Survival Sex or Consumption Sex?
Gender, Wealth and HIV Infection in 16 sub-Saharan African Countries

Ashley M. Fox*

Abstract

Researchers have linked women's disproportionate burden of HIV/AIDS in sub-Saharan Africa to their economic dependence on men, often putting them in a position necessitating an exchange of sex for money or favors. Poor women are thought to be particularly vulnerable to this form of informal transactional "survival" sex. Yet, ethnographic research on gender and HIV has demonstrated that women may not have sex only to survive, but also to gain access to consumer goods. Unlike the notion of "survival sex" which points to women's economic dependence or desperation as a source of HIV risk, the "sugar-daddy" phenomena paints a picture of wealthy men lavishing money and gifts on their partners and upwardly mobile young women competing for this attention. Recent evidence from Demographic and Health Surveys with linked HIV biomarkers seems to defy both of these images, revealing that both wealthy men and more surprisingly, wealthier women are more likely to be infected with HIV in many African countries. Using data from 16 Demographic and Health Surveys in sub-Saharan Africa, this study examined the survival sex/sugar-daddy phenomenon or the proposition that richer men and poorer women are more likely to be infected with HIV in a given area. Results from a three-level, hierarchical linear model found that while the survival sex/sugar-daddy phenomenon holds in richer regions, in poorer regions both richer men and women are more likely to be infected. Segmenting the analysis by urban and rural areas within regions further reveals that men and women of the same socioeconomic group are infected in urban and rural areas. The survival sex/sugar daddy phenomenon does not appear to play out in differential infection rates within rural and urban regions. Rather, men and women of the same socio-economic group are equally likely to be infected.

Keywords: HIV/AIDS, gender, transactional sex, sub-Saharan Africa, Demographic and Health Surveys, poverty, wealth

* Ashley M. Fox, amfox@hsph.harvard.edu. Postdoctoral Fellow, Department of Global Health and Population. This research received support from the American Psychological Association (APA) Division 38 in Health Psychology, Graduate Student Research Awards Program and the Horowitz Foundation for Social Policy, Robert K. Merton Award for Studies in the Relation between Social Theory and Public Policy.

1 Introduction

Gender inequality and gendered power relations became a popular explanation for women's disproportionate vulnerability to HIV/AIDS in the late 1990s, when researchers noted that unlike the concentrated epidemics in advanced industrial countries (AICs) and other parts of the world, sub-Saharan Africa's (SSA) generalized epidemics were resulting in higher infection rates among women rather than men. By 2003, 57% of people living with HIV/AIDS (PLWHA) in SSA were women (UNAIDS, 2006). Initially, women's disproportionate vulnerability was explained as resulting from their economic reliance on men, which was argued to make women more open to coercion, placing them in a position requiring an exchange of sex for money or housing (WHO, 2000; Heise, 1998; Gilbert & Walker, 2002). Variably termed "survival sex," or "sex-for-favors," researchers demonstrated that many sexual relationships, even where not explicitly a commercial activity, contained a transactional element, placing women at risk for HIV (Heise & Elias, 1995; Pronyk et al., 2005).

However, a number of studies have now begun to question the theoretical and empirical basis for the notion of "survival sex," pointing out that women may engage in transactional sex not just to survive, but also to gain access to material possessions. For instance, Leclerc-Madlala (2004) has identified the notion of "consumption-sex," arguing that transactional sex occurs along a continuum of both needs and wants. Hunter (2002) points to the same phenomenon in his essay "the Materiality of Everyday Sex," where he argues that it is the pursuit of modernity that puts women at risk through transactional sex rather than economic privation as such. Unlike the notion of survival sex which points to women's economic dependence or desperation as a source of HIV risk, the "sugar-daddy" phenomenon paints a picture of older men lavishing money and gifts on their younger partners and girls competing for this attention (Luke, 2005). Likewise, the phenomenon of the "3-C's boyfriend" who provides girls with coveted "cash, cars and cell phones," has been identified in countries as far flung as Kenya (Pisani, 2008) and South Africa (Soul City Research Unit, 2007), demonstrating that meeting basic needs may not be the primary driver of transactional sex in SSA. These "intergenerational relationships" have been noted to confer additional risk for HIV and to account for the gendered age dynamics in infection rates since the likelihood that older sexually active men are more likely to be HIV positive than men of young women's own age group (LeClerc-Madlala, 2008).

Patterns of transactional sex appear to vary by area of residence as well. Consumption sex seems to be more common in towns than in rural areas where girls have aspirations for upward mobility: "it is easier to get a girl in the township [than in the informal settlement]" and "Township girls like fashion too much," (Hunter, 2002). These sexual dynamics also are thought to be a more recent occurrence, linked to rising living standards and increasing consumerism, rather than economic decline or privation: "today you need money; it's not like before because everything is expensive in town. That's why we [women] do it" (LeClerc-Madlala, 2004). Young women who engage in transactional sex, including women attending university, may not be considered poor by most standards, but constitute a class of "material girls" whose growing consumer impulses place them at risk for HIV through consumption sex. This trend is reminiscent of the rise of the "leisure class" and "conspicuous consumption" in response to the marketization of economies in the West (Veblen, 1902). Whereas the literature in HIV has classically painted poor and desperate

women, disenfranchised by structural adjustment and the increasing feminization of poverty as most at risk for HIV (Doyal, 2001; Schoepf, Schoepf & Millen, 2000), the literature examining the relationship between the pursuit of modernity and HIV points to the way that economic "development" rather than economic decline may be creating new pathways of risk for young women (Smith, 2007; Parikh, 2007; Hirsch & Wardlow, 2006).

These ethnographic findings have been bolstered by Demographic and Health Survey (DHS) data that have found that contrary to most health disparities where health outcomes tend to improve with rising wealth, HIV infection in sub-Saharan Africa tends to increase with both wealth and education (Shelton, Cassell, & Adetunji, 2005; Wojcicki, 2005; Mishra & Bignami et al., 2007; Mishra & Assche et al., 2007; Forston, 2008). What is even more striking is that the DHS surveys have found that the positive association between wealth and HIV is as steep or in some cases even steeper for women as it is for men (see Figure 1). It therefore cannot be the case that wealthy men are infecting poor women since wealthy women in a number of countries have as high or higher infection rates than men. This finding is quite extraordinary given the amount of scholarship that has gone into linking women's vulnerability to HIV to their poverty.

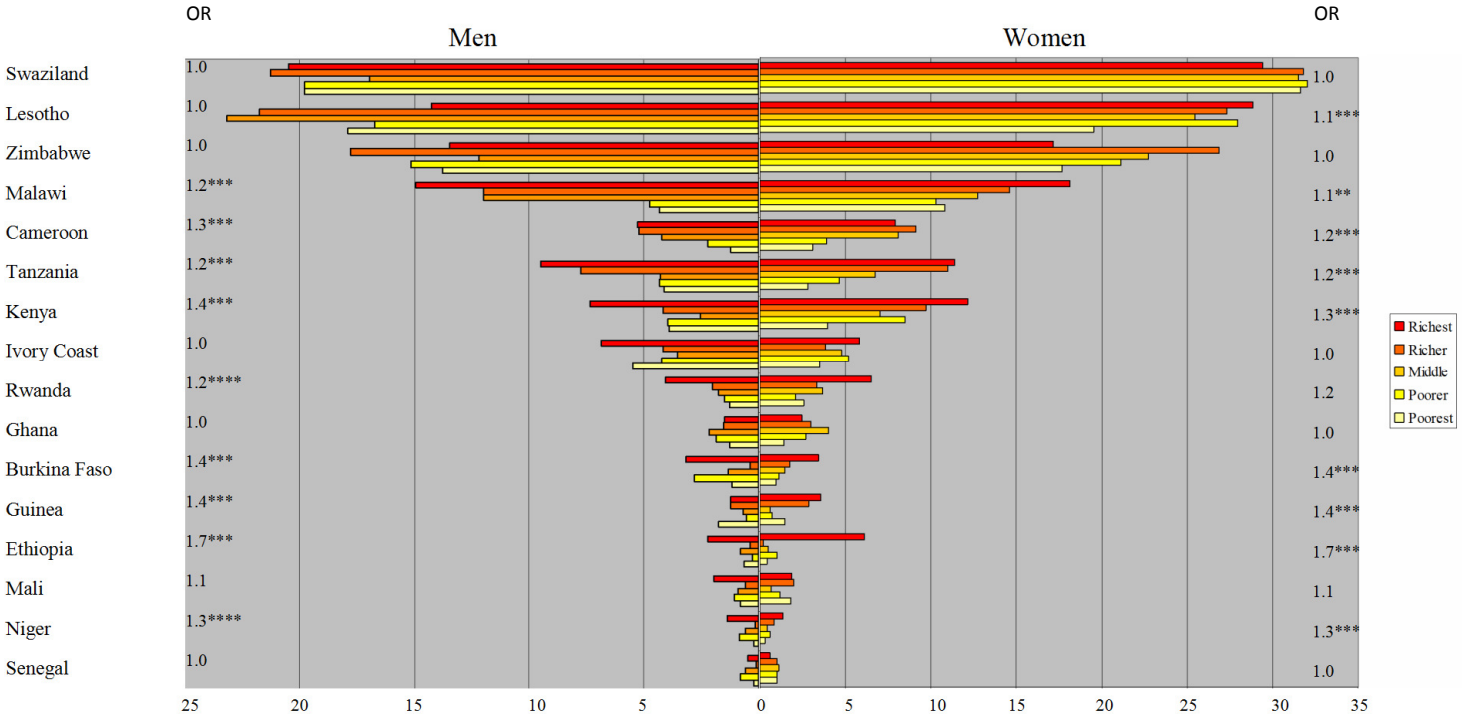


Figure 1: HIV-Wealth Gradient by Male and Female, 16 Countries*. HIV prevalence at each wealth quintile weighted for selection into the sample for males (age 15-59) and females (age 15-49). * p<0.1, ** p<0.05, ***p<0.01*

In addition to the sugar-daddy stereotype, the common narrative to date has been that women who are themselves monogamous are put primarily at risk through their husbands or male partners who may have multiple partners. While the DHS data confirm previous studies showing that marriage is a risk factor for HIV in SSA, analysis of sero-discordance

from the couple's dataset has revealed that it is often the woman who brings HIV into the relationship, not the man in a number of countries (Mishra, 2007). The researchers were able to infer that women likely have more partners outside marriage than they report on the DHS since in a number of countries there is a high rate of married women who are positive while their husbands are negative even though they report being married for over 10 years. In addition, studies of sero-discordance in couples in high migration settings have found that the direction of spread of the epidemic is not only from returning migrant men to their rural partners, but also from women to their migrant partners (Lurie et al., 2003). These women presumably contract HIV from male partners at home while their husbands are away.

Previous research on the positive wealth gradient in HIV infection has attempted to explain away the finding with reference to selection bias. Researchers have suggested the positive wealth gradient may result from high non-response among poorer groups. However, research has shown that non-response and refusal rates are higher among the wealthy in urban areas, which would tend to attenuate the true effect of the positive wealth gradient (Opuni-Akuamoa, 2009) (see Figure 2).

Apart from selection bias, the fact that wealthier men and women are more likely to be infected has been argued to arise from confounding in the relationship between wealth and urbanicity. Bingenheimer (2007) argues that the fact that traditional forms of wealth, like cattle ownership, is weighted negatively in the wealth index, "leads to a situation in which some people may appear to be wealthy when one considers their traditional holdings, yet appear to be poor according to their score on the DHS Wealth Index," (p. 84). However, cattle ownership is not actually included in most of the wealth indices in sub-Saharan Africa. Further, if the consumption sex theory is correct, there is reason to believe that traditional forms of wealth, as markers of economic "backwardness" rather than "modernity," would not prompt transactional sex.

Similarly, Opuni-Akuamoa (2009) argues that the positive wealth gradient is the result of confounding – since wealth as measured in the index is mainly concentrated in urban areas, as is HIV, it appears that wealthier individuals have higher infection rates, but in fact this is a product of urban residence rather than wealth per se. She demonstrates that once urbanicity is taken into account by running separate analyses on rural and urban areas, in fact, poorer individuals in urban areas have greater odds of infection in several countries. She finds that this relationship holds even when wealth is recalculated based on the distribution of resources in rural areas. She concludes that to understand the relationship between economic status and HIV infection in a country, it is necessary to stratify by area of residence. While this finding is an important contribution to understanding the conditional trends in the wealth gradient, this explanation fails to clarify why HIV infection rates should be higher in urban areas if not a product of the higher wealth of these areas (Fox, 2008). As the urban bias literature has shown, higher wealth in urban areas is not a statistical artifact (e.g., Lipton, 1975). People in urban areas are more likely to have access to public goods like electricity, improved water sources and a number of consumer goods. Thus, if something about the greater wealth concentration in urban areas is contributing to the spread of HIV, then wealth still remains a driver of the epidemic and the relationship between wealth and HIV is not spurious, though clearly wealth works through more proximal mechanisms to increase risk among the wealthy or those living in wealthier areas.

Whereas others have tried to explain away the finding that wealthier individuals are more likely to be infected with HIV, I argue that the debate about whether poverty or wealth fuels HIV is semantic- if relative poverty (fewer material possessions) rather than absolute poverty (deprivation of basic needs) acts as an underlying driver of the epidemic, then the notion that the poor are more likely to be infected may result from a conflation of the definition of relative poverty (poverty as generally experienced in developed countries) and absolute poverty (subsistence level poverty characteristic of large portions of the population in developing countries). It may be that both defenders and detractors are correct.

If the consumption sex argument is true, then we would expect relatively poor women (basic needs met, but fewer luxury goods) to have higher infection rates. If the survival sex theory holds, we would expect absolutely poor women (lack of basic needs) to have higher risk of HIV. Further, the sugar-daddy theory would suggest, that wealthy men and relatively poor women would have the highest infection rates. On the other hand, if women who engage in consumption sex are successful at their trade, then we would expect the richest women to have the highest infection rates.

There are several important limitations and caveats to this study that prevent us from being able to answer this question definitively. First, sexual dynamics are only indirectly assessed in this particular study. Clearly poverty or wealth cannot *directly* cause HIV. Socio-economic conditions have to work through other more proximal mechanisms, most probably sexual behavior, to produce HIV infection in individuals. However, for the purpose of this study, I concentrate on biomarker data and leave to the side the behavioral mechanisms that mediate the relationship measures of wealth and HIV. In addition, because the DHS has only collected biomarkers for one time point in most countries, and because we are now nearly three decades into the HIV epidemic, clearly these results represent merely a snap shot of current trends and cannot tell us the dynamic history of how the epidemic has evolved. Finally, the highly stylized measures of survival sex versus consumption sex utilized in this study allow us to test empirically the contribution of each to population trends in HIV infection. However, clearly the social world is more complex than what can be tested empirically. Surely both contribute to the epidemic in some manner. The goal of this research is to look for generalizable, stylized, population-based trends.

2 Measurement

Methods. This research draws on multi-national data from Demographic and Health Surveys (DHS) with linked individual HIV test results from sixteen sub-Saharan African countries. Currently a total of twenty-four countries have collected DHS surveys with biomarkers for HIV, nineteen in Africa. This study includes sixteen of these nineteen African countries, representing diverse geographic regions in Africa- West, East and Southern (see Figure 1 below for sample). Figure 2 shows that in all African countries except Burkina Faso, women comprise the majority of infections, in some cases being more than twice as likely as men to be infected with the virus. Though refusal rates are high in certain countries, as previously noted, they are highest among the wealthiest individuals, which if anything should attenuate the true effect of the positive wealth gradient in HIV infection.

Country	*Prevalence (C.I.)**	*Tested Sample*	*Sex Ratio** *	*Year of Survey*	*% Not Tested (Refusal, Absent, Other)*	*% Not Tested Richest (%)*	*% Not Tested Poorest (%)*
Senegal	0.7 (0.4, 1.0)	7,823	2.3	2005	19.6	23.5	12.6
Niger	0.7 (0.5, 0.9)	7,283	1	2006	12.2	17.6	9.4
Ethiopia	1.4 (1.2- 1.6)	11,383	2.1	2005	24.6	35.3	24.9
Guinea	1.6 (1.2-1.9)	6,912	2.1	2005	10.5	21.4	6.9
Mali	1.7 (1.5- 1.9)	8,629	1.5	2006	11.9	18.3	10.8
Burkina Faso	1.8 (1.6- 2.2)	7,790	0.9	2003	10.7	21.7	8.7
Ghana	2.2 (1.8-2.4)	9,779	1.8	2003	15.1	21.5	13.5
Rwanda	3.0 (2.9-3.5)	10,592	1.6	2005	3.5	7.3	2.1
Ivory Coast	4.7 (4.5- 5.4)	8,570	2.2	2005	22.2	31.2	15.0
Cameroon	5.5 (5.0- 6.0)	10,682	1.7	2004	9.0	17.7	5.0
Kenya	6.8 (6.0-6.9)	6,360	1.8	2003	26.6	39.7	18.1
Tanzania	7.0 (5.9-7.2)	10,957	1.2	2003	19.5	28.8	15.5
Malawi	11.7 (10.7-12.7)	5,357	1.3	2004	33.0	38.8	35.8
Zimbabwe	18.1 (16.9-19.3)	13,069	1.5	2005/6	30.0	42.2	22.5
Lesotho	23.2 (21.7-24.5)	5,364	1.1	2004	25.3	27.5	11.0
Swaziland	25.9 (25.2-27.1)	8,187	1.6	2006/7	15.2	25.1	10.4

Figure 2: Country Sample Characteristics.

Measures & Instrumentation. This study uses a multi-level analysis to model HIV serostatus at individual, regional and national levels of analysis. The principle dependent variable for this study, an individual's serostatus, is measured as the test result from the DHS rapid HIV test. Though precise methods of collection may vary slightly from country to country, in all countries, dried blood spots were collected from willing and informed participants to test for HIV using two Enzyme-Linked Immunosorbent Assay (ELISA) tests that would also allow for sero-typing (Mishra et al, 2006).

The constructs of individual wealth status and regional mean wealth for this study will be assessed and constructed using the DHS wealth index. The exact assets that go into the wealth index vary from country to country depending on the presence or absence of various questions, but generally include at minimum the following: type of flooring (e.g., dirt, cement, parquet), water supply (e.g., surface, communal well, piped), sanitation facilities (e.g., bush, pit latrine, flush toilet), electricity, radio, television, refrigerator, transportation (e.g., bicycle, motorcycle, car) (Rutstein & Johnson, 2004). All categorical variables are recoded and entered into the PCA as dummy variables.

The questions used to construct the wealth index are posed as part of the household component of the survey and not asked of each individual. Thus, individuals are coded according to household wealth. Importantly, this means that it is not possible to examine intra-household variation in wealth and its impact on HIV infection. Although researchers have questioned the degree to which the wealth index is a valid proxy for economic well-being such as income or consumption (Filmer & Pritchett, 2001), there is a strong case to be made for using the wealth index especially in low income countries where traditional measures of income and consumption are notoriously unreliable (Sahn & Stifel, 2003). The individual components that comprise the wealth index can be divided between assets that

constitute consumer goods (i.e., radio, television, refrigerator, car, bicycle, motorcycle) and assets that constitute basic needs (i.e., electricity, improved water source, improved toilet, finished floor). Because this study is primarily concerned with whether women with unsatisfied basic needs are most at risk for HIV or women whose basic needs are satisfied but have aspirations toward the accumulation of material possessions, the wealth index is an appropriate measure to assess socio-economic well-being in the context of this study. Examining the relationship between consumer goods and HIV infection versus basic needs and HIV infection can further shed light on whether survival sex or consumption sex is the modus operandi underlying HIV-wealth gradients across richer(poorer) regions or urban(rural) areas.

Analysis. Among its many applications, multilevel modeling is able to work with the clustered or hierarchical nature of sample data utilizing sampling units at different levels of analysis to model inferences at the individual level (Goldstein, 1999; Gelman & Hill, 2007). Data were analyzed using Stata version 11 (StataCorp; College Station, TX, USA). Bivariate relationships between the outcome measure (HIV serostatus) and wealth at the regional level and national levels were assessed across the sixteen countries. All multivariate models were run as three-level, hierarchical random coefficient and slope models in Stata adjusted for clustering at the regional and national levels (Rabe-Hesketh, Pickles & Skrondal, 2004). A varying-slope model was run to model slopes for the individual wealth gradient by gender in order to assess whether there is evidence that the direction of the wealth-gradient varies systematically between rich and poor regions within countries and between urban and rural areas within regions. Regions in this analysis represent the primary or secondary administrative units of the sixteen countries under analysis in this study.

Marital status (single, currently married, divorced, widowed) and age differentials in HIV infection for men and women were also assessed across regions and urban and rural areas. Separate models were run examining the effect of basic needs poverty versus luxury consumption on HIV status. Since the principal transmission route postulated to account for wealth differentials in HIV infection between men and women is sexual, respondents reporting never having had sex were excluded from the analysis, which constituted 19% of the sample or 24,562 respondents.

3 Results

Gender Slopes and Intercepts in HIV Infection. Figure 3 shows the results of gender-specific varying-slope, varying-intercept models to examine the degree to which the national positive HIV-wealth gradient holds for men and women separately across regions. Overall, both men and women have positive HIV wealth slopes, except in certain regions (primarily the richest regions) women's wealth slopes are reversed indicating that poorer women are more likely to be HIV positive in these regions (Figure 2). In poorer regions both men and women have positive wealth slopes. This finding raises the possibility that the sugar-daddy phenomenon is most prominent in richer regions. In the richest regions relatively poor women have the highest infection rates. Examining the gender-specific wealth slopes by high, medium and low prevalence countries reveals that inverse wealth slopes for both men and women are more common in higher prevalence finding also diminishes the possibility of selection bias operating among women in the richest regions- wealthy women are not more likely to be HIV positive in the richest regions because of their success at gaining goods in exchange for sex. Rather, in the countries, particularly for women (Figure 3).

Examining trends across high, medium and low prevalence countries, the percentage of regions that had positive wealth gradients decreases with country prevalence. High prevalence countries have a higher percentage of regions with inverse wealth gradients, particularly for women. It is not clear whether the greater degree of inverse gradients in higher prevalence settings is the result of higher mortality among the most at risk groups- potentially previously the richest individuals- or risk behaviors associated with decreasing wealth.

This finding is in keeping with the systematic review of the literature on socio-economic status and HIV that suggested that in richer (i.e., high prevalence, Southern African) countries increasing wealth among women may decrease HIV risk compared with poorer (i.e., low prevalence, West African) countries:

> In low-income sub-Saharan African countries, where poverty is widespread, increasing access to resources for women may initially increase risk of HIV or have no effect on risk-taking behaviours. In some parts of Southern Africa where per capita income is higher and within-country inequalities in wealth are greater, studies suggest that increasing SES may decrease risk (Wojcicki, 2005).

Indeed, the present analysis confirms that in the lowest prevalence countries, which are also correspondingly some of the poorer countries in SSA, HIV is principally positively associated with wealth in most regions including in many cases in the wealthiest regions. Also, the richest country in this dataset in Southern Africa, Swaziland, has mostly inverse wealth gradients. Unfortunately, due to the fact that this dataset does not contain a full set of the richest high prevalence Southern African countries- South Africa, Botswana & Namibia- it is not possible to fully test the observation that richer countries should have more inverse wealth gradients.

Urban-Rural Differentials. Wealth in SSA is highly concentrated in urban areas and the particularly pronounced urban-rural divide in development patterns is well-known to scholars of SSA (Sahn & Stifel, 2003). The economic disparity between infected men and women within regions could be an artifact of rural-urban differences in infection. Separating the analysis by urban and rural areas reveals that in urban areas both poorer men and poorer women are more likely to be HIV positive whereas in rural areas richer women and men are more likely to be infected. Thus, looking within urban and rural areas reveals that both men and women of similar socio-economic status are infected with HIV (see Figure 4). This finding would seem to contradict both the survival sex and sugar-daddy narratives since men and women of the same socio-economic group are infected with HIV once we segment by urban and rural areas. While poor women in rich areas are more likely to be infected, so are poor men.

Married-Single Differentials. Given the nature of the household sampling procedure used to collect the HIV data, the detection of wealth differentials in infection between men and women may be difficult to observe, especially since a large portion of the sample are married or cohabitating couples. While research has shown that marriage is itself a risk factor for HIV and that men and women do in fact frequently have additional partners even in the context of marriage, there is reason to believe that the survival/sex sugar daddy phenomena should be more pronounced among single (never married) individuals. Further segmenting the analysis by married and never married individuals could help shed light on

whether the wealth effect is mainly being driven by the fact that married couples of the same wealth are more likely to be infected and obscuring wealth differentials between men and women.

Segmenting by married and unmarried individuals, we find that, though the results are more mixed, HIV mainly increases with wealth for married individuals and decreases with wealth for single individuals across the 170 regions in the sample (Figure 5). Wealthier married couples tend to be infected and poorer single individuals tend to be infected. From the perspective of women, this supports the sugar-daddy theory. Relatively poor single women are the most likely to be infected. However, relatively poor single men are equally likely to be infected. Looking between rural and urban areas, regardless of marital status, the poor in urban areas are more likely to be infected and the rich in urban areas are more likely to be infected (see Table 6).

Basic Needs Poverty versus the Luxury Consumption. Dividing assets into basic needs versus luxury items, it is possible to assess… At the national level, HIV positive men and women are more likely to have their basic needs met (improved water source, improved toilet, electricity), but less likely to own luxury items (car, television, refrigerator). Thus, although this finding does not discount the fact that relatively poor women have the highest risk, relatively poor men are also more at risk at the population level.

4 Discussion

The narrative that poor women, increasingly impoverished as a result of structural adjustment or other economic pressures are forced to exchange sex for money and favors does not seem to be the principal driver of population trends in HIV infection. However, there also does not appear to be a great deal of evidence that wealthier men infect relatively poor women who exchange sex for access to material items. Rather, both relatively poor men and women (men and women who have their basic needs met) are equally at risk for HIV. The most vulnerable group is the urban poor. These trends are fairly constant across countries regardless of their infection rates, though countries with higher prevalence have more inverse HIV-wealth gradients.

Rural to urban migration is likely a substantial factor contributing to these trends, but given the limitations of DHS questions, this proposition is difficult to test empirically. There is some evidence that suggests that previously wealthier individuals in urban areas were more likely to be infected and in rural areas, the wealthiest individuals (men and women) continue to have the highest infection rates even as rural areas, which are poorer than urban areas, have lower infection rates overall. There are several potential reasons for the finding that men and women from the same socio-economic groups are equally likely to be infected in each country. One reason is potentially that the degree to which people have relationships outside of their own social groups is fairly uncommon. Whereas relatively poor migrant men and women in urban areas are more likely to be infected with HIV, the relatively rich recipients of migration remittances and other consumer goods from extramarital partners will be more likely to be HIV positive in a rural setting.

But what accounts for the higher burden of HIV among the relatively poor? Given that studies early in the epidemic showed high rates among the wealthy, it is likely that

previously wealthier men and women were more likely to be infected, but now in richer areas, HIV has descended the social gradient to become a disease of the relatively poor. Two possible mechanisms that could produce these reversals are high mortality among the wealthiest, most at-risk individuals, or changes in sexual behavior over time. If the wealthiest individuals concentrated in urban areas were the first to become infected early in the epidemic, mortality from HIV may be sufficient to generate an inverse socio-economic gradients. A number of empirical studies have tried to tease out the relative contribution of HIV-related mortality versus behavior change in population level HIV infection trends (e.g., Stoneburner, 2004; Hallet et al, 2006). In certain countries, declines in HIV infection have been plausibly linked to changing behavioral patterns (Uganda, Kenya, Zimbabwe, Haiti, Thailand) while in other countries declines cannot be directly linked to behavioral variables (Rwanda, Ivory Coast) (Hallet et al, 2006).

To date no study (to the author's knowledge) has examined the socio-demographic impacts of either of high mortality or changing sexual behavior patterns. Instead the focus has been on the impact of total population prevalence rather than sub-group prevalence. In the absence of high coverage of antiretroviral therapy (uncommon in SSA), the natural history of HIV should progress relatively rapidly from disease onset to death. While greater prestige and power may initially have served as risk factors for the wealthy, this group would also likely be the first to change its behavior increasingly adopting more protective behaviors such as condom use or a reduction in partners (Link & Phelan, 1995). Ironically, successful prevention campaigns may inadvertently reinforce socio-economic gradients in HIV infection.

Assuming that behavior change produces these trends, what can we learn about the effects of economic conditions on HIV risk behavior in SSA? Evidence from the collaborative ethnographic Love, Marriage and HIV project finds that the pursuit of modern identities creates particular patterns of risk even in the context of marriage by generating informal secondary households and multiple concurrent sexual partnerships as traditional polygyny has become stigmatized in SSA (e.g., Parikh, 2007; Smith, 2007). For instance in the case of Uganda, Parikh (2007) finds that there "has been a gradual transformation from formal polygyny, in which households of co-wives were somewhat interconnected, to a pattern of informal secondary households that often remain autonomous and hidden from each other" (p. 1205). Smith (2007) uncovers similar though locally contextualized trends in Nigeria. He observes that in Southern Nigeria, even where Christian discourses exalting mutual monogamy are strong, historical polygyny and changing economic conditions have created "contradictory moralities" for men and women, generating a trend towards informal (secret) extra-marital sexual partnerships. Both point to the ways that changing economic conditions at least partially underlie seemingly ideological transformations. These ideological transformations- the aspiration of burgeoning middle classes to demonstrate their "modernity" with the acquisition of material possessions- leads to new sexual opportunity structures that heighten HIV risk.

Hirsch & Wardlow (2006) find in their book Modern Loves that that changing sexual opportunity structures associated with a global convergence towards a companionate marriage ideal increases risk for HIV, at least in the short term. Importantly, they argue that it is not only cultural globalization that is causing this convergence in marital ideals, but also changing "material structures of power":

> …we locate these ideologies of intimacy in relation to the material and demographic conditions of people's lives, looking at the ways in which the organization of production and consumption enables or impedes various kinds of conjugal ties, as well as the different strategic advantages men and women see (or don't) in their particular local version of companionate marriage (p. 2).

Inglehart (1997), drawing on Maslow's theory of a hierarchy of needs, notes that only after a certain level of wealth is obtained in a society can individuals begin thinking about issues other than their immediate material well-being, a state which he refers to as "post-materialism." In the language of the social determinants of health, the movement of people from absolute poverty to relative poverty is a particularly risky and fraught transition. As it turns out, it is not so much the consequences of absolute poverty- the weakening of immune systems or survival sex to meet one's basic needs- that places men and women at risk for HIV in SSA, but rather rising relative deprivation where individuals' aspirations towards "conspicuous consumption" and their ability to attain those aspirations are out of step. Theses changing modes of production and patterns of consumption create a "risk environment" particularly suited to the rapid transmission of HIV infection.

Speaking of the Zulu ethnic group in South Africa, Hunter (2005) describes how the "isoka" ideal-type (a man who has many non-marital sexual partners) developed in place of the "umnumzana" (household head) as a result of changing economic conditions occasioned by the integration into markets, labor migration and Christianity, which threatened previous expressions of masculinity, notably marriage and the establishment of independent households. Hunter stresses that this new sexual archetype must be understood in light of the increasing challenges that men faced in establishing independent rural homesteads as a result of increasing labor migration as well as women's increasing incorporation into the labor force.

Likewise, Mojola (2009) examines how the gendered structure of the fishing economy around Lake Victoria in Kenya created an economic environment that fueled the epidemic in this region through the promulgation of networks of concurrent sexual partners for both men and women. Fishermen in Nyanza acted as bridges in these sexual networks, spending their earnings on women, food and alcohol. More surprisingly, fisherwomen used the profits they obtained from the fish trade to take on young "husbands." In both cases, these networks of risk were conditioned by the changing ecology of Lake Victoria, which required fishermen and women to make longer trips away from home and reduce catch size, fueling multiple concurrent partnerships.

5 Conclusions and Limitations

There are several limitations to this study that should be noted. First, due to the sampling methodology of the DHS, it is not possible to separate individual wealth from household wealth, rendering the analysis of intra-household wealth dynamics impossible. Likewise, sampling couples and members of the same household means that single individuals may be underrepresented in the sample that may fit more closely with the profile of the survival sex/sugar daddy relationship dynamic. Nevertheless, the analysis of single individuals shows little difference from the analysis of married individuals. Further, selection cannot be

ruled out. It may be the case that wealthier women are HIV positive as a result of their success at attracting wealthier men.

As there has only been one round of HIV biomarker collection on the DHS for most countries, the data are cross-sectional and only allow researchers to establish which social groups are infected at the present moment. Early in the epidemic, a number of researchers noted that HIV tended to affect wealthier and more educated populations (e.g. Whiteside, 1990; Hargreaves et al, 2008), but without population data on HIV, this was not possible to substantiate. Subsequently, the relationship between poverty and HIV became a focus of researchers' attention. Now nearly two to three decades into the epidemic, this research cannot speak to which social groups were most affected by HIV at the beginning of the epidemic, but given what is known about the dynamics of health inequalities, it is likely that the richest individuals were the first to use their knowledge, prestige and power to change their behavior and reduce their risk (Link & Phelan, 1995) or the first to expire as a result of early high risk sex [cite].

Breaking out measures of basic needs poverty and luxury assets, this study has attempted to examine the role that absolute poverty versus relative poverty plays in fueling the epidemic, testing the competing hypotheses of the "survival sex" literature against the "consumption sex" or "sugar-daddy" literature. However, these measures are at best a crude proxy for the complex economic dynamics that fuel sexual economies. While this study has tried to measure these competing hypotheses empirically, the data do not allow researchers assess the motivations of men and women or to distinguish between whether the relatively poor women that are the most at risk have aspirations for upward mobility or are just trying to get by and therefore cannot fully distinguish between survival sex and consumption sex.

6 References

Doyal, L. (2002). Putting gender into health and globalisation debates: New perspectives and old, Third World Quarterly, 23(2): 233-250

Forston, J. G. (2008). The gradient in sub-Saharan Africa: Socioeconomic status and HIV/AIDS. *Demography*, 45(2), 303–322.

Gelman, A. & Hill, J. (2007). Data analysis using regression and multilevel/hierarchical models. Cambridge University Press.

Gilbert, L. & Walker L. (2002). Treading the path of least resistance: HIV/AIDS and social inequalities- a South African case study. *Social Science and Medicine*, 54, 1093-1110.

Goldstein, H. (1999). Multi-level statistical models. London Institute of Education.

Heise, L. L., & Elias, C. (1995). Transforming AIDS prevention to meet women's needs: A focus on developing countries. *Social Science and Medicine,* 40(7), 931-943.

Hirsch, J. S., & Wardlow, H. (2006). Modern loves: The anthropology of romantic courtship & companionate marriage. Ann Arbor, MI: University of Michigan Press.

Hunter, M. (2005). Cultural politics and masculinities: Multiple-partners in historical perspective in KwaZulu-Natal. *Culture, Health & Sexuality*, 7(4): 389–403

Hunter, M. (2002). The materiality of everyday sex: Thinking beyond 'prostitution.' *African Studies*, 61(1): 99–120.

Ingelhart, R. (1997). Modernization and postmodernization: Cultural, economic and political change in 43 societies. Princeton, NJ: Princeton University Press.

Jewkes, R., Penn-Kekana, L., Levin, J., Ratsaka, M., & Schrieber, M. (1999). 'He must give me money, he mustn't beat me' violence against women in three South African Provinces. Medical Research Council Technical Report, Pretoria. Available online at: http://www.mrc.ac.za/gender/violence.pdf [Accessed on 12 May 2009]

Leclerc-Madlala, S. (2004). Transactional sex and the pursuit of modernity. *Social Dynamics*, 29(2): 1-21.

Leclerc-Madlala, S. (2008). Age-disparate and intergenerational sex in southern Africa: The dynamics of hypervulnerability. *AIDS*. 22(suppl 4), S17-S25.

Luke, N. (2005). Confronting the 'sugar daddy' stereotype in urban Kenya. *International Family Planning Perspectives*, 31(1), 6-14.

Lurie, M. N., Williams, B. G., Zuma, K., Mkaya-Mwamburi, D., Garnett, G. P., Sweat, M. D., et al. (2003). Who infects whom? HIV-1 concordance and discordance among migrant and non-migrant couples in South Africa. *AIDS*, 17(15), 2245-2252.

Mishra, V. (2007). Why do so many HIV discordant couples in sub-Saharan Africa have female partners infected, not male partners? Presentation at the HIV/AIDS Implementers' Meeting, Kigali, Rwanda, June 18, 2007. Available online at: http://www.hivimplementers.com/2007/agenda/pdf/U3/U3-Mishra%20Abstract%201717.ppt.pdf

Mishra, M. K., Vaessen, M., Boerma, T., Arnold, F., Way, A., Barrere, B., et al. (2006). HIV testing in national population based surveys: experience from the demographic and health surveys. *Bulletin of the World Health Organization*, 84(7), 537-545.

Mishra, V.K. Assche, S. B., Greener, R., Vaessen, M., Hong, R., Ghys, P.D., et al. (2007). HIV infection does not disproportionately affect the poorer in sub-Saharan Africa. *AIDS*, 21(suppl 7), S17–S28.

Mishra, V. K., Bignami, S., Greener, R., Vaessen, M., & Hong, R. (2007). A study of the association of HIV infection with wealth in sub-Saharan Africa, DHS Working Papers, No. 31. Available online at: http://pdf.usaid.gov/pdf_docs/PNADJ208.pdf.

Parikh, S. A. (2007). The political economy of marriage and HIV: The ABC approach, "safe" infidelity, and managing moral risk in Uganda. American Journal of Public Health, 97(7), 1198-1208.

Pisani, E. (2008). The wisdom of whores: Bureaucrats, brothels, and the business of AIDS. New York, NY: Boydell & Brewer.

Pronyk, P. M., Hargreaves, J. R., Kim, J. C., Morison, L. A., Phetla, G., Watts, C. et al. (2006). Effect of a structural intervention for the prevention of intimate-partner violence and HIV in rural South Africa: A cluster randomised trial. *The Lancet*; 368, 1973–1983.

Pronyk, P. M., Kim, J. C., Hargreaves, J. R., Makhubele, M. B., Morison, L. A., Watts, C. et al. (2005). Microfinance and HIV prevention—emerging lessons from rural South Africa. *Small Enterprise Development*, 16, 26-38.

Sahn, D. E., & Stifel, D. C. (2003). Urban-rural inequality in living standards in Africa. *Journal of African Economies*, 12(4), 564-597.

Schoepf B., Schoepf C., Millen J. (2000) Theoretical therapies, remote remedies: SAPs and the political ecology of poverty and health in Africa. In Kim J. Y. (Ed.), et al. Dying for Growth. Global Inequality and the Health of the Poor(Common Courage Press, Maine).

Shelton, J. D., Cassell, M. M., & Adetunji, J. (2005). Is poverty or wealth at the root of HIV? *The Lancet*, 366(9491), 157.

Smith, D. J. (2007). Modern marriage, men's extramarital sex, and HIV risk in Southeastern Nigeria. American Journal of Public Health, 97(6), 997-1005.

Soul City Research Unit. (2007). HIV prevention: Multiple and concurrent sexual partnerships among youths and adults in South Africa. Final Report available online at: http://www.soulcity.org.za/programmes/research/target-audience-research/soul-city-series/South_Africa_MCP_Report_final.pdf/

UNAIDS. (2006). Report on the Global AIDS Epidemic. UNAIDS. Available online at: http://www.unaids.org/en/HIV_data/2006GlobalReport/default.asp

Whiteside, A. (1990). AIDS in Southern Africa: A position paper for the Development Bank of Southern Africa. Development Bank of Southern Africa. Halfway House.

Wojcicki, J. M. (2005). Socioeconomic status as a risk factor for HIV infection in women in East, Central and Southern Africa: A systematic review. *Journal of Biosocial Science*, 37(1), 1-36.

World Health Organization (WHO). (2000). Women and HIV/AIDS fact sheet No. 242. Available online at: http://www.who.int/inf-fs/en/fact242.html

7 Tables and Figures

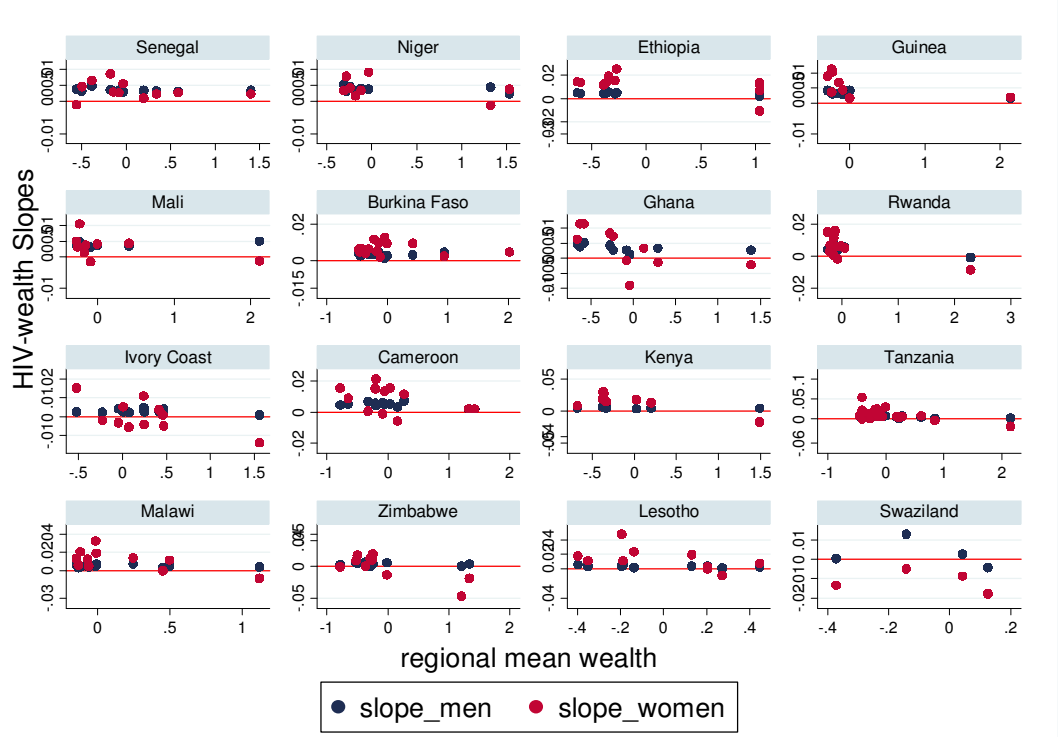


Figure 2: Regional HIV-Wealth Slopes for Men and Women. *In most regions both men and women have positive slopes, indicating that both wealthier men and wealthier women are at heightened risk for HIV. However, in certain regions (primarily the wealthiest) women have inverse slopes meaning that poorer women in these regions are more likely to be infected (in keeping with the sugar daddy theory). In Swaziland and Ivory Coast, women mainly have inverse gradients and men mainly have positive gradients.*

	Male- + Wealth Gradients	Female- + Wealth Gradients	Total
Low Prevalence	100%	87%	60 regions
Medium Prevalence	99%	80%	75 regions
High Prevalence	88%	58%	35 regions
Total	98%	79%	170 regions

Figure 3: HIV Wealth Slopes for Women and Men- Summary by Country Prevalence. *Wealth slopes for women are less likely to be positive than for men- in a larger proportion of regions HIV increases with wealth for men, but decreases with wealth for women. This is particularly the case in high prevalence Southern African countries.*

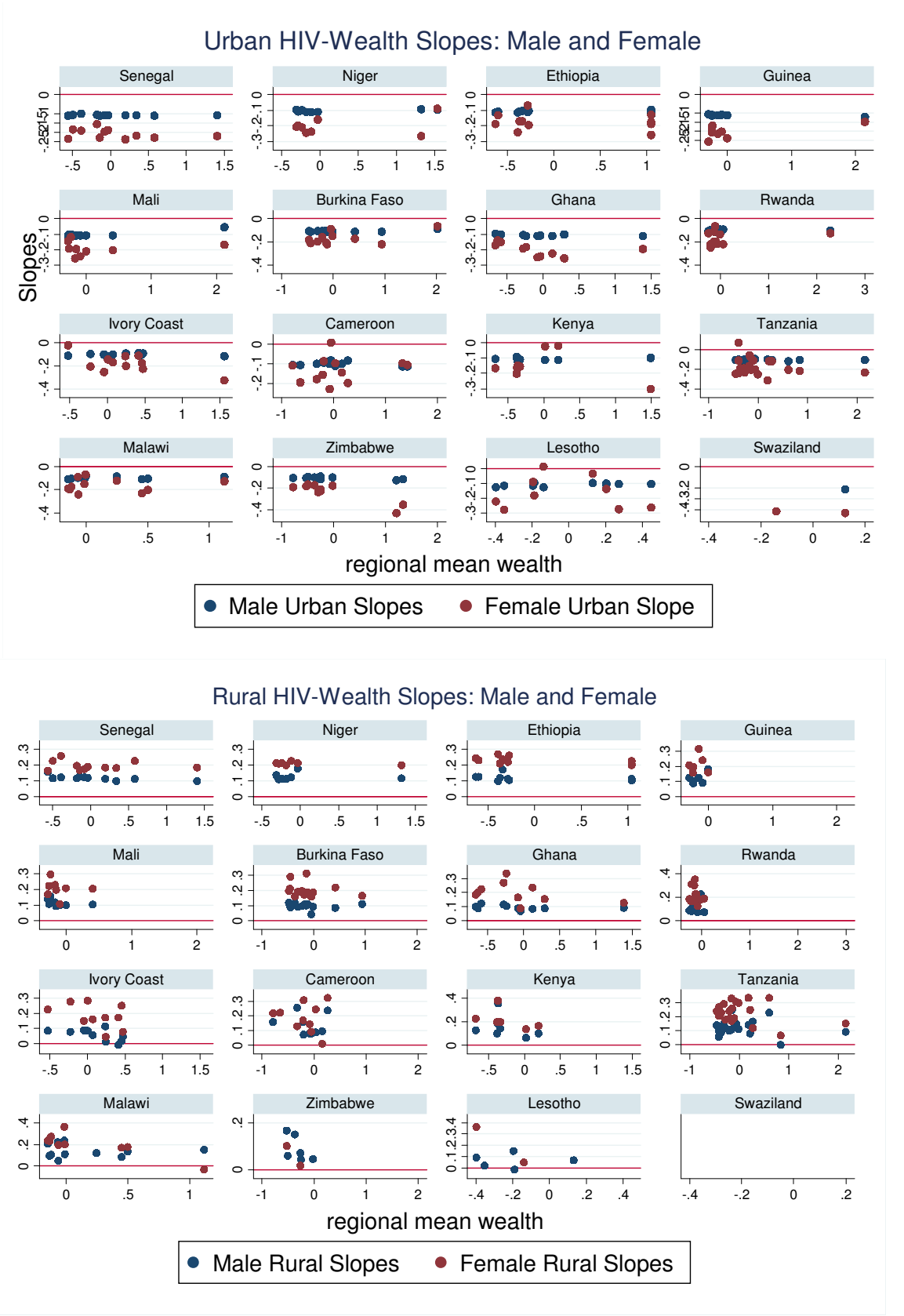
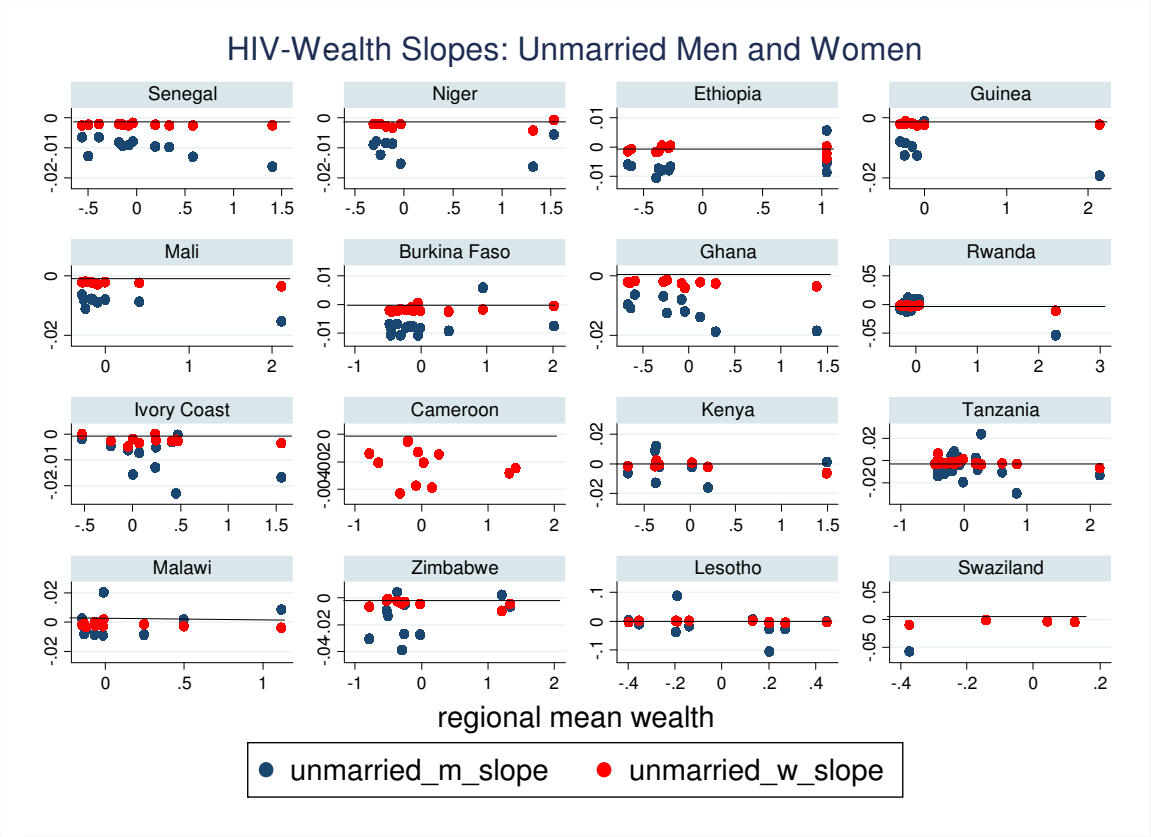


Figure 4: Urban-Rural Regional HIV-Wealth Slopes for Men and Women. *In urban areas, HIV decreases with wealth for both men and women, whereas in rural areas HIV increases with wealth for both men and women.*



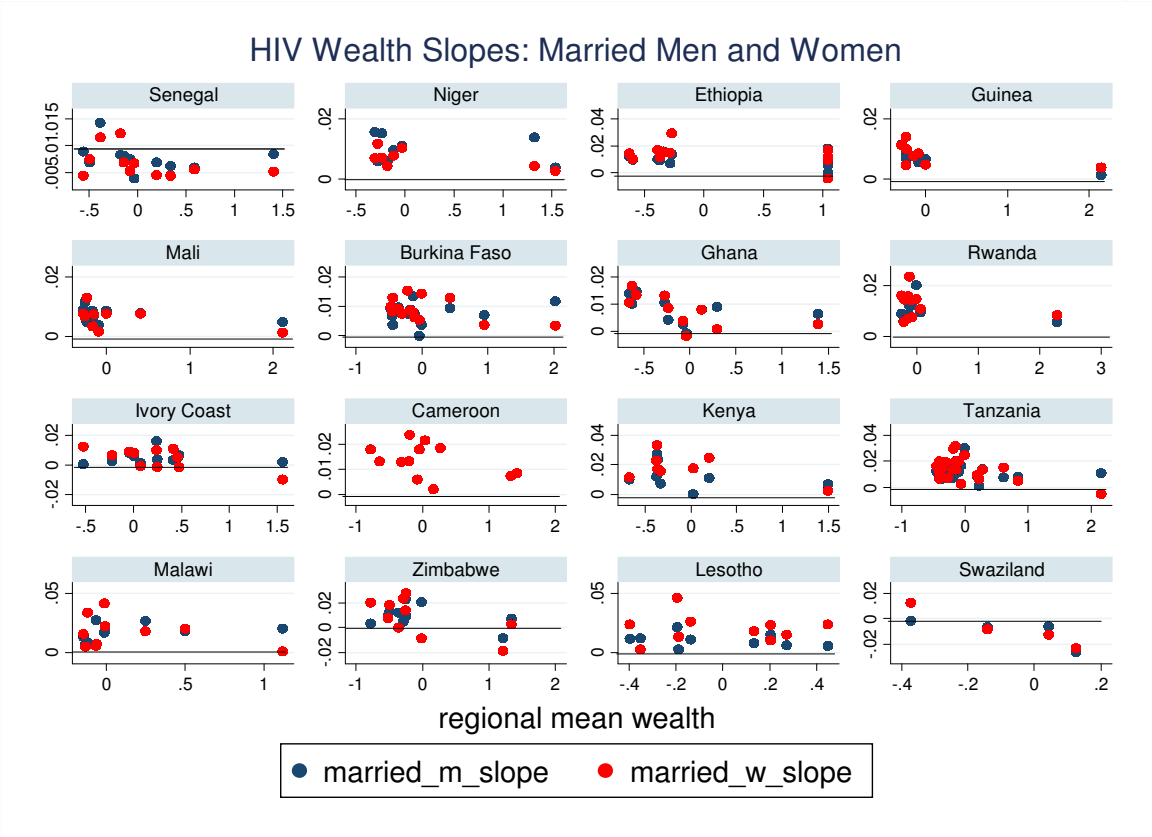


Figure 5: HIV Infection by Wealth- Married and Unmarried Men and Women. Among married individuals HIV increases with wealth for both men and women, whereas among single individuals HIV increases with wealth for both men and women.

	National		Urban		Rural	
	Men	Women	Men	Women	Men	Women
Wealth	1.08***	1.06***	0.89***	0.85***	1.03	1.10***
Never Married	1.04	0.47***	0.96	0.84***	2.41***	0.77***
Currently Married	1.34***	1.06	1.28*	1.88***	2.77***	1.55***
Divorced	1.98***	1.32***	1.59***	2.12***	3.66***	2.11***
Widowed	1.77***	1.39***	2.0***	2.16***	3.71***	1.97***
Other (ref)	-	-	-	-	-	-

Figure 6: HIV Infection by Wealth- Urban-Rural, Married and Unmarried Men and Women. HIV increases with wealth in rural areas but decreases with wealth for both men and women. The positive wealth gradient at the national level is mainly driven by the fact that HIV infection is higher in urban areas where there are more wealthy people. Age included, but not shown.

	Urban				**Rural**			
	Men		Women		Men		Women	
	Married	Unmarried	Married	Unmarried	Married	Unmarried	Married	Unmarried
Wealth	0.83***	0.81***	0.91***	0.80***	1.13***	1.01***	1.19***	1.05
age_15_19	0.08***	0.08***	0.56***	0.07***	0.28**	0.05***	0.43***	0.05***
age_20_24	0.16***	0.16***	0.93	0.23***	0.41***	0.16***	0.84**	0.28***
age_25_29	0.43***	0.44***	1.19*	0.60***	0.61***	0.37***	1.13*	0.65***
age_30_34	0.87	0.90	1.12	0.92	0.90	0.93	1.22***	0.96
age_35_39 (ref)	-	-	-	-	-	-	-	-
age_40_44	1.91**	1.92**	0.79*	0.75*	1.08	1.38*	0.66***	0.62***
age_45_49	1.3	1.28	0.45***	0.43***	0.70***	1.18	0.40***	0.45***
age_50_54 (men)	1.28	1.13	-	-	0.55***	0.51*	-	-
age_55_59 (men)	1.19	1.07	-	-	0.30***	0.27*	-	-

Figure 7: HIV Infection by Wealth and Age Group- Urban-Rural, Married and Unmarried Men and Women. Even stratifying by marital status, HIV decreases with wealth in urban areas for men and women and increases with wealth for men and women in rural areas.

	National		Urban		Rural	
	Men	Women	Men	Women	Men	Women
Basic Needs (electricity, improved water source, improved toilet, non-dirt floor)	1.21*** (.08)	1.27*** (.03)	0.90 (.07)	1.1 (.05)	1.08 (.10)	.89*** (.03)
Luxury Goods (television, car, motorcycle, refrigerator, telephone)	0.98 (.08)	.83*** (.02)	.86 (.11)	0.80*** (.02)	1.14* (.10)	1.13*** (.04)

Figure 8: HIV Infection by Wealth and Age Group- Urban-Rural, Married and Unmarried Men and Women*. Stratifying wealth by basic needs and luxury goods, at the national level ,HIV increases with basic needs and decreases with luxury goods. In urban areas, HIV is lower among men and women with luxury goods but higher in men and women in rural areas with luxury goods. There is no discernable relationship between basic needs and HIV stratified by urban and rural areas. Age & Marital Status included but not shown.*