

THE ASSET DEBATES: HOW (NOT) TO USE ASSET INDICES TO MEASURE WELL BEING AND THE MIDDLE CLASS IN AFRICA

DEBORAH JOHNSTON AND ALEXANDRE ABREU*

ABSTRACT

Asset indices are ubiquitous in the debate about wellbeing in African countries, not least because of the paucity of traditional household income and expenditure data. Indeed, asset data have fuelled the creation of a new, more optimistic picture of wellbeing in Africa, where both income and the middle class are growing fast. This is the first review of the use of asset indices for African countries. Readers are guided through key debates over the use of asset data, including the use of assets to measure trends over time as well as socio-economic status and class. We argue that the theoretical and empirical advantages of the asset index over traditional welfare measures are clear, but that caution is needed. Most asset indices show significant improvements in private wealth and social welfare in African countries due to increases in the number of household assets and improvements in health and education. However, we argue that simplistic conclusions in the economics literature about the growth of income or of a ‘middle class’ using asset indices are poorly founded.

THE 2012/13 DEBATE ABOUT AFRICA’S ‘GROWTH MIRACLE’ between Alwyn Young and Kenneth Harttgen and colleagues has thrust the asset index into the limelight.¹ Before that, asset indices had been slowly creeping into the development debate for African countries since the 1990s, used as proxies for various kinds of wellbeing: household income, wealth, socio-economic status and welfare. The reasons for this popularity include a number of apparent advantages over

* dj3@soas.ac.uk, Reader in Development Economics, SOAS University of London. alexjabreu@gmail.com,

¹ Alwyn Young, *The African growth miracle*, (NBER Working Paper no. 18490, National Bureau for Economic Research, 2012); Kenneth Harttgen, Stephan Klasen, and Sebastian Vollmer, ‘An African growth miracle? Or: what do asset indices tell us about trends in economic performance?’, *Review of Income and Wealth*, 59, S1 (2013) pp. S37-S61, doi: 10.1111/roiw.12016.

more traditional money metrics and the fact that large data sets on asset ownership have been available for some time for numerous African countries, while the income and expenditure data remain poor. The poor quality of data in African countries was highlighted by Morten Jerven, and his book led to an acrimonious debate about the extent to which the quality of Gross Domestic Product (GDP) data could be trusted.²

Of course there are many forms of economic data. GDP data arises from the system of national accounts that aims to measure production within a country's borders and with some additional information is also used to determine Gross National Product (GNP), which is a country's income. GDP or GNP data come from official sources (usually the central bank or the government statistical office), but may be adjusted by international agencies such as the World Bank or academics. Data on household income usually comes from household economic surveys carried out by the government statistical office, although as Jerven notes it has been common for these to be carried out by consultants in some countries. In contrast, asset data mainly comes from the module on assets and housing characteristics in the USAID-sponsored Demographic and Health Surveys (DHS), implemented since the 1980s.³ The DHS surveys, as Jerven observes in his *African Affairs* blog post (see footnote 4), have become widely used due to their frequency and quality.

In the African context, asset indices have often suggested trends in wellbeing quite distinct from (and more optimistic than) those produced by other indicators. While optimism about Africa's development record may not seem so odd now, David Sahn and David Stifel's use of asset data to show improving welfare in 10 out of 11 African countries from the late 1980s to mid-1990s contrasted strongly with prevailing views of deepening poverty.⁴ Young's recent work returns to the assertive tone of Sahn and Stifel, claiming a strong advantage for the asset index over more traditional measures.⁵ Strikingly, Young estimates that real household consumption in sub-Saharan Africa grew between 3.4 and 3.7 percent per year over the period 1990 to 2006, which is three and a half to four times the 0.9 to 1.1 percent reported in international data sources.⁶ He argues that his asset-based measure is preferable to the official growth rate data and that it

² Morten Jerven, *Poor numbers: How we are misled by African development statistics and what to do about it*. (Cornell University Press, Ithaca and London, 2013). On the debate, see the African arguments blog, which details some of the controversy in 2013, <http://africanarguments.org/2013/09/26/poor-numbers-the-politics-of-improving-gdp-statistics-in-africa-by-morten-jerven/> (accessed 17 June 2015).

³ As of 2013, there were more than 300 DHS surveys in over 90 countries (<http://www.measuredhs.com/> accessed 13/4/13).

⁴ David Sahn, and David Stifel, 'Poverty comparisons over time and across countries in Africa', (Cornell University, Cornell Food and Nutrition Policy Programme Working Paper 95, 2000) <www.he.cornell.edu/cfnpp>.

⁵ Young, 'The African growth miracle'.

⁶ *Ibid.*, p. 698

reveals a growth miracle in Africa starting in the 1990s, one that went unnoticed in the traditional data.

At the same time, asset data has fed into debates about the growth of an African middle-class. The complex nature of class relations in African countries has been debated by many academics, investigating the extent to which colonial and post-colonial states have either compressed or accelerated class differentiation.⁷ For example, Bridget O’Laughlin shows that the nature of the academic and political debate about class relations in Mozambique was oversimplified, assuming a simple dualism that did not exist at Mozambican independence.⁸ Here though, O’Laughlin uses a measure of class that relates to the varied access to resources and position in the labour market. Asset measures of class, in contrast, usually rest on a picture of social differentiation in terms of wealth, with the rise of a middle group (between the rural poor and an elite, variously defined) that is purchasing and consuming in ways quite different to the past. As such, these asset-based measures of class relate to the issue of changing consumption in African countries, issues that have concerned a range of authors in terms of understanding changing cultures and how this is related to integration in globalized markets.⁹

As such then, the story of a growing middle-class that emerges from some of these asset-based investigations glosses over concerns about changing social relationships, but does illuminate some changes in the nature of reproduction and consumption. The story about a large and growing middle class would suggest that concerns about the unequal nature of growth in African countries might be misplaced. Indeed, there is a political dimension to the use of asset data. Not only is asset data more likely to suggest positive welfare trends, and thus useful for those who want to emphasize the rapid and indeed inclusive nature of African growth patterns, but it is also cheaper to collect and can be added on easily to a range of survey types, as discussed below. This contrasts sharply with the difficulty and expense of traditional household income and expenditure surveys, which are now infrequently carried out in the vast majority of countries in sub-Saharan Africa.¹⁰

⁷ For a discussion of the role of class analysis in African studies and development studies, see Deborah Fahy Bryceson, ‘Discovery and denial: Social science theory and interdisciplinarity in African Studies’, *African Affairs*, 111/443, (2012), 281-302.

⁸ Bridget O’Laughlin, ‘Class and the customary: The ambiguous legacy of the *Indigento* in Mozambique’, *African Affairs*, 99 (2000), 5-42,

⁹ For example, Caryn Abrahams, ‘Transforming the region: Supermarkets and the local food economy’, *African Affairs*, 109/434, (2009), 115-34.

¹⁰ Johnston discusses the decline in ‘traditional’ surveys (such as household income/expenditure surveys and labour force surveys) and the rise of newer, lower cost and fashionable surveys in the context of Southern Africa. See Deborah Johnston, ‘Disguised employment? Labour market surveys, migration and rural employment in Southern Africa.’ In Carlos Oya and Nicola Pontara (eds.) *Rural wage employment in developing countries: Theory, evidence, and policy* (Oxford: Routledge, 2015), pp. 128-143.

However, not everyone is a fan. Harttgen and colleagues argue that it is inappropriate to use asset indices to chart trends over time due to several methodological biases.¹¹ Equally sceptically, Laura Howe, James Hargreaves and Sharon Huttly argue that the asset index is poor at distinguishing between welfare levels in many settings.¹² Furthermore, Howe and colleagues conclude that ‘the wealth index is at most a poor proxy for consumption expenditure’.¹³ While these critical articles focus on different weaknesses in the construction of the asset index, they share a scepticism about what the asset index actually measures.

This article sifts through the evidence, suggesting asset indices should be used carefully. Household income, national income, household wealth, socio-economic status and welfare are vastly different concepts, but often confused in practice when an index is constructed. To complicate matters a range of other indices have been developed using asset data and adding other kinds of wealth or welfare indicators. Two examples are Foster-Alkire multidimensional poverty index used by UNDP and Afrobarometer’s Poverty Scale.¹⁴

Trends in household income may be different to those of national income, due to differences in concept (a significant proportion of national income may be earned by corporations or governments, rather than households) and differences in statistical methods (household income is usually measured by household surveys, while national income is measured by looking at broad financial flows supplemented by sample surveys of output and prices). At the same time, household wealth is different to household income, as income is only the amount received in a specific period (for example, measured over a week and then averaged to a daily amount), while wealth is the stock of various kinds of assets built up over a longer period. Welfare is a much broader term, reflecting a wider sense of multi-dimensional wellbeing, both economic and social. Importantly welfare may move in a different direction to either income or wealth. For example, where schooling and health costs are rising quickly, people’s access to health or education services may deteriorate even if their income and wealth seem constant. In this article, we will use the term wellbeing as an umbrella under which we look at specific attempts to measure trends in household income, national income and socio-economic status.

¹¹ Harttgen et al., ‘An African growth miracle’.

¹² Laura Howe, James Hargreaves, and Sharon Huttly, ‘Issues in the construction of wealth indices for the measurement of socio-economic position in low-income countries’, *Emerging Themes in Epidemiology*, 5, 3 (2008) doi:10.1186/1742-7622-5-3.

¹³ Laura Howe, James Hargreaves, Sabine Gabrysch, and Sharon Huttly, ‘Is the wealth index a proxy for consumption expenditure? A systematic review’, *Journal of Epidemiology and Community Health*, 63, 11 (2009), pp. 872, doi:10.1136/jech.2009.088021

¹⁴ For the Multiple Poverty Index, see Jeni Klugman, *Human Development Report 2010. The real wealth of nations: pathways to human development*, (UNDP, 2010). For the Lived Poverty Index, see Robert Mattes, *The material and political bases of lived poverty in Africa: Insights from the Afrobarometer*, (Springer, Netherlands, 2008).

To illustrate the issues, we provide a summary of the key uses of the asset index for African countries, and against the stormy backdrop of debates and disagreements, we discuss theoretical foundations and empirical soundness of these indices. Specifically, we argue that asset indices can tell us a great deal about trends in household wealth and are particularly good at generating a wealth ranking. However, researchers should be clear about what it is that they are looking at. Caution is needed if asset data is intended to act as a proxy for changes in welfare, household or national income, as assets do not map neatly onto income or wellbeing. Indeed, asset indices are best thought of as a proxy for changes in household wealth. Similarly the index can give us only fleeting glimpses of class differentiation. This is because assets give us limited insight into the relations of production that structure the nature of the complex class systems in African countries. To be used convincingly, consideration of the other factors that also determine asset ownership is essential.

Given that all measures of wellbeing are approximations, which is the most reliable? Our conclusions are that asset indices are a better proxy for changing welfare in African countries than income or expenditure measures, but that their aims and assumptions should be made clear, they should be used over limited geographic areas and timescales, and their conclusions triangulated. We begin by setting out what asset indices are, how they are compiled, and what their theoretical underpinnings are. Next the article provides an overview of the use of asset indices in Africa by summarizing the two key debates over their results, and then assesses the strengths and weakness of the asset index approach.

Explaining the fashion for asset indices in Africa

All asset indices use data on a household's ownership of a range of assets, but will differ in the range of assets considered and the way in which these variables are then combined to construct the composite index. The DHS list has become a common standard for the list of assets to be included, focusing on three different kinds of ownership: consumer durables (such as watch, radio, television, motorcycle, and car); dwelling characteristics (such as the type of walls, roof and floor); and access to services (such as the type of water source, and access to electricity).¹⁵ However, other

¹⁵ Laura Howe, Bruna Galobardes, Alicia Matijasevich, David Gordon, Deborah Johnston, Obinna Onwujekwe, Rita Patel, Elizabeth A. Webb, Debbie A. Lawlor, and James R. Hargreaves, 'Measuring socio-economic position for epidemiological studies in low-and middle-income countries: A methods of measurement in epidemiology paper' *International Journal Of Epidemiology* (2012), pp. 1-16, March 21, 2012 doi:10.1093/ije/dys037.

studies use different indicators such as years of schooling of the head of the household,¹⁶ living space per person,¹⁷ or the number of cattle heads owned by the household.¹⁸

To produce a composite index, it is standard practice to assign weights to each of the variables based on the statistical analysis of patterns in the data— whether through factor analysis, principal components analysis or multiple correspondence analysis. These are similar techniques that identify underlying structures in data sets (called *factors* in factor analysis and *components* in principal components analysis and multiple correspondence analysis).¹⁹ To compute the weights, a measure of the correlation between these factors/components and the original variables is calculated by software packages. The result is that the weights used to calculate most indices are data-driven instead of theoretically or arbitrarily assigned. There is an underlying theoretical justification for this: the idea that what we are really trying to measure is not asset ownership *per se*, but rather the main unobserved variable *underlying* the pattern of asset ownership across the sample of households.

Thus, if we believe that economic wealth drives the purchase of assets, we would expect that the underlying driver of patterns in the asset data is wealth, and that our statistically-driven index is therefore a true reflection of the wealth-ranking of various households. This is the crux of the method, reflecting the assumption that asset ownership might be causally determined by many variables (for example wealth, availability, cultural norms, individual preferences), but it is the *main* underlying variable (*assumed* to be wealth) that accounts for the largest share of the patterns in the data—and that this is what is reflected in our computed index. To give an example, it may be common practice for successful people in a certain area to purchase an electricity generator. Thus, we would imagine that the variable that captures generator ownership would be important in an index measuring wealth in that region, even if there was other ‘noise’ in the data arising from differences in the distance to the outlets where generators are purchased, differences in the stability of public electricity supply, and differences in preference between men and women, and between senior and junior household members.

¹⁶ Sahn and Stifel, ‘Poverty comparisons over time’; Hope Michelson, Maria Muñiz and Kyle DeRosa, ‘Measuring socio-economic status in the millennium villages: The role of asset index choice’, *Journal of Development Studies* 49, 7 (2013) pp. 917-935, doi: 10.1080/00220388.2013.785525

¹⁷ Martin Wall and Deborah Johnston, ‘Counting heads or counting televisions: Can asset-based measures of welfare assist policy-makers in Russia?’, *Journal of Human Development* 9, 1 (2008) pp. 131-147

¹⁸ Alexandre Abreu, *Migration in development in contemporary Guinea-Bissau: A political economy approach* (School of Oriental and African Studies, University of London, Unpublished PhD Thesis, 2012).

¹⁹ See Howe et al., ‘Measuring socio-economic position’ for a discussion of these various techniques, their uses and their implications. The results using factor analysis, principal components analysis and multiple correspondence analysis are usually similar. See Hope Michelson, Maria Muñiz and Kyle DeRosa (2013) for an example where resulting indices behave in similar manners. Michelson, Hope, Maria Muñiz, and Kyle DeRosa, ‘Measuring socio-economic status in the millennium villages: the role of asset index choice’, *Journal of Development Studies* 49, 7 (2013), pp. 917-935.

Hence the asset index effectively expresses each household's score in terms of the main variable driving asset ownership, and we assume that this underlying variable is in some sense wellbeing. Importantly, assets are not measured because they are seen as *directly* increasing households' wellbeing, but rather because patterns of acquisition of assets reflect underlying wellbeing. This is very different to the approach that includes assets because of their direct value, and it has important implications for the selection of the assets to be included in the construction of the index, on which more below. In asset index construction, assets do not contribute to household wealth, but rather the patterns of asset ownership across the sample allow us to place households accurately along a wealth spectrum.

There are two reasons for assuming that assets are a good reflection of the long-term wealth of a household. First, assets are expensive, and households need to save to buy them. Second, assets tend to be long-lived, and so reflect the past wealth of the household. The ability to identify long-run underlying wealth gives the asset index stronger theoretical justification compared to measures of household income or consumption, which are a 'snapshot' at a point in time and so are affected by issues such as seasonality and price volatility.²⁰ Indeed, assets are a 'stock' variable (a measure of quantity at a point in time), while income and expenditure are flow variables (an amount received or spent over a certain period of time). In this sense, we may prefer to use the asset index as a measure of long-run economic welfare.

Alongside the theoretical arguments, the asset index may have practical advantages in the field. Collecting data on asset ownership is assumed to be quicker and less susceptible to voluntary and involuntary bias than collecting household income or consumption data.²¹ However, this assumption has not been tested directly. On the one hand, we have the work of Obinna Onwujekwe and colleagues that tested the reliability of asset scoring by repeating interviews with the same or different interviewers and argued that the answers to asset questions were moderately robust.²² On the other hand, we have the well-established problems with data on household consumption or income in African countries. These problems are divided between those that are common to income and consumption questions in any setting (intentional or unintended mis-reporting, and failure to include the very richest and poorest households) to those that are specific to African settings (lack of financial resources for statistical department to adequately run surveys, volatility of data due to seasonal and casual nature of economic activity, and the problems of

²⁰ Howe et al., 'Measuring socio-economic position'; Wall and Johnston, 'Counting heads or counting televisions'.

²¹ Howe et al., 'Measuring socio-economic position'.

²² Obinna Onwujekwe, Kara Hanson, and Julia Fox-Rushby, 'Some indicators of socio-economic status may not be reliable and use of indices with these data could worsen equity', *Health Economics* 15, 6, (2012), pp. 639-644.

valuing home production).²³ Data on household income or consumption is collected infrequently in most African countries, and measurement methods may change between surveys, leading to problems in comparability.²⁴ At the same time, the data on household consumption estimated from the national accounts exercise is perceived as low quality.²⁵

So there are significantly more discussions about the problems in household income and consumption estimates than there are for asset estimates. Perhaps the most persuasive evidence in favour of the asset index comes from comparisons with other indicators of wellbeing. These indicators include measures of health and education outcomes and are often poorly associated with household income or expenditure data, but more closely correlate with asset data.²⁶ Interestingly, asset ownership itself usually correlates poorly with consumption data,²⁷ reflecting the different degrees of measurement error in each and the fact that they measure somewhat different qualities (not least because one is a stock and the other a flow variable).

Thus, despite potential weaknesses, the asset index appears less prone to error than traditional economic data and more closely associated with other indicators of wellbeing. With its wide availability, unsurprisingly it has become an important means to chart wellbeing for African countries. Asset indices have had two main uses in African studies. The first is to describe inequalities among households, which is discussed next, and the second is to track changes in wellbeing. In each area of inquiry, studies using asset data have made controversial conclusions and have faced some criticism of their validity, illuminating fundamental issues regarding the appropriate use of asset indices.

What do asset indices tell us about class and socio-economic status

Asset data is commonly used to investigate the extent of inequality within African countries, paired with data on welfare outcomes such as malaria, child undernutrition, child mortality, and educational attainment.²⁸ These discussions have been vital to assess key policy issues such as whether government health and education services reach the poorest. However, many authors

²³ See Howe et al., 'Measuring socio-economic position' for a general review. See Abdel Gadir Ali, Germano Mwabu and Rachel Gesami, *Poverty reduction in Africa: Challenge and policy options*, African Economic Research Consortium, Special Paper No.36 (Nairobi, AERC, 2002); Lucia Hanmer, Graham Pyatt and Howard White, 'Poverty in Sub-Saharan Africa. What can we learn from the World Bank's poverty assessments?', *Development and Change* 30, 4 (1999), pp. 795-823; Sahn and Stifel, 'Poverty comparisons over time' for a discussion of the problems with African poverty data.

²⁴ Shantayanan Deverajan, 'Africa's statistical tragedy', *Review of Income and Wealth* 59, S1 (2013), pp.S9-S15.

²⁵ Jerven, *Poor numbers*; Young, 'The African growth miracle'.

²⁶ Deon Filmer and Kinnon Scott, 'Assessing asset indices', *Demography* 49, 1 (2012), pp. 359-392.

²⁷ Howe et al., 'Is the wealth index a proxy'.

²⁸ Filmer and Scott, 'Assessing asset indices'.

have argued that the standard list of assets is poor at making social distinctions, especially in rural areas. They argue that the DHS list of assets, so often copied by other researchers, is dominated by assets owned predominantly by urban households.²⁹ As a consequence, the resulting asset index will itself be dominated by the differences between urban and rural households, and will be inadequate at distinguishing between rural households. This phenomena, given the visually-evocative moniker of ‘asset clumping’ by Howe and colleagues, occurs when graphs of DHS-style asset indices record very similar asset scores in poor rural areas, or in urban areas of middle income countries.³⁰

Nevertheless, asset data has also been used to chart the creation of an African middle class. For example, Abebe Shimeles and Mthuli Ncube use DHS asset data rather than household income and consumption data, which the authors see as replete with error, to create several measures of middle-class status, including an absolute index where a household is classified as middle class if it owns a particular asset (see Table 1 below).³¹ Based on these measures, Shimeles and Ncube find a rapid increase in the size of the middle class for almost all African countries, but they suggest this class accounts for about 15 percent of the African population.³²

Table 1: Absolute Indicators of Middle-Classedness

Asset	Indicator
Source of drinking water	Dummy=1 if Piped, 0 otherwise
Type of toilet facility	Dummy=1 if flush, 0 otherwise
Access to electricity	Dummy=1 if yes, 0 otherwise
Radio ownership	Dummy=1 if yes, 0 otherwise
Television ownership	Dummy=1 if yes, 0 otherwise
Refrigerator	Dummy=1 if yes, 0 otherwise
Bicycle	Dummy=1 if yes, 0 otherwise
Motorcycle/scooter	Dummy=1 if yes, 0 otherwise
Floor material	Dummy=1 if (Parquet, ceramic, carpet) , 0 otherwise
Car/truck	Dummy=1 if yes, 0 otherwise
Telephone	Dummy=1 if yes, 0 otherwise

Source: Shimeles and Ncube, ‘The making of the middle class in Africa’, Appendix Table 2.

The discussion of what asset indices have to tell us about class and socio-economic status has to start with a review of what the asset index actually measures. Earlier, we showed that the approach is based on the assumption that the main driver of patterns in the asset data is ‘wealth’. At the core of every asset index exercise lies an empirically-derived *model* of what the poverty-

²⁹ See for example Booyesen et al., ‘Using an asset index’, and Howe et al., ‘Is the wealth index a proxy’, p. 874.

³⁰ Howe et al., ‘Is the wealth index a proxy’.

³¹ Abebe Shimeles and Mthuli Ncube, ‘The making of the middle class in Africa: Evidence from DHS data’, *Journal of Development Studies* (2015), 51:2, 178-193, DOI:10.1080/00220388.2014.968137

³² *Ibid.*

wealth spectrum looks like in terms of the pattern of asset ownership. For example, while many households own radios, only the better-off own bicycles and only the very wealthiest own cars. How the various assets relate to long-run wealth is not imposed *a priori*, but rather derived empirically from the data set based on how each asset varies and co-varies with the other assets. Provided the main underlying variable is ‘wealth’, and that the assets have been adequately selected to discriminate between households in terms of that underlying variable, then the exercise will detect that few households own cars and these households also tend to own all the other assets so car ownership will exhibit a strong and positive component/factor loading. Hence, car ownership will have a large positive weight in the construction of the final index.

However, the pattern is seldom as neat as the example above. A good illustration is the case of goods that are inferior for the data set as a whole (meaning demand decreases when household income/wealth increases) but normal within one or more sub-samples (meaning demand increases when household income/wealth increases). A pertinent example comes from an asset index computed for two villages in Guinea-Bissau where portable gas stoves were found to be highly valued in one of the villages but not in the other (for locally-specific cultural reasons having to do with the value assigned to added privacy compared to cooking outdoors), but the village where they were highly valued was also much poorer overall, so in the overall sample the gas stove appeared as an inferior good, whereas it is a normal good in the poorer village.³³

This effect illustrates two more general points. First, asset ownership is often very strongly influenced by factors other than household wealth. Second, there may be quite different consumption norms, or ‘idioms of wealth’, among even quite proximate geographical settings. This is most obvious across the rural-urban divide, but as the example from Guinea-Bissau above illustrates, it may also apply within any rural or urban sample. While the ‘clumping critiques’ above focus on the rural-urban dichotomy, the issue of clumping is reflective of more complex patterns in the economic and social implications of possessing certain assets, which may even differ within rural or urban areas.

In a real-life setting, the actual asset ownership will reflect many other underlying factors: prices, commercial availability, consumption norms, productive structures (for those assets that serve an economic purpose), individual preferences, and access to credit, to name just a few. In addition, we must also consider factors that make themselves manifest at a national or regional

³³ Abreu, ‘Migration in development in contemporary Guinea-Bissau’. In this example, portable gas stoves were typically owned by the wealthier households in the poorer village, but not by *any* households in the wealthier village. The wealthier households of the poorer village were poorer than the average of the sample as a whole and so ownership of a portable gas stove was statistically associated with having relatively *less* assets than average. As a result this particular asset had a negative coefficient, meaning that it contributed negatively to any household’s asset score. This would have been very misleading at the level of the poorer village, where wealthier households were more likely to own the gas stoves. In a case like this, the asset in question should not be included in the asset index.

level, through public or communal provision, or provision by third parties. The latter applies to services that might be provided by government or NGOs, such as access to electricity or piped water; dwelling characteristics, where for example, public programmes improve housing; and consumer durables, where, for example, mobile phones are distributed or heavily subsidized by development projects. The more each of these additional intervening variables exerts an impact upon the pattern of asset ownership, the more actual poverty-wealth patterns will diverge from a simple underlying model and the less valid the asset index will be as a proxy for wealth.

This problem may be mitigated in various ways. First, assets whose ‘ownership’ can be immediately identified as depending primarily on factors other than household wealth should be excluded. Second, assets for which there is strong evidence of different social meanings (such as normal versus inferior goods) among different sub-samples should also be eliminated. Triangulation with qualitative data will be important. In this we would agree with the conclusion of Howe and colleagues that for an asset index to measure either private wealth or social status, the assets chosen must be discriminating enough to pick up local specificities and must do more than simply replicate the standard DHS list.³⁴ Finally, we would argue that the resulting index is best used over relatively circumscribed areas, where all of the non-wealth ‘noise’ factors are likely to have less of an effect.

Used carefully, asset indices might be able to tell us about relative wealth and socio-economic differentiation, but it is less clear if they could be used to measure class position. With class as a relational concept, pure asset indices seem unable to do more than give us a numerical ordering of the wealth of different households. However, Janet Bujra’s critique of asset data appears of great relevance here. She argues that asset index data exists in terms of measurement of assets rather than the measurements of unequal relationship between a particular individual and other groups in society.³⁵ Rather than an absolute value of wealth, what is crucial to explain class is social inequality, and this is true of both Marxist and Weberian notions of class. Asset indices must then be complemented by other kinds of measurement. If we use a classic political economy perspective, we might follow Carlos Oya’s approach of including measures to capture differences in the ownership of capital and dependence on wage labour.³⁶

These conclusions would certainly lead us to be wary of attempts to identify changing class patterns from large multi-country exercises that collect simple indexical data, such as that by

³⁴ Howe et al., ‘Measuring socio-economic position’.

³⁵ Janet Bujra, ‘Class relations: AIDS and socioeconomic privilege in Africa’, *Review of African Political Economy* 33, 107 (2006), pp. 113-29, p.117.

³⁶ Carlos Oya, ‘The empirical investigation of rural class formation: Methodological issues in a study of large- and middle-scale farmers’, *Historical Materialism* 12, 4 (2004), pp. 289–326.

Shimeles and Ncube.³⁷ However, while it is hard to read-off class position from this asset data, what Shimeles and Ncube's study does show are complex trends in asset ownership over time. There has been an increase in the number of households with moderate levels of asset acquisition over time, but Shimeles and Ncube note that there remains a group at the bottom of the original asset distribution that has seen little change.

Asset indices and trends in poverty and economic growth

The first attempt at a large-scale asset-based welfare assessment for Africa was by Sahn and Stifel.³⁸ Their paper, which was hugely influential in promoting the asset index methodology, produces optimistic trends in poverty using asset indices trends for 11 sub-Saharan African countries: Cameroon, Ghana, Kenya, Madagascar, Mali, Senegal, Tanzania, Togo, Uganda, Zambia and Zimbabwe.³⁹ The index was comprised of data on ownership of radio, TV, bicycle and motorized transport; improved water source and toilet; and floor quality.⁴⁰ To this was added a variable capturing the education of the household head. Two relative 'poverty lines' were drawn, set at the bottom 25 percent and 40 percent of the initial distribution.⁴¹ Using the lowest 'poverty' line, only Zimbabwe did not experience statistically significant reductions in poverty,⁴² and the authors argued that their results provided cause for optimism about the impact of policy in Africa.⁴³ While optimism about Africa's development record may not seem so odd now, at the time this was decidedly contrary to the prevailing view. Shaohua Chen and Martin Ravallion calculated, using a \$1 a day poverty line and household consumption data, that poverty in Sub-

³⁷ Shimeles and Ncube, 'The making of the middle class in Africa'.

³⁸ Sahn and Stifel, 'Poverty comparisons over time'.

³⁹ The DHS data periods varied. The data for Ghana, Mali, Uganda and Zimbabwe covered the late 80s to the early 90s, while for Cameroon, Madagascar, Tanzania and Zambia, they covered the early 1990s to the mid-1990s. Data for Kenya, Senegal and Togo ran from the late 1980s to late 1990s. Sahn and Stifel, 'Poverty comparisons over time', p. 2130.

⁴⁰ Although some of these are dropped for particular countries as either the data is not available or the variable violates the characteristics necessary for its use in the index. Ibid, p. 2128.

⁴¹ In the studies reported in this section, asset indices are used to *describe* changes in underlying welfare. However, there is a parallel band of work on poverty traps where assets are used to *explain* wealth outcomes directly. Michael Carter and Christopher Barrett, 'The economics of poverty traps and persistent poverty: An asset-based approach', *Journal of Development Studies* 42, 2 (2006), pp. 178-199, doi: 10.1080/00220380500405261). This work increasingly uses asset data in preference to household income and expenditure data. Carter and Barrett argue that using household consumption/income data could be one reason why it has been empirically difficult to find poverty traps in practice. However, even this use of asset data remains problematic. Michelson and colleagues argue that choices about the range of assets and the construction of an index have significant impacts on the outcome of poverty dynamics work. Michelson et al., 'Measuring socio-economic status in the millennium villages'.

⁴² Sahn and Stifel, 'Poverty comparisons over time', p. 2130

⁴³ Ibid. p. 2152

Saharan Africa declined slightly between 1987 and 1999, but then returned to previous levels between 1999 and 2001.⁴⁴

While the Sahn and Stifel method spawned excitement about the potential for the asset index, their optimism about poverty in Africa was not contagious. The extremely short time span of their data may have played a part in undermining the results. Most countries had data for only five years, although three countries (Kenya, Senegal and Togo) had data covering around a decade.⁴⁵ More fundamentally, Sahn and Stifel refrained from contrasting their results with traditional data, arguing that the latter was so poor there was little point to comparison.

The next attempt at assessing large-scale poverty trends using assets explicitly made such comparisons.⁴⁶ Frikkie Booyesen and colleagues focused on countries with a longer track of data (10 to 15 years). While the data was restricted to seven sub-Saharan African countries (Ghana, Kenya, Mali, Senegal, Tanzania, Zambia and Zimbabwe), the longer historical sweep lent their conclusions greater validity.⁴⁷ The index used similar variables to Sahn and Stifel: ownership of radio, TV, fridge and bicycle; improved water source and toilet facilities; and type of flooring. However, the 'poverty line' was set quite differently. Not only did Booyesen et al. set higher lines (at 40 percent and 60 percent of the initial distribution), they also set a third line based on an absolute (rather than relative) poverty standard.⁴⁸ This aimed to reflect the basis of an adequate standard of living, defined as owning a radio and bicycle, having a cement floor, and access to public piped water and a pit latrine.

Booyesen et al. assessed their results against the available consumption data for five countries.⁴⁹ For two countries, they had the same results, for two a more optimistic result and for one a slightly more pessimistic result. Thus, Booyesen et al. found that from the mid-1980s to early 2000s, poverty had fallen in Ghana,⁵⁰ which chimed with consumption expenditure estimates that poverty declined from 50 percent in 1992 to 39.5 percent in 1998.⁵¹ Francis Teal also reports that poverty declined from 53 percent to 45 percent in Ghana between 1988 and 1998.⁵² Booyesen et al.'s results for Zambia also agreed with traditional data sources, with the finding that poverty had

⁴⁴ Shaohua Chen and Martin Ravallion, 'How have the world's poorest fared since the early 1980s?', *World Bank Research Observer*, World Bank Group, 19, 2 (2004), pp. 141-169.

⁴⁵ Sahn and Stifel, 'Poverty comparisons over time', p. 2130.

⁴⁶ Frikkie Booyesen, Servaas van der Berg, Ronelle Burger, Michael von Maltitz, and Gideon du Rand, 'Using an asset index to assess trends in poverty in seven Sub-Saharan African countries', *World Development* 36, 6 (2008), pp. 1113-1130.

⁴⁷ Their results are for Ghana 1988-98; Kenya 1989-98; Mali 1987-2001; Senegal 1986-1997; Tanzania 1992-99; Zambia 1992-2001; and Zimbabwe 1988-99.

⁴⁸ Booyesen et al., 'Using an asset index'.

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*

⁵¹ World Bank, 'World Development Indicators', World Bank, Washington DC, 2005.

⁵² Francis Teal, *Education, incomes, poverty and inequality in Ghana in the 1990s* (CSAE Working paper series No. 2001-21, University of Oxford, Centre for the Study of African Economies, 2001).

risen. Consumption expenditure data for Zambia suggested poverty increased from 69.2 percent to 72.9 percent between 1996 and 1998.⁵³

Results that conflicted with traditional data were found for Zimbabwe and Kenya, with the asset index showing more improvement in poverty than the standard measures. The asset index suggested that regardless of the line used, poverty had fallen in both countries between the mid-1980s and the early 2000s. In Zimbabwe's case, consumption expenditure data suggested poverty increased between 1990 and 1995.⁵⁴ Likewise, in the case of Kenya, traditional measures suggested that it had been rising.⁵⁵ The situation was somewhat different in Tanzania, where expenditure-based estimates suggested that poverty declined between 1991 and 2000, while the asset analysis was unclear.⁵⁶ Using the 40th or 60th centile line, poverty had fallen, but using the absolute line, poverty had risen. While Booysen et al. noted the trends for asset data were different to those for expenditure data, they did not make strong claims to superiority. Rather they argued that asset measures identify only one aspect of (multidimensional) poverty, that they are slow to reflect changes in household income, and that there are some problems of comparability across DHS surveys, making trend analysis difficult.⁵⁷

In contrast, recent work by Young claims a strong advantage for the asset index over more traditional measures.⁵⁸ Young uses assets as a proxy not for household income but for national income, utilizing a complex statistical transformation. The expansion in the number of DHS surveys means that Young is able to use data from 29 African countries.⁵⁹ There are four types of 'asset' data: (1) ownership of durables (radio, television, refrigerator, bicycle, motorcycle, car, telephone); (2) housing conditions (electricity, tap drinking water, flush toilet, constructed floor, sleeping rooms per person); (3) children's nutrition and health (mortality, height, weight, and experience of diarrhoea, fever and cough); and (4) household characteristics (school attendance for children and young adults, female employment, recent birth by woman, women ever married). Using this data, he estimates the relationship of the above measures to educational attainment, and then estimates the relationship of educational attainment to earnings. As a result, Young extrapolates from changes in assets to changes in earnings, and this gives him a set of data on growth of consumption expenditure. He argues that these are preferable to the official growth rate

⁵³ World Bank Development Indicators.

⁵⁴ Ibid.

⁵⁵ World Bank Development Indicators; Republic of Kenya, *Millennium development goals progress report for Kenya* (Government of Kenya, Ministry of Planning and National Development, Nairobi, 2003).

⁵⁶ Teal, 'Education, incomes, poverty and inequality'.

⁵⁷ Booysen et al., 'Using an asset index'.

⁵⁸ Young, 'The African growth miracle', p. 698.

⁵⁹ Only 23 countries have more than one data observation, with the other 6 being used to produce an Africa-wide estimate.

data, which have poor statistical foundations.⁶⁰ For Young, the asset data reveal a growth miracle in Africa starting in the 1990s, one that went unnoticed at the time because of the reliance on faulty growth data.

Certainly Young's approach is complex and involves a heroic number of assumptions in order to determine a reliable relationship between changes in assets and changes in national income. It received some popular attention in newspapers and blogs, but also strong criticism. For example, Harttgen and colleagues argue that asset data will never be appropriate to measure wellbeing trends due to inbuilt biases that will over-estimate wellbeing improvement.⁶¹ While there are several reasons for this bias, three are most important. First, asset index surveys do not measure quality, age and obsolescence, essentially giving the same score to a household with new, working assets and those where assets are older and not working well. Second, preferences for asset purchase increase over time, meaning that increased asset holdings may not reflect increased income but simply a decision to spend a higher percentage of income on assets. Third, there may be a tendency for asset prices to fall, again breaking the link between asset holdings and income. Thus, asset holdings could increase, not because income has increased in real terms overall but because the relative prices of assets have fallen. Given this, Harttgen et al. reject both the asset index as a source of wellbeing data and also Young's conclusions about an African growth miracle.⁶² From this perspective, asset data consistently overstates the size of asset purchase and asset purchases themselves do not faithfully reflect income change.

What can asset measures tell us about trends in African countries

In the previous section, we saw how asset indices have shown an African growth miracle, with rapid national income growth, rapid household income growth and the rise of a middle class. On the other hand, critics argue the asset index simply picks up various biases in the data. In this section, we will evaluate the various debates and explain why we argue that the asset index can be used as a proxy for trends in wealth if appropriately constructed.

The issues of what drives asset data (discussed above for measures of differentiation) are relevant here. For with inter-temporal comparisons, there are changes not only in long-run wealth but also prices, commercial availability, consumption norms, productive structures, individual preferences, public/communal provision and access to credit (among other factors). Unless controlled for, the likelihood of the asset index's component scores being affected by these

⁶⁰ Young, 'The African growth miracle', p. 721-722

⁶¹ Harttgen et al., 'An African growth miracle'.

⁶² Harttgen et al., 'An African growth miracle'.

extraneous factors is significant, rendering the index a poorer proxy for changes in private wealth. In addition, Harttgen et al. argue against Young's use of an asset index to proxy for private national *income* changes, as changes in the stock of wealth do not neatly track changes in the flow of income.⁶³ Whether or not there is an African growth miracle does not seem to be the sort of question that asset data can answer well. This mismatch between stock and flow measures is supplemented by their concern about changes in relative prices and consumer preferences that will lead to a biased measure of national income changes.⁶⁴

For us, the critique by Harttgen et al. is too narrow given the wide range of factors affecting the validity of asset indices, but we agree that changing prices might have some real empirical bite to it. In most African countries, among other changes in the co-determinants of asset ownership, there have been significant changes in the price and accessibility of consumer goods driven by liberalised markets and rising imports from countries like China and India. The entry of lower-cost Chinese imports in particular, is likely to have significantly reduced the real cost of consumer durables and some household building materials.⁶⁵

Young does not account for these changes in his estimation of trends in national income, but instead holds fixed the relationship between assets and income.⁶⁶ Even asset index exercises that are trying to establish trends in household income have the same problem. Rather than an African miracle in terms of either national income or household income growth *per se*, asset index analysis has captured perhaps an important shift in the ability to acquire and keep certain assets, partially driven by a fall in the real price of assets for African households. Given that the asset index cannot help us untangle the various contributing factors, an index should not be used uncritically to measure changes in private national or household income.⁶⁷

However, this is not to negate the value of a well-constructed index that may allow us to investigate relative wealth levels. Some of the indices we have reviewed contain not only asset data but also other indicators that reflect wider concepts of wellbeing. For example, Young's index includes indicators of health, employment and education status, and he explicitly states that he takes 'a broader view of consumption than is typically used in the national accounts, including

⁶³ Harttgen et al. argue that as the DHS surveys do not record age and depreciation of assets, there is a tendency to overestimate the value of assets. If households are reluctant to dispose of older assets and so there is an accumulation of assets with rising average age, this will overestimate the rise in asset values over time.

⁶⁴ Harttgen et al., 'An African growth miracle', p.6.

⁶⁵ Michal Lyons and Alison Brown, 'Has mercantilism reduced urban poverty in SSA? Perception of boom, bust, and the China–Africa trade in Lome and Bamako', *World Development* 38, 5 (2010) pp. 771-782; Ron Sandrey and Hannah Edinger, 'China's manufacturing and industrialization in Africa' (Working Paper Series no. 128, African Development Bank Group, 2011).

⁶⁶ Young, 'The African growth miracle'.

⁶⁷ It should also be remembered that measures in GDP are also subject to problems with base-weighting and recent revisions that doubled Ghana's GDP were the result of updating the 'base'. Morten Jerven and Magnus Ebo Duncan, 'Revising GDP estimates in Sub-Saharan Africa: Lessons from Ghana', *African Statistical Journal* 15, (2012) pp. 12-24.

health outcomes and the use of family time'.⁶⁸ Sahn and Stifel include education of the household head.⁶⁹

Unlike certain other approaches, asset indices do not seek to simply convey a synthetic picture of welfare/deprivation across a range of dimensions. In the standard asset index methodology, the data, not the researcher, establish how ownership of each asset is to be weighed to compute the overall index score. However, when asset indices contain education and health indicators they no longer become simple measures of household wealth, as such indicators are heavily affected by changes in public health and education policy.⁷⁰ The inclusion of non-asset indicators does make the asset index more like a measure of welfare than of wealth, but in such cases the use of factor analysis, principal components analysis or multiple correspondence analysis techniques is theoretically inconsistent, for the implicit direction of causality has been reversed. This is because it is not appropriate to assume that the broad range of multi-dimensional assets are 'caused' by changes in welfare, but rather that they contribute to welfare. So in this case, pre-set weights are certainly more warranted than the use of statistical techniques that were specifically developed to identify underlying causal variables. It is also true that in the case of measuring welfare, the basis for the choice of assets is somewhat different. Rather than choosing assets that are good at discriminating rich or poor households, the selection of assets in a welfare exercise must be consistent with the rationale underlying the approach – it should include whatever is most relevant in improving welfare. However, in our review of the past use of asset indices, it is clear that many authors have conflated the two approaches.

Additional problems arise when we turn to the issue of how to construct absolute cut-off points ('poverty lines') using an asset index. A fair amount of disagreement in the literature between data trends based on assets and money metrics may stem from the lack of an objectively set 'asset poverty line'. In order to assess changes in asset indices, some kind of threshold is needed, usually as defined by 25, 40, or 60 percent of the baseline distribution. Only Booysen and colleagues attempt an absolute poverty line.⁷¹ This is the weighted sum of categories that are deemed as representing an adequate standard of living. Problems emerge with both absolute and relative cut-offs for two reasons: due to the general caveats raised above about trends in asset data; and because the 'lines' may be purely arbitrary, or worse chosen for the tractability of results. However, this is a problem shared with national income and consumption measures, and the problems in setting both international and national poverty lines for African countries using

⁶⁸ Young, 'The African growth miracle', p.698

⁶⁹ Sahn and Stifel, 'Poverty comparisons over time'.

⁷⁰ See Deborah Johnston, 'Shooting for the wrong target? A reassessment of the international education goals for Sub-Saharan Africa', *Revista de Economia Mundial* 27 (2011) pp. 95-116, for an example of the ways that various shifts in education policy have led to significant changes in educational indicators in many African countries.

⁷¹ Booysen et al. 'Using an asset index'.

traditional data have been discussed frequently.⁷² Therefore, all discussions of wellbeing trends need clarity about the poverty lines or cut-offs used.

So, what can asset measures tell us about wealth or welfare trends in African countries? Young's paper shows significant positive trends in a wide range of assets (based on DHS data at various points in time).⁷³ In particular, rapid growth is found for TV, refrigerator, motorcycle, telephone, electricity, flush toilet, and rooms per capita. This corresponds with the conclusion that in general African populations have had a growing ability to acquire assets and so have been becoming wealthier on average. Shimeles and Ncube's study indicates that these average findings are likely to hide some accumulation by a 'middle group' of households, and that there still remains a significant group of households who continue to hold very few assets. Regarding overall trends in welfare, Young's data shows large positive growth in a number of welfare outcome variables, most notably those reflecting child height and weight; child survival; school attendance; and a large fall in the fertility rates of young women.⁷⁴ These would imply an improvement in a range of health and education indicators, but this obviously begs a cautious interpretation as some of the data does not tell us directly about welfare outcomes. For example, increases in school attendance do not necessarily tell us that school outcomes are improving. For that we would ideally need to see evidence on the quality of education and on the attainment of pupils. Overall then, we have evidence of improvements in health outcomes such as fertility rates, child anthropometry and child survival, and other evidence on the improved ability of African households to access education.

Conclusion

This article has demonstrated that asset indices are invaluable in charting changes in household wealth. Overall, asset data provided an optimistic story about changes in African countries much earlier than other kinds of evidence. While we have discounted some of the headline conclusions about a growth miracle or a burgeoning middle class, it is clear that the asset data tell us a reliable story about the accumulation of assets by many people in many African countries. The reasons for this accumulation are complex, and they may have as much to do with a supply of cheaper assets (notably from China) as they do with an increased ability to pay for durables and household

⁷² Maia Green and David Hulme, 'From correlates and characteristics to causes: Thinking about poverty from a chronic poverty perspective', *World Development* 33, 6 (2005), pp. 867-879; Hanmer et al., 'Poverty in sub-Saharan Africa'.

⁷³ Young, 'The African growth miracle', Figure 1.

⁷⁴ *Ibid.*

improvements resulting from changes in incomes and credit availability. In this story, we should recognize that there are differences by country and within country, and there is certainly evidence that this accumulation has not been uniform with a group of households at the bottom of the distribution able to accumulate assets less effectively.

However, if we wanted to make strong conclusions about changes in household wealth, we would need better quality asset data. Only then could we be sure what this pattern of asset accumulation really signifies. In other words, only then could we be sure that the underlying driver for this accumulation of assets was changes in wealth rather than changes in the range of other factors that drive the growth in asset holdings. Underlying all of our conclusions are three interlinked recommendations regarding the construction of an index: (1) indices should be constructed and compared over limited geographic scales and time periods; (2) the choice of assets should be based on an understanding of what it means to be wealthy or poor in a particular place; and (3) finally that the choice of assets in an index should reflect the kind of wellbeing to be measured.

Provided that asset selection is accurately made, asset indices can provide good proxies of long-run wealth in Africa, and indeed they suggest that long-run wealth has been improving. This is validated by the abundant evidence of the robust association between assets and a range of other indicators of wellbeing. However, the less the selected assets are good discriminators and the more actual poverty-wealth patterns within the set of households differ from the asset index ‘model’, the less valid the index becomes as a proxy for wealth. With more heterogeneous sets of households (for example over long periods of time or across significantly different geographical settings), non-wealth explanatory variables take on greater weight. While it is not possible to indicate a priori what the maximum reasonable temporal or geographical scale is, it is clear that asset indices are most valid in short-period comparisons or comparisons over small regions. This does not render them any less useful as part of the social scientists’ toolbox, especially when other data can be used to triangulate asset choice or to compare results. In addition to their practical advantages (availability in existing data sets and the quickness and reliability in new data collection), there are strong theoretical underpinnings for their use. The issue is, therefore, not whether to use them, but rather how to use them properly.