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Economic Coping Mechanisms in Response to Household Health
Shocks in Kagera, Tanzania: 1991-2004

A Thesis Presented to

The Faculty of the Yale School of Public Health

In Candidacy for the Degree of Master of Public Health

By

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Thesis Readers: Dr. Melinda Pettigrew, Dr. Michael Boozer

May 2013

ABSTRACT

Background: Chronic and acute illnesses pose substantial economic burden on households due to explicit health expenses and implicit costs engendered by decreased productivity and increased time allocation to care provision. This study examined economic coping mechanisms employed by households to respond to health shocks represented by chronic and acute morbidities.

Methods: Data from Kagera Health and Development Survey (1991-2004) were utilized to examine household health status and economic coping. Pooled OLS regression models were used to analyze the association between household health status and economic burden and coping mechanisms controlling for household size, mean age, income, and characteristics of household head. Household health status was categorized as chronic, acute, or healthy, economic burden was characterized by health expenditures, and coping variables examined included assets, transfers, and debt. Fixed effects regression models were employed to assess variations in household economic indicators and coping strategies corresponding to changes in health status over time.

Results: Pooled regression analysis did not indicate significant associations between health status and economic burden and coping strategies. Fixed effects model revealed that entry into chronic and acute status was significantly associated with increases in health expenditures (p value 0.01). The marginal propensity to spend on health expenses given additional transfers was 0.22 for acute households (p value 0.01).

Conclusion: Although health status overall did not significantly explain economic coping, developing acute and chronic illnesses was associated with larger health expenditures with chronic status being associated with the biggest increase. Transfers played a significant role in funding health expenses for acute households, and chronic households appear to have relied on self-insurance.

ACKNOWLEDGEMENTS

I would like to foremost thank Dr. Melinda Pettigrew and Dr. Michael Boozer for the invaluable guidance and support they provided during the pursuit of this research. I am also grateful to Dr. Kaveh Khoshnood and all Yale School of Public Health faculty members who have encouraged exploration of this subject. I am heavily indebted to the Kagera Health and Development Survey (KHDS) research team without whose efforts this analysis would not have been possible.

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Introduction:

Reducing morbidities can have critical implications for addressing poverty and improving overall welfare. Both chronic and acute illnesses can generate negative externality effects at the household level through economic pathways such as reduced productivity and income generation and increased health expenditures and time burden on other household members. Health burden can also adversely impact household welfare through decreased consumption of other goods and lower investments in children's education and nutrition (Abegunde and Stanciole 2008, Zivin et al. 2009). In addition to infectious diseases, epidemiological studies indicate the rising global burden of chronic conditions including cardiovascular diseases, cancer, and diabetes which propel concerns about relevant economic burden on households (Yach et al. 2004, Kelly et al. 2012).

A household's ability to respond to health shocks can be imperative in determining its overall welfare. Strategies to cope with economic consequences of illness can include both financial and non-financial tools. Empirical studies indicate that options employed for the former subcategory constitute asset usage and reliance on informal transfers and credit markets, while the latter include changes in labor supply and household time allocation, economic activity diversification, and alterations in household structure through migration (Rugalema 2000, Beegle et al. 2008). This study emphasizes financial coping strategies.

Chronic illness is more likely to prompt long-term impact on economic status of the household in comparison to acute illness primarily because it is a permanent shock and possibly due to severity of health outcome. Therefore, households with members who suffer from chronic illnesses are likely to experience the most significant financial burden and have to rely on self-

insurance to cope through asset depletion. Informal transfers should be more effective for coping against acute illnesses, which are characterized by transient shocks, as opposed to addressing long-term burden associated with chronic illnesses.

Literature Review:

Economic burden of morbidities

Both economic and health literature corroborate the burden of morbidities induced by explicit medical treatment and care costs (Russell 2004, Mwakalobo 2007, Abegunde and Stanciole 2008). The financial burden of prominent communicable diseases such as HIV/AIDS and malaria on households (Beegle, et al. 2008, Linnemayr, et al. 2011, Sachs and Malaney 2002) have been examined more extensively than the impact of non-communicable chronic diseases (Abegunde and Stanciole 2008). Developing nations additionally face the quandary of dealing with significant chronic and communicable disease burden. For instance, approximately 80 percent of cardiovascular diseases related death occurs in low and middle income countries (Kelly et al. 2012).

In addition to explicit costs, illnesses can lead to diminished labor productivity among those who are sick. Moreover, other household members may have to reallocate their productive time into care provision, thus further lowering income with estimates of one ill person equating to loss of labor of about two individuals (Mwakalobo 2007). However, income loss could also imply compensatory increased labor burden on other household members including children. In the case of HIV infected adults, Zivin et al. (2009) found that treatment corresponded to less reliance on children's labor along with improved schooling and nutritional outcomes. Economic burden might be particularly significant if primary earners are ill (Abegunde and Stanciole

2006). Reduced life expectancy due to morbidities affects both lifetime earning potential at the household level and quantity and quality of labor force at the macro-level which could lead to lower gross national income (GNI), savings, and possibly decreased economic growth (Abegunde and Stanciole 2006).

Economic coping mechanisms

Economic coping mechanisms include both financial and non-financial options. The former consist of asset usage, remittances, transfers, and reliance on credit markets, while the latter could include changes in labor supply and household time allocation, economic activity diversification, reduced consumption of other goods, and alterations in household structure through migration (Rugalema 2000, Mwakalobo 2007, Beegle et al. 2008, Abegunde and Stanciole 2008). Households can smooth consumption by accumulating assets during successful economic periods and depleting them when experiencing shocks (Dercon and Krishan 2000). Besides the myriad mechanisms, household risk management strategies can incorporate an element of time either through ex-ante methods including “savings, insurance contracts, social insurance arrangements” or ex-post strategies such as “borrowing, trading of assets, private and public transfers” (Baez 2006). Coping post health shocks has been predominantly examined in the context of HIV/AIDS (Rugalema 2000, Linnemayr et al. 2011).

Coping mechanisms become especially pertinent in poor rural households that are generally at higher risk for acute and chronic morbidities, are more vulnerable to exogenous shocks such as weather shocks, crop failure, or market price fluctuations, and usually have limited resources to manage risks associated with income volatility (Baez 2006, Abegunde and Stanciole 2008). Risk sharing mechanism such as “informal insurance networks” may serve as a

good source for obtaining transfers to cope with idiosyncratic shocks (Linnemayr 2010). However, these inter-household networks might be rendered less beneficial if the shock is systemic or permanent. Therefore, acute households are more likely to attain informal transfers to shield against an idiosyncratic and temporary shock, whereas chronic households might have to depend on self-insurance if external risk sharing strategies are limited. Further, ability to cope, smooth consumption, and maintain welfare may be hindered by liquidity constraints and imperfect credit and asset markets (Dercon and Krishan 2000).

Description of Data Set:

Data from Kagera Health and Development Survey (1991-2004), a longitudinal observational survey of households from 51 clusters in Kagera, a region in northwestern Tanzania, was utilized (World Bank). The primary objective of the survey was to determine the effects of adult mortality at the household level. When the survey was initiated, northeastern regions of Kagera had HIV prevalence that was as high as 24% (World Bank). Households were randomly selected through two stage stratification including geography and mortality rates.

There were four waves of questionnaires from 1991 to 1994 with wave 1 corresponding to the first time that households were interviewed. The sample size at baseline was 919 households. Additional follow-up interviews were conducted in 2004 and 2010 with a participation rate in 2004 amounting to 93% of baseline households (Beegle et al. 2008). Due to the ten year gap in between first rounds of interviews and follow-up in 2004, the latter sample consisted of 2774 households that included at least one member from an original household (Beegle et al. 2006). Besides household survey with individual level data, between 1991 and 1994, there were six additional questionnaires pertaining to schools, community, health facilities,

price, traditional healer, and follow-up questionnaires for those who left the sample. In the 2004 version, only community, price, and school questionnaires were continued aside from household surveys (Beegle et al. 2006). Household questionnaires and aggregated household level economic data on assets, income, and expenditures were analyzed exclusively. The twenty section household questionnaires covered topics such as demographics, health, education, nutritional status, expenditures, and economic indicators.

Methodology:

Health Status

The primary independent variable was household health status which was categorized into chronic, acute, and healthy households. A household was considered to be chronic if at least one member suffered from a chronic illness, which was defined as a condition that had existed for at least six months. Similarly, a household was characterized as acute if there were no chronic illnesses and only acute condition(s) indicated by an illness that occurred within the past month. Finally, a healthy household, as implied by the title, included households with no reported illnesses. Since the survey involved oversampling of sick households in order to assess mortality, which was the primary outcome of interest in the original study, the sample included substantially more chronic and acute household classification compared to controls (World Bank).

Economic Indicators and Coping

The primary dependent variables of interest were health expenditures and coping mechanisms. This study principally focused on financial coping mechanisms that included

transfers from individuals or organizations, debt, and total and physical assets, all of which were obtained from aggregate economic data. If households were able to respond effectively to a health shock, they would have larger transfers, greater access to and usage of credit, and higher utilization of assets controlling for household size, average age, and income.

Pooled Multivariate Regression Analysis

Pooled multivariate regression analysis was conducted to assess the correlation between household health status and economic burden and coping mechanisms using backward selection methodology. Covariates included household size, mean age, income, and characteristics of household head including gender and education level completed.

Longitudinal Fixed Effect Models

Household health status could have evolved over time especially for baseline acute and healthy households. In order to take advantage of the panel data, fixed effects models were employed to assess changes in economic burden and coping corresponding to changes in health status over time. Changes in total assets, transfers, and debt were examined from 1991 to 1994; differences in physical assets and health expenditures were analyzed from 1991 to 2004 since aggregate data on these variables were available for 2004 as well. Additionally, changes in health expenditures were correlated with changes in transfer to assess the marginal propensity to spend on health given additional transfers for all groups and subsequently for chronic and acute households exclusively. Fixed effects regression models were appropriate for the non-experimental longitudinal data because they controlled for time invariant observed household characteristics such as cluster and also accounted for other household specific unobserved

characteristics. The fixed effects model also permitted heterogeneity among households by estimating an intercept for each.

Trends Analysis

The effect of baseline health status on health expenditures, assets, transfers, and debt over time were assessed to determine whether initial health conditions had long-run impact.

Additionally, entry into and exit from chronic and acute status and corresponding changes in health expenses were evaluated over time.

Results:

According to baseline demographic and economic characteristics (Table 1), households with chronic illness were older (p value 0.023), had bigger household size (p value < 0.001), and had higher health expenditures (p value 0.012) compared to acute and healthy households. Heads of chronic households also had the least years of education completed (p value 0.001). Aside from health expenditures, other economic indicators conformed to theory even though they were not statistically significant. Income for chronic households was highest which could have corresponded to age effect since they were also the oldest. Chronic households also had the highest total expenditure, which could either be attributed to bigger household size or greater health expenditures. Similarly, coping variables including value of debt and transfer income were highest in chronic households. Total value of assets was highest in acute households, followed by chronic and healthy households. Chronic households could have had more assets compared to healthy ones because of the dominant age or household size effects.

Pooled ordinary least squares estimates for household health status and economic indicators and coping mechanisms controlling for household size, average age, income, and household head traits including female head and years of education completed were not significant (Table 2). The direction of association followed expectations for all variables except transfers, which were negative for both acute and chronic households and assets for chronic households, which were still higher than that for healthy controls. Household size was significantly associated with both total and health expenditures (p value 0.01). Having a female head of household was linked to higher spending on health (p value 0.05) compared to having a male head. Additionally, there was a positive household age effect and a negative age-squared effect on value of total assets (Table 2). Overall, the pooled regression models explained minimal variation in the economic indicators and coping variables given that the R^2 values ranged from 0.01 to 0.08 with the exception of transfers, which had a R^2 value of 0.3.

The fixed effects models assessing the differences in economic indicators including income and health expenditures corresponding to changes in health status from 1991 to 1994 were not significant (Table 3). The models explained a small proportion of variation in changes in economic indicators. However, when changes in transfer were accounted for in the model for changes in health expenditures, there was a modest but significant effect on health expenditures with a 0.01 average increase in health expenditures per every 1 shilling of transfer increase (Table 4). When stratified by chronic and acute status, the marginal propensity to spend on health expenditures upon receiving transfers was 0.22 for households entering acute status and the model explained 20% of the variation (p value 0.01), but the result was not significant for chronic households.

The association between changes in health status and coping variables also were not statistically significant for total assets, debt, and transfers that only included data from 1991 to 1994 (Table 5). The coefficients, however, reveal that in comparison to healthy households, acute and chronic households had reductions in assets and transfers. In comparing acute and chronic households, the latter had greater drop in assets and transfers which parallel the hypothesis. For instance, entry into chronic status meant that a household was likely to have 60211 shillings worth of reduction in assets compared to healthy households and changing into acute household meant having 8816 shillings less in assets (Table 5). However, these estimates are not very precise since the standard errors are large.

Assessment of health expenditures and physical assets which included data from 2004 indicates significant period effect (Table 5). A dummy for 2004 was included because observations from that year would be far removed from 1991 to 1994 data. Additionally, entry into chronic or acute households was significantly associated with increased health expenditures compared to healthy households; the magnitude of increase was higher for chronic households which supports the hypothesis. The 2004 wave was associated with higher overall health expenditures and physical assets. Finally, the coefficients for changes in physical assets corresponding to household entry into chronic or acute status, although not significant, were positive, which goes against expected direction of asset changes (Table 5).

Test for time series trends were also conducted based on both baseline health status and temporal changes in status. Time effect, health status group effect, and interaction between time and group effect were tested. Baseline health status did not yield any significant effect on total value of assets (Figure 2), transfers, and debt, but it did result in a statistically significant group effect on health expenditures (p value 0.01) (Figure 1). Changes in chronic or acute health status,

however, presented a statistically significant time effect on changes in health expenditure at α of 0.01 level with higher health expenditures over time (Figure 3 and Figure 4).

Discussion:

Chronic households at baseline were older which is reasonable since chronic conditions are positively associated with age. Heads of chronic households also had the least years of education completed which could correspond to their age since younger generation are likely to attain higher levels of education. Based on pooled multivariate regression analysis, health status overall did not explain levels of health expenditures and coping mechanism. Assessment of R-squared values indicate that the model minimally explained variations in economic indicators with the possible exception of transfers ($R^2 = 0.3$). The positive age effect and negative age-squared effect for assets indicate that as households got older, the influence of age on asset level became reduced.

According to the primary interest of the study, if households were able to cope effectively, then following changes in household health status, there would be expected changes in coping variables. For instance, if a healthy household at baseline developed an acute or chronic illness in wave 2, the expected economic responses to cope would be asset utilization indicated by a negative change and increase in transfers and debt under the assumptions of smooth functioning asset or credit markets and risk-sharing networks. The results demonstrate that changes in health status were not significant in explaining the changes in economic coping variables between 1991 and 1994, which could partly be a reflection of a shorter time frame of data analysis. Health status particularly for baseline chronic households would less likely have changed in a matter of three years. Nonetheless, examining the coefficients for assets, transfers,

and debt indicate that entry into chronic households was linked to greatest reductions in the first two mechanisms and highest increase in debt. These results imply that chronic households rely on self-insurance by utilizing their assets and by going into further debt. Their transfer channels either through informal networks or organizations were more limited. While entry into acute household status also yielded lower transfers, the effect size was smaller compared to that of chronic units. However, the results corroborated the hypothesis driven by theory that acute households would rely more on transfers to fund health expenditures. The marginal propensity to spend on health per additional unit of transfer was 0.22; for every 100 shillings received in transfer, 22 shillings would be spent on health expenses. There was no significant increase in health expenditure associated with changes in transfers for chronic households.

The fixed effects model correlates for changes in health status and health expenditures between 1991 and 2004 were significant and positive with chronic households having the highest increase in expenditures. There was also a positive period effect for year 2004 which signifies greater spending on health in that year. Evaluation of physical assets illustrate a significant positive effect for year 2004 which is logical since households would have accumulated wealth over time, but the positive yet non-significant change in physical asset value upon entry into chronic or acute household status violates expected direction of change.

Time series trends based on baseline health status were conducted to examine whether initial health status had longitudinal impact on economic indicators and coping variables. Only health expenditures were significantly higher for baseline chronic households over the 1991 to 1994 time period. Further, entry into and exit from either chronic or acute status did not have significant implications for changes in health expenditures, but there was an overall time trend for rising health expenditures regardless of changes in health status between 1991 and 1994.

Due to data quality issues and dearth of information on chronic and acute conditions, particularly on formal diagnosis, it was not possible to conduct analysis based on type of disease such as HIV/AIDS, which would have been beneficial since the prevalence in the region at baseline was as high as 24% (World Bank). Lack of information on formal diagnosis might have been an issue either due to under-reporting or due to limited health-seeking behavior. Therefore, the households were stratified by broader classifications of acute and chronic conditions based on duration of onset. While these basic chronic and acute measures were optimal choices given data availability, these measures are limited since they are only indicative of duration and not severity of illnesses. They also do not enable assessment of major types of health burden or determination of differences in economic effects based on distinct morbidities. Further, there might be misclassification of chronic and acute conditions since they were not verified through medical records.

These models also have to be analyzed with caution because they overall do not explain large proportion of variations in economic indicators and coping variables except possibly for transfers and changes in health expenditures. Nonetheless, the minimal explanatory potential of these models on economic coping might be due to the reality of these household circumstances being more complex. Poor households might encounter myriad economic shocks that could dilute the effect of health shocks alone and, more specifically, the distinction between chronic and acute households might not make much difference in the long run. Additionally, these coping mechanisms would not be used exclusively to respond to illnesses, and therefore health status would only explain a portion of variations in changes in transfers, assets, and debt. Health shocks constitute only part of the story.

Further considerations regarding what constitutes coping is the duality of debt and asset usage. While both availability of credit and usage of savings benefit households in responding to a health shock and are crucial means to smooth consumption, in the long run, decrease in assets and increase in debt may lead to lower economic profile and pose a burden instead. The substantial decrease in assets and rising debt can especially be pronounced if households are ailed by chronic diseases where the economic burden is experienced for long periods of time. Therefore, economic coping is perhaps more relevant and amenable to short-term shocks. Additionally, although chronic households appear to rely on self-insurance, particularly through asset usage, the significant increase in health expenditures among chronic households imply that they were able to fund health expenses and therefore were able to respond. Nonetheless, the results are not entirely conclusive and not significant. The positive time effect on physical assets for 2004 seems to indicate that the value of these assets overall increased and could imply general economic improvement over time in the region.

Conclusion:

While the data set included comprehensive economic information including expenditures, assets, and income, specific health condition information was gravely limited. Future research can emphasize the differences in effects of major morbidities such as HIV/AIDS and other chronic illnesses.

Besides analyzing levels of usage of coping mechanisms including transfer, credit, and assets, it would be beneficial to assess multifarious aspects of coping. More specifically, examining three features of coping including availability of different resources amenable to cope, ability to use those resources, and extent of utilization would illuminate both resource and

behavioral barriers to coping. Diversity of coping mechanisms as a coping strategy could also be assessed.

The study results indicate that overall health status did not explain economic coping in the given time period. However, entry into chronic households was associated with highest increase in health expenditures followed by entry into acute status. Transfers were important in funding health expenses for acute households, while chronic households seem to have depended on asset utilization and debt to cope with economic burden. Aside from transfers, there were no significant differences between the ability of chronic and acute households to cope against respective type of health burden.

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Table 1: Baseline Demographic and Economic Characteristics by Household Health Status (1991)

Characteristics	Chronic N (%)	Acute N (%)	Healthy N (%)	P- value
Number of Households	524	293	98	
Household Mean Age	25.87	23.66	24.05	0.023
Average Household Size	6.41	5.22	4.89	<0.001
Household Head				
Female	130 (24.81)	81 (27.65)	27 (27.55)	0.631
Age	51.32	44.01	43.54	<0.001
Years of Education Completed	5.36	5.73	6.51	0.001
Marital Status				0.647
<i>Married</i>	331 (63.17)	166 (56.85)	59 (60.20)	
<i>Partner</i>	4 (0.76)	5 (1.71)	2 (2.04)	
<i>Divorced</i>	13 (2.48)	14 (4.79)	3 (3.06)	
<i>Separated</i>	30 (5.73)	16 (5.48)	7 (7.14)	
<i>Widowed</i>	119 (22.71)	72 (24.66)	21 (21.43)	
<i>Never Married</i>	27 (5.15)	19 (6.51)	6 (6.12)	
Economic Indicators				
Income	348779	298636	286295	0.426
Value of Total Assets	1545491	2446937	1033556	0.651
Expenditures	404605	379764	320526	0.396
Health Expenditures	8906	3617	3271	0.012
Debt	8573	3381	4065	0.614
Transfers	15426	7867	14634	0.231

Values for continuous variables represent mean and values for categorical variables represent N and column %; denomination for economic indicators are in shillings.

P-values were obtained through ANOVA for continuous variables and chi-square test for categorical.

Table 2: Pooled Multivariate Regression Analysis for Economic Indicators (1991-1994)

Predictors	Total Expenditures	Health Expenditures	Transfers	Assets	Debt
Health Status					
Healthy	Reference	Reference	Reference	Reference	Reference
Chronic	50841 (71476)	2093 (2460)	- 14008 (17163)	349684 (986113)	10394 (32299)
Acute	24584 (71041)	2338 (2445)	- 10219 (17059)	740337 (979660)	- 10009 (32103)
Household Size	20648 (5278)***	729 (182)***	1011 (1267)	83876 (72764)	4350 (2385)
Household Average Age	- 162 (1728)	115 (59)	564 (415)	235715 (74943)***	460 (781)
(Household Average Age) ²				- 2798 (1047)***	
Household Head					
<i>Female</i>	- 18059 (43047)	3305 (1481)**	5938 (10337)	- 698507 (594803)	- 9895 (19454)
<i>Years of Education Completed</i>	15783 (6695)***	350 (230)	- 2868 (1608)	141314 (92383)	2714 (3026)
Household Income	0.32 (0.03)***	0.01 (0.001)***	0.24 (0.01)***	2.86 (0.46)***	0.02 (0.01)
Year 1992	- 123198 (44519)***	- 3265 (1532)**	2868 (1608)	- 246906 (613730)	10416 (20118)
Year 1993	- 183873 (46182)***	- 4171 (1590)***	41801 (10690)***	- 211847 (636670)	27494 (20869)
Year 1994	- 205466 (47907)***	- 2192 (1649)	40024 (11090)***	- 485917 (660491)	- 4487 (21660)
Constant	68048 (99951)	- 7506 (3440)**	- 50483 (11504)***	- 4114224 (1684834)**	- 53720 (45167)
Observations	2281	2282	2282	2282	2281
R-Squared	0.08	0.05	0.3	0.03	0.01

Note: Values (in shillings) indicate estimated regression coefficients and (standard error)
 ** statistically significant at ($\alpha= 0.05$) level, ***statistically significant at ($\alpha=0.01$) level

Table 3: Fixed Effects Model Results of Changes in Economic Indicators Corresponding to Changes in Household Health Status (1991-1994)

Predictors	Income	Health Expenditure
Health Status		
Healthy	References	Reference
Chronic	21775 (40244)	- 124 (2238)
Acute	- 23178 (38452)	589 (2138)
Constant	- 50363 (11303)***	- 1065 (629)
Observations	2010	2010
R-Squared	0.003	0.0002

Note: Values (in shillings) indicate estimated regression coefficients and (standard error)
 ***statistically significant at ($\alpha=0.01$) level

Table 4: Fixed Effects Model Results of Changes in Household Health Expenditures in Response to Changes in Transfers (1991-1994)

Predictors	(A)	(B)	(C)
Health Status			
Healthy	Reference	Reference	Reference
Chronic	- 90 (2231)	2799 (1682)	
Acute	607 (2131)		- 658 (1802)
Transfers	0.01 (0.002)***	0.0005 (0.002)	0.22 (0.01)***
Constant	- 1125 (626)	- 3620 (992)	313 (1227)
Observations	2010	944	978
R-Squared	0.007	0.003	0.2

(A) Changes in health expenditures corresponding to changes in transfer income

(B) Changes in health expenditures corresponding to changes in transfers in households entering into chronic status

(C) Changes in health expenditures corresponding to changes in transfers in households entering into acute status

*** statistically significant at ($\alpha=0.01$) level

Table 5: Longitudinal Multivariate Fixed Effects Model Results of Changes in Economic Coping Mechanisms and Burden Corresponding to Changes in Household Health Status (1991-2004)

Predictors	Total Assets ^a	Physical Assets ^b	Health Expenditure ^b	Transfers ^a	Debt ^a
Health Status					
<i>Healthy</i>	Reference	Reference	Reference	Reference	Reference
<i>Chronic</i>	- 60211 (527106)	668926 (506454)	2901 (699)***	- 3278 (18167)	13632 (39777)
<i>Acute</i>	- 8816 (503624)	149789 (495685)	1859 (686)***	- 1644 (17358)	- 8719 (38005)
Year 2004		2006199 (357546)***	11948 (509)***		
Constant	- 64882 (148048)	53484 (257047)	- 140 (367)	5771 (5013)	465 (11175)
Observations	2010	4180	4502	2010	2009
R-Squared	0	0.008	0.11	0	0.001

Note: Values (in shillings) indicate estimated regression coefficients and (standard error)

*** statistically significant at ($\alpha=0.01$) level

^a Only covers 1991-1994 based on data availability; ^b data covers 1991-2004

Figure 1: Trends in Total Health Expenditures Based on Baseline Health Status

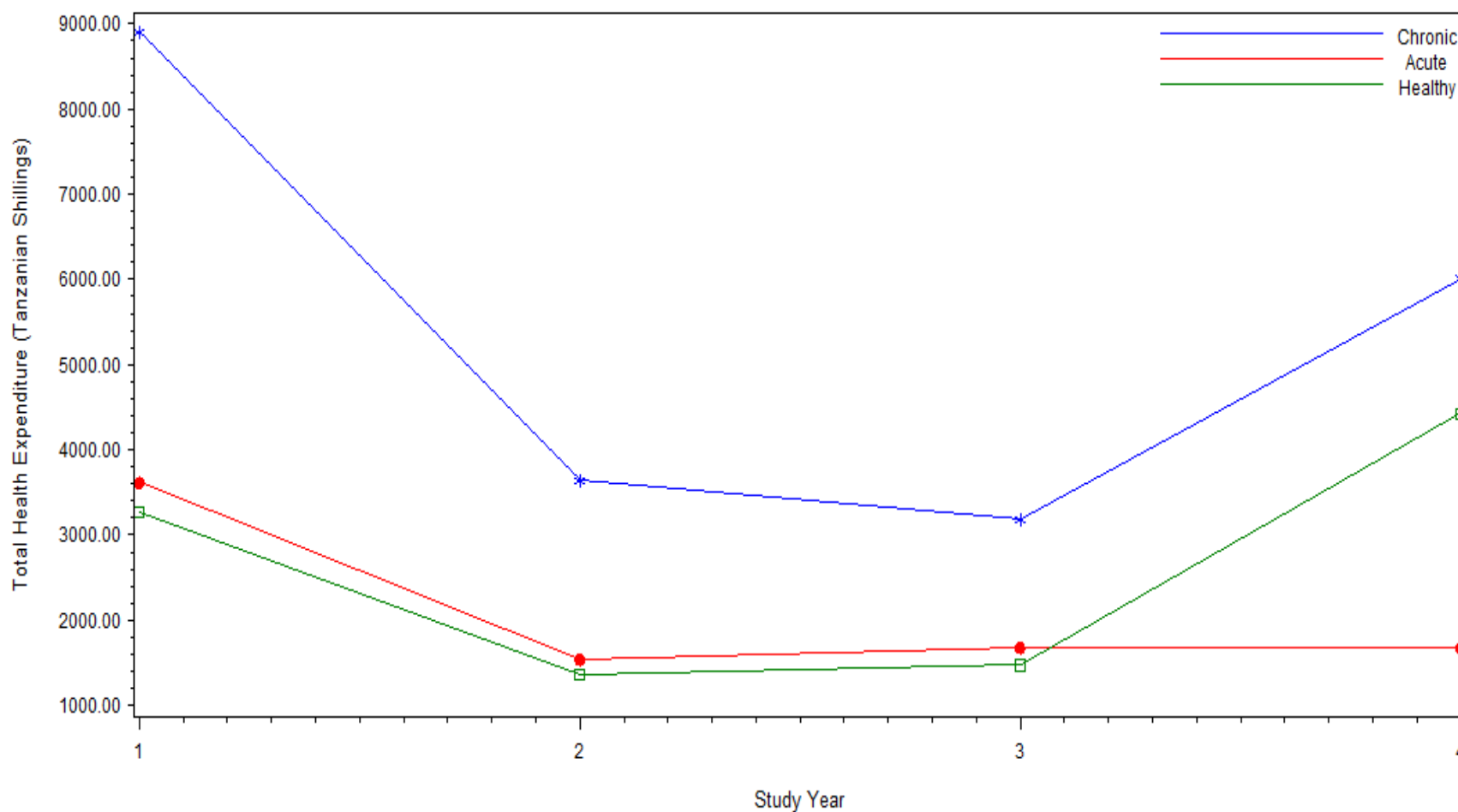


Figure 2: Trends in Total Stock of Household Assets Based on Baseline Health Status

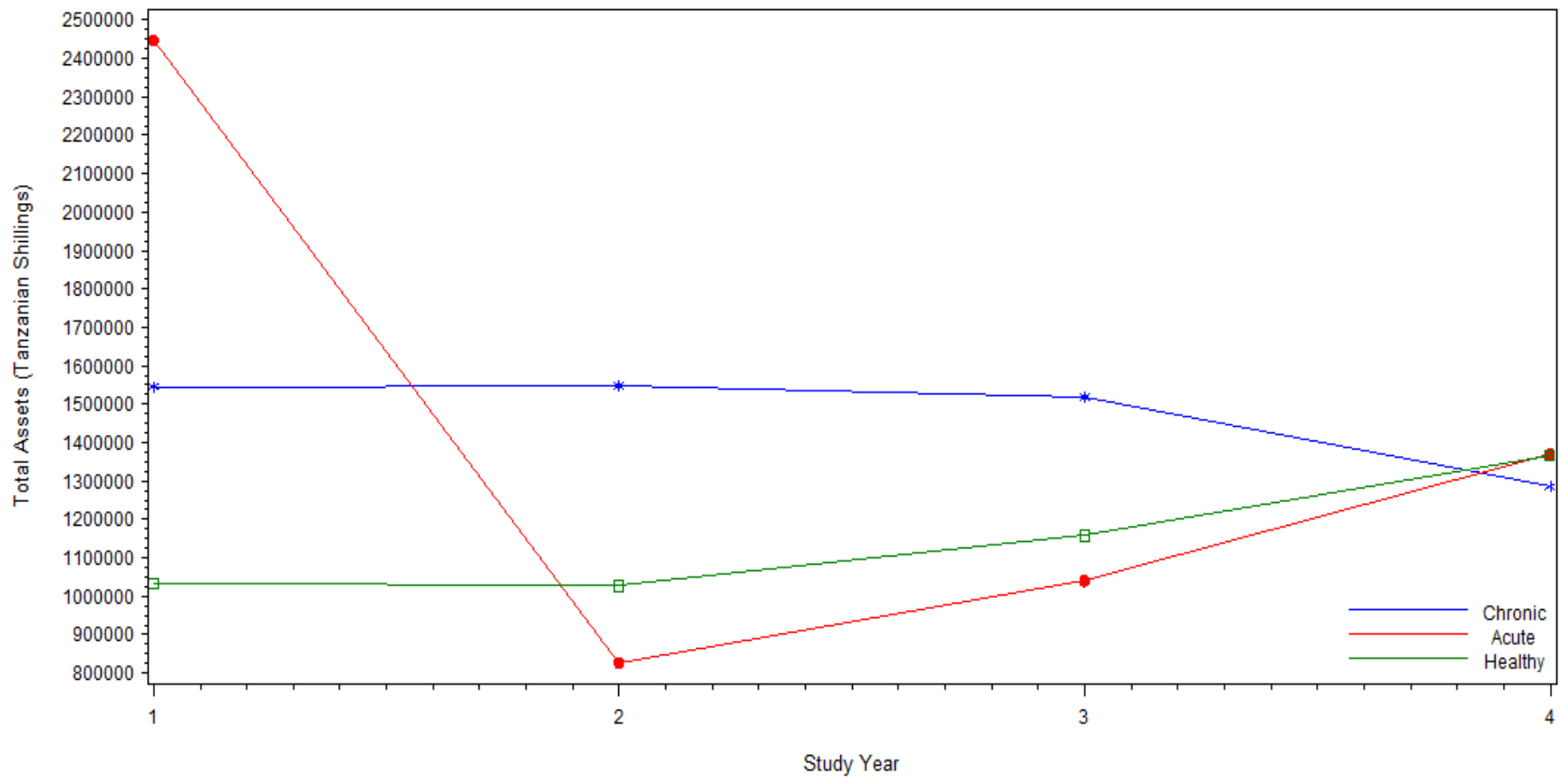
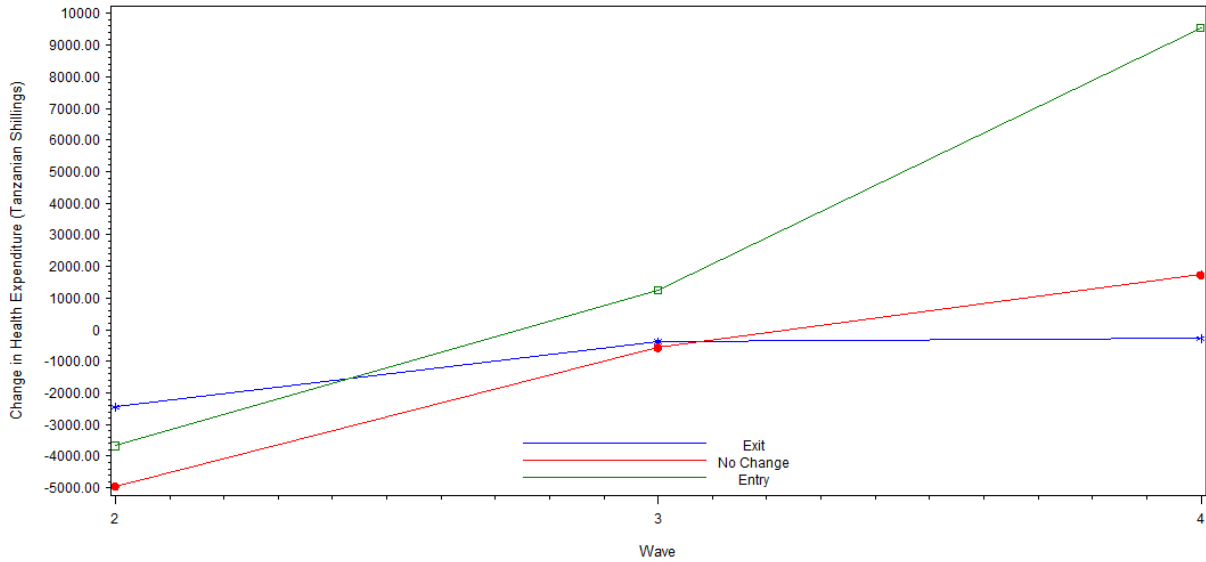
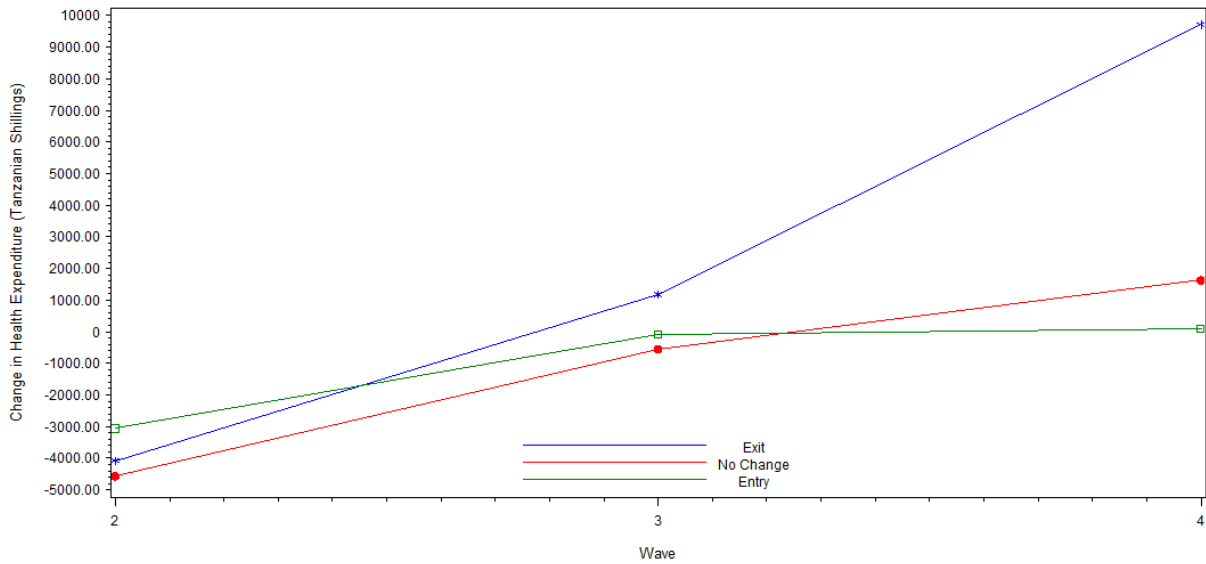


Figure 3: Differences in Health Expenditures Based on Changes in Household Acute Status (1991-1994)



Note: No change either indicates that respective households were in the acute group for two consecutive waves or that they retained acute status in both waves.

Figure 4: Differences in Health Expenditures Based on Changes in Household Chronic Status (1991-1994)



Note: No change either indicates that respective households were in the chronic group for two consecutive waves or that they retained chronic status in both waves.