Measuring the Middle Class in the World and in Morocco

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Summary

The rise of the middle class in the emerging economies is affecting significantly consumption habits and thus, transforming these economies. The size and growth of the middle class is of interest to gauge market potential for many products, and can serve as a barometer of political awareness. Measuring the Middle Class using income presents many challenges, beginning with finding an appropriate definition. Previous research by Ali and Dadush (2012) suggested an alternative measure, which can complement the studies based on household surveys: using cars in circulation. In the developing world, unlike in high income countries, buying a car is virtually synonymous with entry into the middle class. This paper updates the previous research conducted by Ali and Dadush using the most recent data, and also extends the analysis to a much larger sample of developing countries. The case of Morocco, a country where the middle class is growing rapidly and has rising expectations, is reviewed. While cars in circulation are certainly not a perfect measure of the rise of the middle class in developing countries, the measure points to an extraordinarily challenging period ahead for governments, especially in middle-income developing countries, such as Morocco. Governments will see their tax revenues grow, but demands on them will grow even more rapidly. At the same time, many companies will see wide new business horizons open to them.

Measuring the Middle Class in the World and in Morocco

The swelling middle class in developing countries is transforming the global economy and its main centers of consumption. The size and growth of the middle class is of interest to gauge market potential for many products, and – since the middle class typically makes many demands on public services – as a barometer of political awareness. A sizable middle class is often seen as a source of stability and cohesion, as assurance of adequate market potential, and as a sign that the most divisive features of high inequality of outcomes and of opportunity are avoided. Middle class families in countries such as Morocco, for example, are also seen as putting pressure on politicians and government agencies for improved services in education, health and infrastructure. High-income families can go around public services and pay for their provision in the private sector – middle class families typically cannot.

The broadest classification of «middle class» suggests the middle class comprises anyone who is not poor, which according to the World Bank means those who earn an income in excess of $2 a day after adjusting for purchasing power (Chen and Ravallion 2010). That level has now been achieved nearly by 6.7 billion of the world's 7.5 billion people (World Bank, 2015). Yet, many of these people can buy a cell phone but have no access to a regular power supply, and are very vulnerable to a relapse into poverty. This definition is clearly too broad. Numerous alternative definitions based on income and consumption levels frominfrequently conducted household surveys have been proposed, each arbitrary to some degree.

Previous research by Ali and Dadush (2012) suggested an alternative measure which can complement the studies based on household surveys: using cars in circulation. In the developing world, unlike in high income countries, buying a car is virtually synonymous with entry into the middle class. In these poorer countries, car ownership separates those with the ability to purchase many other nonessentials from those within the wider population. Evidence from household surveys in India shows that car ownership is associated with ownership of all other household appliances such as a washing machine and an air conditioner, and is also associated with higher education (Krishna and Bajpai, 2015; Roy, 2018). Car statistics, moreover, are generally reliable since people pay a fee for their vehicles to remain registered, and these statistics are frequently updated. For this reason, the number of passenger cars in circulation multiplied by the size of the average household can also serve as a gauge of the size of a country's middle class. This measure, which is updated frequently, can be used in isolation or as a check of measures of the middle class derived from household surveys.

Applying this measure shows that in some developing countries there are many more affluent people than is evident from household surveys, while in others there are many less. In some instances the discrepancies are large enough to question the accuracy of income and expenditure measures. The car index also shows unequivocally that very large numbers of people have entered the middle class in the last several years and suggests that many more will soon join the middle class.

In this brief, we update the previous research conducted by Ali and Dadush using the most recent data, and also extend the analysis to a much larger sample of developing countries. We delve more deeply into the case of Morocco, a country where the middle class is growing rapidly and has rising expectations. Though we argue below that no single measure of the middle class is appropriate in all cases or even in most cases, and much depends on the purpose to which the measure is put, we also believe that monitoring car use can provide additional easy to obtain information on the evolution of the middle class across the world.

Defining the middle class

There is no widely accepted definition of what constitutes the middle class, and the most common ways of measuring its size suffer from a number of flaws. However measured, reflecting their rapid growth and low levels of initial income, the middle class in the developing countries is certainly rising fast (Dadush and Shaw 2011) irrespective of the various definitions used.

The narrowest commonly used classification defines middle class as individuals with an income close to or above the median income in advanced countries – roughly $31,000 per capita in 2010 or $85 a day at US prices. Only about 12,7% of the world's population today lives in countries whose average per capita income is higher than that threshold, and only a tiny minority in developing countries would qualify. Moreover, that level of income is about seven times what marketing studies suggest is needed to buy a car. This measure is, we believe, too narrow for most purposes.

The most widely used measure of the middle class was proposed in 2002 by Branko Milanovic and Shlomo Yitzhaki, who counted people with daily incomes between roughly $10 and $50 adjusted for purchasing power, denoting the average income of Brazil on the low end and Italy on the high end at that time (Milanovic and Yitzhaki 2002). Another definition, which better captures the size of the middle class in rich countries, counts people with income between $10 and $100 adjusted for purchasing power, and which includes a more affluent subset, was proposed by Homi Kharas of the Brookings Institution.

There is a degree of arbitrariness in all these income-based definitions, but even beyond that, they are based on infrequently conducted household surveys, which vary enormously in quality. Incomes, even when adequately measured, do not directly reflect private consumption.

Moreover, there is much controversy over appropriate PPP exchange rates for some countries, especially those with large territories and widely divergent conditions across their regions, and most notably China. Using a single purchasing power adjustment measure across all income classes is also problematic since the relative cost across countries of necessities purchased by the poor and those of products purchased by the rich can vary greatly. Comparing incomes across countries at different levels of development represents a great statistical challenge, leading to frequent large revisions in these estimates. The most recent set of household surveys, for example, suggest that the global middle class, using income measures derived from them, may be over 500 million people larger than believed a few years ago (Kharas, 2017).

Measuring the middle class

There are other ways to measure the middle class. Cars are big-ticket items that indicate the ability and willingness to purchase many other nonessential goods. Indeed, while the vast majority of households own a car in advanced countries and many own more than one, in developing countries owning a car symbolizes relative affluence. Critics may contend that measuring car ownership excludes households that can afford, say, a computer, TV set, or air-conditioner, but not a car. However, because cars in circulation in the developing world are often of very old vintage and correspondingly cheaper – for example, the average passenger car in India is about 20 years old, compared with 11.6 years in the US – this supposed omission is not nearly as large as it seems.

Cars in circulation can therefore provide a measure of the number of middle-class households. Assuming that middle class families in the developing world own only one car, the population that is middle class can be estimated by multiplying the number of cars in use by the country's average household size as reported by the World Bank, which typically lies in the range of 3 to 5. These average household figures may overstate the size of the middle class in developing countries to a small extent since middle class households may be smaller in size than the average.

As one would expect, the simple correlation between the cars in circulation per 1,000 people and per capita income and per capita consumption is high [0.7 and 0.76, respectively][1]. Reflecting in part differences in the income distribution, the correlation is far from perfect, however. Thus, as would be expected, the middle class, using cars in circulation as the measure, was shown by Ali and Dadush to be larger in relatively equal societies, controlling for income. Moreover, other factors such as space restrictions and policies discouraging car ownership for environmental and congestion reasons clearly play an important role in some rich countries such as Singapore. In contrast, car ownership in poor countries can be lower than predicted by income on account of weak infrastructure and high tariffs or excise duties on imported vehicles which are perceived as luxury items.

Figure 1. Cars and consumption per capita
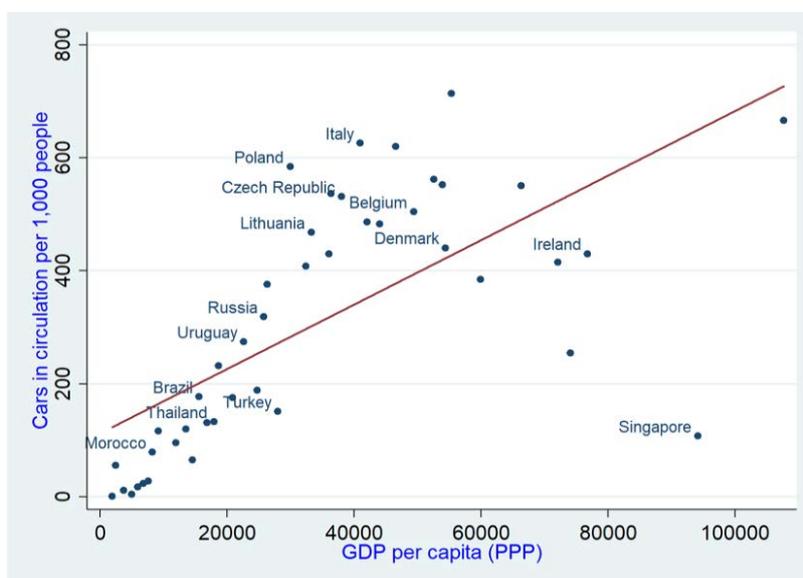
Source: World Bank, International Organization of Motor Vehicle Manufacturers Data and authors' calculations.

1. Using a sample of 118 countries, with different income levels

Even so, the car measure can offer important information about how the middle class is evolving. The car ownership metric suggests that the middle class in developing countries has grown very rapidly, and more so than had been expected using income or expenditure measures. For example, according to a World Bank report issued in 2007, the global middle class in developing economies was projected to grow on average annually by 4.5% between 2005 and 2030 (World Bank 2007), but this is less than the 6.5% average annual growth of cars in circulation in developing countries[2] since. Another study employing the Milanovic-Yitzhaki definition, projects the middle class in China, India, and Russia to grow annually by 9.4%, 5.8%, and 2.4%, respectively, over the coming two decades (Dadush and Shaw 2011). Again, such growth rates are much slower than the average annual growth rates of cars in circulation in these countries from 2005 to 2017: 19.2% in China, 11% in India, and 4.4% in Russia.

The car measure also suggests that the ranks of the global middle class are poised to swell in the coming years. Cars in circulation per capita rise once income per capita crosses a certain threshold. A cross-country analysis suggests that the threshold is around $3,400 PPP. During the 2005-2017 period, for countries with average per capita income between $3,400 PPP and $10,000 PPP, the average income elasticity of car ownership is 1.21 (see Figure 1 below).

Of all countries classified as developing by the World Bank, 39, home to a combined 1.4 billion people, lie in the per capita annual income range of $3,400 PPP to $10,000 PPP, meaning that a large share of that population is just on the threshold of affluence. In 2017 alone, the BRIC countries – Brazil, Russia, India, and China – added about 29 million cars to their circulation. That figure would imply that about 100 million people are in the process of joining the middle class. Indeed, projection exercises suggest that over the next generation, not only will the vast majority of people in the middle class reside in developing countries, but their purchasing power in the aggregate will match that of advanced countries (Dadush and Shaw, 2011; Kharas, 2017).

Figure 2. Income per capita and elasticity of car ownership*
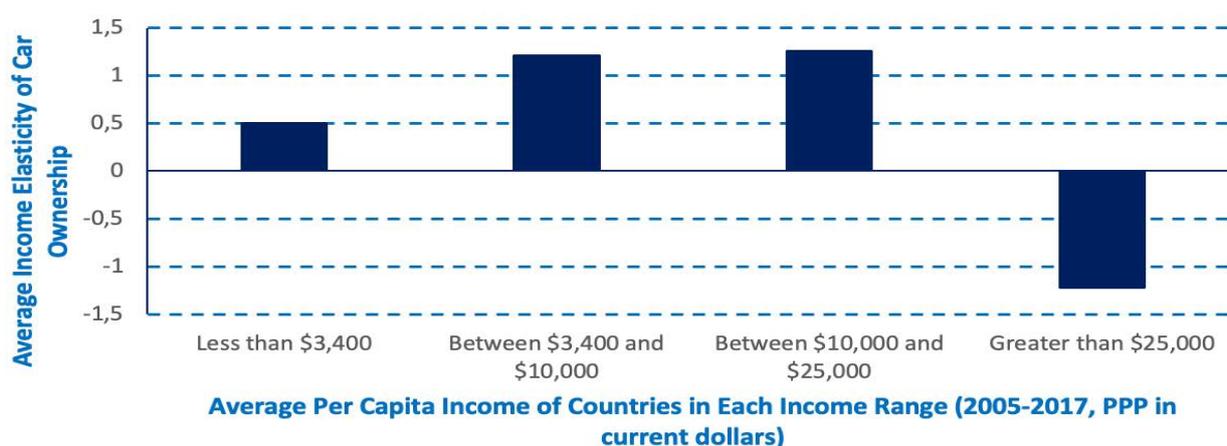
* Income elasticity of cars is calculated using a regression of car ownership growth against income per capita growth (2005-2017)
Sources: International Organization of Motor Vehicle Manufacturers Data and authors' calculations.

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2. Brazil, Russia, India, China, South Africa, South Korea, Indonesia, Malaysia, Mexico.

Using the car metric, there were 1726 million people in the middle class in 2017 in countries classified as developing by the World Bank, compared to 939 million in 2000, a growth rate of over 9% a year, over five times the 1.7% growth rate of per capita GDP over that period. Well over half the middle class in developing nations is concentrated in South and East Asia, and that is also where the middle class is growing most rapidly by a wide margin. As a share of population, the middle class is most prevalent in Latin America and the Caribbean, where 42% of the population is middle class, and least prevalent in South Asia and Sub-Saharan Africa, where less than 9% of the population is middle class. Appendix Table 1 shows the results by country.

Table 1. Middle class Estimate by Developing Region

Region	Middle class in 2010 (in Millions)	Middle class in 2017 (In Millions)	Middle class as share of total population 2017	Middle class annual growth (2010-2017)	GDP per capita annual growth (2010-2017)
Europe & Central Asia	179,1	245,3	26,8%	4,1%	1,4%
East Asia & Pacific	318,1	792,7	34,2%	14,3%	3,7%
Latin America & Caribbean	193,0	269,6	41,8%	4,5%	1,1%
Middle East & North Africa	98,9	162,1	36,4%	7,5%	1,4%
Sub-Saharan Africa	68,2	94,6	9%	4,7%	1,1%
South Asia	82,1	160,8	9%	12,6%	5,1%
Total	939,4	1725,1	23%	9,3%	1,7%

In 2017, the middle class in developing countries was much larger than the total population of advanced countries, [1248 million]. Given the stagnation in both population and incomes in advanced countries in the wake of the financial crisis, the number of people in the middle class in advanced countries, however defined, is unlikely to be increasing – and may even be declining. The still untapped potential of the middle class in developing countries is evident when comparing car ownership levels there with those in advanced economies. In 2017, the number of passenger vehicles per 1,000 people in India, Morocco and China is just 20 and 78 and 130, respectively, compared with 561 in Germany and 385 in the United States.

Comparing the Car and Income/Expenditure Measures

It is possible to provide a rough comparison of the car measure of the middle class with that of the Milanovic-Yitzhaki definition and the Kharas definition using a database assembled by the latter author at the Brookings Institution. For some of the computations that follow we use a convenient on-line calculator provided by the Washington Post Newspaper using the latest available data from Kharas[3]. The exercise is necessarily approximate given the different vintages and incomplete data in household surveys.

3. https://www.washingtonpost.com/graphics/2018/business/global-income-calculator/?utm_term=.8d851d95fafd

We focus on 35 developing countries with the largest population divided in three groups as per the World Bank Classifications: Low Income, Lower-Middle Income, and Upper Middle-Income. These 35 countries account for 75% of the population of developing countries. The Appendix Tables 2 and 3 show the comparisons by country. After correcting for household size, measuring car ownership suggests that the middle class in the sample of 35 developing countries is around 1.49 billion compared to 2.2 billion arrived at using the Milanovic-Yitzhaki definition, for example.

The comparison shows that in some middle-income countries, such as China, Costa Rica, Brazil, and Morocco, the estimate of the middle class using cars in circulation matches that arrived at using the Milanovic-Yitzhaki (M-Y) method, lying within a 20% range.

But the car-ownership metric also suggests that some other middle-income countries – notably Russia, Mexico, and Malaysia – have a much larger middle class than arrived at using the M-Y definition. Even using the broader Kharas definition which includes a more affluent group does not close this gap by much. It is difficult to reconcile widespread car ownership in those nations with the income statistic. The market for consumer goods in those countries is likely much larger than suggested by the income statistic.

The car measure also indicates that India has a much smaller middle class than the M-Y definition suggests and that the same is true of nearly all the low-income countries in the sample. We are reluctant to attribute the difference mainly to overreported incomes or to errors, although these may form part of the explanation. Many believe, for example, that growth in India has been greatly overstated in recent years. Most likely, the surprisingly low level of car ownership may be the result of policies which deter car ownership in poor countries, such as high excise taxes and tariffs placed on automobiles. These are often considered a luxury item and weigh heavily on the balance of payments of poor countries. Inadequate road infrastructure and extreme urban congestion may also play a role. Many prefer a two-wheeler mode of transport. If owners of two wheelers were included, the gap between the car measure and M-Y measures of the middle class would largely close (See also Krishna and Bajpai, 2015).

The case of Morocco

The car measure suggests that about 38% of Morocco's population belong to the middle class. Using the latest household expenditure survey of the Haut Commissariat du Plan , carried out in 2014 [National Survey on Household's Consumption and Expenditures], and updating to reflect prices of 2017 (See figure 3 bellow), shows that 40% of Moroccans spend above $3600 a year, the lower bound of both the M-Y and Kharas definition of middle class, and that even the highest decile spends on average less than $13000 a year, or about $35 a day, which tells us that the car and income measures of the middle class essentially coincide.

Figure 3. Annual average expenditure In Morocco per Decile, US PPP 2017

Decil cut-off point ■ **Average annual expenditure**
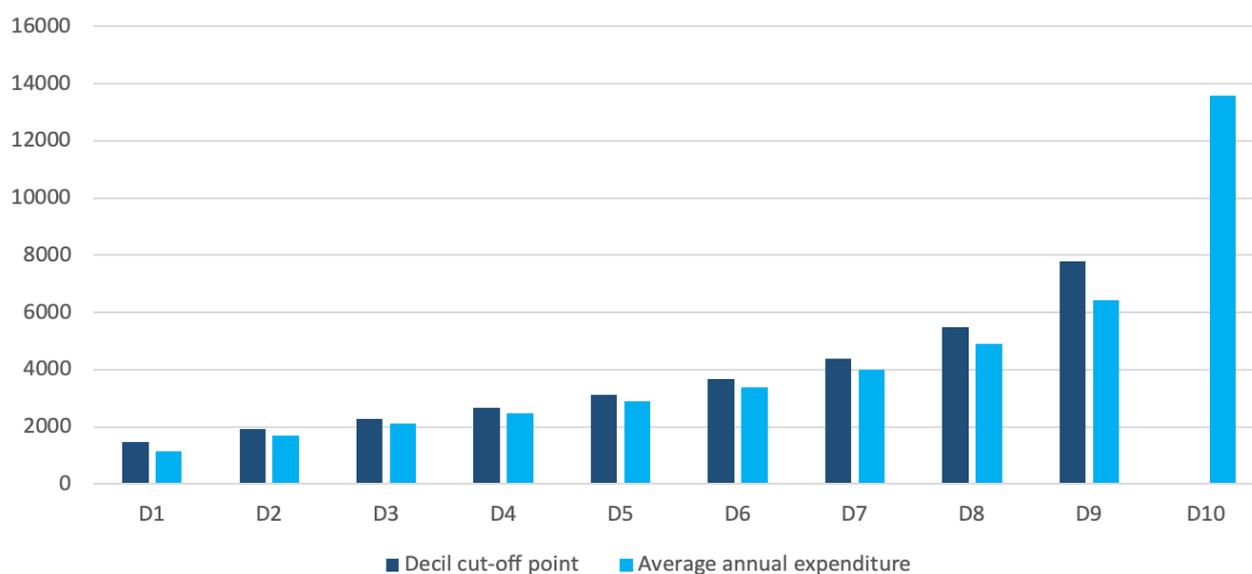
These shares are far smaller than the 90% of Moroccans who live on more than $2 a day, the World Bank's definition of the non-poor. Using the car method, the share of the middle class in Morocco's population turns out to be about the same as that in Tunisia and significantly larger than in Egypt, countries with which Morocco is often compared. However, using the M-Y method and based on the Kharas data suggests that the share of the middle class in Morocco's population is much smaller than that in both Tunisia and Egypt.

How do these shares compare to the estimates provided by the Moroccan national authorities? In 2007, the Moroccan Planning Commission defined the middle class as individuals who earn an annual income of the Moroccan Dirham equivalent of between 4104$ (or $11 a day) to 9816$ (or $27 a day) at 2007 exchange rates. Using that definition, and based on the available household surveys at the time, the Commission estimated that the middle class represented 53% of the global population, quite a bit higher than the car or the M-Y method.

The car measure also suggests that the middle class in Morocco is growing rapidly. The total car parc in Morocco grew at 5.7% a year over 2005 and 2017, about twice as fast as real average per capita income (2.8%), reflecting the fact that many Moroccans are near the per capita income threshold of the middle class, but possibly also affected by trade liberalization which contributed to car prices declining in real terms. The number of cars per 1000 people has jumped from 47 in 2005 to 78 in 2017. As is the case in many developing economies, it is likely that Morocco will continue to see rapid growth of the middle class in coming years.

Common observation suggests that there is a sizable group of more well-off families that are part of the Moroccan middle class, whose incomes are not very far from the average of affluent Europeans. The car method can provide additional information on the affluent in Morocco which household surveys may not pick up, because of sampling errors or because wealthier households may not be forthcoming in declaring their income or expenditure. By examining the share of luxury cars in the Moroccan car

park, which include the Audi, BMW and Mercedes, Land Rover and Jeep brands[4] we can guess how large the more affluent group is. These brands account for just 6.9% of the car park, suggesting that even a household income of between $ 50 to $100 a day is insufficient to afford a luxury automobile in Morocco, which costs a multiple of economy cars. The size of the "rich" class in Morocco, people whose incomes probably matches that of more affluent Europeans, is small, in the vicinity of 2.5-3% of families but hardly insignificant[5].

Table 2: Shares of Luxury and mid-range cars in total passenger car sales, 2017

	Brand	Global Sales	Market Share
Mid-rang cars	DACIA	45599	29,38%
	RENAULT	21726	14,00%
	FORD	12026	7,75%
	VOLKSWAGEN	11856	7,64%
	PEUGEOT	10158	6,54%
	HYUNDAI	9965	6,42%
	NISSAN	6817	4,39%
	FIAT	6382	4,11%
	CITROEN	6107	3,93%
	TOYOTA	3699	2,38%
Luxury cars	MERCEDES-BENZ	3178	2,05%
	BMW	2639	1,70%
	AUDI	2461	1,59%
	LAND ROVER	1267	0,82%
	JEEP	1140	0,73%
	OTHER	10193	6,57%
	TOTAL	**155213**	**100,00%**

Source: AIVAM, Vehicle Importers Association in Morocco.

The sizable middle class in Morocco and its rapid growth, as well as the significant size of the upper middle class and rich families has important policy implications, which are of general interest in other countries as well. For example, the middle class in Morocco, having satisfied its basic needs, has three well-known preoccupations, namely access to good housing, to good education for the children, and to good health care.

In Morocco, dignified housing is generally in the near periphery of the city, starting at an amount of 600 000 MAD (60 000$), and can be paid with a bank draft of 300$ per month over 25 years[6]. Access to good housing remains difficult for many in the middle class in Morocco. Indeed, the price to

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4. Very few luxury Japanese or American cars are sold in Morocco, and very few other European luxury brands.
5. Calculated on the basis of luxury cars in use as a share of total cars in use multiplied by the share of the middle class in the Moroccan population.
6. Saadani Y., "Classe moyenne et croissance durable partagée" cycles de conférences «échanger pour mieux comprendre», AWB, 2014

income ratio[7] (the average years of income required to afford a house) in Morocco is 15, while it is 9 in Turkey and only 4 in South Africa.

Middle class people in Morocco, as in other countries, aspire to the improvement of their children compared to their own through education. However, the very low quality of the public school in Morocco (reflected in very low educational attainment scores in internationally standardized tests) obliges many middle-class parents to send their children to private schools, bearing an additional large expenditure. Ensuring that their children have access to private schooling is a top priority of Moroccans, even those who belong to the lower-middle class.

As in other countries, access to quality health-care is a big preoccupation of all Moroccans, not just the middle class. Morocco knows two health care systems, a private and a public one. The first is only accessible at great cost compared to incomes, often exceeding the capacity to pay of even the middle class. The second is associated with lower quality of care, and generally requires some modest form of payment, which may include bribery. In an effort to guarantee a fair access to quality medical care, the Moroccan authorities launched RAMED in 2012, a medical insurance plan. The plan aims to assist less well- off citizens to have access to medical care, and comes with Compulsory Health Insurance (AMO). RAMED and AMO cover 60% of Moroccans, and according to HCP statistics, of the 10.7 million people formally employed in 2017, 4.6 are covered with healthcare insurance. However, as it turns out low-income people are not the only beneficiaries of RAMED; higher-income families can benefit from these government-sponsored schemes and can sometimes do so because of cronyism or corruption.

As is evident from recent developments in the Moroccan social landscape, the Moroccan middle class, which is growing rapidly, is increasingly socially and politically aware and inclined to manifest its views. The expectation of government services is rising. If these expectations are not met, the result will be polarization. The most affluent will be able to afford private alternatives to education, health and housing services, while most of the middle class have to settle for low-quality public services. Undoubtedly, such a scenario would be characterized by widespread popular dissatisfaction.

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7. Price to Income Ratio is the basic measure for apartment purchase affordability (lower is better). It is generally calculated as the ratio of median apartment prices to median familial disposable income, expressed as years of income.

Conclusion

Income-based measures tend to underestimate the middle class's size and growth rate in some developing countries, sometimes dramatically so. In other countries, where governments have discouraged car ownership though taxes and tariffs or regulations, or simply by not investing sufficiently in road infrastructure, the car index tends to underestimate the size of the middle class. Still, the car index is a relatively easy-to-understand, and in many instances a useful addition or even replacement for income measures when they are out of date or unreliable. Statistics on cars in circulation show clearly that the middle class has great room to expand and that spending by the middle class in developing countries remains tiny compared to its potential. Despite the middle class's rapid growth, it will take emerging economies half-a-century or so before the incidence of the middle class in the total population resembles that of the advanced economies.

There is much work to do to refine the car index as a measure of the middle class in developing countries. Estimates of household size for middle-class families, the share of cars that are used for business use, and the share of households that own more than one car can all be refined. In countries where car registrations are available by province or region, the car index could also be used to shed light on the size of the middle class within countries and how it varies, for example, between coastal and inland regions. Segmentation of cars in circulation by price category could also be used to arrive at finer mea-sures of the middle and rich classes, including the geographic location, size, and growth of different groups.

What is certain is that broader and diverse measures of the middle class are required beyond income. As stated by Rash: « The policy implications for fine-tuning the measure of the middle class in middle income countries are significant. Using strictly income-based measures obscures the fact that a significant percentage of the fabled, emerging middle class in some middle income countries is still highly undereducated, are not in professional/managerial positions and therefore lack the credentials to upgrade their relative positions in the global economy. Incorporating socio-economic indicators, such as occupation and education, allow for a more complete understanding of the characteristics of these new middle class households and highlight their continued vulnerability. Policies that focus on increasing access to education and job skills training, in addition to job creation, may be the key to ensuring that the middle class in middle-income countries receive not just the income, but also the credentials necessary to maintain, or ideally elevate their status in the years to come. »

While cars in circulation are certainly not a perfect measure of the rise of the middle class in developing countries, they point unequivocally to an extraordinarily challenging period ahead for governments, especially in middle-income developing countries, such as Morocco. Their revenues will grow, but demands on them will grow even more rapidly. At the same time, many companies will see wide new business horizons open to them.

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Appendix

Appendix Table 1: Middle class and GDP per capita growth by country

	Income group	Country	Middle class in 2010 (in Millions)	Middle class in 2017 (In Millions)	Middle class annual growth (2010-2017)	GDP per capita annual growth (PPP, 2010-2017)
Europe & Central Asia	Upper middle income	Albania	1,1	1,8	4,2%	1,5%
	Upper middle income	Azerbaijan	3,7	5,4	6,6%	-0,03%
	Upper middle income	Bulgaria	6,0	8,0	4,8%	3,0%
	Upper middle income	Kazakhstan	10,8	12,5	2,2%	1,6%
	Upper middle income	Romania	11,7	15,4	3,2%	4,6%
	Upper middle income	Russian Federation	89,3	119,7	3,7%	1,7%
	Upper middle income	Serbia	4,5	5,5	2,5%	0,4%
	Upper middle income	Turkey	30,9	50,1	7,1%	4,7%
	Lower middle income	Georgia	2,0	3,7	9,1%	4,6%
	Lower middle income	Kyrgyz Republic	2,1	4,4	10,6%	1,3%
	Lower middle income	Ukraine	16,9	18,8	1,5%	0,2%
East Asia & Pacific	Upper middle income	China	209,6	617,0	16,6%	7,1%
	Upper middle income	Malaysia	42,4	62,2	5,2%	3,5%
	Upper middle income	Thailand	17,6	33,9	9,0%	2,5%
	Lower middle income	Indonesia	35,6	61,7	8,1%	4,2%
	Lower middle income	Philippines	13,0	17,9	4,6%	4,5%
Latin America & Caribbean	Upper middle income	Brazil	88,7	122,5	4,1%	-0,4%
	Upper middle income	Colombia	8,1	11,2	3,6%	2,6%
	Upper middle income	Costa Rica	2,2	3,3	5,6%	2,6%
	Upper middle income	Dominican Republic	2,3	2,9	2,5%	3,8%
	Upper middle income	Ecuador	2,8	3,9	4,8%	1,8%
	Upper middle income	Guatemala	2,6	3,8	5,2%	1,5%
	Upper middle income	Jamaica	0,4	0,5	2,2%	0,3%
	Upper middle income	Mexico	78,3	110,8	5,0%	1,1%
	Upper middle income	Paraguay	1,4	1,8	2,9%	0,5%
	Upper middle income	Peru	4,2	6,4	6,2%	2,8%
	Lower middle income	Bolivia	0,7	1,1	5,8%	3,5%
	Lower middle income	El Salvador	0,4	0,5	3,7%	2,1%
	Lower middle income	Honduras	0,1	0,2	2,1%	2,0%
	Lower middle income	Nicaragua	0,6	0,6	0,6%	4,1%
	Low income	Haiti	0,2	0,2	1,1%	0,9%

Middle East & North Africa	Upper middle income	Algeria	16,1	25,1	6,3%	1,1%
	Upper middle income	Iran, Islamic Rep.	28,6	50,0	7,9%	0,9%
	Upper middle income	Iraq	7,6	15,7	10,2%	2,9%
	Upper middle income	Jordan	3,5	5,8	6,5%	-1,8%
	Upper middle income	Lebanon	1,9	2,7	4,5%	-3,1%
	Upper middle income	Libya	12,6	18,3	5,5%	-7,0%
	Lower middle income	Egypt, Arab Rep.	13,0	22,5	7,3%	0,9%
	Lower middle income	Morocco	9,1	13,0	5,2%	1,8%
	Lower middle income	Tunisia	3,4	4,4	2,9%	0,6%
	Low income	Yemen, Rep.	3,0	4,6	6,2%	-8,8%
Sub-Saharan Africa	Upper middle income	Botswana	0,5	1,0	9,6%	2,6%
	Upper middle income	Mauritius	0,4	0,8	8,1%	3,6%
	Upper middle income	South Africa	17,0	21,7	3,5%	0,1%
	Lower middle income	Angola	1,4	1,9	4,9%	-0,7%
	Lower middle income	Cameroon	1,1	1,4	4,3%	2,1%
	Lower middle income	Côte d'Ivoire	1,8	2,4	3,8%	4,3%
	Lower middle income	Ghana	1,4	2,2	6,1%	2,8%
	Lower middle income	Kenya	2,0	3,6	8,8%	2,8%
	Lower middle income	Nigeria	11,8	16,0	4,5%	0,8%
	Lower middle income	Sudan	0,2	0,3	2,9%	3,1%
	Lower middle income	Zambia	1,0	1,4	4,4%	1,2%
	Low income	Benin	0,8	1,2	4,5%	1,1%
	Low income	Burkina Faso	0,7	1,5	11,2%	2,4%
	Low income	Burundi	0,1	0,1	2,3%	-1,1%
	Low income	Congo, Dem. Rep.	4,9	6,4	3,7%	1,5%
	Low income	Ethiopia	0,3	0,4	2,8%	7,1%
	Low income	Liberia	0,1	0,1	5,2%	1,1%
	Low income	Madagascar	0,7	1,1	6,2%	0,2%
	Low income	Malawi	0,3	0,3	1,0%	0,3%
	Low income	Mali	0,7	1,1	6,9%	1,1%
	Low income	Mozambique	1,0	1,5	5,4%	2,8%
	Low income	Niger	14,2	19,3	4,5%	0,9%
	Low income	Senegal	1,7	3,2	7,8%	1,4%
	Low income	Tanzania	0,9	1,3	4,8%	3,2%
	Low income	Togo	0,5	0,7	5,6%	3,1%
	Low income	Zimbabwe	2,7	3,8	5,0%	3,6%
South Asia	Lower middle income	Bangladesh	1,4	1,8	3,1%	5,5%
	Lower middle income	India	61,0	124,9	10,6%	5,6%
	Lower middle income	Pakistan	12,6	21,1	7,5%	2,3%
	Lower middle income	Sri Lanka	1,6	3,7	11,4%	4,3%
	Low income	Afghanistan	5,5	9,3	5,4%	0,9%

Appendix Table 2. Middle class size, using cars, Milanovic-Yitzhaki method, and Kharas method[8] :

		Average household size	Passenger cars (2017[9], Millions)	Middle class using cars (Millions)	Middle Class based on Milanovic-Yitzhaki[10] Method (Millions)	Middle Class based on Homi Kharas[11] Method (Millions)
	China	3,4	181,5	617,0	1109,1	970,5
High Middle Income	Brazil	3,3	37,1	122,5	125,5	146,5
	Russia	2,6	46,0	119,7	101,15	115,6
	Mexico	3,7	30,0	110,8	77,5	103,3
	Turkey	4,1	12,2	50,1	48,5	64,6
	Thailand	3,7	9,2	33,9	55,2	48,3
	South Africa	3,2	6,8	21,7	22,7	22,7
	Colombia	3,5	3,2	11,2	29,5	29,5
	Peru	3,8	1,7	6,4	19,3	22,5
	Malaysia	4,6	13,5	62,2	19	25,3
	Romania	2,7	5,7	15,4	13,7	15,7
	Kazakhstan	3,5	3,6	12,5	14,7	14,7
	Costa Rica	3,5	0,9	3,3	2,9	3,9
	Mauritius	3,5	0,2	0,8	0,88	1,13
	India	4,6	27,1	124,9	401,7	401,7
	Indonesia	4	15,4	61,7	158,4	132
	Nigeria	4,9	3,3	16	76,3	76,3

8. The data used in this calculator was provided by the Brookings Institution from its analysis of the global middle class, covering 97 percent of the world's population. All data is for 2016. Brookings uses a per-person, per-day income threshold of between 11 and 110 U.S. dollars to determine the global middle class. The number of people in the global middle class in this calculator differs from the number in the Brookings report because of additional adjustments to the data made in the report.

In three countries (China, India and Indonesia), the rural and urban regions of those countries are listed and calculated separately, to more accurately capture the disparities between rural and urban wealth in those nations.

Only income deciles are available at the country level, so user-entered income is rounded up or down to the nearest decile mean.

Income is also adjusted for relative purchasing power in the country selected using the World Bank's most recently available PPP conversion factors.

9. The available data on passenger cars ended at 2015, data for 2016 has been extrapolated using 2015/2014 variation.

10. The part of population with daily incomes between 10$ and 50$ was determinated using The Washington post middle-class calculator (see Appendix 1).

11. The part of population with daily incomes between 11$ and 110$ was determinated using The Washington post middle-class calculator.

Low Middle Income	Philippines	4,7	3,8	17,9	63	63
	Egypt	4,1	5,5	22,5	58,5	58,5
	Tanzania	4,9	0,3	1,3	5,7	5,7
	Ukraine	2,5	7,5	18,8	9	4,5
	Morocco	4,6	2,8	13,0	13,5	13,5
	Ghana	3,5	2,2	7,8	2,9	2,9
	Tunisia	4	1,1	4,4	8	8
	Bolivia	3,5	0,3	1,1	4,4	3,3
	Honduras	4,5	0,04	0,2	3,7	3,7
	El Salvador	4,1	0,1	0,5	5,1	5,1
Low Income	Ethiopia	4,6	0,1	0,4	10,5	10,5
	Uganda	4,5	0,2	0,8	4,2	4,2
	Madagascar	4,9	0,2	1,1	2,5	2,5
	Burkina Faso	5,9	0,2	1,5	1,9	1,9
	Mali	4,6	0,2	1,8	1,8	10,6
	Benin	5	0,2	1,2	1,1	1,1
	Togo	4,6	0,2	0,7	0,7	0,7
	Liberia	4,9	0,0	0,1	0,4	0,4

Source: International Organization of Motor Vehicle Manufacturers Data and authors' calculations.

Appendix Table 3. Middle class size, using cars, as part of the global population

		Middle Class size using cars in circulation	Middle Class size using Milanovic-Yitzhaki Method	Middle Class size using Homi Kharas Method	Total population (in Millions)
High Middle Income	China	44,5%	80%	70%	1386,4
	Brazil	58,5%	60%	70%	209,29
	Russia	82,8%	70%	80%	144,5
	Mexico	85,8%	60%	80%	129,16
	Turkey	62%	60%	80%	80,75
	Thailand	49,1%	80%	70%	69,04
	South Africa	38,3%	40%	40%	56,72
	Colombia	22,8%	60%	60%	49,07
	Peru	19,9%	60%	70%	32,17
	Malaysia	196,7%	60%	80%	31,62
	Romania	78,6%	70%	80%	19,58
	Kazakhstan	69,3%	80%	80%	18,4
	Costa Rica	67,3%	60%	80%	4,91
	Mauritius	63,3%	70%	90%	1,26

Low Middle In	India	9,3%	30%	30%	1339,18
	Indonesia	23,4%	45%	51%	263,99
	Nigeria	8,4%	40%	40%	190,89
	Philippines	17,1%	60%	60%	104,92
	Egypt	23,1%	60%	60%	97,55
	Tanzania	2,3%	10%	10%	57,31
	Ukraine	41,9%	20%	10%	44,83
	Morocco	38,4%	40%	40%	33,84
	Ghana	27,1%	10%	10%	28,83
	Tunisia	38,2%	70%	70%	11,53
	Bolivia	10%	40%	30%	11,05
	Honduras	2,2%	40%	40%	9,27
	El Salvador	7,8%	80%	80%	80%
Low Income	Ethiopia	0,4%	10%	10%	104,96
	Uganda	1,9%	10%	10%	42,86
	Madagascar	4,3%	10%	10%	25,57
	Burkina Faso	7,8%	10%	10%	19,19
	Mali	4,9%	10%	10%	18,54
	Benin	10,7%	10%	10%	11,18
	Togo	9%	10%	10%	7,8
	Liberia	2,1%	10%	10%	4,73