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Can Consumer Debt Burden Adequately Explain Slowdowns in Kenya's Economic Growth?

Otieno Rickyjesse Daudi Omino

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Proposal contains no material previously published or written by another person except where due reference is made in the Research Proposal itself.

Otieno Rickyjesse Daudi Omino [*Name of Candidate*]

[*Signature*]

01/03/2021 [*Date*]

This Research Proposal has been submitted for examination with my approval as the Supervisor.

Godfrey Madigu [*Name of Supervisor*]

[*Signature*]

30-03-2021 [*Date*]

Strathmore Institute of Mathematical Sciences

Strathmore University

Abstract

This study set to examine the relationship between consumer debt burden and economic growth. The prior specification was that consumer debt burden causes a slowdown in economic growth. The analysis makes use of Kenyan time series data from 1970 to 2019. Analysis of the data was done by means of a Vector Error Correction Model (VECM) and tested how consumer debt burden explains economic growth through a third variable (consumption & agriculture) which are the main drivers of Kenya's economy and also included a control variable; net exports. The results indicate a negative causal relationship between consumer debt burden and economic growth which means that rises in consumer debt burden cause economic slowdowns.

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List of Abbreviations and Acronyms

AI – Artificial Intelligence.

AIC - Akaike Information Criteria.

DAG - Direct Acyclic Graphs.

GDP – Gross Domestic Product.

KBA – Kenya Bankers Association.

OLS – Ordinary Least Squares.

SACCO – Savings and Credit Co-operations.

Chapter 1: Introduction

1.1. Background Information

Consumer debt burden also private debt burden is defined as the level of consumer (private)[1] debt relative to their ability to repay (Garner, 1996). Policy makers have been mindful of rising consumer debt levels as from the past their repayment costs have been shown to decrease consumer spending which slows economic growth, this is as high debt levels lead more people into financial distress (McNamee & Melcher, 1997).

While growth in private debt is desirable as it encourages economic growth by promoting economic activities (Vague, 2016), unprecedented increases may have detrimental effects to a country's economic performance (King, 1994). Kenya's private debt to GDP has registered a crescendo of just over 2.7 times from 1962 to 2019 (World Bank, 2019). To simplify, GDP sums up all spending in a country hence can be equated to income, private debt going up by this amount we can conclude that currently Kenyan households have about 3 times more debt than income compared to 1962 (Vague, 2016). This is concerning as theoretically, rising levels of consumer debt worsen business cycles (Danielian, 1929). However, some economist believe that increases in debt burdens are normal occurrences in the life cycle of individuals and that an increase in debt levels may also be due to an increasing population and not necessarily people taking on more debt (Schmitt, 2000).

This raises the questions: is there a relationship between consumer debt burden and economic performance? Do increases in consumer debt burden cause GDP growth to decrease?

Research on relationship between consumer indebtedness and the economy dates back to the 1920s but only more recently to consumer debt burden (Schmitt, 2000). Finance experts and economists alike have so come up with several deductive theories to explain this relationship, some proven and some theoretical. King (1994) outright stated that in industrialized countries, household debt was a major source of recessions. This was

1. Consumer debt burden refers to private debt, which means the aggregate debt held by a country's households and private firms.

agreed on by the Fisher debt-deflation theory: that debt-deflation (a fall in nominal value of debt) is the main cause of recessions and depressions as it causes the real value of debt to go up in turn causing default (Fisher, 1983).

In his research on consumer debt burden Garner (1996) stated that it has no predictive abilities. However, he mentions that analysts should continually monitor it as recent structural changes like greater use of credit cards and easier access to credit facilities by low income households strengthen its relationship with economic growth. This is supported by Schmitt (2000) in her work where rising debt burdens are fixed as normal occurrences in economic booms in her analyses of consumption of durable goods as the driver of the economy. However, Fisher (1983), King (1994) and Gärtner (2013) argue that consumer debt burden actually has predictive aspects concluding, with evidence from the U.S economy, that high levels of consumer debt burden are suggestive of worse economic performances.

1.2. Problem Statement

Economic theory like the Fisher debt deflation theory suggests that rising levels of private debt cause slowdowns in economic growth (Fisher, 1983). However, studies that have set to examine this, specifically the impact of consumer debt burden rather than general levels of debt, have come up with inconsistent results. Some like that by Garner (1996) and Schmitt (2000) have highlighted that so far, there is no relationship while others like that by Gärtner (2013) concluded that there is indeed a relationship between consumer debt burden and economic growth.

Given these conflicting results, there is need to re-examine the relationship between consumer debt burden and economic growth. While all the aforementioned papers analyzed the US economy, this analysis will be based on the Kenyan economy. In her analysis Schmitt (2000) used a VAR model and examined how consumer debt burden affects economic growth through the consumption of durable goods as this was a main driver of the US economy at that time. This analysis follows a similar premise only that I use a VECM rather than a VAR model as there are cointegrating relationships among my variables. Also, other than consumption of durable goods I use agricultural output and consumption as these are the main drivers of Kenya's GDP (World Bank, 2018).

1.3. Research Objective

i. To find out if there is indeed a relationship between consumer debt burden and economic growth through agricultural output and consumption.

ii. To find out if a rising consumer debt burden signals economic slowdowns.

1.4. Significance of Research

This paper will be useful in influencing policy decisions by policy makers/economists who all have one goal in the end regarding a countries economic performance, that is to ensure high, stable and sustainable growth rates.

Chapter 2: Literature Review

2.1. Theoretical Review

Analysis on consumer debt burden looks at two main branches of literature that is the private debt held within a country and income distribution (financial and non-financial) and how (together) they affect economic growth. In his paper Garner (1996) used aggregate data of private debt and income from the U.S collected over the periods 1961 – 1996 to conclude that consumer debt burden has no predictive powers on economic growth which was agreed on by other papers (Schmitt, 2000) et all. However, other papers also suggest that in fact an increase in this burden is a foreshadow of an economic downturn (King, 1994; Fisher, 1983 & Gärtner, 2013).

For the argument by Gärtner (2013) the federal reserve took a survey and found that private debt contributed to fluctuations in economic activity as countries with significant levels of debt burdens are prone to even worse recessions, trends in private debt was then seen to have substantial influence on economic recessions and expansions (Federal Reserve, 1943). Mian, Rao, & Sufi (2013) added to this argument that countries with high debt burdens end up having worse recessions as accumulation of debt affects consumption, they cause a dire and lengthy collapse in consumption which is impactful to the economic growth rate of a country.

Building on consumption as a driver of GDP, Friedman (1963) proposed that consumption depends on permanent income or expected income and with rising debt burdens people expect lower disposable income as they service their debts thus reducing their spending abilities. However, Dickerson (2016) further noted that not all people are rational enough to reduce their consumption as people who are financially strapped make surprisingly bad financial decisions including but not limited to taking on more debt, this in turn puts them at even worse financial positions and in the end causes the already ailing economy to plunge even further. General expenditure is also altered as increases in the consumer debt burden makes households prone to financial distress in the event of an adverse economic shock such as the loss of a job or large uninsured medical expenses among others causing them to cut back further on spending (Garner, 1996).

Hindun & Reza (2016) explain that people borrow money to fulfill their basic needs and maintain their lifestyles i.e., to keep up with their consumption habits. For businesses, they borrow to increase their revenue by expanding their business scope (Cressy, 1995). With debt facilities available to consumers their expenditure on goods and services change as some take on more debt in a bid to leverage their investments. When these debt burdens substantially increase, people reduce their consumption of these goods and also reduce their expenditure on investments as they are vulnerable to financial distress. The reason they reduce their consumption of such goods and investments is that during times of distress these goods sell off at discounted prices causing more loses, so, the only solution is not to buy them or not to invest at all (Mishkin, 2011). With this reduction in consumption and investments, this translates to reduced growth rates in GDP as consumption contributes to GDP growth rates.

According to King (1994) household debt was a cause of recessions in industrialized countries. He stated that during economic downturns households in financial distress would reduce the debts they held in order to build their balance sheets. The result was a pronounced weakness in aggregate demand stifling economic growth, this would then be followed by a high and persistent unemployment rates which only hurt the economy more. This statement was found to be true not only for the USA but a study done by the International Monetary Fund (2012) found that it also holds across countries.

Evidence further suggests that not only does consumer debt have an impact on economic growth, but it also slows the recovery pace i.e. countries with higher consumer debt burdens take even longer to recover from an economic downturn (Mishkin F. , 1978). Allen (1931) had also attested to this as he stated that the unexpected boom in the credit market emphasized the 1920 crash even more. Portes (1990) made an observation that countries that accepted this flaw in the credit market and restructured their debts around them recovered faster than those that resisted default keeping all credit holders accountable to their payments.

Kenya's private debt has grown by a noteworthy amount as from 2000 to date it has roughly doubled (World Bank, 2019). Various theories try to explain for this. One is the recent technological sophistication in loan production (Dynan, 2009). This includes but

is not limited to improved monitoring and reductions in distribution costs as well as other secondary market innovations. Income inequality is also a factor that has contributed to growth in consumer debt. Kumhof, Ranciere, & Winant (2015) suggested that increases in debt burdens caused by income inequality is in indeed a sign of an ailing economy.

While people increasingly take on more debt, Barba & Massimo (2008) highlighted that increases in poor performing debt obligations are the most threatening ones to economic growth. To be able to rank performances of private debts, Minsky came up with a criterion of subdividing them.

1. Hedge finance: Here the debt's principal can be paid as well as interest it accrues.
2. Speculative finance: There is an ability to pay interest but not the principle.
3. Ponzi finance: Can't pay anything.

Barba & Massimo's (2008) statement was that the Ponzi finance category is the one to be most watchful of as it increases the likelihood that increases in consumer debt burdens will ultimately cause an economic slowdown. To explain the increasing levels of Ponzi debts, Black & Morgan (2008) noted that with credit options being actively in the reach of consumers as banks are aggressively marketing their credit facilities, even without proper stability, they are always increasingly willing to use them and the result is an increasing debt burden.

Barba & Massimo (2008) also highlighted that for debt to be sustainable and have little to no impact on economic growth, the growth rates of interest rates must always be lower than that of income growth which is not necessarily the case in Kenya according to a report by (Kenya Bankers Assosiation, 2015).

Portes (1990) also suggested that there may be a link between consumer debt and agricultural output because of purchases of durable (farm) goods such as farm trucks and major farm appliances which improve productivity. Consumers mostly borrow to finance these goods as they expect a stream of income from them that will help in servicing the loans. However, as Garner (1996) pointed out, these goods are mostly illiquid and require time to extract cash from them and as a result, when consumers have

high debt burdens they shy away from such purchases which actively translates to less agricultural output which slows economic growth.

With the substantial increase in private debt levels in the US during the 1950s, Smith (1957) undertook a study to find out to what extent consumer debt affects the economy and his conclusion was that consumer debt is responsible for most of the fluctuations in economic activities. He also highlighted that private debt had a significant impact in the 1953-1954 recession. However, some authors like Enthoven (1957) refuted this, claiming that increases in consumer debt are normal and had no effect whatsoever on any macroeconomic performance.

2.2. Empirical Review

With regard to consumer debt burden and the economy, Garner (1996) estimated for this causal relationship using household data from the US collected for periods between 1961 to 1996. He used a general regression where the dependent variable was spending on durable goods and the explanatory variable were six period lagged values of consumer debt burden. He found that only one measure of consumer debt burden was found to have predictive capabilities which was the ratio between consumer debt and disposable income, but its usefulness disappears when he included stock prices in the regression. He so concluded that the different measures of consumer debt burden do not adequately predict changes in the growth of the economy. But believes given the different structural changes happening i.e., the aggressive marketing of credit cards to low income households might cause there to be an impact.

To improve for this, Zhang et al (2006) tried to test for a causal relationship between consumer debt burden and key economic indicators using direct acyclic graphs (DAGs) rather than the renowned granger causality test. DAGs are graphs that point to the direction of causality and are generated by AI. His findings were that at 20% significance, there is a causal flow of GDP to consumer debt and vice versa and also a causal flow of auto sales to consumer debt. When increased to 30% the causal flow of auto sales to debt disappears but a flow from interest rates and auto sales to GDP appears and from GDP to housing statistics.

Chapter 3: Methodology

The objective of this study is to find the relationship between consumer debt burden and economic growth in the Kenyan economy from the period 1970 – 2019. The study examined how consumer debt burden explains economic growth through a third variable (agricultural output and consumption).

3.1. Data Description & Collection

The data is time series in nature and is comprised of the following variables:

Table 1: Variables Used.

Variable	Description
Aggregate private debt	The level debt held by individuals or private companies in an economy.
Aggregate disposable income	The amount an individual has to spend or save after all statutory deductions have been made.
Aggregate consumption	The amount individuals spend on resources available to them to maximize utility.
Aggregate agricultural output	The general stock that comes from agricultural practices.
Net exports	A measure of a nation's total trade.

The data was obtained from The World Bank repository and all variables were quantified in terms of currency (USD). The data is made available on an annual basis and is an aggregate of all household data in Kenya.

3.2. Data Analysis

I calculated consumer debt burden in two ways. The first is with regard to disposable income and the second way is with regard to stock market income (See Appendix: C). The first measure is useful as it factors in general disposable income which heavily influences GDP. The second technique is deemed more robust as it reflects changes in stock prices and stocks are viewed as leading economic indicators (Schmitt, 2000). I

used these two measures as among all the measures of consumer debt burden these are the ones that were useful in predicting GDP growth according to (Garner, 1996).

3.3. Model Specification

I use the two techniques to estimate two models, one for each technique.

I estimate two VECM models to model the relationship between consumer debt burden and economic growth through consumption and agricultural output and I also include a control variable, net exports.

The VECM model specification is so given by the four system equation below:

$$\Delta Y_t = \alpha_1 + \sum_{i=1}^{p-1} \alpha_{1i}\Delta Y_{t-1} + \sum_{i=1}^{p-1} \beta_{1i}\Delta X_{t-1} + \sum_{i=1}^{p-1} \delta_{1i}\Delta V_{t-1} + \sum_{i=1}^{p-1} \mu_{1i}\Delta Z_{t-1} + \lambda_1 ECT_{t-1} + u_{1t} \quad (1)$$

$$\Delta Z_t = \alpha_2 + \sum_{i=1}^{p-1} \alpha_{2i}\Delta Y_{t-1} + \sum_{i=1}^{p-1} \beta_{2i}\Delta X_{t-1} + \sum_{i=1}^{p-1} \delta_{2i}\Delta V_{t-1} + \sum_{i=1}^{p-1} \mu_{2i}\Delta Z_{t-1} + \lambda_2 ECT_{t-1} + u_{2t} \quad (2)$$

$$\Delta V_t = \alpha_3 + \sum_{i=1}^{p-1} \alpha_{3i}\Delta Y_{t-1} + \sum_{i=1}^{p-1} \beta_{3i}\Delta X_{t-1} + \sum_{i=1}^{p-1} \delta_{3i}\Delta V_{t-1} + \sum_{i=1}^{p-1} \mu_{3i}\Delta Z_{t-1} + \lambda_3 ECT_{t-1} + u_{3t} \quad (3)$$

$$\Delta X_t = \alpha_4 + \sum_{i=1}^{p-1} \alpha_{4i}\Delta Y_{t-1} + \sum_{i=1}^{p-1} \beta_{4i}\Delta X_{t-1} + \sum_{i=1}^{p-1} \delta_{4i}\Delta V_{t-1} + \sum_{i=1}^{p-1} \mu_{4i}\Delta Z_{t-1} + \lambda_4 ECT_{t-1} + u_{4t} \quad (4)$$

Where;

Y – Consumption.

Z – Net Exports.

V – Agricultural Output.

X – Measure of Consumer Debt Burden (Model 1 takes on the first measure while Model 2 the second measure).

t – Time today.

p – Number of lags.

In order to determine the appropriate number of lags to use, I used different information criteria like the Akaike Information Criteria (AIC), Hannan Quinn (HQ), Final Prediction Error (FPE) and Schwartz Criterion (SC) and the lag value (p) that was most common is what I used.

Chapter 4: Empirical Results

4.1. Descriptive Statistics

Table 2: Data Description.

Variable	Minimum	Maximum	Mean	Median	Stdev	Skewness	Kurtosis
PDEBT	-4.13249	5.97996	0.164	-0.1793	2.050	0.127684	0.541197
CONS	-5.90958	7.14546	0.296	0.02184	2.861	0.221903	0.750519
INC	-4.98260	5.78364	-0.019	0.37559	2.467	-0.01853	-0.62278
GRWTH	-0.79949	8.40569	3.970	4.35338	2.284	-0.33304	-0.95792
STCKS	-1.79871	2.48133	0.018	0	0.718	0.644174	3.246805
AGRIC	-3.716587	3.758899	0.099	0.07483	1.421	-0.10216	0.470213
EXP	-2.687517	3.872383	0.151	0.24100	1.555	0.206267	-0.23712
DBRDEN1	-6.91895	8.819477	-0.059	-0.0991	2.421	0.700942	4.004651
DBRDEN2	-5. 98714	8.40569	-0.089	-0.0861	3.725	0.69997	4.385005

PDEBT: Private Debt; **CONS**: Consumption; **INC**: Disposable Income; **GRWTH**: Economic Growth Rate; **STOCKS**: Income Related to Stocks; **AGRICS**: Agricultural Output; **EXP**: Net Exports; **DBRDEN**: Debt Burden.

From the description above, the mean of disposable income is negative (-0.019257) to show that on average people's disposable income levels have reduced over the years. Private debt on the other hand has been increasing given its positive mean (0.164361). Other than that, in general all other variables have also been increasing over the years. An interesting point to also note from the descriptive statistics is that the variation in private debt, consumption, debt burden and disposable income is almost similar which may infer some kind of relationship. Stocks and debt burden also have high kurtosis values to show that they easily register aberrant observations.

4.2. Unit Root Test

Table 3: Augmented Dickey Fuller Unit Root Test.

Variable	ADF	P - Value
PDEBT(1)	-5.018	0.01**
CONS(1)	-3.7387	0.03488*
INC(1)	-4.0007	0.02003*
GROWTH(1)	-4.8665	0.01**
STOCKS(1)	-1.798716	0.023*
AGRIC(1)	-3.8795	0.2471*
EXP(1)	-4.5271	0.01**
DBURDEN1(1)	-5.5287	0.01**
DBURDEN2(1)	-4.7765	0.01**

** Significant at the 1 percent level. * Significant at the 5 percent level.

Variable	Level	1st Difference
PDEBT	Non - Stationary	Stationary
CONS	Non - Stationary	Stationary
INC	Non - Stationary	Stationary
GROWTH	Non - Stationary	Stationary
STOCKS	Non - Stationary	Stationary
AGRIC	Non - Stationary	Stationary
EXP	Non - Stationary	Stationary
DBURDEN1	Non - Stationary	Stationary
DBURDEN2	Non - Stationary	Stationary

Private Debt, Consumption, Income, Growth, Stocks Income, Agricultural Output, Net Exports & Consumer Debt Burden are non-stationary at level, but stationary at first difference.

4.3. Results Output

As I am using a VECM, I tested for any cointegrating relationships among the variables since they are non-stationary at level.

Cointegration Test

Table 4: Johansen Cointegration Test for Model 1: Debt Burden Calculated with Regard to Disposable Income.

Model 1	CONS, AGRIC, EXP, DBURDEN
r 0	19.96
r 1	12.39
r 2	9.24*

Table 5: Johansen Cointegration Test for Model 2: Debt Burden Calculated with Regard to Stock Market Income.

Model 2	CONS, AGRIC, EXP, DBURDEN
r 0	53.12
r 1	34.91
r 2	19.96
r 3	9.24*

There are two cointegrating relationships in the first model while in the second model there are three cointegrating relationships. This shows that there exist long term relationships hence we proceed with the VECM model.

4.3.1. Model 1: Debt Burden Calculated with Regard to Disposable Income

Table 6: VECM Output for Model 1.

Variable	CONS	AGRIC	EXP	DBURDEN
ECT	-1.2921	-0.6262	-0.7518	-0.1915
INT	0.6365	0.4662	0.5164	0.2209
CONS-1	0.6153	0.5076	0.4183	0.1237
AGRIC-1	-1.3359	-0.7470	-0.3361	-0.5132
EXP-1	0.3124	-0.6727*	-0.4484	-0.8052.
DBURDEN-1	0.3557	0.1386	-0.0554	-0.5879
CONS-2	0.3647	0.2767	0.5057	0.02533
AGRIC-2	-0.1019	-0.5546.	-0.8831*	-0.9009
EXP-2	-0.4957	-0.3688	-0.3760	-0.6755
DBURDEN-2	0.3427	0.3588	0.3556	-0.3675
CONS-3	0.4771	0.3357	0.4825	0.4849
AGRIC-3	0.5400	-0.7571	-0.0222	-1.2505.
EXP-3	0.2160	0.6097	-0.3703	-0.8523
DBURDEN-3	0.1812	0.3673	0.5651	-0.0275
CONS-4	0.0518	0.3661	0.5852	0.4409*
AGRIC-4	-0.0390	0.4088	-0.0783	-0.866
EXP-4	0.3563	0.2996	0.1717	-0.4676
DBURDEN-4	0.2311	0.3046	0.3542	-0.1408
CONS-5	0.1323	0.17851	0.2296	0.3914
AGRIC-5	0.3454	0.3828	0.0573	-0.4800
EXP-5	0.3301	0.5890	0.1642	-0.5237
DBURDEN-5	0.4149	0.3348	0.3693	0.2391
CONS-6	0.0053	-0.0848	0.1587	-0.1198
AGRIC-6	0.0783	0.5016	-0.5453	-0.3576
EXP-6	0.3658	0.5811	0.0128	-0.3648
DBURDEN-6	0.3957	0.1491	0.5408*	-0.09161

Portmanteau Test *p-value = 0.3659*
ARCH (multivariate) *p-value = 0.9869*
JB-Test *p-value = 0.5435*

The numbers indicate the lag e.g. (CONS-4) means the fourth lag of Consumption.
* Significant at the 5 percent level . Significant at the 10 percent level

On estimation of the model we find that only six relationships are significant and only three from consumer debt burden. At the 10% level of significance there is a causal flow from the first lag of net exports to the consumer debt burden and from the third lag of agricultural output to consumer debt Burden. At the 5% level of significance the sixth lag of consumer debt burden causes net exports and the second lag of agriculture causes

net exports. We also see a causal flow from the first lag of net exports to agricultural output.

Calculating consumer debt with respect to disposable income so helps in explaining economic growth through net exports but it is not significant in explaining the main drivers of GDP these being consumption & agricultural output.

To test for the robustness of our model (Diagnostic tests), the Portmanteau test tells us that there is no serial correlation. The heteroscedasticity test also tells us that our model has no ARCH effects and the Jarque Bera test shows us that the residuals are normally distributed.

4.3.1.1. Impulse Response Function

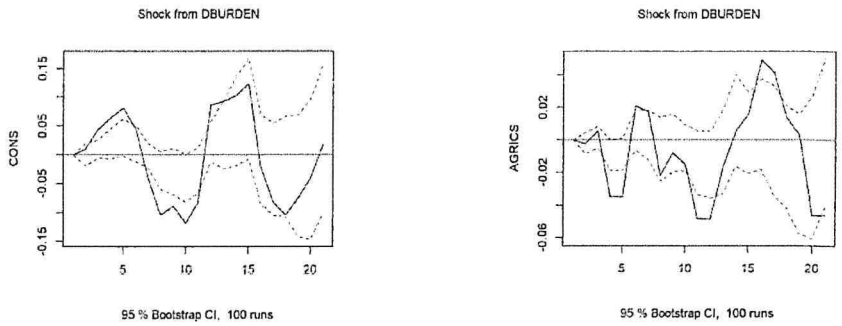

Figure 1: Impulse Response Functions.

The impulse response functions show us how the two variables, consumption and agriculture, evolve given shocks from consumer debt burden over the years. We see that at first an increase in debt burden causes both consumption and agricultural output to reduce slightly then increase, but as debt burden continues to increase consumption and agricultural output eventually decline but then increase and the cyclical movement continues. This is the case as in the periods when the consumers still have the debt income at their disposal they are able to increase expenditure and when the repayment comes due there is a crash in consumption and agricultural output. Further, when this debt is repaid they take on more debt and consumption and agricultural output increases hence the continuation of the cyclical process. As Danielian (1929) put it; Increases in consumer debt burden often cause overproduction and consumption of goods during the borrowing periods when the funds borrowed are still available for use but are followed

by falls in consumptions during the repayment periods and a lot of resource wastages. The impulse response function helps us see that indeed consumer debt burden is responsible for the variations (up and down movements) in these two variables that actively contribute to movements in GDP.

4.3.1.2. Variance Decomposition

The variance decomposition (See Appendix: A) tells us that as time passes consumer debt burden begins to explain economic growth more significantly and while economic growth influences debt burden right from the start, its influence on debt burden doesn't increase with time.

4.3.2. Model 2: Debt Burden Calculated with Regard to Stock Market Income

Table 7: VECM Output for Model 2.

Variable	CONS	AGRIC	EXP	DBURDEN
ECT 1	-1.2636	-0.1468**	-0.3384	-1.2482*
ECT 2	2.1986	-0.7263**	0.4185	-1.3515*
ECT 3	0.8927	-0.1809**	-0.5623	-1.1921*
INT-1	0.2637	-0.0132	0.2518	-0.0520
CONS-1	0.3018	-0.1340**	0.1253	-1.1825*
AGRIC-1	-2.7045	0.0857*	-0.3134	1.0335
EXP-1	-0.5277	-0.7678**	-0.4809	0.5591
DBURDEN-1	-0.3217	-0.0976	-0.6443*	-0.5059
CONS-2	0.2571	-0.2341	0.2088	-1.1277*
AGRIC-2	-1.6591	0.0664	-0.7521	0.6073
EXP-2	-0.7399	-0.8089	-0.3233	0.1333*
DBURDEN-2	-0.2585.	-0.0643**	-0.4263	-0.483
CONS-3	0.3190	-0.2112	0.1621	-0.6927*
AGRIC-3	-0.3309	-0.3011*	-0.1757	0.1552*
EXP-3	0.0856	-0.2712	-0.46377	-0.1782*
DBURDEN-3	-0.3450	-0.1666**	-0.15677	-0.3903*
CONS-4	0.0119	-0.0908	0.1856	-0.3268*
AGRIC-4	-0.7060	0.1926	-0.0097	-0.01991.
EXP-4	0.2967	-0.5180	-0.0897	-0.0131*
DBURDEN-4	-0.2315	-0.0264**	-0.0518	-0.4028*

Portmanteau Test *p-value = 0.2945*
ARCH (multivariate) *p-value = 0.9869*
JB-Test *p-value = 0.5435*

Where ECT refers to the long term significance and ** Significant at the 1 percent level
* Significant at the 5 percent level . Significant at the 10 percent level

From this we see that agricultural output and consumer debt burden have a long term causal relationships in equations 1, 2 and 3 (consumption, agricultural output and net exports) as their ECT terms are statistically significant. On the focus of consumer debt burden, we see that at the 10% significance level the second lag of consumer debt burden causes consumption and at the 5% level of significance the third and fourth lag of consumer debt burden cause debt burden itself while the first lag of consumer debt burden causes net exports. At the 1% level of significance all the four lags of consumer debt burden significantly explain variations in agricultural output. This model also tells us that at the 5% level there is indeed bi-directional causality between consumer debt burden and agricultural output.

From the extracted summary (general) results in (Appendix: D) this model shows that consumer debt burden granger causes both agricultural output and consumption.
One thing to also note is that consumer debt burden negatively affects these variables i.e., a rise in consumer debt burden will cause these variables in the short run to fall and since its ECT terms are also significant its will cause the variables to also decline in the long run. This can help explain the fact that rises in consumer debt burden precedes economic slowdowns as it causes these drivers of GDP (consumption & agricultural output) to decrease. This is consistent with McNamee & Melcher's (1997) proposition that rising levels of consumer debt worsen economic performances as principal and interest payment costs reduce other expenditures which in turn weakens consumer spending impeding economic growth.

For the robustness of our model (Diagnostic tests), the Portmanteau test tells us that there is no serial correlation. The heteroscedasticity test tells us that our model has no ARCH effects and the Jarque Bera test shows us that the residuals are normally distributed. I also found that this model is the most stable given its CUSUM test for stability (See Appendix: E).

4.3.2.1. Impulse Response Function

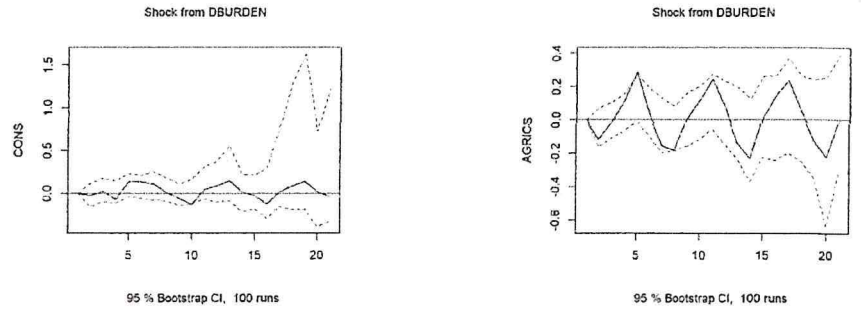

Figure 2: Impulse Response Functions.

Just like in the first model, the impulse response functions show us how the two variables, consumption and agricultural output, evolved given shocks from consumer debt burden. We see that at first an increase in debt burden causes both consumption and agricultural output to reduce slightly then increase, but as debt burden continues to increase, consumption and agricultural output eventually decline but then increase. Just like in the first model, we see that consumer debt burden helps us explain variations in economic growth through a third variable (consumption & agricultural output).

4.3.2.2. Variance Decomposition

The variance decomposition (See Appendix: A) tells us that as time passes consumer debt burden begins to influence economic growth in a more significant amount and vice versa.

Chapter 5: Conclusion

The above analysis shows us that indeed there is a relationship between consumer debt burden and economic growth in the Kenyan economy. However, we note that consumer debt burden affects economic growth through third variables (consumption & agricultural output). We also note that consumer debt burden calculated with regard to stock market income gives the most useful (significant) results. As this burden might not directly explain economic growth as concluded by Garner (1996) it significantly explains the constituents of GDP especially agricultural output, being that it was significant at the 1% level. It also significantly affected consumption which is vital in driving GDP growth. We also see from the sign of the short run coefficients that consumer debt burden negatively influences these drivers of GDP i.e., increases in consumer debt burden would cause both agricultural output and consumption to fall in the short run leading us to conclude that indeed increases in consumer debt burden may precede economic slowdowns.

Further, from the Impulse Response Function, we learn that increases in consumer debt burden are actually responsible for fluctuations in economic growth for we see a cyclical pattern in economic growth as consumer debt burden increases.

This helps us answer the objectives we set to settle. The first being if consumer debt burden explains variations in economic growth (if there is a relationship between the two) and the impulse response function shows us that indeed it plays a part in the cyclical movements of economic growth. These cyclical movements are referred to as debt driven business cycles. The second was if increases consumer debt burden foreshadow economic slowdowns and the negative short run coefficients show that unprecedented increases in consumer debt burden indeed precede economic slowdowns.

5.1. Limitations

One limitation was data availability. The World Bank Repository had data only on a yearly basis and we were not able to take advantage of the high frequency characteristic of data. Also, for the Income associated with stock market there were few gaps in the data which I filled with an average of the two consecutive data points which may not give an accurate representation.

Another factor was that, calculating debt burden with respect to stock market income is limiting as it leaves out a large percentage of the population. This is as only about 17% of the population invests in such markets which leaves out the remaining 73% (NSE, 2019).

5.2. Policy Recommendations

Being that increases in consumer debt burden suggest an oncoming economic slowdown, policy makers should monitor the movements of this indicator and if increases are unprecedented they can do one of two things to lighten the downturn. One, they can either push to increase disposable income by offering tax breaks or they can push banks to allow for rescheduling of loans to lower the burden as people would have more time to repay the loans given their income levels. This might not completely alleviate the economic slowdown but it will lessen the blow.

5.3. Areas of Further Research

Though the findings lead us to conclude that rises in consumer debt burden cause economic slowdowns, it is apparent that the Kenyan private credit market is not mature enough (World Bank, 2019). This is as the use of credit cards is not that integrated into consumer behaviors as it is in other countries and as Garner (1996) had pre-emptied, use of credit cards improve the link between economic growth and consumer debt burden. It would so be of interest to see how the relationship between economic growth and consumer debt burden would evolve if Kenyans adopt the use of credit cards or if this research was done in a country where credit cards are popular. Also, as pointed out by Emmons and Ricketts (2017) there remains poor understanding of the 'tipping points' of consumer debt i.e., at what level does debt become unsustainable?

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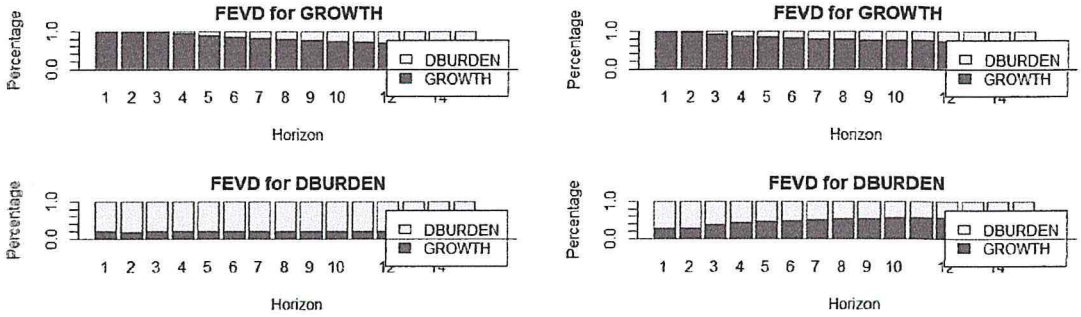
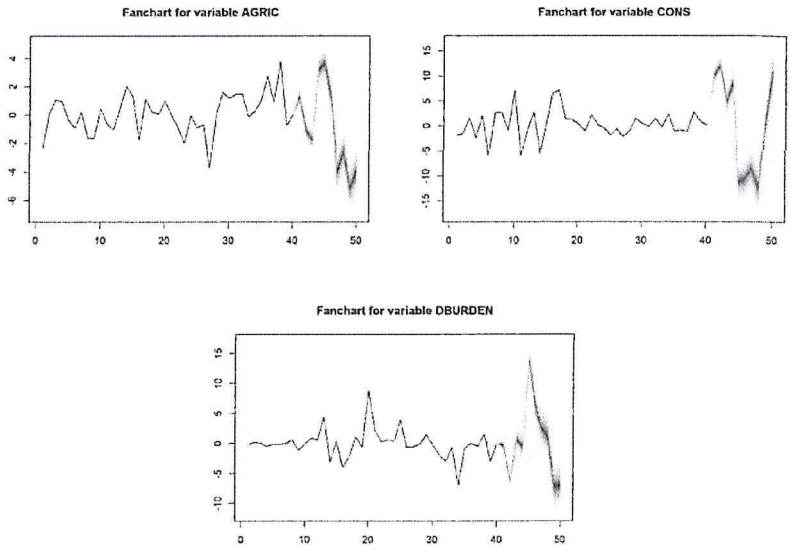
Appendix

Appendix A: Variance Decomposition for Model 1 & Model 2 respectively.



Appendix B: Forecasts of The Variables.



Appendix C: The two way I calculated debt burden with.

Model 1: $$Consumer\ Debt\ Burden = \frac{Aggregate\ Private\ Debt}{Aggregate\ Disposable\ Income}$$

Model 2: $$Consumer\ Debt\ Burden = \frac{Aggregate\ Private\ Debt}{Aggregate\ Stock\ Market\ Income}$$

Appendix D: Extracted granger causality test.

```
$Granger DBURDEN ~ CONS

    Granger causality H0: DBURDEN do not Granger-cause CONS

data:  VECM object MODEL1

F-Test = 0.63624, df1 = 2, df2 = 64, p-value = 0.04326
```

```
$Granger DBURDEN ~ AGRICS

    Granger causality H0: DBURDEN do not Granger-cause AGRICS

data:  VECM object MODEL2

F-Test = 1.6835, df1 = 2, df2 = 64, p-value = 0.01938
```

Appendix E: Test for model stability (Model 2).