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Are African Households Heterogeneous Agents?

Stylized Facts on Patterns of Consumption, Employment,
Income and Earnings for Macroeconomic Modelers

Louise Fox

I N T E R N A T I O N A L M O N E T A R Y F U N D

IMF Working Paper

Research Department, and Strategy, Policy, and Review Department

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Macroeconomic Modelers**

Prepared by Louise Fox

Authorized for distribution by Andrew Berg and Catherine Pattillo

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Abstract

This paper reviews the evidence on how households in Sub-Saharan Africa segment along consumption, income and earning dimensions relevant for quantitative macroeconomic policy models which incorporate heterogeneity. Key findings include the importance of home-grown food in the income and consumption of households well up the income distribution, the lack of formal financial inclusion for all but the richest households, and the importance of non-wage income. These stylized facts suggest that an externally-generated macroeconomic shock and the short-term policy response would mainly affect the behavior and welfare of these richer urban households, who are also more likely to have the means to cope. Middle class and poor households, especially in rural areas, should be insulated from these external shocks but vulnerable to a wide range of structural factors in the economy as well as idiosyncratic shocks.

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Author's E-Mail Address: fox.louise@outlook.com

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1. Introduction and background

Until recently, macroeconomic policy models in developing countries focused primarily on issues of aggregate growth and stability. While incomplete labor markets and unequal opportunities for households to share in economic growth have long been a feature of the microeconomics of development, it took some time for them to enter the development macroeconomic literature, either in the form of short term (business cycle and stabilization) models or long term (growth) models. In the last twenty years, both types of models have started to incorporate these features.

Developed country heterogeneous agent business cycle models have been incorporating the distribution of income and assets in their analysis for time, recognizing the importance of variables such as wealth and age in risk preferences and coping strategies, and therefore on the impact of an interest rate or employment shock. These models allow for a joint distribution of income, consumption, and wealth, recognizing that business cycles affect different types of households differently (Rios-Rull, 1995). For example, a low interest rate policy may benefit young people holding mortgages more than older people holding bonds (Prasad, 2013). Households with primarily labor income are affected differently by business cycles than households with primarily capital income. Recent recessions have demonstrated that the negative effects of recessions can last longer in labor markets than in asset markets; the scarring effect of unemployment can last a lifetime while asset prices exhibit no such trend. Whether counter-cyclical monetary or fiscal measures are chosen when recessions hit also has long lasting distributional consequences, especially if the expenditure reductions hit public services consumed disproportionately by the poor such as inner city social programs.

Longer term growth models have also incorporated heterogeneous households. Early growth theorists such as Kaldor hypothesized that inequality might be good for growth because the rich save more. Later models looked at the growth effects of redistributory policies, and more recent analysis has focused on the negative effects of income inequality for growth in developing countries through such channels as amplifying the potential for financial crisis, discouraging investment because of political instability, making it more difficult for governments to make difficult choices (such as raising taxes or cutting public expenditure) in the face of shocks, or by discouraging investment in education and health for the poor (Berg and Ostry, 2011).

Evidence has been accumulating from developing countries on the need to incorporate income distribution into macro models and analysis. In the long run, it is now clear that as in developed countries, not only could the structure of growth affect inequality, but the existence of inequality itself could lower growth. (World Bank, 2005). The need to protect social services consumed by the poor, especially ones that build human capital, during fiscal contractions in order to avoid long term negative effects on poor households and on economic growth is well understood, even if implementation may be problematic. Likewise, it is recognized that macroeconomic shocks have long term distributional effects in developing countries as well as developed. Cross section evidence from middle income countries showed that during currency crises and bank bailouts of the 1990s, the poor lost more than the rich. This was because (a) the labor earnings fell as a share

of GDP, and (b) poorer households were not able to sustain consumption in the face of inflation or an income shock (World Bank, 2005).

Once open economy macroeconomic models for developing countries began to relax the assumptions of complete labor markets, and include assumptions that households are heterogeneous in their ability to respond to and manage risk, the distributional effects of external shocks emerged. For example Marjit (2003) models formal and informal sector output and earnings, and shows that earnings in each sector respond differently to a negative external shock, leading to a contraction in the formal sector output. Berg et al. (2010) models two classes of households – richer, asset-holding households who can smooth consumption intertemporally in response to a shock, and “hand-to-mouth” households who cannot smooth consumption because they have no savings or assets to sell. Under these circumstances, volatility has much greater long term effects on poor households, and the gains from dampening cycles accrue to these households. Prasad (2013) points out that it is not only the crises which hurt the poor, but the choice of instruments to deal with them. For example, the choice of monetary policy instruments to manage short term macroeconomic fluctuations – interest rates or exchange rates – can have distributional consequences. In particular, households which produce exported goods will lose when exchange rates are allowed to appreciate. If these households consume less imported goods, the gain in welfare from the appreciation will mostly accrue to wealthier households. This is a common issue in mineral-exporting countries when mineral prices rise, or if aid inflows cause a similar appreciation issue. A related case would be if poor households are more likely to hold their savings in cash, instead of in real or interest-bearing assets. Under these circumstances, they would pay a higher “inflation tax”, an issue widely discussed during Latin America’s period of high inflation and indexation.

Initially the obstacle to employing such models was the computational complexity (Rios-Rull, 1995). But as advances in computer power and computing algorithms relaxed this constraint, heterogeneous agent models became more common. The frontier for application to developing countries became data. Estimating such models requires at least an adequate cross-section of data on key variables such as representative households’ demographic composition, labor market status, income sources by sector, assets (human, physical and financial) and their returns, and payments to and receipts from the government, in order to calibrate the model. Increasingly, these data are available on emerging market middle income countries in Latin America, as well as Turkey and the transition economies of Eastern Europe, and the larger economies in Asia. (World Bank, 2014). Panel data, allowing the study of individual households’ behavior over time, mobility, and response to shocks, are also becoming more widely available. A summary of the stylized facts which can be used to calibrate heterogeneous agent models for developed and emerging market economies was published as a special issue of *The Review of Economic Dynamics* in October 2009.¹

But for African countries the data picture is much worse. In *Poor Numbers*, Morton Jerven (2013) alleged that national accounts data in Sub-Saharan Africa are misleading domestic audiences as well as international stakeholders. The situation with respect to micro data on

¹ *Review of Economic Dynamics*, Vol. 13(1).

households is even worse. A quick review of the World Bank's *African Development Indicators* on line shows that most countries collect the needed household survey data infrequently. Data on household consumption needed to estimate income distribution and poverty by household type almost always several years old. Employment data by sector is often missing. Data on income from agriculture, the sector where the majority of the labor force works in their primary employment is usually only collected in specialized rural surveys, conducted once or at most twice a decade. Even for simple indicators such as labor force participation, the quality of data collected is often poor and the trend unreliable as it is not collected consistently (Fox and Pimhidzai, 2013; Guarcello et al., 2010).

The good news is that African countries, supported by external donors, are making a major effort to improve household survey data. Projects such as LSMS-ISA² are testing new, lower cost methods of collecting more reliable data on incomes, consumption, and household behavior for rural African households. Panel data is starting to trickle in. The macroeconomist can be optimistic that in ten years, adequate cross sections could be available to calibrate a wide variety of interesting heterogeneous agent models for African countries.

What should analysts and policy makers do until these data become available? One option is to use national accounts data, and some simple assumptions on how classes of households behave. This indeed was the approach of Berg et al. (2010) in their paper on Uganda, where they used data on household access to finance to estimate the share of households able to smooth consumption in response to shocks. While not ideal, such an approach may be an improvement over ignoring heterogeneity between rich, poor and middle class households completely. Another alternative is to calibrate models with data from other, data rich countries. In order to do this, however, some stylized facts identifying the distribution of the key variables are needed. These stylized facts should provide guidance on what differences matter most in modeling households within a macroeconomic framework which includes endogenous household choices.

The purpose of this paper is to develop some stylized facts on household incomes, employment and earnings across the income spectrum in low and middle income African countries, to support this type of modeling and analysis. It follows on the work of Krueger, et al. (2009) for developed and emerging market countries. We searched for the variables identified in that paper as needed to calibrate the household budget constraint for different types of households, trying to identify distribution key differences and similarities in the cross-section patterns and time trends which would be relevant for macroeconomic models. The main focus was on sources of income, employment and earnings and their connection to aggregate trends, as there has been much less work on this topic than on consumption patterns in low income countries.³

While data on many variables is not readily available in a comparable fashion for many countries, much less as a time trend, nonetheless, some stylized facts can be presented. At the

² See www.worldbank.org/lsms-isa

³ For example, most African countries have a national poverty line based on consumption patterns of low income households.

household level, these include trends in consumption inequality and the key characteristics of richer and poorer households – their demographics and consumption patterns, and qualitative and quantitative differences in household economic activities which shape how they may react to macroeconomic events, including whether they live in urban or rural areas and whether their income comes primarily from farm or nonfarm activities. Significantly more information is available on employment and earnings of individuals within households, and stylized facts here were easier to develop. Despite their importance in developed and emerging market heterogeneous agent models, stylized facts were not developed for patterns of wealth – levels and composition – as these data are not widely available.

Inequality is rampant in African countries, suggesting that heterogeneity is important. In contrast to Latin America, inequality is not related to income level or growth – it simply persists. It tends to be higher in mineral-exporting economies. Heterogeneity is not obvious in consumption patterns as both richer and poorer African households spend a high share of income on food, even as mean income rises. One reason is that both rich and poor households tend to have a lot of dependents, owing to still high fertility rates in urban and rural areas.

A rural-urban breakdown yields essential heterogeneity. In rural areas, the majority of food is self-produced, resulting in substantial insulation from external price fluctuations (through an exchange rate channel or a real price shock) but vulnerability to domestic weather. In urban areas among richer households home-produced food is less common and imported food more common, which may explain the observed lack of a Kuznets curve. These urban households will be vulnerable to both a weather shock –which raises domestic food prices – and an external price shock. But they have more resources (include remittances from abroad, which are disproportionately received by richer and urban households), so they should be able to weather these shock more easily than their poorer rural neighbors. Not surprisingly, urban households have more access to banking services and credit. A surprisingly large share of adults report savings, using informal mechanisms, as well as borrowing through these same mechanisms. As the funds do not go through the formal banking system, they are insulated from interest rate movements – but not from inflation.

Heterogeneity shows up strongly in livelihood patterns and sources of income, with both a rich/poor and rural/urban divide. Mixed livelihoods are common in African households, with household production the dominant income source. Almost all households produce some farm and/or non-farm goods or services for sale, and for most rural households this production provides the earned income. Agricultural wage income is neither common nor important, in contrast to Asia or Latin America. In urban areas a combination of wage and self-employment income is common, supplemented by subsistence gardening. Households with more non-farm income tend to be richer. By diversifying income sources, mixed livelihoods provide households with some risk protection. However, almost all household enterprises have other households as their customers. This means that they depend on incomes in the other sectors (farm and wage employment) to support demand. In urban areas in particular growth of wage job opportunities is critical to the survival of the household enterprise sector.

From employment and earnings analysis, a picture of both opportunity and rigidities emerges. Adults use their (limited) education, skills, and assets to try to get ahead. Greater human capital

provides individuals and households with more opportunities, especially in the nonfarm sectors, where earnings tend to be higher. To the extent that they exist (e.g. there is demand for labor supplied into the market), labor markets seem to work fairly well. Private sector wage job creation has grown rapidly during the recent economic growth period, but from a low base so not fast enough to change the structure of employment much. While evidence suggests that aggregate real wage levels are flexible and respond to macroeconomic policy (e.g. exchange rate devaluation) recent analysis indicates that wages in private, (mostly) formal manufacturing employment are high in dollar terms, which may partly explain why these jobs are scarce.

For those with complete secondary education and above, good jobs and high earnings translate into better living standards. This is especially true for public sector employment. Meanwhile, adults without some secondary education cannot access the nonfarm wage labor market at all. Only casual, unskilled wage employment is available to this group, and this employment often pays less than self-employment. It is more popular among youth searching for a permanent livelihood. Mobility between non-wage employment and regular, more formalized wage employment is pretty limited. This, combined with the fact that unemployment is low as it is difficult to finance, means that business cycles do not have the same effect on employment as they do in more developed economies.

A tentative interpretation of these stylized facts is that that living standards in rural and the poorest urban African households are fairly resilient to short-term macroeconomic cycles, while longer term structural factors which affect the productivity of household farms and firms and the demand for labor in the growing medium and large enterprise sector matter a lot. This resilience may be one reason why African poverty rates were not broadly affected by the recent global economic crises to the same extent as poverty rates in emerging market economies. Of course, a series of macroeconomic crises leading to a poor growth performance over a number of years definitely worsens African poverty and living standards, as the period between the late 1980s and the late 1990s showed.

Urban middle and upper class households will be more vulnerable to short-run macroeconomic events, as they are the ones who consume imported food and fuel, who use the formal banking system, and have public sector jobs that might be at risk in case of a fiscal consolidation. Although they have more resources to cope with shocks, they are also the most politically active and vocal. This may lead to pressure for a high interest rate policy to shore up the exchange rate, for example, as opposed to allowing a depreciation, which would hit their pocketbook but help exporters in the agricultural sector. Thus the political economy dimensions of household heterogeneity and macroeconomic policy maybe the most important one.⁴

The rest of paper discusses the data available and specific results. It starts with the data on levels and trends in income inequality in order to quantify the potential economic heterogeneity. It then moves on to trends in consumptions and savings for types of households, as well as differences in household fertility and demographics, relevant for macroeconomists as this affects savings behavior. Next, heterogeneity in the quantity and quality of household income sources is

⁴ This is the argument of Acemoglu and Robinson (2012), among others.

discussed. In order to drill down on this topic, stylized facts on the structure of employment and earnings are presented.

2. Dimensions of heterogeneity: inequality in household expenditure levels and patterns

Inequality is high in Africa in both rich and poor countries. Surprisingly given the high inequality, the rich and the poor both spend a high share of income on food, even in richer countries, reflecting a relatively weak Engel curve. This suggests that with respect to price shocks, especially domestic ones, household consumption patterns may not be as heterogeneous as the inequality would suggest. Richer households are more vulnerable to externally generated price shocks, but these households have more assets and better access to financial services, so they may be able to weather the shocks better.

As a subcontinent, Sub-Saharan Africa achieved high growth in GDP over the period 2000-2012, average 5 percent per year, twice the rate achieved in 1990-2000.⁵ Household consumption per capita grew at 2 percent per annum over the period.⁶ The bottom half of the distribution gained, resulting in substantial poverty reduction, although not as much reduction as some observers expected (World Bank, 2013). One reason is the relatively high inequality. Recent data show that about two thirds of African countries have a Gini index of inequality above 0.40.⁷ Although not high by Latin American standards, this puts the majority of African countries at a higher inequality level than China (0.42) India (0.33) Indonesia (0.34) and Viet Nam (0.36). In most countries, the richest 20 percent account for at least 50 percent household of consumption. The actual figure is most likely higher as the consumption measures from household surveys in this part of the world do a poor job of measuring the consumption of the top 20 percent because they usually do not include consumer durable purchases or the use value of major consumer durables such as housing or cars.

Two aspects of inequality are noteworthy. First, African inequality shows no overall trend in terms of level of income or growth. Olinto and Saavendra (2011) show that for those countries with at least two data points in the period 2000-2010, more countries showed falling inequality than rising inequality. The analysis in World Bank (2013) shows that the change in Gini was not related to real GDP growth, nor was the ending value. Indeed as a group, African economies do not exhibit a Kuznets curve, with inequality rising as GDP levels rise (Figure 1).

Inequality is somewhat related to structure of the economy. The countries with the highest levels of inequality as measured by the Gini tend to be resource exporting countries such as Lesotho,

⁵ The GDP numbers are from World Development Indicators, available online at <http://wdi.worldbank.org>, Tables 4.1 and 4.9.

⁶ Population growth was 3 percent over the same period.

⁷ In Africa, inequality is typically measured by expenditure per capita or adult equivalent; the Gini is the most widely available and accepted measure so it is used here.

Zambia, Swaziland, Nigeria, Mauritania, Mozambique, Guinea-Bissau, and South Africa. The levels in these countries are similar to those in the E. Asian mineral-exporting countries of Malaysia (0.46) and Papua New Guinea (0.50), but higher than Indonesia (0.34) or Mongolia (0.37). But other African countries with high levels of inequality are not (yet) mineral exporters, e.g. Kenya (0.48) and Rwanda (0.51).

Once purged of lumpy consumer durable expenditures, the household survey data show that both rich and poor households spend a lot of money on food (Figure 2). While the poorest quintiles do spend proportionally more on food than the richest, the difference is only about 15 percentage points, and this ratio is relatively constant once countries reach an income level of about \$400/per capita in current prices.⁸ This is surprising. In other regions, the Engel curve effect is somewhat stronger. For example, a simple linear regression estimated for Viet Nam found an average marginal propensity to spend on food of 0.25 (Haughton and Khandker, 2009).⁹ In part this is because the richest 20 percent live in urban areas where food is more expensive than in rural areas where food is grown on the farm. Another reason is that purchased food in Africa is relatively expensive in PPP terms. The reasons include the fact that much food consumed by the rich is imported (e.g., imported rice instead of locally produced coarse grains) and high port and transport costs raise prices (especially for land-locked countries).

As a result, rural populations and the poorest urban populations (who also grow their own food) are actually less vulnerable to externally generated food price shocks than the richer urban middle and upper class populations. As long as they have rainfall, farm can produce and store most of their own food.¹⁰ The most recent evidence for this came during the 2006—2008 (externally generated) food price shock, when rural households reported *increases* in food security, but urban household reported decreases (Verpoorten, 2013). But the consistent pattern of high food expenditures across the distribution suggests that all households may experience food price shocks caused by domestic weather events in a similar way. The difference would be that the richer households would be expected to have better coping mechanisms; poorer households would certainly need food aid.

One household coping mechanism is liquid savings; another is borrowing. Data from the FINDEX data base shows that after controlling for country income level, African adults save as much or more than their counterparts in other countries (Filmer and Fox, 2014, Figure F3.1). But they do not save in banks; only 10 -13 percent of adults in African countries reported saving any amount in a bank account. The other 15-30 percent of adults who saved either kept the cash at home, or used an informal savings mechanism such as a community savings and credit union, or a rotating savings scheme. Not only are non-bank savings schemes are much less secure, they

⁸ Richer households tend to be in urban areas, where they spend more money on transport and education.

⁹ A better fit was found using a quadratic term, which would show an even lower propensity to spend on food for the richer households compared with the poorest.

¹⁰ Seasonal food security remains an issue in rural Africa, as many rural households (especially where there is only one agricultural season) do have to buy food during the “hungry season,” just before harvest, when prices are at their highest. They may not have the cash needed for these purchases. In addition, micronutrient deficiencies are common among poor children, resulting poor nutrition indicators.

also receive no interest so have no inflation protection. Likewise, few have access to formal credit. For example, in Uganda in 2010, household survey results showed that just under 9 percent of urban households and about 3 percent of rural household reported that they had even sought credit from formal banking sources, and even fewer sought credit from semiformal microfinance organizations.

3. Household demographics

Owing to high fertility, African households are young and large in both rural and urban areas. This trend is expected to continue for several decades. This means a rapidly growing labor force for economies to absorb, lower private savings, and probably persistent rural poverty.

Sub-Saharan Africa is a young continent, and will remain so for the foreseeable future because a rapid, systematic reduction in fertility rates has yet to occur. The median person in Sub-Saharan Africa is 18 years old—7 years younger than the median age in South Asia, which is the next youngest region. Most Africans live in rural areas. In 2010, only 1/3 of the population in low and lower middle income countries was located in areas classified as urban. In rural areas, population density is low. Fertility rates are substantially higher in rural areas compared with urban ones (Figure 3) and as a result, poor households (mainly located in rural areas) tend to have much larger households. For example, in Burkina Faso in 2010, average household size in the poorest quintile (overwhelmingly rural) was 8.8 people, while in the richest quintile (overwhelmingly urban) it was only 4.5. Dependency ratios followed a similar pattern, as 60 percent of the members of poor households were younger or older than working age, while in the richest households the share was only 43 percent. But even urban fertility rates have been falling slowly, suggesting that the growth in the urban population is mostly driven by natural population growth. As a result, Africa will have a young and growing labor force for decades to come.

Africa's stubbornly high fertility has been partly explained by the tendency toward early marriage for females (Filmer and Fox, 2014). This cultural dimension suggests that traditional drivers of fertility decline such as income growth, urbanization, and availability of contraception, may not have as strong an effect on fertility as was seen in other regions. High fertility is associated with lower private savings (Birdsall and Sinding, 2001), contributing to lower ability to cope with shocks and increased poverty in the next generation.¹¹

4. Mixed livelihoods: household sources of earned income

Households tend to have multiple sources of income. In rural areas, agriculture income in cash or kind is almost universal, but households are increasingly developing nonfarm income sources as well, either as an off season activity or as the main activity of one member. Wage income is more common in urban areas, and in

¹¹ It is possible that increased educational opportunities for females could reduce this tendency for early marriage. Alternatively, changing marriage norms may be necessary in order to increase educational opportunities for females.

upper income households. But a sizable share of richer and/or urban households engage in agriculture, either as a source of subsistence or to sell in urban markets or as export (e.g. high value vegetables). Household enterprise income is the fastest growing income source, and is found through the income distribution. This implies that households could be best modeled as having a household income portfolio (a mixed livelihood), with the composition of the portfolio varying by country level of economic development and household income. In particular, as households are better able to manage risk, they begin to reduce their income sources.

Economic activities undertaken by household members (employment) can be grouped into two types of income – wage and nonwage – as well by sectors (primary, secondary, tertiary or finer breakdowns). Following Fox et al. (2013) and Filmer and Fox (2014) we combine these dimensions into three basic employment/income categories.

- *Agricultural employment*—predominantly farmers working on small holdings and consuming a significant share of their production, but including more commercialized farmers as well. Income takes the form of gross profits from the sale of goods as well as income in kind (home consumption). Wage work in agriculture as a primary activity is included in this category, as well as fishing and primary forestry (collecting wood and other forest products). Regular wage employment in agriculture is rare in Africa as smallholders dominate the sector.¹²
- *Household enterprise employment*—Household enterprises are unincorporated, nonfarm businesses owned by households. This category includes self-employed people running unincorporated businesses (which may or may not employ family or other workers) and family members working in those businesses. Income is mostly cash, and is recorded as gross profits.
- *Wage employment (non-agricultural)*—includes all labor force participants who report working outside the agricultural sector and receive a payment for their work from an unrelated individual. It includes the public and private sectors. Public sector employment is mostly in the service sectors.

Households tend to have more than one main source of income. Figure 4 shows the share of households with income from agriculture, household enterprises, and wages for a set of representative countries, by quintile of household consumption per capita. In all countries, the shares add up to over 100, indicating that many households have more than one source of income. The majority of households have income in cash or kind from agriculture or livestock. Even in urban areas, 20-50 percent of households report growing crops or livestock for sale, with an additional 5-10 percent reporting producing agricultural products for home consumption only.

¹² This may change as if large scale commercial agriculture takes hold in the next decade.

The next most frequently reported income type is non-farm household enterprise income (self employment or family members running a business). In rural areas, this is often a part time, off season activity, while in urban areas it is more likely to be full time. The least common source of income is non-agricultural wage income of any kind (casual or formal).

In every case shown in Figure 4, the number of households with multiple types of income is growing. The exception is Ghana, where the number of sources is decreasing. Several explanations have been offered for this trend (Haggeblade et al., 2010).

- Non-farm incomes are in general higher than farm incomes, so rural households seek to add this source to their portfolio (Fox and Sohnesen, 2012).
- Owing to lack of water management limiting the crop season, an agriculture-only household often suffers from underemployment. At least one household member may seek off season wage work or try to run an off-season business in order to keep earning income during the “hungry” season (Fox and Pimhidzai, 2013).
- Agriculture suffers from weather and price risk, so a household may wish to diversify income. Only households able to manage this risk would choose to specialize in agriculture. (Fox and Filmer, 2014)

It is noteworthy that of the countries shown, Ghana has some of the most commercialized agriculture. An indicator of this is that agriculture accounted for 30 percent of GDP in 2010, compared with only 17 percent in Senegal even though both countries had about the same share of households with income from this sector. This may be the reason that the number of incomes per household in Ghana is declining – households can afford to take the risk of specializing. Market integration may also contribute to increased specialization (Rijkers and Soderbom, 2009).

Richer and urban households are less likely to have agriculture income and more likely to have wage income (Figure 5). Over 80 percent of households in the poorest quintile have agricultural income in the countries shown in the figure below. In poorer countries the share tends to be over 90 percent, but in richer and more urbanized countries such as Kenya and Zambia (where urban poverty is becoming more common), only about 80 percent report this type income (in cash or in kind). As GDP and urbanization increase, households in the highest quintile are less likely to report agricultural income. In Zambia and Cote d’Ivoire, only about 25-30 percent of households in the highest quintile reported agricultural income, while in poorer countries such as Rwanda and Malawi, the percentage is much higher – up to 80 percent. Even 80-90 percent of households in these poor countries living in areas classified as urban report some agricultural production, if only for home consumption.¹³ Owing to weak transportation links, it common for high value perishables for export such as cut flowers and fresh vegetables to be grown by middle income households in peri-urban areas near the airport. Other common urban agriculture cash crops include eggs and fresh milk.

¹³ In Uganda in 2010, a surprising 5 percent of urban household reported subsistence farming as their *main* source of income.

Income from household enterprises is more likely to be found in the middle and upper quintiles of the income distribution. Except for the very poorest countries, where wage employment is less developed, the highest quintile is less likely to have a HE than the middle quintiles in urban areas. The nature of the enterprise (and therefore the value and stability of the income) is quite different between rural and urban areas, and richer and poorer households. In rural areas, a HE may be a part time or seasonal activity while it is more likely to be a full-time, year around activity for urban residents. Small scale, low value natural resource based processing activity (e.g., beer brewing, charcoal making, or grain milling) is more common in rural areas. Trading is common in both, but the value of goods tends to be higher in urban areas (Fox and Sohnesen, 2012). Unlike in South Asia, the overwhelming majority of HEs report that their sell to other households and retail customers. The sector is not integrated into export value chains, for example.

Non-farm wage income shows a distinctly urban and upper income pattern (Figure 5). Even in the poorest countries, about half of households living in urban areas have wage income – although the type of wage income may be different. Richer households, with more education, have wage income from more secure sources such as the public sector or larger private firms, while middle income and younger households tend to have income from less secure, less well paid wage jobs. By age 30, about half of those reporting wage income as their primary income source also reported having a contract.

In sum, households tend to develop a portfolio of activities. In rural areas, the non-agricultural activity may be a part-time, off season one, while in urban areas the pattern is more stable around the year. The motives for household income diversification in rural areas are reported to be primarily underemployment in agriculture owing to seasonality, potential higher earnings in the nonfarm sector owing to low agricultural productivity, and risk diversification. But in more remote areas, households are not able to diversify away from agricultural risk by starting an HE because if the crop fails, there is not enough income in the community to buy what the HEs are selling. However, in a good year, rural households do report that they invest the proceeds from the sale of their agricultural production into their HE, using it as a piggy bank as well as an additional source of income.

5. What do we know about the importance of types of income in the household portfolio?

Income is difficult to measure in Africa, and major data improvements allowing the quantification of the household budget constraint are not likely to come soon. Although the majority of households earn income from agriculture, data on the importance of this income in overall household income is very difficult to find. Rural household surveys show that for the poor and often even the middle class, most of their income is not in cash, and what cash income they have does not come primarily from the sale of crops. When it exists, data on the structure of urban incomes is not published. Transfer income is received by a minority of households. When a transfer comes from abroad, it tends to be sizable and received by upper income households. Domestic transfers are more frequent, but much smaller as a share of income.

Public transfers to households are small, but can be expected to grow as safety net programs begin to scale up.

Of more interest to economists modeling household behavior are estimates showing quantitatively, how important these sources of income are. Unfortunately, for most countries, these data are not available. Countries regularly collect data on wage income, but data on non-farm self-employment and agricultural earnings are much more limited. Often they are collected, but not all in the same survey. Household expenditure surveys typically collect data wages, as well as on food produced for home consumption, but not on self-employment income or *net* income from agricultural production consumed or sold. Often the wage data are limited to formal sector or year-around jobs; seasonality is not assessed. Labor force surveys (LFSs) collect much more detailed and reliable data on household non-farm income, often with a larger sample allowing more detailed breakdowns. These data are usually reliable for nonfarm income. One good example of this type of survey is the Tanzanian Labor Force Survey of 2006.¹⁴ But LFSs generally do not cover agricultural income at all because it is almost impossible to measure in the time frame of an LFS (the whole survey is usually done during a short period).

Specialized household surveys which follow households over the agricultural cycle (and often the whole year) have been developed to measure net household income in cash and kind from agricultural and livestock production. One example is agricultural census. Confusingly, these are actually sample surveys which use a variety of methods to collect data on land use, inputs, and production. Other cross section and panel data exist as well. Michigan State University (MSU), with support from USAID, has built up a series of regular rural cross sectional and panel household income surveys in association with Ministries of Agriculture in a few African countries, including Mali, Mozambique, and Zambia. These surveys only cover rural areas, but they include data on both farm and non-farm income, including wage work in agriculture and household enterprises. These data have shown that non-farm income is quite important in rural areas (Cungara, 2011; Fox and Sohnesen, 2013). But because they only cover rural areas, they miss the substantial portion of households who earn agricultural income in urban areas.

Data from the Mozambique rural household survey from 2005 suggests that even in a very poor country, at least half of farmers market some portion of their production (Mather et. al. 2008). However, they do not get much income from these sales (Figure 6). Only 11 percent of income for the average rural household comes from crop sales. Another 2.5 percent comes from livestock sales while 25 percent comes from nonfarm income sources, including nonfarm wage labor and HE income. As expected, richer households have more monetary income and more nonfarm income. In the bottom quintile, 60 percent of income came from retained food crops, but in the 4th quintile only 50 percent came from this source and in the top quintile 38 percent came from this source. 50 percent of income in the top quintile came from nonfarm sources, and 12 percent from the sale of crops or livestock. This can be contrasted with more developed Ghana, where only 40 percent of the highest income group had any nonfarm income (Breisinger et al., 2008).

¹⁴ Report available on the website <http://www.nbs.go.tz>

One reason why data on agricultural income is not regularly collected or reported in multipurpose household surveys is that it has been difficult and expensive to collect it well. Reardon and Glewwe (2000) classified agricultural situations according to whether they are easy or hard to survey. Most African agriculture falls into the “hard to survey” classification, for the following reasons:

- Farmers grow multiple crops, including tubers, bananas roots and coarse grains, and report production in units of measure which are non-standard.
- Households have multiple plots which are spatially dispersed.
- Farmers rely on rainfall for irrigation.
- Livestock is kept in open pastures.
- The farm economy is only partially monetized, and the level of education/literacy is low. (Reardon and Glewwe, p.158).

As a result, collecting data at the household level on agricultural and livestock income in Africa is expensive, time consuming, and requires well trained enumerators. In addition, the data often conflict with National Accounts data, which use different methods to estimate production. In some countries, not just the level but the trend estimated from household surveys has been quite different from that estimated in the national accounts. (Tanzania, Mozambique). This is obviously a serious issue for researchers trying to combine macro and micro data.

The poor quality of data on the agricultural sector in Africa spurred the creation in 2011 of a global partnership to improve agricultural statistics in low income countries, headed up by the FAO. Newer technologies such as GPS, tablet computers, etc., are expected to support improved data collection and dissemination. But it is still common for the collection of data on agriculture incomes to be done separately from other types of income owing in part to the need to focus data collection around planting and harvest times, and the complexity of the problem.¹⁵

Even when data on all types of income are collected, tables on the structure of household income, nationally or by subgroups is usually not published. For example, both the Uganda and Tanzania National Panel surveys collected data on all sources of household income. But the statistical abstracts published did not include any data on the structure of household income. The Uganda reports included only data on wage earnings, while the Tanzania report covered primarily poverty and access to services.¹⁶ Statistical offices are not used to creating and publishing household income aggregates; until this changes researchers will have to go through the tedium of creating their own from the raw data.

In addition to labor income, remittances – transfers from one working household to another – play an important role in Africa. Ratha (2011) provides the most detailed analysis to date of the impact of remittances at the microeconomic level. His data show that the average remittance sent is high – the average annual remittance from OECD countries is over \$1200 per year per

¹⁵ An example is the Nigeria LSMS-ISA, which visited household twice – at planting and harvesting – but did not visit households during the rest of the year to collect data on off season nonfarm income.

¹⁶ These reports and the data are available on the respective websites: www.ubos.org and www.nbs.go.tz

sender. If this transfer goes to one household, it could increase average income by about \$3.50 per day – enough to cushion a shock or allow more effective consumption smoothing. Data on households receiving remittances confirms this trend, with receiving households in Senegal and Kenya reporting average remittances of over \$3000 per year from abroad. However, it seems that most of these households are already well off, as they tend to be urban and in the top two consumption quintiles.¹⁷ Households receiving transfers from domestic sources tend to receive much less and tend to be poorer. (Ratha, 2011) For example, data from household survey data from Uganda show that during the conflict period and even after, over 60 percent of households in Northern Uganda had received remittances. The Mozambique rural household data discussed above shows that 23 percent of rural households received any kind of transfer – public or private – in 2005, but this only accounted for 5 percent of total income, with the income share fairly constant over the distribution. Given the low percentage of households receiving substantial remittance payments, a large sample is required to adequately study the characteristics. Again, specialized surveys have been developed for this purpose.

Transfer payments from government have played a very small role in household income to date in Africa. Public pension systems tend to have very low coverage levels, and these payments mostly reach ex-civil servants living in comparatively wealthy urban households. Many systems include an option for a lump-sum payout, and this option is often taken, owing to doubts about the long term viability of the system. Cash transfers for poor households are just starting to scale up in Africa. These programs tend to target rural residents with children. The size of the transfer is low – about 25 percent of the monthly poverty level. Governments tend to spend much less than 1 percent of GDP on these programs. Partial donor financing is common. Poor rural residents are also likely to receive in kind transfer from NGOs, especially in the planting season, and when a weather shock has occurred (drought or flood). These are more difficult to track in household surveys. They may be recorded as gifts (unpurchased food), without the source identified.

Households do receive services in kind from their governments. If valued, these would be an important part of income. Analysis suggests that in value terms, more is captured by the rich than the poor. This is because (1) services are more likely to be available in urban areas than in rural areas, and (2) richer households are more likely to consume the higher value services. For example, rich household in urban areas may send their children to private primary school, but then to public secondary and/or tertiary education, where costs per pupil are 4-10 times higher.

A final caveat. As background for a study on savings, World Bank researchers tried to create complete income aggregates from the LSMS-ISA data, as well as from a few other household surveys which had income data. Comparing this with consumption, they found that about half of households with primarily wage earnings and an even larger share of households with primarily agricultural or HE earnings had negative savings – that is, for the vast majority of households, the income reported (including transfers) did not cover consumption.¹⁸ Yet

¹⁷ Causality is difficult to attribute. Remittances may have allowed them to become richer through investments in household production.

¹⁸ Personal communication, David Robalino.

microeconomic data suggest that 30-40 percent of adults in Africa do pit aside cash over the year somewhere – in a bank, through a savings club, or just hidden away at home (Filmer and Fox, 2014). Household consumption is not easy to measure, as the wide differences between survey estimates and national accounts estimates show. Nevertheless, there seems to be more progress on collecting consumption data at plausible levels in household surveys than on collecting income.¹⁹

6. Where does Africa work today?

Employment data is usually presented showing primary activity only, in order to show the evolution of shares. Most adults and many youth in Africa are in the labor force, and work most of the time, as they cannot afford to be unemployed. Consistent with the structure of household income, about the majority of individuals report that their primary activity is in agriculture; only about 20 percent report a wage job as their primary employment. However, this structure overstates the importance of agricultural employment, since 40-50 percent of all those employed report a second activity in a different sector from their main one. This is consistent with the portfolio of household economic activities shown above.

If measured over a 12 month period, labor force participation in Africa is quite high. Seasonality is also strong, so when a 7 day recall period is used, many people may be recorded as out of the labor force (not working and not looking for work) in the off season (Fox and Pimhidzai, 2013). Using a longer recall period, Fox et al. (2013) estimated an 89 percent LFPR in low income countries, and 86 percent LFPR in middle income countries, and a 65 percent LFPR in upper middle income countries (e.g. countries with a GDP per capita over US\$3000 such as South Africa, Mauritius). These average participation rates are higher than the ones reported in World Development Indicators (which come from the ILO and use a short recall period).²⁰ One reason for high LFPR in low income countries is that in poorer countries, youth are more likely to drop out of school and enter the labor force early. Many youth in Africa aged 15-20 report both working and being in school (Filmer and Fox, 2014). As household income increases, labor force participation tends to go down for youth as they stay in school full time for a longer period of time before working, and may spend a significant amount of time after school dropping in and out of the labor force before settling into an activity. Young females not married and not in school may be assigned household chores such as looking after younger siblings or cooking, which prevents them from taking on even part time productive employment.

Consistent with the household livelihood portfolios presented above, employment estimates show that most Africans today report agriculture as their primary economic activity (Figure 7).²¹ This is not too surprising as almost half of employment in 2010 was in low income countries,

¹⁹ For a discussion of why survey and national accounts data do not match up, see Ravallion (2003).

²⁰ For all low income countries, World Development Indicators report 83 percent for men and 68 percent for women, lower than the estimates of Fox et al. (2013) but still high.

²¹ See Fox et al. (2013) for the methodology behind the regional employment estimates.

where the share of agriculture in GDP was also higher. Although output and employment in non-agricultural sectors have grown faster than agriculture in the past 15 years, we still see the well known result that the transformation in employment by sector lags the transformation in value added.

The next largest category of employment is household enterprises. This is primarily self employment, but not exclusively, as in low and lower-middle income countries; a significant minority of household enterprise owners involve family members or a casual wage employee in their business. Taken together, the analysis shows that 86 percent of employment in 2010 was in household farms and firms – a segment commonly termed “the informal sector”. To the extent that the employment transition consists of moving labor to the wage sector, by 2010 most countries in sub-Saharan Africa had not made much progress here.

The majority of wage employment was in the services sector in 2010. This category includes both “formal” wage employment (where the employee has a contract and may be entitled to social protection), and “informal” or casual wage employment. These two types of wage employment are grouped together because most of the data sets used do not allow a consistent disaggregation of wage employment to this level. This also includes the public and private sector. Public sector employment primarily presents in the services sector. A disaggregation of wage employment between the public and private sectors shows that in non-resource rich countries, the dominance of the public sector in wage employment common in the 1960s and 1970s was reversed in the ensuing decades. The private sector created most of the wage jobs found in SSA in 2010. This reversal—including the shedding of many public sector jobs in the 1990s—helps explain the low share of wage employment in the economy in 2010. Despite the fact that wage employment grew faster than GDP in many countries since the mid 1990s, it started from such a low base that it was hard to catch up to the other sectors, given the rapid growth of the labor force (Fox and Sohnesen, 2012; Fox and Gaal, 2008). In resource rich countries there has not been a reversal. Growth was dominated by commodity exports, and the state distributed part of the resource rents in the form of public sector jobs. The incentives for the private sector to create employment remained weak, so the public sector still provided the majority of the wage these countries.

The estimates above may overestimate the role of agriculture in employment, as they only show primary employment (in order to show the employment shares). In low and lower middle income countries, 40-50 percent of labor force participants report a secondary economic activity. For those engaged in agriculture, the secondary activity is usually running a HE, and for those running a HE, it is usually agriculture. Even a sizable fraction of wage employees (especially in the public sector) report a secondary activity – either a HE or farming. The importance of secondary activities is partly responsible for the diversified household portfolio shown above.

Finally, unemployment is in general low in low and lower middle income countries, especially in rural areas. In urban areas, unemployment is more common, especially for younger, educated participants whose families can support them while they look for a job. Using the ILO definition of unemployment, Roubaud and Torelli (2013) report an average rate of 11 percent in West African capital cities. It is more common for people to be working, but not full time. Defining

time-related underemployment as those who involuntarily work less than 35 hours a week, they found that about 15 percent of the employed fell into this category.

7. Matching and mobility between sectors

The labor market in Africa is structured. Without education, it is very difficult to get a good paying stable wage job, even after a long search. Those who get one of these jobs tend to stay there, and those who start working full time in a non-wage job (household farm or firm) tend to stay there as well. There is not much movement between wage and nonwage sectors in response to business cycles; downsizing in the public sector tends to lead to a withdrawal from the labor force. A bad agricultural season can lead smallholder farmers to search for low wage, temporary employment while a good season can lead them to start an HE.

How labor force participants end up in their sector of activity, and how much mobility there is between segments has been studied extensively, but primarily with cross-section data. These data do not allow a proper study of individual mobility because they do not track individuals over time. They tended to find varying degrees of segmentation according to the following stylized facts.

- *Education* is the best predictor of labor market outcome (Figure 8). Most Africans in the labor force today did not complete primary education. While this is changing as countries devote more resources to education, it can be expected that for the next decade at least the majority of new entrants will not have more than primary education. Those without education at all or with little primary education tend to be found in the agricultural sector, while those with secondary education are overwhelmingly found in formal wage jobs. The education levels of those in the HE sector and in informal wage jobs tend to be found somewhere in between. However, there is significant overlap between these categories. Gunther and Launov (2012) found that about half of those currently working in the HE sector in West Africa had similar observable characteristics as those with wage jobs.
- *Analysis of determinants of earnings tended to find higher returns to education and experience in wage employment, compared to nonwage employment*, leading to claims of segmentation. (Teal, 2012). This strand of literature tended to label the HE sector in urban areas as an “informality trap”. Other analysis finds a high premium (up to 50 percent) for wage jobs with a contract (often called formal wage jobs) (Rouband Torelli, 2013). Of course, these differences could reflect unmeasured and/or unobserved personal characteristics and not any type of segmentation (Bridges, et al., 2014).
- *Parents job helps predict current activity*. A study covering five West African economies found that farmer’s sons born in 1960-69 had a 60-70 percent chance of being farmers themselves 40 years later. Similar probabilities were found for the children of

nonfarmers.²² This may simply reflect the fact that the children of farmers tend to grow up in rural areas, where even primary schools were not available in the 1970s and 1980s or were very poor quality. Other data from urban West Africa show that more than 60 percent of those who were self-employed had fathers who were also self-employed (Pasquier-Dumer, 2011)

- *Networks*: Qualitative studies of youth job seekers and those who found a job point to family/clan/ethnic networks as being very important in finding a job (Filmer and Fox, 2014). Enterprise surveys revealed that most medium and large firms rely on their employees and their employees networks when they want to hire. Even in the public sector this practice is common. This tends to result firms or departments in ministries being more ethnically homogeneous.

However, the problem with all these studies on matching using cross section data is that they do not allow for unobserved heterogeneity, including personal choice, so the conclusion of segmentation is subject to criticism (Teal, 2012)

Longitudinal data – just now emerging from Africa - is beginning to shed more light on this picture. Starting with how people enter into employment, analysis suggest that although youth may spend a relatively longer time in Africa compared with other regions in the transition from school to work - in urban Tanzania, about five years - once they settle into a sector, they stay there. (Filmer and Fox, 2014). This is especially true for the HE sector. Some leave the wage sector to start a HE, but almost no one got to the wage sector from the HE sector after the age of 25 in urban Tanzania (Bridges et al 2014). In Ethiopia, panel data covering urban residents in a 10 year period from 1994-2004 showed that of those in self-employment in 1994 and still in the labor force in the final period, 2/3 were still in self employment, while only 10 percent had found a formal wage job. (Bigsten, Mengistae, Shimeles). During this period, the share of private sector wage employment in total employment doubled. The rest of those who left the HE sector were either in casual wage employment or reported being unemployed. Seventy percent of those who reported formal private sector wage employment in 1994 and were still in the labor force had stayed in this segment, while another 14 percent had found jobs in the public sector (including in SOEs), indicating a high degree of permanency in the wage sector. In Africa, those who are in the wage sector by age 25 are less likely to be engaged in lower paying, casual employment; they have found job security so they stay in this sector (Filmer and Fox, 2014).

Studies which use panel data to control for selectivity and personal preferences in the choice of occupation and in earnings are much less likely to find segmentation. This is especially true when the assumption that the current state is independent of the previous state is relaxed. A landmark study is Falco et al. (2010) who find that once this key assumption is relaxed, endogenous sorting explains a large share of the observed variance in earnings within human capital and experience groups. Falco, Maloney, and Sarrias (2013) use measures of happiness

²² See Box 2.2 in Filmer and Fox, (2014)

and subjective occupational choice to find that in urban Accra, Ghana, people in the HE sector are as happy or happier with their occupational choice as those in wage employment.

The panel data studies cited above (primarily covering urban areas) does not provide much evidence on how individual employment and labor force status respond to cyclical economic fluctuations or external shocks. One exception is the urban Ethiopian data, which cover a period of public sector restructuring. During the period between 1997 and 2000 (when SOEs were closing and shedding workers), only 1/3 of those who reported working in and SOE in 1997 were still in the sector in 2000 (compared with 93 percent in the period 1994-1997). Of those who left the sector, 40 percent found a job in the general government sector, 9 percent went to the private formal sector, 12 percent went to the HE sector, and 25 percent left the labor force entirely (many taking early retirement under the SOE restructuring program). (Bigsten et al. 2008). Only 7 percent reported being unemployed, confirming again that in the absence of safety nets a prolonged job search is not an option for prime age workers (the overwhelming majority of SOE workers were 30 years of age or older). In part the low transition out of the public sector reflects the fact that the formal private wage sector only accounted for 15 percent of urban employment in 2000, but it also suggests low mobility – even between the public and the private sectors.

In rural areas, panel data from rural Mozambique showed that during a bad drought period during the mid 2000s, rural small holder farmers sought alternative employment. Most of those who changed employment ended up in casual farm or nonfarm wage employment, however. Household enterprise employment did not grow at this time. But when the agricultural economy recovered, people did tend to start up household enterprises (Cungara et. al 2011). In urban Kenya (including small towns), however, the opposite pattern was observed in small area panels collected during the 1990s. In bad times, when wage employment was scarce, the number of HEs grew rapidly, while in good times, the growth slowed. (Mead and Lindholm, 1998).

In sum, for those in the labor force, mobility between broad employment categories seems to be limited. This represents a variety of factors – the small size of the wage employment sector relative to new entrants, the low level of skills of those in the agricultural sector, especially in rural areas, and people’s preferences, which may evolve as they gain more information about their economic opportunities – potential earnings and job characteristics.

8. Earnings and their determinants

Just as education correlates with opportunities, it also explains earnings, although not as well as might be expected once unobservable individual and family characteristics are controlled for. This may explain why returns to education seem to be declining – they were actually measuring selectivity and unobserved skills. Analysis suggests that labor force participants with less education do not do well in the wage sector, and they learn this quite quickly so they head for the household enterprise sector. Wages in larger enterprises seem high in dollar terms, but evidence suggests that wage levels do adjust in response to labor market and macroeconomic conditions. Public sector employment requires relatively high levels of education, and often earns a premium as well in terms of wages and security. Not surprisingly, this employment is found in the richest households.

Reflecting the limited data on household incomes discussed above, most multivariate analyses of earnings tend to focus on the determinants of wages. Explaining the variance in earnings is not easy. Using cross section data, the standard Mincerian formulation plus variables for sector of activity, type of contract, and location researchers can explain about 50 percent of total variance in real wages.²³ Using data on wage workers from enterprise surveys for 10 countries, Fox and Oviedo (2008) used education, age, experience, tenure at the firm, and firm characteristics and also explained about 50 percent of the observed variance. The main findings from these types of analyses are:

- *Returns to education are convex*, with very high returns to post-secondary education and no or very low returns to primary education.²⁴ This result is seen most clearly when dummy variables are used for levels of education, instead of a simple linear or quadratic specification is used with years of education. Kuepie, Nordman, and Roubaud (2009) found that instrumenting for education (to reduce the influence of selection bias on this variable) still produces high and convex returns. Fox and Oviedo (2008) also controlled for age cohort, and showed that the rapid expansion of education in Eastern and Southern Africa reduced returns to secondary education substantially for the younger workers in the sample compared with older cohorts, controlling for firm and individual characteristics. But of course this result may also reflect lower ability of those who gained entrance to secondary school once educational opportunities expanded.
- *Firm characteristics are relevant*, with larger firms appearing to pay a premium. Fox and Oviedo (2008) do not find a union wage effect in Anglophone Africa, but did find one in Francophone. In his work on Ghana and Tanzania, Teal finds a union wage effect (often correlated with firm size; see Rankin, Sandefur and Teal, 2010 for a discussion).
- *Having a contract and/or being in the public sector yields a premium*. Even in the larger, more established firms common in the enterprise survey data base, these results are observed. Fox and Pimhidzai (2013) used only teachers for their analysis of the public sector premium in Uganda and found it to be very high – over 50 percent, after controlling for personal characteristics.

It is harder to use observable personal characteristics to explain HE earnings variation compared with wage earnings variation. In their analysis of hourly HE owner earnings for Ghana, Rwanda, and Tanzania from cross-section data, Fox and Sohnesen (2012) found much lower R^2 s than in a typical wage determinants analysis. This is not unusual, as it indicates that the self-selection into the sector and unobservable personal characteristics are the most important determinants of earnings in this very heterogeneous activity. Convex returns to education were found in Tanzania and Rwanda, but not in Ghana. In an analysis of only urban HE owners (who are more likely to run their enterprise full time as a primary economic activity), Rankin et al. (2010) found the

²³ For an example, see World Bank (2006) for Uganda, Table A2.9. Other examples are cited in Fox and Gaal, (2008).

²⁴ Given that almost no one is hired into formal sector wage employment with these low levels of education, the lack of significance of limited primary education in the regression is not surprising.

typical convexity in returns for this sector, but with the returns tending to be smaller than in wage employment, especially wage employment in large firms. Kuepie et al. (2009) found a similar result for HE owners in the capital cities in W. Africa. They also found a lower R^2 in the earnings regressions for the HE owners and informal wage workers compared with the formal wage workers.

In their analysis of the earnings of HE owners and wage workers together in urban areas using OLS, Falco et al. (2010) only explained about 1/3 of the observed cross section variance. Instrumenting for education (to control for the correlation of education and unobserved characteristics), Falco et al. improved the result substantially, but *still left the majority of variance unexplained*. They then draw on the panel element of the data and use fixed effects estimators to explain earnings. They conclude that individual variables - either the standard Mincerian variables or time invariant skill (and network/family background) unobservables - are not sufficient to explain African wage variation; firm size and job characteristics are also important.

Analysis of the determinants of different types of individual earnings together in one specification is rarely done in Africa. This is not only because nonfarm wage, HE and agricultural earnings are rarely collected together. A second reason is that the challenge of measuring these earnings across similar and homogeneous units of time and space is very difficult to achieve. Daily or hourly earnings in agriculture are quite difficult to compute. The measurement errors are likely to be related to both the type of income and the personal characteristics, creating not just an imprecise but also a biased result. One way around this is to use human capital characteristics and job type to explain household consumption levels (as a proxy for household income). This is the approach followed in Fox and Sohnesen, (2012) that used the type of income coming into the household as an explanatory variable, controlling for household characteristics including location, demography, and the human capital of the household.²⁵ Regressions were run separately for rural and urban areas in six countries to estimate the marginal effect of household economic activity by type. Wage employment was disaggregated into public and private, and HEs with employees were considered separately from pure self-employment. Their results show that consumption is 11 - 27 percent higher in urban areas, and 11-32 percent higher in rural areas for households that are engaged in nonfarm self-employment, controlling for levels of education and household characteristics. The few households that have microenterprises show even greater effects (over 60 percent higher in Mozambique). What is surprising is that controlling for education, the marginal effect of HE earnings in urban areas is higher than the marginal effect of non-farm private sector wage employment and only in Burkina Faso and Cameroon is the effect lower than private sector nonfarm wage earnings in rural areas. The marginal effect of public sector wage earnings is almost always higher than private sector non-farm earnings wage or HE earnings, but sometimes lower than those for microenterprise earnings. This result suggests that while HEs may be the only occupational choice for people excluded from wage income opportunities (either because of

²⁵ This methodology is not without faults. Among others issues, since there is no measure of hours worked, it is assumed that the intensity of effort by the household in each type of income earning activity is the same. The specification was done separately for both rural and urban areas in order to reduce the importance of this problem, but it cannot be assumed away.

lack of education or simply lack of labor demand), they are still a good income choice for many members of this group, and for their households. This result is similar to Barrett et al. (2001) using household panel data to analyze the evolution of livelihoods in rural SSA, and how adding nonfarm activities helped households reduce poverty. While finding a positive effect of adding an HE, they also found that better off households were more likely to be able to take advantage of opportunities both within and outside the agricultural sector.

Finally, at the macro-sectoral level, several analyses using enterprise data have found African wages to be high relative to income level and productivity. Gelb et al. (2013) used enterprise survey data to estimate labor cost per worker at between US\$ 950-1000 in Nigeria, Tanzania, and Uganda, about the same level as Indonesia despite higher education and labor productivity in the later. UNCTAD data show that the ratio of manufacturing wage per worker to GDP per capita in 2005 was about 2 in Viet Nam compared with nearly 54 in Ghana and Kenya, despite similar income levels (Filmer and Fox, 2014). Gelb et al. (2013) found that controlling for GDP per capita produces a strongly positive wage dummy in their analysis of average manufacturing wages and productivity in Africa and comparator countries. This partly reflects higher costs of living in urban areas in Africa compared with E. Asia. Not only are the prices of nontradeables such as land, transportation, and telecommunications higher in Africa compared with low income Asia, but the price of food is higher as well.²⁶ This high cost of living effectively puts a floor under wages, as workers have to eat and pay for transportation to work. Within these limitations, however, studies have found that wage levels are flexible in response to external shocks. Rama (2000) found that real wages did adjust downwards and stayed down when the CFA devalued in the late 1990s in Francophone Africa. In Uganda, a country with one of the fastest growing labor forces, data suggest that in the private sector, real wages have not risen substantially over the decade 2000-2010, suggesting that a large supply of labor can indeed moderate aggregate wage levels.²⁷

9. Conclusion

Inequality (measured by the dispersion in household consumption) is high, and available evidence suggests that households are indeed heterogeneous in low and middle income sub-Saharan Africa, but not along exactly the same dimensions as in other regions. Poor rural households have very limited cash income, mostly grow their own food and consume it, and are less likely to have significant income diversification. For these households, welfare depends on safety nets to help them through the hungry season before harvest, and structural improvements in the economy which would allow them to raise productivity and get better farmgate prices for their crops. Middle income households (and poorer households in richer countries), have a more diversified portfolio of economic activities, and more cash. But they still grow their own food. Richer households tend to have mostly non-farm income and they purchase food. Thus it is only the richer households who face significant welfare risk when an external price shock hits. A surprisingly large share of adults report savings, but they use informal mechanisms to hold

²⁶ See <http://icp.worldbank.org/>

²⁷ Calculated using private sector wage data reported from UNHS surveys. See www.ubos.org for the statistical abstracts.

savings, not banks. In addition to savings, richer households are more likely to receive remittances, another way in which they can smooth consumption in the face of economic volatility.

From employment and earnings analysis, a picture of both opportunity but rigidities emerges. Mobility appears low, although this is not well studied owing to lack of data. Going to secondary school provides individuals and households with more opportunities, including access to more stable wage-earning opportunities. But outside of urban settings, this level of education is rare, and non-wage activities still dominate.

A tentative interpretation of these stylized facts is that rural and poorer urban African households are fairly resilient to short-term macroeconomic cycles, while longer term structural factors which affect the productivity of household farms and firms and the demand for labor in the growing medium and large enterprise sector matter a lot. This resilience may be one reason why African poverty rates were not broadly affected by the recent global economic crises to the same extent as poverty rates in emerging market economies.

The dominance of non-wage income makes some of the key mean variables for different household groups and individuals difficult to quantify. Existing labor force survey data either does not even try to measure this activity, or develops estimates which appear implausible (with a few exceptions). This means that the stylized facts reported here are necessarily contain more noise than those reported on emerging market or developed countries. This implies that sensitivity analysis during phases of model calibration as well as policy analysis will necessarily be even more important for the economist working on Sub Saharan Africa.

A macroeconomic modeler might be advised to focus on the *qualitative* ways in which household livelihood patterns and consumption differ (e.g. not just rich or poor, but rural/urban or farm/nonfarm income sources), and the extent to which these difference matter in household response to macroeconomic events, such as an external or domestic shock. Clearly higher income households have the resources to be more resilient, as they have education, diversified sources of income, and more cash to deploy, including the possibility of an external transfer from abroad. But the costs of urban living are high, and even the richest Africans in low and lower middle income countries report spending a lot of money on food. This leaves the middle classes – especially those urban areas – more vulnerable to external shocks affecting food or fuel prices than the poor in rural areas. It will be important to recognize this vulnerability in macroeconomic models used for policy analysis, as urban households are often well-placed to block policies which hurt their pocketbook. Poorer rural households are vulnerable to domestic shocks, both covariate and idiosyncratic, and they have few cash resources available to cope. Expansion of targeted cash transfers may change this reality.

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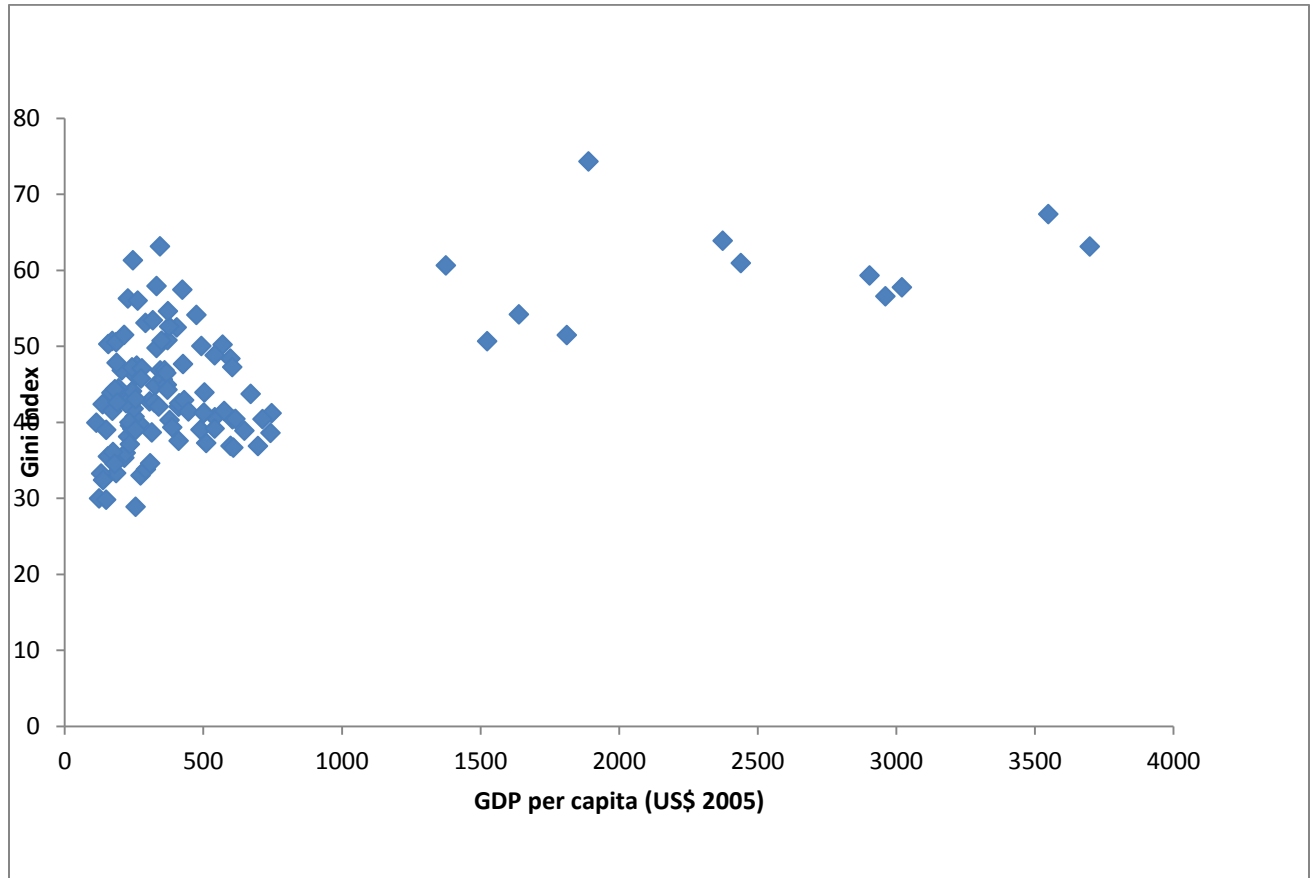
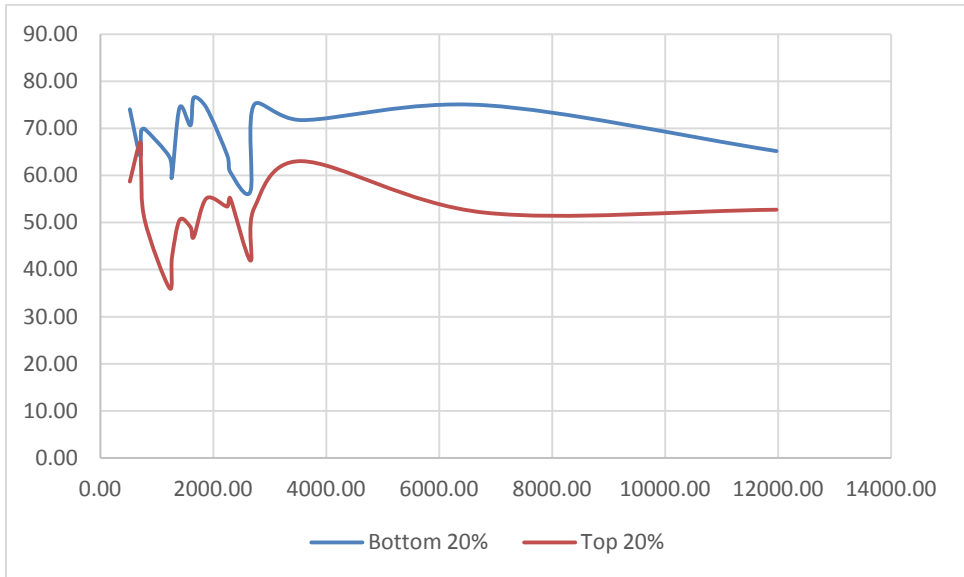
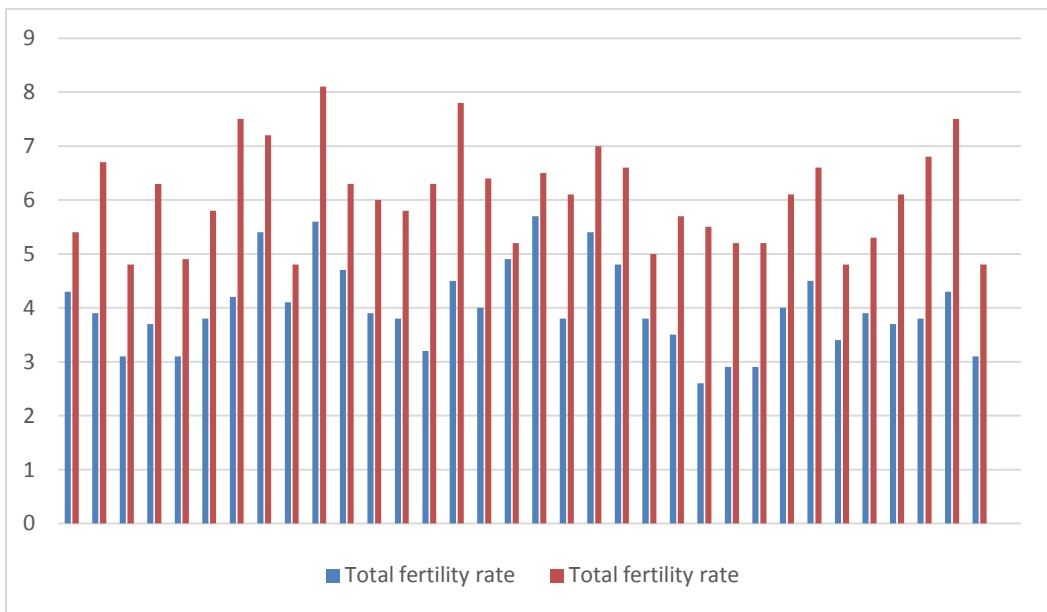
Figure 1. Sub-Saharan Africa: Gini index by Income Level

Figure 2. Food as a Share of Total Consumption Expenditures, by Country Income Level



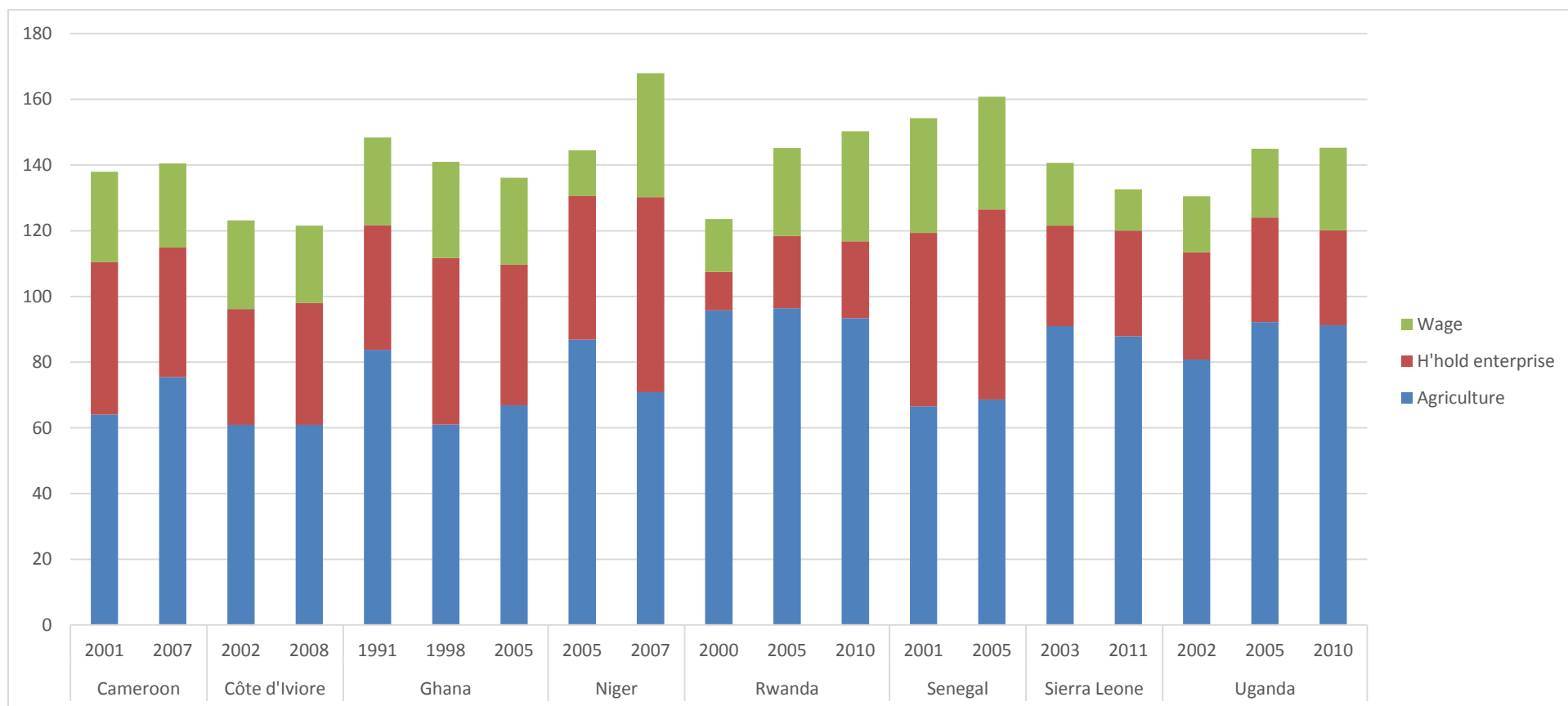
Sources: Consumption data - most recent household surveys, selected countries; Country income - GDP per capita in USD, PPP adjusted, from *World Development Indicators* on line

Figure 3. Total Fertility Rate, Rural vs. Urban, Low and Lower Middle Income African Countries



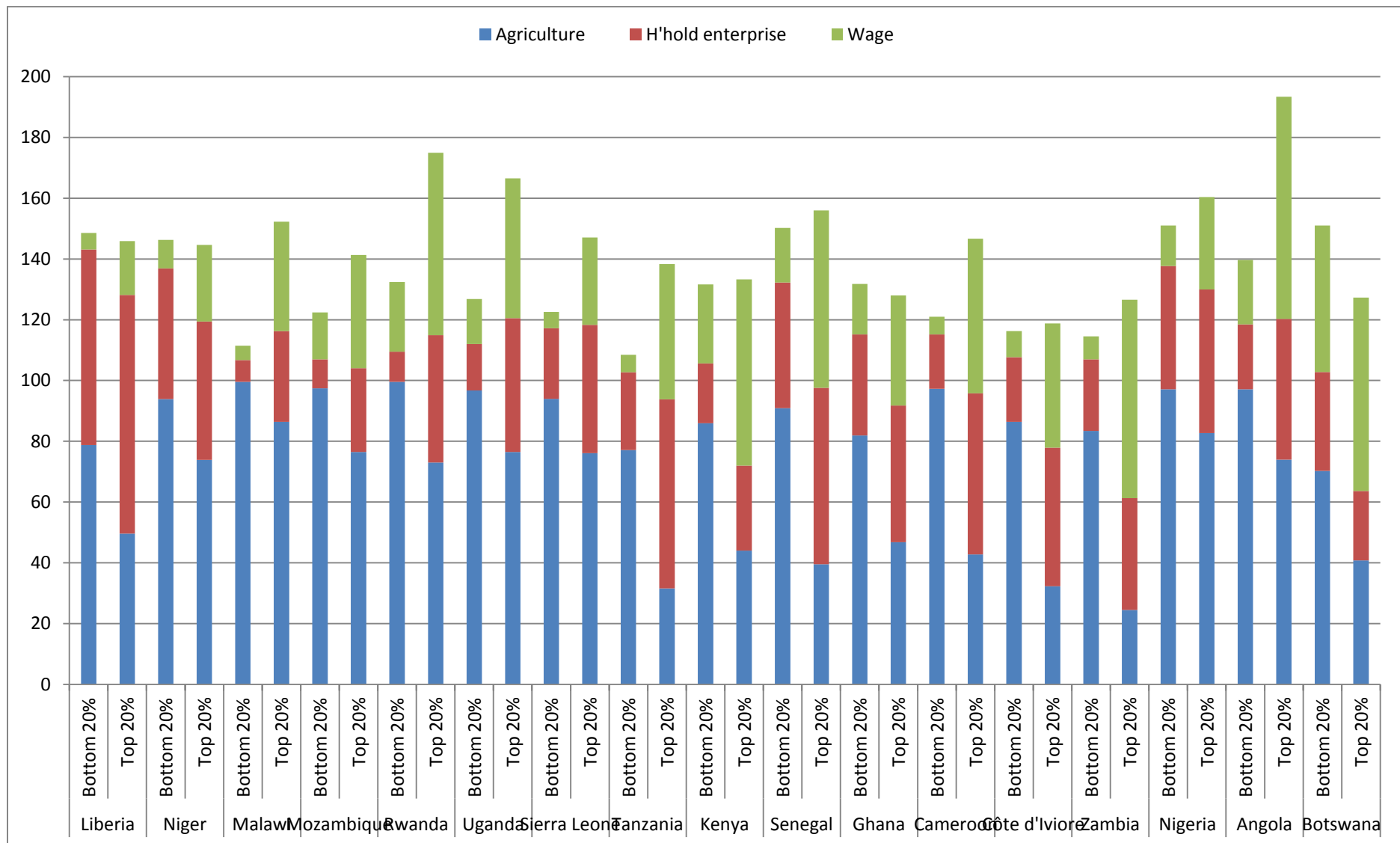
Source: DHS Statcompiler

Figure 4. Household Sources of Income, Selected Countries and Years



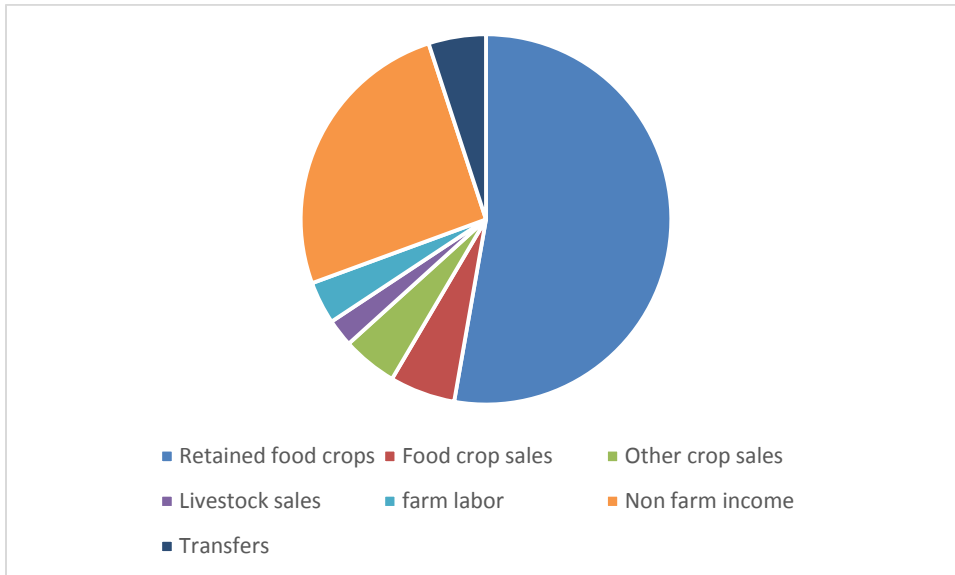
Source: Household surveys

Figure 5. Household Sources of Income, Top and Bottom Quintiles



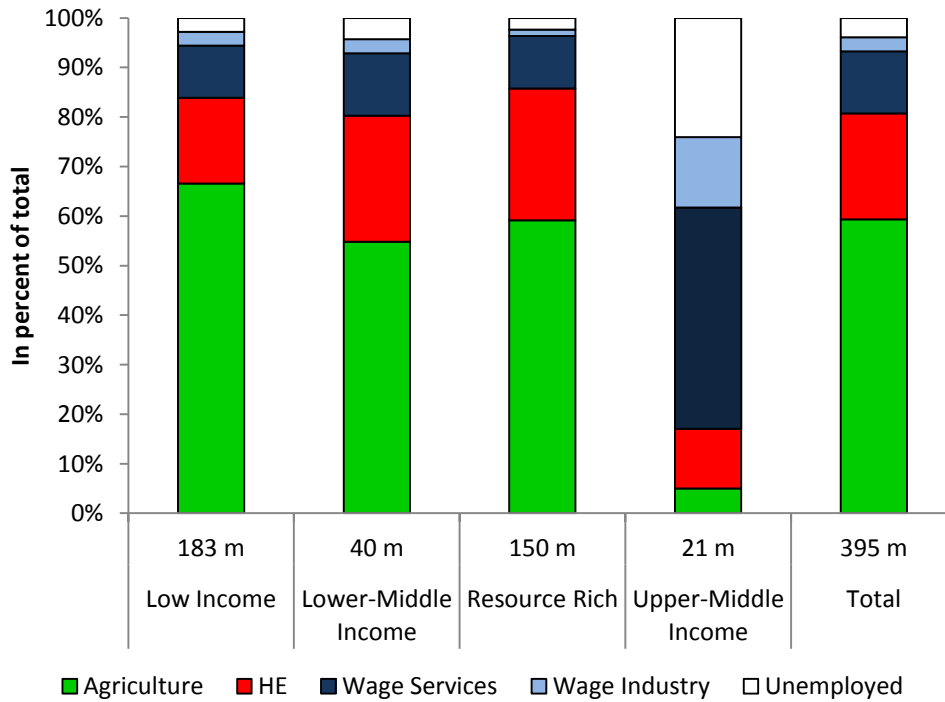
Source: Household surveys

Figure 6. Structure of Rural Household Income, Mozambique, 2005

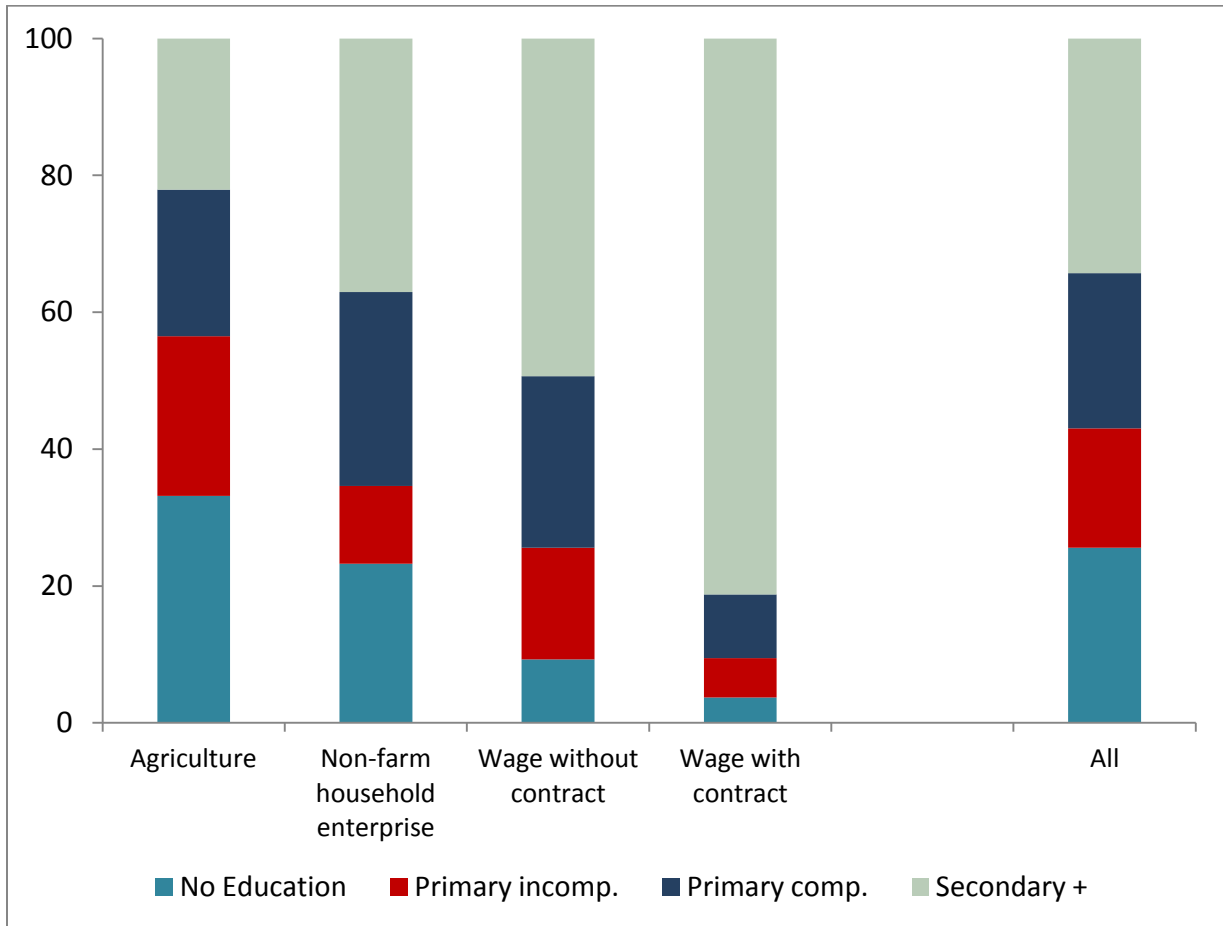


Source: computed from Mather et al. (2008)

Figure 7. Estimate Structure of Employment in Africa by Country Type, 2010



Source: Fox et al. (2013)

Figure 8. Education by Job Type, Africa

Source: Filmer and Fox (2014)