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Absolute versus Relative Measures of Poverty:
Application to DHS African Surveys

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Abstract

Many measures of poverty are currently available and used. The World Bank proposes absolute values, expressed in an estimate of income in standardized United States Dollars. The United Nations Development program proposes a Human Poverty Index based on the Human Development Index. The Demographic and Health Surveys propose a relative index of wealth, based on principal components within each country. We propose here another measure, an Absolute Wealth Index based on the number of modern good and amenities owned by a household. We show that this index is a powerful tool for assessing differentials in demographic outcomes, and that it can be used in a variety of ways for measuring poverty and inequalities. We show that its simplicity does not reduce its screening value. We interpret our Absolute Wealth Index as a measure of the degree of integration of a household into modern economy, and a clear proxy for development.

Résumé en français (147 mots)

Titre: Pauvreté absolue et pauvreté relative: mesures et interprétations
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Plusieurs mesures de la pauvreté sont disponibles et utilisées dans le monde. La Banque Mondiale utilise des mesures de pauvreté fondées sur le revenu par tête, exprimé en monnaie standardisée (USD). Le Programme des Nations Unies pour le Développement utilise un indicateur de pauvreté basé sur l'indicateur de développement humain. Les enquêtes EDS proposent un indice relatif de pauvreté, basé sur les composantes principales, redéfinies pour chaque enquête. Nous proposons une autre mesure, très simple, calculée sur un ensemble de biens de consommation et d'équipement possédés par le ménage. Il s'agit du nombre de biens modernes choisis dans une liste. Celui-ci peut varier de 0 à 16 dans les enquêtes DHS, voire plus dans les recensements. Nous montrons que cette mesure est aussi discriminante que des indicateurs plus complexes. De plus, cette mesure est absolue, et permet des comparaisons dans le temps et dans l'espace. Elle est aussi bien corrélée avec le PIB par tête en parité de pouvoir d'achat dans les pays les plus pauvres.

Poverty and Development in a broad historical context

Debates about the relationship between poverty and development go back to the early days of political economy in the 18th and 19th century. Concerns about extensive poverty, or even increasing poverty, in a context of increasing wealth, were expressed by key writers such as Adam Smith (1776), Thomas Malthus (1826), Villermé (1840), Turgot (1844), Alexis de Toqueville (1835), Karl Marx (1867), and many others. Poverty in 18th and 19th century Western Europe was seen not only as lack of economic resources but also as a social issue. The poor were often stigmatized, categorized (vagrants, beggars, etc.), when not repressed, or obliged to stay in institutions (such as the workhouses) or even jailed. Poor laws developed in England since the 17th century aimed not only at providing an income but also at correcting what was seen as deviant behaviour. If the situation has changed since, because of the massive involvement of the state, there are still forms of stigmatization associated with poverty in developed countries. Paugam (1995a,b) reviewed the literature on poverty in the 20th century, and showed the complex relationships between modern societies and the poor in Western Europe. He often refers to the writings of Georg Simmel (1907) on the sociology of poverty, who focused on the relationship between the state and the poor, and in particular on the notion that state assistance defines the poverty status. He also shows the many forms of poverty in Western Europe and the different implications depending on state policies.

The situation of today's poverty in sub-Saharan Africa is quite different, and this has been noted by several authors [Bahri, 2004; Gendreau, 1999; Winter, 2002; Dubois et al., 2003]. Economic development was imported from European nations with colonization at the end of the 19th century, and spread irregularly, with much emphasize on urban areas, on industrial complex built around mineral resources (mines, oil), or special rural areas (estates) designed for exporting tropical products. Much of the rural populations of Africa remained outside the economic development process, and continued to live on subsistence economy, as they ancestors had done for many centuries. In this situation, poverty defined with modern concepts (lack of monetary income) is above all a sign of lack of integration into the modern economy. It is usually not associated with social stigmatization, not labelled as deviant behaviour, and does not have the same social connotation. Groups still living in traditional economies are living in traditional societies, which are usually not acculturated, and maintain traditional social links and norms. Of course, these groups are expected to be poorly endowed with respect to so-called development indicators, and their economic situation is a major handicap to enjoy good and services supplied by modern economies.

Definitions of poverty adopted by the United Nations agencies tend to ignore this historical process, and tend to focus on the current situation seen from a first world perspective:

> *"Fundamentally, poverty is a denial of choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and cloth a family, not having a school or clinic to go to, not having the land on which to grow one's food or a job to earn one's living, not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living on marginal or fragile environments, without access to clean water or sanitation"*
> (UN Statement, June 1998)

The situation of traditional farmers is quite different from that described in the UN statement. They still have functioning traditional societies, can participate effectively in them, do not face major issues of human dignity, have usually enough to feed or cloth a family, have land to farm, are not excluded, and live in secure environment except when international or civil wars disturb them. Their poverty is real with respect to international standards because lack of monetary income hampers them to have access to modern goods and services, which require cash to be acquired. But the social stigma associated with poverty in developed nations, and which are emerging among the urban poor in developing nations, do rarely exist in rural areas of pre-transitional societies.

This is within this context that we undertook this study. We propose a simple measure of poverty, based on goods and amenities owned, as a proxy for the degree of integration into the modern economy. We will show how this measure relates to various socio-economic and demographic indicators, again showing the degree of advancement into the development process. Viewed this way, the correlations between wealth and any development indicator are straightforward. We will also show other relationships when variables under study are determined by other non-economic factors, whether biological or cultural.

The paper presents first an "Absolute Wealth Index", which is a direct and simple measure of poverty, and which differs from classic measures of inequalities, in particular from the "relative wealth quintiles" often found in the literature and much promoted by the United Nations Agencies (World Bank, United Nations Development Program, etc.). The aim is not so much to focus on inequalities as to focus on the development process. We will show how this measure relates to many demographic indicators computed in censuses and surveys (fertility, mortality, marriage, education, nutritional status).

Data and Methods

The "Absolute Wealth Index" (AWI) was developed originally for a study on health insurance in Morocco [Garenne & Hohmann, 2005]. It is based on modern goods and amenities owned by households. It is defined as a sum of dummy variables, where 1 means ownership, so that the AWI varies from 0 to n, n being the total number of goods and amenities considered in the list. The AWI was shown to be closely related to child survival, and to perform at least as well as any other linear combination of the same goods and amenities, such as first principal component, discriminant function, or their economic values (price included). There is an obvious rationale for the number of goods and amenities. When households have some disposable income, they will first acquire some basic goods, such as a radio, a bicycle, a tin roof, etc, which they need and can afford. When income increases, they will acquire more goods, more expensive goods, and so on, until they have enough income to acquire all the necessities of modern life. The order in which households acquire goods is fixed by the local environment and by the preference of the household members. But, whatever the situation, when households have no or very few modern goods they can be labelled as "poor", and when they have all possible goods and amenities, they can be labelled as "wealthy". We will see that in Africa, the proportion of the population with very few modern goods and amenities is so large that the number of goods entered into the list does matter very little. Of course, the longer the list, the more precise is the AWI. We have proposed a list of 20 items, which seems to be enough to discriminate most situations in the developing world. These items are the 14 items commonly found in DHS surveys, plus 6 items which have been used in other censuses and surveys (see Table 1 for the complete list).

Data to compute the AWI were derived from DHS and related surveys (MIS, AIS) conducted in sub-Saharan Africa by Macro International (see DHS web site for details). The list of goods and amenities used in this study includes 14 items, coded basically the same way in all surveys (see Table 1). For some surveys, the list was incomplete, in particular the "type of walls" and the "type of roof", living only 12 items in some surveys. Some early DHS surveys (DHS-I) and some non-DHS surveys (AIS and MIS) also has some items missing. All surveys had at least 10 of the items, which is enough for screening the very poor.

Relationships between the AWI and several indicators were investigated. These were either computed from the same DHS surveys, or taken from other data bases. Indicators computed from the DHS surveys were the following:

- Urban residence, defined as the proportion of women interviewed (age 15-49) living in urban areas;

- Fertility, defined as the mean number of children ever born, standardized by age of mother (age 15-49);

- Child mortality, defined as the proportion of children who died among children ever born, standardized by age of mother (age 15-49);

- Median age at marriage, defined at the age at which half the female population is ever married (women age 15-49);

- Level of education, defined as the mean number of years schooling (women age 15-49);

- Premarital fertility, defined as the proportion of women who had a birth before the first marriage (women age 15-49, either ever married or ever fertile);

- Child nutritional status, defined as the mean Z-score of weight for age, children age 12-59 months;

- Adult nutritional status, defined as the mean height (women age 20-49);

- Wealth quintile: provided by DHS surveys (when available).

In addition, we used data from other sources for comparison:

- Country population, provided by the United Nations Population Division (2004 revision);

- Country income per capita: provided by the OECD database [Maddison et al. 2003].

- Human poverty index, provided by the UNDP (Human Development Report, 2007).

An average for Africa was prepared by computing the weighted average of the various variables, weights being proportional to the population in year 2000. For graphic presentation, the AWI was grouped in seven categories: 0-1, 2-3, 4-5; 6-7; 8-9, 10-11, 12+.

The correlation between socio-demographic correlates and the AWI was compared with the same correlation with the Relative Wealth Quintiles, computed by DHS surveys. For this comparison, the AWI was grouped into five categories: 0-1, 2-3, 4-5; 6-7; 8+, to be matched with the five quintiles provided by DHS surveys.

Results

Wealth and Income

The absolute wealth index (AWI) was oddly distributed in Africa, highly skewed towards the left, with a majority of households with very low values (0 or 1 items) and very few with 8 items of more [Figure 1]. The average was very low (3.1 items), and the standard deviation quite high (2.9 items). This distribution differs markedly from similar distributions in transitional economies, such as those of Central Asia, which are normally distributed around a mean of 5.5 goods, and much lower standard deviation [Hohmann & Garenne, 2006], and from equivalent distributions in developed countries, which are skewed to the right, where most households have basic necessities. The first category (AWI= 0-1) grouped already 38.2% of the African population; and the second category (AWI= 2-3) an additional 27.0%; the next categories accounted respectively for 14.1% (AWI= 4-5); 10.2% (AWI= 6-7); 7.0% (AWI= 8-9); 3.1% (AWI= 10-11); and only 0.5% for the last category (AWI= 12+).

The AWI at national level ranged from 0.89 to 6.27, reflecting the large differences in wealth, and in Gross-Domestic Product (GDP) between countries. In fact, the correlation was positive (ρ= 0.70) between AWI and LOG(GDP-PPP), which means that our AWI is a proxy for log-income [see Figure 2]. The largest outliers from the regression line linking the two variables seemed to be due to erratic estimates of GDP rather than of AWI (e.g. Congo Democratic Republic), or to very unequal income distribution (e.g. Botswana). Furthermore, this regression line allows one to convert estimates of AWI into estimates of GDP-PPP. A value of AWI= 0 corresponds to a GDP-PPP of 365 USD per capita (just one dollar per day), a value of AWI= 1 to 691 USD per capita (about two dollars per day), a value of AWI= 6 corresponds to 2478 USD per capita, and a value of AWI= 12 to 16827 USD per capita, a range going from very low to high values of income per capita. According to this conversion, more than half of the population of sub-Saharan Africa has an income lower than two dollars per day.

Defining as "very poor" the households with less than 2 modern items indicates that 35.4% of households are "very poor" in Africa, with a range from 8.4% (South Africa) to 78.4% (Burundi) across countries. These estimates need to be taken with caution, since the year at which they apply may vary from 1987 to 2007. Our indicator of the prevalence of poverty had a positive correlation (ρ= +0.44) with the Human Poverty Index (HPI) defined as

a composite indicator including mortality (the proportion of persons dying before age 40), education (proportion of adults who are illiterate), and health variables (percentage of people with access to health services, percentage of people with safe water, and percentage of malnourished under-five children [UNDP, 1997].

The AWI can also be used to compute a Gini coefficient, either directly (distribution of wealth) or after converting AWI into an equivalent of GDP-PPP (distribution of income). Results show an average value of Gini coefficient for Africa equal to 51 (wealth) and 56 (income), which is close to that computed by the United Nations Development Program (UNDP) for the same countries (48.3) [Figure 3, Table 2]. The Gini coefficient (income) ranged from 28 (Burundi) to 61 (Namibia), but the correlation with UNDP estimates of Gini coefficients was very weak. However, countries known to have large inequalities came out clearly with our Gini coefficient (Namibia, Zambia, Zimbabwe), and countries with less inequalities, primarily because a large proportion of the population are very poor, also showed up clearly (Burundi, Chad, Rwanda). Countries from Southern Africa came out with values closer to average (South Africa, Lesotho, Swaziland), with the surprising exception of Botswana. Of course, the Gini coefficient reflects not only the inequalities but also the degree of development, a situation different from that of European countries.

Socio-demographic correlates

The AWI correlated well with most socio-demographic indicators investigated. Correlation with urbanization was high, most wealthy households being located in urban areas, whereas most poor households were located in rural areas [Figure 4a]. The relationship between wealth and urbanization was similar to a logistic curve, with almost universal rural residence for the very poor and almost universal urban residence for the very wealthy. This type of relationship could have been anticipated, since very traditional households are almost necessarily living in rural areas, and since very wealthy households are almost necessarily living in urban areas. Compared with the Relative Wealth Quintiles (RWQ), the relationship with urbanization was clearer with the Absolue Weath Index (AWI), and with a shape closer to what could be anticipated: a logistic curve [Figure 4b].

Correlation with level of education was also high: households with a very low AWI (0-1) had very low levels of education (2.2 years of schooling), and the relationship was almost linear up to AWI= 10-11 (10.0 years schooling), and tended to level off in the highest category, possibly due to a small sample size, or simply because few women undertake higher

education (more than 12 years) [Figure 5a]. The relationship between level of education and the AWI was also more straightforward than that with quintiles [Figure 5b]. In any case, level of education was closely associated with integration into modern society, as could have been anticipated.

Correlation with age at first marriage was strong, but less straightforward. There are of course lower and higher limits to women age at first marriage, determined by biology (puberty, and optimum age for child bearing). So that, median age at marriage tended to level off around 26 years even for the wealthiest women, and exceeded age 18 years even for the poorest women [Figure 6a]. We showed in an earlier paper the relationship between age at marriage and modernization at country level in Africa [Garenne, 2002]. This relationship is well reflected in this study comparing traditional and modern women at the level of the continent. In this case too, the relationship between wealth and age at marriage was better reflected by using the AWI than the quintiles [Figure 6b].

Fertility was closely linked to wealth, here with some bottom threshold below AWI= 4, below which fertility seems to have little declined (4.1 children ever born per woman age 15-49) [Figure 7A]. There was hardly any upper threshold, and the number of children ever born was low and very low for the women in the higher classes (1.9 for AWI= 10-11; 0.5 for AWI= 12+). Here again the quintiles would not have provided a regular pattern, and only the highest quintile exhibited a much lower fertility [Figure 7b].

Relationship with premarital fertility was not straightforward, and had rather the shape of a hat. If premarital fertility increased with wealth for low levels, it had a maximum around AWI= 8-9, and then tended to decline. This seems to be due to non economic factors: age at marriage and permissiveness tend to increase with wealth, but use of efficient contraception too, so that the two effects counter-balance at higher values of wealth. [see Garenne & Zwang, 2006 for more details on premarital fertility in Africa)].

The relationship with child survival is one of the most studied relationships, and as anticipated child survival exhibited a strong gradient with respect to wealth [Figure 9a]. Child mortality ranged from 213 per 1000 at very low levels of wealth (WI= 0-1) to 44 per 1000 at high levels (WI= 12+), a ratio of 4.8 to 1. The relationship was regular, as could have been anticipated, and again better shown by the absolute wealth index than by the relative wealth quintiles [Figure 9b].

Discussion

In summary, the Absolute Wealth Index (AWI) provides a simple and synthetic measure of the degree of modernization of a household. This can be easily understood since as soon as a family gets involved into modern economy it can cumulate goods and equipment, it can benefit from a variety of modern services (health services, education services, etc.), and tend to change its behaviour, imitating the upper classes (marriage, contraception, etc.). This is why these relations show up clearly in this study.

A nice feature of this approach is the correlation of the AWI with an independent measure of income, the GDP-PPP, as calculated by Maddison et al. (2003). Of course, the amount of goods and amenities cumulated by families is only a proxy for log(GDP), but which in some cases might be more informative than formal measures of income. A small country with lots of natural resources (petrol, minerals) and with very little redistribution could have in theory a high GDP per capita and a low AWI, but in this case the low AWI would reflect better the situation of the population (as in Equatorial Guinea in the recent years). Conversely, a country undergoing a severe economic crisis could have a low GDP for a number of years, and still keep a relatively higher AWI because of the goods cumulated in the good years. Here again, the AWI might be a more informative indicator of the situation of the population.

Of course, the study could be refined, with better measures of all indicators, and above all with a more comprehensive and more standardized list of items. If censuses and standard demographic surveys (such as DHS, MICS, LSMS etc.) could come out with a fixed list of items, with some common basic coding, they could be used very efficiently for a number of purposes, including providing key indicators of wealth and of wealth distribution, and key references for numerous studies of socio-economic and demographic differentials. We proposed a list of 20 items in Table 1, which seems to be enough for most developing countries. Note also that the AWI is based on data easy to collect (presence or absence of a good or amenity in the household) and is easy to compute, which makes its application particularly simple in developing countries.

To have a simple and replicable indicator of modernization could be also used for monitoring changes over time. In this study, we focused on cross-sectional differences, but the same indicator could be used for evaluating progress in wealth over time, or in severe crises to identify households who lost wealth, or ended up in a worse situation. This could be

of particular interest for studying changing poverty in informal settlements of large cities of developing countries, a major emerging issue in several African countries.

References

Bahri, A. (2004). Sur la definition de la pauvreté. *African Population Studies*; Suppl to Vol 19: 1-12.

Dubois JL. Lachaud JP, Montaud JM, Pouille A. (2003). Pauvreté et développement socialement durable. Presses Universitaires de Bordeaux.

Garenne M, Hohmann S. (2003). A wealth index to screen high risk families: application to Morocco. *Journal of Health, Population and Nutrition*; **21**(3):235-242.

Garenne M. (2004). Age at marriage and modernization in sub-Saharan Africa. *Southern African Journal of Demography;* **9**(2): 57-77.

Garenne M, Zwang J. (2006). Premarital fertility and ethnicity in Africa. DHS Comparative Reports No. 13. Calverton, Maryland, USA: Macro International Inc. 87 p.

Gendreau F. (eds). 1999. Crises, pauvreté et changements démographiques dans les pays du sud. Paris, ESTEM.

Hohmann S, Garenne M. (2006). Vulnérabilité et santé en Ouzbékistan : origine des différentiels de mortalité selon la richesse des ménages. *Annales de Démographie Historique*, 2005(2) : 109-138.

Malthus TR. (1826). *An essay on the principle of population*. Sixth edition. [Reprinted by Dent & Sons, London, 1982.]

Marx K. (1867). *Das Kapital: Kritik der politischen Ökonomie*. Wilhelm Wolf. [French translation: *Le Capital: critique de l'économie politique*. Paris, PUF, 1993.]

Montesquieu. (1758). *De l'esprit des lois*. [Reprinted in 1995, Editions Gallimard, Paris] (see Livre XXIII, chapter 29).

Paugam, S. (1995). *La société française et ses pauvres*. Paris, PUF.

Paugam, S. (1995). *Les formes élémentaires de la pauvreté*. Paris, PUF.

Simmel G. (1907). [French translation: *Les Pauvres*. Paris, PUF, 1998.]

Smith A. (1776). An inquiry into the nature and causes of the wealth of Nations. [Reprinted in 2000, Random House, New York.]

Tocqueville, AD. (1835). De la démocratie en Amérique (voir chapitre 14). [Reprinted in 1999, Flammarion, Paris.]

Turgot ARJ. (1844). Oeuvres complètes. Editions Dupont de Nemours.

United Nations Development Program (UNDP). *Human Development Report* (see issues 1997 and 2007-2008).

Winter G. (2002). *L'impatience des pauvres*. Paris, Presses Universitaires de France.

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Table 1: List of goods and amenities used for the computation of the Absolute Wealth Index

Variable code			Nb of African DHS surveys in which available
HR file	IR file	Variable	
HV201	V113	Source of drinking water	36
HV204	V115	Time to get to water source	30
HV205	V116	Type of toilet facility	36
HV206	V119	Has electricity	36
HV207	V120	Has radio	36
HV208	V121	Has television	36
HV209	V122	Has refrigerator	35
HV210	V123	Has bicycle	36
HV211	V124	Has motorcycle	36
HV212	V125	Has car/truck	36
HV213	V127	Floor material	36
HV214	V128	Wall material	18
HV215	V129	Roof material	17
HV221	V153	Has telephone	29
		Mean number of items	12.7

Note: Supplementary questions that could be asked in surveys and censuses:
- Has mobile phone?
- Type of cooking fuel?
- Has a watch?
- Does any member have a bank account?
- Has a computer?
- Has an internet connection?

Table 2: Characteristics, and distribution of wealth in 36 African countries

Country	Survey Year	Popul-ation 2000	Income / capita (GDP-PPP)	Absolute wealth index (AWI)	Propor-tion very poor	Gini Coef-ficient (wealth)	Gini Coef-ficient (income
Angola	2006	12.386	789	4.45	26.8%	0.41	0.48
Benin	2006	6.222	1323	4.85	10.7%	0.33	0.52
Botswana	1988	1.725	4348	3.04	19.9%	0.33	0.36
Burkina Faso	2003	11.905	853	2.92	24.8%	0.40	0.47
Burundi	1987	6.267	575	0.89	78.4%	0.68	0.28
Cameroon	2004	15.117	1115	3.00	33.4%	0.44	0.43
Central Afri. R.	1994	3.715	647	1.80	56.1%	0.57	0.45
Chad	2004	7.861	424	1.03	75.1%	0.65	0.32
Comoro Islands	1996	0.705	581	2.30	41.3%	0.43	0.37
Congo Kinshasa	2007	48.571	218	2.39	51.2%	0.58	0.53
Congo Brazza	2005	3.447	2214	4.16	23.4%	0.40	0.50
Ivory Coast	2005	15.827	1326	4.17	19.7%	0.37	0.46
Ethiopia	2005	65.590	624	1.66	69.2%	0.69	0.56
Gabon	2000	1.258	3887	5.80	12.0%	0.29	0.42
Ghana	2003	19.593	1280	3.65	15.3%	0.34	0.43
Guinea	2005	8.117	572	2.34	42.8%	0.48	0.44
Kenya	2003	30.549	1020	3.33	25.3%	0.42	0.50
Lesotho	2004	1.785	1645	2.36	40.2%	0.45	0.40
Liberia	2007	2.943	847	2.66	38.9%	0.46	0.42
Madagascar	2003	15.970	706	1.97	58.3%	0.59	0.44
Malawi	2004	11.370	679	1.93	48.0%	0.49	0.42
Mali	2006	11.904	842	3.30	22.7%	0.39	0.47
Mozambique	2003	17.861	1432	1.95	49.0%	0.52	0.42
Namibia	2007	1.894	3795	6.01	19.4%	0.42	0.61
Niger	2006	10.742	503	1.62	67.9%	0.61	0.47
Nigeria	2003	114.746	1156	3.50	21.9%	0.37	0.42

Rwanda	2005	7.724	830	1.21	71.3%	0.58	0.30
Senegal	2005	9.393	1433	4.41	17.0%	0.35	0.45
South Africa	1998	44.000	4139	6.27	8.4%	0.28	0.46
Sudan	1989	31.437	991	2.63	48.1%	0.55	0.52
Swaziland	2006	1.044	2606	6.22	8.7%	0.31	0.55
Tanzania	2004	34.837	524	2.32	42.7%	0.51	0.49
Togo	1998	4.562	575	2.87	25.0%	0.37	0.37
Uganda	2006	23.487	788	2.84	36.1%	0.49	0.56
Zambia	2007	10.419	666	4.77	19.1%	0.42	0.61
Zimbabwe	2005	12.650	1280	5.40	23.1%	0.43	0.59
Africa		627.623	1134	3.13	35.4%	0.51	0.56

Table 3: Gradient of various demographic indicators by level of absolute wealth, weighted average of 36 African countries

Indicator	Absolute Wealth Index (Number of modern items in the household)						
	0-1	2-3	4-5	6-7	8-9	10-11	12+
Women age 15-49							
Population (%)	38.2	27.0	14.1	10.2	7.0	3.1	0.5
Proportion urban (%)	8.9	22.9	53.8	74.5	87.8	92.6	94.5
Level of education	2.24	3.63	5.72	7.49	8.93	10.28	9.91
Fertility (CEB)	4.18	4.15	3.57	3.06	2.63	1.94	0.52
Age at first marriage	18.6	19.3	20.7	22.4	24.6	25.1	25.5
Age at first birth	19.3	19.5	20.9	22.2	23.6	24.4	24.7
Age at first sex	18.0	17.1	17.6	17.9	18.3	19.0	19.1
Premarital fertility (%)	11.5	15.1	22.0	25.1	34.9	27.5	22.3
Child mortality (per 1000)	213	187	151	121	99	80	44

Figure 1: Distribution of African populations by level of wealth, 36 countries
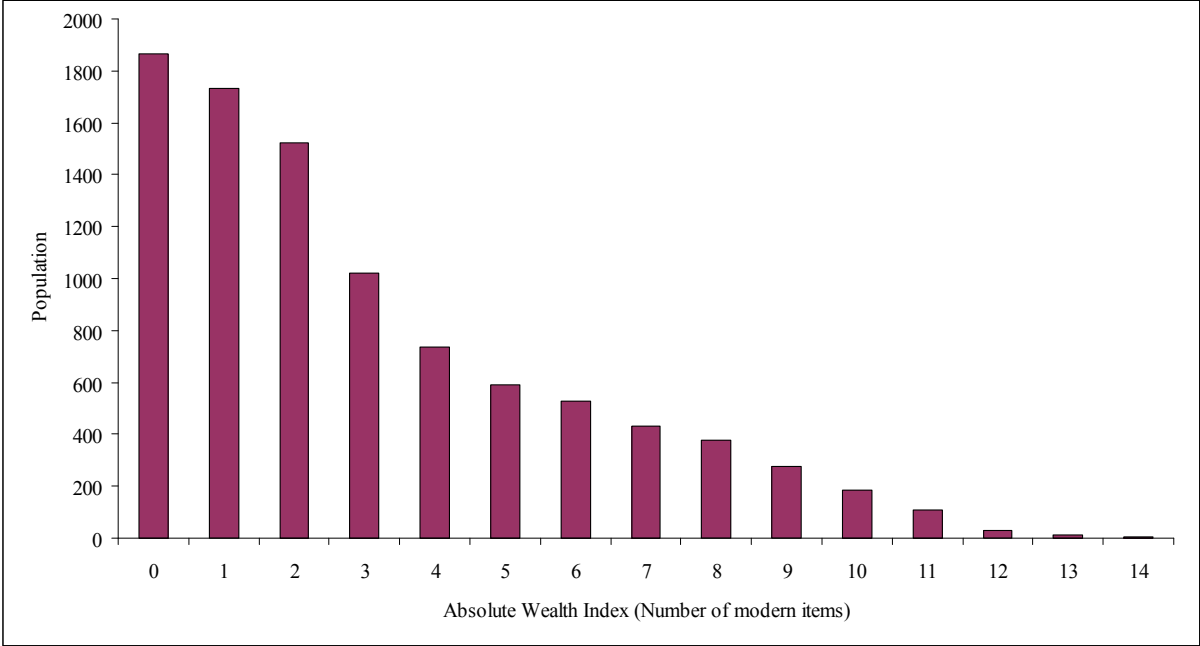
Figure 2: Relationship of Absolute Wealth Index with Log-GDP at country level, 36 countries
in sub-Saharan Africa
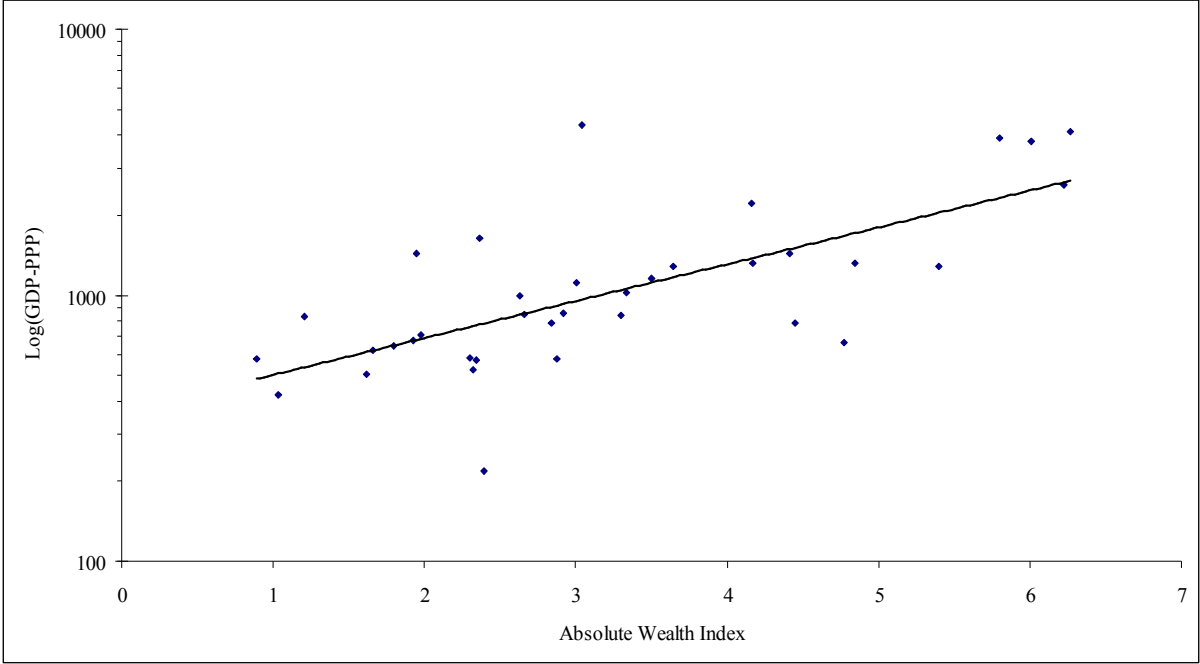
Source for GDP-PPP: Maddison, 2003.

Figure 3a: Lorenz curves of inequalities in wealth distribution, 36 African countries

Lorenz curve: absolute wealth
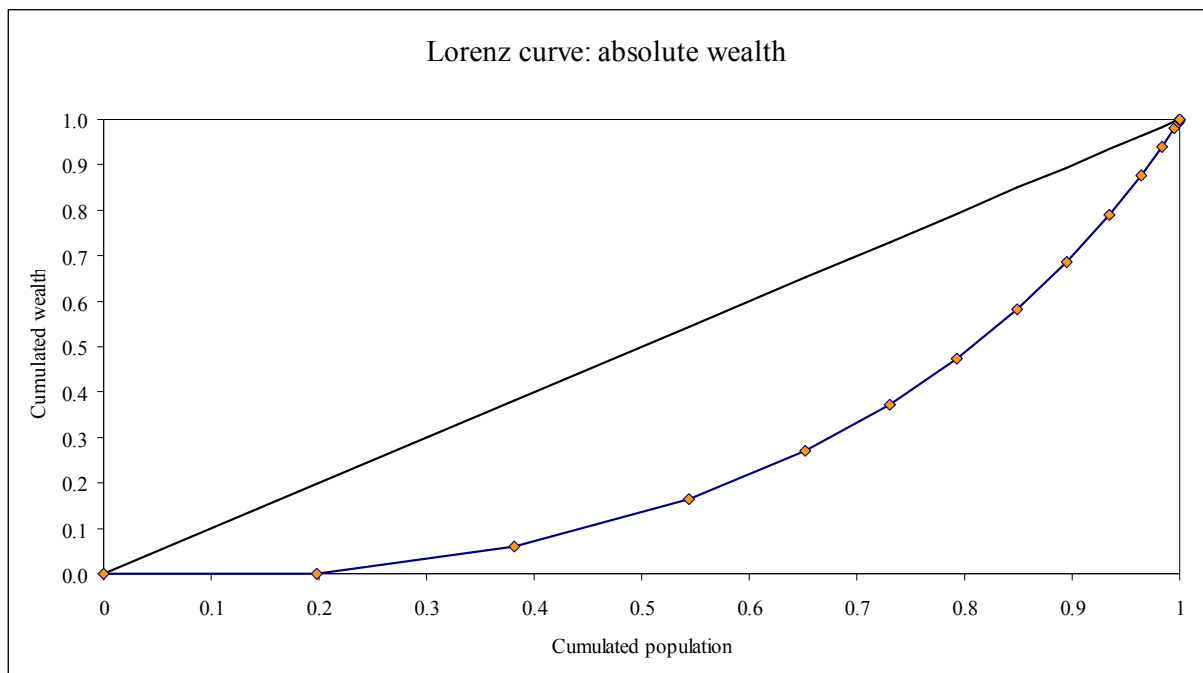
Figure 3b: Lorenz curves of inequalities in income distribution, African countries

Lorenz curve: income (from AWI)
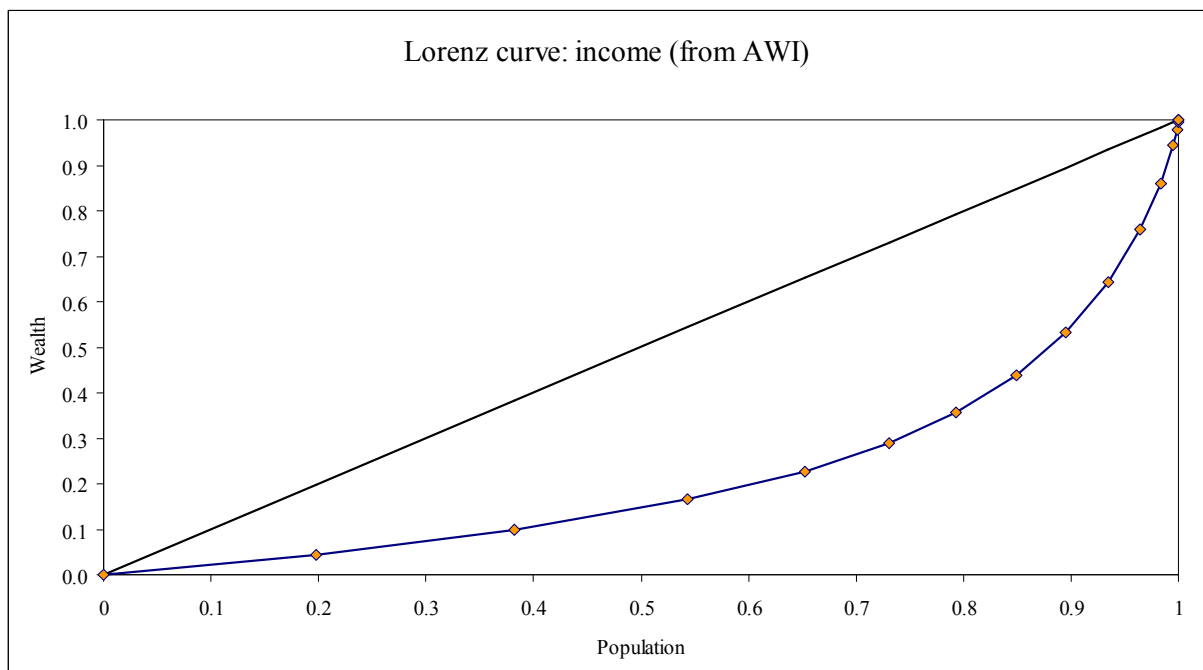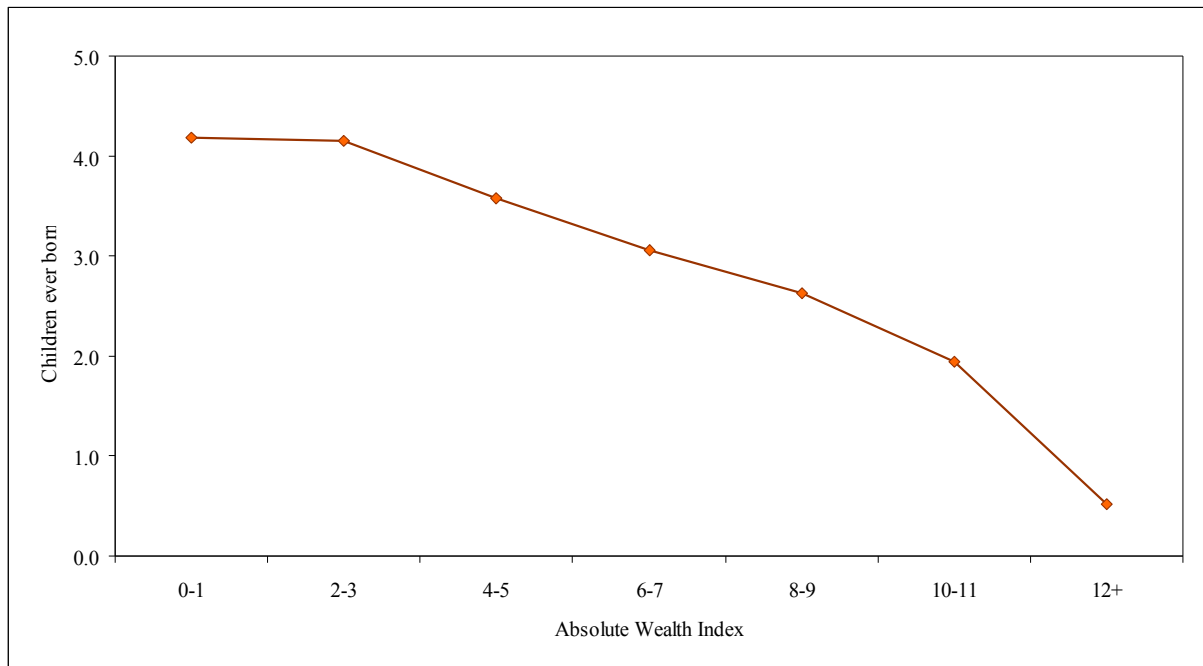
Figure 4a: Gradient of urbanisation by Absolute Wealth Index
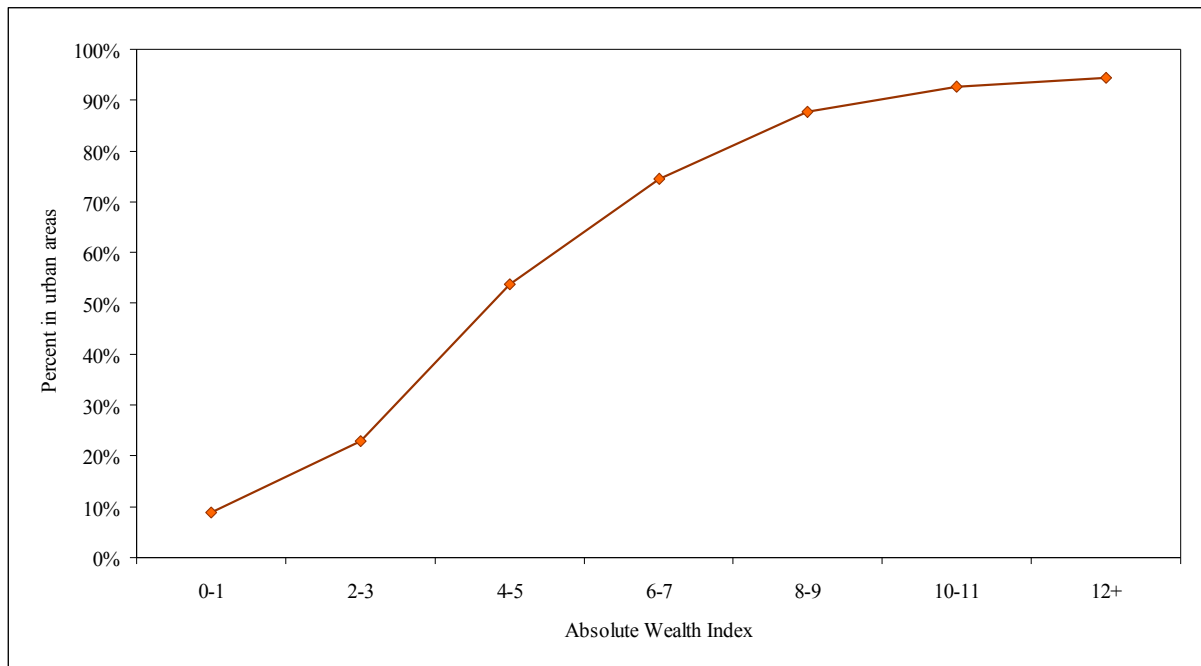
Figure 4b: Comparison of the relationship of urbanisation with absolute wealth index and wealth quintile
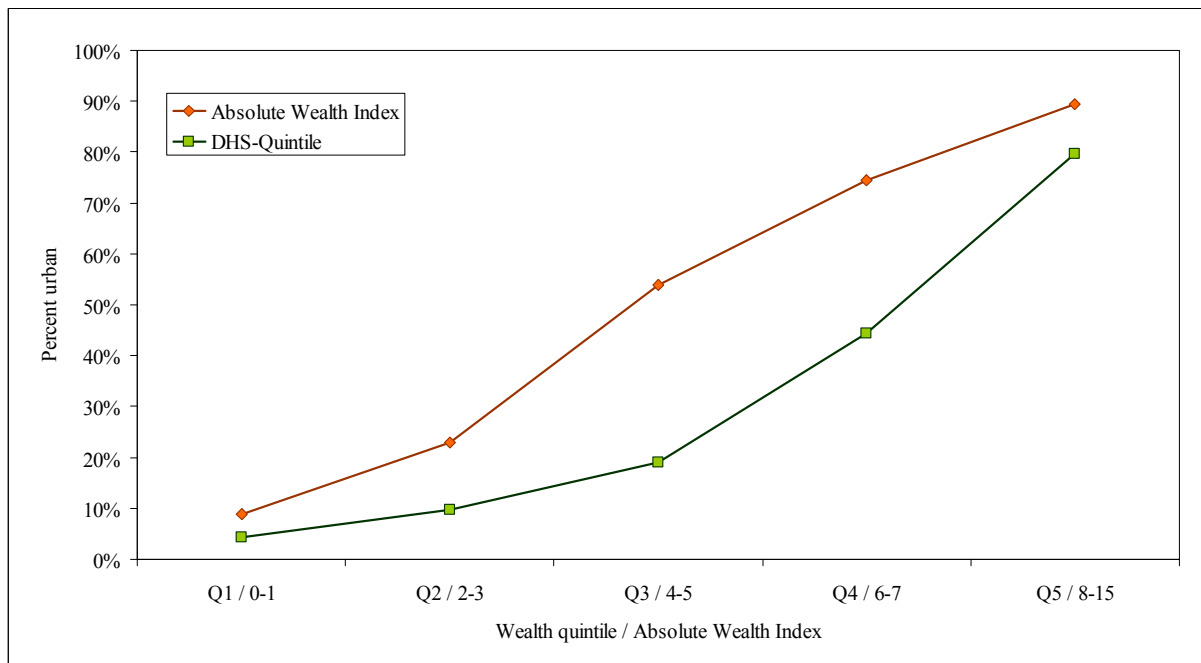
Figure 5a: Gradient of female level of education by Absolute Wealth Index
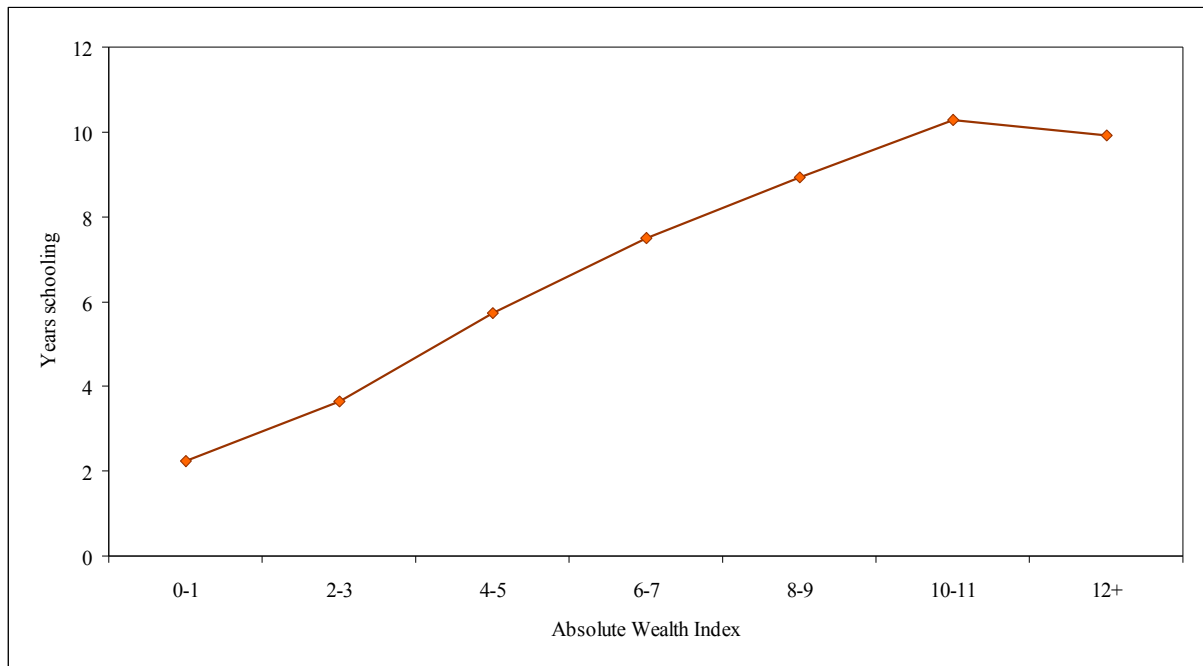
Figure 5b: Comparison of the relationship of female level of education with absolute wealth index and wealth quintile
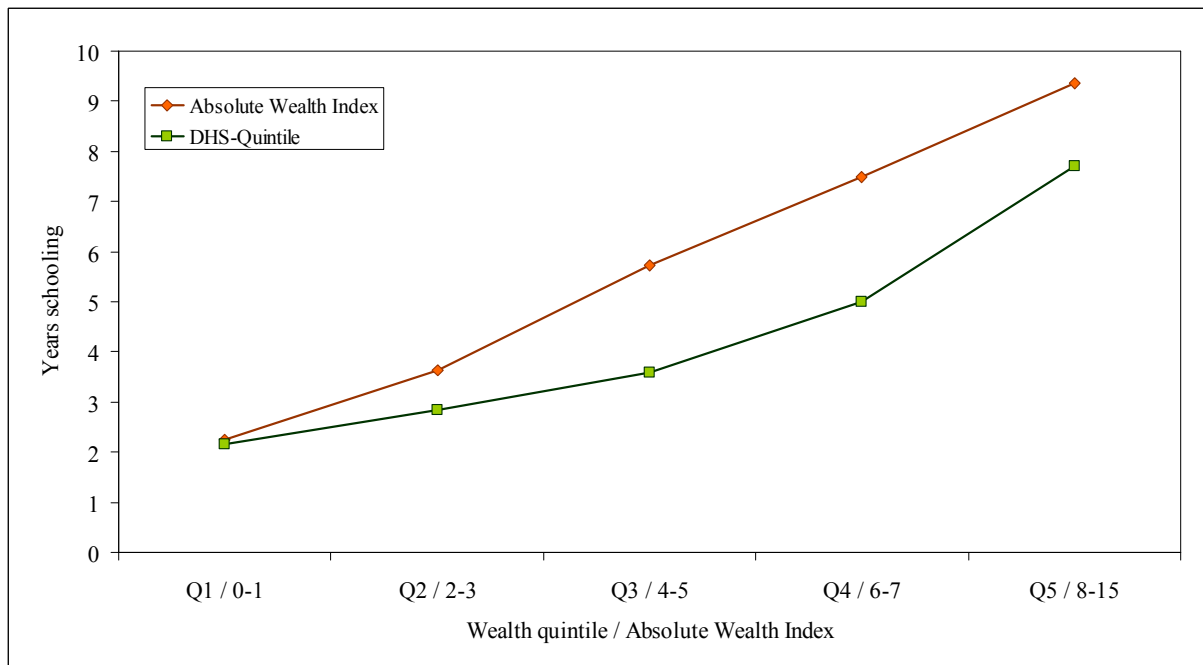
Figure 6a: Gradient of median age at first marriage by Absolute Wealth Index
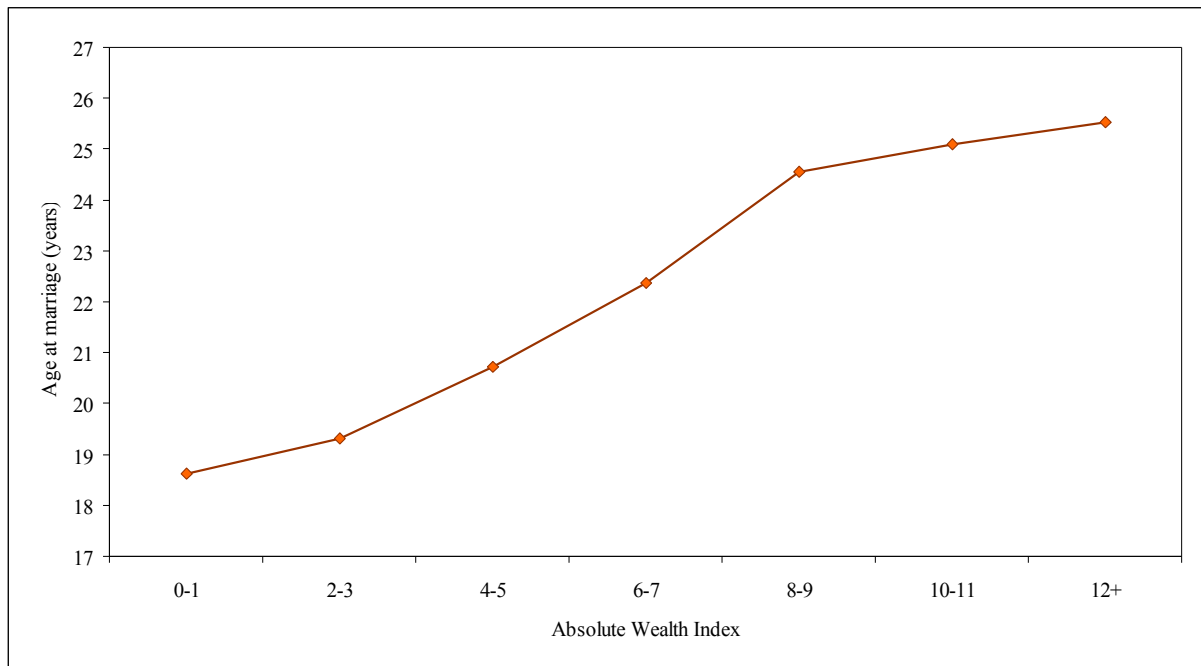
Figure 6b: Comparison of the relationship of median age at first marriage with absolute
wealth index and wealth quintile
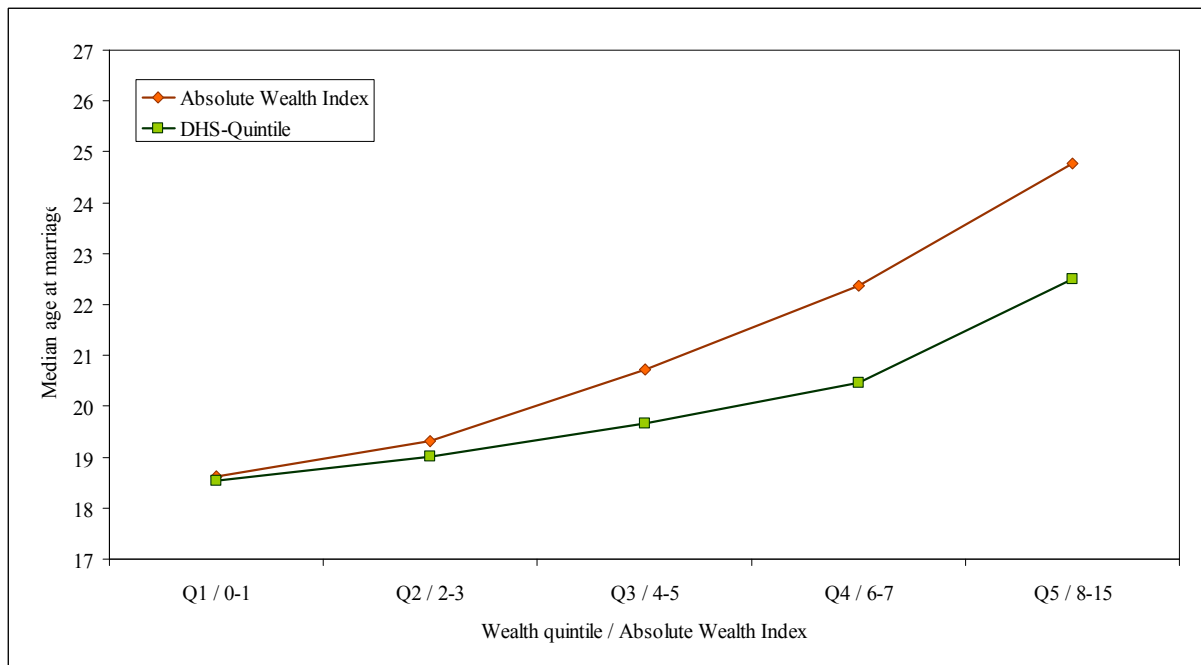
Figure 7a: Gradient of past fertility by Absolute Wealth Index

Figure 7b: Comparison of the relationship of past fertility with absolute wealth index and
wealth quintile
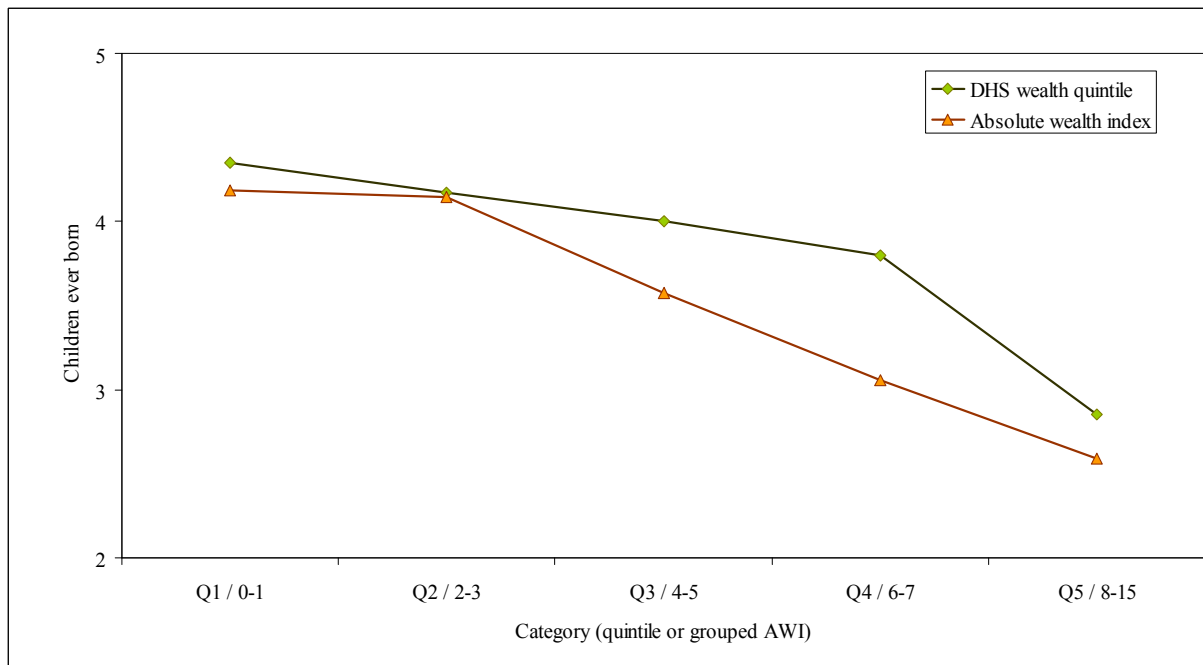
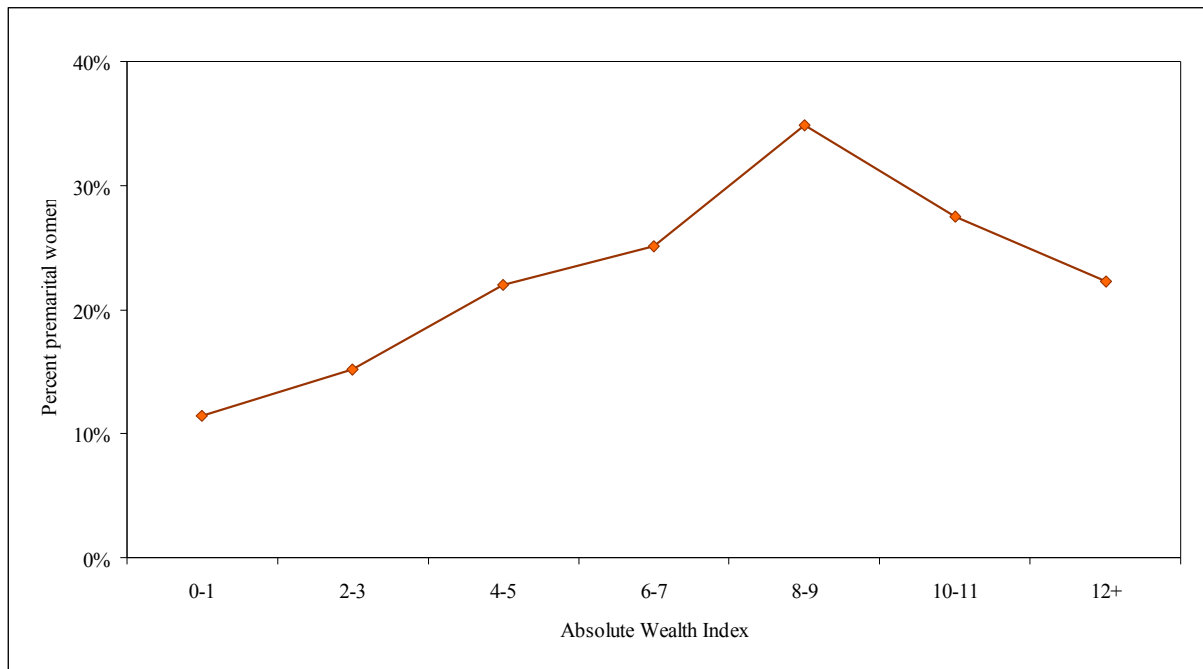Figure 8a: Gradient of premarital fertility by Absolute Wealth Index

Figure 8b: Comparison of the relationship of premarital fertility with absolute wealth index and wealth quintile
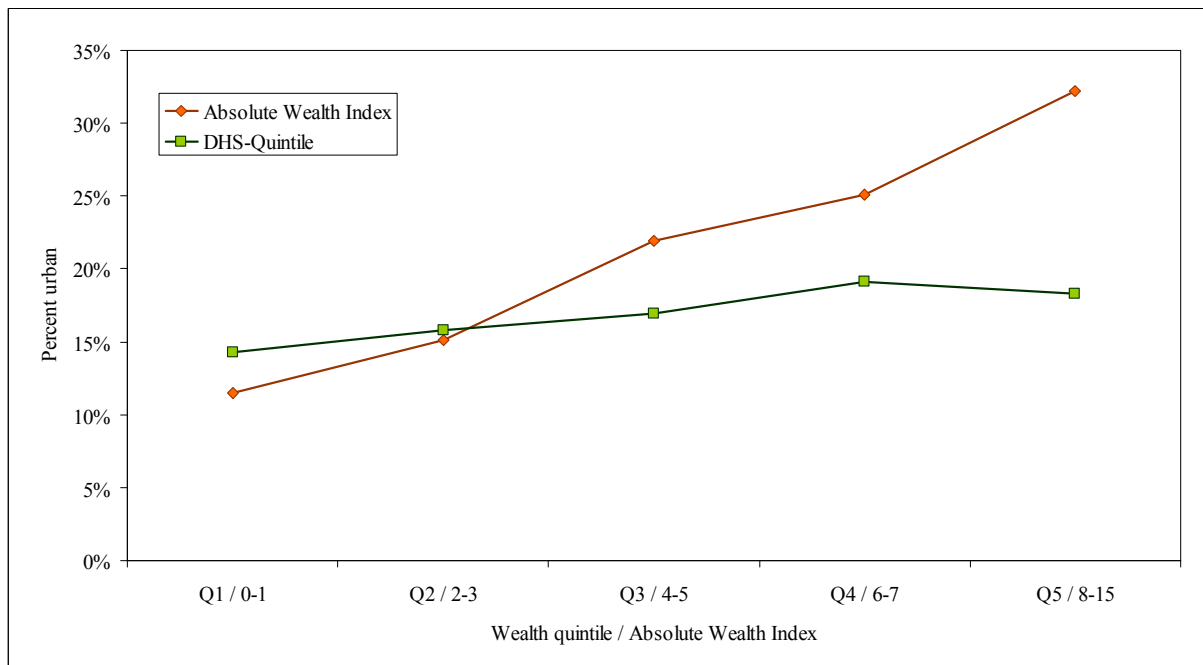
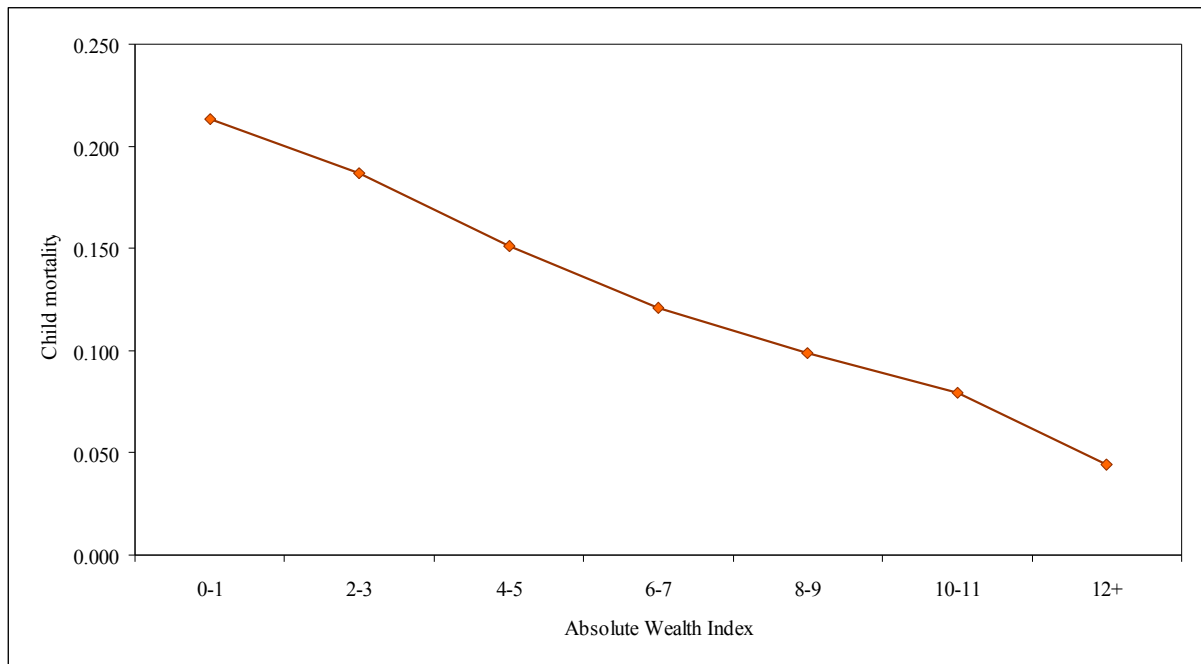Figure 9a: Gradient of child survival by Absolute Wealth Index

Figure 9b: Comparison of the relationship of child survival with absolute wealth index and
wealth quintile