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WIDER Working Paper 2016/3

Estimating the level and distribution of global wealth, 2000–14

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Abstract: Davies et al. (2008, 2011) provided the first estimates of the global distribution of wealth, using 2000 as the benchmark year. These estimates have been revised and updated since 2010, and the purpose of this paper is to explain the ways in which the estimation methodology has evolved and improved in recent years. Further, the paper summarizes lessons learned about trends in the level and distribution of global wealth for the period 2000-14. Finally, the paper discusses the results in the context of the discourse provoked by Piketty (2014).

Keywords: wealth inequality, global wealth, income distribution, econometrics

JEL classification: D31, O15

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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), with greater detail provided in the accompanying Databooks (Davies, Lluberas and Shorrocks 2010; 2011; 2012; 2013; 2014). The purpose of this paper is to explain the ways in which the estimation methodology has evolved and improved in recent years, and to summarise what we have learned about trends in the level and distribution of global wealth for the period 2000-2014.

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. 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 methodology 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 47 countries, although 30 of these countries cover only financial assets and debts. An additional four countries have household survey data from which wealth levels can be calculated. Together these countries covered 66% of the global population and 96% 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 31 countries. 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 methodology 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, as detailed in Shorrocks (2015).

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, 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.¹ 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.

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.

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 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.

¹ 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.

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 51 countries with HBS or survey data in at least one year. 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 97% 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.

Separate regressions are run for financial assets, non-financial 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.

The estimation procedure 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. Relatively complete financial and non-financial balance sheet data are available for 17 countries for at least one year.² These are predominantly high income countries, the exceptions being the Czech Republic and South Africa which fall within the upper middle income category according to the World Bank. The data are described as complete if financial assets, liabilities and non-financial assets are all adequately covered. Another 30 countries have financial balance sheets, but no details of real (i.e. non-financial) assets. This group contains ten 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. For countries which have both HBS and survey data, the HBS figures are given priority. The HBS estimates typically use a country's wealth survey results as one input, but also take account of other sources of information, and should, therefore dominate wealth survey estimates in quality. However, this does not ensure that HBS data are error-free.

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 the real assets regression now has 132 observations compared to 23 earlier.

Table 1 shows our main regression results. The independent variables are similar to those used in Davies et al (2011): log consumption per capita, GDP per capita growth, log market capitalization,

² Table 1-1 in Davies et al. (2014) lists the countries for which there is HBS or survey data on household wealth, while tables 1-2 and 1-3 provide the sources.

proportion of urban population, log domestic credit available in the private sector, life expectancy and log population density.³ Three sets of dummy variables are also included. 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 Chile, China, India and Indonesia. 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 & the Caribbean upper middle and high income, Latin America & 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 – like the recent 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% of the global adult population – for which we are unable to estimate wealth per adult. 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.

Wealth estimates for the most recent years require further interventions. A few countries release wealth data with a short lag. Our mid-2014 estimates for the USA, for instance, were based on wealth data for the first quarter of 2014. However, wealth data were missing for most countries for part or all of the period 2009 - 2014. In order to obtain estimates of net worth per adult and its components we update the most recent available figures using, when available, 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% increase in market capitalization is associated with 1.8% and 1.1% increases in financial assets in low/mid and high income countries

³ The regression specification and choice of variables are based on the life-cycle model (LCM) which predicts that wealth should be related to income per capita, the growth rate, length of retirement, and the interest rate. Interest rates were not significant, so are not included here. Consumption per capita is used instead of income per capita since it gives similar results but allows imputations to be done for more countries (since consumption data are available for more countries than income). The other variables are used in those equations where they are expected to be relevant. For example, house prices tend to be higher in countries with greater population density, boosting the importance of non-financial assets. While the number of countries with data on house prices is limited, population density is available for all countries, again facilitating imputations. For the rationale for the other variables see Davies et al. (2011).

respectively. A 10% increase in GDP per capita is associated, in turn, with 11% and 2.5% increases in debts in low/mid and high income countries respectively. Finally, a 10% increase in house prices is associated with 1.6% and 3.1% 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 263 trillion in mid-2014, equivalent to USD 56,000 per adult. The corresponding values for 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 125% over the 2000-2014 period and wealth per adult climbed 77%.

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. Despite the crisis, it appears that the past 15 years has 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 55%.

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; whilst residents in China held 4% of world wealth in 2000, the figure is 8% in 2014. This was almost exactly offset by the decline from 24% to 19% 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% in 2000 to 8.8% 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 55% 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 17% more than non-financial assets in 2014. On the liabilities side of the household balance sheet, average debt rose by 80% between 2000 and 2007, and then leveled out. It amounted to USD 9,250 per adult in 2014. Expressed as a proportion of household assets, average debt has moved in a narrow range, rising from 13.8% in 2000 to 16.5% in 2008 and then steadily declining to 14.1% 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 44% of gross assets in Europe and 69% in North America in 2014, but just 14% of gross assets in India and 36% in Latin America. Household debt as a percentage

of gross assets is 15% in both Europe and North America, but only 6% in India, 7% in China and 9% in Africa. There are also variations in portfolios unrelated to the level of development. Some developed countries, such as Italy, have unusually low liabilities (9% of gross assets in 2014), while others have surprisingly high debt, for example Denmark (29% 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 31 countries. 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 2 using a common template which gives the shares of the top 10%, 5%, 1%, 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.⁴ Asset coverage also differs between surveys in different countries.⁵ 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.

The summary details reported in Table 2 show relatively sparse distributional information. Estimates for the empty cells were generated using an “ungrouping” computer program which constructs a synthetic sample that conforms exactly to any set of Lorenz values – including negative 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

⁴ 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%, and also no significant relationship for the top 1% if the USA is omitted.

⁵ For example, Australia, Canada and the United Kingdom all include full estimates of employer-based pensions in their surveys, and the USA 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.

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 31 countries having data on both wealth and income distribution, the Lorenz curves for wealth are lower everywhere than those for income, indicating that wealth is more unequally distributed. These 31 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 various Lorenz points were computed for each category. Estimates of wealth distribution for the 143 countries lacking wealth distribution data were then generated by scaling up the Lorenz figures for income by the relevant average wealth-income ratios.

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 10,000 adults in the bottom 90% 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.⁶ 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 1.3 million observations.

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.

⁶ 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% or the Gini coefficient.

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. The most recent estimates refine this procedure by pooling the top tail patterns for each year since 2000, and by applying region-based adjustments to countries with insufficient billionaire observations: see Shorrocks (2015) for details of the methods employed.

The overall global weighted sample contains 1.3 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 3 shows some key numbers for our estimated 2014 global and regional wealth distributions. 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 (373 million adults) to the millionaire group (35 million adults). The top group, comprises just 0.7% of the world’s adult population but its household wealth amounts to USD 115.9 trillion, or 44.0% of the global total. As would be expected, the higher wealth groups are heavily over-represented in Europe and North America.

Table 3 also reports our estimate of 91.1% for the Gini coefficient for global wealth – much higher than the estimates found by others for global *income* inequality.⁷ The figure is also considerably higher than the 80.2 found by Davies et al. (2011) on a PPP 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.

Table 4 shows the shares of the wealth deciles and the top 5% and 1%, plus the minimum wealth required to be in each group, again for regions and the world as a whole. The shares of the top groups are remarkably high. For example, the top 1% possess 48.2% of global wealth and the top 10% own 87.4%. Shares of the top 1% are highest in India and Africa, and lowest in Europe. However, the

⁷ Lakner and Milanovic (2013) report a Gini coefficient of 70.5 for the world income distribution as of 2008 using PPP exchange rates. With a Pareto top-tail and other adjustments this figure rises to almost 76.

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 3,641 was needed to belong in the top half in 2014 according to our estimates, and USD 77,450 was sufficient to be in the top decile. But again, there are large differences across regions. Note also that membership of the top 1% does not require extreme wealth. For the world as a whole the requirement is USD 798,285, and just a few million dollars are sufficient for Europe or even North America. The global top 1% 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 40% of the worldwide membership of deciles 6–8. 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% of global wealth holders than any other country except for the USA and Japan, having moved into third place in the rankings by overtaking France, Germany, Italy and the United Kingdom. In contrast, residents of India are heavily concentrated 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: half 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 64% of adults in the top 10%, and an even higher percentage of the top percentile. Europe accounts for 38% of members of the top wealth decile, a proportion that rose considerably over the decade leading up to 2014 alongside appreciation of the euro against the US dollar.

Table 5 provides some country detail regarding levels of wealth inequality in mid-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% and 60%. 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 Waldenström, 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%. This leaves Hong Kong, Switzerland and the United States, which qualify as “very high inequality” on account of top decile shares above 70%; and Belgium and Japan which just squeeze below the “low inequality” threshold share of 50%.

For emerging market economies, the classification appears to shift upwards by a grade or more. The majority of countries, including 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, China, Korea and Taiwan – are classed as “high inequality,” except for the United Arab Emirates, which rates 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.

Turning to trends over time, Table 6 reports changes over the period 2000-2014. Top wealth shares increased in Latin America and Africa, and to a greater extent in India and China, 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.

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 percentile and 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 (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 UK and the USA, while it fell in Australia and Canada. Inequality in the bottom range rose in all six countries except the UK where it fell slightly.

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 USA accounts for 90% of adults in North America and is the source of this stable pattern. According to our estimates, the share of the top 1% in the USA changed insignificantly from 38.5% in 2000 to 38.4% in 2014, while the share of the top 10% was 74.6% in both years. This stability in top wealth shares in the USA 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% in the USA, 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 USA 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.⁸ We plan to re-examine trends in the USA 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

⁸ 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 % 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.

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 twentieth century. Barring widespread wars, depression or very high tax rates, Piketty expects that r will exceed g in the twenty-first 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 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 twentieth 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 increasing and being increasingly recognized.

Although personal wealth has been rising 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 do 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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Table 1: Regressions of wealth components

Independent variables	Log financial assets	Log liabilities	Log real assets
Log consumption per capita	1.212*** (0.0858)	1.326*** (0.0771)	1.066*** (0.133)
GDP per capita growth rate	-0.0122*** (0.00310)		
Log market capitalization	0.117*** (0.0357)		
% Urban population	0.00871*** (0.00233)	0.00675*** (0.00203)	0.00794* (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 (0.0938)	-0.0234 (0.0837)	-0.0458 (0.104)
Year 2002	0.208** (0.0997)	0.158* (0.0831)	0.0401 (0.1000)
Year 2003	0.356*** (0.116)	0.236*** (0.0833)	0.125 (0.106)
Year 2004	0.336*** (0.110)	0.242*** (0.0843)	0.105 (0.106)
Year 2005	0.157 (0.100)	0.104 (0.0851)	0.0260 (0.117)
Year 2006	0.235** (0.103)	0.194** (0.0875)	0.0802 (0.121)
Year 2007	0.370*** (0.117)	0.201** (0.0886)	0.105 (0.127)
Year 2008	-0.106 (0.121)	-0.170* (0.0981)	-0.167 (0.196)
Constant	-2.002** (0.785)	-7.423*** (0.701)	-19.40** (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.

Table 2: Wealth shares for countries with wealth distribution data

Country	Year	Unit	Share of lowest							
			10%	20%	25%	30%	40%	50%	60%	70%
Australia	2010	household		0.9			6.3		18.2	
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	20.0
Chile	2011	household	-1.2	-1.2		-1.0	2.3	9.4	18.0	28.9
China	2002	person	0.7	2.8		5.8	9.6	14.4	20.6	29.0
Cyprus	2010	household	-0.2	0.3		1.6	4.0	7.3	12.0	18.3
Denmark	2009	family	-15.3	-18.9		-20.2	-20.2	-19.0	-15.0	-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	2002	household	0.3	1.0		2.5	4.8	8.1	12.9	19.8
Indonesia	1997	household	0.0	0.4		1.3	2.8	5.1	8.5	13.5
Italy	2010	household	-0.1	0.1	0.4	1.0	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		1.0	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	0.0	4.9	12.4	23.5
New Zealand	2001	tax unit	0.0	0.0		1.0	3.0	7.0	13.0	21.0
Norway	2004	household	0.0	0.2		0.8	1.9	3.8	6.9	11.8
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	12.0	18.9	27.5
Sweden	2007	adult								
Switzerland	1997	family								
Thailand	2006	household		0.5			3.5		12.5	
United Kingdom	2008	adult	0.0	0.5		1.8	4.6	9.2	15.7	24.8
United States	2010	family	-0.7	-0.7	-0.6	-0.5	0.0	1.2	3.3	7.0

Table 2: Wealth shares for countries with wealth distribution data, continued

Country	Year	Unit	Share of top									
			25%	20%	10%	5%	2%	1%	0.5%	0.1%		
Australia	2010	household		38.2								
Austria	2010	household		22.9	38.3							
Belgium	2010	household		38.8	55.9							
Canada	2012	family		32.8	52.3							
Chile	2011	household		43.6	62.4							
China	2002	person		40.7	58.6							
Cyprus	2010	household		27.6	43.2							
Denmark	2009	family		7.2	30.7							
Finland	2010	household		35.1	55.0							
France	2010	household		32.5	50.0							
Germany	2010	household		23.7	40.8							
Greece	2009	household		43.3	61.2							
India	2002	household		30.1	47.1	61.7			84.3			
Indonesia	1997	household		21.1	34.6	44.0			71.3			
Italy	2010	household	31.1	37.4	54.3	67.1	79.0		85.2			
Japan	2009	household	37.2	44.7	65.7	80.7			95.7			
Korea	2011	household		36.1								
Luxembourg	2010	household		33.3	48.7							
Malta	2010	household		38.0	53.1							
Netherlands	2009	household		38.7	59.8							
New Zealand	2001	tax unit		33.0	52.0							
Norway	2004	household		19.9	34.7							
Portugal	2010	household		32.1	47.3							
Slovakia	2010	household		51.1	67.2							
Slovenia	2010	household		45.7	63.8							
Spain	2008	household	32.7	38.7	55.0	67.4	78.3		83.5			
Sweden	2007	adult			33.0	51.0			76.0			
Switzerland	1997	family			28.7	42.0			65.2	72.4		84.0
Thailand	2006	household		30.5								
United Kingdom	2008	adult		37.2	55.7	69.5			87.5			
United States	2010	family	9.7	13.3	25.6	39.1	55.2		65.9			

Source: See Table 1-3

Table 3: 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	557,336	5,080	679	92.2	7.3	0.5	0.0	100	85.6
Asia-Pacific	1,114,814	44,715	2,842	73.3	17.9	8.3	0.5	100	89.5
China	1,003,456	21,330	7,033	62.3	35.4	2.2	0.1	100	71.9
Europe	583,651	145,977	15,853	44.3	28.1	25.5	2.0	100	82.7
India	775,767	4,645	1,006	94.5	5.1	0.3	0.0	100	81.4
Latin America	396,273	22,997	5,053	65.2	31.9	2.8	0.2	100	80.9
North America	268,086	340,340	56,886	28.0	31.4	34.8	5.7	100	83.7
World	4,699,383	56,016	3,641	69.8	21.5	7.9	0.7	100	91.1

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

Table 4: Wealth shares and minimum wealth of deciles and top percentiles for regions, 2014

Country	Wealth decile									Top		
	1	2	3	4	5	6	7	8	9	10%	5%	1%
I Wealth shares (%)												
Africa	0.0	0.1	0.3	0.6	1.1	1.8	2.9	5.0	10.0	78.3	67.7	46.1
Asia-Pacific	0.0	0.1	0.2	0.3	0.5	0.8	1.3	2.7	8.9	85.3	70.9	40.4
China	0.4	1.3	1.8	2.3	2.9	3.8	5.1	7.1	11.2	64.0	54.4	37.2
Europe	-0.3	0.0	0.1	0.3	0.7	1.7	3.9	8.3	16.4	68.8	54.4	31.1
India	0.2	0.4	0.8	1.3	1.8	2.6	3.8	5.7	9.4	74.0	65.5	49.0
Latin America	0.0	0.1	0.4	1.0	1.7	2.8	4.4	7.0	11.9	70.8	60.0	40.5
North America	-0.5	0.0	0.2	0.6	1.2	2.3	3.9	6.6	12.5	73.1	61.3	37.5
World	-0.3	0.1	0.1	0.3	0.5	0.8	1.4	2.6	7.1	87.4	75.7	48.2
II Minimum wealth (USD)												
Africa	32	103	226	406	679	1,129	1,904	3,343		7,760	15,292	58,143
Asia-Pacific	133	474	1,022	1,746	2,842	4,515	7,868	18,130		81,438	197,273	648,640
China	1,639	3,301	4,394	5,535	7,033	9,242	12,736	18,248		31,823	54,500	190,041
Europe	41	842	2,949	7,132	15,853	36,536	82,514	168,683		331,057	544,825	1,609,601
India	128	250	477	703	1,006	1,456	2,116	3,252		5,995	10,770	41,964
Latin America	159	595	1,473	2,923	5,053	7,956	12,579	20,187		38,016	66,382	231,580
North America	-3,148	3,460	12,554	29,641	56,886	102,805	171,329	301,291		600,473	1,126,184	4,357,900
World	137	494	1,086	2,129	3,641	5,824	10,103	20,909		77,450	209,586	798,285

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

Table 5: Current wealth inequality in developed countries and emerging markets

Very high inequality top decile share > 70% (USA c1910)	Hong Kong Switzerland United States		Argentina Brazil Egypt India Indonesia Malaysia	Peru Philippines Russia South Africa Thailand Turkey
High inequality top decile share > 60% (eg USA c1950)	Austria Denmark Germany	Israel Norway Sweden	Chile China Colombia Czech Republic Korea United Arab Emirates	Mexico Poland Saudi Arabia Taiwan
Medium inequality top decile share > 50% (eg Europe c1980)	Australia Canada Finland France Greece Ireland Italy	Netherlands New Zealand Portugal Singapore Spain United Kingdom		
Low inequality top decile share < 50%	Belgium Japan			

Table 6: 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	39.7	38.0	38.6	38.2	40.0	39.8	40.0	39.4	39.5	42.4	42.8	42.9	44.8	44.2	46.1
Asia-Pacific	39.0	38.4	38.1	37.8	37.6	37.1	36.8	36.8	37.2	37.6	37.9	38.6	39.2	39.4	40.4
China	19.0	19.8	20.6	21.6	22.8	24.0	25.5	27.2	29.1	30.3	31.6	33.1	34.6	35.4	37.2
Europe	31.7	31.0	30.4	29.7	29.1	28.6	28.3	27.8	27.7	28.2	28.8	29.6	30.3	30.6	31.1
India	36.8	37.9	39.0	40.2	41.6	43.0	44.6	46.4	48.1	48.3	48.6	48.7	48.8	48.9	49.0
Latin America	39.6	38.9	38.2	37.9	37.1	36.5	35.8	35.1	34.3	36.1	37.1	38.3	39.0	39.5	40.5
North America	38.5	38.5	38.5	38.3	38.3	38.3	38.3	37.9	38.1	37.6	37.5	37.5	37.4	37.5	37.5
World	48.7	48.4	46.9	46.3	46.3	46.9	46.1	44.7	44.2	44.0	44.4	45.0	46.0	47.1	48.2

top decile

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Africa	74.4	72.9	73.5	73.1	74.9	74.6	74.7	73.9	74.0	76.0	76.0	76.3	77.8	77.0	78.3
Asia-Pacific	86.4	85.5	85.1	84.6	84.0	83.1	82.2	81.1	83.4	83.8	83.6	84.8	84.7	84.2	85.3
China	48.6	49.4	50.2	51.1	52.2	53.3	54.6	56.1	57.6	58.7	59.7	60.8	62.0	62.7	64.0
Europe	70.1	69.4	68.8	68.2	67.8	67.2	66.9	66.3	66.2	66.7	67.0	67.8	68.2	68.4	68.8
India	65.9	66.7	67.4	68.3	69.2	70.1	71.2	72.3	73.4	73.6	73.8	73.8	73.9	73.9	74.0
Latin America	70.4	70.0	69.0	68.9	68.6	68.1	67.5	66.8	66.1	67.2	68.1	68.7	69.5	70.0	70.8
North America	74.1	74.2	74.1	73.9	73.8	73.7	73.7	73.4	73.4	73.1	73.0	73.0	73.0	73.1	73.1
World	88.5	87.9	87.3	87.1	87.3	87.2	86.5	85.1	85.7	85.4	85.0	85.5	86.0	86.4	87.4

Figure 1: Financial assets vs market cap growth by income group

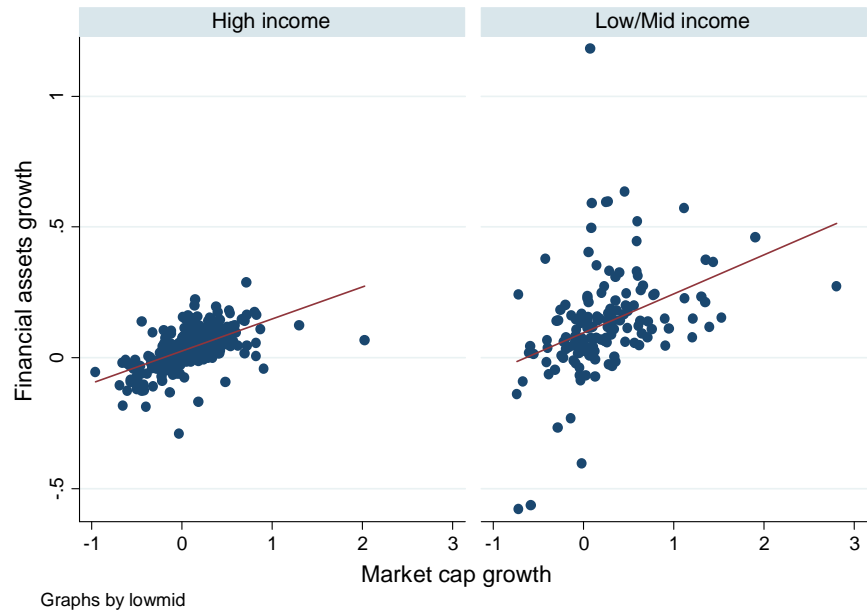


Figure 2: Liabilities vs GDP per capita growth

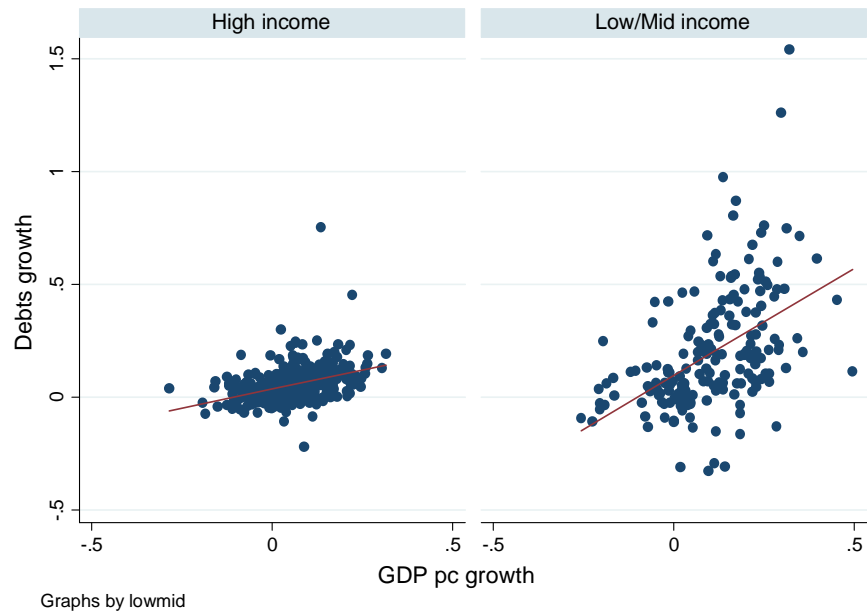


Figure 3: Real assets vs house prices growth

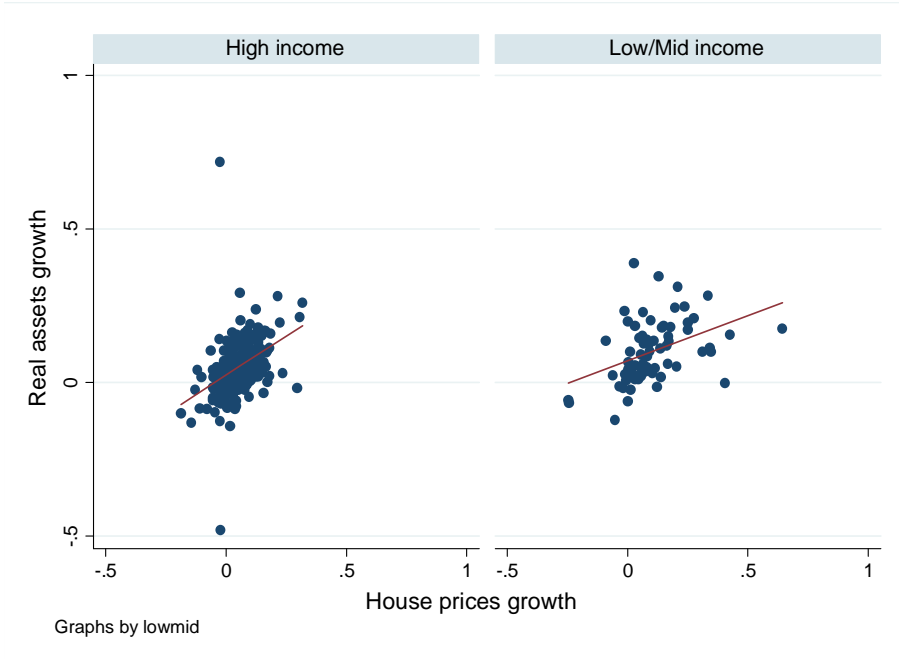


Figure 4: Total wealth by region (in USD trillion)

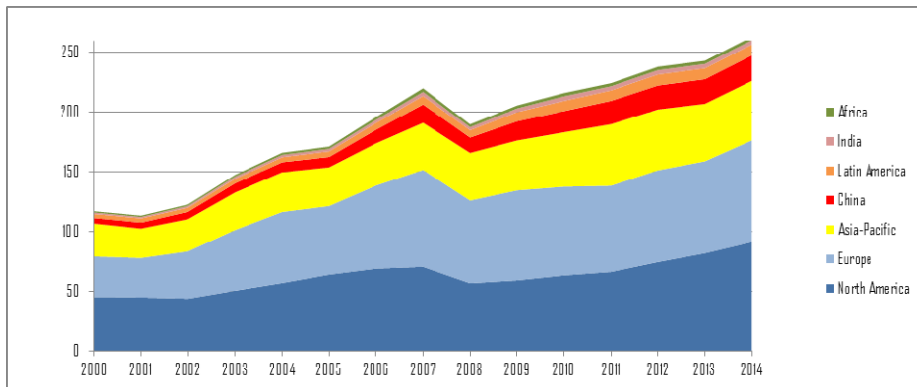


Figure 5: Wealth share by region (in %)

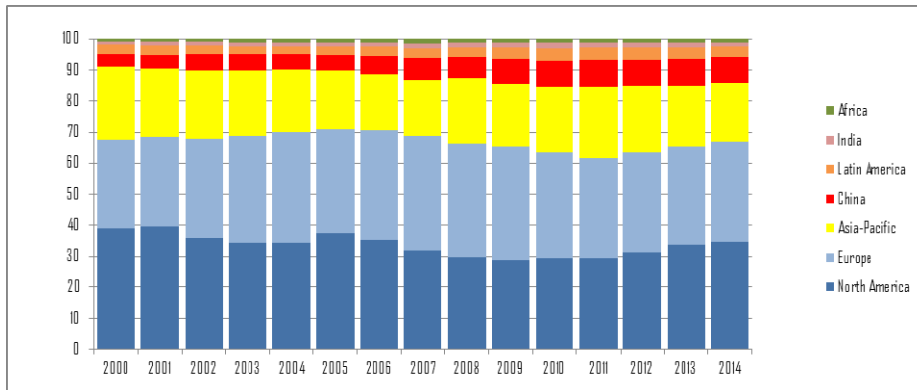


Figure 6: Global trends in wealth per adult (in USD)

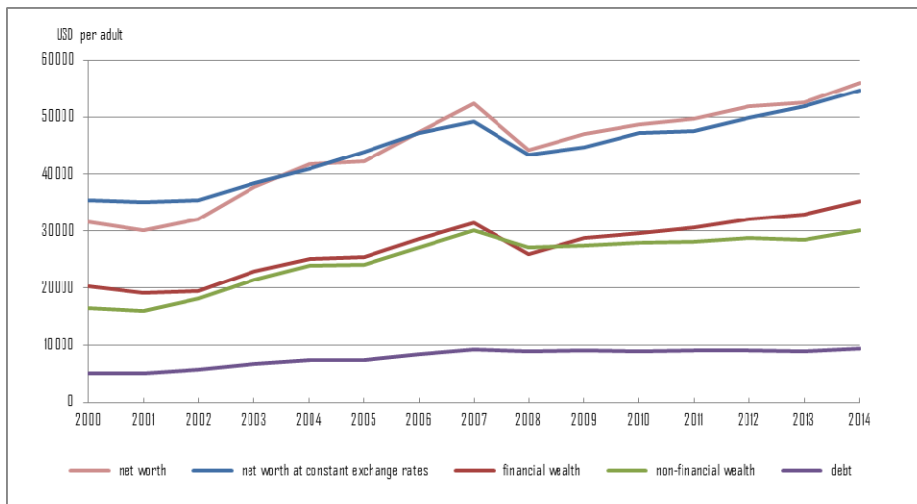


Figure 7: Regional Composition of Global Wealth Deciles, 2014

