Saving for the Future?
HIV Testing and Economic Behavior

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September, 2007

Abstract:
According to economic models of lifetime consumption, life expectancy is important for long-term planning such as savings. Because HIV is fatal and there is no cure, learning HIV results could have large effects on subjective life expectancy and subsequent savings decisions. This paper examines how learning HIV positive or negative results affects economic activity two years after testing. The paper evaluates a field experiment in Malawi that randomly assigned individuals incentives to learn their HIV results and followed the same individuals two years later. Using the exogenous incentives as instruments for knowing HIV positive or negative results, I find that HIV negatives who learned their status saved significantly *more* than those who did not learn their status. HIV positives who learned their status were significantly *less* likely to save than those who did not learn their status. There were no other significant economic effects of learning HIV results among the HIV negatives. This may be, in part, due to no persistent differences in subjective beliefs of infection between the HIV negatives who learned they were negative and those who did not. These results contribute to the policy debates on the impact of AIDS and the effects of HIV testing in Africa.

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I thank Jere Behrman, Hans-Peter Kohler, Susan Watkins and the MDICP team for support and data and Kondwani Chavula and other members of the MDICP study team for excellent assistance with fieldwork. I am grateful to David Cutler, Michael Kremer, Sendhil Mullainathan, Emily Oster, and Susan Watkins for helpful comments and discussion.

The Malawi Diffusion and Ideational Change Project is supported by grants from the Rockefeller Foundation; NICHD (R01-HD4173, R01 HD372-276); NIA (AG1236-S3); the Center for AIDS Research and the Center on the Demography of Aging at the University of Pennsylvania. The project on Information, Incentives and HIV/AIDS Prevention is supported by the University Research Foundation, University of Pennsylvania. Follow-up data collection was supported by the Warburg Foundation of the Economics of Poverty. I acknowledge financial support from the Harvard Population Center, Harvard Graduate Council, the Harvard Center for International Development, National Bureau of Economic Research Fellowship on Aging, and the University of Pennsylvania.

1 Introduction

According to economic models of lifetime consumption, life-expectancy is important for long-term planning such as savings, investment, and retirement decisions. Studies have examined responses to changes in life-expectancy and have generally found a positive correlation between increases in average life-expectancy at birth and savings (Hurd, McFadden et al. 1998; Lee, Mason et al. 1998; Lee, Mason et al. 2000; Tsai, Chu et al. 2000; Bloom, Canning et al. 2003). There have been several, albeit fewer, studies that have examined how individuals respond to changes in health status or information affecting their own life expectancy. These studies have shown impacts on investment in schooling, smoking, and health behavior (Kalemli-Ozcan, Ryder, and Weil 2000; Stoler 2004). One challenge, however, to quantifying individual level responses to changes in life expectancy is that subjective life expectancy is endogenous and thus empirical analyses must rely on an individual receiving unexpected health or information shocks, rarely found in available data sources.

One opportunity to study how individuals have been affected by changes in life expectancy is the HIV/AIDS epidemic in Africa. The effects of life expectancy might be particularly relevant to study in Africa where demographers have estimated that life-expectancy at birth has dropped dramatically – by as much as 30 years in countries such as Botswana and Swaziland – as a result of the AIDS epidemic (Stover 1998; United Nations 2004). The low levels and reductions in aggregate life-expectancy may potentially be one important factor contributing to low savings rates, investments in health, and long-term planning behaviors in Africa. It has been suggested that there may be substantial negative economic consequences due to behavioral responses to these large decreases in life expectancy, such as reduced savings (IMF Staff 2000; Engel 2002; Freire 2002; Huang, Fulginiti et al. 2003), reduced investments in schooling (Fortson 2006), changes in fertility (Kalemli-Ozcan, S. 2006, Young 2006), and reductions in health investments.

This paper measures the economic response of individuals living in rural Malawi to

receiving an HIV positive or negative diagnosis. To the extent that individuals do not know their status before testing, or if they have sufficient uncertainty about their likelihood of infection, receiving an HIV positive or negative diagnosis may contain important information which could inform individuals of the number of additional years of life they could expect live. This could, in turn, affect long run economic behavior such as savings or investment. Using either cross-sectional or longitudinal data to measure the effects of learning HIV positive or HIV negative results are complicated by the fact that in most settings individuals endogenously choose to learn their HIV status. Depending on the direction of this selection bias, comparing those who know their HIV results with those who do not may either overstate or understate the true causal effects of learning HIV status on economic activity.

The analyses in this paper overcomes these limitations by using unique data that included a field experiment where individuals were tested for HIV and given randomized monetary incentives to learn their results. The locations of the results centers were also randomly placed throughout the communities. The incentives and the distance of the HIV results centers were randomly assigned for each individual and had strong significant effects on individuals learning their HIV status. This randomization thus created an experimental treatment and control group of HIV positives and HIV negatives who learned and who did not learn their HIV results, not due entirely to selection, but due, in part, to the exogenous instruments. This design and these data thus allow for an instrumental variable analysis of the economic impact of learning HIV results.

The baseline survey, HIV testing, and randomization was conducted in 2004. Two years later, in 2006, respondents were re-interviewed and asked a variety of questions such as their economic output, income and savings, expenditures, and time use. I use the randomized incentives and distance as exogenous instruments for learning HIV results and measure the effects of HIV positives and HIV negatives learning their results in 2004.

Consistent to theoretical predictions of lifetime consumption models, there were strong and significant effects of receiving HIV results on savings: HIV negatives who learned their

status in 2004 saved significantly *more* than those who did not learn their status. Conversely, HIV positives who learned they were positive were significantly *less* likely to save than those who did not learn their status. These effects were both statistically and substantially significant.

There were no significant effects of receiving either an HIV positive or negative diagnosis in 2004 on reported annual income, assets, value of crops or value of livestock in 2006. There were almost no significant effects of learning either HIV negative or HIV positive results on reported expenditures or on allocation of time. Two exceptions are that HIV negatives who learned they were HIV negative appear to have an increased time allocation towards cash work and spent slightly more on their medical expenditures than those who did not know they were HIV negative, suggesting increased investment in the future after learning HIV negative status.

To better understand the large effects on savings, but smaller overall effects on other measures, I utilize a survey conducted in 2005 among a sub-set of the sample asking respondents about subjective beliefs of HIV infection and subjective life expectancy. Questions on subjective life expectancy asked in the 2006 survey are also examined. I find that beliefs about subjective life expectancy were strongly affected by learning HIV negative results in the short run, but not in the long run. This suggests that repeat testing may be one possible way that could sustain long term investments in the future as induced by HIV testing among HIV negatives.

The paper proceeds as follows: Section 2 presents a theoretical framework. Section 3 presents the data. Section 4 presents the empirical strategy and results. Section 5 concludes.

2 Theoretical Framework: Life Expectancy, Savings, and HIV Testing

A large body of literature has examined implications of life expectancy on savings, investment, and growth with the main theory originating from the life-cycle model of savings – individuals save when they are young in order to finance consumption when they are old[1]. Many papers take

[1] While increases in life expectancy may increase the savings due to increases in length of retirement there may be other factors that would reduce savings or counter-act the motive to save. For example, reduced morbidity may also increase the working life span of individuals which would reduce savings rates. This

a macro approach by looking at increases in longevity on national savings rates and either simulate models or use cross-sectional data to test these theories (Bloom, Canning, and Graham 2003; Hurd, McFadden, and Gan 1998; Tsai, Chu, and Chung 2000); for example, it has been suggested that increases in life-expectancy may have been one of the reasons for increases in national savings rates in East Asia during between 1950 and 1990 (Lee, Mason, and Miller 1998; Lee, Mason, and Miller 2000; Kalemli-Ozcan, Ryder, and Weil 2000; Zhang and Zhang 2005). Other papers have examined the impact of receiving information health on subsequent decisions. For example, Stoler (2004) found suggestive evidence that those diagnosed at younger ages with Huntington's disease were more likely to smoke and invested in lower levels of education. In making decisions to plan for the future (such as decisions of savings, consumption, and investment), individuals' belief of their length of life is important and thus changes in individuals' perception of life expectancy should affect their behavior.

This basic model of lifetime consumption predicts that savings is increasing in additional years of life. If learning HIV status affects subjective probability of survival (e.g., expected additional years of life) savings will unambiguously be affected. Specifically, to the extent that individuals update their subjective beliefs of life-expectancy after learning HIV results, those learning that they are HIV negative would be expected to save more, and those learning they are HIV positive would be expected to save less.

Because HIV is fatal and there is no cure, we might expect, a priori, that learning HIV results would have a large effect on subjective life expectancy. For an average African without access to anti-retroviral drugs, it is estimated that HIV will progress to AIDS within 8 years and that the individual will die from an AIDS-related cause within the next year (UNAIDS 2002).

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would be especially important in countries such as in the United States and in Europe where retirement ages are set and there have been dramatic improvements in health care for the elderly (Fogel 1994, 1997). Rising old-age dependency rates may also offset these effects and leads to a net savings rate of zero in equilibrium (Bloom, Canning, and Graham 2003). See also (Bernard et al. 2003) for a model of uncertain dependency in old-ages. However, for individuals in rural Africa where individuals are mainly engaged in agricultural work and retirement is less demarcated, these offsetting factors are likely to be minimal.

Therefore, an individual learning she is HIV positive can expect at most ten additional years of life. Moreover, most will not know when they were infected and thus those receiving a positive diagnosis can, on average, expect only another five years of life[2]. However, how individuals themselves perceive their likelihood of infection and how perceptions are updated after learning their results is an empirical question.

There may be important differences between short term and medium to long run effects of learning HIV results on subjective life expectancy. For those learning they are HIV negative, in the short run, there may be large gains in subjective life expectancy while in the long run, if individuals continue to face risk of infection – for example, by engaging in unsafe sex, there may be no long term effects of learning HIV results on subjective life expectancy. For those learning they are HIV positive, because there is no cure for the disease, we could expect no difference between short run and long run subjective life expectancy. On the other hand, if individuals experience denial, or begin treatment and see signs of improved health, there may be differences in subjective life expectancy over time.

A simple two-period lifetime consumption model may not account for factors that may be specific to individuals learning their HIV status. For example, those learning they are HIV positive may choose to seek treatment or receive better health care in order to prolong their life, increasing health expenditures (Thirumurthy, Goldstein, and Zivin 2005). On the other hand, sickness may prevent HIV positive individuals from normal daily activities and may reduce levels of income. These effects may further reduce savings among HIV positives learning their status. There may also be bequest motives that could motivate HIV positives to save more after learning their HIV status in order to provide for their children or to finance funeral costs (Freire 2004). HIV positives may also want to save for the time when they will be unable to work (Thirumurthy, Goldstein, and Zivin 2005).

[2] Individuals learning their HIV status do not know when they have been infected and current HIV tests do not reveal CD4 count that may indicate this information.

Theoretically, receiving an HIV diagnosis should only impact savings if individuals learn new information[3]. This is violated if an individual's posterior belief of infection is equal to her prior. For example, if an individual had perfect knowledge of her status (either through prior testing or through inference from previous sexual behavior), there would be no additional information from the diagnosis. Individuals must also view their diagnosis as credible in order to have an effect on current beliefs of likelihood of infection.

In order for current knowledge of HIV status to affect future planning, individuals must also use current information and beliefs about their HIV status to forecast their expected number of years of life. This includes taking into account the risks they will face in the future from sexual partners as well as risks from other mortality dangers. Individuals might also take into account whether there is treatment available for HIV/AIDS and how treatment might extend years of life if HIV is contracted. It is notable that although there are objective probabilities of infection and life-expectancy determined by biological transmission rates and prevalence rates, it is an individual's subjective beliefs about infection and life-expectancy which should affect savings behavior.

3 Data and Experimental Design

The data in this paper are part of the Malawi Diffusion and Ideational Change Project (MDICP), a panel study of men, women, and adolescents randomly selected from 125 rural villages in three districts of Malawi[4]. In 1998, a sample of married men and women was randomly drawn and these individuals were re-interviewed in 2001. In 2004, an additional sample of men and women (ages 14-24) were randomly selected from the same villages and were added to the sample. In 2006, all of the respondents from 1998, 2001, and 2004 were included in the sample of

[3] (Boozer and Philipson 2000) discuss this more formally where they suggest that the benefits of HIV testing are an upside-down U shaped function of the prior belief of HIV infection. That is, there is no benefit to learning HIV results if HIV status is known with certainty – the information would not be able to be used for updating behavior and only individuals who are surprised by their HIV results should respond to the information

[4] See http://www.malawi.pop.upenn.edu/Level%203/Malawi/level3_malawi_sampling.htm.

individuals to be approached. While the sample was randomly drawn from the population, sample attrition across waves of data collection may affect the degree to which this sample is representative[5].

During data collection in 2004, respondents were offered free tests for HIV and other sexually transmitted diseases; 91 percent accepted a test for at least one sexually transmitted disease[6]; a sample of 2,894 individuals. The HIV prevalence rate was 6.4 percent. The HIV rate in this sample is significantly lower than the estimated national prevalence rate at 12 percent (DHS 2004). This may be due to the fact that national rates are typically estimated from urban and antenatal clinics rather than rural representative populations; the difference may also be due to attrition or refusals[7].

The decision to learn HIV results is likely to be correlated with other behaviors, perceptions of risk, or characteristics of the results centers, leading to a biased estimate of cross-sectional analyses of the impact of knowing HIV results. To causally estimate the effects of knowledge of HIV status in 2004, I use the fact that in 2004 there was an experiment that randomly assigned the benefits and costs of learning HIV results to each individual who agreed to be tested. At the time of the HIV test, individuals were given a randomly assigned monetary voucher redeemable upon obtaining their results two months later[8]. Test results were available at temporary counseling centers randomly placed throughout the villages[9]. Both randomized incentives and distance to the results center were large predictors of attending the centers to learn HIV results (not shown). The full description of the data and design of this experiment are found in Thornton (2005).

[5] The main reason for attrition across all waves of data is temporary and permanent migration. In 2004, 18 percent of those interviewed in 2001 were away or had moved; this is comparable to attrition rates in other longitudinal studies in Africa (Maluccio 2000; Chapoto and Jayne 2005).
[6] (Bignami-Van Assche, Smith et al. 2004) provides a full testing protocol.
[7] Preliminary data from tracking migrant attritors from the MDICP sample in 2007 indicate HIV rates of over 15 percent (Personal correspondence with Philip Anglewicz).
[8] Vouchers ranged between one and three dollars and the average total voucher amount was 1.04 dollars.
[9] Respondents were personally informed of the time and location of their assigned center.

Approximately two months after results were available, respondents who tested for HIV in two of the three sample districts (Balaka and Rumphi) were re-interviewed in their homes for a short survey. Approximately 79 percent of those tested in 2004 in Balaka and Rumphi were interviewed at this time. In 2006, respondents were again re-interviewed and of those who were tested for HIV in 2004, 74 percent were interviewed in 2006.

The main sample for the paper consists of all respondents who accepted an HIV test in 2004, who had a survey administered in 2006, and had basic covariate data. This consists of a total sample of 1,937 individuals. While there was attrition in both the 2005 and 2006 surveys, the attrition rates were not correlated with the randomized incentives or distance to the VCT (not shown). Because this paper uses the randomized experiment for the main econometric analysis, the fact that attrition across sample waves is not correlated to the exogenous incentives and distance to the HIV results centers suggests that internal threats to validity are limited. To the extent that there is selective sample attrition across survey waves, there may be threats to external validity because individuals in the 2004 sample who tested for HIV may be different than the general population of Malawi.

Table 1 presents summary statistics for the sample of individuals who tested in 2004 and who were interviewed by the survey team in 2006. In this sample, 44 percent are male, with an average age of 34, and 3.5 children. Respondents completed, on average, almost five years of school in 2004 and owned 3.4 of a possible total of 13 assets[10]. There were 87 (5 percent of the sample), who are HIV positive. Only 19 percent reported having had an HIV test in 2004, of those approximately half reported having heard their results. The majority of the respondents, indeed most individuals in Malawi, are subsistence farmers. Using prices from 2004 and 2006 of specific crops, reported amount of annual yield and the number of livestock owned, the log value

[10] Assets include: Bed with mattress, sofa set, table and chairs, paraffin glass lamp, television, radio, cell phone, mosquito net, solar electricity panel, bicycle, motorcycle, Pit latrine, and oxcart.

of crop output and livestock value was calculated and is presented in Table 1[11]. In 2006 (but not in 2004), respondents were asked to report their annual income by estimating all the value of all work done (paid in cash and kind) within the previous year, yielding an average non-logged value of 87 dollars (median 36 dollars (not shown)). In 2006, respondents were also asked if they had any savings for the future ("such as a bank account, savings group, or cash"). If they had any savings, they were asked the approximate total value of all of their savings. The average non-logged savings among those that saved a positive amount was 107 dollars and the median amount was 36 (not shown). Out of a variety of expenditure categories, respondents reported an average of 36 dollars worth of household and individual expenditures in 2006 with a median of 17 dollars (non-logged values not shown) [12]. The largest expenses were farm-related expenses and expenses for children.

At the baseline – before the majority of the respondents knew their HIV status – there were certain economic differences between HIV positives and HIV negatives. Generally, HIV positives have a higher economic status than HIV negatives. For example, HIV positives were 12 percentage points more likely to own land (Appendix A, Column 2).[13] HIV positives were more likely to spend money on medicine for themselves, (Column 6), on expenses for their children (Column 7), and on funeral costs (Column 9). Gender is also strongly associated with higher economic output. Males are more likely to report owning land (Column 2), have higher values of livestock ownership (Column 3), and have higher values of crop ownership (Column 4). However, males are not any more likely to own more assets (Column 1). Age, completed years of education, and total number of children are also associated with higher economic output in

[11] Livestock includes cows, goats, sheep and poultry. Crops include maize, tobacco, and cotton.
[12] These categories included: clothes or medical expenses for themselves, expenses on children (including clothes, medical expenses, and school fees), farm expenses (including seeds, fertilizer, labor, new tools or inputs), and expenses on funerals.
[13] Appendix A presents OLS regressions of each of the 2004 economic measures (income, agricultural production, and expenditures) on basic demographic data from the 2004 survey, including controls for gender, age, age-squared, years of completed education in 2004, HIV status in 2004, number of children alive, and region dummy variables (Standard errors are clustered by village).

expected directions. In addition, there are strong district level effects, which may capture overall district level differences, ethnic differences, or differences in the seasonal timing of when the survey was conducted in 2004. Being male, having completed more years of education, and age are also positively associated with increased expenditures as expected. Individuals in Rumphi report higher levels of expenditures than the omitted district (Mchinji), while those in Balaka reported lower expenditures.

4 The Economic Impact of Learning HIV Results

4.1 Empirical Strategy

To empirically measure the impact of learning HIV status I estimate the following specification:

$$(2)\quad Y_{ij} = \alpha + \beta_1 \text{GotResults}_{ij} + \beta_2 \text{HIVPositive}_{ij} + \beta_2 \text{HIVPositive} * \text{Got Results}_{ij} + X'_{ij}\mu + \varepsilon_{ij}$$

Y indicates the relevant dependent variable measured in 2006 for person i in village j, such as savings or expenditure. *"Got Results"* indicates an individual went to the VCT center and heard her HIV status in 2004. *X* includes indicators of gender, age, age-squared, years of completed education in 2004, number of children alive, an indicator of land ownership in 2004, as well as dummy variables indicating the region, with Mchinji district the omitted category. Standard errors are clustered by village.

In each of the specifications, baseline economic data from 2004 are included as covariates, including land ownership, total number of assets, as well as log value of crops and livestock. Because past economic activity in 2004 strongly predicts economic outcomes in 2006 these variables reduce the standard error, increasing the explanatory power of each specification. Each specification in the below analyses is robust to excluding these control variables (not shown)[14].

[14] While assets and log crop value in 2004 are highly correlated to each other (coefficient of 0.39) and assets and log livestock value are also highly correlated (0.49), land ownership is not highly correlated to any of the measures, and livestock and crops are not highly correlated to each other.

The variable "Got Results" is instrumented by exogenously assigned incentives and distance to the assigned VCT center. The full set of instruments for getting HIV results in 2004 includes an indicator of with being offered any incentive, the amount of the incentive, living over one kilometer from the assigned center, interactions of these with gender, as well as a control for a simulated average distance in each VCT zone. The first stage is modeled as:

$$(3)\quad \begin{aligned} \text{GotResults}_{ij} = {} & \alpha + \beta_1 \text{Any}_{ij} + \beta_2 \text{Amount}_{ij} + \beta_3 \text{Over 1 km}_{ij} + \beta_4 (\text{Any}_{ij} \cdot \text{Male}_{ij}) + \\ & \beta_5 (\text{Amount}_{ij} \cdot \text{Male}_{ij}) + \beta_6 (\text{Over 1 km}_{ij} \cdot \text{Male}_{ij}) + X_{ij}\mu + \varepsilon_{ij} \end{aligned}$$

where *"Any"* indicates if an individual received any incentive, *"Amount"* indicates the total amount of the incentive, and *"Over 1 km"* is an indicator whether the assigned HIV results center was over one kilometer from an individual's home. Interactions with gender are included to account for possible heterogeneous treatment effects (Appendix B).

In equation (2), the coefficient on *"GotResults"* represents the effect of an HIV negative learning his or her HIV negative results in 2004. The coefficient on *"HIVPositive"* represents the difference between HIV positives who do not know their HIV results in comparison to the HIV negatives who do not know their results. The sum of the coefficients *"GotResults"* and *"GotResults*HIVPositive"* represent the impact of HIV positives learning their HIV status in 2004. These are the main coefficients examined in the analyses that follow.

4.2 Results: Savings

Table 2 presents the impact on savings. Recall that respondents were asked if they had any savings, and the amount of savings. Approximately 23 percent of the respondents reported having any savings, coded as a zero-one indicator variable. Although the results presented are linear IV models (IV probit estimates do not differ substantially from the linear specifications). While the point estimate is positive (0.046), there is no statistically significant impact of learning negative HIV results in 2004 on the probability of saving (Column 1). HIV positives who learn their status are 33 percentage points less likely than HIV negatives who learn their status to save (standard error 0.20, Column 1).

Among those who did save a positive amount (approximately 23 percent of the sample), there are strong and significant impacts of learning HIV results on the amount of savings. The coefficient on *"Got Results"*, indicating the impact of HIV negatives learning they are HIV negative in 2004 on the amount of savings in 2006, shows a large and significant increase in log savings (1.06, standard error 0.35, Column 3). This increase is equivalent to over a 100 percent increase in the amount saved for HIV negatives receiving a diagnosis.

Thus, HIV positives learning their status were significantly less likely to save anything, but there was no impact on the amount saved, among those who did save some amount. Among HIV negatives, while there was no impact on the likelihood of saving, the total among saved increased substantially after learning their status.

It is worth examining the OLS estimates which do not eliminate the selection bias due to individuals' choice to go to learn their results. Columns 2 and 4 present the OLS estimates, where the coefficients are smaller than those in the IV specifications. This suggests, for example, that HIV negative individuals who are less likely to save are more likely to self-select to come for their HIV results. Indeed, in a regression predicting VCT attendance in 2004 with baseline 2004 economic indicators of assets, land, expenditures, and log crop and livestock value, HIV negatives with higher values of economic indicators are less likely to attend the VCT center (regression not shown). This may be due to the opportunity cost of time (those with higher incomes would have a higher opportunity cost of attending the VCT center and thus would be less likely to go to get their HIV results). It may also be indicating some other sort of selection bias which would affect the OLS estimates. A Hausman test indicates that the coefficient on learning HIV negative results in the IV estimate is significantly different than that in the OLS estimate, supporting the importance of using an IV strategy to test the impacts of learning HIV results.

4.3 Results: Income and Economic activity

Table 3 presents the impact of learning HIV positive and negative results in 2004, on economic output in 2006. There is no significant impact of learning either HIV negative results, or learning

HIV positive results on the number of household assets in 2006, log income, log livestock, or log value of crops.

The fact that there appears to be no difference in output between HIV positives and HIV negative who learned and did not learn their HIV status, is a first indication that there may be little overall difference in investment on farm activities – either in expenditures (i.e. farm investments) or in time (discussed below). Note also that there is very little difference between the income and economic output of HIV negatives and HIV positives. The fact that there is no significant difference between HIV positives and HIV negatives suggests that households may be able to self-insure against household shocks, enabling them to better cope with sickness.

4.4 Results: Time Use

Table 4 presents the impact of learning HIV results on time allocation on the day before the 2006 survey. Each specification includes the 2004 baseline amount of time spent engaged in each activity as a control. For most of the activities, there is no significant impact of either HIV positives or HIV negatives learning their results. It is notable that there is no additional time reported spending sleeping among the HIV positives who know they are positive, nor do they appear to adjust their time by spending fewer hours working – in the home or elsewhere. There are no significant differences in the response to learning HIV status between genders, ages, education levels, or district (not shown).

One striking difference – and the only difference in reported time use – is the number hours spend doing outside work for cash (Column 1). Those HIV negatives who learn they are negative spend almost one hour more working on labor to earn cash. This could be one source of the additional amount of savings that were invested by the HIV negatives who knew their status. This is suggestive of increased investments by those learning they are HIV negative.

4.4 Results: Expenditures

Table 5 presents the impact of learning HIV results on reported expenditures of clothes for self,

medicine for self, expenses for children, farm expenses, and funeral-related costs. The only effect of learning HIV results is observed among HIV negatives learning their results. HIV negatives who learned they were negative in 2004 reported spending significantly *more* on their own medical expenses than those who did not know they were negative (0.114, standard error 0.066, Column 2). These results are also robust to using changes in expenditures as each dependent variable as well as dollar-valued expenditures. There are no significant differences in the response to learning HIV status among different genders, ages, education levels, or respondents in different district (regressions not shown). Although this result is only statistically significant at the 0.90 percent level, it is suggestive of increased investment in one's own life. On the other hand, it is noticeable that there wasn't an increase in medical expenditures among the HIV positives who learned they were positive.

4.5 Subjective Beliefs

Theoretically, receiving an HIV diagnosis should only affect life expectancy if individuals learn new information[15]. This is violated if an individual's posterior belief of infection is equal to her prior. For example, if an individual had perfect knowledge of her status (either through prior testing or through inference from previous sexual behavior), there would be no additional information from the diagnosis. Only a limited number of individuals had ever had a prior HIV test – in the 2004 data, 19 percent of respondents reported having a previous test for HIV although only half of these actually learned their results (not shown).

In order for learning HIV results to impact behavior, individuals must view their diagnosis as credible. There is evidence from the survey data that individuals did update their subjective beliefs of the likelihood of HIV infection after learning their results – at least for a short period of time and most noticeably among the HIV negatives. During the 2004, 2005, and

[15] (Boozer and Philipson 2000) discuss this more formally where they suggest that the benefits of HIV testing are an upside-down U shaped function of the prior belief of HIV infection. That is, there is no benefit to learning HIV results if HIV status is known with certainty – the information would not be able to be used for updating behavior and only individuals who are surprised by their HIV results should respond to the information

2006 interviews, respondents were asked a number of questions about their subjective likelihood of HIV infection including "What is the likelihood that you are currently infected with HIV?", and "what is the likelihood that you will be infected with HIV in the future?"[16]. By comparing beliefs of the likelihood of infection before and after learning results there is evidence that individuals did update their beliefs; however, this update in beliefs did not persist over time to last until 2006.

In 2004, before the HIV test, Table 6 presents the subjective likelihood of current and future infection by HIV positives and HIV negatives. There are large significant differences in likelihood of current and future infection by HIV status, suggesting that HIV positives may have knowledge of their own risky behavior (Anglewicz and Kohler 2005; Bignami-Van Assche, Anglewicz et al. 2005).

In 2005, two months after individuals would have learned their HIV results if they had attended the VCT results clinics, there is the first indication that some individuals updated their beliefs. Among HIV negatives, of those who heard their results in 2004, 87 percent believed that there was no likelihood of being infected, while only 49 percent of those who did not learn their negative results thought that there was no likelihood. The differences of average responses for each category are presented comparing those who did and did not learn their results. Receiving an HIV negative diagnosis significantly reduced the likelihood of believing there was a chance of being infected. These differences are robust to using the randomly assigned monetary incentives and distance as instruments and the IV coefficients are similar to the OLS, only with larger standard errors (regressions not shown).

[16] One consideration is that although *objective* life expectancy may be strongly correlated with *expectations* of life expectancy, individuals make planning decisions based on their beliefs of expected length of life and probability of infection. In fact, there is a growing literature suggesting that subjective beliefs are, in many instances, better predictors of behavior than objective measures (Hamermesh 1985; Manski and Dominitz 1994; Lusardi 1999; Smith, Taylor et al. 2001; Hurd and McGarry 2002; Gan, Hurd et al. 2003; Hurd, Smith et al. 2003; Gan, Gong et al. 2004; Perozek 2005; Salm 2005; Schunk 2005; Engelberg, Manski et al. 2006). To determine the impact of HIV/AIDS, or the effects of learning HIV results on savings and investment, it may be most important to account for subjective beliefs about the likelihood of infection and life expectancy.

Among the HIV positives, there is very little difference in reported current likelihood of HIV infection among those knowing their status and those not knowing their status (although the proportion of those who knew they were positive reported a slightly higher likelihood of infection, albeit not significantly different). The small sample size of HIV positives make it difficult to determine if there is simply not enough statistical power to pick up an effect or if the HIV positives did not believe (or were in denial) of their results. It might also be the case that positives did not want to report a likelihood of HIV infection to the interviewer with the fear that the interviewer might infer their positive status. When asked about their likelihood of future HIV infection, HIV positives who knew their status were significantly more likely to report being unsure, rather than those who did not learn their status (58 percent as opposed to 31 percent)[17].

In 2006, the results are strikingly different from those in 2005. Among HIV negatives, there is a very small, although statistically significant, difference between those who had heard their results in 2004 and those who had not in believing there was no likelihood of infect (0.04 percentage points). There was also a very small difference in the likelihood of believing that there was a high likelihood of infection. However, the large difference in subjective likelihood that was seen in 2005 has all but disappeared. In 206, (as in 2005), there is no difference in subjective beliefs of future likelihood of infection. The advantage in learning HIV negative status has diminished over the year that passed between survey rounds.

Among the HIV positives there is no significant difference between those who had learned their results and those who had not. There is a difference in the reported future likelihood of infection, in the opposite direction than expected.

Columns 1 and 2 in Table 7 present the IV regressions that are analogous to Table 6. Two new variables were created for 2005 and 2006 indicating whether an individual believed there was some likelihood of current HIV infection (with “don’t’ knows” coded as believing there was

[17] It should be noted that in the 2005 survey, individuals were only given three possible responses in which to categorize their subjective likelihood of infect – none, some, and high. This is one of the reasons for the differences in distribution between 2005 and the other survey years.

some likelihood). Here the results clearly show the strong effects of HIV testing on subjective likelihood of current infection in 2005, which disappears in 2006.

In addition to asking respondents about their subjective beliefs of infection, respondents in Balaka and Rumphi were asked a series of questions in 2005 to elicit subjective life expectancy. Individuals were asked if they thought they would live up to various ages, from age 40 to 100, in increments of five years. Respondents would answer "yes" if they believed they would live up to that age, "no" if they believed they would not live up to that age, or they would answer "don't know". Subjective life expectancy was calculated as the age at which a respondent changed her responses from "yes" to "no" or "don't know". On average, individuals believed they would live until approximately 64 years old (67 for men, 62 for women)[18].

Table 7 Columns 1 to 3 presents the IV results (from specification 2), on the impact of learning HIV results on subjective life expectancy in 2005. Those learning they were HIV negative reported 5 additional more years of life. This is statistically significant at the 90 percent confidence level (Column 1). HIV negatives who knew their results were 28 percentage points less likely to believe there was some likelihood of HIV infection than those who did not know their results (Column 2). HIV positives learning their results were significantly more likely to believe there was some likelihood of being HIV positive (Column 2). Most of these results diminish when measured in 2006.

The fact that subjective beliefs of infection among the HIV negatives who had learned their results in 2004 and those who had not were no different after two years, it may not be surprising that there is little observed impact of the HIV testing on most economic outcomes, other than savings.

5 Conclusion

This paper used an experiment that randomly assigned individuals monetary incentives to learn

[18] These subjective estimates do not vary greatly from recent life-tables (Thornton and Lam 2007).

their HIV results after being tested and randomly assigned the location of the HIV results centers. This allowed for the causal estimation of the impact of learning HIV positive and negative results on economic activity including income and economic output, savings, expenditures, time use. There is evidence that there were large effects of HIV testing on savings: HIV negatives who knew their status saved significantly more than those who did not know their status; HIV positives who knew their status were significantly less likely to save than those who did not know their status, consistent with predictions of a lifetime consumption model where learning HIV results affect life expectancy and savings.

HIV negatives who learned their status reported spending more on medical expenses and increased hours on work for cash. These findings are consistent with increased investments for the future among those learning they are HIV negative.

While these findings are significant, there were almost no other effects of learning HIV negative results. This may be in part due to the fact that 2 years after receiving their results, there were only very small no differences in subjective belief of HIV infection. If one of the objectives of HIV testing is to change individuals' posterior beliefs of infection, in order to affect subsequent behavior, more frequent testing might be necessary.

This research also has important implications for recent debates related to the economic costs of HIV/AIDS, where empirical studies have yielded mixed and inconclusive findings (Over 1992; Bloom and Mahal 1997; Bonnel 2000; Lorentzen, McMillan et al. 2004; Papageorgiou and Stoytcheva 2004; Werker and Wendell 2004; Corrigan, Gloom et al. 2005; Young 2005; Kalemli-Ozcan 2006). This paper suggests that despite dramatic reductions in life expectancy at birth due to AIDS, on average, there may be little effect or persistent effect of HIV testing on subjective life expectancy or on economic output. However, among some individuals, for example, those who choose to save, HIV testing may have large effects on the amount that is saved.

The results in this paper also speak to suggestions made in the popular press that the AIDS epidemic has exacerbated problems with famine and food shortages (Agence France-Presse

2002; BBC News Reporter 2002; de Waal and Whiteside 2003; Nyamu 2003). The basic argument is that the AIDS epidemic prevents individuals from working in their fields, either because they are too sick, or because they need to care for those who are sick, or, that other financial demands such as medicine or treatment prevents individuals from making important farm investments such as on fertilizer or seeds. The findings in the paper find little difference in time use or in economic output between the HIV positives and negatives, or among those who know their results and those who do not. Further exploration is needed, but at the very least, this may suggest functioning informal insurance networks such as family members and extended household which could help to mitigate the effects of the disease.

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Table 1: Summary Statistics

	2004 Summary Statistics			2006 Summary Statistics		
	(1)	(2)	(3)	(4)	(5)	(6)
	Obs	Mean	SD	Obs	Mean	SD
Demographics						
Male	1937	0.44	0.50			
Age	1937	34.61	13.51			
Number of children	1937	3.51	2.97			
HIV positive, 2004	1968	0.04	0.21			
Yrs education	1936	3.53	3.67			
Life expectancy	1185	64.00	17.58			
Income						
Number of assets	1937	3.37	2.19	1937	3.47	2.13
Log value of crops	1937	7.46	1.78	1933	7.66	0.98
Log value of livestock	1937	3.49	2.06	1877	3.76	1.96
Log income				1936	3.45	1.50
Savings						
Saved				1937	0.23	0.42
Log Savings				449	3.46	1.46
Log Expenditures						
Total expenditures	1937	2.43	1.56	1937	2.81	1.24
Clothes	1937	1.14	1.18	1937	1.37	1.20
Medicine/health	1937	0.56	0.80	1937	0.34	0.64
Total children expenses	1937	1.40	1.37	1937	1.76	1.29
Farm	1937	0.70	1.35	1937	1.15	1.39
Funerals	1937	0.28	0.56	1937	0.53	0.67

Notes: HIV prevalence rates do not include respondents with indeterminate diagnoses

Table 2: Impact of Learning HIV Results on Savings

	(1) IV	(2) OLS	(3) IV	(4) OLS
	Saved (0/1)		Log Savings	
Got Results	0.046	-0.001	1.058***	0.128
	[0.049]	[0.023]	[0.351]	[0.138]
HIV positive*Got Results	-0.332*	-0.143	-0.287	-1.049***
	[0.200]	[0.088]	[0.660]	[0.391]
HIV positive	0.232	0.102	0.46	0.732***
	[0.144]	[0.073]	[0.458]	[0.255]
Education	0.00	0.00	0.037*	0.036*
	[0.004]	[0.004]	[0.020]	[0.019]
Male	0.078***	0.076***	0.372***	0.338***
	[0.022]	[0.022]	[0.121]	[0.119]
Assets	0.025***	0.024***	0.196***	0.179***
	[0.005]	[0.005]	[0.037]	[0.038]
Land	0.027	0.027	0.375**	0.320**
	[0.027]	[0.026]	[0.146]	[0.150]
Log expenditures	0.033***	0.033***	0.143***	0.124***
	[0.008]	[0.008]	[0.046]	[0.043]
Log livestock	0.006	0.006	0.01	0.008
	[0.005]	[0.005]	[0.038]	[0.035]
Log crops	0.007	0.008	0.032	0.044
	[0.007]	[0.007]	[0.038]	[0.036]
Constant	-0.166	-0.126	0.608	1.352**
	[0.111]	[0.103]	[0.763]	[0.597]
Observations	1937	1937	449	449
R-squared	0.06	0.06	0.29	0.38

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Each column represents an IV regression where Got results is instrumented with having any incentive, the amount of the incentive, being over one kilometer from the HIV results center and interactions of all three of these with gender. Got results * HIV positive is instrumented with each of the 6 above variables with being HIV positive.

Standard errors are clustered by village.

Each column also includes control variables including gender, age, age squared, number of children in the household, years of completed education in 2004, a simulated average distance term, district fixed effects, number of household assets in 200, log expenditures in 2004, log livestock value in 2004, and log crop value in 2004

Table 3: Impact of Learning HIV Results on Economic Output

	(1)	(2)	(3)	(4)
	Assets	Log Income	Log Crops	Log Livestock
Got Results	-0.184	0.057	-0.048	-0.312
	[0.178]	[0.159]	[0.092]	[0.194]
HIV positive*Got Results	0.374	-0.368	0.102	0.554
	[0.838]	[0.705]	[0.349]	[0.769]
HIV positive	-0.04	0.474	-0.224	-0.428
	[0.563]	[0.475]	[0.237]	[0.515]
Education	0.051***	0.030**	0.013**	0.02
	[0.014]	[0.013]	[0.006]	[0.015]
Male	0.055	0.683***	0.146***	0.229**
	[0.072]	[0.083]	[0.041]	[0.087]
Assets	0.554***	0.072***	0.093***	0.123***
	[0.032]	[0.019]	[0.013]	[0.025]
Log expenditures	0.066**	0.088***	0.057***	0.009
	[0.027]	[0.030]	[0.015]	[0.024]
Log livestock	0.070***	-0.018	0.067***	0.410***
	[0.022]	[0.018]	[0.012]	[0.028]
Log crops	0.051***	0.023	0.044***	0.022
	[0.019]	[0.019]	[0.011]	[0.022]
Constant	0.559	0.845**	6.765***	1.368***
	[0.370]	[0.364]	[0.224]	[0.438]
Observations	1937	1936	1933	1877
R-squared	0.48	0.11	0.26	0.32

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Each column represents an IV regression where Got results is instrumented with having any incentive, the amount of the incentive, being over one kilometer from the HIV results center and interactions of all three of these with gender. Got results * HIV positive is instrumented with each of the 6 above variables with being HIV positive.
Standard errors are clustered by village.
Each column also includes control variables including gender, age, age squared, number of children in the household, years of completed education in 2004, a simulated average distance term, district fixed effects, number of household assets in 200, log expenditures in 2004, log livestock value in 2004, and log crop value in 2004

Table 4: Impact of Learning HIV Results on Time Use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cash work	Agriculture Work	Domestic	School	Sleep	Funeral	Friends	Religion
Got Results	0.702***	-0.564	0.01	0.077	-0.167	0.042	-0.094	0.11
	[0.257]	[0.401]	[0.323]	[0.191]	[0.241]	[0.148]	[0.196]	[0.102]
HIV positive*Got Results	-0.403	1.04	-1.803	-0.36	-0.066	0.444	-0.376	0.565
	[1.337]	[1.619]	[1.549]	[0.383]	[1.030]	[1.573]	[0.804]	[0.949]
HIV positive	0.576	-1.152	0.715	0.341	0.307	0.004	0.317	-0.31
	[0.897]	[1.227]	[1.167]	[0.271]	[0.648]	[0.917]	[0.512]	[0.537]
Education	0.058**	-0.008	-0.075***	0.031**	-0.081***	-0.008	0.011	0.021**
	[0.025]	[0.027]	[0.022]	[0.013]	[0.018]	[0.011]	[0.015]	[0.009]
Male	1.457***	0.648***	-4.634***	0.442***	-0.027	0.041	0.660***	0.053
	[0.161]	[0.152]	[0.187]	[0.116]	[0.102]	[0.055]	[0.095]	[0.040]
Cash work	0.253***							
	[0.034]							
Ag work		0.088***						
		[0.025]						
Domestic			0.03					
			[0.028]					
School				0.282***				
				[0.057]				
Sleep					0.036*			
					[0.021]			
Funeral						-0.012		
						[0.016]		
Friends							0.045*	
							[0.023]	
Religion								0.026
								[0.025]
Constant	-1.560***	-0.891	8.040***	2.316***	10.467***	0.353	2.079***	-0.162
	[0.527]	[0.732]	[0.754]	[0.509]	[0.582]	[0.310]	[0.300]	[0.202]
Observations	1871	1937	1871	1871	1871	1871	1871	1871
R-squared	0.22	0.16	0.48	0.25	0.05	0.02	0.09	0.01

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Each column represents an IV regression where Got results is instrumented with having any incentive, the amount of the incentive, being over one kilometer from the HIV results center and interactions of all three of these with gender. Got results * HIV positive is instrumented with each of the 6 above variables with being HIV positive.

Standard errors are clustered by village.

Each column also includes control variables including gender, age, age squared, number of children in the household, years of completed education in 2004, a simulated average distance term, district fixed effects, number of household assets in 200, log expenditures in 2004, log livestock value in 2004, and log crop value in 2004

Table 5: Impact of Learning HIV Results on Log Expenditures

	(1) Clothes	(2) Medicine	(3) Children	(4) Farm	(5) Funeral	(6) Total
Got Results	-0.092	0.114*	-0.054	0.015	0.04	-0.002
	[0.129]	[0.066]	[0.153]	[0.159]	[0.076]	[0.139]
HIV positive*Got Results	-0.179	-0.638	0.576	0.4	0.573	0.127
	[0.550]	[0.489]	[0.502]	[0.696]	[0.352]	[0.481]
HIV positive	0.113	0.644*	-0.235	-0.255	-0.285	0.104
	[0.378]	[0.376]	[0.364]	[0.502]	[0.229]	[0.350]
Education	0.037***	0.011*	0.008	0.027**	-0.002	0.036***
	[0.012]	[0.006]	[0.010]	[0.011]	[0.006]	[0.009]
Male	0.285***	-0.007	0.149**	0.184***	0.031	0.327***
	[0.062]	[0.034]	[0.059]	[0.058]	[0.030]	[0.057]
Constant	1.307***	-0.012	-0.108	-0.085	0.158	1.258***
	[0.252]	[0.171]	[0.320]	[0.351]	[0.150]	[0.295]
Clothes	0.077**					
	[0.032]					
Medical 2004		0.077***				
		[0.023]				
Children Expenses 2004			0.167***			
			[0.034]			
Farm 2004				0.015		
				[0.036]		
Funeral 2004					0.086**	
					[0.038]	
Observations	1937	1937	1937	1937	1937	1937
R-squared	0.10	0.04	0.22	0.14	0.13	0.22

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Each column represents an IV regression where Got results is instrumented with having any incentive, the amount of the incentive, being over one kilometer from the HIV results center and interactions of all three of these with gender. Got results * HIV positive is instrumented with each of the 6 above variables with being HIV positive.

Standard errors are clustered by village.

Each column also includes control variables including gender, age, age squared, number of children in the household, years of completed education in 2004, a simulated average distance term, district fixed effects, number of household assets in 200, log expenditures in 2004, log livestock value in 2004, and log crop value in 2004

Table 6: Subjective Likelihood of HIV Infection

	2004			2005						2006					
Panel A: Current Likelihood				HIV Negative			HIV positive			HIV Negative			HIV positive		
	HIV Negative	HIV Positive	Difference	No Results	Got Results	Difference	No Results	Got Results	Difference	No Results	Got Results	Difference	No Results	Got Results	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
None	0.58	0.38	0.21***	0.44	0.86	-0.42***	0.50	0.48	0.02	0.69	0.74	-0.05**	0.30	0.47	-0.16
Low	0.20	0.20	0.00	0.13	0.05	0.08***	0.13	0.10	0.03	0.22	0.19	0.03	0.36	0.27	0.10
Medium	0.05	0.10	-0.05**							0.04	0.04	0.00	0.12	0.10	0.02
High	0.06	0.90	-0.02				0.19	0.19	0.00	0.50	0.02	0.03***	0.21	0.17	0.05
DontKnow	0.11	0.23	-0.12***	0.43	0.08	0.35***	0.19	0.23	0.04	0.00	0.01	0.01	0.00	0.00	0.00
Panel B: FutureLikelihood															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
None	0.39	0.29	0.09*	0.20	0.30	-0.10***	0.15	0.12	0.04	0.47	0.47	-0.01	0.06	0.30	-0.24***
Low	0.26	0.32	-0.05	0.25	0.24	0.01	0.54	0.27	0.27*	0.35	0.33	0.00	0.48	0.30	0.18**
Medium	0.12	0.12	0.01							0.08	0.09	-0.01	0.21	0.15	0.06
High	0.05	0.09	-0.03	0.02	0.01	0.01				0.07	0.06	0.01	0.24	0.25	-0.01
DontKnow	0.18	0.17	0.01	0.53	0.45	0.08**	0.31	0.62	-0.31*	0.03	0.04	-0.01			

Table 7: Impact of Learning HIV Results on Subjective Beliefs

	(1)	(2)	(3)
	Follow-up Sample		Full Sample
	Subjective Life Expectancy 2005	Some Likelihood of being HIV positive 2005	Some Likelihood of being HIV Positive 2006
Got Results	5.195**	-0.279***	0.080*
	[2.209]	[0.054]	[0.044]
HIV positive*Got Results	-2.258	0.842**	-0.157
	[8.258]	[0.325]	[0.228]
HIV positive	-0.222	-0.336	0.427***
	[5.066]	[0.236]	[0.163]
Male	4.648***	-0.099***	-0.123***
	[1.516]	[0.030]	[0.020]
Constant	47.890***	0.346***	0.232**
	[5.070]	[0.124]	[0.104]
Observations	1185	1168	1936
R-squared	0.12	0.18	0.04

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Each column represents an IV regression where Got results is instrumented with having any incentive, the amount of the incentive, being over one kilometer from the HIV results center and interactions of all three of these with gender. Got results * HIV positive is instrumented with each of the 6 above variables with being HIV positive.
Standard errors are clustered by village.

Each column also includes control variables including gender, age, age squared, number of children in the household, years of completed education in 2004, a simulated average distance term, district fixed effects, number of household assets in 200, log expenditures in 2004, log livestock value in 2004, and log crop value in 2004

Appendix A: Baseline 2004 Survey Economic Indicators

	Cash and Agricultural Products				Log Expenditures						Time use							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Assets	Land	Log Livestock	Log Crops	Clothes	Medicine	Children	Farm	Funeral	Total	Other Cash work	Ag work	Domestic	School	Sleep	Funeral	Friends	Religion
HIV 2004	0.179	0.121***	-0.001	0.03	0.063	0.303***	0.263**	0.288*	0.172**	0.249	0.42	-0.335	-0.337	0.117	0.269	-0.134	0.142	0.006
	[0.227]	[0.036]	[0.213]	[0.181]	[0.151]	[0.104]	[0.127]	[0.159]	[0.079]	[0.156]	[0.262]	[0.300]	[0.289]	[0.150]	[0.268]	[0.135]	[0.159]	[0.069]
Male	0.539***	0.088***	0.541***	0.273***	0.362***	0.124***	0.283***	0.279***	0.078***	0.500***	1.518***	1.525***	-5.094***	0.452***	-0.001	0.071	0.731***	-0.003
	[0.083]	[0.026]	[0.075]	[0.076]	[0.055]	[0.040]	[0.059]	[0.063]	[0.028]	[0.071]	[0.264]	[0.166]	[0.122]	[0.095]	[0.163]	[0.063]	[0.094]	[0.033]
Yrs Educ	0.162***	-0.014***	0.102***	0.042***	0.039***	-0.007	0.013	0.022*	0	0.043***	0.018	0.021	0.01	0.084***	-0.057**	-0.004	-0.007	0.020***
	[0.017]	[0.004]	[0.016]	[0.015]	[0.011]	[0.006]	[0.011]	[0.012]	[0.006]	[0.012]	[0.024]	[0.028]	[0.021]	[0.018]	[0.024]	[0.015]	[0.016]	[0.007]
Age	0.025	0.025***	-0.011	0.019	0.011	0.014*	0.108***	0.062***	0.015*	0.101***	0.113***	0.058**	0.017	-0.194***	-0.013	0.047***	-0.072***	-0.003
	[0.019]	[0.004]	[0.018]	[0.019]	[0.011]	[0.008]	[0.019]	[0.014]	[0.008]	[0.018]	[0.025]	[0.029]	[0.024]	[0.023]	[0.020]	[0.015]	[0.020]	[0.009]
Age Squared	0	-0.000***	0	0	-0.000*	0	-0.001***	-0.001***	-0.000*	-0.001***	-0.001***	0	0	0.002***	0	-0.001***	0.001***	0
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Num Kids	0.088***	0.002	0.037	0.034	-0.003	0.014	0.089***	0.048***	0.021**	0.069***	0.001	0.03	0.008	0.012	-0.032	0.013	0.002	-0.005
	[0.031]	[0.004]	[0.024]	[0.022]	[0.014]	[0.009]	[0.013]	[0.016]	[0.009]	[0.015]	[0.030]	[0.035]	[0.028]	[0.008]	[0.034]	[0.023]	[0.019]	[0.007]
Rumphi	1.152***	-0.142***	0.926***	0.032	0.315***	0.181***	0.424***	0.345***	0.208***	0.589***	0.107	-1.628***	1.289***	-0.158	0.380*	-0.151	0.370***	-0.035
	[0.190]	[0.031]	[0.184]	[0.127]	[0.097]	[0.065]	[0.111]	[0.125]	[0.045]	[0.153]	[0.158]	[0.243]	[0.152]	[0.101]	[0.202]	[0.192]	[0.111]	[0.053]
Balaka	0.017	0.065**	-0.336**	-0.797***	0.023	-0.119**	-0.183*	-0.112	-0.075**	-0.221*	1.513***	-2.086***	0.920***	0.239**	0.42	-0.184	0.427***	-0.045
	[0.133]	[0.028]	[0.149]	[0.135]	[0.066]	[0.051]	[0.103]	[0.073]	[0.036]	[0.120]	[0.302]	[0.277]	[0.133]	[0.099]	[0.257]	[0.191]	[0.126]	[0.046]
Constant	1.368***	0.234***	2.683***	6.852***	0.682***	0.151	-1.145***	-0.887***	-0.172	-0.127	-2.367***	1.575**	5.263***	3.713***	10.772***	-0.522**	1.945***	0.101
	[0.372]	[0.084]	[0.384]	[0.391]	[0.235]	[0.157]	[0.365]	[0.274]	[0.141]	[0.354]	[0.552]	[0.606]	[0.475]	[0.479]	[0.421]	[0.230]	[0.396]	[0.183]
Observations	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1881	1937	1881	1881	1881	1881	1881	1881
R-squared	0.18	0.2	0.15	0.08	0.07	0.06	0.2	0.08	0.1	0.16	0.13	0.13	0.53	0.21	0.02	0.02	0.08	0.01

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Sample includes respondents who were tested for HIV and re-interviewed in 2006. Robust standard errors clustered by village in parenthesis.

Controls include a simulated average distance variable (an average distance of respondents' households to simulated randomized locations of HIV results centers) .

Appendix B: First Stage:
Impact of Monetary Incentives
and Distance on Learning HIV Results

	Got Results	Got Results * HIV Positive
Any*Male	0.044	0
	[0.065]	[0.009]
Amount*Male	0	0
	[0.000]	[0.000]
Under 1 km	0.055*	-0.001
	[0.032]	[0.003]
Male * Under	-0.029	0
	[0.034]	[0.003]
Any	0.325***	-0.001
	[0.046]	[0.005]
Amount	0.001***	0
	[0.000]	[0.000]
Any*Male*HIV	0.16	0.26
	[0.180]	[0.196]
Amount*Male*HIV	-0.001	-0.002
	[0.001]	[0.001]
Under*HIV	-0.007	0.042
	[0.117]	[0.109]
Male*Under*HIV	0.195	0.136
	[0.193]	[0.198]
Any*HIV	-0.112	0.237
	[0.165]	[0.168]
Amount*HIV	0	0.001*
	[0.001]	[0.001]
HIV	-0.034	0.317**
	[0.123]	[0.126]
Education	-0.005	0
	[0.004]	[0.001]
Male	-0.051	-0.001
	[0.052]	[0.010]
Constant	0.443***	0.006
	[0.099]	[0.017]
Observations	1937	1937
R-squared	0.25	0.73
F Stat	30.79	39.8