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THE UNPRECEDENTED EXPANSION
OF THE GLOBAL MIDDLE CLASS
AN UPDATE

Homi Kharas

Homi Kharas is a senior fellow and deputy director in the Global Economy and Development program at the Brookings Institution.

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INTRODUCTION

Seven years ago I published a set of projections suggesting that the emerging middle class in developing countries was about to surge (Kharas, 2010). I argued further that demand from this segment of the market could drive global economic growth and partly offset lower demand among middle-class consumers in developed countries who were struggling to deal with the shocks to their living standards caused by the Great Recession.[1]

Since then, four relevant developments have shaped middle-class calculations, and the first two of these turn out to have quantitatively important implications for overall estimates of trends and levels. First, a survey of purchasing power parity (PPP) prices, conducted in 2011, has replaced the previous 2005 PPP survey (World Bank, 2015) as the basis for comparing real income levels across countries. The 2011 survey differs not just in updating price levels, but also uses a new methodology for generating country-level data. The results have markedly changed and improved our understanding of countries' and households' relative economic strength. In brief, Asian and African countries were estimated to be far richer, compared to other countries, than previously imagined, by 18 to 26 percent in several cases (Deaton and Aten, 2015).

The second development has been the continued weakness in global economic growth. Global recovery has fallen short of forecasts and remains weaker than the recovery from previous recessions (although perhaps in line with the rate of recovery from previous financial crises). Major institutions have sequentially and continuously downgraded their growth forecasts. The hoped-for "green shoots" have not materialized. A series of shocks, most recently the collapse of oil and other commodity prices, have reduced income levels in the short run, while deeper analysis of the data has led to a rethinking of long-run potential growth prospects (Summers, 2016; Rachel and Smith, 2015).

The third development is the continued improvement of GDP data. In some countries, there has been a rebasing of national accounts leading to significant revisions of estimated output and national income; for example, Nigeria increased its estimate of the size of its economy by more than three-quarters in 2014 (Magnowski, 2014).

Fourth, new household surveys have permitted a more up-to-date assessment of income distribution at a time of significant changes in within-country inequality, and, in some cases, allow for direct measurement of the middle class for the first time.

The purpose of this paper is to assess the impact of these four improvements and the updates to the underlying data on the evolution of the global middle class.

Key findings of the paper include:

- There were about 3.2 billion people in the middle class at the end of 2016, 500 million more than I had previously estimated. This implies that in two to three years there might be a tipping point where a majority of the world's population, for the first time ever, will live in middle-class or rich households.

- The rate of increase of the middle class, in absolute numbers, is approaching its all-time peak. Already, about 140 million are joining the middle class annually and this number could rise to 170 million in five years' time.

- An overwhelming majority of new entrants into the middle class—by my calculations 88 percent of the next billion—will live in Asia.

- The absolute market size of middle-class spending is larger than previously estimated. In 2015, middle-class spending was about $35 trillion (in 2011 PPP terms), roughly 12 percent higher than my previous estimate. It now accounts for one-third of the global economy.

- The global middle-class market is now clearly bifurcated: a slow-growing developed country middle class, and a fast-growing emerging economy middle class—with growth in both instances measured in terms of either numbers of people or total spending.

- The most dynamic segment of the global middle-class market is at the lower end of the scale, among new entrants with comparatively low per capita spending.

- Big geographic distributional shifts in markets are happening, with China and India accounting for an ever-greater market share, while the European and North American middle class basically stagnates.

- At a growth of about 4 percent in real terms, the middle-class market is growing faster than global GDP growth, but not as fast as it did in the 1960s and 1970s, the boom years for the middle class.

A larger middle-class population and market has significant environment and social implications. Naturally, assuming technology does not change, the carbon footprint per person will rise as the middle class expands. Two mitigating factors could limit the extent of this. First, middle-class growth is associated with migration from rural to urban areas and, for a given level of income, households in urban areas tend to have a smaller carbon footprint than households in rural areas, especially for transport. Second, middle-class households tend to invest more in their children's education and this, in turn, can reduce fertility rates and decrease the long-term population trajectory for the world.

The social implications of a larger middle class are also important. There is considerable evidence that a larger middle class will also imply a happier population, at least for new entrants into the middle class (Kahneman and Deaton, 2010). But there is little evidence to suggest that this will create pressures for more democratic governance or for better delivery of public services, both of which are required for sustained growth. In fact, governments may find themselves unable to meet the growing expectations for middle-class enhancing programs, such as universal health care, public education, pensions, and affordable housing, without resorting to deeply unpopular tax increases. Getting the right balance between taxes on the middle class and services to support them likely presents the greatest source of uncertainty for this paper's forecasts.

DEFINITION AND METHODOLOGY

The middle class has been defined by myself and many others, before and since, as comprising those households with per capita incomes between $10 and $100 per person per day (pppd) in 2005 PPP terms (Kharas, 2010; World Bank, 2007; Ernst & Young, 2013; Bank of America Merrill Lynch, 2016). This implies an annual income for a four-person middle-class household of $14,600 to $146,000.[2]

Taking into account inflation, the income range for middle-class families can now be expressed as $11 to $110 pppd in 2011 PPP terms.

I estimate the numbers and spending levels of the middle class in every country based on household surveys (from which income distribution by country is obtained) and national accounts (from which average household expenditure per person is taken). These es-timates can show the evolution of the middle class over time. For each country, the assumption is that mean household expenditure will grow at the same rate as real GDP growth per capita. For the period 2017-2021, the International Monetary Fund provides forecasts for real GDP growth (IMF, 2016a). For the period 2021 to 2030, I simply assume the same average growth rate as the IMF envisages for the 9-year period 2012-2021. Within-country income distribution is held constant over the projection periods, with distributional parameters estimated from the most recent survey.

The scenario permits calculation of an annual estimate for the middle class for each country for each year up to 2030 and, by addition, for the world and other aggregates. The data include 165 countries covering about 97 percent of global output and population. The Methodical Approach Section (Page 24) has the full details.

DATA IMPROVEMENTS AND UPDATES

Below, I describe the implications of each of the four key data improvements and updates mentioned above. The magnitude of changes to the data suggests that scenario results should be interpreted with caution and are subject to change as the underlying data changes.
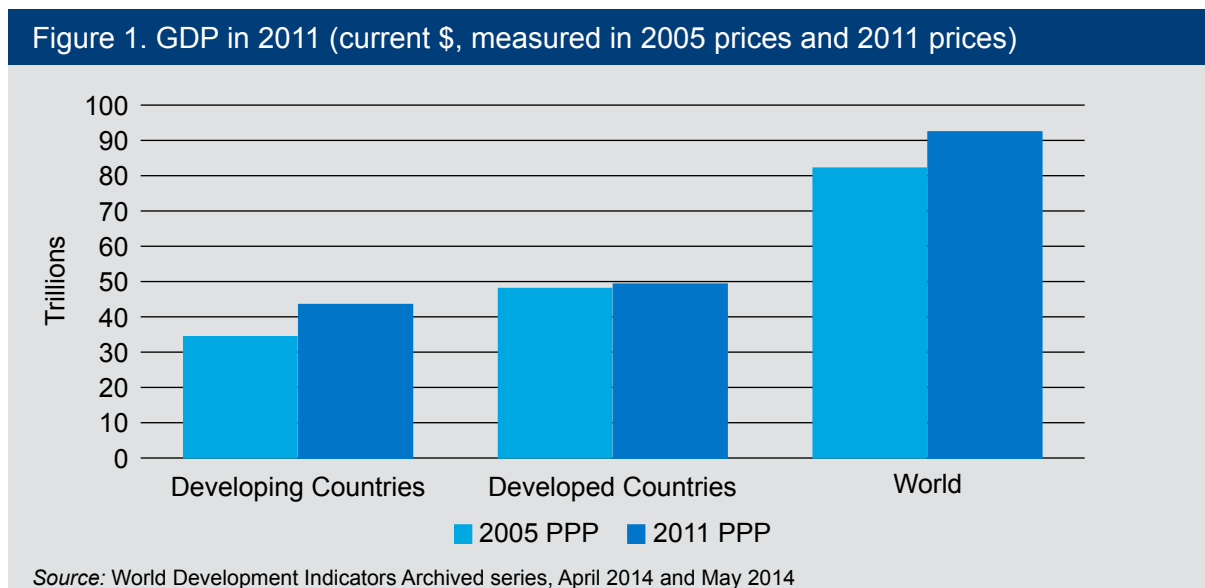
The 2011 PPP data

The 2011 International Comparison Program contained many innovations to improve the methodology compared to the 2005 survey. Some changes were to add precision and coverage. For example, the 2011 China survey covered rural and urban outlets in all provinces. In 2005, China only provided price data from 11 cities or provinces. Beyond China, efforts were made to reduce urban bias in all large economies. A new process was also used to compare the different price levels of goods across countries. Deaton and Aten identify this change in process as one of the principal reasons why

the results of the 2011 survey differed so far from what was expected based on 2005 data updated for domestic consumption inflation.

Figure 1 shows the effect of the new PPP calculations for the world economy, developed countries, and developing countries as represented by aggregates for high-income, and low- and middle-income countries. The data is derived from two series for GDP compiled by the World Bank: one based on 2005 prices (adjusted for inflation) and the other based on 2011 prices. Figure 1 shows there is a significant increase in the size of global GDP; in the new 2011 series, global GDP is estimated at $92 trillion. Based on 2005 prices, global GDP in 2011 was only $82 trillion (PPP). The difference of $10 trillion (PPP) is almost entirely due to adjustments made in measuring developing countries' GDP.

Because the change from 2005 is so large, it is appropriate to ask whether the 2005 or 2011 survey is more reliable. Deaton and Aten conclude that "the ICP 2011 estimates are the most accurate that we have, and

Figure 1. GDP in 2011 (current $, measured in 2005 prices and 2011 prices)

Source: World Development Indicators Archived series, April 2014 and May 2014

provide no grounds for doubting them."[3] The ICP itself concludes, "…the ICP 2011 results can be considered more reliable than those for ICP 2005, especially when taking into account the inconsistencies between the ICP 2011 benchmark results and extrapolations from ICP 2005. Thus it is recommended that greater reliance be placed on the ICP 2011 results."[4]

In general, the effect of the new PPP data is to increase both the size of the middle class and middle-class consumption in developing countries. It makes little difference to estimates for developed countries.

The Growth Slowdown

Forecasts of the slowdown in the global economy after the 2008 crisis were initially for a fairly short and shallow decline. Over time, these forecasts steadily worsened, both in terms of the depth of the decline and the length of time to recover. Figure 2 below uses the changes over time of the IMF's forecasts to show how growth expectations have been revised. In 2011, the IMF was projecting that global GDP growth would bottom out at 4 percent in 2012, and recover steadily thereafter at around 4.7 percent per year. But growth conditions continued to deteriorate and subsequent forecasts showed a more substantial dip, a longer trough before recovery, and a lower long-run growth rate.

This pattern is observed in the changing forecasts for both advanced and emerging economies, but the change in growth is more pronounced for emerging economies. For advanced economies, the 2009 recession was steep—a fall of over 6 percentage points in growth from +3 to -3 percent. But the rebound was equally sharp. Since then, growth has drifted lower and is now hovering at about 1.5 to 2 percent per year, compared to around 3 percent before the financial crisis.

Emerging economies had the same V-shaped recovery, but growth since 2010 has come steadily down to a trough of around 4 percent in 2015. The IMF projections show a recovery in growth toward a 5 percent level by 2019, but this is substantially below the pre-crisis 7.5 to 8 percent growth rate that was being registered. In fact, the IMF has lowered five-year growth forecasts for emerging economies by about 1.7-2 percentage points between its September 2011 forecast and the October 2016 forecast.
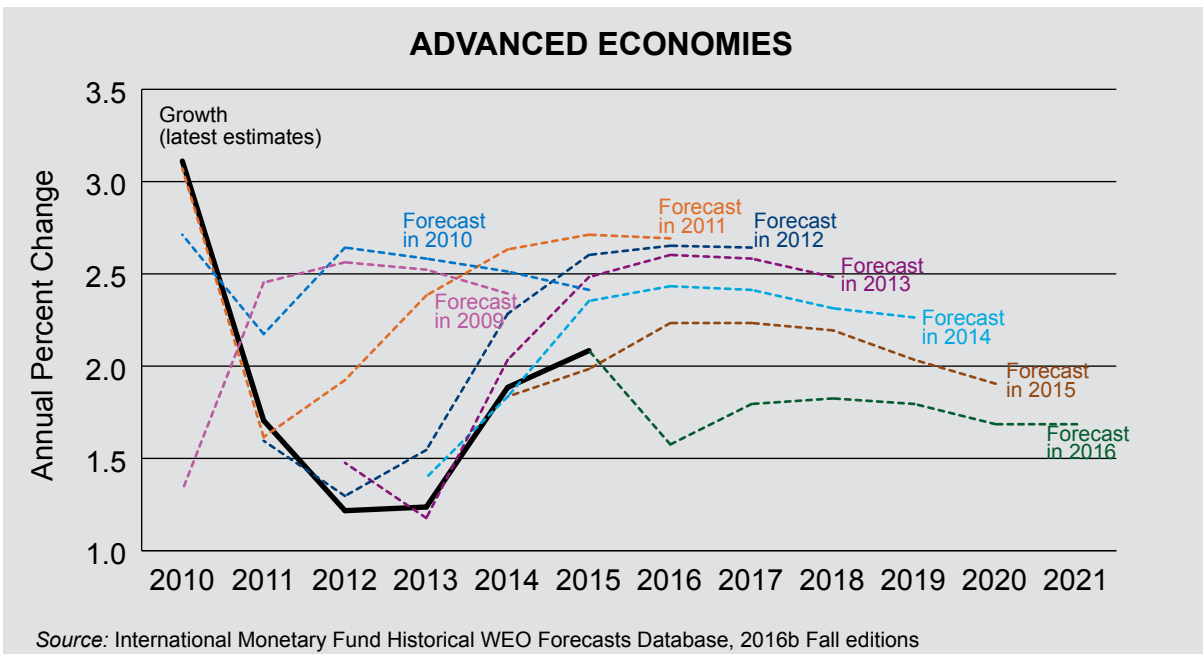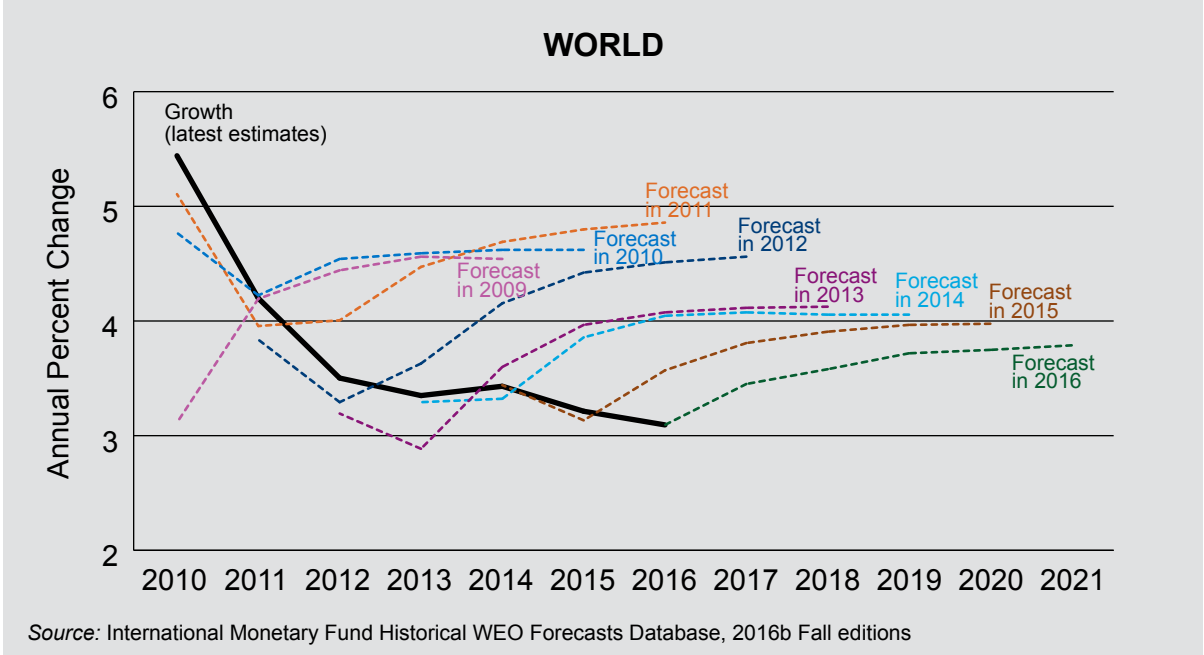
The greater pessimism in growth forecasts follows a steady decline in the actual rate of global growth since the bounce back of 2010; 2015 saw the slowest growth in 20 years, excluding the recessions in 2001-2002 and 2008-2009 and the Asian financial crisis of 1998. New forecasts for 2016, post-Brexit, indicate a postponement of global growth acceleration by at least one year and perhaps two. The slowdown is expected to hit both advanced and emerging economies.

The lower growth forecasts have a strong impact on middle-class calculations, both in the short-term and, more significantly, in the medium-term forecasts. Low growth is responsible for the stagnation of the middle class in advanced countries and in selected emerging economies, notably those outside Asia, like Brazil.

Rebasing Growth

Recently, a number of developing countries have rebased their GDP growth to account for the fact that the old GDP data may not adequately reflect the changing structural composition of GDP. Nigeria was one country that received considerable publicity. Nigeria's rebasing in 2014 lifted its GDP from $270 billion to $510 billion, becoming, in the process, the largest economy in Africa. Other countries also have rebased their GDP, with double-digit increases in several instances.

Figure 2. GDP growth, actual and forecasts made in 2009-2016 (percent change in constant prices)

WORLD

Growth (latest estimates)

Forecast in 2011
Forecast in 2012
Forecast in 2010
Forecast in 2009
Forecast in 2013
Forecast in 2014
Forecast in 2015
Forecast in 2016

Source: International Monetary Fund Historical WEO Forecasts Database, 2016b Fall editions

ADVANCED ECONOMIES

Growth (latest estimates)

Forecast in 2010
Forecast in 2011
Forecast in 2012
Forecast in 2009
Forecast in 2013
Forecast in 2014
Forecast in 2015
Forecast in 2016

Source: International Monetary Fund Historical WEO Forecasts Database, 2016b Fall editions

EMERGING ECONOMIES

Source: International Monetary Fund Historical WEO Forecasts Database, 2016b Fall editions

Importantly, rebasing did not just lead to changes in the level of GDP, but also in its composition. For the most part, the sectors that were found to be larger than before are in services, especially information and communications, but also including housing, transport, and trade. These services are consumed directly by households, suggesting that the level of income or expenditure of households was higher than had previously been thought.

The IMF and other organizations factored rebasing into their revised accounts. Figure 3 shows the combined effect of a move to 2011 PPP measures along with rebasing on the measure of global economic activity. It shows a relatively large change for emerging economies compared to advanced economies (unsurprising as the latter rebase their GDP series frequently), but most of the changes are due to revised PPP data rather than rebasing.

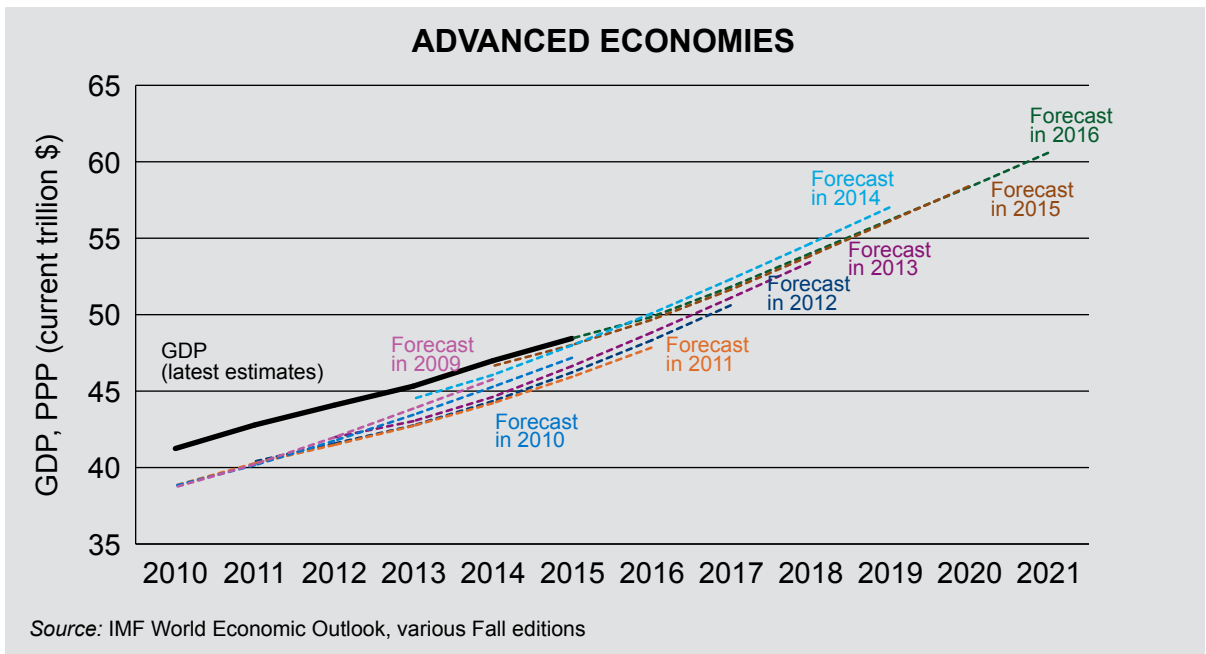Rebasing has increased the estimate for Africa's middle class, but has had a small impact in other regions and, because Africa's middle class is small, on global aggregates.

New Household Survey Data

Estimates of the size of the middle class are based on household survey data for individual countries from which income distributions are calculated. As new surveys become available, the income distribution data can show meaningful changes in the number of individuals considered rich, middle class, or poor.

Almost all countries have conducted new household surveys since 2006 (the last available year of data used in the previous study). Table 1 shows that 143 countries, almost the entire sample, have had a household survey update compared to data that was used before. In a few cases is there still a need to rely on data that is more than 10 years old. However, even today, some quite populous countries have no survey data, or highly unreliable data, including Syria, North

Figure 3. Level of GDP, actual and forecasts made in 2009-2016 (PPP, current trillion $)

WORLD

Source: IMF World Economic Outlook, various Fall editions

ADVANCED ECONOMIES

Source: IMF World Economic Outlook, various Fall editions
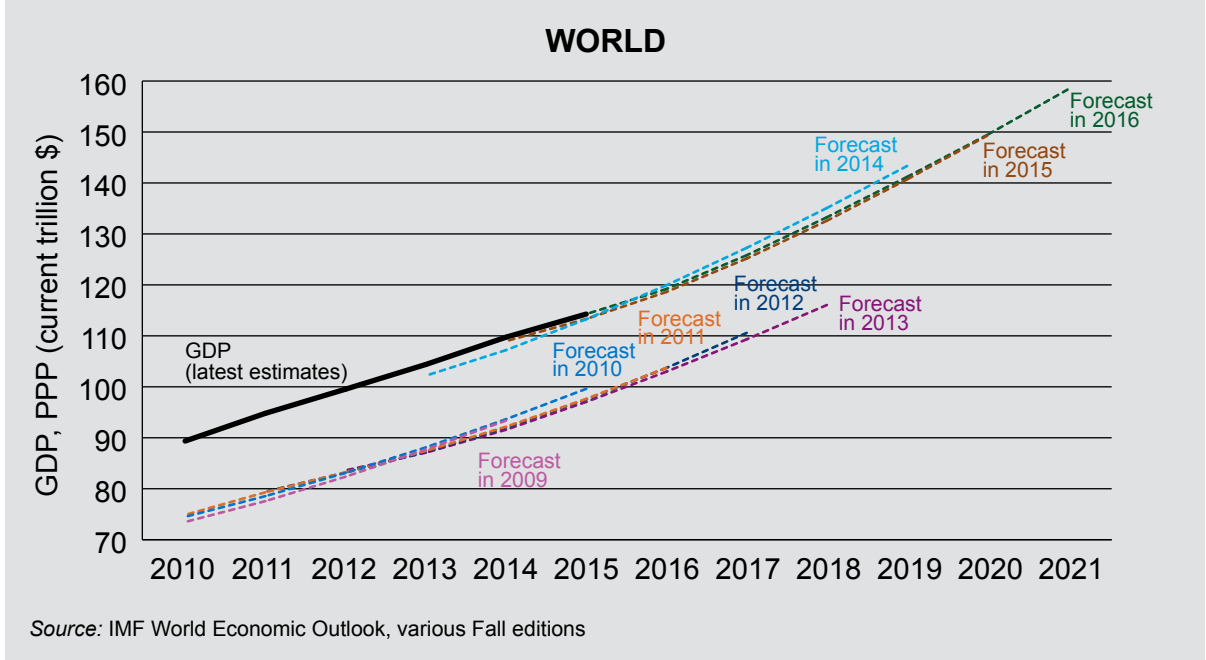
EMERGING ECONOMIES
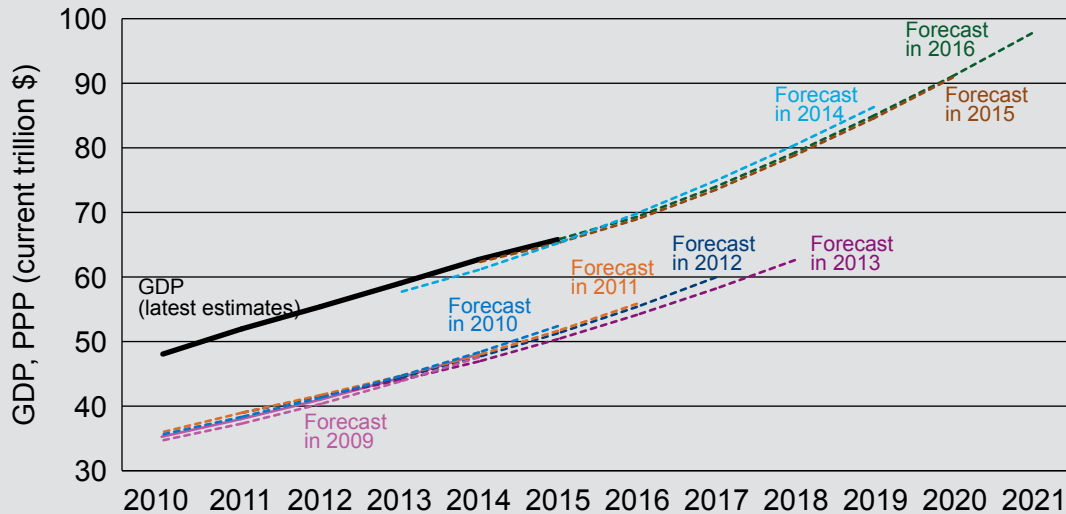
Source: IMF World Economic Outlook, various Fall editions

Korea, and Saudi Arabia; these countries are excluded from the calculations of the global middle class.

Table 1: Latest available household survey (number of countries)	In 2008	In 2017
Before 2001	39	9
2001-2003	23	2
2004-2006	72	11
2007-2009	0	26
2010 onwards	0	117
Total sample of countries	134	165

Source: Author's calculations

Note: Data for the earlier paper was accessed in December 2008.

Although many countries have new survey data, the changes to income distribution within countries have not had much impact on the global middle-class numbers.

This is consistent with previous findings. Li, Squire, and Zou (1998) find that only 10 percent of the variance in the global Gini coefficient over time is related to within-country changes in income distribution—the remainder is due to cross-country differences. Furthermore, there has been no systematic change in inequality; two-thirds of developing countries saw improvements in distribution during the 2000s, while inequality increased in most developed countries. Alvaredo and Gasparini (2013) show that the unweighted mean Gini coefficient for developing countries peaked around 2002 and has steadily fallen since then. They suggest that there has been systematic mean-reversion of Gini coefficients. Countries with high initial Gini coefficients in 2000 have seen declines, while those with low starting values have tended to see increases. However, they caution that the population-weighted mean value of developing country Gini coefficients did not decline in the 2000s, largely due to continued increases in inequality in China.

Cárdenas, Kharas, and Henao (2011) used model simulations for Latin American countries to show that

growth was a better determinant of the middle class than changes in income distribution. This is because changes in income distribution tend to reflect changes in the income shares of the top 10 percent and the bottom 10 percent. For middle-class calculations, the share of the middle deciles is most relevant, and this tends to be quite stable. Palma (2011) first pointed out this phenomenon and referred to it as the homogeneous middle.

The Palma effect is clearly seen in developed countries, where, as is now well-documented, most of the gains from the recovery after the 2009 crisis have accrued to the top 1 percent and income inequality has risen sharply. But the size of the middle class has barely changed. True, it has stopped expanding, but middle-class growth in advanced economies had already slowed to a crawl in the mid-1990s.

Middle-class growth in most countries is a function of growth in incomes and in population, and not due to changes in inequality. The new household surveys have not had a sizeable impact on the size of the middle class.

EMPIRICAL RESULTS

This section provides results of the trends in the number of people in the middle class and their consumption levels.

Numbers of People in the Global Middle Class

The four data updates imply that, by 2015, the global middle-class count exceeded 3 billion people, of whom almost half lived in Asia. There were probably about 500 million more people in the middle class in 2015, compared to previous estimates (Figure 4).

The results suggest that we are close to a historic milestone. As shown in Figure 5 below, around 2020, the middle class will become a majority of the global population for the first time ever.

Figure 5 also shows a sharp acceleration of the speed at which the middle class is expanding. It was only around 1985 that the middle class reached 1 billion people, about 150 years after the start of the Industrial Revolution in Europe. It then took 21 years, until 2006, for the middle class to add a second billion; much of this reflects the extraordinary growth of China. The third billion was added to the global middle class in nine years. Today we are on pace to add another billion in seven years and a fifth billion in six more years, by 2028. Of course, thereafter, all the large countries will already have substantial middle classes and the rate of increase will slow significantly.

Figure 6 illustrates this point by showing the increases each year in the global middle-class headcount. The numbers start to accelerate after the turn of the century but peak prior to 2030. The figure also shows the impact of selected global economic events. In 1998, the

Figure 4. The size of the global middle class, 2000, 2015, and 2030 (billion people)

Source: Author's calculations
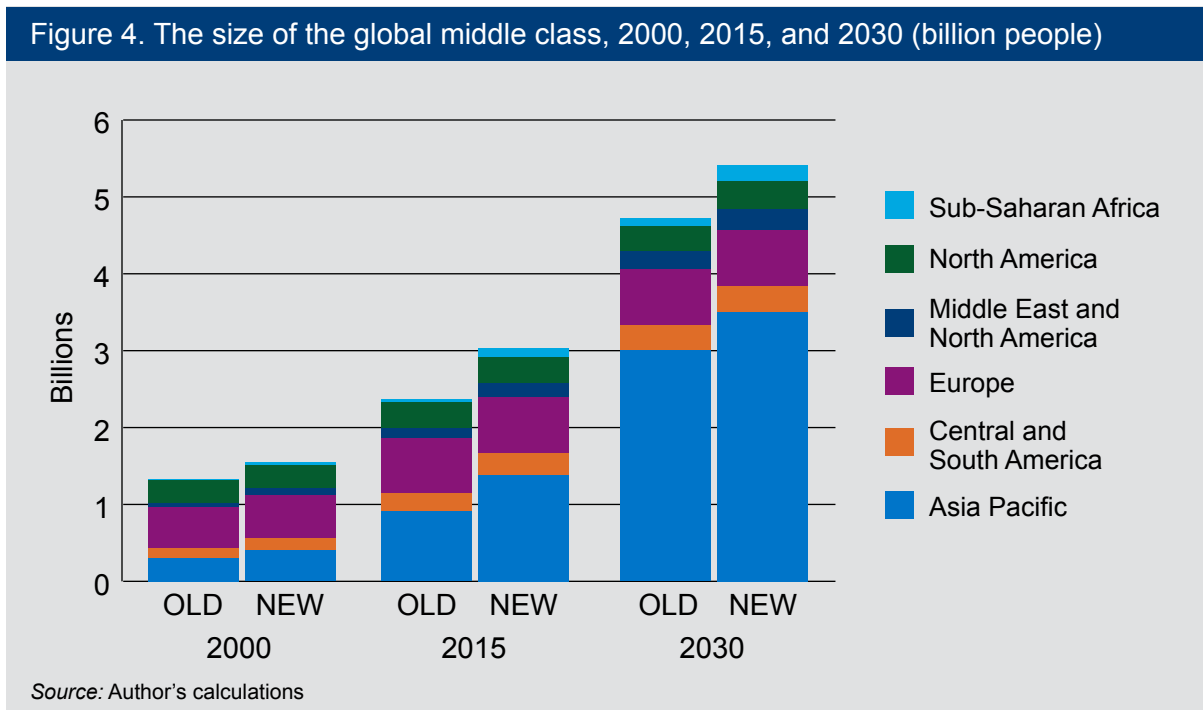
Figure 5. Estimates of the size of the global middle class, 1950-2030 (billions)

Headcount (billions)

— World Middle Class   — World Population   – – World Middle Class Share (rhs)
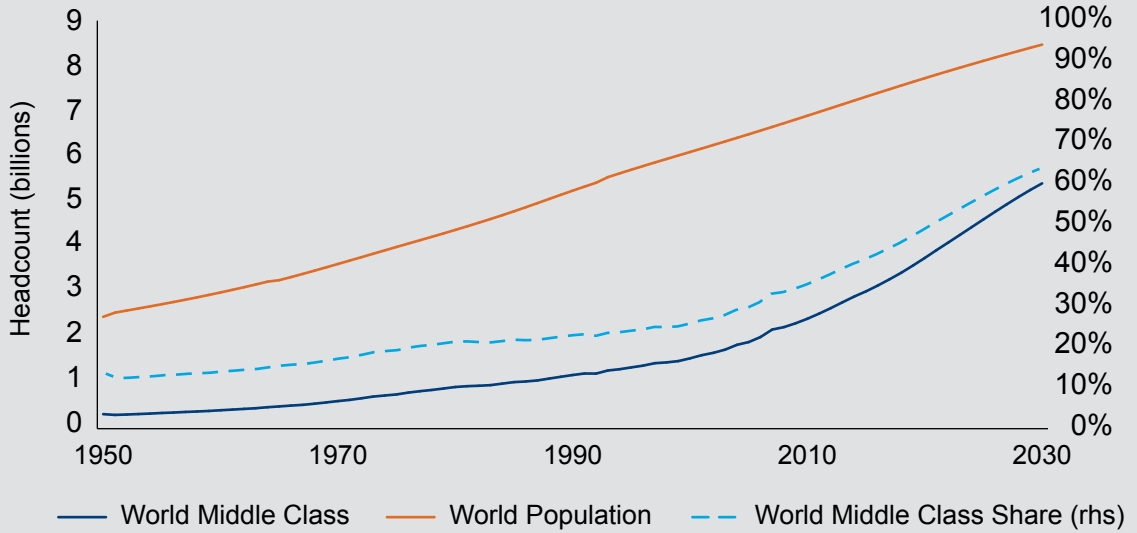
Source: Author's calculations

Figure 6. Annual changes in the size of the global middle class, 1955-2030 (millions)

Millions
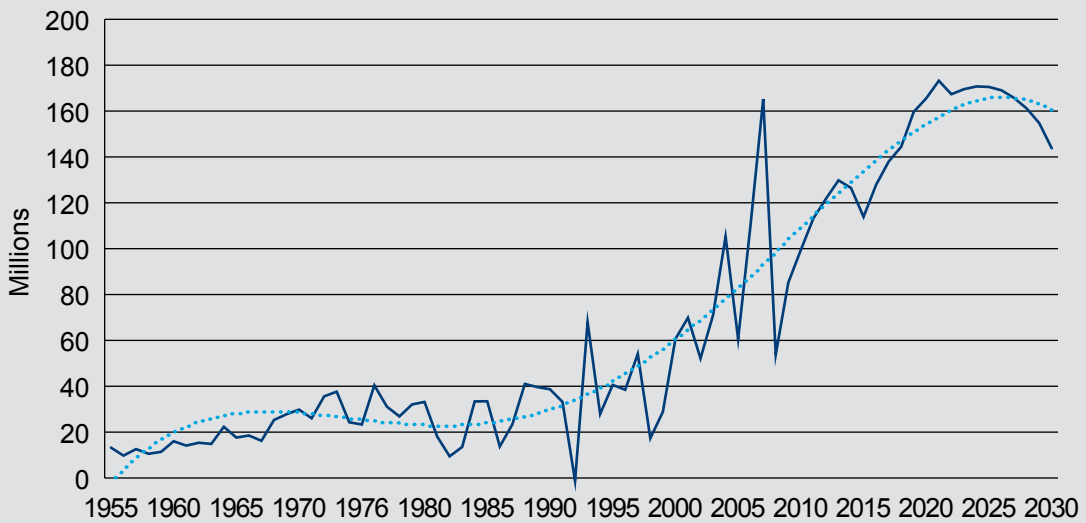
Source: Author's calculations

middle-class numbers fall as a result of the Asian financial crisis. In 2007, they soar as the global economic boom accelerates, but then collapse after the Great Recession of 2008. Looking to the future, the middle class is set to grow by 160 million people per year on average through 2030.

We are witnessing the most rapid expansion of the middle class, at a global level, that the world has ever seen. And, as Figure 7 makes clear, the vast majority—almost 90 percent—of the next billion entrants into the global middle class will be in Asia: 380 million Indians, 350 million Chinese, and 210 million other Asians.

Figure 7 reveals a cleavage in the global middle class. There are actually two distinct groupings today. In the developed countries of North America and Europe, the middle class is large but stagnating in numbers. In fact, it is squeezed between two ends, growing even slower than overall population growth. Some households are

falling below the middle-class threshold, while others are escaping and becoming rich.

The other grouping is a dynamic, fast growing middle class in developing countries. The middle class is growing everywhere in the developing world, but the numbers are by far the greatest in Asia. By 2030, Asians could represent two-thirds of the global middle-class population (Table 2).

Market Size of Middle-Class Consumption

Based on the new data, middle-class consumption in 2015 was probably about $35 trillion, or about $12,000 per head, approximately evenly divided between developed and developing countries. The global middle class represents the dominant consumer goods market; by comparison, the rich (those spending above $110 a day) consumed goods and services totaling
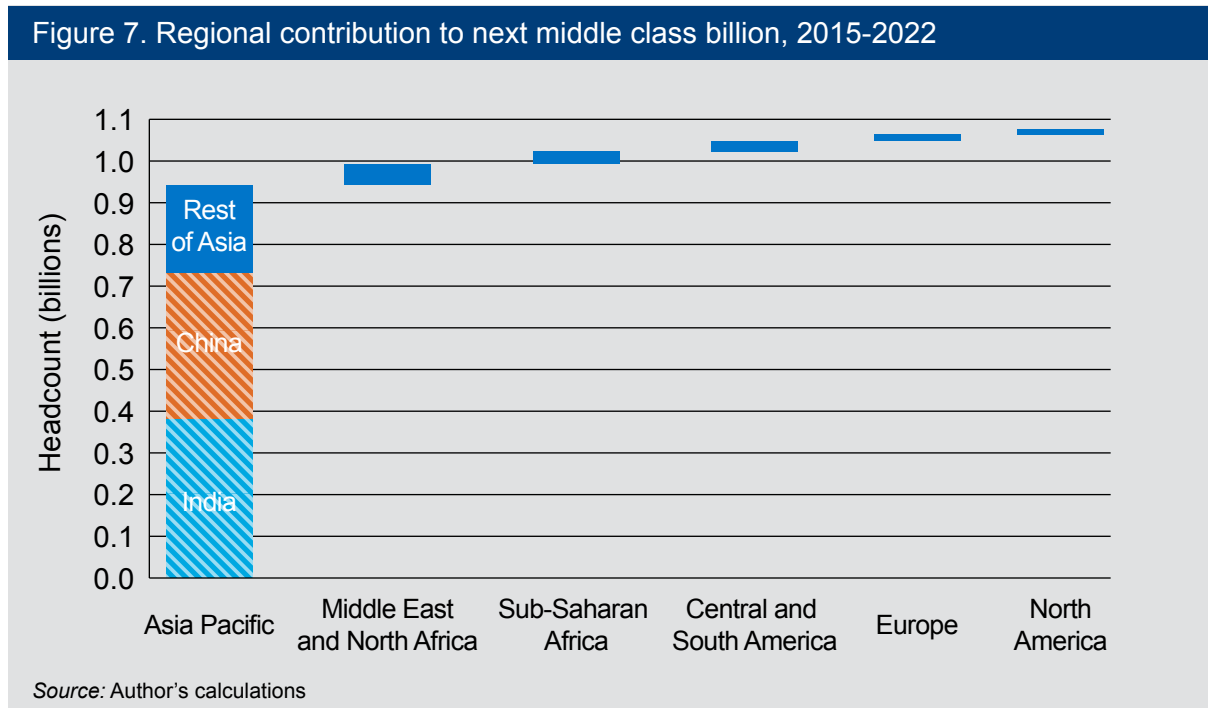

Figure 7. Regional contribution to next middle class billion, 2015-2022

Source: Author's calculations

Table 2. Number (millions) and share of the global middle class by region

	2015 #	2015 %	2020 #	2020 %	2025 #	2025 %	2030 #	2030 %
North America	335	11	344	9	350	8	354	7
Europe	724	24	736	20	738	16	733	14
Central and South America	285	9	303	8	321	7	335	6
Asia Pacific	1,380	46	2,023	54	2,784	60	3,492	65
Sub-Saharan Africa	114	4	132	4	166	4	212	4
Middle East and North Africa	192	6	228	6	258	6	285	5
World	3,030	100	3,766	100	4,617	100	5,412	100

Source: Author's calculations

Figure 8. Middle class consumption expenditures (PPP, constant 2011 trillion $)

Source: Author's calculations
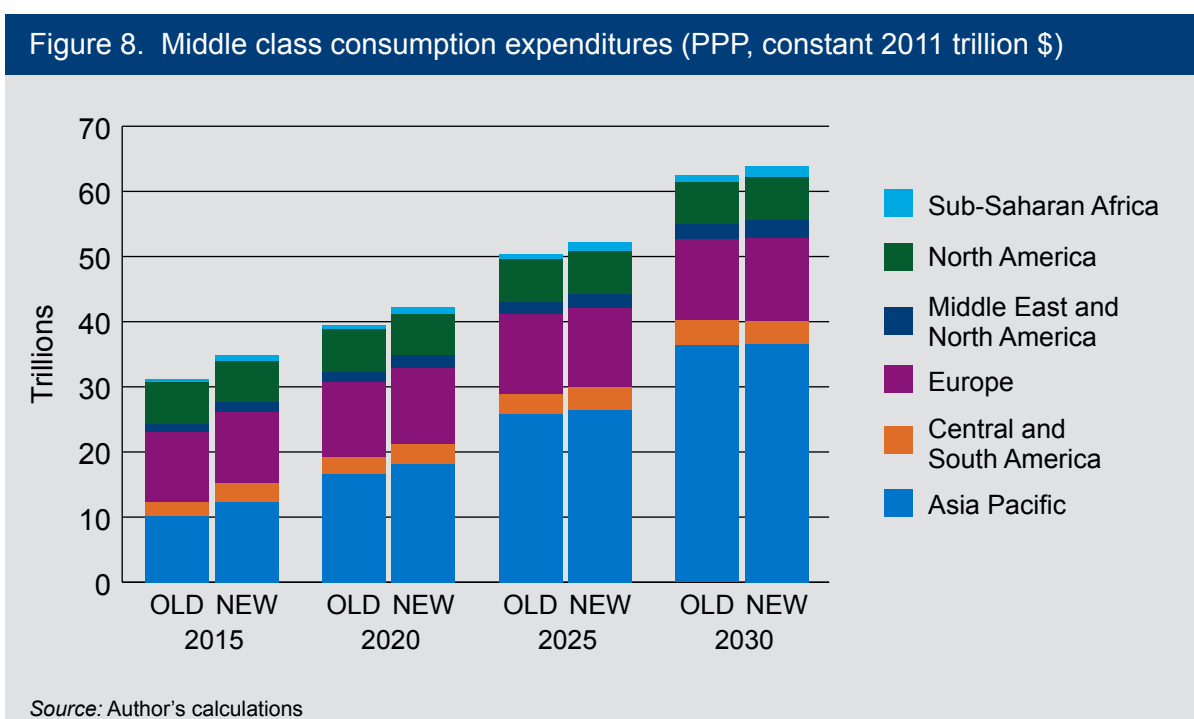
only $11 trillion and those below the middle class spent another $8 trillion.

This market size is 12 percent higher than originally estimated (Figure 8). Almost all the increase is accounted for by the higher levels of middle-class consumption in Asia.

Figure 8 also shows that the old and new estimates for total middle-class consumption are quite close to each other by 2030. This is because the two big changes in the data—higher initial levels of the middle class, but lower growth rates over time—offset each other.

Middle-class consumption accounts for over one-third of the global economy, and it is growing by around 4 percent in real terms. This is faster than GDP growth; middle-class consumption does appear to be a driver of growth, but the rate of middle-class consumption

growth is still a full percentage point or more below what it was during the 1960s and 1970s when middle-class consumption in Europe and North America was booming.

As is the case with the number of people entering the middle class, the distribution of middle-class consumption growth is uneven. As indicated above, there are two distinct groups that today are of roughly compara-

ble market size. In developed countries, middle-class consumption is about 44 percent of the global total, but averaging around $19,000 per person per year. Growth is essentially flat, at between 0.5 to 1 percent per year. In developing countries, consumption is growing far more rapidly at rates of around 6 to 10 percent per year, but from a much lower base of only $8,500 per person per year. The implications are stark. By 2022, the middle class could be consuming about

Figure 9. The middle class could spend $10 trillion more by 2022 (PPP, constant 2011 trillion $)

Source: Author's calculations
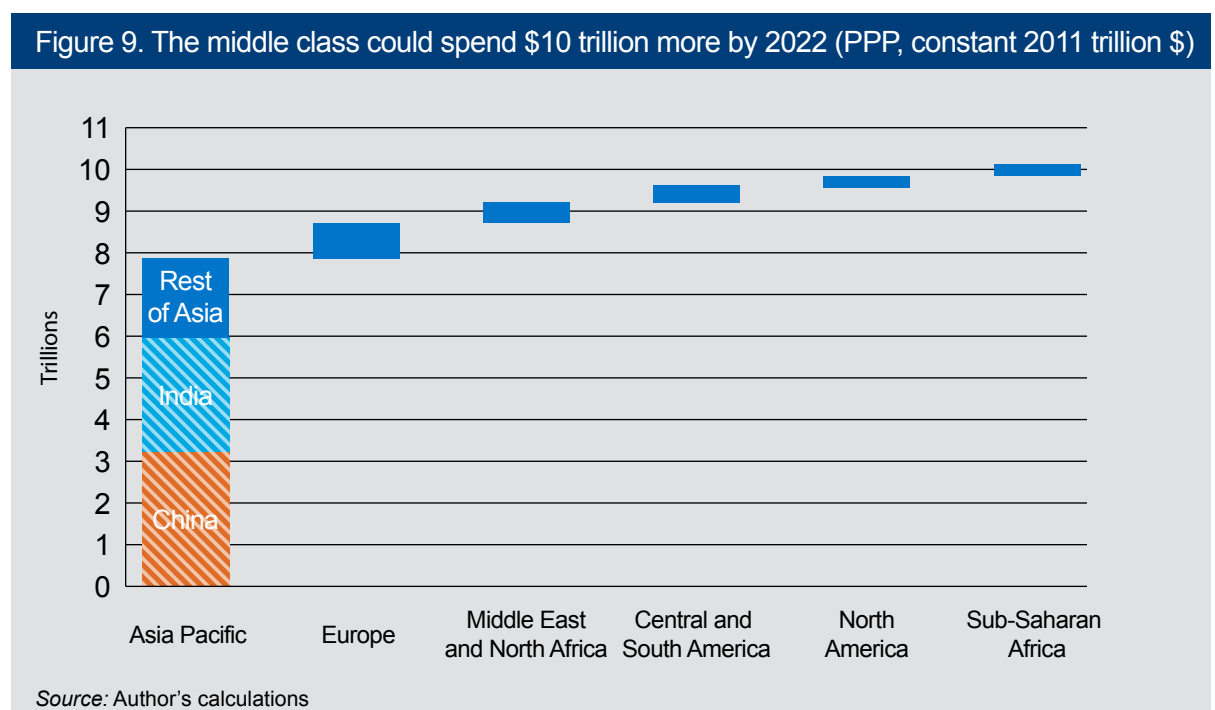
Table 3. Spending by the global middle class (PPP, constant 2011 billion $ and shares)								
	2015		2020		2025		2030	
	#	%	#	%	#	%	#	%
North America	6,174	18	6,381	15	6,558	13	6,681	10
Europe	10,920	31	11,613	27	12,159	23	12,573	20
Central and South America	2,931	8	3,137	8	3,397	8	3,630	6
Asia Pacific	12,332	36	18,174	43	26,519	51	36,631	57
Sub-Saharan Africa	915	3	1,042	2	1,295	2	1,661	3
Middle East and North Africa	1,541	4	1,933	5	2,306	4	2,679	4
World	34,814	100	42,279	100	52,234	100	63,854	100

Source: Author's calculations

$10 trillion more than in 2016; $8 trillion of this incremental spending will be in Asia (Figure 9).

By 2030, global middle-class consumption could be $29 trillion more than in 2015 (Table 3). Only $1 trillion of that will come from more spending in advanced economies. Today's lower middle-income countries, including India, Indonesia, and Vietnam, will have middle-class markets that are $15 trillion bigger than today. Most of the remaining increase will be in today's upper middle-income countries, like China and Brazil.

By 2030, Asia will account for well over half the total middle-class consumption market. Even though there will be substantial growth in the African middle class, the base is so small that the expansion in market size is limited. Still, sub-Saharan Africa could have a middle-class market in 2030 of about the same size as the Middle East today.

To see this in more detail, Table 4 shows the numbers in the largest middle-class economies. The United States had the largest middle-class market in the world

($4.7 trillion) but was likely overtaken by China (albeit in PPP terms) in 2016. The Indian middle-class market is growing fast and probably overtook Japan to move into third spot in 2016. By 2022, India could also overtake the U.S. and become the second-largest middle-class market in the world.

The trend is clear. In 2015, the top 10 middle-class markets in the world were from the G-7 group (except Canada) and the economies of Brazil, Russia, India, and China. By 2020, Indonesia will enter the top 10, while Italy will drop out. By 2030, Mexico will join and France will drop out.

By 2030, Pakistan, Turkey, and Egypt could have middle-class markets larger than $1 trillion each. The Philippines middle class could spend more than Italy's.

Of course, the focus on middle-class consumption obscures the spending by rich households in advanced countries. Already in the U.S., spending by the rich far exceeds spending by the middle class ($7.2 trillion compared to $4.7 trillion), reflecting the particularly

Table 4: Middle class consumption - top 10 countries, 2015, 2020, and 2030 (PPP, constant 2011 trillion $ and global share)								
Country	2015	Share (%)	Country	2020	Share (%)	Country	2030	Shares (%)
U.S.	4.7	13	China	6.8	16	China	14.3	22
China	4.2	12	U.S.	4.7	11	India	10.7	17
Japan	2.1	6	India	3.7	9	U.S.	4.7	7
India	1.9	5	Japan	2.1	5	Indonesia	2.4	4
Russia	1.5	4	Russia	1.6	4	Japan	2.1	3
Germany	1.5	4	Germany	1.5	4	Russia	1.6	3
Brazil	1.2	3	Indonesia	1.3	3	Germany	1.5	2
U.K.	1.1	3	Brazil	1.2	3	Mexico	1.3	2
France	1.1	3	U.K.	1.2	3	Brazil	1.3	2
Italy	0.9	3	France	1.1	3	U.K.	1.2	2

Source: Author's calculations

skewed distribution of income toward the top 1 percent of households within the U.S. Europe, too, has significant consumption by rich households ($1.7 trillion). However, in Japan, with its far more even distribution, rich household spending is only one-fifth the value of middle-class spending.

How much the U.S. dominates the global rich bears emphasizing. In 2016, rich households in the U.S. made up 61 percent of the global number, and they spend almost two-thirds of total consumption by rich households. This dominance is likely to persist. Even with a growing number of rich households in other countries, the U.S. should still account for over 50 percent of rich household spending by 2030.

SOCIAL AND ENVIRONMENTAL IMPLICATIONS OF A MIDDLE-CLASS WORLD

Aworld with more middle-class people must wrestle with the implications for carbon emissions and for national politics. Without managing the effects on these, a backlash of anti-growth or populist policies harmful to the middle class could result.

Carbon Emissions

A majority middle-class world could have important effects on carbon emissions and climate change. A significant concern is that continuation of a consumer-spending based global economy would be incompatible with a world where temperature changes are kept below 2 degrees Celsius above pre-industrial levels.

One example of this argument is based on data shown in Minx et al. (2009). They estimate the carbon footprint due to consumption patterns associated with a variety of lifestyles. Usefully, their study uses a multi-regional input-output model to estimate direct and indirect carbon emissions—the input-output part permits estimates of the carbon emissions due to intermediaries such as transport and retail services, while the multi-regional part permits calculations of the effect of trade with different parts of the world.

In the U.K., the study finds that the carbon footprint of a middle-class household is 50 percent higher than a borderline poor household.[5] The authors find a strong positive relationship between the carbon footprint and weekly household disposable income. The major carbon hotspots are in housing, transport, and food consumption. Other studies, including on India, find similar results—higher incomes and consumption levels will raise carbon emissions. Grunewald et al. (2012) show

an income elasticity of carbon emission in India to be well over unity.

However, two factors weaken these findings. Holding income levels constant, rural households tend to have a higher carbon footprint than urban households, largely because transport (which is relatively carbon intensive) accounts for a larger share of spending in rural households. To the extent that joining the middle class is associated with urbanization, as is the case for most of the developing world, the income effect on carbon emissions is slightly mitigated.

The second mitigating factor is the impact of the middle class on population growth, usually treated as exogenous in most modeling exercises to date. Yet population dynamics are a major factor in global carbon emissions. Middle-class families not only have higher incomes than poor families, but they also have higher female labor force participation and are urbanized and better educated. Completion of girls' secondary education, in particular, along with income levels, has been shown to be a major determinant of fertility rates.

It turns out that the countries contributing the most to global population growth are also the countries that are likely to have the most rapid expansion in their middle class—India, Pakistan, Indonesia, and Nigeria. But if these countries are indeed successful in building up their middle class, then they could also be successful in reducing fertility faster. The difference between the optimistic and the median variant of population growth developed by the International Institute for Applied Systems Analysis in Vienna suggests that there is scope to reduce population in developing countries by 600 million people by 2050 and 2 billion people by 2100. The reduction by 2 billion would translate to a 20 percent reduction in global population, achievable by bringing down fertility rates.

The order of magnitude of these numbers means that, while a larger middle class will undoubtedly contribute to higher carbon emissions, at least some portion of that increase will be offset by urbanization, if properly managed, and by a smaller population.

Politics and Governance

In the heyday of middle-class growth in the U.S., Europe, and Japan, there was a close link between democratization and government support for the middle class. Government policy improved urban conditions, provided inner-city and intra-city transport, supported state-funded mass education for boys and girls, including at tertiary levels, and provided affordable housing and other social assistance programs such as health care and pensions.

In other words, in today's advanced economies, the middle class developed because of public services as well as national economic growth.

Compared to these efforts, public programs in support of the middle class in most of today's developing countries is lagging behind. Desai (2015) notes that "India today is already richer than Germany was when it introduced social insurance for all workers in the late 1880s. Indonesia is richer than the U.S. was in 1935, when the Social Security Act was passed. And China is richer than Britain was in 1948, when the National Health Service was introduced." His point: None of these developing countries has anywhere near as well developed a package of social assistance programs as today's advanced countries had at a similar stage of development.

Supporting the middle class became an essential component of democratic governance in advanced economies. In the U.S., New Deal programs such as the Works Progress Administration and the Social Security Act helped bring about an unprecedented rebound in the American middle class, adding 20 million people between 1932 and 1937.

Today, however, there is no such link between various indicators of democratic governance and the size of the middle class. In Egypt and Thailand, for example, the middle class supported a return to stability through military intervention against democratically elected governments. Equally, the middle class ended strongman rule in Brazil, Indonesia, Philippines, and Tunisia.

What drives these differences in history? One hypothesis points to the nature of tax structures in a globalized world. According to the World Values Survey (2015), people in countries with burgeoning middle classes do not feel that governments are responsible for their success, but rather that it is thrift, hard work, determination, and perseverance that count. Accordingly, they do not support tax increases to pay for the services they ask for. At the same time, in a world where capital is mobile, governments are reluctant to tax business. There is no social contract binding the middle class to democratic government and, at least in advanced countries, there now even appears to be skepticism about the benefits of globalization for the middle class.

CONCLUSION

New data, especially on prices and growth, suggest that the global middle class, numbering about 3 billion people in 2015, may be considerably larger, by about 500 million people, than previous calculations suggested. Asian households, in particular, are now thought to be much richer, relatively speaking, than before.

Notwithstanding gloomy forecasts for global growth, middle-class expansion seems set to continue, at a rate approaching 150 million people per year. In fact, the next decade could see a faster expansion of the middle class than at any other time in history. Within a few years, based on current forecasts, a majority of the world's population could have middle-class or rich lifestyles for the first time ever.

While global numbers are driven by developments in the largest economies in the world, notably China and India, the middle-class expansion is expected to be broadly based, but heavily concentrated in Asia. The vast majority (88 percent) of the next billion people in the middle class will be Asian.

Globally, the middle class is already spending $35 trillion (2011 PPP) annually, and could be spending $29 trillion more by 2030, accounting for roughly a third of projected GDP growth (in PPP terms).

The market for middle-class consumption could grow at an average rate of about 4 percent in the long-term. While this provides some impetus to the global economy, it is not as large as the demand growth generated by middle-class spending in North America and Europe during the 1960s and 1970s, which exceeded 5 percent per year.

The global average masks two distinct groups of roughly comparable size. The middle-class market in advanced economies has matured and is projected to grow at only 0.5 to 1 percent per year, while the middle-class market in emerging economies is far more dynamic and could register annual growth rates of 6 percent or more.

The changing distribution of middle-class spending toward new entrants will have an effect on markets. Households just entering the middle class will seek to purchase consumer durables, as well as services including tourism, entertainment, health, education, and transport.

Growing middle-class spending will undoubtedly have an effect on carbon emissions, but the size depends on government policies. If cities are properly planned with energy-efficient buildings and mass transport, and if aggressive campaigns are introduced to provide universal secondary education to girls, then the carbon footprint of global middle-class expansion can be reduced considerably.

Crafting political support for the middle class may present a greater challenge. Unless globalization can be reframed into a win-win for the middle class in each country, the political narrative can be distorted into one of colliding interests between the middle class in emerging economies and those in advanced economies. A new package of "inclusive growth" must be constructed based on the common theme that continued widening of income and opportunity inequality, and the barriers these create to social mobility, must be forcefully tackled while preserving the benefits afforded by globalization and technological change and innovation.

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METHODOLOGICAL APPROACH

This paper is built upon a database of country-by-country estimations of the middle class that was formed as described below. For each country, a household survey, household expenditure from national accounts, population, and GDP growth projections are needed.

The dataset covers all countries and territories (like Kosovo and the West Bank and Gaza) for which these variables were found. This covers 165 countries, representing 98 percent of the world's population in 2015, 96 percent of the world's GDP, and 97 percent of total world household expenditure.

Countries with a population greater than 1 million that are excluded from this study are listed below. These countries are not included either because of an absence of survey data or household expenditure information or both.

Country	Population (2015)
Saudi Arabia	31,540,372
Korea, Dem. Rep.	25,155,316
Syrian Arab Republic	18,502,412
Cuba	11,389,562
Somalia	10,787,104
United Arab Emirates	9,156,963
Libya	6,278,438
Lebanon	5,850,743
Singapore	5,603,740
Eritrea	5,227,791
Oman	4,490,541
Kuwait	3,892,115
Qatar	2,235,355
Bahrain	1,377,237

I assign countries to standard geographic groupings. Several clarifications: I assign Mexico to North America, due to its close relationship with the U.S., Russia to Europe due to its population center lying much closer to Europe than Asia, Iran to the Middle East and North Africa, Australia and New Zealand to Asia Pacific, and Turkey to Europe in line with IMF country groupings.

The primary data source for household survey information is the World Bank's PovCal database. I supplement this in the case of four countries (New Zealand, South Korea, Zimbabwe, Myanmar) with household survey information available through the United Nations University World Institute for Development Economics Research (UNU-WIDER) World Income Inequality Database (WIID).

Household Expenditure in 2011 PPP terms is taken from the World Bank's World Development Indicators' database (code NE.CON.PRVT.PP.KD). This value, divided by population, is used as the mean consumption level in each country.[6] Use of national-accounts based household expenditure mean values helps overcome two problems. It imposes consistency across countries with household income surveys and those with household expenditure surveys. It also is one mechanism to distribute all sources of income to households within a country, thereby correcting for cross-country differences in the coverage of surveys, for example in the treatment of imputed housing services or self-employment income. This method is similar to that used by Pinkovskiy and Sala-i-Martin (2014). Note that it differs from that used by the World Bank in computing global poverty aggregates; the World Bank uses survey means exclusively on the assumption that left-out income is mostly attributable to wealthier households that surveys do not capture. As the focus here is on the upper end of most distributions in developing countries, the World Bank method could result in significant amounts of household income not being allocated any-

where and would be a significant issue for computing the size of the middle class.

Population is taken from the medium variant, U.N. Populations Prospects, the 2015 Revision. Growth forecasts are taken from the IMF World Economic Outlook October 2016 database. This provides GDP growth forecasts to the year 2021, as well as estimates for 2016. Beyond 2021, I use the average from the last nine years of available GDP growth (for most countries, the average of 2012-2021 growth rates) to extrapolate GDP up to 2030. Our assumption is that household expenditure grows at the same rate as GDP.

Computing breakdown of household expenditure:

I use a Beta Lorenz specification using the P's and L's from household surveys to estimate the full distribution of all households in each country. For estimation of distributional parameters and Beta Lorenz functional form, see Datt (1998). The most common alternative, the general quadratic (GQ) specification, returned occasional negative values of people living below some thresholds and so was rejected as an alternative. For each Beta Lorenz curve, the survey mean was replaced by household expenditure per capita data drawn from the national accounts.

The latest household survey is used for each country in projections. Distributional parameters are held constant throughout the projection period. Means are updated annually, using the growth rate of GDP per capita in constant prices.

Once the distributions are known, it is possible to compute the number of people below any given threshold of expenditure using the following formula:

$$(1) \qquad \Theta HCR_z^{\gamma} (1 - HCR_z)^{\delta} \left[\frac{\gamma}{HCR_z} - \frac{\delta}{1 - HCR_z} \right] = 1 - \frac{z}{\mu}$$

Where z corresponds to the thresholds (2011 PPP \$11 or 2011 PPP \$110 a day for the middle class as I define it), μ corresponds to the mean consumption per capita for a given country in a given year, and Θ, γ, and δ are parameters calculated from the P's and L's of household surveys. See Datt (1998) for further explanation.

The two thresholds are used to divide the total population of each country into three groups: one below the lower threshold (denoted "below middle class"); a second above the upper threshold (denoted "rich"); and the third between the two thresholds (denoted "middle class"). Absolute numbers of people in each group is obtained by multiplying the headcount rates by total population for that year.

The advantage of using a parametric estimation for the distribution is that expenditure shares can then be computed directly from the distributional parameters.

The share of spending by each group below a given threshold is computed using a three-step process.

First, the Lorenz curve is traced out where the income share for each headcount rate can be computed from the distributional parameters.

$$(2) \qquad L(HCR_z) = HCR_z - \theta * HCR_z^{\gamma} * (1 - HCR_z)^{\delta}$$

Where subscript z indicates the threshold, and other variables are distributional parameters estimated by fitting the Beta distribution function to the household survey data.

Second, a threshold gap index is computed that measures the extent to which individuals fall below the threshold as a percent of the threshold:

(3) $Threshold\ Gap\ Index_z = HCR_z - (\frac{\mu}{z}) * L(HCR_z)$

Both formulas are from Datt (1998).

Third, I generate mean per capita consumption for the group below a given spending threshold using the following formula:

(4) $Mean\ consumption\ per\ capita_z = z * \{1 - (TGI_z / HCR_z)\}$

The latter formula is from Chen and Ravallion (2008).

With estimates of the mean per capita spending of people below \$110 per day and those below \$11 per day in hand, along with the respective populations in both categories, I can compute spending of the middle-class group by recognizing that the mean spending of the below \$110 group is a weighted average of the mean spending of the below middle-class group and the middle-class group:

(5) $Mean\ consumption\ per\ capita(middle\ class)=$
$$\frac{(Cons_{\$110} * HC_{110} - Cons_{\$11} * HC_{11})}{HC_{110} - HC_{11}}$$

Finally, total consumption measures are calculated by multiplying the headcount of each income category by its mean consumption per capita.

ENDNOTES

1. Throughout this paper, I use "developed countries" and "developing countries" alongside "advanced economies" and "emerging economies" to describe country groups. Though these terms have no exact definitions, they are in common use and so used here with no prejudice as to the level of development of any particular country. When referring to data sourced from the IMF, I use emerging economies as shorthand for "emerging and developing" economies.

2. See Kharas (2010) for the rationale behind this choice of the middle class income range. At the lower end of the threshold, households no longer risk falling into poverty and they can afford to buy a range of consumer durables and services. The upper threshold is a level at which households can afford to buy almost anything they wish.

3. Op. cit p. 33

4. Op cit. p. 5

5. Minx et al. describe "suburban comfort" and "urban intelligence" households, which loosely correspond to middle-class households.

6. For countries with missing values for the mean, I use alternate sources. For Kiribati and Micronesia, Fed. Sts., I use current household final consumption expenditure in current LCU (code NE.CON. PRVT.CN) and then use the country-specific PPP conversion factor. For Papua New Guinea and Solomon Islands, I use the current Household Final Consumption Expenditure, PPP series (code NE.CON.PRVT.PP.CD) and deflate to 2011 dollars. I use the survey mean in the case of Samoa, Marshall Islands, and Tuvalu.