9 | 40.2 | 41.5 |
| Europe | 31.7 | 30.9 | 30.3 | 29.7 | 29.2 | 28.7 | 28.3 | 27.8 | 27.5 | 28.0 | 28.7 | 29.4 | 30.1 | 30.9 | 31.5 |
| India | 39.1 | 40.0 | 41.0 | 42.0 | 43.2 | 44.5 | 45.9 | 47.4 | 49.0 | 50.1 | 51.4 | 52.4 | 53.7 | 54.9 | 56.2 |
| Latin America | 39.3 | 38.7 | 38.2 | 37.2 | 36.6 | 36.4 | 35.7 | 35.0 | 34.4 | 35.9 | 36.7 | 37.9 | 38.5 | 39.4 | 40.3 |
| North America | 42.3 | 42.4 | 42.3 | 42.1 | 42.0 | 41.9 | 41.8 | 41.4 | 41.7 | 41.3 | 41.2 | 41.1 | 41.0 | 41.0 | 41.1 |
| World | 49.6 | 49.6 | 48.1 | 47.4 | 47.5 | 48.1 | 47.2 | 45.8 | 45.5 | 45.4 | 45.8 | 46.1 | 47.1 | 48.5 | 49.7 |

| top decile | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Africa | 75.7 | 74.2 | 75.0 | 74.8 | 76.6 | 76.4 | 76.6 | 75.8 | 76.0 | 78.2 | 78.2 | 78.7 | 80.1 | 80.5 | 81.4 |
| Asia-Pacific | 86.1 | 85.3 | 84.9 | 84.6 | 84.1 | 83.5 | 82.8 | 81.8 | 83.8 | 84.1 | 83.9 | 84.9 | 84.8 | 85.1 | 84.9 |
| China | 66.5 | 66.6 | 66.7 | 66.9 | 67.1 | 67.3 | 67.6 | 68.2 | 68.9 | 69.3 | 69.8 | 70.3 | 70.8 | 71.5 | 72.1 |
| Europe | 71.0 | 70.4 | 69.8 | 69.2 | 68.8 | 68.3 | 68.0 | 67.3 | 67.0 | 67.5 | 67.9 | 68.7 | 69.0 | 69.5 | 70.4 |
| India | 70.3 | 70.8 | 71.3 | 71.8 | 72.4 | 73.1 | 73.9 | 74.7 | 75.6 | 76.2 | 76.9 | 77.4 | 78.1 | 78.8 | 79.5 |
| Latin America | 70.3 | 69.8 | 68.8 | 67.9 | 67.6 | 67.6 | 66.9 | 66.3 | 65.8 | 66.8 | 67.3 | 68.1 | 68.7 | 69.4 | 70.0 |
| North America | 77.0 | 77.1 | 77.0 | 76.7 | 76.6 | 76.5 | 76.4 | 76.1 | 76.3 | 76.0 | 75.9 | 75.9 | 75.8 | 75.9 | 76.0 |
| World | 89.4 | 89.0 | 88.5 | 88.4 | 88.6 | 88.3 | 87.7 | 86.5 | 87.0 | 86.8 | 86.5 | 86.9 | 87.2 | 87.9 | 88.3 |

(2008) examined this issue in depth and found increasing concentration among both the rich and the super-rich.

Our results for the period after the global financial crisis are also broadly consistent with the time series evidence that comes directly from household surveys in six OECD countries. OECD (2015, p. 271) reports that inequality at the top of the wealth distribution rose after the global financial crisis in four out of the six countries—Italy, the Netherlands, the U.K. and the U.S., while it fell in Australia and Canada. Inequality in the bottom range rose in all six countries except the U.K. where it fell slightly.

What explains the V-shaped pattern of trends in top wealth shares over the 2000–2014 period? While a complete explanation would require further research, an important element is the behavior of housing markets and stock markets. When house prices rise more than stock prices, top wealth shares tend to decline since housing is a relatively more important asset for middle than for top groups. In contrast, if stock prices rise faster than house prices the shares of top wealth groups tend to increase, since stocks are more important at the top of the distribution (Atkinson *et al.*, 1989; Wolff, 2009). According to our estimates, from 2000 to 2007 non-financial assets rose as a proportion of total global household assets from 44.8 percent to 48.1 percent, reflecting stronger performance of housing than of stock markets. From 2008 to 2014, on the other hand, the share of *financial* assets rose—from 50.2 percent to 55.0 percent, due to stronger performance of stock markets than of housing markets. These contrasts likely explain a good part of the V-shaped pattern of changes in top wealth shares since the year 2000.

One slightly unexpected finding is the flat trend in the top shares in North America, which have scarcely moved in the years since 2000. The U.S. accounts for 90 percent of adults in North America and is the source of this stable pattern. According to our estimates, the share of the top 1 percent in the U.S. changed

insignificantly from 42.5 percent in 2000 to 42.2 percent in 2014, while the share of the top 10 percent was 77.8 percent in 2000 and 77.6 percent in 2014. This stability in top wealth shares in the U.S. contrasts with the substantial rise in income inequality since the mid 1970s. While it is consistent with the results of previous studies based on both estate tax and survey data (Kopczuk and Saez, 2004), several recent studies point to an increase in the wealth share of the top 1 percent in the U.S., especially after the global financial crisis. Some of the evidence relates to investment income multiplier estimates (Saez and Zucman, 2014) and could be challenged on the grounds that the investment income multiplier method is subject to a range of limitations that call its reliability into question (see Davies and Shorrocks, 2000). Other evidence for rising wealth inequality in recent years in the U.S. is derived from the Survey of Consumer Finance (Bricker *et al.*, 2014; also see Kopczuk, 2015, for an overview) and needs to be taken more seriously.[25] We plan to re-examine trends in the U.S. in future work.

## 6. DISCUSSION AND CONCLUSION

It is interesting to consider how our findings concerning the level and distribution of personal wealth relate to the discussion about the likely course of wealth inequality in the 21st century prompted by Piketty (2014). Piketty's analysis covers many issues, but it places special emphasis on the role played by the gap between the after-tax rate of return on private capital, $r$, and the growth rate of the economy, $g$. Inherited wealth tends to grow at the rate $r$, or a somewhat lower rate allowing for consumption. On the other hand, aggregate life-cycle wealth tends to grow at the rate $g$. Historically, Piketty finds that $r$ has generally exceeded $g$, except in periods of capital destruction or high tax rates, like those prevailing in the first half of the 20th century. Barring widespread wars, depression or very high tax rates, Piketty expects that $r$ will exceed $g$ in the 21st century, which will lead to a tendency for wealth inequality to increase. We think this is an important insight, and with the appropriate qualifications that Piketty has indicated we agree with his basic analysis. However, in order to analyze or project the trajectory of world wealth inequality, some additional considerations need to be taken into account.

Piketty's analysis applies most clearly to wealth inequality within countries. But world wealth inequality also depends on the rise or fall of wealth in different countries and regions. An important element in the current evolution of wealth inequality is the role played by the fast growing developing economies, which include China and India, of course, but also a number of other economies in the Asia-Pacific region. Despite great progress in recent decades, these countries still have relatively low income and wealth. Their rise has already had an important

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[25]As mentioned above, household wealth surveys are especially vulnerable to non-sampling error in the upper tail of the distribution. It could be that these errors have become smaller in the SCF in recent years due to more readiness on the part of the rich to respond and to report their assets accurately, or due to improvements in survey technique. It should also be borne in mind that the SCF sampling frame excludes the Forbes 400. Since the U.S. population continues to increase, the Forbes 400 is falling as a percent of the population. This suggests that the SCF may be gradually reaching further into the upper tail, which would tend to increase its estimated top shares.

equalizing impact on both world income and world wealth. The fact that world wealth inequality rose in most regions from 2000 to 2014 but did not rise globally, according to our estimates, is a striking indication of the importance of the role of these economies in determining the global trend in wealth inequality.

If China, India, and other developing economies continue to achieve rapid growth, then any tendency for wealth inequality to grow within countries will largely be offset, in terms of the impact on global inequality, by this increase in wealth in large parts of the developing world. One may also perhaps hope that the rapid wealth growth experienced by some developing countries will spread to other parts of the world, especially Africa and Latin America. If that turns out to be true, global wealth inequality may be stable or declining in the coming decades despite rising wealth inequality within many individual countries.

What of the longer term? The moderation of trends in global wealth inequality due to the rising wealth of large lower income countries cannot continue indefinitely. By the end of this century–and possibly long before–China, India and a number of other current developing countries will have become middle or high wealth countries. Does this mean that at some point during this century the tendency for wealth inequality to rise within countries will overcome the equalizing impact of China, India and other rapidly developing lower wealth countries? This could certainly happen. But before then the rapidly growing developing countries are likely to become increasingly concerned about their own tendency towards increased inequality, which may result in the kind of institutional change that Piketty has called attention to. If such a trend emerges it could moderate or even stop the overall movement towards higher wealth inequality within countries. The 20th century initially saw a large decrease in wealth inequality in the most advanced economies due to the broader spread of wealth via home ownership, pensions and other assets (Roine and Waldenström, 2015). It seems reasonable to expect that something similar may happen in today's rapidly developing economies as they mature.

In conclusion, our research has shown that, although the road has not been smooth, the initial period of the 21st century has been one of considerable growth of personal wealth in global terms. The top wealth shares for the whole world in 2014 were similar to the shares in 2000, but took a V-shaped path in-between, declining up to the time of the global financial crisis, and increasing afterwards. Personal wealth has also become relatively more important over time. For a long time, human capital was regarded as the dominant determinant of family welfare and of the distribution of economic resources. But the pendulum has been swinging in the other direction during the last 15 years, with the importance of non-human wealth rising and being increasingly recognized.

Although personal wealth has been increasing globally in relative terms, it is still true that labor earnings are a larger fraction of family income, on average, than capital income. Correspondingly, human capital no doubt bulks larger, overall, than does physical and financial wealth. However, non-human wealth has important attributes that make it more effective in empowering people and encouraging development. Human capital cannot be bought and sold. It is not a consumable store of value and it cannot be used as collateral for the borrowing required to start up new enterprises. The economic system we live with is often

referred to as "capitalism", reflecting the fact that capital has a special, and very important role in the market system. The importance of its role is increasing. Much more research on the role of personal capital is needed. We hope that our efforts in beginning the study of the level, composition and concentration of global household wealth have been a help in that regard.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this paper on the publisher's website:

**Appendix A**: Countries included in regressions

**Appendix B**: Total wealth by region, 2000-2014

**Appendix C**: Robustness checks

**Appendix D**: Adjustments using Forbes billionaire data

**Appendix E**: Bounds between wealth deciles and other centile groups by country and region, 2000-2014

**Appendix F**: Wealth details by country and region, per capita and per adult, including wealth components, medians, and means using PPP exchange rates, 2000-2014

**Appendix G**: Confidence intervals for Gini coefficient and share of top 10% by region, 2000-2014